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Compiled by  
THOMAS E. BOLTON



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**GEOLOGICAL SURVEY  
PAPER 78-5**

**CANADIAN GEOSCIENCE COUNCIL**

**CURRENT RESEARCH IN THE GEOLOGICAL  
SCIENCES IN CANADA, MAY 1977 - APRIL 1978**

Compiled by  
THOMAS E. BOLTON

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## CURRENT RESEARCH IN THE GEOLOGICAL SCIENCES IN CANADA

May 1977 – April 1978

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### INTRODUCTION

The present publication recording research in progress in Canada from May 1977 to April 1978 is the result of a survey conducted between November, 1977 and February, 1978. The response to this twenty-seventh annual survey by Canadian researchers in the earth sciences was most gratifying; the 1951-52 first survey recorded only 502 research projects underway in Canada.

The research projects listed in this compilation are being undertaken mainly within universities, and federal and provincial departments. Data on industrial research is limited to four oil companies. A relatively complete overview of scientific research activities in the geological and allied science, however, is provided for this period.

Using the data supplied for this compilation by the respondees, some indication as to the lines of research receiving the greatest attention, and conversely the least, can be formulated. At least 544 research projects have not been previously reported. The greatest increase during the 1977-78 period was in the fields of Mineral/Energy Geoscience (80), Paleontology (66), and Geochemistry (53). Research projects undertaken as graduate thesis in the universities during the survey period are so specified wherever possible. Additional details on research in the earth and related sciences underway in Canada during 1977 can be obtained through many of the annual reports prepared by the individual University departments, research councils, and museums. Comprehensive reports on Geophysical research and development in 1977 are contained within the Canadian Geophysical Bulletin Volume 30 published by the Earth Physics Branch of the Department of Energy, Mines and Resources. Summaries of progress and short research reports related to hydrology/water-related environmental research and glaciology are provided annually by the Water Resources Branch of the Department of Fisheries and Environment Canada and the Associate Committee on Hydrology, National Research Council. An in-depth report on 'Soil Science in Canada' forms the major component of "The Geosciences in Canada, 1977" prepared by the Canadian Geoscience Council (Geological Survey of Canada, Paper 78-6, 1978).

Again this year a listing is included of the 1977 awards provided for geological research within the Research Agreements programs of the Departments of Energy, Mines and Resources and Fisheries – Environment Canada, and the Grants in the Natural Sciences Program of the Department of Indian and Northern Affairs. The National Research Council of Canada also provided for publication herein a computer print-out of the operating grants actually awarded in 1977.

#### Use of the compilation

The projects are grouped under main headings that cover the majority of disciplines within the geological and allied sciences. These groupings are unchanged from last year's compilation (Geological Survey of Canada, Paper 77-5, 1977).

A complete list of organizations contributing to the present survey is included. Acknowledgment is made in particular to those who assembled and forwarded the data on research projects underway in the organizations under their direction.



## AREAL MAPPING, 1:50 000 OR LESS

### ALBERTA

1. GODFREY, J.D., Alberta Research Council (Geology Div.):  
Fort Chipewyan District map area, Alberta, 1970-77.
2. GODFREY, J.D., LANGENBERG, C.W., Alberta Research Council (Geology Div.):  
Bocquene Lake, Turtle Lake map areas, Alberta, 1973-78.  
Map compilation, and supporting laboratory studies underway.
3. GODFREY, J.D., LANGENBERG, C.W., PLOUFFE, R.D., Alberta Research Council (Geology Div.):  
Alexander Lake, Wylie Lake map areas, Alberta, 1971-77.  
Map compilation, laboratory studies, and report completed.
4. GODFREY, J.D., LANGENBERG, C.W., PLOUFFE, R.D., Alberta Research Council (Geology Div.):  
Ryan Lake, Fletcher Lake map areas, Alberta, 1972-78.  
Map compilation complete, report preparation underway.
5. GODFREY, J.D., LANGENBERG, C.W., PLOUFFE, R.D., Alberta Research Council (Geology Div.):  
South Fitzgerald, Myers Lake, Daly Lake map areas, Alberta, 1973-78.  
Map compilation, supporting laboratory studies underway.
6. GODFREY, J.D., LANGENBERG, C.W., PLOUFFE, R.D., Alberta Research Council (Geology Div.):  
North Fitzgerald, Tulip Lake, Mercredi Lake map areas, Alberta, 1974-79.  
Map compilation, supporting laboratory studies underway.
7. MORAN, S.R., PROUDFOOT, D.N., MCCORD, B., LECKIE, D., STEEDMAN, R., NOWACK, R., Alberta Research Council (Geology Div.):  
Geology of the Calgary urban areas and environs, Alberta, 1974-78.  
Progress during 1977 included finalizing surface mapping of approximately 1/3 of the area. Stratigraphic studies have advanced with study of numerous outcrops as much as 30 m high along rivers in and just south of the project area. About 50 testholes were drilled to trace and correlate the 5 till units presently recognized in the area.
8. OLLERENSHAW, N.C., Geol. Surv. Can.:  
Geology of the southern Alberta Foothills, Highwood River to Athabasca River, 1970 -.

### BRITISH COLUMBIA

9. GREENWOOD, H.J., BARTHOLOMEW, P.R., Univ. British Columbia (Geological Sciences):  
Geology west of Yale, British Columbia, 1977-78; M.Sc. thesis (Bartholomew).

The geology of an area west of Yale, British Columbia, has been mapped and sampled. The thesis will present the maps and describe the mineralogy, petrology, and geology and make conclusions about the metamorphism, igneous activity, and geologic history of the area.

10. MULLER, J.E., Geol. Surv. Can.:  
Geology of Victoria map-area, Vancouver Island, British Columbia, 1973 -.

#### See:

Evolution of the Pacific Margin, Vancouver Island, and adjacent regions; Can. J. Earth Sci., vol. 14, no. 9, p. 2062-2085, 1977.

11. RICHARDS, T.A., Geol. Surv. Can.:  
Hazelton map-area, British Columbia, 1972-.

#### See:

Geology of the Hazelton (West-half) map-area, British Columbia; Geol. Surv. Can., Paper 78-1A, p. 59-60, 1978.

12. TAYLOR, G.C., Geol. Surv. Can.:  
Operation Liard, British Columbia, 1963-.
13. TAYLOR, G.C., Geol. Surv. Can.:  
Operation Smoky, British Columbia-Alberta, 1968-.
14. TIPPER, H.W., Geol. Surv. Can.:  
Taseko Lakes map-area, British Columbia, 1961-.
15. TIPPER, H.W., Geol. Surv. Can.:  
Smithers map-area, British Columbia, 1969-77.

### MANITOBA

16. BAILES, A.H., Manitoba Geol. Services Br.:  
Geology of the File Lake area, Manitoba, 1970-78.
17. GILBERT, H.P., SYME, E.C., ZWANZIG, H.V., Manitoba Geol. Services Br.:  
Lynn Lake project, 1976-79.

Geological mapping, chemical sampling and gathering of structural and stratigraphic data has been extended to encompass 2500 km<sup>3</sup> of the Lynn Lake volcanic belt. During previous mapping a tentative stratigraphy of the Wasekwan Group was defined with an upper and a lower metavolcanic division and a central metasedimentary division. The present mapping supports the earlier findings that there are extensive lateral variations in the stratigraphic succession. Outlying belts of volcanic and sedimentary rocks and gneisses bear only a broad resemblance to the rocks at the Lynn Lake townsite. Mafic flows and mafic breccias dominate the succession everywhere but intermediate and felsic deposits are concentrated around 3 or 4 centres, namely, Fox Mine, Lynn Lake and Hughes and Barrington Lakes.

18. GILBERT, H.P., ZWANZIG, H.V., SYME, E.C., Manitoba Geol. Services Br.:  
Arbour Lake, Manitoba, 1976-79.

19. HERD, R.K., Geol. Surv. Can.:  
Geology of the Island Lake map-area (53E),  
Manitoba and Ontario, 1974-.

20. JANES, D.A., WEBER, W., Manitoba Geol. Services  
Br.:

Geology of southeast Manitoba, 1974-79.

Geologic mapping of southeast Manitoba has been completed at the 1:50 000 scale and a regional compilation (1:250 000) is in preparation. The area is underlain by a granitoid complex with thin belts of relict epicrustal rocks in the south. North of the Winnipeg River, the epicrustal rocks increase in abundance and become the dominant lithology near the Manigotogan River. Petrologic and chemical studies are in progress.

21. SCOATES, R.F.J., MACEK, J.J., Manitoba Geol.  
Services Br.:

Thompson nickel belt project, Manitoba, 1977-79.

The Thompson nickel belt is a northeast-trending suite of migmatitic gneisses and associated meta-sedimentary, metavolcanic and ultramafic supracrustal rocks, bounded to the southwest by Archean granulite facies rocks of the Pikwitonei region and to the northeast by Aphebian paragneisses of the Churchill Province. The supracrustal rocks bear a strong resemblance to supracrustal rocks of the Fox River belt but are more intensely deformed and more highly metamorphosed than their Fox River equivalents. The project will focus on the nature of the supracrustal rocks and the relationship between the supracrustal rocks and the enclosing migmatitic complex.

22. SCOATES, R.F.J., MACEK, J.J., CORKERY, M.T.,  
Manitoba Geol. Services Br.:

Fox River greenstone belt, northeastern Manitoba,  
1972-78.

The Fox River belt occupies the Churchill-Superior boundary in northeastern Manitoba. Fine-grained, finely laminated sedimentary rocks, komatiitic and theoleiitic volcanic rocks, differentiated intrusions, and a large stratiform ultramafic complex comprise the units of the belt. The units are similar to those associated with the circum-Ungava geosyncline.

23. WEBER, W., SCOATES, R.F.J., HUBREGTSE, J.J.M.W.,  
MACEK, J., CORKERY, M.T., Manitoba Geol.  
Services Br.:

The Western Superior Province in the Split - Sipiwesk - Knee Lakes area and the Churchill-Superior boundary, 1974-79.

Present data suggests a prograde metamorphic gradation from Superior Greenstone Belt terrain into Pikwitonei granulite region and not an unconformity as proposed by Bell in 1971. The western margin of Superior Province was overprinted by the Hudsonian orogeny 1.8 Ga. but shares the earlier history with the Pikwitonei region. The Churchill-Superior boundary is defined as the fundamental and sharp, originally unconformable contact between Archean rocks (typical) of the Superior Province and Aphebian supracrustal rocks of the Churchill Province. Paleohelikian(?) supracrustals overlie Archean near the Churchill-Superior boundary.

## NEW BRUNSWICK

24. FYFFE, L.R., New Brunswick Dep. Nat. Res. (Mineral  
Res. Br.):

Bedrock mapping - west-central New Brunswick,  
1977-78.

### See:

A radiometric age of deformed granitic rocks in north-central New Brunswick; Can. J. Earth Sci., v. 14, no. 7, p. 1687-1689, 1977.

Comparison of same tectonostratigraphic zones in the Appalachians of Newfoundland and New Brunswick: Discussion; Can. J. Earth Sci., v. 14, no. 6, p. 1468-1469, 1977.

To increase the efficiency of exploration in the central folded belt of New Brunswick through the collection, interpretation and publication of basic geological data. Rock units coeval with the ore-bearing rocks of the Bathurst-Newcastle camp extend southwesterly through central New Brunswick to the United States border. The full exploration potential of these rocks has not been realized in the past. One of the important constraints has been the lack of geological control. Accordingly, it is planned to map the area at a scale of 1:1/4 which will provide the necessary structural and stratigraphic detail to permit basic exploration and development decisions. Four geology maps were completed and published during 1976. Reports have been submitted for publication. Twelve map-areas have been surveyed during the 1977 field season. Geophysical surveys were used to aid mapping in areas of poor exposure and to outline the sulphide horizons. Detailed mapping 1976 and 1977 has permitted the establishment of stratigraphic sequences in the Ordovician and Devonian terranes of west-central New Brunswick. Areas of high grade metamorphism have also been outlined. Mapping in central New Brunswick in 1977 indicates large areas previously mapped as paragneiss are actually underlain by felsic volcanic rocks similar to the Bathurst area.

25. SKINNER, R., Geol. Surv. Can.:  
Plaster Rock (east half) map-area, New Brunswick,  
1970-.

26. SKINNER, R., Geol. Surv. Can.:  
Juniper (east half) map-area, New Brunswick,  
1971-.

## NEWFOUNDLAND/LABRADOR

27. BLACKWOOD, R.F., GREENE, B.A., Newfoundland  
Dep. Mines Energy:  
Gander Lake project, Newfoundland, 1976-78.

### See:

Geology of the Hare Bay area, northwestern Bonavista Bay, Newfoundland; Newfoundland Dep. Mines Energy, Rept. 77-1, p. 7-14, 1977.

Geology of the East Half of the Gambo (2D/13) map-area and the northwest portion of the St. Brendans (2L/13) map-area Newfoundland; Newfoundland Dep. Mines Energy, Rept. 77-5, 1977.

The relationship between the Middle Ordovician and younger volcanic and flyschoid rocks of the Botwood Zone and the pre-Middle Ordovician crystalline rocks of the Gander Zone will be investigated. A belt of ultramafic rocks and their significance to the plate tectonic development of the area will be studied. The mineral potential of the project area will be continually evaluated.

28. COLMAN-SADD, S.P., GREENE, B.A., Newfoundland Dep. Mines Energy:

Canada-Newfoundland regional mineral potential evaluation: Project 3:2, regional study of the Bay d'Espoir area, 1974-81.

Gaultois map sheet (1M/12): Mapping completed, report with map (1:50 000) and sections to be published during 1978. Twillick Brook map sheet (2D/4): Mapping in west half almost complete, to be placed on open file, 1978. It is intended to complete mapping of this sheet in 1978 and publish report with map (1:50 000) and section in 1979.

29. HERD, R.K., Geol. Surv. Can.:  
Geology of Red Indian Lake, west half, Newfoundland, 1977-82.

**See:**

Geology of Puddle Pond area, Red Indian Lake map-sheet, Newfoundland; Geol. Surv. Can., Paper 78-1A, p. 195-197, 1978.

30. HIBBARD, J.P., GREENE, B.A., Newfoundland Dep. Mines Energy:

Mapping of the Baie Verte Peninsula, Newfoundland, 1977-82.

**See:**

Geology east of the Baie Verte Lineament; Newfoundland Dep. Mines Energy, Rept. 78-1, 1978.

Comprehensive geological mapping of the Baie Verte Peninsula proceeded in 1977 with coverage of the terrane east of and including the Baie Verte Lineament. The purpose of the project is to remap, compile, and integrate the results of 20 years of previous studies in this area of proven economic importance. Mafic-ultramafic complexes of the Baie Verte Lineament that have been interpreted as dismembered Lower Paleozoic ophiolitic suites are fault bounded to the east by metasedimentary rocks of the Mings Bight Group and mainly mafic and felsic volcanic rocks of the Pacquet Harbour Group. Both of these units have been interpreted as pre-dating local ophiolite complexes. Present mapping has revealed large blocks of ophiolitic lithologies deposited in mafic volcanoclastics of the Pacquet Harbour Group, indicating the group post-dates ophiolite complexes of the Baie Verte Lineament and probably represents island-arc lithologies overlying oceanic crust. Relationship between the Mings Bight and Pacquet Harbour Groups is unexposed in the area, though regional implications infer that it is a major fault. Future mapping will encompass rocks east of the Lineament, the Fleur de Lys Supergroup, that are considered correlative with the Mings Bight Group, and probably of Eocambrian age.

31. HILL, J.D., SMYTH, R., Newfoundland Dep. Mines Energy:

Regional mapping of anorthosite-adamellite igneous suite, Davis Inlet area, Labrador, 1977-82.

Mapping commenced in 1977 on a 5 year DREE program to examine and determine the economic potential of the Helikian anorthosite-adamellite igneous suite in the Davis Inlet-Mistastin Lake area, Labrador. Preliminary mapping revealed the suite consists of at least four intrusive events and one extrusive event. From earliest to latest, the sequence is anorthositic plutons, gabbro/diorite plutons, quartz-feldspar porphyry and felsite, monzonite and finally adamellite. The most felsic adamellites tend to be peralkaline. Fluorine, copper, lead and radioactive mineralization was found associated with the upper contact of the adamellite which is exposed in several areas.

32. HYDE, R.S., GREENE, B.A., Newfoundland Dep. Mines Energy:

Deer Lake mapping project, Newfoundland, 1977-81.

The objective of the first summer's field work was subdivision of the lower Mississippian Anguille Group of the Deer Lake Basin in western Newfoundland and to evaluate its mineral potential. This will continue during the summer of 1978, and a start made on systematic mapping of the Anguille plus the overlying Deer Lake groups.

33. KEAN, B.F., GREENE, B.A., MERCER, N.L., Newfoundland Dep. Mines Energy:

Geological mapping in south-central Newfoundland (Victoria Lake project), 1975-81.

**See:**

Geology of the Victoria Lake map area (12A/6), Newfoundland; Newfoundland Dep. Mines Energy, Rept. 77-4, 1977.

To date the Lake Ambrose sheet (12A/10), Stor Lake east half (12A/11E) and Grand Falls sheets (2D/13) have been mapped and reports are in preparation. Future plans call for the mapping of the Noel Pauls Brook west half (12A/9), the Buchans sheet (12A/15), the Badger sheet (12A/16) and the King George IV Lake sheet (12A/4). A geochronology program has also been initiated in the project area.

34. KNIGHT, T., BOYCE, D., Newfoundland Dep. Mines Energy:

Regional study of the Daniels Harbour area, Newfoundland, 1976-82.

**See:**

Cambro-Ordovician, platformal rocks of the Northern Peninsula, Newfoundland; Newfoundland Dep. Mines Energy, Rept. 77-6, 1977.

Platformal sediments on the Great Northern Peninsula: Stratigraphic studies and geological mapping of the North St. Barbe District; Newfoundland Dep. Mines Energy, Rept. 78-1, 1978.

Recent developments in western Newfoundland Cambro-Ordovician trilobite biostratigraphy; *ibid*, 1978.

Geological 1:50 000 mapping of the Cambro-Ordovician carbonates of the Great Northern Peninsula of Newfoundland to include stratigraphy, macro-and micropalaeontology, mineralization, sedimentology and palaeo-environments.

35. O'BRIEN, S.J., GREENE, B.A., TAYLOR, S.W., Newfoundland Dep. Mines Energy:  
Regional study of Burin-Bonavista belt: Burin sub-project, 1977-82.

**See:**

Geology of the Baine Harbour map-area (1M/7 west-half); Newfoundland Dep. Mines Energy, Rept. 78-1, 1978.

Geology of the Grand Bank and Lamaline map-areas, Newfoundland; Newfoundland Dep. Mines Energy, Rept. 77-7, 1977.

Geology of the Marystown (1M/3) and St. Lawrence (1L/14) map-areas, Newfoundland; Newfoundland Dep. Mines Energy, Rept. 77-8, 1977.

The Burin sub-project was initially established with the aim of assessing the mineral potential of the western Avalon Zone of the Newfoundland Appalachians by delineating the stratigraphy, structure and petrochemical features of the late Proterozoic to mid-Paleozoic volcanic, sedimentary and granitoid rocks of this zone. Prior to the 1978 season mapping and related research had been completed on 4 1/2 1:50 000 N.T.S. sheets in the southern Burin Peninsula. The 1978 season will include regional 1:50 000 scale mapping of the 1M/6 and 1M/7 (E/2) N.T.S. sheets

36. O'DRISCOLL, C.F., HUSSEY, E.M., GREENE, B.A., Newfoundland Dep. Mines Energy:  
Regional study of the Burin - Bonavista belt: Merasheen sub-project, 1976-82.

**See:**

Geology of the Harbour Buffett map-area (1M/9 west half); Newfoundland Dep. Mines Energy, Rept. 78-1, 1978.

Geology of the Sound Island map-area (west half); *ibid.*, 1978.

The Merasheen sub-project is a geological mapping program with the aim of delineating geological relationships in the little known belt of volcanic, sedimentary and intrusive rocks exposed in the western part of the Avalon Zone in Newfoundland. During 1977, work was carried out in the west half of the Sound Island map-area and the west half of the Harbour Buffett map-area.

**NORTHWEST TERRITORIES**

37. BLUSSON, S.L., Geol. Surv. Can.:  
Operation Selwyn, Northwest Territories-Yukon-British Columbia, 1965-.
38. CHRISTIE, R.L., Geol. Surv. Can.:  
Operation Grant Land-northeastern Ellesmere Island and northwestern Greenland, 1963-.

39. COOK, D.G., Geol. Surv. Can.:  
Operation Norman, District of Mackenzie, 1967-.

**See:**

Twitya Uplift: a pre-Delorme phase of the Mackenzie Arch; Geol. Surv. Can., Paper 78-1A, p. 383-388, 1978.

40. EADE, K.E., Geol. Surv. Can.:  
Geology of the Tulemalu Lake map-area, District of Keewatin, 1975-.

41. HENDERSON, J.B., Geol. Surv. Can.:  
Yellowknife and Hearne Lake map-areas, District of Mackenzie, 1970-.

**See:**

Age and origin of the gold-bearing shear zones at Yellowknife, Northwest Territories; Geol. Surv. Can., Paper 78-1A, p. 259-262, 1978.

42. HENDERSON, J.B., Geol. Surv. Can.:  
Keskarrah Bay map-area, District of Mackenzie, 1976-.

43. HENDERSON, J.B., Geol. Surv. Can.:  
Henley Lake map-area, District of Mackenzie NTS 76B, 1977-.

To determine the general structural, metamorphic and age relations of rocks on each side of the Thelon Front, in order to better understand the nature of the boundary between Slave and Churchill Provinces.

44. HEYWOOD, W.W., Geol. Surv. Can.:  
Geology of Amer Lake map-area, District of Keewatin, 1976-.

45. HODGSON, D.A., Geol. Surv. Can.:  
Surficial geology, geomorphology and terrain inventory of the Ringnes and adjacent islands, 1976-.

46. HOFFMAN, P.F., Geol. Surv. Can.:  
Geology of the Athapuscow Aulacogen, east arm of Great Slave Lake, District of Mackenzie, 1976-79.

47. KERR, J.W., Geol. Surv. Can.:  
Southwestern Ellesmere-western Devon Islands (Operation Grinnell), District of Franklin, 1967-.

**See:**

Cornwallis Fold Belt and the mechanism of basement uplift; Can. J. Earth Sci., vol. 14, no. 6, p. 1374-1401, 1977.

An unusual sea stock at high elevation on Northwest Devon Island; Geol. Surv. Can., Paper 77-1C, p. 79, 80, 1977.

48. KERR, J.W., Geol. Surv. Can.:  
Boothia Peninsular and Somerset Island (Operation Boothia), District of Franklin, 1974-.

**See:**

The Somerset Island Formation: an Upper Silurian to ?Lower Devonian intertidal/supratidal succession, Boothia Uplift region, Arctic Canada; Can. J. Earth Sci., vol. 15, no. 2, p. 181-189, 1978.

Frost and glacially deformed bedrock on Somerset Island, Northwest Territories; Geol. Surv. Can., Paper 77-1C, p. 75-77, 1977.

49. THOMAS, R.D., Geol. Surv. Can.:  
Surficial geology, terrain inventory, north-central Keewatin, 1976-.

**See:**

A brief description of the surficial materials of north-central Keewatin, Northwest Territories; Geol. Surv. Can., Paper 77-1B, p. 315-317, 1977.

**NOVA SCOTIA**

50. DONOHUE, H.V. Nova Scotia Dep. Mines:  
Cobequid Highlands survey, 1974-.

**ONTARIO**

51. AMUKUM, S.E., Ontario Geol. Surv.:  
The Geology of Conglomerate Lake area, District of Thunder Bay, Ontario, 1976-77.

The map-area is located between two major exploration areas and contains narrow zones of Cu-Zn-Pb-Silver mineralization. Except for Middle to Late Precambrian (Proterozoic) diabase dikes, the bedrock is entirely of Early Precambrian (Archean) age, and is composed of metavolcanics (55% of map area), metasediments (10 per cent) and intrusive rocks (35 per cent). The belt forms part of the Wabigoon Belt, a major subdivision of the Superior Province of the Canadian Shield. The metavolcanics are predominantly of mafic to intermediate composition with only minor felsic metavolcanics. Carbonation is extensive, appears to be the principal type of alteration, and produces white weathering appearance. The clastic meta-sedimentary unit appears to be locally derived and a typical unit is made up of a clast-supports, polymictic pebble to cobble conglomerate, intercalated with thin beds of feldspathic wacke, arkosic arenite and mudstone. In the area the intrusions are roughly circular and are composed of gabbro-diorite and felsic granitic bodies.

52. AMUKUM, S.E., Ontario Geol. Surv.:  
The Geology of Little Marshall Lake area, District of Thunder Bay, Ontario, 1977-78.

**See:**

Little Marshall Lake area, District of Thunder Bay; Ontario Division of Mines Map P. 1561, 1977.

Rocks of the map-area previously mapped as quartzose metasediments are reinterpreted as a thick volcanic pile. The rocks host 1,441,810 tons of disseminated Cu-Zn-Ag ( $\pm$  Lead and Gold) and minor amounts of Cadmium and Bismuth. Mineralization is probably volcanogenic but structural control is paramount in the exposed mineralization to date.

53. BENNETT, G., Ontario Geol. Surv.:  
Geology of the Jarvis Lake-Garden River area, Ontario, 1974-78.

The map-area lies along the boundary of the Superior and Southern Provinces of the Canadian Shield. The oldest known rocks are Archean metavolcanics and metasediments which are

intruded and surrounded by a variety of felsic to intermediate Archean plutonic rocks. The Archean rocks are unconformably overlain by a thick Huronian (Proterozoic) sequence which in ascending order, consists of: Livingstone Creek, Thessalon, Aweres (probably equivalent to the Ramsay Lake Formation), Mississagi, Bruce, Espanola, Gowganda and Lorrain formations. The Huronian formations generally dip to the southwest and are locally folded about southeast trending fold axes. Northwest and northeast striking faults are important structural features and prevent direct correlation between rocks of the Sault Ste. Marie area and those to the east. Thick sills and dikes of Nipissing diabase intrude all the above formations. Several vein-type deposits of galena, sphalerite and chalcopryrite occur in both the volcanic and plutonic Archean rocks.

54. BLACKBURN, C.E., Ontario Geol. Surv.:  
Boyer-Meggisi Lakes area, District of Kenora, Ontario, 1974-77.

55. BLACKBURN, C.E., Ontario Geol. Surv.:  
Synoptic geology, Manitou Lakes, Kenora District, Ontario, 1976-78

- 56.. CARTER, M.W., Ontario Geol. Surv.:  
Greenwich Lake area, Thunder Bay District, Ontario, 1977-78.

**See:**

Ontario Division of Mines, M.P. 75, 1977.

57. DRESSLER, B., Ontario Geol. Surv.:  
Wanapitei Lake area, District of Sudbury, Ontario, 1977-79.

In 1977 Aylmer and Ruthbun Townships, north and east of Lake Wanapitei, were mapped.

58. GRUNSKY, E.C., Ontario Geol. Surv.:  
The Geology of the Cowie Lake area, District of Algoma, Ontario, 1977-78.

**See:**

Cowie Lake Area, District of Algoma; Ontario Division of Mines, M.P. 75; Prel. Map P1562, 1977.

Rocks of the Cowie Lake area, previously grouped with mafic to intermediate metavolcanics have been reclassified as felsic to intermediate metavolcanics with a significant amount of felsic pyroclastic rocks. Part of the area may be close to a felsic volcanic centre. An outlier of Huronian Gowganda Conglomerate has been discovered.

59. MACKASEY, W.O., Ontario Geol. Surv.:  
Stratigraphy and structure of the Sturgeon River area, District of Thunder Bay, Ontario, 1976-79.

**See:**

Ontario Division of Mines, M.P. 75, 1977.

60. MOORE, J.M., Jr., MORTON, R.L., Carleton Univ. (Geology):  
Geology of the Clarendon Lake area, Ontario, 1975-78.

Remapping of an area mainly in Barrie Township, at 2 in. = 1 mi. primarily to establish volcanic stratigraphy and reassess the setting of numerous mineral occurrences

61. MUIR, T.L., Ontario Geol. Surv.:  
Heron Bay area, Ontario, 1977-78.
62. PIRIE, J., Ontario Geol. Surv.:  
Geology of Balmer, Bateman, McDonough and Graves Townships, District of Kenora, Ontario, 1976-78.
- See:**  
McDonough, Graves Townships, District of Kenora; Ontario Division of Mines, Prel. Maps P1239, P1240, 1977.  
Detailed mapping of the four townships has been completed.
63. PIRIE, J., Ontario Geol. Surv.:  
Geology of Byshe, Heyson, Ranger and Willans Townships, Red Lake area, Ontario, 1978-80.  
To complete detailed mapping of this portion of Red Lake metavolcanic-metasedimentary belt in order to provide data for a final compilation of the belt as a whole.
64. PYKE, D.R., Ontario Geol. Surv.:  
Geology of Timmins area; Geology of the Watabeag River area; Geology of Radisson Lake area; Geology of Sinclair Lake area, Ontario, 1973-80.
65. ROBERTSON, J.A., Ontario Geol. Surv.:  
Geology of the Cutler area, District of Algoma, Ontario, 1977.
- See:**  
Geology of the Cutler area, District of Algoma; Ontario Division of Mines, G.R. 147, 1977.
66. ROBERTSON, J.A., Ontario Geol. Surv.:  
Geology of the Flack Lake area, District of Algoma, Ontario, 1977.
67. SIRAGUSA, G.M., Ontario Geol. Surv.:  
Geology of the Cunningham-Garnet area, Ontario, 1977-79.
68. TELFORD, P.G., Ontario Geol. Surv.:  
Paleozoic geology of southern Ontario, 1973-.
- See:**  
Lower-Middle Devonian conodont biostratigraphy and paleoecology, Niagara Peninsula, Ontario; ROM Life Sci. Occ. Paper, no. 30, 1977.  
Silurian conodonts from the Bruce Peninsula, Ontario and their use in local correlation; Geol. Soc. Am., Abstracts with programs, vol. 9, no. 5, p. 658-659, 1977.
69. VEILLETTE, J.J., Geol. Surv. Can.:  
Geologie du Quaternaire, region de l'Outaouais superieur, 1977-.
70. WALLACE, H., Ontario Geol. Surv.:  
Geology of the Slate Falls area, Ontario, 1977-78.  
Mapping in the Bamaji-Fry Lakes area of the Uchi Subprovince is being conducted on a scale of 1:15 840. Preparation of maps and geological reports emphasizing the stratigraphic and structural relationships within the predominantly metavolcanic sequence is in progress. Several types of mineral deposits, notably uranium, molybdenum-copper and gold-silver, are being examined with special emphasis on disseminated molybdenite and chalcopyrite mineralization in a subvolcanic trondhjemite body around Slate Falls.
71. WOLFF, J.M., Ontario Geol. Surv.:  
1/4 mile to 1 inch mapping of the Kaladar area, eastern Ontario, 1977-78.,
- QUEBEC**
72. ALLARD, G.O., LACOSTE, P., Québec Min. Richesses Naturelles:  
Prolongement de la ceinture verte de Chibougamau dans la province de Grenville, Québec, 1977-.
73. BOUDREAULT, A.P., Québec Min. Richesses Naturelles:  
Géologie de la demie est du Canton de Blaiklock, Québec, 1977-78.
74. CHEVE, S., Québec Min. Richesses Naturelles:  
Géologie de la région de Woburn, Comté de Mégantic-Compton, Québec, 1974-79.
75. CLARK, T., Québec Min. Richesses Naturelles:  
Project fosse du Labrador - région du Lac Herodier, Limestone Falls (moite est), Lac Souel, Manitou Gorge (en partie), territoire du Nouveau-Québec, Québec (1:50 000), 1976-.
- Voir:**  
Forbes Lake area: Prel. report; Québec Min. Richesses Naturelles, DPV-452, 1977.
76. GERMAIN, M., Québec Min. Richesses Naturelles:  
Est et demie ouest du Canton de Courville, Québec, 1977-.
77. HEBERT, C., Québec Min. Richesses Naturelles:  
Géologie de la demie sud du Canton de Fancamp, Québec, 1977-78.  
Cartographie géologique détaillée d'une zone aurifère au sud de Chibougamau.
78. LACHANCE, S., Québec Min. Richesses Naturelles:  
Géologie de la région de St-André-de-Restigouche, Québec, 1974-79.
79. SHARMA, K.N.M., Québec Min. Richesses Naturelles:  
Région de la Grande Rivière, territoire du Nouveau-Québec, Québec (1:50 000), 1973-78.
- Voir:**  
La Grande Rivière area, New Quebec Territory: Prel. report; Québec Min. Richesses Naturelles, DPV-493, 1977.
- SASKATCHEWAN**
80. DAVISON, W.L., Geol. Surv. Can.:  
Milliken Lake-Goldfields mining area, Saskatchewan, 1975-.

**YUKON TERRITORY**

81. BLUSSON, S.L., Geol. Surv. Can.:  
Operation Stewart, Yukon-District of Mackenzie, 1968-.
82. CAMPBELL, R.B., Geol. Surv. Can.:  
Operation Mount St. Elias, Yukon-British Columbia, 1973-.
- See:**  
Operation Saint Elias, Yukon Territory; Geol. Surv. Can., Paper 78-1A, p. 35-41, 1978.
83. KLASSEN, R.W., Geol. Surv. Can.:  
Surficial geology and terrain evaluation, southern Yukon, 1977-.
- See:**  
Geol. Surv. Can., Paper 78-1A, p. 465, 1978.

84. NORRIS, D.K., Geol. Surv. Can.:  
Operation Porcupine, Yukon-District of Mackenzie, 1961-.
85. TEMPELMAN-KLUIT, D.J., Geol. Surv. Can.:  
Operation Snag-Yukon, 1970-.
- See:**  
Lherzolite nodules from a Pleistocene cinder cone in central Yukon; Can. J. Earth Sci., vol. 15, no. 2, p. 220-226, 1978.  
Uranium in Nisling Range Alaskite and related rocks of Yukon crystalline terrane; Geol. Surv. Can., Paper 77-1C, p. 89-94, 1977; Paper 78-1B, p. 556, 1978.

**AREAL MAPPING, GREATER THAN 1:50 000**

**BRITISH COLUMBIA**

86. GABRIELSE, H., Geol. Surv. Can.:  
Operation Finlay, British Columbia, 1970-.
87. GABRIELSE, H., Geol. Surv. Can.:  
Operation Dease, British Columbia, 1977-.
- See:**  
Operation Dease; Geol. Surv. Can., Paper 78-1A, p. 1-4, 1978.  
Structure style in northeast Cry Lake map-area, north-central British Columbia; *ibid.*, p. 33, 34, 1978.
88. MULLER, J.E., Geol. Surv. Can.:  
Geology of northern Vancouver Island, British Columbia, 1968-.
89. RODDICK, J.A., Geol. Surv. Can.:  
Coast mountains project, British Columbia, 1963-.
90. SOUTHER, J.G., Geol. Surv. Can.:  
Cordilleran volcanic project, British Columbia-Yukon, 1970-.
91. WOODSWORTH, G.J., Geol. Surv. Can.:  
Kemano project, British Columbia, 1977-.
- See:**  
Eastern margin of the Coast Plutonic Complex in Whitesail Lake map-area, British Columbia; Geol. Surv. Can., Paper 78-1A, p. 71-75, 1978.

**MANITOBA**

92. DAVISON, W.L., Geol. Surv. Can.:  
Geology of the Seal River map-area, Manitoba, 1968-.
93. DAVISON, W.L., Geol. Surv. Can.:  
Geology of Southern Indian Lake, Manitoba, 1968-.

94. McRITCHIE, W.D., ZWANZIG, H.V., BAILES, A.H., SCHLEDEWITZ, D.C.P., SYME, E.C., GILBERT, H.P., LENTON, P., Manitoba Geol. Services Br.:  
Lithostructural and stratigraphic belt delineation in the Churchill structural province of Manitoba, 1971-.
- Mapping coverage has now been secured for almost the entire Churchill structural province in Manitoba. A preliminary compilation sketch at approx. 1:1 000 000 has been prepared as a basis for the final 1:1 000 000 map intended for the near future. Seven major domains have been delineated and are named informally Flin Flon-Snow Lake, Kisseynew, Lynn Lake, Reindeer-Southern Indian, Chipewyan, Seal River and Nejanilini domains, respectively, from south to north. The Kisseynew, Reindeer-Southern Indian Lake, and Seal River belts comprise highly metamorphosed metasedimentary greywacke and shale-derived gneisses and migmatites with conformably overlying arkosic gneisses. The Flin Flon and Lynn Lake greenstone-granite diapir belts contain scattered relicts of unconformably overlying arkosic gneisses. The Chipewyan and Nejanilini domains are of batholithic dimensions and comprise granite and pyroxene granulite, the latter of possible Archean age. A similar lithologic association and sequence in the sedimentary belts may imply a similar or shared evolutionary pattern for these belts which appear to be structurally preserved keels of a single original Aphebian basinal complex, situated to the south and east of the main Hudsonian mobile belt in Saskatchewan.
95. SCHLEDEWITZ, D.C.P., Manitoba Geol. Services Br.:  
Nejanilini-Caribou Lakes project, Manitoba, 1977-79.
- Compare the geology of this region with areas of the west and south to define a unified geologic base and provide a broad geological overview, specifically for evaluation of uranium potential.

**NEWFOUNDLAND/LABRADOR**

96. CHERRY, M.E., Newfoundland Dep. Mines Energy:  
Regional geological mapping in the Grenville Province, southeastern Labrador, 1977-81.

To assess the mineral potential and produce geological maps of the Grenville Province in southeastern Labrador.

97. KNIGHT, I., FONG, C.C., Newfoundland Dep. Mines Energy:  
Regional mapping, stratigraphy, sedimentation structure and mineralization of the Bay St. George Carboniferous, 1974-78.

98. RIVERS, T., SMYTH, W.R., Newfoundland Dep. Mines Energy:  
Geological mapping in southwestern Labrador.

99. RYAN, A.B., SMYTH, W.R., HARRIS, A., Newfoundland Dep. Mines Energy:  
Regional geology, stratigraphy and mineral potential evaluation in the Central Mineral Belt of Labrador, Newfoundland, 1974-78.

**See:**

Archean-Proterozoic geology of the Kanairiktok-Kaipokok River valleys (NTS 13K/10), Labrador; Newfoundland Dep. Mines Energy, Rept. 77-1, p. 63-70, 1977.

Geologic setting of the Moran Lake uranium showings, Central Mineral Belt, Labrador; *ibid.*, p. 57-62, 1977.

The 1978 field season should see the completion of regional mapping of six 1:50 000 NTS sheets (13K, 2, 3, 6, 7, 9, 10) covering the distribution of the Moran and Bruce River Groups in the Central Mineral Belt. Certain parts of the belt which have economic and stratigraphic importance will be studied in detail.

100. SMYTH, W.R., Newfoundland Dep. Mines Energy:  
Regional geology and metallogeny of the Aphebian sequences of central and northern Labrador, 1974-82.

Completed geological mapping of the Moran and Bruce River Groups and extended mapping into the Ailhk Group. To establish stratigraphic correlations and to place the known mineral occurrences in the stratigraphic sequences. Studies will be supplemented by radiometric dating.

101. WARDLE, R.J., SMYTH, R., Newfoundland Dep. Mines Energy:  
Eastern margin of the Labrador Trough: stratigraphy, structure and mineral potential evaluation, 1976-78.

Completion of mapping in the Andre Lake area 23I/12 (1:50 000), Wade Lake and Timmins Lake (23I/5, 23I/4, 1:100 000 scale) areas. Work in progress on the Hollinger Lake (23J/16) sheet and will proceed this coming field season with work in parts of the Knob Lake (23J/15), Tait Lake (23O/2) and Bacchus Lake (23O/2) areas.

**NORTHWEST TERRITORIES**

102. CAMPBELL, F.H.A., Geol. Surv. Can.:  
Geology of the Bathurst Inlet area, District of Mackenzie, 1974-.

103. CLAGUE, J.J., Geol. Surv. Can.:  
Surficial geology Bear-Slave Province, District of Mackenzie, 1977-.

104. EADE, K.E., Geol. Surv. Can.:  
Gibson-MacQuoid Lakes map-area, Northwest Territories, 1972-.

105. FRISCH, T., Geol. Surv. Can.:  
Reconnaissance mapping of the Precambrian geology of southeastern Ellesmere and eastern Devon Islands, District of Franklin, 1976-.

**See:**

Reconnaissance geology of the Precambrian Shield on Ellesmere and Cobourg Islands, Canadian Arctic Archipelago; Geol. Surv. Can., Paper 78-1A, p. 135-138, 1978.

106. FRITH, R.A., Geol. Surv. Can.:  
Indin Lake map-area, District of Mackenzie, 1972-.

**See:**

The geochronology of the granitic rocks along the Bear-Slave structure province boundary, northwest Canadian Shield; Can. J. Earth Sci., vol. 14, no. 6, p. 1356-1373, 1977.

107. FRITH, R.A., Geol. Surv. Can.:  
Geology of the Hackett River-Back River area, District of Mackenzie, 1975-.

108. HEYWOOD, W.W., Geol. Surv. Can.:  
Operation northern Melville Peninsula, District of Franklin, 1970-.

109. HOFFMAN, P.F., Geol. Surv. Can.:  
Sloan River map-area, District of Mackenzie, 1973-.

110. JACKSON, G.D., Geol. Surv. Can.:  
Operation Bylot, District of Franklin, 1967-.

111. JACKSON, G.D., Geol. Surv. Can.:  
Operation Penny Highlands, District of Franklin, 1969-.

112. LECHEMINANT, A.N., Geol. Surv. Can.:  
MacQuoid Lake (W 1/2) and Thirty Mile Lake (E 1/2) map-area, District of Keewatin, 1975-.

113. McGLYNN, J.C., Geol. Surv. Can.:  
Calder River map-area, District of Mackenzie, 1973-.

114. MORGAN, W.C., Geol. Surv. Can.:  
Geology of the Foxe Fold belt, Baffin Island, District of Franklin, 1974-.

115. PETRYK, A.A., Québec Min. Richesses Naturelles (Énergie):  
Stratigraphy and paleogeography, northeasternmost Sverdrup Basin, 1976-.  
Mesozoic and Tertiary rocks at Lake Hazen, Ellesmere Island, new biochronological and stratigraphic interpretations.
116. THORSTEINSSON, R., Geol. Surv. Can.:  
Cornwallis and adjacent smaller islands, District of Franklin, 1965-.
- ONTARIO**
117. BLACKBURN, C.E., BEARD, R.C., Ontario Geol. Surv.:  
Kenora-Fort Frances compilation map, first revision, 1973-78.
118. BREAKS, F.W., BOND, W.D., Ontario Geol. Surv.:  
Geology of the English River Subprovince, northwestern Ontario, 1974-79.  
**See:**  
Ontario Division of Mines, M.P. 75, 1977.  
Helicopter-supported reconnaissance mapping (1:63 360) of the English River Subprovince between longitude 89°00' and Manitoba-Ontario interprovincial boundary was completed during 1977. The Marchington Lake area, in vicinity of Sioux Lookout, marked the final field mapping phase of this reconnaissance program that commenced in 1974. Future emphasis will be placed upon geochronology, petrochemistry, metamorphism, and metallogenic studies.
119. CARD, K.D., Geol. Surv. Can.:  
Regional geological synthesis, central Superior Province, Ontario and Quebec, 1977-.
120. LUMBERS, S.B., Royal Ontario Mus. (Mineralogy and Geology):  
Geology of the Pembroke and Renfrew areas, Ontario, 1977-79.  
**See:**  
Pembroke and Renfrew areas, District of Nipissing and Counties of Renfrew, Frontenac, Lanark, Lennox and Addington; Ontario Geol. Surv., Misc. Paper 75, p. 126-129, 1977.
121. PYKE, D.R., JENSEN, L.S., Ontario Geol. Surv.:  
Regional stratigraphy at the Timmins-Kirkland Lake area, Ontario, 1975-80.
122. ROBERTSON, J.A., GIBLIN, P., LEAHY, E., Ontario Geol. Surv.:  
Compilation map, Sault Ste. Marie-Elliot Lake area, Ontario, 1977.  
Map shows stratigraphy, structure and economic geology of the Elliot Lake area including surface projection of U-mineralization established by drill holes.
123. SPRINGER, J.S., Ontario Geol. Surv.:  
Ontario mineral potential 1:250 000, 1975-78.  
Map sheets to 86°W in press, sheets 86°W and 92°W Manitoba boundary due for completion by May 1978.
124. THEMISTOCLEOUS, S.G., Ontario Geol. Surv.:  
Clontarf area, Renfrew county, Ontario, 1977-78.  
Most of the rocks in the area are of Late Precambrian age but diabase of younger age and Paleozoic limestone are also present. Outcrop is generally poor, less than 20 per cent, due to Pleistocene deposits of clay, sand and gravel. Metasediments and a variety of igneous rocks underlie most of the area. The oldest rocks are coarsely recrystallized arkosic metasandstone, metagreywacke, biotite-hornblende-feldspar gneiss and marble. Large masses of quartz-monzonite, syenite and gabbro intrude these rocks. Several outliers of Ordovician limestone unconformably overlie the Precambrian rocks. The metasediments were complexly folded about a north-south trending axis. Fold plunges are generally southeast to south. The principal faults belong to the Ottawa Bonnechere Graben System, trending east to south-east. The mineral assemblages of the Precambrian rocks are indicative of upper almandine-amphibolite facies temperature and pressure metamorphic conditions.
125. WOOD, J., Ontario Geol. Surv.:  
Geology of the Mine Centre area, Ontario, 1976-78.  
**See:**  
Mine Centre area, District of Rainy River; Ontario Division Mines, M.P. 75, p. 51-52, 1977.  
The Mine Centre area straddles the Wabigoon/Quetico subprovincial boundary and can be subdivided into three domains separated from each other by faults. The northern gneissic domain is separated for a low-grade domain of meta-volcanics ("Keewatin"-Lawson 1913), anorthositic and gabbroic intrusions, and unconformably overlying metasediments ("Seine Series") by the Quetico Fault. This fault is not considered to be the subprovincial boundary but rather the fault that separates the Quetico metasediments ("Coutchicing") from the "Seine metasediments and "Keewatin" metavolcanics. There is no evidence to suggest that the Quetico metasediments are older than the Wabigoon metavolcanics.
- QUEBEC**
126. BOURNE, J.H., Geol. Surv. Can.:  
Operation Olomane, Québec, 1976-.  
**See:**  
Portions of the Natashquan, Musquaro and Harrington Harbour map-sheets, eastern Grenville Province, Quebec - a preliminary report; Geol. Surv. Can., Paper 78-1A, p. 413-418, 1978.
127. PETRYK, A.A., Québec Min. Richesses Naturelles (Énergie):  
Géologie et exploration pétrolière, Bassin d'Anticosti 1975-.  
**Voir:**  
Géologie et exploration pétrolière, île d'Anticosti, Québec: Reconnaissance préliminaire; Québec Min. Richesses Naturelles, (Direction générale de l'énergie), Rapport DPV 505, 1977.

Stratigraphie des formations de siluriennes (Gun River, Jupiter, Chicotte) et ordoviennes supérieures (Vauréal supérieur et Ellis Bay) dans partie est d'Anticosti; descriptions lithologiques qui complètent la colonne stratigraphique dans rapport DPV 505; carte géologique, 1:100 000, disponible en 1978.

128. TAYLOR, F.C., Geol. Surv. Can.:  
Operation Torngat, Quebec and Newfoundland, 1966-.

129. TAYLOR, F.C., Geol. Surv. Can.:  
Operation Nuvilik, Québec, 1972-.

#### SASKATCHEWAN

130. FORSYTHE, L.H., Sask. Geol. Surv.:  
Reconnaissance geology: The area around Middleton Lake, Geikie River area (part of NTS area 74H), 1977-78.

1:100 000 scale reconnaissance geological mapping coverage, northern Saskatchewan, along the southeastern margin of the Athabasca Formation. Metasediments and granites of the central core of the Wollaston Fold Belt underlie the main part of the area.

131. FUH, Tsu-Min, Sask. Geol. Surv.:  
Geological mapping Pagato River area (NTS area 63M-16), 1977-78.

1:63 360 scale bedrock geological mapping in the Loon Lake area, Saskatchewan. The area is wholly underlain by pelitic to semi-pelitic and hornblende gneisses of the Kiseynew domain as well as granitic bodies and migmatites of probable anatectic origin.

132. GILBOY, C.F., Sask. Geol. Surv.:  
Reconnaissance geology: Cree Lake (South) area (part of NTS area 74G), 1977-78.

1:100 000 scale bedrock reconnaissance geological mapping in northern Saskatchewan. The area covers much of the northern margin of the Mudjatik mobile domain adjacent to the Athabasca Formation.

133. JOHNSTON, W.G.Q., Sask. Geol. Surv.:  
Geological mapping, Royal Lake (West) area (NTS area 64D-3W), 1977-78.

This bedrock geological mapping at 1:63 360 scale almost completes the primary coverage of the Tabernor Belt running immediately west of the Reindeer River.

134. LEWRY, J.F., ROBERTS, K., REES, C., THOMAS, D., Sask. Geol. Surv. - Univ. Regina (Geological Sciences):

Reconnaissance geology, Compulsion Bay area, Wollaston Lake (part of NTS area 64E-NW), 1977-78; M.Sc. theses (Roberts, Rees), B.Sc. (Thomas).

1:100 000 scale bedrock reconnaissance geological mapping in northern Saskatchewan. The main part of the area is underlain by metasediments of the Wollaston Group and an extension of the Johnson River granitic inlier.

135. MacDONALD, R., Sask. Geol. Surv.:  
Compilation geology: Pelican Narrows (63M) and Amisk Lake (63L) area, 1975-78.

Observations were made in the 1977 summer mainly west of Pelican Narrows through to Jan Lake with view to establishing some rudimentary lithostratigraphic relationships, connecting with work carried out in 1976 in the Limestone-Tulabi Lakes area. Future 1:250 000 mapping in the Laird Lake area.

136. PATERSON, D.F., KENDALL, A.C., CHRISTOPHER, J.E., Sask. Geol. Surv.:

Phanerozoic geology of the La Loche area, Saskatchewan, 1975-77.

Maps completed, text near completion.

137. RAY, G.E., Sask. Geol. Surv.:  
Compilation geology: Foster Lake area (74A), including reconnaissance geological mapping of the Daly Lake (West) and part of the Middle Foster Lake areas, 1977-78.

A one-year project to include office compilation, field checking and conciliation, as well as some fill-in reconnaissance mapping, and a coloured geological map with marginal notes and bibliographic reference list.

138. SCOTT, B.P., Sask. Geol. Surv.:  
Reconnaissance geology: Upper Clearwater River area (part of NTS area 74F), 1977-78.

1:100 000 scale bedrock reconnaissance geological mapping in northern Saskatchewan. The area lies immediately west of the Virgin River shear zone in a presumed cratonic Archean domain. Blue quartz gneisses and other granulite facies rocks are common in the area, which is bounded to the north by the Athabasca Formation and to the southwest by the Cree Lake Moraine and Phanerozoic rocks.

139. STAUFFER, M.R., FUMERTON, S.L., LANGFORD, F.F., MOSSMAN, D.J., Sask. Geol. Surv. - Univ. Saskatchewan (Geology):

Reconnaissance geology: Ballentin Island vicinity, Reindeer Lake (part of NTS area 64E-NE), 1977-78; Ph.D. thesis (Fumerton).

1:100 000 scale bedrock reconnaissance geological mapping in northern Saskatchewan. The area covers the northern part of Reindeer Lake adjacent to the Manitoba border and comprises mainly granitic rocks including extensions of the Wathaman - Chipewyan Batholith, the "Northern Intrusive Complex" and a small part of the Wollaston Group.

140. COAKLEY, J.P., Fisheries-Environment Canada (CCIW):  
Distribution of tar balls on Bahamian beaches, 1976-77.
- See:**  
Shore and Beach, v. 45, no. 2, p. 30-35, 1977.
141. DELL, C.I., BOOTH, W., Fisheries-Environment Canada (CCIW):  
Weathering of geological materials and characterization of anthropogenic constituents in lakes, 1976-78.  
To determine (a) the rates, transformations and processes related to the weathering of geologic materials in lake basins, and (b) the mineralogy, chemistry, distribution, and sources of macroscopic anthropogenic materials in Great Lakes sediments. Work during the past year has consisted of size analysis, size fractionation and X-ray diffraction analysis of shoreline bluff materials and lake sediments, and microscopic and microprobe analyses of anthropogenic particles. All sample materials have been collected and laboratory work was completed during 1977-78.
142. DELORME, L.D., ZOLTAI, S.C., KALAS, L.L., Fisheries-Environment Canada (CCIW):  
Paleoclimate of northwestern Canada between 14400 and 6800 years B.P., 1976-77.
- See:**  
Freshwater shelled invertebrate indicators of paleoclimate in northwestern Canada during late glacial times; Can. J. Earth Sci., v. 14, no. 9, p. 2029-2046, 1977.
143. DUBOIS, J.M.M., Univ. Sherbrooke (Géographie):  
Hydromorphologie des rivières à Saumon: rivières Matamek et Moisie, Côte-Nord du Saint-Laurent, Québec, 1975-77.
144. DUBOIS, J.M.M., Univ. Sherbrooke (Géographie):  
Télé-détection de l'hydromorphologie et du potentiel de frayères à saumon de la rivière Saint-Jean en Gaspésie, Québec, 1977.
145. EGGINTON, P.A., Geol. Surv. Can.:  
Periglacial processes and slope movement, central District of Keewatin, 1977-  
To determine the rates of slope mass movement, the processes involved in mudboil development and their rate of development, and relate slope movement to mudboil development and morphology within the proposed Polar Gas pipeline route.
146. FRENCH, H.M., Univ. Ottawa (Geology-Geography):  
Terrain sensitivity and terrain disturbance studies, Canadian Arctic, 1977-79.  
To undertake survey of old oil and gas exploration sites in Arctic Canada and to document the degree of terrain disturbance; to monitor the thermal regimes and terrain disturbance associated with sump construction, operation and restoration at Arctic well sites; to document the permafrost and terrain conditions at selected Arctic well sites; to advise the Land Use Section, Indian Affairs and Northern Development, upon the effectiveness of current Arctic Land Use regulations as they relate to oil and gas exploration; and to carry out "ground-truth" evaluation of permafrost terrain sensitivity maps of Banks and Melville Islands, Northwest Territories.
147. GLOOSCHENKO, W.A., SAMPSON, R.J.C., CAPOBIANCO, J.A., MAYER, T., GREGORY, M., MARTINI, I.P., Fisheries-Environment Canada (CCIW):  
The sensitivity of coastal wetlands in the Hudson Bay Lowlands in respect to future possible development, 1976-  
**See:**  
Above-ground biomass of vascular plants in a subarctic James Bay salt marsh; Can. Field-Nat., v. 92, no. 1, p. 30-37, 1978.  
The study will investigate the ecology of coastal areas by: investigating the major physico chemical factors of soils and sediments influencing the species composition, biomass, and productivity of coastal vegetation with emphasis upon salt marsh communities; determining both the qualitative and quantitative distribution of coastal vegetation in terms of species composition and biomass, with particular emphasis upon species important to wildlife; studying major geochemical cycles in such environment; and developing a predictive model to determine the possible effect of environmental perturbations upon coastal ecology. During 1977, the first three projects were carried out in the southern portion of James Bay in addition to a reconnaissance coastal survey of coastal ecosystems from Moosonee to north of Fort Severn. This year's program will emphasize the region from the Albany River to Cape Henrietta Maria.
148. GORMAN, W.A., BOWLBY, J.R., JOHNSTON, L.M., FRAPE, S.K., CREASY, D.E.J., Queen's Univ. (Geology):  
Geological studies of Recent deposits of the Kingston area, 1963-; Ph.D. theses (Bowlby, Johnston, Frappe), M.Sc. thesis (Creasy).
149. JACKSON, L.E., Geol. Surv. Can.:  
Environmental assessment of coal resource development, Canadian Cordillera, 1977-.
150. KAMENKA, L.A., RUTTER, N.W., Univ. Alberta (Geology):  
Rates of weathering of spoil piles from open pit mines in the Rocky Mountains of Alberta from field observation and a laboratory experimental system, 1978-79; M.Sc. thesis (Kamenka).  
To determine rates at which rocks weather, to set up a laboratory procedure which could best duplicate natural weathering processes, but at an accelerated rate. This data if correlated to natural rates of weathering i.e., one week of experimental weathering is equal to 3 years of natural weathering, would have great implications in reclamation work in a most difficult environment. Soil type and times of formation, toxic elements, quick and slow weathering material could be identified and a set pattern of stripping of overburden may be set up as well as returning the material in reclamation sites.

151. McMILLAN, R.K., Fisheries-Environment Canada (CCIW):  
Acoustic images of underwater structures, 1977-78.  
To refine and improve methods and techniques of existing acoustic systems in order to develop new application methods to elucidate underwater structures in deep water. It is proposed to carry out the development of the technique and complete the assessment of the method upon structures adjacent to CCIW. In addition, there is an ideal opportunity to use the Hamilton and Scourge in western Lake Ontario as targets for this technique. These targets are located in deep water, unaffected by shipping and other local disturbances and are thus time series consistent. There exists a large scaling of objects, from ropes, to masts, to planking, as well as a variation in acoustic reflectivity in these targets. There is no necessity to construct a target or sink it in deep water in order to evaluate the technique. There is reasonable ground truthing accomplished on these wrecks and there is a degree of control on the nature of the materials of construction of the targets.
152. MORIN, F., Geol. Surv. Can.:  
Environmental geology, Hamilton urban area, Ontario, 1973-.
153. MUDROCH, A., CAPOBIANCO, J., Fisheries-Environment Canada (CCIW):  
Relationship between heavy metals in sediments and marsh water and their uptake by selected plants, 1976-78.  
**See:**  
Analysis of plant material by X-ray fluorescence; X-ray spectrometry, v. 6, p. 215, 1977.
154. MUDROCH, A., ZEMAN, A.J., SANDILANDS, R.G., Fisheries-Environment Canada (CCIW):  
Identification of fine grained particles of less than 4  $\mu\text{m}$  in size, 1976-77.  
**See:**  
Identification of mineral particles in fine grained lacustrine sediments with transmission electron microscope and X-ray energy dispersive spectroscopy; J. Sed. Pet., v. 47, no. 1, p. 244, 1977.
155. NRIAGU, J.O., Fisheries-Environment Canada (CCIW):  
Dissolved silica in pore waters of Lakes Ontario, Erie and Superior sediments, 1976-77.  
The distribution of dissolved silica in pore waters from Lakes Ontario, Erie and Superior sediments is not directly related to the quantity of the diatom biomass in the overlying water. It is proposed that the silica concentrations in the pore waters are controlled by the dissolution of amorphous ferrous-aluminum silicate,  $\text{Al}_{1-x}\text{Fe}_x^{3+}(\text{SiO}_2)(\text{OH})_{6(1-x)}$ . The amorphous complex is formed in the sediments by the reaction of biogenic silica with alumina and ferric oxyhydroxides or by the hydrolysis of clay minerals. The maxima in silica profiles at several stations in these lakes are attributed to biological and hydrodynamic mixing of the surficial layers. Budget calculations show that the regeneration of silica from Lakes Ontario and Erie sediments exceeds the annual silica input from external sources. Most (> 80 percent) of the released silica comes from the dissolution of diatom tests and frustules at the sediment-water interface.
156. NRIAGU, J.O., RICKARD, D.T., Fisheries-Environment Canada (CCIW):  
The biogeochemistry of lead in the environment, 1976-78.  
**See:**  
The biogeochemistry of lead in the environment; Elsevier/North-Holland Biomedical Press, Chapters 1, 2, 6, 8, 1978.
157. RUKAVINA, N.A., LaHAIE, G.G., ST. JACQUES, D.A., Fisheries-Environment Canada (CCIW):  
Nearshore sedimentology of the Great Lakes, 1968-77.  
**See:**  
Measurement of thickness of nearshore sands by hydraulic jetting; CCIW Hydraulics Res. Div. Tech. Note 77-13, 1977.
158. RUKAVINA, N.A., ST. JACQUES, D.A., DUNCAN, G.A., LaHAIE, G.G., Fisheries-Environment Canada (CCIW):  
Nearshore sediments, transport, erosion; shore bathymetry and classification in the Great Lakes, 1976-.  
Nearshore profile changes, sediment transport and erosion at Van Wagner's Beach, Hamilton on Lake Ontario, are being related to storm activity and seasonal water level variations using time-lapse techniques. Reports of nearshore sediment studies for Lake Ontario and the western basin of Lake Erie are expected to be completed by the end of 1978. As well, a report on a field survey of the sediments and bathymetry of the nearshore zone of southern Georgian Bay will also be completed. A report on the classification of Great Lake's shoreline for use in oil-spill contingency planning is expected to be completed by March 1979.
159. SCHWARTZ, F.W., MUEHLENBACHS, K., Univ. Alberta (Geology):  
Isotope geochemistry of the Milk River aquifer, 1977-79.  
An  $^{18}\text{O}/^{16}\text{O}$  and D/H study has been undertaken of the Milk River aquifer, Alberta, to characterize the groundwater in the aquifer.
160. SLY, P.G., Fisheries-Environment Canada (CCIW):  
Disposal of dredgings in the Great Lakes, 1975-77.  
**See:**  
A report on studies of the effects of dredging and disposal in the Great Lakes with emphasis on Canadian waters; CCIW Sci. Ser. no. 77, 1977.
161. SOLES, J.A., MIRKOVICH, V.V., CANMET (EMR):  
Underground nuclear waste repository, 1976-80.  
**See:**  
Thermal conductivity of certain rock types and its relevance to the storage of nuclear waste; CANMET Lab. Rept. MRP/MSL 77-223 (OPJ), 1977.  
Petrographic studies and determination of the thermal characteristics of rocks selected from

various potential sites for nuclear waste repositories will continue until disposal sites are finally chosen. Related field work may expand or curtail the investigation of material from given sites.

162. VANLOON, J.C., BEAMISH, R.J., HUTCHINSON, T.C., Univ. Toronto (Geology, Botany), Environment Canada: A study of metal contamination and acidification of lakes due to mining and smelting, 1972-.

**See:**

Precipitation loading of acid and heavy metals to a small lake near Sudbury; J. Fish. Res. Bd. Can., 34, p. 649-658, 1977.

Heavy metal contamination by atmospheric fall-out of several Flin Flon area lakes; Ibid., p. 899-906, 1977.

Our expertise in metal-water analyses has lead us to co-operate with other researchers interested in the impact of metals and acid on flora and fauna in lake and ocean waters. Studies have been made in Flin Flon, Sudbury and Strathcona Sound areas.

163. VANLOON, J.C., LARKINS, P.L., RADZIUK, B., Univ. Toronto (Geology):  
Flame resonance spectroscopy, 1975-.

**See:**

Application of the flame resonance spectrometer to the analysis of biological and environmental samples; Environmetnal Analysis, p. 47-57, 1977.

Development and evaluation of an atomic absorption spectrophotometer based on the flame resonance spectrometer. Emphasis is being placed on application to geological samples.

164. VANLOON, J.C., LARKINS, P.L., RADZIUK, B., IP, J., KAHN, N., Univ. Toronto (Geology):  
Metal speciation studies using an atomic fluorescence detector, 1976-.

**See:**

Non-dispersive atomic fluorescence spectroscopy, a new detector for chromatography; J. Chromatog., v. 136, p. 301-305, 1977.

Development and evaluation of chromatography and thermal volatilization/atomic fluorescence spectroscopy systems for metal speciation studies. This study involves the development of equipment and procedures for the study of the forms of metals in geological, environmental and biological/clinical samples. The atomic fluorescence detector in the system is metal specific and can be used for the multielement (simultaneous on separate channels) determination of inorganic chemical compounds. Particular emphasis is being placed on the study of the methylation of metals in lake sediments and the study of metal-amino acids in patients with high serum metal levels.

165. VANLOON, J.C., RADZIUK, B., LICHWA, J., KAHN, N., IP, J., Univ. Toronto (Geology):  
Metal speciation studies using atomic absorption, 1974-; M.Sc. theses (IP, Kahn), Ph.D. thesis (Radziuk).

Evaluation and chromatography and thermal volatilization/atomic absorption systems for metal speciation studies. This approach, developed in Germany, is still the work horse of metal speciation work. The technique applies to only one metal at a time and is less sensitive than the approach mentioned above. However, commercially available equipment exists making this method more attractive to the analysis in laboratories today. Emphasis is being placed on the study of iron metabolites produced by alga under conditions leading to entrophication in lakes; the study of organo-selenium compounds resulting from plant growth on uranium tailings dumps, and the rapid determination of compounds of lead in lead ores.

166. WARREN, H.V., Univ. British Columbia (Geological Sciences):

Trace elements in various environments, 1970-.

During the past two years we have become increasingly aware of the important part that trace elements play in human health. We have observed that not only are the absolute amounts of various elements absorbed significant but also the relative amounts of each that are ingested. Furthermore not only can geology influence the trace element content of soils, vegetables, dusts, airs, and waters but also industrialization and urbanization. Many elements when present in anomalous amounts may be harmful to human health. We have been concerned chiefly with zinc, lead, copper, molybdenum, nickel, arsenic, mercury, and cadmium.

167. WINDER, C.G., DREIMANIS, A., Univ. Western Ontario (Geology):

Geology of London, Ontario, 1977-78.

Field guide of Geology of London, Ontario to be published by the Geological Association of Canada.

168. ZEMAN, A.J., OELZE, L., HARAS, W.S., Fisheries-Environment Canada (CCIW):  
Shoreline and bluff evolution, 1976-.

To determine geotechnical controls of bluff recession by monitoring recession rates, pore pressure and slope indicator readings during the progressive failure of a previously instrumented bluff, by statistically evaluating bluff recession rates determined by 2-D survey profiles and 3-D survey maps to determine spatial and temporal variability of bluff recession rates and bluff slope development through time of Lakes Erie and Ontario.

## ANALYTICAL METHODS AND ANALYSIS

169. ABBEY, S., Geol. Surv. Can.:  
Analysis of international reference samples, 1969-.
- See:**  
Studies in "Standard Samples" for the analysis of silicate rocks and minerals; Geol. Surv. Can., Paper 77-1B, p. 107, 1977.
170. ABBEY, S., Geol. Surv. Can.:  
Development of methods for the analysis of geological materials, 1969-.
171. FAYE, G.U., SUTARNO, R., BOWMAN, W.S., CANMET (EMR):  
Canadian certified reference materials project, 1973-.
- See:**  
Antimony-arsenic ore CD-1 - a certified reference material; CANMET Rept. 77-63, 1978.  
Zinc-Copper ore RU-1: its characterization and preparation for use as a certified reference material; CANMET Rept. 77-7, 1978.  
Interlaboratory programs have been established for the certification of a zinc concentrate (CZN-1), lead concentrate (CPB-1) and a copper concentrate CCU-1, and a high-grade uranium ore BL-5.
172. HAYNES, S.J., Brock Univ. (Geological Sciences):  
Analysis of granitoid rocks for fluorine and chlorine by ion-selective electrode techniques, 1975-77.  
A new analytical technique for the rapid determination of fluorine and chlorine in granitoid rocks from a single sample fusion has been devised. The technique employs a sodium carbonate-zinc oxide fusion in platinum crucibles. The resultant fusion cake is leached with water and subsequently split into two aliquots. One aliquot is treated with nitril acid and analyzed for chlorine. The other aliquot is treated with citric acid and analyzed for fluorine. Both chlorine and fluorine are determined by ion-selective electrode methods using known-addition techniques which enable the concentrations and activities to be measured. In the case of low-level chlorine a potentiometric gran's plot titration is employed. The method gives comparable results for standard rocks G-2 and GSP-1 compared with other analytical techniques.
173. KEMP, A.L.W., THOMAS, R.L., WONG, H.K.T., JOHNSTON, L.M., Fisheries-Environment Canada (CCIW):  
Geochemical budgets, 1976-77.
- See:**  
Nitrogen and C/N ratios in the sediments of Lakes Superior, Huron, St. Clair, Erie, and Ontario; Can. J. Earth Sci., v. 14, no. 10, p. 2402-2413, 1977.  
The distribution of nitrogen (N) was determined on 1238 surface sediment samples (0-3 cm) and 24 cores from Lakes Superior, Huron, St. Clair, Erie, and Ontario. The concentration of N was greatest in the depositional basins of the lakes. The N concentrations decreased sharply from high values at the sediment-water interface to uniformly lower N values at the base of the cores. The surface enrichment was related to increased inputs of N to the lakes since settlement of the region in the order: Lake Ontario > Lake Erie > Lake Superior > Lake Huron > Georgian Bay. The organic carbon: total nitrogen (C/N) ratios averaged 10.2 in the surface sediments with a range of 5.1 to 66.0. The lowest ratios were found in the depositional basins, with the exception of Lake St. Clair. The magnitude of the C/N ratios was related to the source of the organic matter. Plankton, which are the main source of Org-N in the lakes, accounted for C/N ratios between 7 and 9. Dilution of the modern sediment with organic matter from glacial deposits yielded the higher ratios and low Org-C contents in the nondepositional zones. The high C/N ratios and Org-C contents in Lake St. Clair were believed to be due to a large component of macrophytes in the inputs of organic matter to the lake sediments.
174. KINRADE, J.D., VANLOON, J.C., Univ. Toronto (Geology):  
Determination of inorganic ions in water for exploration geochemical purposes, 1973-78; Ph.D. thesis (Kinrade).  
Atomic absorption spectroscopy, polarography and arodic stripping voltametry are being used for the determination of 30 to 40 inorganic ions in waters. Emphasis is being placed on schemes of analysis which apply to large groups of ions in a single sample. In this regard, great use is being made of solvent extraction separations and preconcentrations.
175. ST-AMANT, M., PERRAULT, G., SOQUEM:  
Fluorescence-X terrain; développement d'un analyseur à multi-éléments, transportable sur le terrain, 1976-78.  
Nous avons mis au point un analyseur mesurant l'abondance de 30 à 50 éléments chimiques présents dans des carottes de forage dans leur propre boîte sans aucune autre manipulation. La concentration, l'erreur statistique et l'intensité de fluorescence des éléments détectés sont inscrits sur télétipe.
176. SCHIMANN, K., SMITH, D.G.W., BURWASH, R.A., LAMBERT, R.St J., Univ. Alberta (Geology):  
Quantitative energy dispersive electron microprobe determination of whole rock compositions using an optical fusion furnace, 1974-77; Ph.D. thesis (Schimann).  
An optical furnace has been designed and built which will produce rapidly and cheaply a homogeneous fused button from a powdered rock sample, in most instances without the addition of any flux. The glass obtained is analysed rapidly and fully quantitatively for twenty-two elements (Na to Zr inclusive plus Zr and Ba) by energy dispersive electron microprobe techniques. Tests indicate a detection limit for most elements of about 500 ppm.
177. SMITH, D.G.W., GOLD, C.M., Univ. Alberta (Geology):  
Atomic number dependence of X-ray continuum intensity at high atomic numbers, 1977-78.  
The dependence of the intensity of the X-ray continuum on the average atomic number of the target material is being investigated at high atomic numbers. Earlier work has established an empirical relationship between intensity, average atomic

number, electron accelerating potential and continuum energy, which has permitted the accurate calculation of background in energy dispersive microprobe analysis for all elements up to  $Z = 30$ . If this, or a similar expression, can be applied to calculate background generated in higher average atomic number targets, rapid, energy dispersive microprobe analysis may be extended to cover any element in the periodic table from Na to U. Hence, quantitative microanalysis of virtually any mineral should prove possible using energy dispersive techniques once suitable computer software for data reduction is also available.

178. TUREK, A., MITCHELL, D.K., QUIRT, D.H., Univ. Windsor (Geology):

Trace element and major element analysis using argon plasma emission, 1976-79; M.Sc. thesis (Mitchell), MA. Sc. thesis (Quirt).

Argon plasma emission offers analytical capabilities similar to that of atomic absorption. Instrumentation in this field is expensive, however, this study to date has demonstrated the feasibility of converting AA instruments for argon plasma emission. Numerous elements that are difficult or totally impossible to determine by AA have been shown to be determinable by argon plasma emission. Superior detection and sensitivity has been established for several elements (e.g. B, P, Si) and the use of argon plasma jet as an add-on device on existing AA instruments is feasible and relatively inexpensive, thereby extending the versatility of AA instruments.

179. WILLIAMS, J.D.H., PASHLEY, A., MAYER, T., CAPOBIANCO, J., Fisheries-Environment Canada (CCIW):

Geochemistry of a lake sediment column, 1975-77.

#### EXPLORATION, ORGANIC

180. CLOSS, L.G., Ontario Geol. Surv.:  
Geochemical survey of organic stream sediments in the Beardmore-Geraldton area, District of Thunder Bay, Ontario, 1975-78.

181. FRIZ, P., BARKER, J.F., Univ. Waterloo (Earth Sciences):

Methane in groundwater - A carbon isotope geochemical study, 1975-78; Ph.D. thesis (Barker).

182. JONASSON, I.R., Geol. Surv. Can.:  
Environmental geochemistry, 1974-.

#### See:

On the nature and formation of radioactive hydrocarbons from the Ordovician rocks of the Ottawa area; Geol. Surv. Can., Paper 77-1B, p. 109-111, 1977.

183. POWELL, T.G., Geol. Surv. Can.:  
Hydrocarbon geochemistry of Arctic Archipelago and Canadian East Coast offshore, 1976-.

184. PURCELL, L.P., Geol. Surv. Can.:  
Organic geochemistry related to the petroleum potential, Atlantic coast of Canada, 1975-.

185. RASHID, M.A., Geol. Surv. Can.:  
Hydrocarbon geochemical analysis of eastern offshore well samples-heavy hydrocarbons as source and maturity indicators, 1973-.

186. SAWATZKY, H., GEORGE, A.E., FURIMSKY, E.E., MONTGOMERY, D.S., CANMET (EMR):  
Geochemical information obtained during investigation of bitumen, heavy oils from western Canada and products derived from them: Investigation of oils from frontier areas.

#### See:

Maturation studies of East Coast oils - CANMET Bull. 77-42, 1978.

187. SNOWDON, L.R., Geol. Surv. Can.:  
Development of extraction, identification and correlation systems for organic compounds from sedimentary rocks and crude oils, 1973-.

188. SNOWDON, L.R., Geol. Surv. Can.:  
Hydrocarbon geochemistry of northern Interior Plains and Beaufort Sea, 1976-.

#### EXPLORATION, NON-ORGANIC

189. APPELYARD, E.C., BOWLES, E.G., Univ. Waterloo (Earth Sciences):

Wall-rock alteration at the West Mine, Pilley's Island, Newfoundland, 1976-78; M.Sc. thesis (Bowles).

#### See:

The geology of the West Mine, Pilley's Island, Newfoundland; Geol. Surv. Can., Paper 78-1A, p. 199-203, 1978.

Studies of altered facies of rhyolitic-dacitic volcanics associated with chalcopyrite-pyrite mineralization at the West Mine, Pilley's Island, are close to completion. A mafic to acid sequence comprising flows, pyroclastics and autoclastic units up to 150 m in thickness contains lenses of massive sulphides and associated stockworks and vein networks. A zoned pattern of alteration is associated with the vein and massive sulphide bodies hosted in dacite. Quartz-sericite-(feldspar), sericite-quartz, quartz-sericite-(chlorite), and chlorite-sericite facies are represented. The study emphasizes litho-geochemistry and the establishing of methods of quantifying the chemical changes involved in the alteration.

190. APPELYARD, E.C., HEALING, D.W., Univ. Waterloo (Earth Sciences):

Geochemistry of the stratiform alteration zone at the Gullbridge Mine, central Newfoundland, 1974-78; M.Sc. thesis (Healing).

Studies of altered facies of volcanics associated with chalcopyrite-pyrite mineralization at Gull Pond, central Newfoundland are close to completion. The host Roberts Arm Group comprises calc-alkaline volcanics of predominantly basic character on a regional scale but with centres of acid flows and pyroclastics at Gull Pond and other locations. At Gull Pond a stratiform zone of alteration can be traced for over 10 km; it is composed predominantly of highly altered felsic pyroclastic units with some intercalation of mafic

- dykes and flows(?). The alteration is typically magnesian in character resulting in assemblages characterized by cordierite and anthophyllite. The local sequence closed with the deposition of grits and jasperoid cherts and was succeeded by the eruption of massive rhyolite. The study emphasizes litho-geochemistry and the establishing of valid methods of quantifying the chemical changes involved in the alteration.
191. BINGLEY, J.M., MACNABB, B.E., RICHARDSON, G., Nova Scotia Dep. Mines:  
Geochemical studies, 1974-.
- See:**  
Geology, geochemistry and mineral occurrences of the Northeast Margaree River drainage basin in parts of Inverness and Victoria counties, Cape Breton, Nova Scotia; Nova Scotia Dep. Mines, Paper 76-4, 1978.  
Stream sediment geochemistry of southwestern Cape Breton; stream sediment geochemical maps (with 15 elements) released (Open File) for other areas of western Cape Breton; lake sediment geochemical survey carried out in Halifax, Guysborough and parts of neighbouring counties.
192. BOTTOMLEY, D.J., Fisheries-Environment Canada (Water Res. Br.):  
Geochemistry of arsenic in groundwaters of selected areas in New Brunswick and Nova Scotia, 1977-78.  
Sampling of groundwaters in selected areas of known arsenic contamination in Nova Scotia and New Brunswick was begun in July, 1977. It is hoped that it will be possible to relate arsenic concentrations to other geochemical parameters (pH,  $E_H$ , D.O.,  $pS^-$ ) of the groundwater and to determine the nature and abundance of the solid arsenic phase in the aquifer materials.  $E_H$ , pH, temperature and conductivity were measured in the field. Water samples were collected and preserved for subsequent analysis in the laboratory in Ottawa. Leaching experiments are now being conducted on samples of the aquifer rock which were collected during the drilling of the test wells. It is planned to collect and analyze groundwater samples for D.O. and  $pS^-$  next field season.
193. CAMERON, E.M., Geol. Surv. Can.:  
National geochemical reconnaissance, 1975-.
- See:**  
Geochemical distribution of uranium, tungsten, and molybdenum in the Tombstone Mountains batholith, Yukon; Geol. Surv. Can., Paper 78-1B, p. 37-45, 1977.
194. CARRIGNAN, J., GELINAS, L., DARLING, R.G., Ecole Polytechnique:  
Geochemistry of volcanic rocks surrounding one orebody, Millenbach mine, Noranda, Québec, 1975-78; Ph.D. (Carrignan).  
Data interpretation in progress.
195. CLOSS, L.G., Ontario Geol. Surv.:  
Reconnaissance geochemistry of Paleozoic rocks in southern Ontario, 1976-.
196. CLOSS, L.G., COLVINE, A.C., Ontario Geol. Surv.:  
Geology and geochemistry of pyritic and graphitic volcanogenic sediments and their relationship to massive sulphide deposits, 1975-.
197. CLOSS, L.G., SADO, E.V., Ontario Geol. Surv.:  
Orientation exploration geochemistry and Quaternary geology investigations of carbonatite-alkalic complexes at Prairie Lake and Killala Lake, District of Thunder Bay, Ontario, 1974-78.
198. CLOSS, L.G., SADO, E.V., Ontario Geol. Surv.:  
Exploration geochemistry and Quaternary geology research within the Beardmore-Geraldton gold area, District of Thunder Bay, Ontario, 1974-78.
199. COKER, W.B., Geol. Surv. Can.:  
Regional geochemistry, southern Canadian Shield, 1976-.
200. DARLING, R.G., Ecole Polytechnique:  
Geochemistry of volcanic rocks surrounding the Manitou-Barvue ore deposit, Val d'or, Québec, 1972-78.  
Data interpretation continues.
201. DAVIES, J.F., WHITEHEAD, R.E., Laurentian Univ. (Geology):  
Geochemical variations and stratigraphy, Deloro volcanic group, Timmins area, Ontario, 1977-79.  
The type sections for the Deloro and Tisdale volcanic groups are located on opposite sides of a major structural discontinuity, the Destor-Porcupine fault. Consequently the stratigraphic relationships between, and distribution of, the two groups are uncertain. The geochemical characteristics of the lithostratigraphic units within the type area of the Tisdale group have been determined. To extend the study into the area of Deloro rocks south of the fault and to determine whether or not Tisdale rocks occur there as well; it is expected that geochemical character will permit a distinction between Deloro and Tisdale rocks.
202. DYCK, W., Geol. Surv. Can.:  
Groundwater geochemistry applied to uranium exploration, 1972-.
- See:**  
A semiportable helium analysis facility; Geol. Surv. Can., Paper 77-1C, p. 85-87, 1977.
203. DUNN, C.E., Sask. Geol. Surv.:  
Geochemistry of water-deposited sediments peripheral to the Athabasca Formation, 1975-79.  
Establish trace metal patterns in sediments of lakes and streams that are close to the margin of the Athabasca Formation, northern Saskatchewan with close consideration to patterns associated with major uranium deposits.
204. FOSCOLOS, A.E., Geol. Surv. Can.:  
Clay and clay minerals investigation, 1968-.
205. GRANT, R., WHITEHEAD, R.E., DAVIES, J.F., Laurentian Univ. (Geology):  
Geochemical variations and stratigraphy, Tisdale Group, Timmins, Ontario, 1974-78; M.Sc. thesis (Grant).

206. HARTREE, R., VEIZER, J., Univ. Ottawa (Geology):  
Polarographic determination of base metals in sedimentary rocks, 1975-78; M.Sc. thesis (Hartree).  
Determination of carbonate bound lead and zinc in order to evaluate their diagenetic redistribution and possible secular variations. Samples cover about 2.7 b.y. and the observed concentrations are in ppb-ppm level. Experimental part is completed.
207. JONASSON, I.R., Geol. Surv. Can.:  
Trace elements in sulphides, 1974-.
208. LALONDE, J-P., BEAUMIER, M., Québec Min. Richesses Naturelles:  
Géochimie des sols dans la ceinture d'argile de l'Abitibi, Québec, 1977-79.  
Évaluation de l'applicabilité d'inventaires géochimiques par la méthode d'échantillonnage des sols développés sur les sédiments glacio-lacustres (argile) déposés dans le lac periglaciaire Barlow-Ojibway dans le Nord-Ouest québécois.
209. LALONDE, J-P., CHOUINARD, N., Québec Min. Richesses Naturelles:  
Éléments traces dans les eaux souterraines des mines d'or et de bas métaux du Québec, 1976-77.  
Détermination et évaluation du signal hydrogéochimique obtenu dans les environnements miniers en vue d'assister à l'interprétation de levées d'inventaire hydrogéochimiques des eaux souterraines orientées vers l'exploration minière.
210. LALONDE, J-P., CHOUINARD, N., Québec Min. Richesses Naturelles:  
Levées d'orientation d'exploration géochimiques dans l'environnement de certains mines dans les basses terres du Saint-Laurent par la méthode des eaux souterraines, 1977.
211. LEVINSON, A.S., CAMPBELL, F.A., SILLS, T., Univ. Calgary (Geology):  
Uranium mineralization in the Tertiary gravels in south-central British Columbia, 1977-79; M.Sc. thesis (Sills).
212. LEVINSON, A.A., KNOX, A.W., Univ. Calgary (Geology):  
Geology and geochemistry of the uranium occurrences in the Amer Lake Group, District of Keewatin, Northwest Territories, 1977-79; M.Sc. thesis (Knox).
213. MacRAE, W.E., CROCKET, J.H., McMaster Univ. (Geology):  
The geochemistry of gold, platinum, palladium, and iridium in komatiitic volcanic rocks of Munro Township, Ontario 1975-78; M.Sc. thesis (MacRae).  
An exposure of relative unaltered komatiitic flow in Munro township was analysed for Au, Ir, Pt, Pd by neutron activation. Gold is not particularly high in these rocks, ranging from 1 to 3 ppb. There is little variation in noble content within the various textural units of a single flow although the cumulates are somewhat enriched in noble metals.
214. MAJID, A.H., VEIZER, J., Univ. Ottawa (Geology):  
Geochemistry of Tertiary limestones of Kirkuk Oil Field, Iraq, 1977-79; Ph.D. thesis (Majid).  
Determination of diagenetic history and establishment of geochemical facies criteria for Tertiary backreef-reef-forereef sedimentary cycles.
215. MAURICE, Y.T., Geol. Surv. Can.:  
Regional geochemistry, eastern and northern Canadian Shield, 1976-.
216. McQUADE, B.M., ARMBRUST, G.A., Univ. Ottawa (Geology):  
Petrochemistry of the volcanic complex, Bachelor Lake, Québec, 1974-79; Ph.D. thesis (McQuade).
217. MOIR, R.D., MORTON, R.D., BAADSGAARD, H., Univ. Alberta (Geology):  
Biogeochemical prospecting study of Mo-Cu mineralization at Carmi, British Columbia, 1977-78; M.Sc. thesis (Moir).
218. MUEHLENBACHS, K., HATTORI, K., MORTON, R.D., Univ. Alberta (Geology):  
Oxygen isotope geochemistry of uraninite and uranium deposits, 1975-79.  
To calibrate an uraninite based geothermometer, and to apply this thermometer to uranium ore deposits.
219. OSHIN, I.O., CROCKET, J.H., McMaster Univ. (Geology):  
An evaluation of the economic potential of ophiolites as sources of the platinum group metals, 1977-80; Ph.D. thesis (Oshin).  
The ophiolite suite, on general geological and geochemical grounds, might well contain significant levels of platinum group metals to prove economic under certain circumstances. The pertinent data are not available as no systematic studies of these rocks for platinoids have been reported. We shall sample ophiolites from Québec and Newfoundland to obtain such data. Analyses will be by neutron activation.
220. PARSLow, G.R., Sask. Geol. Surv. - Univ. Regina (Geological Services):  
Evaluation of techniques for assessing the uranium potential of lake-covered areas: II. Geochemical studies, 1977-78.  
**See:**  
Sask. Geol. Surv., Summ. Investig., 1977.  
An investigation into the geochemical patterns and factors related to natural uranium dispersion associated with the Key Lake ore body, Saskatchewan.
221. PRABHU, M.K., WEBBER, G.R., McGill Univ. (Geological Sciences):  
Geochemical and petrological studies at Montauban, Québec, 1976-79; Ph.D. thesis (Prabhu).

- This investigation involves: the use of chemical composition as an aid in determining the genetic nature of the metamorphosed rock units, in particular fine-grained gneisses, calc-silicates and quartzites; trying to find guides to zones of mineralization in the lateral compositional variation of these rock units; and investigation of the relationship between carbonate in the gneisses and the calc-silicates with which mineralization is associated.
222. REARDON, E.J., Univ. Waterloo (Earth Sciences):  
Investigation into the applicability of manganese oxide coatings in regional explorational silt sampling programs, 1976-78.
223. SIRIVNAS, J.M., SCOTT, S.D., Univ. Toronto (Geology):  
Primary trace element distribution in the stratigraphic horizon containing an Archean massive sulphide deposit: Willroy Mines Ltd., no. 4 zone, Manitouwadge, Ontario, 1976-78; MA.Sc. thesis (Sirivnas)  
The ore zones, found exclusively along the southern and western parts of the synform, are associated with metamorphosed iron formations occurring stratigraphically on the flanks of a felsic pyroclastic pile. Previous geological mapping has indicated that in many cases the ore appears to be contained entirely within the iron formations and grades into barren pyrite-pyrrhotite sulphide facies and quartz-magnetite-(pyrite) oxide facies iron formations. Diamond drill intersections of the horizon containing the No. 4 zone at the Willroy mine are being examined for their trace element content in an attempt to recognize a dispersion halo surrounding the ore body. Dispersion patterns, significant elemental ratios and sulfur isotopic values may be an indication of the original variation in the conditions of the seafloor environment in which the ores were formed.
224. SOPUCK, V.J., LEHTO, D.A.W., ALLEY, D.W., Sask. Geol. Surv. - Saskatchewan Res. Council:  
Uranium dispersion studies, Maguire Lake area (part of NTS area 63M-7), 1977-78.  
A multidisciplinary study of uranium anomalies found in the Maguire Lake area as a result of the 1974 GSC lake-centre sediment survey. The anomalies have been investigated in relation mainly to a sequence of pegmatite phases.
225. SPITZ, G., DARLING, R.G., Ecole Polytechnique:  
Geochemistry of volcanic rocks surrounding the Louvem copper deposit, Val d'Or, Québec, 1970-78.
226. SPOONER, E.T.C., GYONGYOSSY, Z., Univ. Toronto (Geology):  
An evaluation of geochemical methods for lithium deposit exploration, 1977-79; M.Sc. thesis (Gyongyossy),  
It is critical to evaluate geochemical exploration methods for lithium mineral pegmatite deposits with which Canada is known to be well-endowed. The field evaluation will be conducted in the Anne Lake pegmatite district of Québec, and the Tanco area of Manitoba.
227. TREMBLAY, R., CHEINIÈRE, J., Québec Min. Richesses Naturelles:  
Géochimie des sédiments de ruisseau-Région de Ste-Anne-des-Monts à Cloridorme, Québec, 1977-78.
228. WALKER, N.C., Sask. Geol. Surv. - Univ. Regina (Geological Sciences):  
An investigation into the use of biogeochemistry for uranium prospecting in areas of glacial overburden, 1976-78; M.Sc. thesis.  
The content of uranium and eleven other elements (Ni, Co, Cu, Pb, Zn, Cd, Mo, Fe, Mn and Ca) were determined for the vegetation and 3 soil horizons over or proximal to the Key Lake uranium-nickel ore body. Results indicate a correlation between 1) uranium in the vegetation and the ore zone at depth, 2) U, Co, Ni, Pb in the vegetation and mineralized boulders in the glacial overburden, and 3) greatest content in the woody tissue of plant ash, viz twigs and wood (from trunk) compared with the other plant organs and all three soils. The ease of wood sample collection and the possibility of winter surveys to plan summer follow up indicates that wood sampling could be the most useful medium for future uranium biogeochemical surveys in this environment.
229. WARREN, H.V., Univ. British Columbia (Geological Sciences):  
New and improved techniques in exploration geochemistry, 1974-.  
During the past summer we have successfully applied neutron activation techniques in the use of tree and lesser plant material in searching for gold and arsenic anomalies, and have been able to complete preliminary studies on the use of pollen in establishing geochemical provinces. We hope, in due course, to see if the techniques which are proving so successful with gold and arsenic may be applied to silver, tungsten, tellurium and mercury.
230. WEBBER, G.R., McGill Univ. (Geological Sciences):  
Investigations in applied geochemistry, 1975-.  
**See:**  
Chemical and petrographic variations in rhyolitic zones in the Noranda area, Québec; Bull., Can. Inst. Min. Met., v. 70, no. 784, p. 80-93, 1977.  
Directed toward the development of geochemical concepts and methods (particularly using rock and water geochemistry) for finding mineral deposits.
231. WILLIAMS, J.D.H., VERNET, J-P., FAVARGER, K., Fisheries-Environment Canada (CCIW):  
The effects of sewage treatment and phosphorus on sediments, 1976-77.
- THEORETICAL**
232. ANDERSON, G.M., Univ. Toronto (Geology):  
Base metal sulfide solubilities and the origin of hydrothermal ore deposits, 1972-78.  
Work is continuing on the solubilities of sphalerite and galena in chloride-rich solutions as a function of pH and reduced sulfur content. It is planned to extend the temperature range upwards (from 100° to 300°C) and to investigate the effects of complexing by organic compounds.

233. CAMPBELL, I.H., NALDRETT, A.J., ROEDER, P.L., Univ. Toronto (Geology):  
Activity coefficients of transition metal oxides in silicate melts, 1977-79.  
The activities of FeO and NiO in basaltic liquids are being determined from the solubility of pure Fe and Ni metals at known  $f_{O_2}$  - to determine the effects of temperature and liquid composition on the activity coefficients of FeO and NiO in basaltic melts.
234. CHOU, C-L., Univ. Toronto (Geology):  
Trace element geochemistry of meteorites, 1975-79.  
Abundances of trace elements have been determined by neutron activation in several groups of meteorites, including the Allende carbonaceous chondrite, a suite of howardite meteorites and a group of ureilite meteorites. These data have allowed us to investigate a number of important processes that have occurred in the earliest history of the solar system: (1) The Ca-Al-rich inclusions in Allende are depleted in volatile elements, consistent with the prediction of condensation model. (2) Howardites are enriched in siderophiles Ni, Ge, Ru, Ir and Au relative to eucrites and diogenites, indicating that the basaltic breccias contain a chondritic component and that the surface of the howardite parent body had been intensely bombarded by chondritic projectiles. (3) Ureilite meteorites, which consist of ultramafic minerals, graphite, diamond and Fe-Ni, can be explained by a model involving partial melting of a chondritic parent body, injection of C-rich material into the ultramafic silicates residual and reaction between C and silicates to produce CO and metallic Fe. Present studies of trace elements in meteorites include petrologic fractions of the St. Mesmin brecciated chondrite, the metal portion of the Dhajala chondrite, and synthesis of trace element data in H and L group chondrites.
235. CHOU, C-L., GOODWIN, A.M., Univ. Toronto (Geology):  
Trace element geochemistry and origin of Archean volcanic rocks, Wabigoon volcanic belt; 1976-79.  
The 12 km-thick northern Sturgeon Lake volcanic sequence, Wabigoon Volcanic Belt, is an excellent example of Archean bimodal volcanism. The rocks comprise low-K tholeiites ( $K_2O = 0.034-0.42\%$ , total FeO = 9.5-16.6%) and low-K dacite ( $K_2O = 0.2\%$ , total FeO = 2.83%). Rare earth and other trace elements have been determined by instrumental neutron activation in eleven meta-tholeiites and one meta-dacite. The tholeiites are divisible into four types based on REE and Hf concentrations and La/Sm ratios, which may have formed from different sources by partial melting processes. Hafnium concentration increases with increasing Sm, indicating similar behavior during magmatic differentiation. Dacite, with low Fe, Mn, Sc, Cr, Co and Yb (1.8X chondritic) contents and a steep-sloped REE pattern (La/Yb = 11X chondritic), may have been derived by partial melting of eclogite with a residual garnet-clinopyroxene phase. The low Sc content (4.8 ppm) and a low Sc/Hf ratio in dacite support the model that Sc was depleted in the melt by garnet separation. We plan to analyze six additional dacites from this volcanic pile for a better understanding of fractionation among and origin of dacites.
236. CHOU, C-L., GOODWIN, A.M., WILLIAMS, J.G., Univ. Toronto (Geology):  
Trace element geochemistry and origin of Archean gneisses and granites, 1975-79.  
See:  
Geochemistry and origin of the eastern Lac Seul area, English River gneiss belt; Proc. 1977 Geotraverse Conf., p. 80-93, 1977.  
Rare earth element geochemistry of Archean amphibolites, tonalites, granites and paragneisses in the eastern Lac Seul area, Ontario; Proc. 23rd. Ann. Instit. Lake Superior Geol., p. 11, 1977.  
Trace element geochemistry is an important tool in petrogenetic studies. Based on their specific partition coefficients among solid and liquid phases, the mineralogy of source rocks and partial melting and fractional crystallization processes can be modelled. We have studied the eastern Lac Seul area of the southern English River Gneiss Belt. Samples were analyzed for rare earth elements (REE) and other trace elements (Sc, V, Co, Rb, Sr, Ba, Hf, Ta and Th) using neutron activation techniques. One of the interesting discoveries is that gneissic tonalites are of two distinct types based on their REE patterns. Type-A tonalites have smooth and steep-sloped patterns and type-B have flat heavy REE patterns, enriched light REE patterns and negative Eu anomalies. Type-A tonalites may be liquids derived by partial melting at a greater depth with garnet as a residual phase and type-B tonalites have had fractional crystallization of plagioclase at a shallower depth. Distinct REE patterns have been found between granites and muscovite granites, indicating they are derived from different crustal depths and have undergone different fractionation processes. Our present trace-element studies include the paragneisses and granites from the Miniss Lake area of the northern English River Gneiss Belt, and granitic rocks from the White Otter batholith, Wabigoon Volcanic Belt.
237. CHOU, C-L., NALDRETT, A.J., Univ. Toronto (Geology):  
Trace element geochemistry of komatiitic rocks, 1977-79.  
Komatiitic rocks represent very complete, uncontaminated mantle melts - to investigate the trace element content of the Archean mantle.
238. CHOU, C-L., PEARCE, G.W., STRANGWAY, D.W., Univ. Toronto (Geology):  
Trace element and magnetochemical studies of lunar samples, 1975-79.  
See:  
On the origin of sample 70019 and its suitability for lunar magnetic field intensity studies; Proc. Lunar Sci. Conf. 8th, p. 669-677, 1977.  
Lunar soils and breccias are enriched in both siderophile elements (e.g. Ni) and metallic iron relative to pristine lunar rocks. The siderophile

elements may be interpreted by an extralunar (meteoritic) component. This project used combined magnetic and neutron activation techniques to characterize the metallic Fe, based on the fact that the meteoritic metal contains about 6 percent Ni and the indigenous metallic iron is essentially Ni-free. We have found that Ni and metallic Fe are positively correlated among Apollo 16 soils, indicating a dominantly meteoritic source in highlands regoliths. A recent study has shown that the glass and breccia fractions of a glass-coated sample 70019 have very similar magnetic properties and trace element compositions. They probably formed in situ or the glass and breccia arrived together to the crater where the sample was found.

239. FARKAS, A., SCOTT, S.D., Univ. Toronto (Geology):  
Experimental study of the distribution of Co and Ni among pyrite, pyrrhotite and sphalerite, 1974-78; Ph.D. thesis (Farkas).

In the temperature range 350°C to 600°C the technique of hydrothermal recrystallization, both under isothermal and temperature gradient conditions, is being used to measure distribution coefficients of Co and Ni in sulfides. Better results are obtained by isothermal recrystallization as transport reactions are hampered by nonstoichiometric solubility. At 670°C and 720°C we are recrystallising sulfides in molten halide salt fluxes in order to improve reaction rates. Our results show that the distribution of Ni and Co between pyrite and pyrrhotite is a function of temperature, giving rise to a potentially useful geobarometer. The distribution coefficient,  $K_D^{Ni}$ , for the pyrite-pyrrhotite pair varies from 2 at 720°C to 12 at 350°C. Nickel in the iron sulfides obeys Henry's law even at high concentration, in the presence of vaesite. Because sphalerite can accommodate only trace amounts of Ni, we can use the FeS content of sphalerite to measure the activity of FeS in nickel-bearing pyrite and pyrrhotite and, thence, to calculate a thermodynamic model for trace element partitioning.

240. GOODWIN, A.M., CHOU, C-L., CHEN, G.S.J., Univ. Toronto (Geology):

Trace element distributions in Archean iron-formation.

Variations of trace elements among thirty samples from a drill core in the Helen Iron-Formation, Wawa, Ontario have been investigated using neutron activation techniques. Radiochemical procedures have been developed for determination of Cu, Zn, Ag and Au. The following concentration ranges are found: 0.67-169 ppm Cu, 5.6-1670 ppm Zn, 0.5-74 ppb Au. Silver is not reported here because duplicate results are not yet finished. To aid on the interpretation of variations in these elements, samples are now being analyzed for Na, Sc, Cr, Mn, Fe and Co using instrumental neutron activation techniques. Incomplete results show the following concentration ranges: 33-136 ppm Na<sub>2</sub>O, 0.15-3.2 ppm Sc, 3.0-28 ppm Cr, 0.21-3.4% MnO, 8.65-58.4% FeO, 0.73-22 ppm Co. These data will be used to search for correlations among elements, and systematic variations with respect to mineral compositions and stratigraphic units.

241. GOODWIN, A.M., THODE, H.G., MONSTER, J., Univ. Toronto (Geology), Univ. McMaster (Chemistry):

Sulfur and carbon isotope abundances in Archean iron-formation.

Additional data are available on S and C isotope systematics across the Helen Iron-Formation, Michipicoten area, Ontario. The previous maximum established Archean range in  $\delta^{34}S$  was 21.0 (-10.5 to +10.1) as present in the Helen Iron-Formation. The new data have broadened this range to 30 (-10.5 to +19.0). This further reinforces the previous interpretation that bacterial reduction of sea-water sulfate to H<sub>2</sub>S in Archean environments was a major contributory factor in accumulation of these sediments. Available  $\delta^{13}C$  values fall in the general range of marine limestones and indicate such a sedimentary source of the siderite rather than an organic carbon source. However the light-enriched carbon isotope samples, i.e. -2.9 and -2.5, may reflect some contribution from nearby graphitic carbon. In general, however, the results indicate the presence of autotrophic organisms and are in agreement with the indicated role of photosynthesis in the deposition of the banded iron-formation.

242. SMITH, F.G., SMITH, M.I., Univ. Toronto (Geology):

Maintenance of ALKHAL, a bibliographic file on a class of molten salts, 1963-85.

The subject is any publication dealing with the liquidus of salt systems which contain one or more of the alkali (or ammonium) halides (or nitrites or nitrates). The file is substantially complete from 1850 up to the current issues of Chemical Abstracts, but only items published before 1976 are being added to the computer-accessible file.

243. SPOONER, E.T.C., GALE, N.H., Univ. Toronto (Geology), Univ. Oxford:

The isotopic composition of lead in metalliferous sediments ("Umbers") associated with ophiolitic rocks in Cyprus, Syria and Oman, 1977-78.

Metal enriched iron-manganese hydroxy-oxide sediments occur in pockets within and immediately above ophiolitic mafic pillow lavas in Cyprus, Syria and Oman. In Cyprus this material is worked as a source of exceptionally high quality umber pigments. It is extremely fine-grained and remarkably free of impurities. It has been suggested that the deposit is an inorganic hydroxy-oxide precipitate which formed during interaction of discharged, reduced hydrothermal fluid with oxidised sea-water. If this were the case, the metals were probably derived by leaching of underlying basaltic rocks. This hypothesis has been tested by determining the 208/204, 207/204, and 206/204 isotopic ratios of lead contained in eighteen umber samples. The ratios obtained are indistinguishable from those of analysed deep sea basaltic rocks and define a field completely separate from the field of sea-water lead determined by analysis of deep-sea "manganese" nodules. Hence, the hydrothermal discharge hypothesis has been confirmed.

245. STONELL, R., CHOU, C-L., ANDERSON, G.M., Univ. Toronto (Geology):  
Trace element distributions in nepheline syenites, 1976-78; M.Sc. thesis (Stonell).

**See:**

Rare earth element distributions in nepheline syenites, Haliburton-Bancroft area, Ontario; Trans. Am. Geophys.Union, v. 58, p. 533, 1977.

Major and trace elements, including rare earths, have been analyzed in nepheline syenites from the Haliburton-Bancroft area using instrumented neutron activation techniques. Samples from the York River area include nepheline gneisses and pegmatites. Four nepheline gneiss samples, which may have formed by metasomatism of lime-bearing paragneisses, have similar REE patterns, i.e., enriched in light REE (La = 50X chondritic) and with flat heavy REE patterns (12X chondritic). These patterns are comparable to, but slightly lower in La/Yb ratios than, typical Precambrian sediments. The nepheline pegmatites are significantly lower in REE than nepheline gneisses, which may be interpreted either as a primary feature or as a result of leaching during metasomatism. Some igneous-textured nepheline syenites from Trooper Lake, Laronde Creek and Tory Hill areas have been analyzed. A systematic increase of the REE content with decreasing Eu/Sm ratio has been found among Laronde Creek samples ranging from nepheline syenite to nepheline gabbro, presumably as a result of fractional crystallization. Two distinct REE patterns have been found in granites from Tory Hill; one has a steep-sloped and smooth pattern and the second has a negative Eu anomaly, indicating feldspar fractionation.

**GENERAL**

245. APPELYARD, E.C., Univ. Waterloo (Earth Sciences):  
Studies of metasomatic and altered rocks, 1974-.
- Studies are in progress on epizonal to katozonal processes termed nephelinization, scapolitization, feldspathization, fenitization, spilitization, and hydrothermal alteration.
246. APPELYARD, E.C., PLUNKETT, H.C., Univ. Waterloo (Earth Sciences):  
Occurrences and geochemistry of scapolite in the Haliburton-Renfrew area, Ontario, 1976-78; M.Sc. thesis (Plunkett).
- Alkaline gneisses are associated temporally and spatially with scapolitic gneisses in the Grenville Supergroup in eastern Ontario. Both may be the result of anatexis within the upper crust caused by fusion of saline evaporites under high temperature prograde metamorphism. Geochemical studies are being undertaken to test the hypothesis.
247. BRAND, U., VEIZER, J., Univ. Ottawa (Geology):  
Geochemistry of the Lower Paleozoic carbonates and associated fossils of Somerset, Griffith and Cornwallis Islands, Arctic Canada, 1976-78; Ph.D. thesis (Brand).

Preliminary geochemical results indicate that diagenetic alteration of the class Crinoidea Miller is related to their original mineral phase (Mg-calcite), the composition and volume of the diagenetic solution(s) and the parameters controlling the diagenetic system. The high Sr values from the Arctic carbonates suggests a partially closed diagenetic microenvironment. Geochemical studies of the order Rugosa suggest an original low-Mg calcite mineralogy of their shell in contrast to their recent aragonitic counterparts.

248. BRISTOW, Q., Geol. Surv. Can.:  
Geochemical technology development, 1976-.
249. FRYER, B.J., EDGAR, A.D., GILL, R.C.O., Memorial Univ. (Geology), Univ. Western Ontario (Geology), Oxford Univ.:  
Comparison of REE distributions, in eudialytes, mafic and felsic minerals in rocks of the Ilmaussaq Intrusion, western Greenland, 1977-78.
- See:**  
Significance of rare earth distribution in coexisting minerals of peralkaline undersaturated rocks; Contr. Mineral. Petrol., v. 61, p. 35-48, 1977.
250. GARRETT, R.G., Geol. Surv. Can.:  
Geochemical data systems, 1975-.
251. GOODFELLOW, W.D., Geol. Surv. Can.:  
Regional geochemistry, Yukon Territory, 1977-.
- See:**  
Uranium in Nisling Range alaskite and related rocks of Yukon crystalline terrane: Discussion; Geol. Surv. Can., Paper 78-1A, p. 555, 556, 1978.
252. JOHNSTON, L.M., INCH, K.J., JACKSON, R.E., Fisheries-Environment Canada (Water Res. Br.):  
The mobility of trace elements in groundwater flow systems in varied geological environments.
- Various methods for the sampling, preservation and where necessary, analysis of groundwater for trace elements and related parameters are being developed. These methods are being applied to the study of trace element mobility in groundwater flow systems at Chalk River Nuclear Laboratories, and selected sites in the Maritimes and Ontario. As well, the seasonal variations of these parameters are being monitored.
253. KERRICH, R., FRYER, B.J., Univ. Western Ontario (Geology):  
Archaean auriferous hydrothermal systems, 1976-78.
254. KERRICH, R., FYFE, W.S., ALLISON, I., Univ. Western Ontario (Geology):  
Yellowknife geochemistry, 1975-78.
255. KUEHNER, S.M., EDGAR, A.D., Univ. Western Ontario (Geology):  
Geochemistry and petrology of rocks of the Leucite Hills, Wyoming, 1978-79; M.Sc. thesis (Kuehner).

256. MASON, D.R., SCHWERDTNER, W.M., Univ. Toronto (Geology):  
 Geochemical relationships between relic greenstone belts and grey gneiss, Superior Province, Ontario, 1977-79.  
 The project will shed light on the origin and development of the ubiquitous 'grey gneiss', a highly deformed and petrologically variable unit of the Wabigoon volcanic-plutonic belt within the Geotraverse area of the Archaean. Previous field work has shown that there are numerous small relic greenstone belts lying in the grey gneiss, implying that there was greenstone material in existence prior to development of the grey gneiss. However, there is an opposing school of thought which considers that greenstone material formed as volcanic piles on a gneissic basement. To clarify the possible relationships between the greenstone material and the grey gneiss, laboratory geochemical work is planned for the samples collected during the summer field season. The laboratory work will concern whole-rock major and trace element studies, as well as microprobe studies of ferromagnesian (hornblende and biotite) mineral phases.
257. PARSLow, G.R., WALTERS, B.R., HARTLING, A.A., DUNNING, N., WALKER, N., Univ. Regina (Geological Sciences):  
 Uranium in Saskatchewan (exploration in lake covered areas, host rocks of deposits), 1975-; M.Sc. theses (Hartling, Dunning, Walker).
258. REARDON, E.J., FRITZ, P., Univ. Waterloo (Earth Sciences):  
 Carbon isotope evolution of groundwaters in the unsaturated zone, 1977-78.  
 A detailed study of CO<sub>2</sub> variations in the unsaturated zone soil and water phases in areas of groundwater recharge and their <sup>13</sup>C isotopic composition to understand carbon isotopic evolution during groundwater recharge and its importance in performing <sup>14</sup>C adjustments and to determine absolute ages for groundwater pour systems.
259. SLAWSON, W.F., Univ. British Columbia (Geophysics and Astronomy):  
 Oxygen isotopes in hydrological studies, 1977-.  
 To test the postulate that there exists in both space and time a body of groundwater with an uniform <sup>18</sup>O/<sup>16</sup>O ratio. During May, W.F. Slawson designed, constructed and installed five lysimeters to sample free groundwater. The installation is on the grounds of the U.B.C. Climatological Station. Each lysimeter is expected to collect free groundwater from a specific depth to a depth of 80 cm. The maximum depth dictated by a thick layer of dense clay. Arrangements have been made to have the contents of the rain gauge deposited into a special collection bottle. The unusually fine summer weather has precluded recovery of groundwater to the date of this report. A soils profile was constructed for the lysimeter site. In conjunction with this profile the following data were determined: bulk density; % fines less than 2 mm; sand-silt-clay particle size analysis; total carbon, iron and aluminum and water pH.
260. SMITH, F.G., Univ. Toronto (Geology):  
 Computer programs for statistical processing and compilation of mineral compositions, 1975-80.  
 Mathematical analysis of sets of chemical analyses of any one mineral shows that there is gross error if the assumptions are made that the probability distribution is normal (gaussian) or log-normal. The expected distribution is a beta p.d.f., and computer programs to determine the two shape parameters of a best-fit beta distribution have been written and are now being tested.
261. SMITH, I.E.M., GOODWIN, A.M., Univ. Toronto (Geology):  
 Trace element geochemistry of Archean volcanic piles, 1976-78.  
 Detailed field studies have defined a progression from geochemically primitive rocks in the lower parts of Archean volcanic piles through intermediate types to evolved rocks at the top. Trace element work on samples collected across major boundaries between rock types can place constraints on the nature of processes which gave rise to the different rock types. In turn, this work can lead to a better understanding of Archean tectonic environments.
262. STEGER, H.F., FAYE, G.H., CANMET (EMR):  
 Thiosalt formation, 1976-78.
263. STEGER, H.F., FAYE, G.H., DESJARDINS, L.E., CANMET (EMR):  
 Oxidation of sulphide ores and minerals, 1973-.  
 Samples of pyrrhotite, pyrite, chalcopyrite, galena, sphalerite and chalcocite which were subjected to 52°C and 68% rel. humid. for up to 5 weeks have been analyzed for the various oxidized metal and sulphur-bearing components of the oxidation products to derive knowledge on the nature of the reaction(s), mechanism(s) and kinetic(s) of the oxidation of these minerals. The effect of temperature and rel. humid. on the oxidation of pyrrhotite is currently being investigated.
264. STEGER, H.F., FAYE, G.H., MARK, E., DESJARDINS, L.E., CANMET (EMR):  
 Effect of microwave radiation on moist sulphide-bearing ores and concentrates, 1976-77.
265. VEIZER, J., Univ. Ottawa (Geology):  
 Chemical evolution of sedimentary rocks, 1974-.
- See:  
 Diagenesis of pre-Quaternary carbonates as indicated by tracer studies; *Sedimentary Petrol.*, v. 47, p. 565-581, 1977.  
 Secular variations in iron and manganese distributions of carbonates; *Proc. 2nd Internat. Symp. Water-Rock Interaction*, v. 1, p. 97-104, 1977.  
 Continuation of major and trace element studies on sedimentary carbonate rocks revealed secular variations in their chemical composition (alkali metals, polyvalent metals, alkaline earths). These variations are consistent with postulated evolution of the continental crust, atmosphere and hydrosphere. Computer simulation of sedimentary recycling during geologic history is in final stages of calculations.

266. VEIZER, J., Univ. Ottawa (Geology):  
Geochemical facies indicators in carbonate rocks and shells, 1975-.
- See:  
Geochemistry of lithographic limestones and dark marls from the Jurassic of southern Germany; N. Jb. Geol. Pal., Abh. 153, p. 129-146, 1977.  
Sodium: Paleosalinity indicator in ancient carbonate rocks; Geology, no. 5, p. 177-179, 1977.  
Trace element studies of Arctic Paleozoic carbonates suggest that Na can be utilized as a paleosalinity indicator. The results indicate that early diagenetic dolomites are mostly hypersaline replacements of aragonitic muds, whereas the late diagenetic ones are hyposaline phreatic replacements of carbonate sediments with stabilized mineralogy.
267. WARREN, H.V., GOULD, C.E.G., Univ. British Columbia (Geological Sciences):  
An investigation into the possible role of some trace elements in the etiology of multiple sclerosis and other demyelinating diseases in humans, 1977-.  
For many years we have been investigating possible relationships between multiple sclerosis in particular, and neurological diseases in general. Lead has, for many years, been thought to be involved. However, work with animals has demonstrated clearly that both zinc and molybdenum may also, by interfering with copper metabolism, be involved. During the last eighteen months many examples have been found that link anomalous amounts of zinc with higher than normal prevalences of multiple sclerosis.
268. WILLEY, J.D., Geol. Surv. Can.:  
Formation and equilibrium of authigenic and syngenetic metal deposits in the marine environment, 1974-.

GEOCHRONOLOGY

269. ARMSTRONG, R.L., MISCH, P., BROWN, E.H., Univ. British Columbia (Geological Sciences), Univ. Washington:  
Geochronometry of Cascade Mountains, Washington-British Columbia, 1975-80.
270. ARMSTRONG, R.L., MONGER, J., WOODSWORTH, G., PRETO, V., McMILLAN, W., GREEN, N., Univ. British Columbia (Geological Sciences), Geol. Surv. Can., British Columbia Dep. Mines Pet. Res. (Geol. Div.), Univ. Oklahoma:  
Sr isotopic composition - survey of plutons and volcanic rocks in Interior (eugeosynclinal) British Columbia, 1974-85.  
Sr isotopic analyses have been completed on several suites from eugeosynclinal volcanic rocks and several plutons of the Intermontane Belt. Where sufficient spread of Rb/Sr ratio is found isochrons have been obtained. This work will be continued and extended to characterize all major tecton - stratigraphic units and most named larger plutons.
271. ARMSTRONG, R.L., SOUTHER, J., GREEN, N., WATTERS, B., READ, P., NICHOLLS, J., Univ. British Columbia (Geological Sciences), Geol. Surv. Can., Univ. Oklahoma, Univ. Regina (Geological Sciences), Univ. Calgary (Geology):  
K/Ar geochronometry and Sr isotope studies of Late Cenozoic volcanic rocks, 1975-78.  
New K/Ar dates and numerous Sr isotopic analyses have been completed for all major volcanic groups of Late Cenozoic age in the Canadian Cordillera. K/Ar dating continues.
272. ARMSTRONG, R.L., WYNNE-EDWARDS, H.R., PRAKASH, R., Univ. British Columbia (Geological Sciences):  
Geochronometry of: 1) metamorphic rocks in upper plate of major Himalayan thrust sheets near Askot and Almora, and 2) Precambrian of the Indian Shield, 1976-77.  
A Precambrian ( $\approx$  1.6 b.y.) whole-rock Rb/Sr isochron has been obtained for schists and gneisses near Askot that were recrystallized during the late Cenozoic. A second isochron (2.7 b.y.) has been obtained for Babina Gneiss of the Indian Shield.
273. BAADSGAARD, H., Univ. Alberta (Geology):  
Isotope geology of Precambrian (and western Canadian) polymetamorphic rocks, 1976-79.  
See:  
Determination of the  $^{87}\text{Rb}$  decay constant; Geochim. et Cosmochim. Acta, v. 41, p. 1745-1751, 1977.  
Acquisition of a new Micromass 30 solid-source mass spectrometer has made possible a doubling of the analytical output of our isotope laboratories. With an extra 800-1000 highly precise mass analyses per year, the rate of progress on individual projects will be accelerated markedly.
274. BAADSGAARD, H., COLLERSON, R., DAVIS, D.W., Univ. Alberta (Geology), Memorial Univ. (Geology):  
Geochronology of the western edge of the Archean North Atlantic craton in Labrador, 1974-.  
The area thus far studied has proven to be very strongly disturbed by later metamorphism, thus complicating any interpretations.

275. BAADSGAARD, H., CUMMING, G.L., MORTON, R.D., HOEVE, J., Univ. Alberta (Geology, Physics), Saskatchewan Research Council (Mineral Res. Div.): U-Pb geochronology and variation in the Precambrian uranium deposits of northern Saskatchewan, 1977-.
276. BAADSGAARD, H., LAMBERT, R. St. J., BANKS, C., Univ. Alberta (Geology):  
A weakly metamorphosed Archean inlier in the central Hudsonian orogenic belt, northwestern Saskatchewan - south-central Northwest Territories, 1975-; M.Sc. thesis (Banks).  
The K-Ar reconnaissance to determine the extent of the relatively unmetamorphosed Archean rocks is completed. Further geochronology by Rb-Sr and U-Pb is contemplated to prove the Archean time assignment and more firmly fix the chronology of the area.
277. BAADSGAARD, H., MCGREGOR, V., Univ. Alberta (Geology), Geol. Surv. Greenland:  
The time and nature of the emplacement of the type Nûk gneiss, Godthaab (Nûk), western Greenland, 1977-78.  
There is argument about the mode of formation of the rocks called Nûk gneiss in West Greenland. This study hopes to be able to offer information towards establishing their origin as primary igneous or by secondary remobilization.
278. BAADSGAARD, H., WILLIAMS, G.D., Univ. Alberta (Geology):  
K-Ar dating of bentonite horizons from the Alwinal no. 2 shaft: rates of sedimentation and unconformities in the Upper-Middle Cretaceous of southeastern Saskatchewan, 1977-78.  
An opportunity to improve earlier work from poor samples collected from an earlier shaft sinking. We have obtained four times the number of samples and of very good quality and should be able to precisely confirm our earlier estimates of unconformities and rates of sedimentation.
279. BAADSGAARD, H., WINZER, S., Univ. Alberta (Geology):  
Geochronologic investigation of the time(s) and nature of metamorphism in the central Kootenay Arc around Kootenay Lake, British Columbia, 1972-77; Ph.D. thesis (Winzer).  
Progress has been very slow since every study gave rise to new problems. In addition, until highly precise Sr isotopic measurements could be undertaken, key data was unavailable. The obtaining of a negative age whole rock Rb-Sr isochron from a metamorphosed pluton necessitated a great deal of study on separated minerals, for example. U-Pb on zircons and separated minerals have proven to be necessary to resolve several problems.
280. BLOY, G., BAADSGAARD, H., Univ. Alberta (Geology):  
U-Pb isotope study of uranium mineralization in the East Arm of Great Slave Lake, Northwest Territories, 1975-77; M.Sc. thesis (Bloy).  
Secondary re-mobilization and extensive alteration characterize the U-mineralization of the study area. Original emplacement was apparently close to 1400 m.y. ago, but alteration appears to have intermittent occurred up to recent times.
281. BRIGGS, N.D., WESTGATE, J.A., Univ. Toronto (Scarborough-Geology):  
Fission-track dating of Quaternary rhyolitic domes and pyroclastic deposits, North Island, New Zealand, 1974-79.  
Obsidians from rhyolitic domes in the Lake Taupo and Maroa Volcanic Centres are being dated using the fission-track method. The domes are associated with major ash-flow eruptions, caldera collapse, and eruption of small-scale ash flows and air-fall tephra within each of the centres. Fission-track dates are also being run on several of the pyroclastic units within the Castlecliffan (Middle Pleistocene) sequence in the Bay of Plenty region.
282. CORMIER, R.F., Saint Francis Xavier Univ. (Geology):  
Rb/Sr geochronology of the granitic rocks of the northern Appalachians, 1965-.
- See:  
A radiometric age of deformed granitic rocks in north-central New Brunswick; Can. J. Earth Sci., v. 14, p. 1687-1689, 1977.  
Several whole-rock isochrons have been measured for granites in the Cobequid highlands of northern Nova Scotia and reconnaissance studies have been carried out in the Antigonish highlands. Detailed whole-rock and mineral age studies are in progress on rocks from the South Mountain batholith from Halifax to its southern extremity near Yarmouth. Several granitic ages have been measured in New Brunswick in the St. George batholith and its vicinity and in central New Brunswick.
283. DAVIS, D.W., GRAY, J., CUMMING, G.L., BAADSGAARD, H., Univ. Alberta (Physics, Geology):  
A redetermination of the decay constant of  $^{87}\text{Rb}$ , 1975-77; Ph.D. thesis (Davis).  
See:  
Determination of the  $^{87}\text{Rb}$  decay constant; Geochim. et Cosmochim. Acta, v. 41, p. 1745-1751, 1977.  
The directly determined constant reported in the above paper has met with general acceptance in the fraternity of geochronologists. It can be improved, however, and a fresh batch of very special  $\text{RbClO}_4$  has been prepared and set aside for a future repeat of measurement.
284. DOIG, R., McGill Univ. (Geological Sciences):  
Rb-Sr geochronology and evolution of the Grenville Province, 1969-.
- See:  
Rb-Sr geochronology and evolution of the Grenville province in northwestern Quebec, Canada; Bull. Geol. Soc. Am., v. 88, p. 1843-1856, 1977.  
Regional Rb-Sr geochronological studies in the Grenville province have been extended to the east of the LaVérendrye Park area (Doig, 1977) and along the north shore of the Gulf of St. Lawrence.

- Preliminary results from the section between Sept-Iles and Havre St-Pierre allow us to identify limited areas of metasedimentary rocks first metamorphosed some 1450 m.y. ago. Extensive plutonism (granitic and syentic rocks) occurred at various times over the period 975 to 1420 m.y. ago.
285. FLETCHER, I.R., FARQUHAR, R.M., Univ. Toronto (Physics):  
Lead isotope studies of lead mineralization in Grenville and related sedimentary rocks, 1973-79; Ph.D. thesis (Fletcher):  
Developments in techniques (improved filament loading, double spiking) of isotopic lead analysis have improved reproducibility of isotopic ratio measurements. Analyses suggest that volcanogenic-exhalative sulphide deposits in or related to the Grenville have derived their lead component from a source having lower than continental average ratio of uranium/lead. Other types of deposits appear to be related to these volcanogenic deposits isotopically, with a few exceptions. The data bank of analyses is being extended.
286. FOLINSBEE, R. E., BAADSGAARD, H., COSTACHUK, S., Univ. Alberta (Geology):  
Zircon geochronology of granites from the Ghost River area, Northwest Territories, 1972-78; M.Sc. thesis (Costachuk).  
It is hoped to discover possible pre-2600 m.y. Archean granites in the areas.
287. FRAREY, M.J., Geol. Surv. Can.:  
Correlation and geochronological studies in the Canadian Shield, 1975-.
288. GODFREY, J., BAADSGAARD, H., Univ. Alberta (Geology), Alberta Research Council (Geology Div.):  
Geochronology of the northeastern Alberta Precambrian shield, 1957-80.  
By the spring of 1978, a two-hundred sample K-Ar reconnaissance of the whole area will be completed. The Rb-Sr of the batholithic western area will take another year and the zircon chronology still another. By 1980 the total area will be covered by three dating methods and its tectonic history tied into the adjacent Canadian shield.
289. GOFF, S., BAADSGAARD, H., Univ. Alberta (Geology):  
Rb-Sr dating of the Pearson volcanics, East Arm, Great Slave Lake, Northwest Territories, 1977; Ph.D. thesis (Goff).
290. HAMILTON, T., BAADSGAARD, H., Univ. Alberta (Geology):  
Relative age and Sr isotopic composition of the volcanic flows of Level Mountain, British Columbia, 1977-78; Ph.D. thesis (Hamilton).  
An Sr isotope study should enable the comparison of these volcanics to mantle-derived volcanics as well as test their homogeneity and source. Rb-Sr and K-Ar dating will enable a chronology of the eruptions to be established.
291. HIGGINS, M., DOIG, R., McGill Univ. (Geological Sciences):  
The age and origin of the Sept-Iles anorthosite suite, Québec, 1975-78; Ph.D. thesis (Higgins).  
See:  
540-Myr-old anorthosite complex in the Grenville Province of Quebec, Canada; Nature, v. 267, no. 5606, p. 40-41, 1977.  
The Sept-Iles anorthosite suite consists of a roughly horizontal sequence of anorthosite, grading upwards into layered gabbro, followed by monzonite and adamellite. Parts of two summers have been spent in the field examining the relationships between the various members of the suite, and extensively sampling the units for isotopic and geochemical studies. All the isotopic work has been concluded. Briefly, all rock units yield ages of approximately 550 m.y. These rather startling results (the suite had been considered to be of "Grenville" age) have important ramifications with regard to the origin of such anorthosites, to the associated (in time) alkaline rift-related rocks, and perhaps to the role of anorthosites in the Grenville province. Initial  $^{87}\text{Sr}/^{86}\text{Sr}$  ratios of all units are low, discounting the possibility that the granitic members are melted country rocks. Ages were obtained from the anorthosite itself from samples of very rare pegmatitic patches bearing sufficient rubidium which are clearly gradational and in equilibrium with pegmatitic anorthosite.
292. HUANG, Y.F., FARQUHAR, R.M., Univ. Toronto (Physics):  
Uranium concentrations and fission tracks in quartz, 1972-80; Ph.D. thesis (Huang).  
See:  
Discharge counter for the determination of uranium in water by the fission track method; Rev. Sci. Instrum., v. 48, p. 1005-1009, 1977.  
Fission tracks from the bombardment of quartz and flint by fission products from  $^{252}\text{Cf}$  have been recorded by etching polished surfaces of these minerals. Other quartzes will be examined for induced tracks, and searches for fossil tracks due to the fission decay of  $^{235}\text{U}$  will be undertaken.
293. HUNTLEY, D.J., WINTLE, A.G., Simon Fraser Univ. (Physics):  
Thermoluminescence dating of ocean sediments, 1977-.
294. KARROW, P.F., HUNTLEY, D.J., Univ. Waterloo (Earth Sciences), Simon Fraser Univ. (Physics):  
Thermoluminescence of tills as a possible dating method in the Quaternary, 1977-80.
295. KESMARKY, S., BAADSGAARD, H., Univ. Alberta (Geology):  
The rates of migration of alkali and Sr ions in a heated quartz monzonite, 1974-77; M.Sc. thesis (Kesmarky).  
An activation step was found for Pb, but not Sr, in the thermal migration at 890°C in quartz monzonite minerals. The rate of migration of both elements proceeds according to the square root of

- the time of migration, even for very long (1000 hours) time. The flux of the migration depends upon the relative stability of the minerals and whether or not a mineral acceptor site is present for the migrating species.
296. KONTAK, D., BAADSGAARD, H., Univ. Alberta (Geology):  
The time and nature of the uranium mineralization in central Labrador, 1977-79; M.Sc. thesis (Kontak).  
The major intrusives (country or host rock units) in the area are to be dated by six Rb-Sr isochrons. A detailed U-Pb study on the uranium mineralization of each paragenesis is to be carried out. Some eight areas of mineralization will then be compared.
297. KROGH, T.E., BREAKS, F.W., BOND, W.D., Ontario Geol. Surv.:  
Geochronology of the English River Subprovince, northwestern Ontario, 1977-.
298. KROGH, T.E., NUNES, P.D., Royal Ontario Mus. (Mineralogy and Geology):  
U-Pb isotopic dating: tests, methods, and results.  
Development and testing of rapid ultra low contamination methods for U-Pb analyses of zircons; measurement of age and duration of volcanic and igneous processes that produced Archean crust; and studies on the effect of chemical alteration on U-Pb isotopic ages in zircons.
299. LERBEKMO, J.F., BAADSGAARD, H., EVANS, T., Univ. Alberta (Geology, Physics):  
Magnetic reversals, palynology and K-Ar dating at an area near the Cretaceous-Tertiary boundary in Alberta, 1977-78.  
A re-measuring of the date of the end of the Cretaceous as well as dating of the last magnetic reversal in the Upper Cretaceous should emerge from this. Cross-correlation of the fossil record, paleomagnetic, stratigraphic and geochronologic methods will help us to find out what we really consider this important time boundary to be.
300. LONGSTAFFE, F.W., BAADSGAARD, H., Univ. Alberta (Geology):  
K, Ca, Rb, Sr isotopic variations in the salts of the Devonian evaporite sequence in Saskatchewan, 1977-80.  
Little work has been done on the isotopic variation in the salts of evaporite deposits. This project should contribute some fundamental information on the formation and subsequent diagenesis of these particular deposits.
301. MATHEWS, W.H., Univ. British Columbia (Geological Sciences):  
Anomalous dates from the Shuswap gneisses of the north Okanagan area, British Columbia, 1973-.  
Dating of gneisses, phyllites, and Tertiary lavas by K-Ar, and fission track on apatite, zircon and sphene is continuing.
302. PARRISH, R., DUNCAN, I., ARMSTRONG, R.L., GREENWOOD, H.J., Univ. British Columbia (Geological Sciences):  
Geochronologic and tectonic studies of crystalline rocks of British Columbia, 1977-78; Ph.D. theses (Parrish, Duncan).  
1. Fission track geochronometric study of crystalline rocks of the coast and Columbia mountains: Using apatite fission-track methods, the cooling history of rocks along traverses across two important mountain ranges of British Columbia will be studied to infer 1) uplift rates during the Tertiary period, 2) amounts of cumulative uplift and erosion, 3) the geomorphological consequences of the above data as applied to the evolution of the present landscape, and 4) the nature of the late Tertiary (latest Miocene-Recent) deformation.  
2. K-Ar, Rb-Sr, and fission track geochronometry of crystalline rocks, Omineca Crystalline Belt, British Columbia: Using a multi-technique approach on metamorphic rocks from the Shuswap and Wolverine complexes, as well as Mesozoic plutonic rocks of southeastern British Columbia, the cooling histories of these rocks will be determined. The nature of the Eocene thermal event will also be studied, and the timing of deformation and high-grade metamorphism in the Shuswap and Wolverine complexes will also, hopefully, be ascertained.
303. REYNOLDS, P.H., MUECKE, G.K., ZENTILLI, M., Dalhousie Univ. (Geology):  
<sup>40</sup>Ar/<sup>39</sup>Ar dating studies: diabase dikes from the Grenville Province; granites and slates from Nova Scotia; plagioclase release patterns, 1975-79; Ph.D. thesis (Reynolds).  
Diabase dikes from the Grenville Province: Detailed <sup>40</sup>Ar/<sup>39</sup>Ar analyses have been carried out on two suites of dikes. It appears that the argon ages of these rocks are controlled by small quantities of K-rich accessory minerals (probably biotite). The data provide in effect probable lower limits to the ages of the paleopoles which have been defined in previous magnetic investigations.  
Granites and slates from Nova Scotia: Our age study of the major granitic plutons of southwest Nova Scotia is nearing completion. Altogether, some 35 mica concentrates have been analyzed by either the <sup>40</sup>Ar/<sup>39</sup>Ar or the conventional K-Ar method. The resulting argon age pattern appears to correlate very well with the regional metamorphic zonation. Initial results have been obtained on a selection of slate samples from the Meguma Group. Well-defined plateau ages at 410 Ma have been interpreted as a minimum value for the time of initiation of the Acadian Orogeny in Nova Scotia. This value is substantially higher than the older time limit as derived from well-established stratigraphic constraints.  
Plagioclase release patterns: Graduate student, V. Stukas has found that volcanic and hypabyssal plagioclases can, in certain instances, yield meaningful results from well-defined age plateaus. In general, however, the age spectra are complex and difficult to unambiguously interpret.

304. RUNKLE, D., HARRISON, M., ARMSTRONG, R.L., CLARK, G.C., LEWIS, T., WOODSWORTH, G., Univ. British Columbia (Geological Sciences), Geol. Surv. Can.:
1. Geochronometry of Esctall, Quottoon and related plutons and surrounding metamorphic complex. 2. Geology of Hawkesburg Island and vicinity, British Columbia, 1975-77; M.Sc. thesis (Runkle), B. Sc. thesis (Harrison).
- Rb/Sr whole rock and mineral dates, K/Ar mineral dates, and fission track dates (for epidote, sphene, zircon and apatite) give emplacement age and cooling history curves for plutons in the Prince Rupert-Terrace portion of the Coast Plutonic complex. Preliminary whole rock Rb/Sr data suggest a Precambrian/Lower Paleozoic age for schists and gneisses along the western side of the plutonic complex. The cooling curves for the Quottoon Pluton are being reproduced by cooling models based on measured heat production, conductivity, and uplift rate. Mapping of Hawkesburg Island is completed and report preparation in progress.
305. SCOTT, K.L., ARMSTRONG, R.L., MULLER, J., Univ. British Columbia (Geological Sciences), Geol. Surv. Can.:
1. Sr isotopic study, igneous rocks of the Insular Belt, British Columbia, 2. The Alert Bay volcanic belt, 1975-80.
306. SHORE, P., ARMSTRONG, R.L., RUSSELL, R.D., SLAWSON, W.F., Univ. British Columbia (Geological Sciences):
- U-Pb dating of zircon, southwestern British Columbia, 1977-79.
- A U/Pb dating laboratory for zircon separates is being completed. Mineral separation and mass spectrometry are operational. The immediate goal is sample dissolution and preparation for mass spectrometry under clean laboratory conditions, and preparation and calibration of spikes. Initial samples to be dated will come from the Coast Mountains and Insular Belt of southwestern, British Columbia.
307. TUREK, A., Univ. Windsor (Geology):
- Geochronology of Lake Superior region, 1977-80.
- To establish the geochronology of Precambrian rock from the Wawa belt westward. Age determinations will be made using Rb-Sr and U-Pb methods. In addition rare earth and trace element analyses will be carried out and integrated with the geochronology study to arrive at a more comprehensive model for the evolution of the early Precambrian crust.
308. ULRIKSEN, C.E., ZENTILLI, M., Dalhousie Univ. (Geology):
- Geological and metallogenetic evolution of the Coastal Cordillera of Chile between latitudes 25° and 26° south, 1977-78; M.Sc. thesis (Ulriksen).
- The Coastal Cordillera of the Andes at this latitudes consists of a folded and metamorphosed basement with Palaeozoic granites and a succession of volcanic or sedimentary rocks of Mesozoic age intruded by the several phases of the coastal batholith, whose age ranges from Jurassic to Cretaceous or younger. Iron, gold, copper and other mineralization is associated with plutonic bodies, and structures. Block faulting and transcurrent faulting has affected the area, and Late Tertiary gravels and ignimbrite sheets cover the valley bottoms. The project attempts to date the different phases of the coastal batholith and associated mineralization using the K/Ar and  $^{39}\text{Ar}/^{40}\text{Ar}$  methods. Field mapping has been completed.
309. WANLESS, R.K., Geol. Surv. Can.:
- Isotopic study of mica-bearing rocks yielding anomalous K-Ar 'ages', 1965-.
310. WANLESS, R.K., Geol. Surv. Can.:
- Geochronological research and control studies, 1973-.
311. WERNER, L.J., BULTMAN, T., ARMSTRONG, R.L., MONGER, J., RODGERS, J., Univ. British Columbia (Geological Sciences), Yale Univ., Geol. Surv. Can.:
- Geology-geochronometry of Atlin Lake- Juneau Ice Field, British Columbia, 1973-78; M.Sc. thesis (Werner), Ph.D. thesis (Bultman).
- See:
- Metamorphic terrane, Northern Coast Mountains west of Atlin Lake, British Columbia; Geol. Surv. Can., Paper 78-1A, p. 69, 70, 1978.
- An area extending from the Atlin Horst across the Laberge Trough into the central crystalline complex of the Coast Mountains has been mapped in detail. Plutons of many ages ranging from lower Triassic to Early Cenozoic have been dated by K/Ar and Rb/Sr. Preliminary results suggest a Precambrian or Paleozoic age for high grade metamorphic rocks in the Coast Mountains, pre-Early Triassic regional metamorphism, extension of the King Salmon thrust along the west side of the Laberge Trough into the Yukon, and Cretaceous age of the thrust.

## GEOLOGICAL COMPUTER APPLICATIONS

312. DITSON, G.M., SINCLAIR, A.J., Univ. British Columbia (Geological Sciences):  
Metallogeny of the Vancouver and Hope (west half) map sheets, 1975-78; M.Sc. thesis (Ditson).  
Compilation of computer file and related output completed in May, 1977. Data on commodities, deposit types, host rock types and host rock ages cross-checked for correlations. Time-space chart displaying distribution of formations, rock types, deformation and mineralization across six tectonic belts near completion.
313. RUCKLIDGE, J.C., RYLAARSDAR, J.C., GORTON, M.P., NIELSEN, P.A., Univ. Toronto (Geology):  
Automatic instrumental analysis of rocks and minerals, 1975-79.  
The development of a system for the automatic bulk XRF and electron probe microanalysis of rocks and minerals has proceeded steadily. The use of CAMAC modules for interfacing the instruments to the computer has proved very successful, and the creation of programmes to collect and reduce data has been proceeding steadily. A sophisticated reduction programme for energy dispersive microanalytical data has been adapted to run on a PDP 11/10 laboratory computer. In 1977, an estimated 20,000 analyses have been performed on one instrument alone and, as other instruments come on line, the potential will be even greater.
314. STANGL, C.A., HAMILTON, W.N., Alberta Research Council (Geology Div.):  
Canadian index to geoscience data, 1974-.
315. WHITE, O.L., FENTON, S.L.A., KARROW, P.F., Univ. Waterloo (Civil Engineering), Ontario Geol. Surv.:  
Geotechnical data bank - Regional municipality of Waterloo, Ontario, 1972-78; M.A. thesis (Fenton).
316. WILLIAMS, G.D., Univ. Alberta (Geology):  
Coal deposits in the deep subsurface of the Canadian Plains, 1977-.  
To relate coal deposits as determined from petroleum borehole data to surface information and to establish models for depositional environments based on subsurface data from Lower Cretaceous coal measures in selected areas in western Alberta.
317. WILLIAMS, G.D., MURPHY, M., Univ. Alberta (Geology):  
Deep coal deposits in the Canadian Plains, 1972-79.  
Computer data files on coal seams intersected by approximately 4,500 petroleum boreholes in Western Canada are being built and verified as part of the National Coal Inventory Program.

## GEOMATHEMATICS

318. AGTERBERG, F.P., Geol. Surv. Can.:  
Probability models for estimating mineral potential, 1969-.
- See:  
A statistical model for the distribution of copper, lead, and zinc in the Canadian Appalachian region; Econ. Geol., vol. 73, no. 2, p. 230-245, 1978.
319. AGTERBERG, F.P., Geol. Surv. Can.:  
Mineral and energy resource evaluation: Probabilistic methods, 1976-.
320. FABBRI, A.G., Geol. Surv. Can.:  
Quantification of geological variables and geomathematical estimation of mineral potential for selected areas in Canada, 1972-.
321. FLINT, D.W., WILLIAMS, G.D., Univ. Alberta (Geology):  
Estimation of coal resource quantities by statistical methods, 1976-77; M.Sc. thesis (Flint).
322. GRUNSKY, E., ROBIN, P-Y.F., SCHWERDTNER, W.M., BAILEY, R.C., Univ. Toronto (Erindale-Geology):  
Numerical analysis of feldspar porphyroclasts from the Birch Rapid fault zone, Saskatchewan. Interpretation of the fabric obtained in terms of orienting mechanisms, 1974-78; M.Sc. thesis (Grunsky).  
Orientation of porphyroclasts in two mylonite samples from the Birch Rapid fault zone, Saskatchewan, is studied by digitization of their outlines in successive sections. A mathematical analysis of the data yield three principal directions and principal values for each porphyroclast. The study of their orientation with respect to the foliation, and of its dependence on various shape parameters provides information on the strain associated with mylonitization.
323. MAY, R.W., SCHWARTZ, R.W., Univ. Alberta (Geology):  
Application of statistical methods to the analysis of geologic data, 1975-.  
Current research is involved with multivariate statistical analysis of geochemistry of groundwater. In particular, studies include: (1) an assessment of factors controlling lakewater chemistry in an area east of Edmonton, Alberta, (2) an evaluation of geologic controls on variability of groundwater chemistry, and (3) the use of discriminant analysis to evaluate geochemical differences between aquifers in drainage basins.

## GEOMORPHOLOGY

324. BARNETT, D.M., Geol. Surv. Can.:  
Proglacial geomorphology, Generator Lake,  
District of Franklin, 1968-.
325. BIRD, J.B., ALGUS, M., DRAKE, P., McGill Univ.  
(Geography):  
Periglacial geomorphic processes in eastern Baffin  
Island, District of Franklin, 1976-80; M.Sc. theses  
(Albus, Drake).
- See:**  
Coastal morphology and terrain studies, Kivitoo  
Peninsula, Baffin Island; Geol. Surv. Can.,  
Paper 77-C, p. 53-55, 1977.  
Field season 1977 concentrated on comparison of  
denudation effecting cliffs at different localities  
on Kivitoo Peninsula with emphasis on mass  
wasting processes. The role of permafrost and  
related groundwater flow in development of cliff  
profiles was analysed. Baseline surveys of cliff  
morphology and position were extended to much of  
the northeast of the peninsula.
326. BRUECKNER, W.D., Memorial Univ. (Geology):  
Geomorphological studies in Newfoundland.  
Recent studies have shown that a major revision of  
the deglaciation history of southwestern  
Newfoundland is necessary. The role of pre-  
Quaternary periods of erosional planation is being  
investigated as well as relics of exhumed landforms  
(mid-Paleozoic in western Newfoundland and late  
Precambrian to the east in part of the Avalon  
Peninsula).
327. BRYAN, R.B., YAIR, A., LUK, S., DEPLOEY, J.,  
MORGAN, C., HODGES, W., SPORN, C., Univ.  
Toronto (Scarborough-Geography):  
1. Influence of soil aggregate properties on  
entrainment threshold velocities in sheetwash  
under intense rainfall (Bryan). Experimental  
laboratory flume project started in Uppsala,  
currently being completed with new equipment at  
Scarborough. Ultimate objective is to adapt  
Hjulstrom curve to varying soil and rainfall  
conditions. 2. Experimental flume study of  
sediment concentrations in relation to hydrograph  
stage in sheetwash (Bryan, Yair). Experimental  
study using a variety of soils from the Scarborough  
area in the flume at gradients varying between 0  
and 14 degrees with and without the addition of  
simulated rainfall. 3. Examination of factors  
contributing to variability of soil loss by sheetwash  
and rainsplash (Bryan, Luk). Experimental study  
using extensive replicate testing under simulated  
rainfall. Initial testing is on very small erosion  
plots, but plot size will gradually be increased in  
the laboratory and eventually in the field in  
attempt to determine an optimal size for erosion  
plot studies. 4. Assessment of the relative  
importance of surface and subsurface erosion in the  
development of small-order badland drainage basins  
in Alberta (Bryan, Yair, Hodges). Experimental  
field plot testing in Dinosaur Provincial Park using  
simulated rainfall, dye tracers and detailed  
monitoring of surface and subsurface water and  
sediment discharge. 5. Comparative testing of  
field and laboratory methods of assessing the  
erodibility of soils of southern Ontario (Morgan).  
Simulated rainfall testing on erosion plots in  
the Scarborough lab. and at four experimental  
sites in southern Ontario. Field data complete.
6. Mechanisms of soil crusting in selected soils  
under simulated rainfall and controlled drying and  
the effect of crusting on entrainment thresholds  
(Sporn). Experimental flume study at Scarborough  
using soils from 4 southern Ontario locations.  
7. Contribution of soil properties and surface  
crusting to differential erosion patterns in the Sde  
Boker experimental drainage basin, Negev desert,  
Israel (Yair, Bryan). Continuing experimental study  
with field work for May, June, July, 1978.
328. DESMARAIS, G., DUBOIS, J.M.M., Univ. Sherbrooke  
(Géographie):  
Géomorphologie quaternaire du bassin de la rivière  
Matamek, côte-nord du Saint-Laurent, 1975-78;  
thèse de maîtrise (Desmarais)
329. DUBOIS, J.M.M., Univ. Sherbrooke (Géographie):  
Bibliographie sur les caractéristiques physiques des  
cantons de l'est, Québec, 1971-.
- Voir:**  
Bibliographie sur les caractéristiques physiques des  
cantons de l'est supplément no. 3; Dép. Géogr.,  
Univ. Sherbrooke, Bull. de Rech. no. 29, 1977.  
Quatre rapports totalisant plus de 3,000 références  
ont été publiés à date pour couvrir tout le domaine  
physique des cantons de l'est. Les références sont  
regroupées par thèmes. L'acquisition de données est  
continue.
330. DUBOIS, J.M.M., BONN, F., Univ. Sherbrooke  
(Géographie):  
Recherches en cartographie automatisée appliquée  
à la géographie physique, 1976-78.  
Le but de ce projet est de monter et de rendre  
opérationnel une batterie de programmes intégrés  
afin de faire face aux besoins en matière de  
cartographie automatisée de gestion de banques de  
données des divers champs de la géographie  
physique.
331. FORD, D.C., McMaster Univ. (Geography):  
Geomorphology and hydrology of river canyons of  
the Ram Plateau, Mackenzie Mountains, Northwest  
Territories, 1975-78.  
A study of the morphology and current aqueous  
erosion of 'Camp' and 'Subject' canyons, two  
canyons typical of the small (10-100 miles<sup>2</sup>) canyon  
catchments developed upon Devonian limestones  
and dolomites of Ram Plateau, Nahanni Plateau,  
Tundra Ridge, etc., which are major elements of  
the Canyon Ranges sector of the Mackenzie  
Mountains. Discharge, suspended and solven load  
are monitored regularly and bed-load movement  
during floods is observed by pointed lines. Regime  
and solute load of active zone waters above  
permafrost in clays and silts, seepage waters from  
bedrock are observed. Three meteorological  
stations record temperature and precipitation over  
the 1300 m relief of the canyons.
332. FRENCH, H.M., LEWKOWICZ, A.G., Univ. Ottawa  
(Geology-Geography):  
Permafrost, ground ice and weathering studies,  
Banks and Victoria Islands, Northwest Territories,  
1968-80; Slopewash processes in an Arctic tundra  
environment; Ph.D. thesis (Lewkowicz).  
To document the nature and distribution of pingos  
and other ground ice forms on Banks Island and to

establish the frequency and magnitude of geomorphic process in high latitude permafrost environments, notably mass wasting (solifluction), slopewash, weathering, frost heave and coastal erosion. Attention has been concentrated upon pingos between 1974 and 1976, specifically, the age and origin,  $C^{14}$  dating techniques together with precise levelling and stratigraphy are main methods. In 1977, attention was focussed upon the importance of slopewash (overland flow and throughflow) as both a transporting and eroding agent upon slopes.

333. GREENWOOD, B., MCGILLIVRAY, D.G., Univ. Toronto (Scarborough-Geography):

Numerical modelling of sediment transport patterns in the Toronto waterfront and an assessment of the impact of man-made structures, 1975-79; Ph.D. thesis, (McGillivray).

See:

A theoretical model of the littoral drift system in the Toronto waterfront area, Lake Ontario; *J. Great Lakes Res.*, 1978.

To establish a computer simulation model to predict sediment transport patterns in the Toronto waterfront and calibrate the model with controlled field experiments. The model is then to be used to assess the impact of artificial structures on the sediment transport system.

334. GREENWOOD, B., PRICE, A.G., BRYAN, R.B., DWORKIN, J.W., Univ. Toronto (Scarborough-Geography):

Hydrodynamical, geotechnical and artificial controls on shoreline change in the Toronto waterfront: the assessment of a natural hazard, 1978-81; M.Sc. theses.

To provide an integrated physical and socio-economic assessment of the hazard generated by shoreline erosion in the Toronto waterfront, particularly in the area of high bluffs.

335. ONGLEY, E.D., RUTHERFORD, G.K., PERCIVAL, J., BYNOE, M., SIMON, A., Queen's Univ. (Geography):

Sediment-related nutrient and contaminant transfer in two southeastern Ontario creeks, 1977-79; M.Sc. theses (Percival, Bynoe, Simon).

Four sites on Wilton Creek and two on Millhaven Creek are sampled for suspended solids during each runoff event commencing with spring melt and extending to freeze-up. Sampling is conducted with continuous-flow centrifuge in order to retain some 10-20 g of solids. Concurrent sampling with USDH-48(58) samplers allow comparison of suspended solids flux with the estimate obtained from submersible pumping samplers which provide input into the centrifuges. The laboratory program includes totals of Cd, Fe, Pb, Zn, Cu, Mn plus sediment-related phosphorus (apatite P, non-apatite inorganic P and organic P). Standard analysis of Total P in stream water allows a check on total phosphorus budget. Organic-inorganic determinations and particle-size analysis of suspended sediment is made for each runoff event.

336. PALA, S., BOISSONEAU, A.N., COWAN, W.R., BLACHUT, S., Ontario Centre for Remote Sensing, Ontario Geol. Surv.:  
Physiography of northern Ontario, 1977-80.

See:

Physiography and surficial geology of northwestern Ontario; Ontario Division of Mines, M.P. 75, p. 159, 1977.

337. ROBERTSON, R.H., KUPSCH, W.O., Univ. Saskatchewan (Geological Sciences):

Waterfalls and rapids of the Precambrian Shield, northern Saskatchewan, 1976-78; M.Sc. thesis (Robertson).

The Precambrian Shield of northern Saskatchewan comprises the Archean and Proterozoic rocks of the Kazan Upland and the Athabasca Formation, a sandstone of Late Proterozoic age, of the Athabasca Plain. These two major physiographic units differ substantially in lithology, structure, and topography. Analysis of topographic maps and airphotos shows a close relationship between stream trends, stream magnitudes, lithology, and structure. An interdependence also exists between the geology, the geomorphology, and the occurrence of waterfalls and rapids. The present drainage on the Shield, particularly that of the Churchill River and other large streams flowing from the west to the northeast, developed during Late Cretaceous and Tertiary time. Lakes cover 35 to 40 per cent of the Kazan Upland whereas lakes comprise only 15 to 20 per cent of the Athabasca Plain. Their size and outline can be related to the underlying bedrock geology. Drainage density is greater on the Athabasca Plain than on the Kazan Upland. The drainage pattern on the Athabasca Plain exhibits a roughly radial arrangement of commonly meandering streams which only in a few areas appear to be structurally controlled. Streams on the Kazan Upland, where northeast-southeast structural trends dominate, exhibit a poorly developed trellis pattern. Classifications of streams according to their associated rock types and lithological-structural characteristics make it possible to correlate stream trends and lengths with various geologic factors. Mapping the structural trends illustrates the drainage patterns and their dependence on geologic structure. The Churchill River, which flows transversely to the prevailing structural trend, consists of a series of irregularly shaped lakes interconnected by short reaches of fast water. The largest number of whitewater occurrences is on the Archean rocks of the Kazan Upland, with the highest concentrations of whitewater associated with rivers flowing transversely to the general trend. Complex, composite contacts and fractures constitute the dominant types of geologic control on the occurrence of whitewater.

338. ST-ONGE, D.A., CARRIERE, H., GASCON, J., Univ. Ottawa (Géographie):

Contrôle du ravinement dans les Swan Hills, Alberta, 1976-80.

Méthodes de contrôles sont maintenant définies. La suite du projet a pour but de définir un facteur de résistance à l'érosion des matériaux géologiques. Ceci permettrait de définir, pour d'autres régions, des méthodes de prévention du ravinement suite à un déboisement.

ELECTRICAL

339. ANNAN, A.P., DAVID, L., GENDZWILL, D.J., Saskatchewan Dep. Energy, Mines Res. (Res. Geophysics), Univ. Saskatchewan (Geological Sciences):  
Radar sounding in potash mines, 1976-79.  
A new form of radar sounding, the impulse method, has been tested in Saskatchewan potash mines. The radar can only penetrate a few tens of feet into the rock salt but the new design permits resolution of reflecting targets even at such close range. Impulse radars differ from conventional pulse radars mainly in that the pulse length is much shorter, a few nanoseconds instead of milliseconds. Thus a great advantage is gained in higher resolution of nearby, closely spaced targets but the cost is a sharp reduction in power transmitted and a loss of directionality for the signal. Targets as close as a few inches can be resolved. In the potash mines, the reduced power of an impulse radar is not much of a disadvantage because some of the most interesting targets are only a few feet away but they are straight up in solid rock. The rock has an exponential rate of attenuation for all radar signals so that penetration is small and does not increase in proportion to radiated power. Consequently, the low power impulse system can obtain reflections at short range through the Prairie Evaporite rock salt but a conventional high power radar cannot obtain reflections at any range. Underground tests to date have shown good results in the detection of fractures, air filled or brine filled. Good results have also been obtained in monitoring some of the thin clay seams which occur above the potash beds. Some results also show the total thickness of salt cover over the mine.
340. BAILEY, R.C., EDWARDS, R.N., GARLAND, G.D., Univ. Toronto (Physics):  
Geomagnetic sounding of the crust and upper mantle in eastern North America, 1970-.  
Geomagnetic variation observations are being made at sites in eastern North America, currently in New York and Pennsylvania. These data are reduced to transfer functions which are then used to define the electrical structure of the crust and upper mantle.
341. BANKS, K.M., JAMES, D.E., EDWARDS, K.W., SCRIBNER, A.L., Roke Oil Enterprises Ltd.:  
Gamma ray-neutron logging systems; evaluation of in situ coal, 1973-.
342. BECKER, A., BAZINET, R., Ecole Polytechnique:  
Prospection géophysique en forage profond à l'aide des courants telluriques, 1977-79.  
L'objet du projet est la détection des gisements proches d'un sondage par la mesure de la distorsion des courants telluriques dans le forage.
343. BRISTOW, Q., Geol. Surv. Can.:  
Radiation instrumentation, 1976-.  
Adaptation and development of advanced technology for more rapid and comprehensive acquisition of radiometric data in various portions of the electromagnetic spectrum, in both laboratory, airborne, surface and subsurface situations.
344. DAVIS, J.L., Geol. Surv. Can.:  
In situ meter for measuring relative permittivity of earth materials, 1975-.  
See:  
Measuring soil water content in situ using time-domain reflectometry techniques; Geol. Surv. Can., Paper 77-1B, p. 33-36, 1977.  
Omnidirectional communications antenna; *ibid.*, p. 69-73, 1977.  
Electrical properties of Saskatchewan potash ore in situ; *ibid.*, p. 75, 76, 1977.
345. DYCK, A.V., Geol. Surv. Can.:  
Borehole geophysics (electrical and magnetic techniques), 1974-.
346. ELLIOTT, H.M., Fisheries-Environment Canada (Water Res. Br.):  
Geophysical survey-Strait of Canso, Nova Scotia, 1974-78.
347. GENDZWILL, D.J., PANDIT, B., Univ. Saskatchewan (Geological Sciences):  
Electromagnetic sounding to determine salt back thickness in potash mines, 1975-.  
Using a computer program designed by A.J. Sinha, Geological Survey of Canada, we computed electromagnetic response parameters for a layered earth which was designed to simulate conditions in a Saskatchewan Potash mine. The objective was to design a coil system for optimum sensitivity to the thickness of salt over the mine and with minimum interference from features such as narrow clay bands in the salt or thick clay bands above the salt. The optimum configuration as calculated is a coplanar coil system, separation 8 meters, frequency about 30KHz. Using normal circumstances the system should measure salt thickness with an accuracy of about 1% and no significant interference from minor clay seams. Brine filled porosity causes a unique response.
348. KATSUBE, T.J., Geol. Surv. Can.:  
Electrical rock properties, 1963-.  
See:  
Electrical parameter conversion Table II; Geol. Surv. Can., Paper 77-1B, p. 293, 294, 1977.
349. QUEBEC MIN. RICHESSES NATURELLES:  
Levé électromagnétique de type input: Wakonichi, Québec, 1978.
350. QUEBEC MIN. RICHESSES NATURELLES:  
Levé électromagnétique de type input: Coigny-Chaste, 1978.
351. QUEBEC MIN. RICHESSES NATURELLES:  
Levé électromagnétique de type Dighem: Palmarou, 1978.
352. ROY, K.K., ELLIOTT, H.M., Fisheries-Environment Canada (Water Res. Br.):  
Geoelectrical methods, 1975-78.
353. SCOTT, W.J., Geol. Surv. Can.:  
Electrical mapping techniques, 1967-.

354. STRANGWAY, D.W., NOWINA, S., WONG, J., Univ. Toronto (Geology, Physics):  
Electrical properties of rocks terrestrial and lunar, 1971-; M.Sc. thesis (Nowina), Ph.D. thesis (Wong).

See:

Permafrost: electrical properties of the active layer measured in situ; *Can. J. Earth Sci.*, v. 14, p. 582-586, 1977.

We continue to study the electrical properties and the influence of moisture on these properties. In the past we have examined very dry lunar samples and the effects of doping these with monolayers of water. We have also studied the properties of clays and the effects of freezing which is relevant to a study of permafrost. At present, we are completing a study of the anisotropic dielectric properties as a measure of the paleostrain. Very clear and repeatable anisotropies were found and these can be modelled with simple combinations of dielectric mixes and specific relaxations associated with biotite. A model for the electrical interface between an electro-chemical fluid and a metallic particle has been developed to help classify the electrochemistry of the induced polarization phenomenon. A calculation of the impedance of a half-wave antenna on an interface has also been developed and this will be used to study the moisture content of soils. A variation of this model was used to study the summer and winter properties of the active layer in Arctic permafrost.

355. STRANGWAY, D.W., REDMAN, J.D., Univ. Toronto (Physics, Geology):

Audiofrequency magnetotelluric sounding at waste disposal test sites, 1977-78; M.Sc. thesis (Redman).

One of the problems to be faced in long term storage is the migration of fluids in shallow crustal regions. We have conducted a pilot AMT survey at Chalk River where many other methods are being tested and an active drilling programme is underway. Our AMT results show large lateral variations in resistivity and significant anisotropy supporting the view that extensive water-filled faults and fractures are present. These studies will be extended during 1978.

356. STRANGWAY, D.W., REDMAN, J.D., KRYZAN, A., Univ. Toronto (Geology Physics):

Crustal sounding by audiofrequency magnetotellurics, 1975-; M.Sc. theses (Redman), Kryzan).

The results of our crustal sounding work have been submitted for publication and continue to show a thin conductive surface layer a few 100 meters thick, followed by an extremely resistive layer that extends to depths of 5-10 kilometers or more. Beneath this, there is a highly conductive layer which we tentatively interpret as the result of trapped pore space fluids at depth. Work in Michigan and in Wisconsin is now being written up and a new detailed study of the Geotraverse greenstones, gneisses and plutons has been interpreted. In the highly resistive plutons we believe that the conductive layer is at a depth of more than 10 kilometers. We have completed a survey south of Sudbury across the Grenville front. The pattern of very high resistivities dropping off at depths is found here as well. Preliminary

indications are that the Proterozoic sediments have very high resistivity values. We are well on in the development of new instrumentation for our AMT work. The system will be based on microprocessors and will be used for on site analyses. We expect the new system to provide full scale tensor analyses and to permit extensive statistical studies of the natural source fields.

EXPLORATION

357. ANDERSON, C.D., LOISILLE, J., Univ. Manitoba (Earth Sciences):

Continuous and near-continuous magnetic profiling-instrument development and field testing, 1975-78.

To develop a magnetometer that will allow for the efficient acquisition of magnetic data at an interval of 3 meters or less along profiles.

358. ANNAN, A.P., *Geol. Surv. Can.:*  
Radar sounding for geological mapping, 1975-.

See:

Time-domain reflectometry-air-gap problem in a coaxial line; *Geol. Surv. Can.*, Paper 77-1B, p. 55-58, 1977.

Time-domain reflectometry-air-gap problem for parallel wire transmission lines; *ibid.*, p. 59-62, 1977.

Impulse radar applied to ice thickness measurements and freshwater bathymetry; *ibid.*, p. 63-65, 1977.

Impulse radar and time-domain reflectometry experiments in permafrost terrain during 1976; *ibid.*, p. 67, 1977.

Radar range analysis for geological materials; *ibid.*, p. 117-124, 1977.

359. ASSARD, R., FAVINI, G., MARLEAU, R., Québec Min. Richesses Naturelles:

Evaluation géostatistique du potentiel minéral en Cu-Zn du nord-ouest québécois, 1978.

360. BOYLE, R.W., *Geol. Surv. Can.:*  
Primary halos and metallogenic distribution of the elements, 1973-.

361. BURKE, K.B.S., Univ. New Brunswick (Geology):  
Development of seismic reflection techniques for shallow investigations, 1974-79.

Various seismic sources have been used to test the seismic reflection method in shallow investigations at sites in New Brunswick. So far, no events have been recorded that can be identified unequivocally as reflections from shallow horizons. A signal enhancement seismograph together with various combinations of geophone patterns and filters has been used in these tests. It is hoped to test a pulsed vibrator as a source of seismic energy in the near future. This source should optimize conditions of signal frequency and reproducibility and allow the various stacking techniques to enhance the relatively weak events that represent reflections from near surface horizons.

362. CHARBONNEAU, B.W., Geol. Surv. Can.:  
Evaluation of uranium reconnaissance data, 1976-.

See:

Radioelement distribution patterns in the Frontenac axis, Ontario; Geol. Surv. Can., Paper 77-1B, p. 337-340, 1977.

Uranium mineralization at the base of the Windsor Group, South Maitland, Nova Scotia; Geol. Surv. Can., Paper 78-1A, p. 419-425, 1978.

363. FOLINSBEE, R.A., Geol. Surv. Can.:  
East coast offshore surveys, 1973-.

364. GRASTY, R.L., Geol. Surv. Can.:  
Gamma ray spectrometry, 1972-.

See:

Calibration for total count gamma-ray surveys; Geol. Surv. Can., Paper 77-1B, p. 81-84, 1977.

A general calibration procedure for airborne gamma-ray spectrometers; Geol. Surv. Can., Paper 77-1C, p. 61, 62, 1977.

365. MCGOWAN, E., ANDERSON, C.D., Univ. Manitoba (Earth Sciences):

A field study of natural radioactivity in the Caddy Lake area, southeastern Manitoba, 1977-78; M.Sc. thesis (McGowan).

The area is to be re-examined in the field using a scintillation counter to identify source of anomalies (i.e., U, Th, K).

366. SINHA, A.K., Geol. Surv. Can.:  
Applied EM problems, 1973-.

See:

A theoretical study on electromagnetic probing of permafrost terrains; Can. J. Earth Sci., vol. 14, no. 10, p. 2388-2401, 1977.

Charts for the correlation of airborne E-phase data; Geol. Surv. Can., Paper 77-1C, p. 63-66, 1977.

367. SLAWSON, W.F., Univ. British Columbia (Geophysics and Astronomy):

U.B.C. radon detection, 1977-.

To monitor radon emanation at five sites in the Vancouver area. The Track-Etch plastic film type detector were deployed for two-week intervals throughout the last six-month of 1977. The sites were chosen in order to evaluate a variety of environments. These included recent deltaic sediments of the Fraser River, glacial deposits, an abandoned well which bottoms in glacial sediments at a depth of about 80 metres, and two sites located in shallow soil over Coast Range granodiorite. To date the most striking effect appears to be related to tidal variations. The feature is very pronounced at the site located in the deltaic sediments.

368. STOLZ, H., DREVER, G., Sask. Geol. Surv.:  
Evaluation of techniques for assessing the uranium potential of lake covered areas: I. Underwater radiometry, 1975-78.

See:

Sask. Geol. Surv., Summ. Investig. 1977, p. 72-77, 1978.

Existing and new techniques were applied to gather information from lake bottoms and lake waters. It was found that bottom radioactivity was a useful and diagnostic parameter, hence a system was developed to continuously record, on four channels, the distribution of radioactive material on lake floors. Methods and instruments for following up anomalies generated by this system were also developed. Several navigation techniques were employed, but it now appears as though only a radio-location device can provide the necessary accuracy, range and flexibility for running an efficient survey. High-grade uriferous boulders were located by the system in lakes containing known mineralization (Seahorse Lake-Key Lake area) and a boulder train was successfully followed from land into a lake (Brochet Island, Lake Athabasca) providing valuable information to exploration companies. More systematic surveying should be completed to help delineate other underwater areas of possible economic potential.

GEOMAGNETISM-PALEOMAGNETISM

369. BARR, S.M., MacDONALD, A.S., HAILE, N.S., Acadia Univ. (Geology), Univ. Malaya:

Reconnaissance palaeomagnetic measurements on Triassic and Jurassic sedimentary rocks from Thailand, 1975-77.

Reddish siltstones of Triassic and Jurassic age in northern Thailand are suitable for paleomagnetic measurements. Groups of samples from east of Khorat Plateau (Loei - Lomsak - Pitsanulok area), Ngao - Phrae Highway, and Tak - Mae Sod Highway yield fairly consistent palaeomagnetic directions, with mean declination 26.3°, inclination 35.7°. This direction gives a virtual palaeomagnetic pole at 64°N, 171°E for Thailand in Triassic-Jurassic time.

370. BEALES, F.W., PEARCE, G.W., WU, Y., JOWETT, C.E., BENDENG, D., Univ. Toronto (Geology):

Paleomagnetism applied to the study of Mississippi Valley-type ore deposits, 1970-; M.Sc. thesis (Bending).

1. The magnetic remanence of limestones has been demonstrated to be a detrital remanence by studying modern lime muds.

2. The magnetic remanence of sulphide ores is probably a chemical remanence associated with the precipitation of trace amounts of pyrrhotite (possibly as lattice defects in pyrite).

3. The remanence of Elmwood sphalerite appears to be a partial thermal remanence.

4. The remanence of dolostones is presumed to be detrital remanence but there is evidence for re-setting of the original detrital remanence by the dolomitization process: a) at Gays River, Nova Scotia, the original Mississippian limestone remanence is superseded by a Pennsylvanian remanence presumably associated with the dolomitization process; the ore is probably Pennsylvanian; and b) Upper Cambrian host dolostones of the Viburnum trend in Missouri also seem to have been reset or partially reset to a Carboniferous pole position.

5. At Pine Point the ore appears to be late Devonian in age.
6. A series of samples for Nanisivik Mine on the Brodeur Peninsula of Northern Baffin Island proved to carry a viscous present day pole position NRM. A.F. and Thermal demagnetization reduced the stable remanence to the limit of machine background. However, the samples available, kindly supplied by the Mine, were extremely friable and further sampling particularly for larger samples, may yet permit satisfactory results to be obtained.
7. Samples collected from the Viburnum trend in southeast Missouri, the largest Mississippi Valley-type deposit so far discovered, provisionally suggest a late Mississippian to Pennsylvanian age for ore emplacement. This is most interesting since it corresponds with the time of emplacement of Tri-State ores and prompts consideration of possible links between plate tectonics and the migration of metal-carrying brines.
8. We are encountering resetting of the paleomagnetic remanence of the host rock during its diagenesis, dolomitization and cementation. Also, the Elmwood sphalerite ore appears to have developed a PTRM (partial thermal remanent magnetism) of possible Triassic or Cenozoic age – too few samples were available to develop a statistically justifiable pole position. Operating problems at the mine have so far precluded return to collect additional samples. At Pine Point, the ore has given a Devonian pole position – presumably Upper Devonian, since the host rocks are palaeontologically dated as Middle Devonian.
371. BOWER, M.E., Geol. Surv. Can.:  
Ocean aeromagnetism, 1965–.
372. CHRISTIE, K.W., Geol. Surv. Can.:  
Paleomagnetism and rock magnetism instrumentation and technological development, 1970–.
373. CURRIE, R.G., Geol. Surv. Can.:  
Geological and geophysical studies in the Beaufort Sea, 1971–.
374. FAHRIG, W.F., Geol. Surv. Can.:  
Paleomagnetism of the dykes of west Greenland, 1972–.
375. FAHRIG, W.F., Geol. Surv. Can.:  
Paleomagnetism of Proterozoic to Devonian strata across Boothia Arch, 1974–.
376. FOSTER, J.H., Geol. Surv. Can.:  
Paleomagnetism of the Natkusiak volcanics, Victoria Island, District of Franklin, 1975–.
377. FOSTER, J.H., Geol. Surv. Can.:  
Paleomagnetic stratigraphy within the Abitibi Belt, Ontario and Québec, 1975–.
378. HALL, D.H., Univ. Manitoba (Earth Sciences):  
Origin of long wavelength magnetic anomalies, 1977–79.
379. HALL, D.H., STEPHENSON, O.J., IVERSON, C., Univ. Manitoba (Earth Sciences):  
Interpretation of aeromagnetic data, Lynn Lake, Manitoba, 1977–79.
380. HALL, J.M., COOKE, H.B.S., PEIRCE, J.W., CLARKE, M.J., HALL, S.L., SZEMETHY, A., Dalhousie Univ. (Geology):  
A high resolution study of the Pliocene-Pleistocene geomagnetic reversal history as recorded in the sediments of the Hungarian Basin, 1975–79.  
  
A first study has involved the paleomagnetic measurement of 700 subsamples from a 1200 m drillhole near to Devavanya, Hungary. The sequence apparently covers the 0–6 m.y. interval at a rather constant sedimentation ratio. The main polarity epochs, previously recognized in deep ocean sediments and linear magnetic anomaly patterns, are clearly evident. What has not been recognized previously is the complexity of field variation within each polarity epoch and during polarity transitions.
381. HALL, J.M., PEIRCE, J.W., CLARKE, M.J., RICE, P., PLASSE, D., Dalhousie Univ. (Geology):  
Structure and history of oceanic crust through magnetic and other studies; 1971–; M.Sc. thesis (Rice), Ph.D. thesis (Plasse).
- See:  
Magnetization of oceanic layer 2—results and thoughts after DSDP Leg 37; Can. J. Earth Sci., v. 14, p. 684–706, 1977.  
  
The volcanic layer of the ocean crust adjacent to Canada – a review; Geol. Soc. Can., Sp. Paper 16, p. 425–444, 1977.  
  
Use of paleomagnetism and rock magnetism in studying the lithological make-up and structure of oceanic layer 2 has been most successful. We have been able to show the major oceanic rift valley volcanism is strongly episodic and that large tectonic rotations within layer 2 are probably commonplace. It is also clear that the source layer for the linear magnetic anomalies of the ocean basins must be rather thicker than previously supposed, comprising all of layer 2 and perhaps part of layer 3. This is the consequence of reduction of net magnetization below arithmetic average values by a combination of reversals in vertical sequence, probably non-magnetic rubble and cavities, rapid lateral variation and large scale reduction of magnetization by low-temperature, cold sea water oxidation. The widespread nature of this low temperature alteration, which effects all magnetic properties, is surprising in view of the supposed high conductive thermal gradient beneath spreading ridges. We have recently completed a study of a small spreading centre in the Caribbean (the Cayman Trough) and plan a major attack on the lithology, structure and magnetic properties of lower layer 2 by deep crustal drilling in eastern Iceland.

382. LERBEKMO, J.F., Univ. Alberta (Geology):  
Magnetostatigraphy of the Late Cretaceous and Cretaceous-Tertiary boundary in Alberta, 1973-78.  
The magnetostatigraphy of the uppermost approximately 90 meters of the Upper Cretaceous and the lowest 40 meters of the Paleocene in the Red Deer Valley of Alberta has been compiled. The section embraces about 4 million years of time from about 67 to 73 m.a. The section has been correlated tentatively with sea floor anomalies 29, 30 and uppermost 31. However, the magnetostatigraphy in the Red Deer Valley appears to be more complex, having a number of short polarity reversals not recognized in the sea-floor pattern. K-Ar dating of four bentonite horizons near the Cretaceous-Tertiary boundary is nearly completed and may provide better time definition of the Cretaceous-Tertiary boundary as well as a needed datum point on the magnetic polarity time scale.
383. McGLYNN, J.C., Geol. Surv. Can.:  
Paleomagnetic study of Proterozoic red beds of the western Canadian Shield, 1968-.
384. OLSON, D.G., Geol. Surv. Can.:  
High resolution aeromagnetism (experimental surveys), 1968-.
385. PEARCE, G.W., JOWETT, E.C., KOBLUK, P.K., POPLAWSKI, S., Univ. Toronto (Geology):  
Paleomagnetism of Paleozoic sedimentary rocks, 1977-.  
Preliminary results from measurements of a Middle Silurian core from Lake Erie and of surface samples of equivalent age from the Niagara Escarpment provide a value of 6° for the paleolatitude of Southern Ontario at that time. Work is continuing and will expand on Southern Ontario material. A project with N.P. James of Memorial University on the paleomagnetism of Lower Cambrian sedimentary rocks from south-eastern Labrador has begun.
386. PEARCE, G.W., STESKY, R.M., ROBIN, P-Y.F., KARSON, J.A., Univ. Toronto (Geology):  
Effects of high pressure on remanent magnetism, 1977-.  
In areas of low geothermal gradient the effect of hydrostatic pressure may be important in modifying the remanent magnetization of rocks. On other planets, e.g. the Moon and Mercury, rock layers magnetized to a considerable depth appear to contribute greatly to global magnetic fields. The processes of shock demagnetization and remagnetization should prove important when we try to untangle the problem of meteorite impacts. We have begun a project of determining how high pressure (up to 20 kilobars) would modify the magnetic remanent magnetization of rocks. Preliminary measurements suggest little effect on saturation isothermal remanence (SIRM) in hematite, but a considerable effect on SIRM in a magnetite-bearing rock. The SIRM decreases up to 60% in intensity after subsection of the sample to pressures up to 20 kilobars. The major part of the decrease occurs in pressures up to 4 kilobars, with a further, but much less pronounced decrease at high pressures. Plans for further experiments concern variation due to differences of mechanism of magnetization, of grain size of magnetite particles in the sample and of mineralogy.
387. PEIRCE, J.W., CLARK, M.J., HALL, J.M., Dalhousie Univ. (Geology):  
A reversed polarity event in Iceland during the last glaciation, 1977-78.  
**See:**  
EOS Trans. Am. Geophys. Un., v. 58, p. 1124, 1977.
388. QUEBEC MIN. RICHESSES NATURELLES:  
Levé hydrosonde, magnétique et de V.L.F. de la partie sud du Lac Chibougamau, Québec, 1978.  
**Voir:**  
Levé hydrosonde, magnétique et de V.L.F. de la partie nord du Lac Chibougamau; Québec Min. Richesses Naturelles, DP-507, 1977.
389. QUEBEC MIN. RICHESSES NATURELLES:  
Levé gradiométrique: Dome de Lemieux, Québec, 1978.
390. SAWATZKY, P., Geol. Surv. Can.:  
High resolution aeromagnetism (instrumentation development), 1977-.  
To improve the performance of the GSC experimental high resolution/gradiometer survey system, in terms of sensitivity, precision, reliability, efficiency and endurance.
391. SCHWARZ, E.J., Geol. Surv. Can.:  
Paleomagnetism of the Circum-Ungava Belt, 1973-.  
**See:**  
Remanent magnetism of an ultramafic flow from Munro township, Ontario; Geol. Surv. Can., Paper 77-1B, p. 197, 198, 1977.  
Magnetic fabric of rocks; Geol. Surv. Can., Paper 78-1A, p. 249-252, 1978.  
Reconnaissance paleomagnetism of the Ordovician Roberts Arm Group volcanics, Newfoundland; *ibid.*, p. 497, 498, 1978.
392. SCHWARZ, E.J., Geol. Surv. Can.:  
Magnetic characteristics of sulphide ore deposits in Bathurst area, New Brunswick, 1977-.
393. SEGUIN, M.K., LAMBERT, G., Univ. Laval (Géologie);  
Paléomagnétisme du secteur sud des appalaches du Québec (complex ophiolitique), 1976-78.  
Projet en cours; désaimantations ac et thermiques quasi-terminées; la statistique et l'écriture du rapport restent à faire.
394. SRIVASTAVA, S.P., Geol. Surv. Can.:  
Sea floor spreading history of the Labrador Sea, 1974-.  
**See:**  
Ordovician strata on the southeastern Baffin Island shelf revealed by shallow drilling; Can. J. Earth Sci., v. 14, no. 8, p. 1925-1939, 1977.

395. STRANGWAY, D.W., GUBINS, A., BAMBRICK, J., TASILLO, A., KWIECIN, B., Univ. of Toronto (Geology):

Magnetic mapping, 1975-; MA. Sc. thesis (Gubins), M.Sc. thesis (Kwiecin), Ph.D. thesis (Tasillo).

A programme to exploit magnetic maps on a regional scale is now underway. In the first programme buried circular features in Saskatchewan are being examined by magnetic gradiometer studies. These features are in the sedimentary sequence and are interpreted by some as ancient impact craters. If this is the case, some of the material should have been heated over the Curie point and the material magnetized in the ambient field. Preliminary indications are that the features do have magnetic anomalies, but detailed analysis awaits completion of surveys now in progress. At the same time we are commencing a study of the aeromagnetic signature in the Abitibi volcanic belt. This study will examine geochemical, petrological and rock magnetic data in an attempt to characterize the area. Compilation of aeromagnetic data from Western Africa and eastern South America continues in an attempt to outline major diabase dike swarms.

396. STRANGWAY, D.W., PEARCE, G.W., LANOIX, M., WU, Y.M., SUGIURA, N., Univ. Toronto (Geology, Physics):

Magnetic paleointensities determined from lunar and meteorite studies, 1969-; M.Sc. thesis (Lanoix).

This study is attempting to reconstruct the magnetic field strength present during the early history of the solar system. The Allende meteorite has been studied in detail and, along with previous investigators, we find a sharp change at 130°C. We attribute this to a property of metallic iron, however, and have shown that it is possible to study the magnetic field preserved in inclusions of Allende at least up to 600°C. These studies show a field as high as 16 oe which we infer to be the field present while the planets were forming and which is often postulated to account for the angular momentum distribution in the solar system. A new system for controlled fugacity measurements has been built and we are resuming measurements on the paleointensities of lunar samples now that we can heat them to 700°C or so without change in their magnetic properties. By looking at samples of various ages we hope to throw more light on the controversy of whether the moon's field decayed slowly over time or whether it decreased suddenly. This constraint is relevant to the presence of a core and hence to the thermal history of the moon.

397. SYMONS, D.T.A., Univ. Windsor (Geology):  
Paleomagnetism and boundary geotectonics of the Superior Geologic Province, 1976-79.

To examine rock units in the 2.1Ga to 2.6Ga time frame adjacent to the boundary of the Superior Province with the Southern and Grenville Provinces. Units involved include Nipissing diabase, Huronian Supergroup, several late Archean plutons, and Archean volcanics. Geotectonic and metamorphic effects on the original remanence of the rocks are being examined.

## GEOTHERMAL

398. AUMENTO, F., Dalhousie Univ. (Geology), Instituto de geociencias dos acores:

Geothermal energy in Azores, 1977-80.

Dalhousie University geoscientists discovered the geothermal field of Agua de Pau volcano in San Miguel, Azores, during their deep drilling in 1973. Subsequently \$1,000,000 have been provided by the regional government of the Azores to develop the field and to bring it into production. Six additional exploratory holes and geophysical exploration have delineated a 5 km x 5 km field around the Dalhousie hole with a 400 mw potential. As of December 1977 we are preparing the site and equipment to drill the first 10"  $\phi$  test/production hole to a depth of 1000 m. Drilling should commence in January 1978. Three such holes are planned for the first half of 1978. Meanwhile shallow drilling and geophysical exploration is underway on the island of Terceira.

## GRAVITY

399. GUPTA, V.K., WADGE, D.R., Ontario Geol. Surv.:  
Gravitational field and its structural implications in the Red Lake and Birch Lake metavolcanic-metasedimentary belts, Ontario, 1975-79.

The preliminary interpretation of the data collected during 1975 and 1976 is now complete. Various statistical techniques have been applied to separate the effects of the shallow and deep gravity features for the purpose of geological interpretation.

400. GUPTA, V.K., WADGE, D.R., Ontario Geol. Surv.:  
Gravity survey in the North Bay-Cobalt area, Ontario, 1977-79.

A gravity survey in the North Bay-Cobalt area was conducted during the summer of 1977. The area includes the Temagami metavolcanic belt, a part of the Grenville Front and a part of the Cobalt Plate. An additional survey was conducted to the north in the adjacent New Liskeard-Englehart area to supplement a Geological Branch survey conducted in 1973.

## SEISMOLOGY AND PHYSICS OF INTERIOR

401. CHAPMAN, C.H., Univ. Toronto (Physics):  
Seismic body wave theory, 1969-.

### See:

Exact and approximate generalized ray theory in vertically inhomogeneous media; Geophys. J. R. Astr. Soc., v. 46, p. 201-233, 1977.

New methods which are more efficient and simpler are being developed for computing synthetic seismograms. Comparisons have been made with old methods to establish the validity of the new results. The method is being extended to allow attenuating, laterally inhomogeneous media to be studied; it is sufficiently simple that interpretation of seismograms can be improved.

402. DAVIS, T.L., Univ. Calgary (Geology):  
Energy applications of seismology to direct detection of hydrocarbons, 1977-78.  
Study into energy related concepts and applications of reflection seismology: initial phase of study involves the direct detection of subsurface hydrocarbons in Alberta, shallow versus deep settings, and disturbed versus undisturbed settings.
403. GENDZWILL, E.J., Univ. Saskatchewan (Geological Sciences):  
Winnipegosis mounds and the Prairie Evaporite of Saskatchewan, a seismic investigation, 1973-78.  
The Prairie Evaporite formation is a thick (up to 700 feet) bed composed mainly of rock salt, some anhydrite and some potash salt. It rests on the Winnipegosis formation, a carbonate unit of Middle Devonian age. In some areas the Winnipegosis thickens and forms mounds that are 200 or 300 ft. high and which are enveloped by the Prairie Evaporite. The mounds have horizontal dimensions of 2 or 3 miles or less as shown by recent seismic work.
404. GENDZWILL, D.J., Univ. Saskatchewan (Geological Sciences):  
Detailed interpretation of seismic reflection data.  
Interpretation parameters and computer data processing procedures have been developed for seismic data collected in the vicinity of some Saskatchewan potash mines. The primary objective is to obtain detail sufficiently fine that it will be of practical use for the prediction of mining conditions and for the planning of rock strata control. Good success has been obtained so far in identifying large solution-collapse structures which are easy targets. Identification and mapping of Winnipegosis mounds is somewhat more difficult and they can be missed if data collection and processing are incorrectly done. Minor structural anomalies with associated stratigraphic thickening can be recognized over the mounds. Accurate and reliable work requires special care and procedures in the data processing. In some instances, the seismic data shows anomalies that may represent local conditions and features only a few hundred feet across in the potash beds themselves. The key to detailed interpretation is the development of so-called high resolution techniques in which the seismic frequency pass band is increased from the "normal" 20-60 Hz to the "high" frequency 50-125 Hz. Special techniques for correcting and assembling the data have been developed. Interpretation parameters have also been developed by computing and studying synthetic seismograms based on well logs and by comparing seismic data with drilling and mining results.
405. GENDZWILL, D.J., HAJNAL, Z., Univ. Saskatchewan (Geological Sciences):  
A microseismic recording station in southern Saskatchewan, 1972-.  
All electronic components of the seismic system have been tested and computer programs written to read and plot output tapes on the main campus computer. Field tests with our system have shown that microseismic noise levels are far too large near the city. Noise levels are much lower in areas 15 or 20 miles outside the city. Early measurements have shown a number of interesting microseismic signals as well as telesisms.
406. GRETENER, P.E., Univ. Calgary (Geology):  
Geophysical and geological significance of velocity reversals, 1977-78.  
Modern seismic shooting techniques permit the continuous and accurate determination of velocity and interval velocity. The geological significance of seismic velocity has long been overlooked. Only recently have geologists come to realize that velocity and in particular velocity changes provide lithological information (the velocity profile is a stratigraphic tool!). Not yet realized is the fact that velocity information is important in terms of structural geology. Velocity reversals (true reversals) signify mechanically weak layers of often low density. Such layers tend to act as décollements during structural deformation and may also be the motherbeds of diapirs. The present projects tends to evaluate the importance of low velocity layers (LVL's) in terms of structural geology.
407. HAJNAL, Z., Univ. Saskatchewan (Geological Sciences):  
Velocity analysis of near vertical crusted reflection data, 1977-78.  
A complex velocity spectral analysis algorithm is applied to an expanding spread crusted reflection survey data. An attempt is made to abstract continuous velocity information from the bases of the sedimentary cover to the top of the upper mantle.
408. HAJNAL, Z., STAUFFER, M.R., Univ. Saskatchewan (Geological Sciences):  
Seismic investigation of Precambrian contact zones, 1973-79.  
See:  
Seismic reflections in exposed Precambrian rocks, Flin Flin, Manitoba; SME Trans., v. 262, p. 275-278, 1977.
409. HALL, D.H., Univ. Manitoba (Earth Sciences):  
Seismic refraction crustal studies, northwestern Manitoba.  
See:  
Partial melting and mineral-stability boundaries and their bearing on the seismic exploration of the lithosphere in Canada; Can. J. Earth Sci., v. 14, no. 11, p. 2630-2650, 1977.
410. HAWORTH, R.T., Geol. Surv. Can.:  
A geophysical investigation of the submarine extension of geological zonation of Newfoundland, 1974-.
411. HUNTER, J.A.M., Geol. Surv. Can.:  
Hammer seismic surveys, Québec, New Brunswick and Ontario, 1968-.
412. HUNTER, J.A.M., Geol. Surv. Can.:  
Seismic properties of earth materials in the permafrost environment, 1973-.

413. INGRAM, R.M., HALL, D.H., Univ. Manitoba (Earth Sciences):  
Deconvolution of seismic reflections, Dawson Bay, Manitoba, 1977-78; M.Sc. thesis (Ingram).
414. KARSON, J.A., STESKY, R.M., ROBIN, P-Y.F., Univ. Toronto (Geology):  
Compressional wave anisotropy in ophiolite rocks, 1977-  
Compressional wave velocities are being measured in foliated and lineated mafic and ultramafic plutonic rocks of the Lewis Hills massif (Bay of Islands Ophiolite Complex, Newfoundland). Velocities are measured in three mutually perpendicular directions that can be restored to their orientations in the field. Anisotropies ranging from 3.6 to 13% of the maximum velocity ( $\Delta V_p = .23$  to  $.99$  km/sec) have been measured. Structural data indicates that there may be large areas with similar seismic anisotropy. The Lewis Hills massif probably formed near or within an oceanic fracture zone and the velocity data may be compared to velocities determined by marine seismic refraction experiments along modern oceanic fracture zones.
415. KEEN, C.E., Geol. Surv. Can.:  
Development of analytical and theoretical techniques for refraction seismology interpretations, 1977-.
416. OVERTON, A., Geol. Surv. Can.:  
Seismic-Precambrian Shield, 1970-.
417. OVERTON, A., Geol. Surv. Can.:  
Regional seismic surveys, Saskatchewan, 1977-.
- See:**  
Seismic determinations of basement depths, Athabasca Basin, Saskatchewan; Geol. Surv. Can., Paper 77-1C, p. 19-25, 1977.
418. RANALLI, G., ATKINSON, G., YZERDRAAT, W., Carleton Univ. (Geology):  
Probabilistic seismic risk analysis, 1975-78.  
To evaluate seismic risk assessment procedures and their underlying statistical assumptions, and to estimate seismic risk in Eastern Canada. As a first step, probabilistic models for earthquake occurrence with respect to time and magnitude were reviewed and compared. A survey of proposed attenuation curves and risk estimation methods led to the choice of the Cornell-Merz procedure for the calculation of risk in Eastern Canada. Using a 48-year long sample of the seismicity of Eastern Canada and adjacent areas, the time distribution and the magnitude distribution of shocks have been determined and their parameters estimated. The region has been subdivided into four subregions. Then the seismic risk has been computed at the nodes of a  $0.5^\circ \times 0.5^\circ$  grid (approximately 2400 cells) in terms of three design Mercalli intensities and three design acceleration levels. Maps of seismic risk at a given ground motion level are being prepared. It is also planned to produce maps of ground motion at a given risk level and to investigate the effect of varying the lower magnitude threshold.
419. ROCHESTER, M.G., MOON, W., SOLLAZZO, C., TODOESCHUCK, J.P., Memorial Univ. (Physics):  
Theoretical global geodynamics and planetary physics, 1961-; M.Sc. theses (Sollazzo, Todoeschuck).  
**See:**  
Variational type finite element solution of normal modes of simple Earth models; Geophys. J., v. 51, p. 327-348, 1977.  
Free oscillations of the Earth's liquid core, particularly those of long period (core undertones and inertial waves modified by buoyancy); effects of the oceans on the dynamics of the Earth's rotation; precession-induced turbulence in the core and the geomagnetic dynamo; and free wobble modes of an oblate rotating self-gravitating stratified Earth with a liquid core.
420. SEREDA, I.T., HAJNAL, Z., Univ. Saskatchewan (Geological Sciences):  
Crustal seismic study in southeastern Saskatchewan, 1974-78; M.Sc. thesis (Sereda).  
**See:**  
Seismic investigation over a segment of the Nelson River gravity trend in southeastern Saskatchewan; J. Geophys. Res., v. 82, no. 30, p. 4279-4892, 1977.  
Interpretation of four crustal expanding spread survey profiles were completed. The profiles were located over the Churchill Superior boundary along a 170 km east-west line in eastern Saskatchewan and western Manitoba. The data revealed a significantly deeper crust at the west end of the line.
421. STESKY, R.M., Univ. Toronto (Geology):  
Seismic and mechanical properties of simulated lunar and martian soils under high vacuum, 1976-.  
The compressional and shear wave velocities and density of finely crushed olivine basalt have been measured under uniaxial strain compaction to 0.005 GPa axial stress and various pressures between atmospheric pressure and  $3 \times 10^{-6}$  torr. The wave velocities are markedly dependent on the applied load: the P-wave velocity at low vacuum rose from 250 m/sec. at near-zero stress to 750 m/sec. at 0.005 GPa while the S-wave velocity increased from 50 m/sec. to 280 m/sec. over the same stress range. At high vacuum and after outgassing the powder, the P-wave velocity remained about the same, while the S-wave velocity was markedly higher, possibly because of greater shearing friction at grain contacts in the out-gassed soil. Although the data remain to be fully analysed, the results suggest that the wave velocities are essentially independent of the soil density being controlled mainly by axial stress and vacuum pressure, and that the change in density with stress is markedly affected by the degree of pre-compaction. These results seem to hold at all vacuum pressures studied. Further work on this project will be aimed at understanding the mechanisms of compaction and wave propagation and the nature of the intergranular friction in air and in high vacuum. We will also study the behavior of a hydrous mineral soil, to predict the seismic and mechanical properties of the Martian regolith.

422. STEWART, I.C.F., Memorial Univ. (Physics):  
Seismotectonic studies of Newfoundland, 1974-79.
- See:**  
Travel-time anomalies in the mantle under the North Atlantic; *Geophys. J.R. Astr. Soc.*, v. 49, p. 487, 1977.
- Two portable event-recording seismographs are being used to monitor quarry blasts for a refraction profile across Newfoundland. Teleseismic travel-time residuals are also being used in the study of the crustal and upper mantle structure under the island; the arrivals are referred to the fixed stations at Corner Brook and St. John's. These latter stations are also used in providing the origin times of the quarry blasts. It is expected that the refraction profile will be essentially completed by 1979, when recording will be extended to two-dimensional coverage of Newfoundland.
423. TIFFIN, D.L., Geol. Surv. Can.:  
Geological and geophysical studies of the Pacific continental margin, 1971-.
- See:**  
Bottom sediments-vicinity of Juan de Fuca and Explorer ridges, northeast Pacific Ocean; *Geol. Surv. Can.*, Paper 78-1A, p. 533-537, 1978.
- OTHER**
424. KILLEEN, P.G., Geol. Surv. Can.:  
Borehole geophysics (nuclear techniques), 1974-.
- See:**  
A gamma-ray spectral logging system including digital playback, with recommendations for a new generation system; *Geol. Surv. Can.*, Paper 78-1A, p. 235-241, 1978.
425. MacAULEY, H.A., Geol. Surv. Can.:  
Sub-seabottom permafrost distribution in the southern Beaufort Sea, 1974-.
426. PANENKA, T.R., DUCKWORTH, K., Univ. Calgary (Geology):  
Development of a multichannel airborne gamma spectrometer, 1975-78; Ph.D. theses (Panenka).
- A multichannel airborne gamma spectrometer is now under instruction. It will be in operation by March 1978. It features are: (1) small crystal volume without loss of performance, (2) compact dimensions for helicopter mounting, and (3) ground based data processing to retrieve optimum information from multichannel data.
427. ROBBIN, P-Y.F., Univ. Toronto (Erindale-Geology):  
The upward flow and loss of water in cratonic crust; numerical simulation, geophysical consequences, 1975-79.
- Reports of high electrical conductivity anomalies at depths of 10-20 km in Precambrian cratons have commonly been interpreted as a consequence of a high water content at these depths. However, the hydraulic gradient should lead to upward flow and elimination of such water. Calculations of flow rates must be done numerically because permeability, among other parameters, depends on depth and water content. It is hoped to establish limits to values of permeabilities necessary to 'keep the water down'. Alternatively other mechanisms than a high water content must be envisaged.
428. SURYAM, J.V., Sask. Geol. Surv.:  
Geophysical investigations over the edge of Athabascia Formation, 1976-.
- Field data interpreted, compilation and report writing in progress.

## GEOTECHNIQUE

### ENGINEERING GEOLOGY

429. BELANGER, J.R., Geol. Surv. Can.:  
Urban geology, Saint John, New Brunswick, 1976-.
- See:**  
Bedform movement studies by remote sensing balloon technique in Minas Basin, Bay of Fundy; *Geol. Surv. Can.*, Paper 78-1A, p. 503-508, 1978.
430. BELLS, M., KARROW, P.F., Univ. Waterloo (Earth Sciences):  
The relationship of weathering to plasticity in tills, 1977-78; B.Sc. theses (Bells).
431. BLUDEN, R.H., MATHEWS, W.H., Univ. British Columbia (Geological Sciences):  
Urban geology of the Greater Vancouver area, 1971-.
432. BROWN, P.A., Geol. Surv. Can.:  
Geological (hard rock) investigations of potential radioactive wastes disposal sites, 1971-.
433. CHAGNON, J-Y., Université Laval (Géologie):  
Etude de la rétrogression des glissements' dans l'argile sensible, 1977-79.
- Le but est de trouver une méthode permettant d'évaluer la rétrogression maximale atteinte par un glissement dans l'argile sensible (avant qu'il ne se produise bien entendu). Les travaux n'en sont qu'à l'étape initiale, soit la collecte des données disponibles et la préparation d'une campagne de terrain.

434. COATES, D.F., SAGE, R., CANMET (EMR):  
Pit slope project, 1972-78.
- See:** 1977/78 publications:
1. Pit Slope Manual – Chapter 2: Structural Geology;
  2. Pit Slope Manual – Chapter 3: Mechanical Properties;
  3. Pit Slope Manual – Supplement 3-1: Laboratory Classifications of Tests;
  4. Pit Slope Manual – Supplement 3-2: Laboratory Tests for Design Parameters;
  5. Pit Slope Manual – Supplement 3-3: In Situ Tests;
  6. Pit Slope Manual – Supplement 3-4: Selected Soil Tests;
  7. Pit Slope Manual – Supplement 3-5: Sample and Specimen Preparation;
  8. Pit Slope Manual – Chapter 5: Design;
  9. Pit Slope Manual – Supplement 5-2: Rotational Shear-Sliding: Analyses and Computer Programs;
  10. Pit Slope Manual – Supplement 5-3: Financial and Computer Programs;
  11. Pit Slope Manual – Chapter 6: Mechanical Support;
  12. Pit Slope Manual – Supplement 6-1: Buttresses and Retaining Walls;
  13. Pit Slope Manual – Chapter 7: Perimeter Blasting;
  14. Pit Slope Manual – Chapter 8: Monitoring;
  15. Pit Slope Manual – Chapter 9: Waste Embankments;
  16. Pit Slope Manual – Chapter 10: Environment Planning.
- The research side of the above project is now complete with the publication of the open pit design manuals. Seminars and workshops are now being carried out by CANMET staff to ensure technology transfer. Tape/slide presentations have been prepared for this purpose.
435. COOPER, A.J., WHITE, O.L., Ontario Geol. Surv.:  
Carbonate solution features in Ontario, 1978–.
- To inventory all known carbonate solution features in Ontario with special emphasis on those posing engineering hazards.
436. DION, D.J., Québec Min. Richesses Naturelles:  
Levé géotechnique de la région Boucherville-Tracy, Québec, 1975-77.
- Voir:**  
Levé géotechnique de la région Boucherville-Tracy; Min. Richesses Naturelles, Québec, DPV-499, 1978.
437. DION, D.J., Québec Min. Richesses Naturelles:  
Levé géotechnique de la région Terrebonne-L'Assomption, 1977.
438. DION, D.J., MARANDA, R., Québec Min. Richesses Naturelles:  
Levé géotechnique de la région de Rimouski, Québec, 1976-78.
439. DUGAL, J.J.B., Geol. Surv. Can.:  
Drilling investigations of test sites and potential radioactive waste sites, 1977–.
440. EGGINTON, P., Geol. Surv. Can.:  
Hydraulic, morphologic and morphometric studies of selected rivers along the Mackenzie Highway, 1975–.
- See:**  
The effect of bottom-fast ice on the stage-discharge relationship; Geol. Surv. Can., Paper 78-1A, p. 493, 494, 1978.  
An apparatus for the measurement of river stage; *ibid.*, p. 496, 1978.
441. GADD, N.R., Geol. Surv. Can.:  
Geological variability of marine deposits, Ottawa-St. Lawrence Lowland, 1974–.
442. GALE, J.E., Univ. Waterloo (Earth Sciences):  
1. Effects of rock type on flow in fractures.  
2. Assessment of compliance effects in pressure pulse testing, 1977-78; M.Sc. thesis (Forster).  
Assessment of factors controlling movement of fluids through fractured rock systems. A contribution to research directed towards the assessment of the feasibility of storing high level radioactive waste in crystalline rocks.
443. HEGINBOTTOM, J.A., Geol. Surv. Can.:  
Slope processes and cryogenic movements, Arctic Islands, 1977–.
- See:**  
An active retrogressive thaw flow slide on eastern Melville Island, District of Franklin; Geol. Surv. Can., Paper 78-1A, p. 525, 526, 1978.  
To document the nature, extent and rate of slope processes and cryogenic movements in a high-arctic, permafrost environment, and to determine the importance of surficial material, geomorphology, ground ice distribution, soil thermal and moisture regime, and other factors on them.
444. HUDEC, P.P. Univ. Windsor (Geology, Geological Engineering):  
Expansion coefficients of rocks in dry, saturated and various humidity states, 1977-79.
445. LAROCQUE, G.E., GYENGE, M., GELLER, L., MIRKOVICH, V.M., TERVO, R.T., CANMET (EMR):  
Underground nuclear waste repository, 1976-85.  
To develop a rock testing program to determine the suitability of candidate rock formations for use as nuclear waste repositories, develop the specialized test equipment required for the mechanical and thermal testing program, carry out aspects of the rock test program that is developed, and develop an in situ heater experiment for on site evaluation of site suitability.

446. LAU, J.S.O., Geol. Surv. Can.:  
Collection and analysis of borehole fracture data at test sites and potential radioactive waste storage sites, 1977-.
447. MATHEWS, W.H., MOORE, D.P., RIGLIN, L., Univ. British Columbia (Geological Sciences):  
Rubble Creek landslide, southwestern British Columbia; MA.Sc. thesis (Moore).  
The 'Perpetual Landslide', Summerland, British Columbia; M.Sc. thesis (Riglin).  
Landslides associated with the 1946 earthquake, southwestern British Columbia, 1974-.
448. MORIN, F., Geol. Surv. Can.:  
Geotechnical and environmental study, Rivière-du-Loup, Québec, 1976-.
449. OWEN, E.B., Geol. Surv. Can.:  
Engineering geology in Canada, 1975-.
450. WHITE, O.L., Ontario Geol. Surv.  
Residual stresses in rock at shallow depths, 1973-.  
Examination of newly reported natural folds and of stress relief occurrences in new excavations.
451. WHITE, O.L., LELIEVRE, B., Univ. Waterloo (Civil Engineering), Ontario Geol. Surv.:  
Lime stabilisation of northern Ontario clays, 1975-78.
452. WILSON, M., GRETENER, P.E., Univ. Calgary (Geology):  
Performance of metamorphic road aggregate, 1976-78; M.Sc. thesis (Wilson).  
The standard Los Angeles Wear Test poorly predicts the performance of metamorphic, highly anisotropic road aggregate. The present study represents an effort to understand this shortcoming of the Los Angeles Test and if possible to recommend a different or additional test to rectify this situation.

#### MUSKEG

453. JARRETT, P.M., RIDDELL, D.V.B., WATERS, G.F., DAWE, P.N., Royal Military College (Civil Engineering):  
Design and construction of pavements on organic soils, 1970-80; M.Sc. theses (Riddell, Waters, Dawe).  
Further field tests using repeated loading on plate bearing tests were made on shallow gravel fills to assess utility of fabric separation membranes between the fill and muskeg. Finite element analyses of plate bearing tests on peat have also been made.

#### PERMAFROST

454. BAKER, T.H.W., National Research Council (DBR):  
Strength and deformation of frozen and thawing soil, 1971-79.  
See:  
Design of a loading platen for testing ice and frozen soil; Can. Geotech. J., v. 14, no. 2, p. 266-261, 1977.

More tests using the compliant platens will be undertaken and extended to testing specimens of rock and concrete. An evaluation of the effects of testing system compliance on strength and deformation properties of frozen soil will be undertaken. Confined compression testing with volume change measurements has been started. A sampling program at Thompson, Manitoba, will provide frozen varved samples that will be tested to determine the effects of anisotropy on the deformation and strength behaviour of frozen ground. It is hoped that these studies will be correlated with the pressuremeter, penetrometer and anchor studies carried out previously in these same varved soils.

455. BROWN, R.J.E., National Research Council (DBR):  
Permafrost distribution in Canada, 1953-.

#### See:

Muskeg and permafrost; in Muskeg and the northern environment in Canada, p. 148-163, 1977.

Permafrost ground surface energy exchange, Thompson, Manitoba. Permafrost ground temperatures and terrain studies, northern Manitoba and Keewatin District. Alpine permafrost studies, southern Alberta and British Columbia.

456. CHATWIN, S.C., RUTTER, N.W., Univ. Alberta (Geology):

Terrain characteristics and ground ice dynamics in a thermokarsted peatland, Fort Simpson, Northwest Territories, 1976-78; M.Sc. thesis (Chatwin).

The terrain investigation has been completed. A detailed topographic survey, delineation of active layer depths on 1 m intervals, vegetation mapping, and numerous cores to delineate peat stratigraphy were carried out summer, 1976. An electrical resistivity survey and drilling program was completed in March 1977. Ten closely spaced holes of 5 and 7.5 cm diameter were cored to the base of the permafrost. Piezometers were installed in unfrozen areas of the palsa complex and through the permafrost into the underlying unfrozen sediments. Thermistors were installed in the palsa and adjacent unfrozen bog. Thaw consolidation and frost heave tests are in progress. Chemical, oxygen isotope and tritium analysis of ice from the cores is in progress. Oxygen isotopic composition of peat cellulose as a paleo-temperature indicator is being examined. Ground ice contents show considerable variation between adjacent cores; the data will be treated statistically to determine to what degree the standard engineering practise of a single core from a peat plateau, characterizes the ground ice regime.

457. GOODRICH, L.E., JOHNSTON, G.H., PENNER, E., National Research Council (DBR):  
Ground thermal regime, 1970-.

#### See:

Efficient numerical technique for one-dimensional thermal problems with phase change; Internat. J. Heat Mass Transfer, 1978.

458. JOHNSTON, G.H., National Research Council (DBR):  
Preparation of manual on permafrost engineering,  
field observations of performance of foundations of  
buildings, bridges, roads, airfields, etc., 1950-.

459. JOHNSTON, G.H., National Research Council (DBR):  
Insulated embankments on permafrost, 1972-80.

460. KING, M.S., Univ. Saskatchewan (Geological Sciences);  
Thermal conductivity of permafrost materials,  
1977-82.

To determine the thermal conductivity of permafrost specimens at their naturally-occurring temperatures, using a divided-bar type apparatus with small temperature drops and temperature gradients across the specimens. This is achieved by the use of high-stability thermistors for temperature measurements along the divided bar. During each series of tests at different temperatures, the temperatures recorded are compared with each other at some point when the whole bar is at the same temperature. Two water-saturated porous sandstones and a limestone have been tested with the apparatus. The results are in excellent agreement with published values of thermal conductivity for these rock types.

461. KING, M.S., PANDIT, B.I., Univ. Saskatchewan (Geological Sciences):  
Mechanical and electrical properties of frozen rocks and soils, 1972-82.

Ultrasonic compressional and shear-wave velocities are measured as a function of triaxial loading conditions on specimens of water-saturated porous sedimentary rocks and soils at permafrost temperatures. Also being measured are the complex resistivity and phase-angle relationships as a function of frequency. It has been observed that there are abrupt changes in ultrasonic-wave velocities and in the electrical properties as the water in the pore spaces is permitted to unfreeze. The effect is marked in the case of porous rocks, but is much less so in certain shales. The influence of pore water salinity has also been studied. The effect of an increase in salinity is to lessen the abruptness of changes in the physical properties of porous rocks at temperatures near freezing.

#### ROCK MECHANICS

462. CRUDEN, D.M., BRUCE, I., McCANN, A., TSE, R., Univ. Alberta (Civil Engineering, Geology):  
Stability of natural slopes in rock, 1971.

#### See:

The dynamics of the Hope Slide; Bull. Internat. Assoc. Eng. Geol., v. 16, 1977.

The reconnaissance of large simple translational rockslides in Alberta, south of Jasper and excluding the National Parks has been completed. Detailed mapping and sampling of selected slides is continuing.

463. CURRAN, J.H., Univ. Toronto (Civil Engineering):  
Effects of voids on the deformation of porous geologic materials, 1977-79.

The ultimate objective is the development of constitutive equations which are consistent with the complex behaviour exhibited by porous geologic materials. However, achievement of this goal will first require an understanding of the void formation process. The geometry of the void space, which ranges from nearly spherical to long and flat, strongly influences the behaviour of porous materials. In view of this, two mechanistic models are proposed for the study of the deformation behaviour of porous rocks. The crush-up behaviour of highly porous rocks will be examined using the spherical model. This model, which has been successfully applied to the prediction of the response of porous rocks to a uniform pressure, and used by the author in the study of nonhydrostatic response property known as shear-enhanced compaction, will be extended to include geometrical nonlinearities. The effects of flat cracks on the hydrostatic and nonhydrostatic response of porous rocks will be examined by means of a "crack model".

464. EDEN, W.J., GRATTAN-BELLEW, P.E., PENNER, E., National Research Council (DBR):  
Expansion of pyritic shale - Ottawa area, 1969-79.

465. EISBACHER, G.H., Geol. Surv. Can.:  
Study of large landslides in the Western Cordillera, 1976-.

#### See:

Observations on the streaming mechanism of large rock slides, Northern Cordillera; Geol. Surv. Can., Paper 78-1A, p. 49-52, 1978.

466. HAWES, R.J., Geol. Surv. Can.:  
Surficial geology and land classification, Mackenzie River Valley Transportation Canada (southern part), 1971-.

467. HUGHES, O.L., Geol. Surv. Can.:  
Surficial geology and land classification, Mackenzie Valley Transportation Corridor, 1971-.

468. KING, M.S., Univ. Saskatchewan (Geological Sciences):  
Quality of the rock mass by acoustic borehole logging, 1972-88.

An acoustic borehole logging system for determining the presence and degree of fracturing in the rock mass has been developed and successfully field-tested. The logging sonde is designed to operate in AX-size boreholes, water-filled or dry, oriented in any direction to a depth of 65 m. The sonde consists of a pair of hardened-steel shoes, spaced 30 cm apart, which act as a transmitter and receiver of acoustic-wave pulses. The shoes are forced into contact with the rock surrounding the borehole and are withdrawn from it under hydraulic pressure. In water-filled boreholes both compressional and shear-wave arrivals are easily identified on an oscilloscope trace. In dry boreholes, however, the amplitudes of the shear-wave arrival is lower and it cannot always be identified unequivocally. The system has been successfully tested underground in a number of Canadian nickel mines and from the surface to provide control for seismic surveys in weathered

rock in both water-filled and dry boreholes oriented in all directions. It is concluded that the system is sufficiently sensitive to locate fracturing adjacent to the borehole precisely. A quantitative estimate of the degree of fracturing can be made from compressional-wave velocities measured by the system, in conjunction with laboratory measurements on samples of core from the borehole.

469. KING, M.S., Univ. Saskatchewan (Geological Sciences): Field studies of microseismic energy emission in potash, 1973-81.

470. KURFURST, P.J., Geol. Surv. Can.: Geotechnical study of rock heave, central Arctic Canada, 1977-.

See:

Geol. Surv. Can., Paper 77-1C, p. 33, 1977.

471. LAJTAI, E.Z., Univ. New Brunswick (Geology): Residual stress effects in Carboniferous sandstones in New Brunswick, 1977-79.

Most materials which have at one time during their history been subjected to stress, retain some of the stress in the form of residual stress. By detecting residual stress or stress effects in rocks, the tectonic history of a rock formation can be interpreted. It is planned to measure residual stress effects, particularly seismic anisotropy, preferred fracture orientation and anisotropy in deformation constants, in Carboniferous sandstones of New Brunswick. The expectation is that these studies would fix principal stress directions at various times during the Carboniferous period and thus aid in resolving the thrusting vs strike slip controversy about the northeasterly faults of New Brunswick.

472. LAJTAI, E.Z., ALISON, J., Univ. New Brunswick (Geology): Creep and static fatigue of granite in tension, 1977-79; M.Sc. thesis (Alison).

There have been several theoretical and experimental studies which have shown a decrease in strength when loading is of long duration. The mechanism suggested for brittle rocks is stress corrosion in which water plays an important role. It is planned to load granite specimens in tension to determine long term strength and strain-time relationships. Fracture surfaces are to be examined under optical and scanning electron microscope. Environmental conditions are to be varied (submerged, submerged-cold, submerged-hot, dry specimen, etc.).

473. PALMER, J.H.L., National Research Council (DBR): Field performance of tunnels under conditions of high in situ stress, 1976-.

Instrumentation of one tunnel is complete. The tunnel has been flooded and long-term monitoring of performance has been initiated. The instrumentation of a second tunnel should be completed in 1978. In cooperation with Dr. K.Y. Lo, University of Western Ontario, and the Ministry of Transportation and Communications of Ontario, a new project has been started involving the measurement of in situ stress in the vicinity of an existing tunnel.

474. PANDIT, B.I., KING, M.S., Univ. Saskatchewan (Geological Sciences):

Dynamic properties of moist rocks, 1977-80.

The amount of vapour present in a porous rock can vary from exceedingly small quantities, as under high vacuum and elevated temperatures, to a fully water-saturated condition. It has been demonstrated experimentally that the addition of small quantities of water vapour alters the velocities and attenuation of elastic waves in a dry rock. However, the results reported from other studies performed at low and high frequencies are conflicting. The variation of compressional, shear and bar-wave velocities and attenuation in a porous sandstone have been studied as a function of changes in moisture content and frequency. Velocity measurements have been made at high frequencies (in the range 100 kHz to 1 MHz) using an ultrasonic first-pulse arrival technique and at low frequencies (in the range 1 kHz to 25 kHz) by a resonant bar technique. The experiments were performed in a chamber in which the relative humidity can be controlled precisely in the range 30 percent to 100 percent. The results of tests at different moisture contents indicate the same behaviour for velocities and attenuation at both low and high frequencies.

475. ROEGIERS, J.C., DAVIDGE, G., Univ. Toronto (Civil Engineering):

Development of a 'Universite de Liege' cell, 1975-.

476. ROEGIERS, J.C., CURRAN, J., BAWDEN, W., Univ. Toronto (Civil Engineering):

'Equivalent medium analogy' as applied to fractured rock.

477. ROEGIERS, J.C., HEYSTEE, R., Univ. Toronto (Civil Engineering):

Influence of the permeability factor in hydraulic fracturing, 1974-.

478. ROEGIERS, J.C., McKAY, D.A., Univ. Toronto (Civil Engineering):

Engineering classification of Ontario shales, 1973-1977.

479. ROEGIERS, J.C., McLENNAN, J.D., Univ. Toronto (Civil Engineering):

Fracture/borehole interaction, 1976-.

This research is conducted within the overall programme of geothermal energy extraction from hot-dry rock. Phase I consists in the development of an analytical approach to fracture propagation, using energy criteria. Phase II will cover the experimental aspects of the problem.

480. ROEGIERS, J.C., WILES, T., Univ. Toronto (Civil Engineering):

Thermal stress cracking, 1976-.

To investigate the failure criterion which could be applied to rocks to predict their behaviour when submitted to a temperature increase.

481. STESKY, R.M., ROBIN, P-Y.F., Univ. Toronto (Geology):

Characteristics of microcracks, pores, and fractures in Precambrian rocks: application to problem of radioactive waste disposal, 1978-.

One criterion for the suitable choice of site for the geological disposal of radioactive waste is that the containing rock have a sufficiently low porosity and permeability to prevent the flow of groundwater to and from the waste canisters. Various locations in the Precambrian shield are being considered as disposal sites; yet very little is known about the nature of the porosity in igneous and metamorphic rocks, particularly at the pressures and temperatures at depth in the crust. We are initiating a laboratory study of microcracks, pores and fractures in a variety of Precambrian rocks. Compressibility, ultrasonic wave velocities, and electrical conductivity of dry and wet samples will be measured at various pressures to 2 GPa and later, at temperature, as well. Initially we will investigate the relative contribution of microcracks and pores to the total porosity, as a function of mineralogy and tectonic setting. The basis for a possible relationship is that cracks and pores may develop because of differences in thermal expansion coefficient and compressibility of adjacent minerals as the pressure and temperature conditions change from those at the time of formation of the rock to those at the present sampling site, whether at depth or at the surface.

#### SOIL MECHANICS

482. BOZOZUK, M., EDEN, W.J., LAW, K.T., National Research Council (DBR):  
Geotechnical properties - eastern marine clay, 1951-.

#### See:

Evidence of creep in steep natural slopes of Champlain Sea clay; *Can. Geotech. J.*, v. 14, no. 4, p. 620-627, 1977.

Measured strengths under fills on sensitive clay; *Proc. IX Internat. Conf. Soil Mechanics Foundation Engin.*, v. 1, p. 187-192, 1977.

Evaluating strength tests from foundation failures; *ibid.*, p. 55-59, 1977.

483. DION, D.J., Québec Min. Richesses Naturelles:  
Levé géotechnique de la région St-Joachim-de-Tourelle-Rivière-du-Loup, Québec, 1973-77.

#### Voir:

Levé géotechnique de la région St-Joachim-de-Tourelle-Rivière-du-Loup; *Richesses Naturelles*, Québec, DPV-540, 1978.

484. KENNEY, T.C., LAU, K.C., CRAWFORD, A., Univ. Toronto (Civil Engineering):

Engineering properties of weak clay soils related to geologic history, 1968-; Ph.D. theses (Lau, Crawford).

The study focuses on weak clay soils in Ontario, with the purpose of determining to what extent their engineering properties are related to their geologic history. The soils currently under investigation are the varved-clay soils at the

northern end of Lake Timiskaming and the lacustrine soils at the western end of Lake Superior. The study will be soon extended to include "clay-tills" of southwestern Ontario. In all studies, attempts are being made to understand the processes involved in the transportation and sedimentation of the soils, and the influences these processes have on the soil fabric and structure. Measurements of engineering properties, both in the laboratory and in the field, are obtained and compared or correlated with information on fabric and structure. Some of the questions being asked are - why do lacustrine clays have many characteristics similar to recent marine sediments? What are causes of soil sensitivity? Why are some "clay tills" homogeneous and very soft?.

485. LÉBOIS, J., RISSMANN, D., Québec Min. Richesses Naturelles:

Mise au point d'une méthode pour cartographier les zones exposées aux glissements de terrain dans les sols argileux, 1976-78:

Cartographier à l'échelle de 1:25000 les zones exposées aux risques de coulées argileuses et d'attaques, en utilisant des facteurs géologiques, géomorphologiques et géotechniques.

486. MARANDA, R., Québec Min. Richesses Naturelles:  
Carte géotechnique Lachute-Terrebonne, 1972-78.

Etablissement d'une carte d'aptitude à l'aménagement en fonction des propriétés géotechniques des sols.

487. MARANDA, R., Québec Min. Richesses Naturelles:  
Carte géotechnique Bécancour, 1973-77.

488. MARANDA, R., LEFEBVRE, J., Québec Min. Richesses Naturelles:

Banque de données géotechnique, 1973-77.

489. PENNER, E., National Research Council (DBR):  
Influence of steel posts on ground temperatures, 1975-80.

Frost heaving around footings of transmission towers is aggravated by excessive heat withdrawal from the soil by steel superstructures. An insulated tower leg installation has been instrumented including the surrounding soil to assess the influence of horizontally placed insulation on the thermal pattern and frost heaving characteristics.

490. RISSMANN, P., LeBUISS, J., Québec Min. Richesses Naturelles:

Cartographie des zones exposées aux coulées argileuses de la région de Shawinigan - Grand-Mère et de la région de Yamaska, Québec, 1977-78.

Zoner le territoire touché par des glissements de terrain, dans le but d'éviter des pertes de vie et des dégâts matériels. Les travaux de terrain ont été effectués, on attend certains résultats d'analyses et la rédaction du rapport.

491. ROBERT, J-M., ALLARD, J-D., Québec Min. Richesses Naturelles:

Programmes d'analyse sur la stabilité des pentes, 1976-78.

SNOW AND ICE

492. FREDERKING, R.M.W., SINHA, N.K., NAKAWO, M., National Research Council (DBR):  
Ice mechanics, 1960-.

See:

Technique for studying structure of sea ice; J. Glaciol. v. 18, no. 79, p. 315-323, 1977.

Effective elasticity of ice; Workshop on Mechanical Properties of Ice, Calgary, Jan. 1977; NRCC Tech. Memo. no. 121, 1977.

To investigate the structural, rheological and mechanical properties of river, lake and sea ice; to investigate ice forces on structures and the load bearing capacity of ice covers.

GLACIOLOGY

493. DILABIO, R.N.W., Geol. Surv.:  
Glacial sedimentation studies, District of Franklin, 1977-.

To study the mechanics of glacier sedimentation to determine the mechanism by which rock fragments are entrained, moved and deposited by glaciers in order to increase the understanding of the relationship between mineralized bedrock and glacial drift and associated sediments.

494. MATHEWS, W.H., Univ. British Columbia (Geological Sciences):

An experimental study of glacial abrasion, 1975-.

Equipment assembled and modified, now in full functioning condition; techniques for improved measurements being developed.

495. OSBORN, G.D., Univ. Calgary (Geology):  
Bergschrund investigations in the Canadian Rockies, 1977-.

Field study of selected glacier bergschrunds in the Canadian Rockies is being conducted to determine temperature vs. depth relationships, amount of rock weathering, nature of maintenance through the seasons, and motion of ice on either side.

496. PATERSON, W.S.B., KOERNER, R.M., FISHER, D., ALT, B., Polar Cont. Shelf Proj. (EMR):  
Mer de Glace, northern Ellesmere Island, District of Franklin, 1977-79.

To study paleoclimate from a northern ice cap by means of coring surface to bedrock and carrying out physical and chemical analyses of the ice. In April/May 1977, a 337 m core was successfully

taken from Mer de Glace Agassiz, northern Ellesmere Island; 3000 oxygen isotope analyses had been completed by Univ. of Copenhagen, Denmark. Mass balance network have been set up over the ice cap and strain nets set up around borehole.

497. PATERSON, W.S.B., KOERNER, R.M., FISHER, D., ALT, B., Polar Cont. Shelf Proj. (EMR):  
Devon Ice Cap, 1971-76.

See:

Core stratigraphy and paleoclimate, Devon Island ice cap; Science, v. 196, p. 15-18, 1977.

An oxygen-isotope climatic record from the Devon Island ice cap, Arctic Canada; Nature, v. 226, no. 5602, p. 508-511, 1977.

Extent of Late-Wisconsin glaciation in N.W. Greenland-N. Ellesmere Island; Quat. Res., v. 8, p. 180-190, 1977.

Strain heating and creep instability in glaciers and ice sheets; Rev. Geophys. Sp. Phys., v. 15, no. 2, p. 235-247, 1977.

Secondary and tertiary creep of glacier ice as measured by borehole closure ratios; Rev. Geophys. Sp. Phys., v. 15, no. 1, p. 47-55, 1977.

Physical and chemical analysis of the Devon core proceed. Investigations of the climate/mass balance relationship were begun and continue. The mass balance of the northwest site of the ice cap was measured as was that of the Meighn ice cap.

## HYDROGEOLOGY

498. BORNEUF, D., OZORAY, G., Alberta Research Council (Groundwater Div.):  
Hydrogeology of the Zama-Bistcho Lakes area, Alberta (84L, 84M), 1977-78.
499. CEROICI, W.J., Alberta Research Council (Groundwater Div.):  
Hydrogeology of Edmonton, southwest Alberta, 1977-78.  
Description of the groundwater availability of the area with comments on hydrochemistry; scale of completed hydrogeological map is 1:125,000.
500. GABERT, G.M., Alberta Research Council (Groundwater Div.):  
Investigations to locate the source of crude oil contaminant in a water well near Rocky Mountain House, Alberta, 1974-77.
501. GABERT, G.M., WITHERS, D.W., Alberta Research Council (Groundwater Div.):  
Alberta groundwater observation well network, 1956-.
502. GRICE, R.H., McGill Univ. (Geological Sciences):  
Quality change trends in operational wells in Ordovician sediments, Montreal, Québec, 1977-78.  
To develop capability and techniques for improved verification, interpretation, analysis, and use of available water quality and water quantity data for the investigation of the relationship of pollutants between infiltration from rain and snow melts and groundwaters. The best cost-benefit ratio for groundwater research seems likely from analysis of existing data provided that the reliability of such data can be verified statistically. Then periodic and routine analyses by well owners can be utilised to map background water quality trends from which the presence of pollutants can be inferred.
503. GRISAK, G.E., BOTTOMLEY, D.J., GRAHAM, B.W., JACKSON, R.E., JOHNSTON, L.M., Fisheries-Environment Canada (Water Res. Br.):  
Hydrogeological factors involved in geologic disposal of high-level radioactive wastes, 1978-.  
To continue the development of equipment and methodology for collection of field data and to investigate the field and laboratory methods of determining the hydrogeologic parameters relevant to radionuclide transport from a geologic disposal zone. For the immediate future the hydrogeologic characteristics of crystalline igneous rocks are of primary interest.
504. GRISAK, G.E., WILLIAMS, D.W., CHERRY, J.A., Fisheries-Environment Canada (Water Res. Br.):  
Contaminant transport in fractured till, 1974-.  
A laboratory study using a large 'undisturbed' sample of fractured glacial till revealed a significant degree of interaction between the fractures and the matrix. A quasi-two dimensional transport model treating conservative contaminants has been developed and will be applied to the laboratory test results. The relative position of breakthrough curves suggests a lateral diffusive flux from the fractures into the matrix. The current practice of depositing much of the country's waste in glacial tills and clays, the upper portions of which are likely to exhibit fracturing, indicates the significance of understanding potential contaminant transport mechanisms.
505. GROVE, G.D., VAN EVERDINGEN, R.O., Fisheries-Environment Canada (Water Res. Br.):  
Hydrogeology of bedrock aquifers along international boundary in southern prairies, 1977-.  
To investigate the water quantity and water quality conditions of Paleozoic and possibly Mesozoic formations in the Western Canada sedimentary basin. This project to evaluate the groundwater resources of selected formations was initiated as a result of proposals within the United States to withdraw large quantities of water from these formations in the American Midwest. The probable effects, if any, of these withdrawals on Canadian groundwater resources are unknown at the present time.
506. HACKBARTH, D.A., Alberta Research Council (Groundwater Div.):  
Water quality monitoring at McIntyre Mines Ltd., Grande Cache, Alberta, 1972-.
507. HACKBARTH, D.A., Alberta Research Council (Groundwater Div.):  
Regional hydrogeology of the Athabasca oil sands area, Alberta, 1974-78.
- See:**  
Application of the drill stem test to hydrogeology; Groundwater, v. 16, no. 1, 1978.  
A conceptual model of the regional groundwater flow of the area has been developed. The flow system has been divided into three hydrostratigraphic units:  
1. The K-Q hydrostratigraphic unit consists of Holocene and Cretaceous sediments and is characterized by a groundwater flow pattern of alternating vertical and horizontal movement controlled by layers of relatively low and high hydraulic conductivity, respectively. Unsaturated zones are believed to extend up to 10 km (6 mi) from outcrop into the units of high hydraulic conductivity. Total dissolved solids concentrations in groundwater in this unit are usually less than 10,000 mg/l and commonly less than 5000 mg/l.  
2. The D-2 hydrostratigraphic unit consists of all Devonian rock units above the Elk Point Group. Groundwater flow in this unit is dominantly horizontal towards a zone of hydraulic heads approximately equal to the elevations of the Athabasca and Clearwater Rivers and which roughly coincides with a fault trend. Total dissolved solids concentrations in this unit are usually less than about 40,000 mg/l - higher values occur in the southwest and in the north-central portions of the area.  
3. The D-1 hydrostratigraphic unit consists of the Methy, McLean River and LaLoche Formations underlying a series of evaporites. Groundwater flow in this unit is northeastward toward the Athabasca and Clearwater Rivers. Total dissolved solids concentration exceeds 2000,000 mg/l west.  
Oil sands have finite hydraulic conductivity when considered in a regional context. Hydraulic conductivities of  $10^{-6}$  to  $10^{-4}$  cm/sec are expected to be observed commonly.

508. HERR, R.L., LENNOX, D.H., Fisheries-Environment Canada (Water Res. Br.):  
Hydrogeology of the National Capital Region, 1974-.
509. HORE, R.C., HUGHES, G., FUNK, G., GOFF, K., VIIRLAND, J., HOLLAND, C., MELLARY, A., SMALL, E., HAMMOND, C., Ontario Ministry Environment (Water Resources Br.):  
Groundwater quality protection, 1957-.
510. HORE, R.C., SIBUL, U., VALLERY, D., GOFF, K., VIIRLAND, J., HOLLAND, C., MELLARY, A., SMALL, E., HAMMOND, C., Ontario Ministry Environment (Water Resources Br.):  
Groundwater interference investigation program, 1961-.
511. HORE, R.C., SIBUL, U., WANG, K.T., CHIN, V., ROY, A., Ontario Ministry Environment (Water Resources Br.):  
Northern Ontario studies, 1966-78.
- See:  
Groundwater resources of northern Ontario; surface-water resources of northern Ontario; and surface-water quality of Northern Ontario; Ontario Ministry Environment Repts., 1978.
512. HORE, R., WILKINS, D., HUGHES, G., SIBUL, U., GOFF, K., VIIRLAND, J., HOLLAND, C., MELLARY, A., SMALL, E., HAMMOND, C., Ontario Ministry Environment (Water Resources Br.):  
Environmental assessment-groundwater, 1961-.
513. JACKSON, R.E., INCH, K.J., CHAMP, D.R., GULENS, J., JOHNSTON, L.M., Fisheries-Environment Canada (Water Res. Br.):  
The distribution coefficient as a geochemical measure of the mobility of contaminants in a groundwater flow system.  
  
The various geochemical factors affecting the mobility of radioactive wastes, road salt and acid precipitation in a shallow aquifer are being studied at the Chalk River Nuclear Laboratories. The radioactive wastes undergo significant sorption whereas the road salt is dispersed with only minor amounts of sodium being sorbed. Acid precipitation promotes silicate weathering and the sulfate eventually is reduced.
514. JEFFS, D., HORE, R., FLEISCHER, F., OSTRY, R., RALSTON, J., WOOD, M., BLACK, S., CHAN, T., KING, D., ONN, D., Ontario Ministry Environment (Water Resources Br.):  
IJC PLUARG (pollution from land use activities reference group), 1972-78.
515. JEFFS, D.N., RALSTON, J., OSTRY, R., SABACH, S.E., FLEISCHER, F.C., PEARCE, G., Ontario Ministry Environment (Water Resources Br.):  
Grand River basin study, 1974-79.
516. JOPLING, A.V., WEIRICH, F., Univ. Toronto (Geography):  
Continuous monitoring of density flows in a lacustrine environment, 1975-79; Ph.D. thesis (Weirich).
517. LeBRETON, E.G., British Columbia Min. Environment (Water Investig. Br.):  
A hydrogeological study of the Salmon River valley, Shuswap Lake, British Columbia, 1974-78.  
  
A study of relationships between groundwater and surface water flow with special emphasis based on classification of groundwaters and surface waters and two minor constituents, silica and total soluble phosphorus.
518. LYTVIAK, A.T., OZORAY, G.F., Alberta Research Council (Groundwater Div.):  
Hydrogeology of Wadlin Lake and Vermilion Chutes, Alberta, 1977-78.
519. LYTVIAK, A.T., WOLLEN, M., Alberta Research Council (Groundwater Div.):  
Central Data Bank.
520. MUNRO, D.S., Univ. Toronto (Geography):  
Energy exchange and water loss from a swamp, 1976-79.  
  
Study of atmospheric and surface controls with respect to evaporation.
521. OZORAY, G.F., Alberta Research Council (Groundwater Div.):  
Hydrogeological mapping (1:500,000) of the Steen River-Whitesand River area (NTS 84N, O), Alberta, 1977-78.
522. OZORAY, G.F., BORNEUF, D., WALLICK, E.I., Alberta Research Council (Groundwater Div.):  
Hydrogeological atlas of Alberta, 1976-82.
523. PRICE, A.G., Univ. Toronto (Geography):  
Snowmelt and runoff in a forest, 1977-80.  
  
The study is being made at the Penh Lake I.H.D. site at Chalk River, Ontario. It is an attempt to elucidate the processes involved in the generation of snowmelt runoff in a hardwood forest. The project is in two main sections. In order to predict rates of melting at the surface of the pack, and thence daily snowmelt totals, the energy balance of the snowpack will be measured as follows: net radiation will be measured directly, and the turbulent exchanges will be assessed using 6-level measurements of windspeed, temperature, and humidity. This part of the study will reveal the relative sizes and importance of the major components of the Energy Balance. The second part of the study involves the checking of the predicted daily melts against actual melt using runoff plots of 100 m<sup>2</sup>. In future years, it is hoped to extend the runoff portion to define all the ways in which meltwater moves from the snow surface to surface drainage.
524. RAVEN, K.B., Geol. Surv. Can.:  
Hydrogeologic investigations of test sites and potential radioactive waste storage sites, 1977-.
525. RODRIGUEZ, E., FLIGG, K., Ontario Ministry Environment (Water Resources Br.):  
Groundwater geophysics, 1965-.

526. SCHWARTZ, F.W., MILNE-HOME, W.A., Univ. Alberta (Geology):  
Hydrogeology of the Muskeg River Basin, 1977-80.  
Over a large area of the Muskeg River Basin, less than 100 feet of drift overlies thick, oil sand deposits. It is expected that mining and extraction will begin on leases within this basin in the next few years. Comprehensive studies of the physical, chemical and biological setting are essential for the ongoing environmental management of the watershed. The groundwater portion of this system is of particular significance because of the important role that it plays in determining the quantity and quality of surface water. In order to properly assess the environmental impact of proposed development schemes within the watershed and to formulate operating and reclamation strategies, a clearer understanding of groundwater conditions in the watershed must be developed. The proposed study focusses primarily on the groundwater surface - water interface and is designed to study the characteristics of shallow, near-surface groundwater systems.
527. SIBUL, U., OSTRY, R.C., WOERNS, N., Ontario Ministry Environment (Water Resources Br.):  
Groundwater resources in the Grand River Basin, Ontario, 1977-80.  
To carry out an inventory of groundwater resources in the Grand River Basin, including the delineation of major aquifers, determining general water quality, and relating the available groundwater resources to the major uses in the basin.
528. SIBUL, U., TURNER, M., Ontario Ministry Environment (Water Resources Br.):  
Aquifer mapping, 1976-79.
529. SIBUL, U., VALLERY, D.J., Ontario Ministry Environment (Water Resources Br.):  
Flowing wells in Ontario, 1976-78.  
Maps for all of Southern Ontario have been completed; Northern Ontario will be completed in 1978.
530. SIBUL, U., WALMSLEY, D., VALLERY, D.J., Ontario Ministry Environment (Water Resources Br.):  
Groundwater probability mapping, 1966-.  
Maps for the following Counties have been completed: Lampton, Kent, Essex, Elgin, Brant, Haldimand, and Norfolk (Hald-Norf.). Work progressing on R.M. Peel and Simcoe County.
531. SIBUL, U., WANG, K.T., CHIN, V.I., VALLERY, D.J., Ontario Ministry Environment (Water Resources Br.):  
Drainage basin studies, 1969-.  
**See:**  
Groundwater resources of the Duffins Creek-Rouge River drainage basins; Ontario Ministry Envir., Water Res. Rep. 8, 1977.
532. SINGH, SITARAM, VANDENBERG, A., Fisheries-Environment Canada (Water Res. Br.):  
Modelling subsurface irrigation return flow, 1977-78.
- Of a volume of water from irrigations joining the main body of groundwater reservoir, a portion is discharged to a drain or effluent stream after a time interval has elapsed and the remaining portion constitutes the transient groundwater storage. The first part is termed subsurface irrigation return flow. The objectives are: To develop a mathematical model for predicting groundwater recharge from irrigations keeping in view the soil-plant-atmosphere interaction and methods of irrigation (eg. surface flooding and sprinkling); to develop an aquifer simulation model for quantitative analysis of groundwater flow towards the drainage facilities; and to validate the models using the soil moisture and groundwater data collected from irrigation experiment project near Calgary, Alberta.
533. SKLASH, M.G., FARVOLDEN, R.N., Univ. Waterloo (Earth Sciences):  
The role of groundwater in storm and snowmelt runoff, 1975-78; Ph.D. thesis (Sklash)  
Storm and snowmelt runoff in four hydrogeologically diverse watersheds (Marmot Creek, Alberta; Hillman Creek and Canagagigue Creek, Ontario; and Ruisseau des Eaux Volees, Québec) have been monitored to determine the role of groundwater in surface runoff quantity and quality. Environmental isotope ( $O^{18}$ , D, T) techniques, hydrometric measurements, and computer simulation methods all confirm the importance of groundwater in runoff generation. In one agricultural basin, nitrate increases in surface runoff are shown to be caused by groundwater discharge increases.
534. STEIN, R., Alberta Research Council (Groundwater Div.), Alberta Dep. Environment:  
Edmonton regional utilities study groundwater evaluation, 1977-.  
This project consisted of a groundwater evaluation (quantity, quality, movement, and recharge rates) for a 5,400 square mile area surrounding the city of Edmonton, Alberta. Presentation was by means of a report (104 pages) and eight 1:250,000 scale maps. Publication is planned for 1978 (by the Alberta Department of the Environment) as one or two volumes of an eight or nine volume series. To describe existing, and to determine the optimum, water supply (surface and groundwater), sewage disposal and storm drainage systems for communities and municipalities within the study area.
535. STEVENSON, D.R., VOGWILL, R.I.J., Alberta Research Council (Groundwater Div.):  
Hydrogeology of Marmot and Streeter basins, Alberta, 1964-78.
536. TERRY, R.D., MILLER, J., MCCLENAGHAN, W., Ontario Ministry Environment (Water Resources Br.):  
Groundwater data, 1947-.
537. TOTH, J., Alberta Research Council (Groundwater Div.):  
Relation between groundwater movement and hydrocarbon accumulation, 1974-78.

The theory is advanced that in geologically mature basins, gravity-induced cross-formational flow is the principal agent in the transport and accumulation of hydrocarbons. The mechanism becomes operative after compaction of sediments and the concomitant primary migration ceases and subaerial topographic relief develops. Hydrocarbons from source or carrier beds are then moved toward discharge foci of converging flow systems and may become entrapped en route where hydrogeologic conditions are favourable. Accordingly, deposits are expected and observed to be associated preferentially with ascending limbs and stagnant zones of flow systems and hence to be characterized by relative potentiometric minima, downward increase in hydraulic heads possibly reaching artesian conditions, reduced or zero lateral hydraulic gradients and relatively high groundwater salinity. Continuous flow of meteoric waters imports hydrocarbons into such traps until the "spill point" is reached. The excess becomes source material for new accumulations. However, a change in surface topography entails delayed readjustment of the flow pattern and redistribution of petroleum. As some hydrocarbons can remain in place, deposits may also occur in discharge and stagnant regions of relict flow systems.

538. VAN EVERDINGEN, R.O., KROUSE, H.R., Fisheries-Environment Canada (Hydrology Res.), Univ. Calgary: Northern groundwater and engineering problems, 1974-.

See:

Stratigraphic differentiation by sulphur isotopes between Upper Cambrian and Lower Devonian gypsum bearing units, District of Mackenzie, Northwest Territories; Can. J. Earth Sci., v. 14, p. 2790-2796, 1977.

Frost mounds at Bear Rock, near Fort Norman, Northwest Territories, 1975-1976; Can., J. Earth Sci., v. 15, no. 7, p. 263-276, 1978.

Landsat imagery 1972 to 1977, waterlevel recording in 1976 and 1977, and time-lapse photography of seasonally flooding karst depressions in 1977 is used in study of groundwater recharge in the area between Great Bear and Mahony Lakes. Study of annual development of frost mounds at Bear Rock, near Fort Norman, is being complemented by time-lapse photography during the period March 1977 to May 1978. Continued study of stable-isotope geochemistry of groundwater in the Franklin Mountains.

539. VOGWILL, R.I.J., BEERWALD, A.S.R., DALAL, G.P., Alberta Research Council (Groundwater Div.): Hydrogeology of the Edson areas, NTS 83F, Alberta, 1975-78.
540. VOGWILL, R.I.J., CHORLEY, D., Alberta Research Council (Groundwater Div.): Aquifer hydraulics and evaluation of aquifer parameters in Alberta, 1972-.

All aquifer test data for the province are now accessible through computer files, aquifer test analysis is continuing and field tests are active, and calculation of aquifer parameters of major geological formations in Alberta is in progress.

541. WALLICK, E.I., BALAKRISHNA, T.S., Alberta Research Council (Groundwater Div.): Hydrogeology and hydrochemistry of the sodium sulfate/carbonate deposits at Horseshoe Lake, Metiskow, east-central Alberta, Canada, 1974-78.

See:

Sulfur isotope geochemistry of a groundwater generated  $\text{Na}_2\text{SO}_4/\text{Na}_2\text{CO}_3$  deposit and the associated drainage basin of Horseshoe Lake, east-central Alberta, Canada; Proc. I.A.G.C. 2nd Internat. Symp. Water-Rock Interaction, p. 56-64, 1977.

542. WANKIEWICZ, A., Fisheries-Environment Canada (Water Res. Br.): River bed temperature on Melville Island, District of Franklin, 1976-78.

In the Canadian Arctic Islands, the rivers stop flowing early in winter, as a result of the freezing of the active layer in the associated river basin. A field investigation was made in 1976 and 1977 of the active layer thickness and permafrost temperature under the river bed at two sites on the King River on Melville Island. Thermistor cables had been installed in May into boreholes drilled into the frozen river bed. The study showed that (a) Arctic rivers which flow for only a few months in the summer exert little influence on the thermal regime of their associated stream beds, and (b) snow drifts induced by river channel morphology and orientation locally insulate the river bed from the extremes of winter cold.

543. WANKIEWICZ, A., Fisheries-Environment Canada (Water Res. Br.):

Thaw zones beneath rivers in areas of continuous permafrost, 1977-78

A study of rivers in permafrost areas which remain flowing until late in winter. The thermal regime of the thaw zone beneath the Rengling and Caribou Rivers near Inuvik, Northwest Territories is being investigated based on temperature measurements. Thermistor strings were installed in transects of boreholes drilled into the frozen river beds and associated valley flood plains in April, 1977. A river icing is found in winter at the Caribou Creek site.

544. WEYER, K.U., HORWOOD, W., Fisheries-Environment Canada (Hydrology Res.):

Investigation of groundwater flow in the Pine Point region, Northwest Territories, 1977-80

Effect of dewatering on regional and local groundwater flow and vice versa; interrelation between hydrology, tectonics and orogenesis.

545. YAKUTCHIK, T.J., MCKENNA, P., Ontario Ministry Environment (Water Resources Br.): Groundwater development, 1957-.

546. AKSU, A.E., PIPER, D.J.W., Dalhousie Univ. (Geology): Marine geoscience studies in the Baffin Bay-Davis Strait region, 1977-80; Ph.D. thesis (Aksu).  
Twenty-six piston and 12 gravity cores from deep water in Baffin Bay and Davis Strait have been examined. Five facies were identified. Apparently hemipelagic muds occur at the surface and at several depths within the cores. Gravelly sandy muds and muds, rich in detrital carbonates, are common on the abyssal plain and Baffin Island rise. This facies thins to the east and south. Gravelly sandy muds with little carbonate occur in slope and rise cores off Baffin Island and Greenland. Thin beds of red sandy mud are very common in central Baffin Bay and the Baffin Island slope. Graded sand and silt beds are the dominant lithology of southern Baffin Bay and Davis Strait. Most appear to be turbidites. Many of the gravelly sandy muds occur in graded beds and are interpreted as resedimented debris flows or turbidites. Some may be directly ice rafted. The cores were correlated lithologically. This correlation was confirmed by the occurrence and abundance of biogenic tests, the presence of two levels of volcanic ash, and paleomagnetic properties. The ash horizons were correlated with North Atlantic ash zones dated at 9,300 yr. BP and 65,000 yr. BP by Ruddiman and Glover (1972, 1975). Two amino acid dates were also used to establish the age of the sediment sequence. One major excursion of the earth's geomagnetic field was identified. Extrapolated dates suggest this occurred between 25,000 yr. BP and 35,000 yr. BP. A climatic curve was established on the basis of abundance and occurrence of dextral and sinistral *G. pachyderma*, and total biogenic material. The results indicate an interglacial period with conditions similar to the present at the base of one core. Extrapolated dates assuming a constant rate of sedimentation suggest a Sangamon age. This is followed by several stadials and interstadials, and followed by a warming to present conditions. The Holocene sediments were accumulated at 5 cm to 6.6 cm/100 yr and Wisconsin sediments at 7.3 cm to 9.1 cm/1000 yr.
547. ALAM, M., PIPER, D.J.W., COOKE, H.B.S., Dalhousie Univ. (Geology): Quaternary stratigraphy and paleo-oceanography of the continental margin of the Grand Banks, 1975-78; Ph.D. thesis (Alam).  
**See:** Pre-Wisconsin stratigraphy and paleoclimates off Atlantic Canada and its bearing on glaciations in Quebec; *Geogr. Phys. Quat.*, v. 31, p. 15-22, 1977.
548. BARRIE, C.Q., PIPER, D.J.W., IULIUCCI, R.J., Dalhousie Univ. (Geology): Marine geology of Makkovik Bay, Labrador, 1977-79; M.Sc. thesis (Barrie).  
**See:** Reconnaissance of the marine geology of Makkovik Bay, Labrador; *Geol. Surv. Can.*, Paper 78-1, p. 333-336, 1978.
549. CHASE, R.L., MURRAY, J.W., GRILL, E.V., COOK, R., BELAND, G., Univ. British Columbia (Geological Sciences): Offshore minerals, 1977-80; M.Sc. thesis (Cook, Beland).  
To seek evidence for hydrothermal processes and mineral deposits on active spreading oceanic ridges adjacent to the western Canadian Continental margin. Shipboard work to date: Three weeks (summer 1977) cruise, during which 3.5 KHz echo sounding profiles, cores, dredges and water samples were taken from two areas of 2900 and 2100 km<sup>2</sup> at northern ends of Explorer and Juan de Fuca Ridges respectively.
550. DRYER, S., LOGAN, A., Univ. New Brunswick, Saint John (Geology): Holocene reefs and sediments of Castle Harbor, Bermuda, 1975-78; M.Sc. thesis (Dryer).  
Quantitative studies on corals and associated sediments of fringing and patch (pinnacle) reefs of Castle Harbor, Bermuda are being performed. Transects and cores are being taken across selected areas of the Harbor, to see if fauna and sediments have been affected by dredging for airfield in 1940's.
551. HESSE, R.F., CHOUGH, S.K., VELDHUYZEN, S.K., McGill Univ. (Geological Sciences): Labrador Sea sediments, 1973-80; Ph.D. thesis (Chough); M.Sc. thesis (Veldhuyzen).  
**See:** Submarine meandering talweg and turbidity currents flowing for 4,000 km in the Northwest Atlantic Mid-Ocean Channel, Labrador Sea; *Geology*, v. 4, no. 9, p. 529-533, 1976.  
New core material (piston cores of total length of 42 m, and grab samples were collected in Karlsefini Trough, Saglek Bank, Labrador Shelf, during Hudson cruise 77-021-I. The objective is to determine to what extent Karlsefini Trough has served as a funnel way for terrigenous sediment to pass from a landward source to the open ocean. During the first months after returning from the cruise, work concentrated on: (1) visual description of the core material, and (2) continuous x-radiography coverage. These preliminary examinations indicate a general coarsening of the sediment seaward from a morainal feature located on the landward side of Saglek Bank. This feature may represent a potential sediment source for material transported into Karlsefini Trough during the Late Pleistocene. Inspection of seismic (Huntec) profiles reveals an upper acoustically transparent unit containing a number of distinct seismic reflectors which overlie an acoustic basement assumed to be till. This upper unit thins regularly in a seaward direction.
552. LOGAN, A., Univ. New Brunswick, Saint John (Geology): Ecology and systematics of reef brachiopods (Recent) from the Caribbean, 1975-78.  
**See:** Reef-dwelling articulate brachiopods from Grand Cayman, B.W.I., *Proc. 3rd Internat. Coral Reef Symp.*, v. 2, p. 87-93, 1977.

Studies are continuing on the cryptic faunas (brachiopod-bryozoan-sclerosponge community) of caves in coral reefs of Caribbean. A new method of determining abundance and dominance of encrusting organisms, using close-up photographs later analysed by computer digitizer, will be tested.

553. LOGAN, A., NOBLE, J.P.A., Univ. New Brunswick, Saint John (Geology):

Systematics and ecology of Recent Brachiopoda of Mediterranean Sea, 1976-79.

Specimens from almost 80 localities are available and show a distribution into shallow-water and eurybathic groups. Limiting factors are being studied, as well as the derivation of the species following the Messinian crisis. Further investigations will be concentrated on the Tertiary and Pleistocene history of the Mediterranean Brachiopoda.

554. MacLEAN, B., Geol. Surv. Can.:  
Eastern Baffin Island shelf bedrock and surficial geology mapping program, 1976-.

See:

Ordovician strata on the southeastern Baffin Island shelf revealed by shallow drilling; Can. J. Earth Sci., v. 14, no. 8, p. 1925-1939, 1977.

Baffin Island shelf-shallow corehole drilling, 1976; Geol. Surv. Can., Paper 77-1B, p. 125-127, 1977.

555. PIPER, D.J.W., Dalhousie Univ. (Geology):  
Deposition of turbidity currents in the oceans, 1976-.

See:

Conglomeratic Miocene Flysch, Western Greece; J. Sed. Pet., v. 48, p. 117-125, 1977.

The natural remanent magnetisation of sediment cores from the Beaufort Sea; Can. J. Earth Sci., v. 14, p. 2007-2012, 1977.

556. PIPER, D.J.W., LETSON, J.R.J., KEPKAY, P.E., SCOTT, D.B., MUDIE, P.J., URQUART, E.F., Dalhousie Univ. (Geology):

Geological study of LaHave Bay, Green Bay and Medway Harbour and nearby coastal bays, Nova Scotia, 1974-79; M.Sc. thesis (Letson); Ph.D. thesis (Kepkay).

To investigate the geology of the area between the LaHave Estuary and Medway Harbour, to approximately the 30 fm isobath offshore. In particular, to produce (a) a map of surficial geology, (b) a map of bedrock geology, (c) as far as is feasible, a map of distribution and thickness of glacial and post-glacial sediments, (d) an account of the late glacial and Holocene history. Fieldwork is complete. A survey from CSS Dawson collected about 100 km of high resolution seismic profiles. Small boat surveys collected some 150 cores and grabs and extensive MS26B sounder profiles. Some magnetometer and 3.5 kHz profiles were obtained. Preliminary data interpretation is complete. There is a thick and complex post-glacial sequence off the LaHave River, but further west bedrock outcrops in many areas. Green Bay is a major reservoir of sand.

557. STEARN, C.W., MacGEACHY, J.K., McGill Univ. (Geological Sciences):

Geological effect of boring sponges on the growth of a coral reef, Barbados, West Indies, 1972-77; Ph.D. thesis (MacGeachy).

See:

Factors controlling sponge boring in Barbados reef corals; Proc. 3rd Internat. Coral Reef Symp., v. 2, p. 477-84, 1977.

Carbonate budget of a fringing reef, Barbados; *ibid.*, p. 471-476, 1977.

558. STEARN, C.W., WILLSON, M., McGill Univ. (Geological Sciences):

Geological effect of boring by endolithic algae and fungi on Barbados reef corals, 1977-79; M.Sc. thesis (Willson).

559. STOW, D.A.V., PIPER, D.J.W., Dalhousie Univ. (Geology):

Quaternary geology of the Laurentian Fan, 1974-77; Ph.D. thesis (Stow).

560. UMPLEBY, D.C., Geol. Surv. Can.:  
Regional subsurface geology, continental shelf and slope, offshore Labrador, Baffin Island and related areas, 1976-.

COAL GEOLOGY

561. BOTHAM, J.C., GARDINER, W., JORGENSEN, J.G., LLOYD, T.A., MONTGOMERY, W.J., CANMET (EMR): Evaluation of canadian coking coals.  
The pilot plant equipment comprises 3 technical-scale ovens. These ovens have been used extensively to evaluate the coking properties of western Canadian coking coals. It is generally recognized that this scale of testing is required for a realistic interpretation of the coking propensities of coals from new sources, particularly when there has been no prior history of their use for the manufacture of conventional coke. The results which have been obtained are well-known to the Japanese steel industry and are regarded as important to the extent that they have insisted, on occasion, that coal from certain seams be tested in these facilities.
562. CAMERON, A.R., Geol. Surv. Can.: Petrographic examination of coking coals from the Kootenay Formation, Alberta and British Columbia, 1961-.
563. CAMERON, A.R., Geol. Surv. Can.: Petrographic analysis of Saskatchewan lignites, 1972-.
564. CAMERON, A.R., Geol. Surv. Can.: Compositional characteristics of coals from Hat Creek, British Columbia, 1977-.
565. CHU, M., Alberta Research Council (Geology Div.): Geology and coal resources of north-central Alberta, 1977-78.  
Investigation of relatively deep coal resources of the Wapiti Formation shows that three coal zones of Upper Cretaceous are of interest. One coal zone stratigraphically presented as the McKay equivalent can be correlated throughout the lower portion of the Wapiti Formation. Seams generally thin although coal beds are locally thick in the area between Clyde and Westlock. Two coal zones of upper Wapiti Formation indicate significant development for commercial interest. The Clover Bar equivalent, a prominent coal horizon in the Horseshoe Canyon Formation and overlying Weaver equivalent are recognized as the two major coal zones widespread throughout the areas of Barrhead and Edmonton. Cross sections illustrate the regional geological structure and stratigraphic relationships of the Upper Cretaceous strata. Maps of coal seams thicknesses are presented including the best seam exceeding 5 ft. thick and the aggregate footages of all seams 3 ft. or more thick in any one section. Areas of potential coal development are outlined in these presentations.
566. EVANS, S.H., MATHEWS, W.H., Univ. British Columbia (Geological Sciences): Geology of the Tulameen coal basin, British Columbia, 1977-78; M.Sc. thesis (Evans).  
To assess the coal resources and examine means of correlation of isolated exposures of coal by intercalated volcanic ashes. Field mapping essentially complete.
567. GRAHAM, P.S., Geol. Surv. Can.: Evaluation of coal deposits in western and northern Canada, 1976-.  
**See:**  
Geological investigations of the coal-bearing Kootenay Formation in the subsurface of the Upper Elk River Valley, British Columbia; Geol. Surv. Can., Paper 77-1B, p. 203-210, 1977.
568. GUNTHER, P.R., Geol. Surv. Can.: Optical properties of coals and dispersed organic materials, 1975-.  
**See:**  
Implications of coalification levels, Eureka Sound Formation, northeastern Arctic Canada; Can. J. Earth Sci., v. 14, no. 7, p. 1588-1598, 1977.
569. GUNTHER, P.R., Geol. Surv. Can.: Surface oxidation of variously ranked coals, 1977-.
570. HACQUEBARD, P.A., Geol. Surv. Can.: Rank and petrographic studies of coal and organic matter dispersed in sediments, 1968-.
571. HACQUEBARD, P.A., Geol. Surv. Can.: Microscopic study of pyrite in main seams of Sydney coalfields, Nova Scotia, 1975-.
572. HONCH, R., WHITTAKER, S.H., MOSSMAN, D.J., Univ. Saskatchewan (Geological Sciences): Geological correlations in Tertiary coal measure, southern Saskatchewan, 1975-78; M.Sc. thesis (Honch).
573. HUGHES, J.D., Geol. Surv. Can.: Resource evaluation of coal deposits of western and northern Canada, 1977-.
574. JERZYKIEWICZ, T., Geol. Surv. Can.: Studies of coal-bearing Upper Cretaceous and Paleocene formations, central Alberta Foothills, 1977-.
575. LONG, D.G.F., Geol. Surv. Can.: Studies of coal deposits of western and northern Canada, 1977-.  
**See:**  
Lignite deposits in the Bonnet Plume Formation, Yukon Territory; Geol. Surv. Can., Paper 78-1A, p. 399-401, 1978.
576. McLEAN, J.R., Geol. Surv. Can.: Lithostratigraphy and sedimentology of the coal-bearing Blairmore Group in the Rocky Mountain Inner Foothills Belt, Alberta, 1976-.  
**See:**  
Bedded volcanic chert near Coalspur, central Foothills, Alberta; Geol. Surv. Can., Paper 77-1B, p. 149-155, 1977.
577. NANDI, B.N., BELINKO, K., CIAVAGLIA, L.A., CANMET (EMR): Alkane distribution of eastern and western Canadian coals, 1977-78.

Various coals of eastern and western Canadian origin including naturally weathered coals are being extracted with different solvents and the extracted materials chemically characterized. Alkane distributions for these coals are being determined by gas chromatographic techniques.

578. NANDI, B.N., BELINKO, K., CIAVAGLIA, L.A., CANMET (EMR):

Binders processed from Athabasca bitumen for non-coking coals, 1977-78.

The Cretaceous coals of Western Canada are rich in inert macerals and consequently possess low fluidity. Some of these coals have also undergone extensive weathering and are therefore unsuitable for the production of metallurgical coke. In Japan, binders produced from Kuwait petroleum residue are being added to such poor coking coals to improve their coking characteristics. Recent investigations in our laboratory have revealed that the residual pitch material from thermal hydrocracking of Athabasca bitumen is an excellent binder material for poor coking coals from western Canada. Utilization of hydrocracked pitch would create a market for poor coking coals and also make thermal hydrocracking more economically feasible. Investigations are being carried out to determine the type of bitumen best suited as a binder material and the optimum operating conditions during thermal hydrocracking for the production of the pitch binder.

579. SMITH, E.W., GILLIS, K.S., Nova Scotia Dep. Mines: Coal inventory survey, 1974-.

Emphasis in the Pictou Coalfield and offshore areas of the Sydney Coalfield.

#### INDUSTRIAL MINERALS

580. BELL, K.E., ZEMGALS, L.K., RILEY, G.W., CANMET (EMR):

Ceramic clays and shales of western Canada, 1973-78.

The ceramic properties of 49 clay and shale samples from western Canada will be related to their mineralogical and chemical compositions in a report to be issued in 1978.

581. BERARD, J., BOILY, B., Ecole Polytechnique:

Etude des produits de réactions chimiques entre les agrégats de grès de Potsdam et le ciment Portland, 1977-79; thèse de maîtrise (Boily).

Etude des minéraux de néoformation dans les bétons faits de grès réactifs aux alcalis du ciment.

582. BRINSMEAD, R.A., BARNETT, D.E., New Brunswick Dep. Nat. Res. (Mineral Res. Br.):

Granular aggregate resources Sevole area 21 P/4, New Brunswick, 1977-78.

Sevole map-area was glaciated by northward - to northeastward-moving ice during the final stages of the last glaciation. The ice melted out in a north-to-south sequence, leaving substantial deposits of sorted sediment in the valley of the Northwest Miramichi River. Ice-contact deposits mark at least six notable stances of the retreating ice margin, which dammed a glacial lake of major

proportions in the valley of the Northwest Miramichi. Glaciogenic streams flowing into this lake deposited quantities of outwash gravel that grades into a large deltaic deposit occupying an area of about 10 square kilometres near the mouth of the Sevole River. The opening of a spillway at Sunny Corner resulted in draining of the lake to successive lower static levels, with associated incision of the river system into the deltaic deposits. At least five erosional terraces are evident in one locality on the Sevole River; these terraces are veneered by fluvial gravels. Granular aggregate is available in economic quantities from deposits of ice-contact stratified drift, glaciofluvial outwash, glaciofluvial deltaic material and ancient alluvium. Potential uses of the material range from borrow and subbase in many of the ice-contact deposits, to asphaltic and concrete aggregate in the deltaic and ancient alluvial deposits.

583. BURWASSER, G.J., FRASER, J.Z., Ontario Geol. Surv.:

Aggregate resources inventory in southern Ontario, 1977-79.

#### See:

Township aggregate inventory, southern Ontario; Ontario Division of Mines, M.P. 75, p. 160-161, 1977.

584. CHRISITE, R.L., Geol. Surv. Can.:

Geology of bedded phosphate deposits in Canada, 1976-.

585. DANNER, W.R., Univ. British Columbia (Geological Sciences):

Rhodonite deposits of Saltspring and Vancouver Islands, British Columbia, 1972-.

To determine origin, mineralogy and age of the rhodonite deposits on Saltspring Island and to the northwest on Vancouver Island. Also to see if this is a special geologic marker unit which would be useful for stratigraphic interpretation.

586. FINAMORE, P.F., BARNETT, D.E., New Brunswick Dep. Nat. Res. (Mineral Res. Br.):

Granular aggregate resources of Bathurst map-area (21P/12), Gloucester County, New Brunswick, 1977-78.

During the fall of 1976 and from May to mid-August of 1977, a granular aggregate resource study of the Bathurst (21P/12) map-area was completed. The Bathurst map-sheet (confined by latitude 47°30' and 47°45'N and longitude 65°30' and 66°00'W), is divided by the New Brunswick Highlands to the west and the Maritime Plain to the east (Bostock, 1967). In the fall of 1977, preliminary investigations began in Restigouche County, New Brunswick. The area investigated includes those portions of New Brunswick in the National Topographic System's Oak Bay (22B/2) and Escuminac (22B/1) map-sheets and parts of the Charlo (21O/16) and Campbellton (21O/15) map-sheets. More specifically, a coastal radius of between 2 and 6 miles, from the city of Campbellton to the town of Dalhousie was examined. Both projects, sponsored by the Department of Regional Economic Expansion

(D.R.E.E.), were initiated to provide basic information on the location and extent of granular deposits and to determine the quality and quantity of them. Both areas exhibit an abundance of granular deposits that are of marine origin. These deposits are usually shallow and discontinuous, whereas deposits of glacial origin are more consistent in extent and size.

587. FOWLER, J.H., Nova Scotia Dep. Mines:  
Sand and gravel survey, 1974-.

**See:**

Sand and gravel resources of Pictou County; Nova Scotia Dep. Mines, Paper 77-6, 1978.

Field mapping and geochemistry of Pleistocene glacial deposits was carried out in Guysborough and Halifax counties as support to a lake sediment geochemistry survey in the same areas.

588. GODFREY, J.D., Alberta Research Council (Geology Div.):

Feasibility study of the Fort Chipewyan granite as a building stone, Alberta, 1972-77.

Project has been determined to be economically unfeasible at the present time.

589. GUNTHER, P.R., Geol. Surv. Can.:

The relationship between kerogen type (known petrographic rank) and chemical extract data, for the purpose of source rock evaluation, 1977-.

590. HAMILTON, W.N., BAINEY, S.J., Alberta Research Council (Geology Div.):

Economic minerals map of Alberta, 1975-78.

591. MacDONALD, D.E., Alberta Research Council (Geology Div.):

Alberta marl survey, 1976-78.

To find marl deposits usable for treating acid agricultural soils.

592. McLAWS, I.J., Alberta Research Council (Geology Div.):

Silica sand in the Fort McMurray area, Alberta, 1973-77.

593. MURRAY, D.A., Nova Scotia Dep. Mines:  
Industrial mineral survey, 1974-.

Preparation of report on barite-celestite-fluorite in Nova Scotia.

594. SANDFORD, B.V., Geol. Surv. Can.:  
Salt basins of Canada, 1975-.

595. SCAFE, D.W., HAMILTON, W.N., Alberta Research Council (Geology Div.):

Potential industrial clays of Alberta, 1973-79.

P.C.E. values within the stoneware range, low values for firing shrinkage, and relatively long firing ranges would make some of the clays associated with the coals of the Kootenay Formation in the Crowsnest Pass area attractive as additives to more plastic clays from other areas. The association of these mudstones and shales with the Kootenay coals would allow them to be produced as a byproduct of coal mining. Care would

be necessary to eliminate the less desirable shales and mudstones that contain calcite and dolomite fluxes, also associated with these coals. With a few exceptions, the shales and mudstones of the Paskapoo Formation sampled in the Wintering Hills and Hand Hills areas have low P.C.E. values and crack badly on drying. The high content of the clay mineral montmorillonite accounts for both these shortcomings. Similar characteristics are present in Paskapoo samples from the Rocky Mountain House-Brazeau Reservoir - Drayton Valley area.

596. THIBAUT, J., BARNETT, D.E., New Brunswick Dep. Nat. Res. (Mineral Res. Br.):

Granular aggregate resources of Nepisiquit Falls map-area (21P/5), New Brunswick, 1977-78.

The Nepisiquit Falls map-area lies in northeastern New Brunswick south of Chaleurs Bay, in the area bounded by latitudes 47°15' and 47°30'N and longitudes 66°00' and 66°30'W. Along the centre of the map-area, a broad northeasterly trending valley separates the Miramichi Highlands to the west from the New Brunswick Lowland to the east. Abundant evidence of glacial abrasion and deposition testified to the complete glaciation of the map-area. Two principal directions of ice movement have been observed: that of the highland plateau in the western part of the area recorded by easterly trending striations, and that of the broad central valley recorded primarily by northeast to north-northeasterly trending streamlined depositional features. Several eskers and esker complexes were formed as a result of the wasting away of late ice lobe in the central valley. Melt-water from the glacier flowed into the Bay of Chaleurs via a vast and intricate network of proglacial streams. Very little sand or gravel has accumulated in these short-lived waterways. Eskers and esker complex represent the principal sources of granular aggregate in the map-area. The probability of finding coarse aggregate is good but the texture of these ice-contact deposits is characteristically variable and may require crushing or screening.

#### MINERAL DEPOSITION EXPLORATION/EVALUATION

597. AUBUT, A.J., MORTON, R.D., Univ. Alberta (Geology):

The nature and mineralogy of a buried Tertiary(?) placer gold-platinum deposit, Granite Creek, Tulameen District, British Columbia, 1977; M.Sc. thesis (Aubut).

598. BALE, W.C., MORTON, R.D., University of Alberta (Geology):

The origin of Methane in the Con Mine, Yellowknife, Northwest Territories, 1977-78; M.Sc. thesis (Bale).

599. BEALES, F.W., ANDERSON, G.M., SPOONER, E.T.C., Univ. Toronto (Geology):

Stratigraphic and geochemical habitat of Mississippi Valley-type ore deposits; M.Sc. and Ph.D. theses.

Investigation of the total evolution of sedimentary basins with an emphasis on their stratabound lead-zinc deposits from genesis through diagenesis to weathering.

600. BELL, R.T., Geol. Surv. Can.:  
Geology of uranium resources of Canada, 1975-.
- See:**  
Breccias and uranium mineralization in the Wernecke Mountain, Yukon Territory - a progress report; Geol. Surv. Can., Paper 78-1A, p. 317-322, 1978.  
Uranium in the Helikian of the northern Canadian Cordillera - a preliminary assessment; *ibid.*, p. 489, 490, 1978.
601. BREAKS, F.W., BOND, W.D., Ontario Geol. Surv.:  
Metallogeny of the English River Subprovince, Ontario, 1977-79.
602. BOURQUE, D., ZENTILLI, M., Dalhousie Univ. (Geology):  
Metallogeny of the Antigonish Highlands, Nova Scotia, 1978-79; M.Sc. thesis (Bourque).
603. BROWN, A.C., BARTHOLOME, P., Ecole Polytechnique, Univ. Liege:  
The genesis of non-ferrous stratiform ores, 1970-.
604. CAMPBELL, F.A., ETHIER, V.G., Univ. Calgary (Geology):  
Study of the Sullivan ore body, British Columbia, 1969-79.
- See:**  
Tourmaline concentrations in Proterozoic sediments of the Southern Cordillera of Canada and their economic significance; *Can. J. Earth Sci.*, v. 14, no. 10, p. 2348-2363, 1977.  
Isotopic composition of sulfur in the Sullivan orebody, British Columbia; *Econ. Geol.*, v. 73, no. 2, p. 246-269, 1978.  
To study the mineralogy and geochemistry of the sulfides and associated minerals with a view to providing data that will allow the development of a model for the origin of the deposit.
605. CANN, B., GODWIN, C.I., Univ. British Columbia (Geological Sciences):  
Trace elements in massive and disseminated magnetite in the Iron Mask batholith south-central British Columbia, 1976-79; M.Sc. thesis (Cann).  
Steeply dipping massive magnetite-apatite-amphibole dykes occur within the Upper Triassic-Lower Jurassic Iron Mask batholith near Kamloops, British Columbia. Their spatial relationships to magnetite rich units of the batholith and copper deposits within the batholith suggest: (1) a genetic relation between magnetite dykes and nearby copper mineralization; and (2) an intrusive magmatic (i.e. segregation and injection of magnetite from a magma) origin for the dykes. The relations between copper and magnetite mineralization will be studied and disseminated and massive magnetite will be analysed for the trace elements V, Cr, Ti, Co, Ni, Zn, Cu, Mn, Mg, Ag, Pb, Cd.
606. CHATTERJEE, A.K., Nova Scotia Dep. Mines:  
Metallogenesis and mineral deposits studies, 1974-.
607. CHEVÉ, S., BROWN, A.C., TRZCIENSKI, W.E., Jr., Ecole Polytechnique:  
Metallogeny of massive sulfide deposits, Megantic area, Québec, 1974-79; Ph.D. thesis (Chevé).
608. CHRONIC, F., GODWIN, C.I., Univ. British Columbia (Geological Sciences):  
Geology of the Guano rare-earth-bearing skarn, Pelly Mountains, Yukon Territory, 1976-77; M.Sc. thesis (Chronic).  
Mapping of the Guano REE-bearing skarn and use of a field test for REE has been completed. Laboratory work includes geochronology (K-Ar, fission-track, and Rb/Sr), petrology of the skarn and associated syenite alteration zones and unaltered limestones and shales, and analyses of twenty representative rocks for rare-earth whole rock, and trace element contents.
609. COLVINE, A.C., Ontario Geol. Surv.:  
Geology of copper, zinc, lead deposits in Ontario, 1974-.
610. COLVINE, A.C., MEYN, H.D., CARTER, T.R., Ontario Geol. Surv.:  
Metallic mineral deposits exclusive of uranium in the Pembroke area, Ontario, 1976-79.
- See:**  
Mineral resource studies in the Pembroke-Renfrew area, Southeastern Ontario - Mineral deposits of metals exclusive of uranium; Ontario Division of Mines, M.P. 75, p. 197-201, 1977.
611. COOMBE, W., POTTER, D., Sask. Geol. Surv. - Univ. Regina (Geological Sciences):  
La Ronge-Wollaston base metals project, 1974-78; M.Sc. thesis (Potter).
- See:**  
*Sask. Geol. Surv.*, *Summ. Investig.* 1977, p. 85-104, 105-110.  
During the course of the project a broad spectrum of mineral deposit types has been examined by the author. Broadly these fall into 2 classes: (a) volcanogenic, and (b) sedimentogenic. Volcanogenic deposits, primarily restricted to the La Ronge domain, include synvolcanic disseminated copper, volcanogenic massive copper (-zinc), iron formation (exhalite), stratiform gold, 'porphyry-gold', magmatogenic nickel-copper and nickel, etc. Sedimentogenic deposits, predominant within the Wollaston domain of Aphebian metasediments, include 'red-bed type' copper and sandstone-hosted zinc-lead and lead occurrences. These possibly grade into copper-uranium occurrences. At present all these occurrences are subeconomic, but a clearer understanding of Aphebian regional metallogeny has emerged.
612. COWAN, P., CROCKET, J.H., FRANKLIN, J.M., McMaster Univ. (Geology), Geol. Surv. Can.:  
Gold metallogeny at the Dickinson Mine, Red Lake area: evaluation of interflow sediments, 1977-79; M.Sc. thesis (Cowan).

To evaluate cherty, interflow sediments as a gold source in the Red Lake area, Ontario. The approach will be to compare gold content, major and minor element composition of these rocks in mineralized and non-mineralized settings. Gold will be determined by neutron activation.

613. DAVIES, J.F., DUPUIS, C., Laurentian Univ. (Geology): Disseminated copper mineralization and alteration in chloritic schist, Timmins, Ontario, 1976-79; M.Sc. thesis (Dupuis).  
Two separate disseminated copper deposits occur in the Pamour (formerly McIntyre) mine near Timmins. The mineralization, alteration and origin of one in felsic schist has been discussed by Davies and Luhta (in press). The second deposit is similar mineralogically but occurs in chloritic rocks characterized by a distinct anhydrite-hematite alteration. To compare the possible processes under which the two deposits formed.
614. DAWSON, K.R., Geol. Surv. Can.: Geology of barium, fluorine and strontium deposits in Canada, 1972-.
615. DiLABIO, R.N.W., Geol. Surv. Can.: Draft prospecting investigations, Bear-Slave Province, District of Mackenzie, 1977-.
- See:**  
Occurrences of disrupted bedrock on the Goulburn Group, eastern District of Mackenzie; Geol. Surv. Can., Paper 78-1A, p. 499, 500, 1978.  
To determine the dispersal pattern of rock, mineral and chemical components in various drift materials relative to their source in the bedrock, with particular reference to its application to the delineation of geological bodies masked by drift in areas of potential base metal and uranium mineralization.
616. DUNSMORE, H.E., Geol. Surv. Can.: Geology of uranium resources of Canada, 1976-.
- See:**  
A new genetic model for uranium-copper mineralization, Permo-Carboniferous basin, northern Nova Scotia; Geol. Surv. Can., Paper 77-1B, p. 247-253, 1977.  
Uranium resources of the Permo-Carboniferous Basin, Atlantic Canada; *ibid.*, p. 341-347, 1977.
617. ECKSTRAND, O.R., Geol. Surv. Can.: Geology of Canadian nickel and platinum group deposits, 1963-.
618. ENGLISH, P.J., MORTON, R.D., Univ. Alberta (Geology): The nature and genesis of gold occurrences in the metasediments of the Yellowknife Group, Northwest Territories, 1975-78; M.Sc. thesis (English).
619. FOWLER, A.D., DOIG, R., McGill Univ. (Geological Sciences): Origin of uranium deposits in granitic rocks, 1975-78; Ph.D. thesis (Fowler).  
Granitic rocks associated with uranium mineralization have been studied in the Mont Laurier and Johan Beetz areas, Québec. Rb-Sr isotopic data have shown that these granites were emplaced very late during the Grenville orogenic episode and were not derived from pre-existing sedimentary rocks. Work is continuing to characterize the origin of both the granites and their contained uranium, using isotopic, petrographic and trace element (REE) methods.
620. FRANCONI, A., GIRAUD, P., Québec Min. Richesses Naturelles: Géologie du secteur de la rivière Broadback entre la baie du Corbeau (lac Evans) et le lac Storm, territoire d'Abitibi, Québec (1:20,000), 1971-78; thèse de doctorat (Franconi).
621. FYONS, A., CROCKET, J.H., KARVINEN, W.O., McMaster Univ. (Geology): Relationship of gold mineralization to carbonated mafic and ultramafic rocks in the Timmins district, Ontario, 1977-79; M.Sc. thesis (Fyons).  
Two distinct, stratabound, carbonate-rich units have recently been delineated in the Timmins area. Further mapping of these units was carried out in the summer of 1977. These units are largely carbonated mafic and ultramafic rocks, and are closely associated with all the major gold deposits of the area. We are presently involved in detailed compositional studies of the rock by XRF, atomic absorption and neutron activation. Gold will be determined by neutron activation.
622. GANDHI, S.S., Geol. Surv. Can.: Geology of uranium resources of Canada, British Columbia-District of Mackenzie, 1977-.
623. GAUTHIER, M., BROWN, A.C., Ecole Polytechnique, Québec Min. Richesses Naturelles: Etude métallogénique des minéralisations zincifères de la région de Maniwaki, comté de Gatineau, Québec, 1977-1980.
624. GAUTHIER, M., BROWN, A.C., Ecole Polytechnique: Metallogeny of zinc mineralization in the Grenville Supergroup of Québec, 1977-79; M.Sc. A. thesis (Gauthier).  
Mapping and detailed sampling for study was conducted during 1977-78.
625. GOETZ, P.A., FROESE, E., MOORE, J.M., Jr., Carleton Univ. (Geology), Geol. Surv. Can.: Geology of the Sherridon Mine, Manitoba, 1974-79; Ph.D. thesis (Goetz).  
Sherridon Mine is a stratiform volcanogenic Cu-Zn deposit enclosed in high-grade metamorphic rocks of the Kisseynew Complex. The Apebrian succession occupies an interference basin, lying unconformably on older migmatites. Bulk geochemistry is being used to discriminate among various possible protoliths for the amphibolites, aluminous and quartzofeldspathic gneisses of the complex.

626. GORDON, J.B., MASSON, S., Ontario Geol. Surv.: Uranium and thorium potential studies, 1976-79; M.Sc. thesis (Masson).
- See:**  
Mineral resource studies in the Pembroke-Renfrew area, southeastern Ontario - uranium and thorium deposits; Ontario Division of Mines, M.P. 75, p. 192-194, 1977.
627. HAMILTON, W.N., Alberta Research Council (Geology Div.):  
Geology of the Clear Hills iron formation, Alberta, 1974-78.
628. HARPER, C.T., Sask. Geol. Surv.:  
Iron deposits in northern Saskatchewan, 1974-78.  
To examine and evaluate, by geological, geophysical and geochemical techniques, the economic potential of iron deposits in northern Saskatchewan and to ensure that no economically feasible iron deposits of greater than 100 million tons grading 30% Fe exist. During the course of this program the following types of iron deposits were examined; 1) banded quartz-magnetite (or hematite) iron-formations, 2) bedded and barren, massive iron sulphide deposits, 3) deposits with a direct association with plutonic rocks, and 4) bog iron ores.
629. HARPER, C.T., Sask. Geol. Surv.:  
Uranium metallogenic studies: Cluff Lake, Saskatchewan, 1976-78.
- See:**  
Sask. Geol. Surv., Summ. Investig. 1977, p. 136-146, 1978.  
To study: 1) geology, geochemistry, structure, and metallogeny of the uranium orebodies in the Cluff Lake area; 2) relationships between deposits, regional geology, structure and geochemistry; 3) current exploration programs to keep abreast of developments in and around the deposits; and 4) geology of the basement rocks of the Carswell circular structure (through geological mapping).
630. HARVEY, Y., ASSAD, R., Univ. Laval (Géologie):  
Métallogénie de l'uranium dans le Grenville du Québec, 1975-1979; thèse de doctorat (Harvey).
631. HAYNES, S.J., Brock Univ. (Geological Sciences):  
Radioactive pegmatites, Peterborough County, Ontario, 1977-79.  
Field work to date indicates that radioactive pegmatites in southern Anstruther Tp., northern Burleigh Tp. and eastern Cavendish Tp. are related to the tectonic emplacement of a gneiss dome complex and penetration of low-melting components of the complex as pegmatites through a ring of migmatites and country rock gneisses.
632. HTOON, MYAT, McTAGGART, K.C., SINCLAIR, A.J., Univ. British Columbia (Geological Sciences):  
Geology of Clinton Creek asbestos deposit, Yukon Territory, 1975-78; Ph.D. thesis (Htoon).  
Field mapping and laboratory research completed.
633. KIMBERLEY, M.M., SORBARA, J.P., Univ. Toronto (Geology):  
Petrology and geochemistry of the Innerring Lake area, Back River Archean volcanic complex, Northwest Territories, 1975-78; M.Sc. thesis (Sorbara).  
Two elliptical features in the Archean Back River volcanic complex are under investigation. The outer feature is a sedimentary formation largely composed of a banded siderite-chert iron formation. This iron formation is locally underlain by oolitic limestone gradational to oolitic ironstone. Associated rocks include highly carbonaceous and pyritic argillite. The inner, concentric feature is a carbonate-and pyrite-enriched zone of volcanic rock which may represent fault surfaces of an ancient cauldron.
634. KIRKHAM, R.V., Geol. Surv. Can.:  
Geology of copper and molybdenum deposits in Canada, 1970-.
635. KISH, L., CLARK, P., Québec Min. Richesses Naturelles:  
Radioactivité dans la fosse du Labrador, Québec, 1977-79.
636. KLASSEN, R.A., Geol. Surv. Can.:  
Uranium drift prospecting techniques, lower Kazan River area, District of Keewatin, 1975-.
637. KUSMIRSKI, R., CROCKET, J.H., FRANKLIN, J.M., McMaster Univ. (Geology), Geol. Surv. Can.:  
Gold metallogeny at the Dickinson Mine, Red Lake area; quartz vein profiles, 1977-79; M.Sc. thesis (Kusmirski).  
A study of auriferous quartz veins from the Dickinson Mine, Red Lake area, Ontario. Variation in bulk composition, volatiles including CO<sub>2</sub> and H<sub>2</sub>O and gold will be determined. Such data is expected to yield information on extent of gold dispersion halos about quartz veins and perhaps distinctive variations in wall rocks (in this case, basic volcanics) indicative of mineralization. Gold will be determined by neutron activation.
638. LAIFA, E., BROWN, A.C., Ecole Polytechnique:  
Geologic character of uranium deposits in the Hoggar, Algeria, 1976-78; M.Sc. A. thesis (Laifa).
639. LEGGETT, S.R., BRISBIN, W.C., Univ. Manitoba (Earth Sciences):  
The volcanic stratigraphic setting of Cu-Zn mineralization at the Gemex showing, Henimga Lake, District of Keewatin, Northwest Territories, 1975-78; M.Sc. thesis (Leggett).
640. LUSTIG, G.N., BRISBIN, W.C., Univ. Manitoba (Earth Sciences):  
An analysis of the local stratigraphic and structural setting of the Cu-Zn mineralization at the Fox Mine, Lynn Lake District, Manitoba, 1976-78; M.Sc. thesis (Lustig).

641. LYDON, J.W., Geol. Surv. Can.:  
Geology of lead and zinc resources in Canada, 1977-.
- See:**  
Observations on some lead-zinc deposits of Nova Scotia; Geol. Surv. Can., Paper 78-1A, p. 293-298, 1978.  
Some criteria for categorizing hydrothermal base metal deposits; *ibid.*, p. 299-302, 1978.
642. MACFARLANE, N.D., MOSSMAN, D.J., Univ. Saskatchewan (Geological Sciences):  
Economic geology of Neimeiben Lake ultrabasic intrusion, Saskatchewan, 1976-78; M.Sc. thesis (Macfarlane).
643. MARCOUX, P., ASSAD, R., Univ. Laval (Géologie):  
Exploration du cuivre dans la méta-anorthosite de Chibougamau (Une évaluation des méthodes d'exploration et élaboration d'une méthodologie intégrée), 1975-78; thèse de maîtrise (Marcoux).
644. MESARD, P.M., GODWIN, C.I., Univ. British Columbia (Geological Sciences):  
The metallogeny and geochronology of copper-molybdenum porphyry deposits, north-central British Columbia, 1978-79; MA.Sc. (Mesard).  
Specific geologic parameters include geochronology, petrology, petrography, distribution, geologic setting, Sr isotope geology, related metals and relative abundance, and major element geochemistry.
645. MEYN, H.D., Ontario Geol. Surv.:  
Iron deposits of Ontario, 1974-.
646. MILLER, C.K., ZENTILLI, M., Dalhousie Univ. (Geology):  
Ecology of the Mindamar Mine, Cape Breton, Nova Scotia, 1976-78; M.Sc. thesis (Miller)  
Drill core, outcrop and dump materials have been studied and permit a re-interpretation of the genesis of the deposit, a massive sulphide from which over  $10^6$  tons of ore were mined.
647. MILLER, J.H.L., SINCLAIR, A.J., Univ. British Columbia (Geological Sciences):  
Geology of part of the Callaghan Creek roof pendant, southwestern British Columbia, 1977-79; MA.Sc. thesis (Miller).  
**See:**  
Geological fieldwork, 1977, British Columbia Mines Petrol. Res.  
The Callaghan Creek roof pendant lies within the Coast Plutonic Complex. To describe the Narthair Mines and Van Silver mineral occurrences relative to the volcanics - to determine whether the mineralization at Northair Mines is syngenetic or epigenetic in origin. Further petrographic and geochemical work will be done in order to characterize the volcanics of the pendant. Detailed mapping, both on surface and subsurface, will be carried out during the summer of 1978.
648. MORRISON, G.W., HODDER, R.W., Univ. Western Ontario (Geology):  
Determination of stratigraphic controls to ore distribution at Craigmont Mines, Merritt, British Columbia, 1977-78.  
Preliminary examination suggests ore distribution at Craigmont Mines is not adequately explained by the classical hypothesis for skarn-type copper mineralization - that is, metal-rich fluids emanating from a granitic intrusion which permeate limestone and deposit sulphide minerals in favourable sites within the chemically reactive rocks. It is proposed to examine the relative importance of intrusive and layered rock sequences.
649. MORTENSEN, J.K., GODWIN, C.I., Univ. British Columbia (Geological Sciences):  
Geology and genesis of the MM massive sulphide deposit, Pelly Mountains, Yukon Territory; 1977-79; MA.Sc. thesis (Mortensen).  
The MM massive sulphide deposit occurs in a structurally complex group of metamorphic rocks of upper greenschist to lower amphibolite facies. These include Lower Cambrian(?) limy phyllites, upper Devonian to lower Mississippian quartzites and carbonates, and a Mississippian(?) sequence of (probable) volcanics and sediments. The immediate thesis area is cut by at least one, and probably two, thrust faults. Sulphides occur as narrow lenses within the Mississippian sequence, closely associated with schists of rhyolitic composition. Proposed research involves structural interpretation to establish original stratigraphy. Trace element geochemistry of the volcanics will also be carried out and incorporated in a model for ore genesis. Mapping to date (two months) will be extended during the summer of 1978 in order to better understand the regional setting of the sulphide bodies.
650. MORTON, R.D., Univ. Alberta (Geology):  
The nature and genesis of uraniferous deposits in Saskatchewan and Northwest Territories (Mainland), 1967-.
- See:**  
The Western and Northern Australian U deposits - exploration guides or exploration deterrents for Saskatchewan?; Uranium in Saskatchewan Symp., 1977.
651. MORTON, R.D., VAN DYKE, C.W., MacDONALD, R.B., Univ. Alberta (Geology):  
Uranium resource potential of post-Precambrian strata in Alberta, 1977-78; M.Sc. theses (Van Dyke, MacDonald).
652. MOSSMAN, D.J., KOO, J., Univ. Saskatchewan (Geological Sciences):  
Geochemistry in the vicinity of base metal deposits at Flin Flon, Saskatchewan and Manitoba, Canada, and the problem of predicting blind stratabound orebodies, 1977-78.

653. MOSTAGHEL, M., HAYNES, S.J., Brock Univ. (Geological Sciences):  
Lead-zinc occurrences in rocks and natural waters, Niagara Peninsula, Ontario, 1975-78; M.Sc. thesis (Mostaghel).
654. NALDRETT, A.J., BARNES, S.J., Univ. Toronto (Geology):  
Petrology and geochemistry of the Katiniq Sill and related rocks in the Proterozoic Ungava nickel belt, 1977-79; M.Sc. thesis (Barnes).  
  
The Katiniq Sill is a roughly concordant lenticular body, composed dominantly of serpentinised olivine-rich peridotite, intruded along the contact between volcanic rocks of the Chukotat Series and a gabbroic sill. Nickel sulphide deposits occur at or near the base of the ultramafic sill, their location being controlled by irregular troughs in the footwall contact. Published analyses indicate a komatiitic affinity for the volcanic rocks overlying the sill. The object is to investigate the petrogenetic relationships between the Katiniq Sill, the overlying volcanics, the gabbro, and a number of thin pyroxenitic sills intruding the volcanics, and to test the hypothesis that the Katiniq Sill represents a high level subvolcanic magma chamber.
655. NALDRETT, A.J., FISHER, D., Univ. Toronto (Geology):  
The petrology of Mt. Edwards nickel deposit, Western Australia, 1973-78; Ph.D. thesis (Fisher).
656. NALDRETT, A.J., GREEN, A.H., Univ. Toronto (Geology):  
Evolution of Fe-Ni sulphide ores associated with Archean ultramafic komatiites, Langmuir Township, Ontario, 1974-78; Ph.D. thesis (Green).  
  
Fe-Ni sulphide ores occur as lenses near the base of a 200 m thick pile of komatiitic flows, in which thick basal flows (40-45% MgO anhydrous) with spinifex tops are overlain by thin peridotitic to pyroxenitic spinifex-bearing and spinifex-free flows. A complex history for the ores has been established, commencing with intrusion of mantle-derived ultramafic magma containing dissolved sulphides. Following assimilation of S from metasediments, the magma was extruded as ultramafic flows, with concentrated immiscible sulphides, into a fissure-bound trough. Typically magmatic ore textures and relations were developed by gravitational settling, quenching and related processes. Ores along one fissure zone were reworked by volcanic-exhalative activity and most of the ore was extensively modified during greenschist facies metamorphism.
657. NALDRETT, A.J., HOFFMAN, E.L., CHAN, C-L., Univ. Toronto (Geology):  
The precious metal content of some nickel sulphide ores, 1975-78; PH.D. thesis (Hoffman).  
  
The precious metal content (including Pt, Pd, Ru, Os, Ir, Rh, Re and Au) of samples from three of Inco Ltd.'s nickel deposits, chosen because of their association with a variety of host rocks. These deposits include the Little Stobie and West Levack Mines (Sudbury) and Pipe Mine (komatiitic). Main objectives are 1) to devise sampling and analytical methods for determining the PGE content by radiochemical neutron activation techniques which will take into account the extreme variability within an individual sample; 2) to obtain the characteristic PGE content of different ore types within the chosen mines; 3) to relate the characteristic PGE values of the deposit to the host rock of that deposit; 4) to correlate PGE values to chemical composition of the ore; and 5) to relate precious metal values to precious metal mineralogy.
658. NALDRETT, A.J., SCRIBBINS, A.B., Univ. Toronto (Geology):  
Ultramafic and mafic inclusions in the sublayer of the Sudbury Nickel Irruptive, 1975-78; M.Sc. thesis (Scribbins).  
  
Sublayer inclusions from various mines along the South Range are being studied. The predominant rock types are norites and harzburgites with the majority of the samples illustrating various degrees of recrystallization. This is in contrast with Rae's (1975) thesis at Strathcona Mine on the North Range where the inclusions were often clinopyroxene-bearing and generally unrecrystallized. The mineral assemblages, cumulate textures and chemistry of the inclusions suggest they are fragments of a hidden layered intrusion disrupted by the ore-bearing sublayer magma.
659. NALDRETT, A.J., THOMPSON, J.F.H., Univ. Toronto (Geology):  
Geology of the Vakkerlien nickel deposit, Kvikne, Norway, 1976-78; M.Sc. thesis (Thompson).  
  
The Vakkerlien nickel deposit lies in the centre of a highly deformed 'ruler'-shaped metagabbro body. The metagabbro body is situated in calc-silicate banded quartz-biotite schists of the Gula group of probable Cambrian age, the oldest group of the allochthonous Trondheim nappe. Initial studies have demonstrated that the metagabbro is ultramafic on the western margin becoming gabbroic towards the east with the central sulfides transecting this boundary. A second barren metagabbro body of similar dimensions has been discovered. Both bodies lie parallel to the regional lineation and a model involving the disruption of a differentiated sill is invoked.
660. RAJAMANI, V., CHOU, C-L., NALDRETT, A.J., Univ. Toronto (Geology):  
Partitioning of Ni, Cu, Co, Fe and Pt-group elements between silicate and sulfide melts and sulfides and silicates at sub-solidus temperature, 1974-77.  
  
See:  
Partitioning of Fe, Co, Ni, and Cu between sulfide liquid and basaltic melts and the composition of Ni-Cu sulfide deposits; Econ. Geol., v. 73, no. 1, p. 82-93, 1978.  
  
The partitioning behaviour of transition metals such as Fe, Co, Ni and Cu between sulfide liquid and silicate melts have been studied experimentally. It is observed that all elements have strong affinities for the sulfide liquid relative to basaltic melt and at temperatures above 1255°C

their relative sulfophile character is  $Fe < Co < Cu < Ni$ . The results also indicated that relative sulfophile character of Ni and Cu depends on the composition of silicate magmas –  $Cu < Ni$  for magmas less basic than a basalt and  $Cu < Ni$  for magmas more basic than a basalt. Using the same experimental techniques, the partitioning of Pt-group elements between sulfide liquid and silicate melts has been studied. The silicate portion of the experimental charge has been separated carefully from the sulfide (wt.% in sulfide/wt.% in silicate) and analysed by neutron activation for PGE. Partition coefficients obtained at 1255°C are 118 for Pt, 156 for Pd, 34 for Os, 80 for Ir and 176 for gold.

661. RANKIN, L.D., DAVIES, J.L., McALLISTER, A.L., Univ. New Brunswick (Geology): New Brunswick Dep. Nat. Res. (Mineral Res. Br.):  
Geology and geochemistry of the Restigouche and Murray Brook sulphide deposits, Bathurst area, New Brunswick, 1977-79; M.Sc. thesis (Rankin).
662. RICHARDS, T.A., Geol. Surv. Can.:  
Geology and mineral deposits of McConnell Creek map-area, British Columbia, 1975-.
663. ROBERTS, R.G., HALL, B.V., Univ. Waterloo (Earth Sciences):  
Alteration of pillowed andesite at the Amulet A orebody, Noranda, Québec, 1976-78; M.Sc. thesis (Hall).  
The Amulet Upper "A" orebody is a zinc-copper massive sulphide deposit emplaced in pillow lavas of the Amulet Andesite. Contact metamorphism by the Lac Dufault granodiorite produced the assemblage cordierite-anthophyllite in the alteration pipe. Three zones within the alteration pipe were defined on the basis of mineralogy. Samples were taken from selvage, altered interior and core of pillows from each of the three zones. The effects of halmyrolysis and hydrothermal alteration were studied using analysis of variance procedures. Halmyrolysis resulted in significant increases in  $Al_2O_3$ ,  $K_2O$ ,  $H_2O$ , and decreases in  $SiO_2$ ,  $MgO$  and  $CaO$ . Hydrothermal alteration resulted in increases of  $MgO$ , total  $Fe$ ,  $H_2O$ ,  $K_2O$ ,  $S$ ; and decreases in  $Al_2O_3$ ,  $CaO$ ,  $Na_2O$ ,  $MnO$ .
664. ROBERTS, R.G., HARRIS, R.D., Univ. Waterloo (Earth Sciences):  
Structural and volcanic setting of gold-bearing quartz veins in the Timmins district, Ontario, 1974-78; M.Sc. thesis (Harris).  
The principle results of the study are as follows: 1. The area has undergone five periods of deformation. The first is associated with the development of an east-west trough in which volcanic flows, pyroclastic deposits and turbidite sediments were emplaced. The second deformation imprinted the well-developed planar and linear fabrics on the rocks. The regional structural architecture of folds overturned to the south was developed during these two periods of deformation. Subsequent deformations did not produce any megascopic structures. 2. The unconformities in the graywacke-shale sequence of the "Porcupine Syncline" are a consequence of turbidite-type sedimentation in an active volcanic environment.
- The 'unconformity' between flow rocks and sedimentary rocks at the Dome mine is a conformable, interfingering sequence of flows, volcanic conglomerates and turbidities. 3. Graded bed structures, transecting erosional relationships demonstrate that the volcanic-sedimentary sequence at the Dome mine faces south. 4. The gold deposits are associated with carbonatized basic flows. The carbonatized zones are strabound, and form mappable units. 5. The various types of gold deposits include: (a) Conformable ankerite-quartz "veins" in chemoganic sediments. These "veins" are probably sedimentary units. (b) Stratabound quartz veins in carbonatized volcanic rocks and sediments. (c) Discordant quartz veins of at least two ages, and younger than (b); in carbonatized volcanic rocks and sedimentary rocks. All veins were emplaced before the second deformation.
665. ROBERTSON, J.A., Ontario Geol. Surv.:  
Uranium and thorium deposits of Ontario, 1972-.
666. ROSCOE, S.M., Geol. Surv. Can.:  
Metallogeny of the northwestern part of the Canadian Shield, 1977-.
667. ROSE, E.R., Geol. Surv. Can.:  
Geology of rare earth deposits of Canada, 1967-.
668. RUZICKA, V., Geol. Surv. Can.:  
Geology of uranium and thorium resources of Canada, 1975-.
- See:  
Evaluation of selected uranium-bearing areas in Canada; Geol. Surv. Can., Paper 78-1A, p. 269-274, 1978.
669. SANGSTER, D.F., Geol. Surv. Can.:  
Geology of lead and zinc deposits in Canada, 1965-.
670. SCOTT, S.D., KALOGEROPOULOS, S., BRYNDZIA, T.L., Univ. Toronto (Geology):  
Genesis of the kuroko Cu-Zn-Pb-Ag sulfide ores and overlying ferruginous mudstones ("Tetsusekiei"), Hokuroku Basin, Japan, 1977-80; Ph.D. thesis (Kalogeropoulos), M.Sc. thesis (Bryndzia).  
Bryndzia is studying the mineralogy and petrochemistry of the pervasive alteration of footwall dacites in barren and mineralized (network ore) zones. His results, when combined with fluid inclusion data of S. Takenouchi (Tokyo University) from the network ores and with published experiments on sulfide solubilities and silicate-brine interactions, are expected to provide limits to the composition of altering and ore-forming brines. Kalogeropoulos is examining the mineralogy and geochemistry of the hematitic cherts and hematitic silicified mudstones, collectively known as "tetsusekiei", which occur in the immediate hanging wall of some massive kuroko lenses and also are interlayered with hangingwall basalts. One purpose of his study is to understand the geochemical controls of trace element dispersion in such an "iron formation" which is intimately related to a sulfide ore environment. Scott is continuing his work on the structural control of the kuroko deposits by basement fractures.

671. SCOTT, W.R., MORTON, R.D., Univ. Alberta (Geology):  
The nature and genesis of the uranium occurrences associated with Cretaceous intrusions in the Tombstone Mountains, Yukon, 1977-78; M.Sc. thesis (Scott).
672. SIBBALD, T.I.I., Sask. Geol. Surv.:  
Uranium metallogenic studies: Rabbit Lake, Saskatchewan, 1976-.
- See:**  
Sask. Geol. Surv., Summ. Investig. 1977, p. 111-123, 1978.  
The geological setting of uranium mineralization in northern Saskatchewan; Sask. Geol. Soc., Sp. Publ. 3, p. 51-98, 1976.  
Rabbit Lake uranium deposit; *ibid.*, p. 331-354, 1976.  
The Rabbit Lake orebody forms a focus for study of undisputed sub-Athabasca 'unconformity type' uranium deposits in Saskatchewan. The present program, being conducted in cooperation with the Saskatchewan Research Council (Dr. J. Hove) and other agencies, attempts to provide a metallogenic model for these deposits.
673. SIBBALD, T.I.I., MUNDAY, R.J., LEWRY, J.F., Sask. Geol. Surv., Univ. Regina (Geological Sciences):  
Geological setting of uranium mineralization in northern Saskatchewan, 1976-77.
- See:**  
The geological setting of uranium mineralization in northern Saskatchewan; Sask. Geol. Soc., Sp. Publ. no. 3, 1978.
674. SINCLAIR, A.J., WILTON, D.H.C., Univ. British Columbia (Geology):  
Genesis of Sustut copper deposit, north-central British Columbia, 1977-78; M.Sc. thesis (Wilton).  
The Sustut copper deposit, of north-central British Columbia, occurs in the Upper Triassic Takla Group volcanics, tuffs and lahars. The deposit consists of both lensoid bodies with disseminated ore and cross-cutting (and interfingering), mineralized, carbonate-epidote-quartz filled veins. The sulphide minerals present (in decreasing order of abundance) are: bornite-chalcocite-pyrite-chalcocopyrite-neodigenite-covellite with some minor native copper and rare sphalerite and greenockite. Mineralogy and mineralogical of both veins and lenses are the same. The lensoid ore bodies occur within interbeds, in the volcanoclastic pile, which have a more open framework matrices and thus increased porosity relative to the remainder of the host rocks. Mineralogical, petrographic, chemical and statistical methods have been used on the deposit in order to ascertain its genesis. The proposed genesis is that the veins acted as feeder fractures through which Cu-rich hydrothermal solutions followed until they reached a permeable layer in the host rocks through which the solutions spread laterally and the copper minerals were precipitated.
675. SINCLAIR, W.D., Geol. Surv. Can.:  
Geology of copper and molybdenum resources of Canada, 1977-.
- See:**  
Porphyry occurrences of southern Yukon; Geol. Surv. Can., Paper 78-1A, p. 283-286, 1978.
676. SMEE, B.W., Geol. Surv. Can.:  
Examination and evaluation of exploration methods for use in clay covered areas, 1977-.
677. SPOONER, E.T.C., Univ. Toronto (Geology):  
The origin of ophiolitic cupriferous pyrite ore deposits in Cyprus and Oman, 1973-78.
- See:**  
Hydrodynamic model for the origin of the ophiolitic cupriferous pyrite ore deposits of Cyprus; Geol. Soc. Lond., Sp. Publ. 7, p. 58-71, 1977.  
Strontium isotopic contamination and oxidation during ocean floor hydrothermal metamorphism of the ophiolitic rocks of the Troodos Massif, Cyprus; *Geochim. Cosmochim. Acta*, v. 41, p. 873-890, 1977.  
<sup>87</sup>Sr enrichment of ophiolitic sulphide deposits in Cyprus confirms ore formation by circulating seawater; *Earth Planet. Sci. Lett.*, v. 35, p. 71-78, 1977.  
Hydrothermal fluids of seawater salinity in ophiolitic sulphide ore deposits in Cyprus; *Nature*, no. 266, p. 808-812, 1977.  
Although relatively insignificant in terms of size, these deposits are of exceptional theoretical importance, firstly because they could be representative of a common type of ore deposit present in oceanic crust layer 2 and, secondly, because geochemical evidence suggests that the ore-forming fluid was simply of sea-water origin. For example, fluid inclusion research indicates that the freezing point of the fluid preserved in inclusions ( $-1.9 \pm 0.4^\circ\text{C}$ ; 205 measurements from 3 mineral deposits in Cyprus) is indistinguishable from that of sea water ( $T_F$  for ave. sea-water =  $-1.9^\circ\text{C}$ ). Stockwork mineralization in Cyprus occurred at temperatures mainly between  $300^\circ\text{C}$  and  $350^\circ\text{C}$ . Boiling at  $\sim 400^\circ\text{C}$  has been detected at the Mathiati deposit in Cyprus and the Lasail prospect in Oman. This information suggests an original ocean depth of  $\sim 2.5$  km.
678. SPOONER, E.T.C., BRAY, G., Univ. Toronto (Geology), Univ. Oxford:  
China clay (kaolinite)-tin-tungsten deposits in the St. Austell area of Cornwall, United Kingdom, 1976-78; Ph.D. thesis (Bray).  
Cornwall, U.K. is the principal area in the world where high quality kaolinite is produced from deposits of primary hydrothermal origin. Kaolinite is used for coating and filling high-quality papers, and for the manufacture of porcelain, other ceramics and alumina-silica based refractories. Kaolinisation of granitic rocks occurs in zones spatially associated with swarms of greisen (quartz-muscovite  $\pm$  topaz) bordered veins containing quartz-tourmaline  $\pm$  wolframite  $\pm$  cassiterite. K-Ar dating indicates that the hydrothermal

phenomena occurred immediately after granite emplacement. Fluid inclusion research suggests that hydrothermal activity occurred at a depth of ~ 2-3 km and at temperatures mainly between ~ 220°C and ~ 420°C. The hydrothermal fluid preserved in the vein minerals was boiling and was extremely variable in salinity (~ 5 equiv. wt% NaCl to ~ 50 equiv. wt% NaCl). The geological and geochemical evidence is consistent with a mode of origin which involved juvenile aqueous fluids released from the cooling granitic magam.

679. SPOONER, E.T.C., PARMENTIER, E.M., Univ. Toronto (Geology), Brown Univ.:

Numerical fluid dynamic modelling of hydrothermal convection in a permeable medium and the origin of the ophiolitic sulphide ore deposits of Cyprus, 1976-78.

Finite amplitude convection in a permeable medium with a cylindrical geometry and an open top has been studied at Rayleigh numbers between 50 and 200 using finite difference approximations. From the results a model for the convective process responsible for generation of the Cyprus ore deposits has been developed which is semi-quantitatively reasonable in terms of thermal structure, flow rates, permeability and bottom heat flux. Three factors have been identified which were important in confining formation of an ore deposit to a localized region within a zone of discharge of hot ascending fluid immediately below the original sea-water/rock interface: a) hot fluid containing significant quantities of metals in solution was confined to a relatively narrow core zone of the plume of rising fluid, b) the fluid flux was greatest in this hot core, and c) significant decrease in temperature was confined to within a few hundred metres of the sea-water/rock interface.

680. STEWART, E.B., COLWELL, J.A., MOORE, R.G., Acadia Univ. (Geology):

A study of the lead-zinc mineralization at Jubilee, Nova Scotia, 1977-78; M.Sc. thesis (Stewart).

681. TESSARI, O., SINCLAIR, A.J., Univ. British Columbia (Geological Sciences):

Geochemical and geostatistical study of Husky Deposit, Keno Hill area, Yukon Territory, 1974-79; M.Sc. thesis (Tessari).

682. THORPE, R.I., Geol. Surv. Can.:

Geology of silver and gold deposits in Canada, 1968-.

683. TREMBLAY, L.P., Geol. Surv. Can.:

Geology of uranium resources of Canada, 1975-.

See:

Uranium subprovinces and types of uranium deposits in the Precambrian rocks of Saskatchewan; Geol. Surv. Can., Paper 78-1A, p. 427-435, 1978.

Notes on possibilities for additional uranium deposits in Saskatchewan; *ibid.*, p. 437-439, 1978.

684. WALROND, G.W., MORTON, R.D., Univ. Alberta (Geology):

The mineral resources potentials of Guyana (excluding bauxite), 1976-78; Ph.D. thesis (Walrond).

685. WATKINSON, D.H., PATTERSON, G., DUNNING, G., WILKINSON, S., Carleton Univ. (Geology):

Relation of ore deposits to igneous rocks, 1970-80; Ph.D. thesis (Patterson), M.Sc. theses (Dunning, Wilkinson).

Three projects involve relation of Ni-Cu-platinum-group sulfides (copper-rich, nickel-poor) to mafic-ultramafic rocks at Thierry Mine, Lac des Iles and Coldwell complex. Future research will centre on the role of assimilation in sulfide precipitation, and relationship to volcanic stratigraphy and chemistry of associated volcanic rocks.

686. WATKINSON, D.H., SKIPPEN, G.B., MORTON, P., Carleton Univ. (Geology):

Ni-Cu-Fe sulfide-carbonate-silicate relationships in altered ultramafic rocks and their host volcanic rocks, 1975-78; Ph.D. thesis (Morton).

The relationships of Ni-Cu-Fe sulfides to serpentinites and their whole relationship to volcanic rocks and iron formation of the Shebandowan greenstone belt is being examined. Assemblages of sulfides and coexisting carbonates and silicates are being documented to understand the relative roles of magmatism, serpentinisation and low-grade metamorphism on these rocks and to describe their geologic history.

687. WITHERS, R.L., MORTON, R.D., Univ. Alberta (Geology):

The geology and nature of the silver-cobalt-nickel-bismuth deposits of the Northrim Mine, Camsell River, Northwest Territories, 1976-77; M.Sc. thesis (Withers).

688. WONG, R., GODWIN, C.I., McTAGGART, K.C., Univ. British Columbia (Geological Sciences):

Geology of a zoned ultramafic complex in north-central British Columbia, 1977-79; M.Sc. thesis (Wong).

Geology of the zoned ultramafic complex, history of emplacement, origin of zoning; relation of the ultramafic complex to apparently associated porphyry Cu-Mo type mineralization.

689. ZENTILLI, M., Dalhousie Univ. (Geology):

Metallogenic studies in the Central Andes, 1975-79.

See:

Geochemistry of volcanic rocks of the Andes between 25° and 28° south; *Contr. Mineral. Petrol.*, v. 63, p. 113-128, 1977.

Uranium in volcanic rocks from the central Andes; *Volcanol. Geotherm. Res.*, v. 2, p. 251-258, 1977.

Easter volcanic chain (S.E. Pacific): a mantle hot line; *J. Geophys. Res.*, v. 82, p. 2457-2478, 1977.

The relationships between volcanic rocks, mineral deposits and the tectonic evolution of the Andes since the Precambrian are being studied.

690. ZENTILLI, M., Dalhousie Univ. (Geology):  
Distribution of uranium in minerals from selected ore environments, 1976-78.
- See:**  
Studies of distribution of uranium in selected ore environments using nuclear track techniques; Geol. Surv. Can., Paper 77-1B, p. 141-143, 1977.
- Distribution of uranium in an active geothermal area in the Azores; *ibid.*, p. 137-139, 1977.
- Uranium distribution has been studied in four Canadian Mississippi Valley-type deposits, and pilot projects have been completed on coal, fluorite, massive sulphide and porphyry copper deposits.
- PETROLEUM EXPLORATION/EVALUATION**
691. AMAJOR, L.C., LERBEKMO, J.F., Univ. Alberta (Geology):  
Correlation of the Viking Formation in central Alberta using bentonite time horizons, 1976-77; M.Sc. thesis (Amajor).
- Three bentonite time horizons in the Viking Formation have been correlated widely in central Alberta on the basis of E-log correlation suggested by chemical identification by XRF. This correlation permits dividing the Viking Formation into three time slices and allows recognition of a number of sand bodies related to the basal, lower and upper sand units. This time subdivision also permits recognition of direction of migration of individual sand bodies. The pattern is complex and exploration awaits further analysis of the depositional environments.
692. BELINKO, K., CIAVAGLIA, L., NANDI, B.N., CANMET (EMR):  
Coking characteristics of the various constituents of Athabasca bitumen, 1976-78.
- The deposition of coke precursors (e.g., asphaltenes and heavy oils) on coal fragments has been observed during thermal hydrocracking of bitumen. The process appears to be highly sensitive to the type of coal used and possibly to the inorganic constituents present in the coal. Experiments have been carried out using various ranks of coals and a patent application is being prepared describing the results of these experiments. Additional experiments are being planned to test the effect of catalyst addition on the inhibition of coke formation during thermal hydrocracking of bitumen.
693. CHESHIRE, S.G., WARDLAW, N.C., Univ. Calgary (Geology):  
Geological and engineering study of Meekwap Oil Field, Devonian of Alberta, 1975-79; Ph.D. thesis (Cheshire).
- The major objectives are to make a comparison of petrophysical properties derived from geophysical logs with petrophysical properties derived directly from core and to relate these properties to a geological model of the Meekwap oil reservoir (Devonian). Further, an attempt is being made to relate the results of these studies to the results of in-situ engineering tests of the formation, principally drill stem tests and pressure drawdown-build-up tests and, ultimately, to make a comparison amongst these various tests and the production history of the reservoir.
694. CURRIE, J.B., Univ. Toronto (Geology):  
Mechanisms and development of fractures in sedimentary strata, 1970-.
- See:**  
Significant geologic processes in development of fracture porosity; Bull. Am. Assoc. Petrol. Geol., v. 61, p. 1086-1089, 1977.
- A method of distinguishing regional directions of jointing and of identifying joint sets associated with individual geologic structures; Can. J. Earth Sci., v. 14, p. 1211-1228, 1977.
695. CURTIS, B., McMILLAN, N.J., TAYLOR, W.W., Aquitaine Co. Canada Ltd. (Calgary):  
Proterozoic project - source for hydrocarbons, 1976-.
- To study the quality and quantity of organic matter in Proterozoic sediments of Canada and the world. The main aim is divided in two: 1) how much hydrocarbons can Proterozoic sediments yield to reservoirs of a younger age if directly connected?; and 2) where are there likely to be found Proterozoic reserves?
696. DAS GUPTA, U., CURRIE, J.B., Univ. Toronto (Geology):  
A study of fractured reservoir rocks, with special reference to Mississippian carbonate rocks of southwest Alberta, 1973-78; Ph.D. thesis (Das Gupta).
697. GILL, J.F., CURRIE, J.B., Univ. Toronto (Geology):  
An investigation of natural fractures in Cardium strata of the Ricinus Field, Alberta, 1977-79; M.A.Sc. thesis (Gill).
- As production from the Ricinus field approaches a stage at which secondary recovery by waterflood may be considered, a significant design factor could be represented by the presence of fracture permeability in the reservoir. A fracture system can serve to direct fluid flow and in so doing affect sweep efficiency. This investigation is directed toward categorizing the types of fractures and degree of fracturing to be expected, toward establishing the geometrical relations between fracture trends and structural trends in the field, and toward study of the relation between fracture incidence and lithology of Cardium rocks.
698. GRANT, A.C., Geol. Surv. Can.:  
Geological interpretation of all pertinent geophysical data as an aid to basin synthesis and hydrocarbon inventory, 1974-.
699. GUNTHER, P.R., Geol. Surv. Can.:  
Optical properties of sedimentary organic materials in relation to oil and gas occurrences in the Sverdrup Basin, District of Franklin, 1975-.
- See:**  
Implications of coalification levels, Eureka Sound Formation, northeastern Arctic Canada; Can. J. Earth Sci., v. 14, no. 7, p. 1588-1598, 1977.

700. HIGGS, R.Y., OLDERSHAW, A.E., OLIVER, T.A., Univ. Calgary (Geology), Aquitaine Co. Canada Ltd. (Calgary):  
Provenance of Mesozoic and Cenozoic siliciclastic sediments of the Labrador and West Greenland continental margins, 1976-77; M.Sc. thesis (Higgs).  
The work so far undertaken encompasses Lower Cretaceous to Paleocene clastics in Labrador and Greenland offshore. The work will continue but will include Eocene and younger stages in the next phase. Fill-in of present information will be done as samples from wildcat wells are released.
701. IWUAGWU, J.C., LERBEKMO, J.F., Univ. Alberta (Geology):  
Diagenesis of the basal Belly River Sandstone in Keystone 'B' Pool of the Pembina Field, Alberta, 1977-78; M.Sc. thesis (Iwuagwu).  
Thin section and SEM studies of basal Belly River sandstones in the Keystone 'B' Pool of the Pembina Field show that porosity and permeability are controlled largely by the distribution of kaolinite and calcite cement. Time relationships between diagenetic cements and controls on cement distribution are still under investigation.
702. McCABE, H.R., Manitoba Geol. Services Br.:  
Reservoir potential of the Winnipeg and Deadwood Formations in southwestern Manitoba, 1972-78.  
To determine the distribution of sandstone reservoir beds in the Winnipeg Formation and to evaluate the potential for petroleum accumulation in terms of lithofacies (sand thickness and distribution), structure, and available geophysical data.
703. NARR, W.M., CURRIE, J.B., Univ. Toronto (Geology):  
The origin of fractures in Tertiary strata of the Uinta Basin, Utah, 1976-77; M.Sc. thesis (Narr).  
Since 1970, a major oil reservoir, the Altamont field, has been developed in Tertiary Green River strata within the central part of the Uinta Basin. Production is entirely due to the existence of fracture porosity and fracture permeability at depths between 11,000 and 15,000 feet. Geological conditions associated with the occurrence of this unusual and significant system of fractures are being investigated by study of joint patterns observed at outcrops, by study of fractures in core from wells and by investigation of physical properties of both surface and subsurface rocks. It is found that incidence of fractures can be related to physical properties and to degree of cementation of the rocks.
704. POWELL, T.G., Geol. Surv. Can.:  
Diagenesis of organic matter and clay minerals in sediments in relation to petroleum generation, 1975-.
705. STEVENS, G.R., COLWELL, J.A., Acadia Univ. (Geology):  
Burial diagenesis and origin of clay minerals in Mesozoic-Tertiary strata of Labrador-Newfoundland Continental Shelf, 1976-78.
- Current theory suggests that migration of hydrocarbons from source beds to reservoirs is initiated by the flushing action of water expelled from the montmorillonite lattice during diagenesis. Thus, recognition of montmorillonite sediments and the stratigraphic level of diagenetic changes are important for identifying potential source rocks and depths of hydrocarbon accumulation and maturation. In addition, the clay mineralogy of sediments bears information of provenance. The present study analysed clay mineralogy by X-Ray diffraction of cuttings from seven (7) deep wells drilled into Cenozoic sediments on the Labrador shelf. Three (3) of these wells encountered wet gas, in reservoirs adjacent to possible source beds dominated by montmorillonite. Kaolin is the dominant clay mineral in the early Cretaceous continental sequence, but montmorillonite is dominant in the later Cretaceous to Paleocene. The pattern is less certain however in younger sediments. Below a certain depth which varies according to the local geothermal gradient, montmorillonite is not present in the sediments, having undergone diagenetic conversion to illite. Diagenesis is also suggested by the increase of the illite crystallinity index with depth.
706. WARDLAW, N.C., Univ. Calgary (Geology):  
Petrophysics and reservoir properties of sedimentary rocks, 1975-78.  
A primary objective of the study is to make a comparison between mercury injection capillary pressure tests and relative permeability tests, using oil and water in a water wet system, as methods of predicting the recovery efficiency of a varied group of carbonate and sandstone reservoir rocks. A further aspect is to explain differences of recovery efficiency in terms of pore geometry and to determine the relationships of pore geometry to depositional and diagenetic provinces.

## GENERAL

707. BLUSSON, S.L., Geol. Surv. Can.:  
Metallogeny of Selwyn Basin 1973-.
- See:  
Regional geologic setting of lead-zinc deposits in Selwyn Basin, Yukon; Geol. Surv. Can., Paper 78-1A, p. 77-80, 1978.
708. CAMPBELL, S.W., SINCLAIR, A.J., Univ. British Columbia (Geological Sciences):  
Mafic and ultramafic rocks with associated nickel-copper sulphide deposits and spatially related copper-bearing volcanic rocks, Kluane Ranges, Yukon Territory, 1973-78; PH.D. thesis (Campbell).  
Whole rock and trace element analyses of mafic, ultramafic and volcanic rocks. To try and relate them genetically; age dating of biotite-bearing ultramafite; and microprobe work on individual minerals - composition of olivine, pyroxenes, intercumulus material, and biotite.

709. COLVINE, A.C., MCCARTER, P., Ontario Geol. Surv.: Mineralization associated with early Precambrian epizonal intrusions in Ontario, 1976-.
- See:**  
Geology and mineralization of the Lateral Lake Stock, District of Kenora, Ontario; Ontario Division of Mines, M.P. 75, p. 205-208, 1977.
710. DAVIES, J.F., WELLS, R., Laurentian Univ. (Geology): Carbonate alteration of mafic and ultramafic volcanic rocks, Dome Mine, Ontario, 1976-79; M.Sc. thesis (Wells).
- The gold-bearing quartz veins of the Dome Mine are spatially (and possibly genetically) associated with "Carbonate rocks", whose original identity is often obscure. It is hoped that a petrographic and geochemical study of altered and unaltered rocks will aid in identifying the original character of the host rocks and reveal the genetic relationship, if any, between primary rock type, alteration, and mineralization.
711. DAWSON, K.M., Geol. Surv. Can.: Metallogeny of the northern Canadian Cordillera, 1974-.
- See:**  
Regional metallogeny of the northern Cordillera: Tungsten and base metal-bearing skarns in south-eastern Yukon and southwestern Mackenzie; Geol. Surv. Can., Paper 78-1A, p. 287-292, 1978.
712. FOLINSBEE, R.E., LEECH, A., WALROND, G., COULTER, K., Univ. Alberta (Geology): Mineral deposit evaluation, 1975-; Ph.D. thesis (Walrond), M.Sc. thesis (Coulter).
- See:**  
World's view - from Alph to Zipf; Bull. Geol. Soc. Am., v. 88, p. 897-907, 1977.
713. FRANKLIN, J.M., Geol. Surv. Can.: Metallogeny of the southwestern part of the Canadian Shield, 1975-.
- See:**  
Lead-zinc-barite veins of the Dorion area, Thunder Bay District, Ontario; Can. J. Earth Sci., v. 14, no. 9, p. 1963-1979, 1977.  
Uranium mineralization in the Nipigon area, Thunder Bay District, Ontario; Geol. Surv. Can., Paper 78-1A, p. 275-282, 1978.
714. GREGORY, D.J., Nova Scotia Dep. Mines: Mineral resources inventory and Canadian index to geoscience data, 1974-.
- See:**  
Index to mineral assessment reports; Nova Scotia Dep. Mines, Rept. 77-2, 1977.  
Geology, minerals and mining in Nova Scotia; Nova Scotia Dep. Mines, Information Ser. no. 1, 1977.
715. GROSS, G.A., Geol. Surv. Can.: Geology of mineral resources in the ocean, 1976-.
716. KIMBERLEY, M.M., Univ. Toronto (Geology): Paleoenvironmental classification of iron formations, 1970-77.
- See:**  
Paleoenvironmental classification of iron formations; Econ. Geol., v. 73, no. 2, p. 215-230, 1978.  
Most well-described rock bodies composed of iron-rich chemical sedimentary rock, iron formations, have been classified according to the sedimentary-volcanic environment in which they formed. No evolutionary trend has been detected within environmental groupings of iron formations but the relative proportions of environmental types have changed markedly through earth history.
717. KIMBERLEY, M.M., TANAKA, R.T., Univ. Toronto (Geology): Trace-element indications of uranium-concentrating processes in Elliot Lake ores, Ontario, 1976-78.
- Comprehensive neutron-activation analysis of Elliot Lake uraniferous conglomerate and underlying regolith is being conducted to elucidate the ore-forming processes through determination of trace-element abundances. Relative abundance of magnetic minerals are being determined by measuring magnetic susceptibility at elevated temperature under a vacuum.
718. KISSIN, S.A., Lakehead Univ.(Geology): The genesis of silver deposits in the Southern Province of northwestern Ontario, 1976-.
- Work has concentrated on establishing detailed field relationships in the Mainland Belt. Detailed work points to a late-stage origin for the silver-bearing veins, with mineralization occurring well after crystallization and faulting of the spatially associated Logan Diabase sills. In an effort to establish the timing of ore deposition, analysis of structural features is proceeding in the hope of establishing a correlation with regional deformation in the Lake Superior Basin. Mineralogical studies of the Mainland Belt ores reveal a more complex mineralogy in some mines than has previously been reported including a number of sulfosalts species.
719. KONTAK, D.J., MORTON, R.D., BAADSGAARD, H., Univ. Alberta (Geology): The nature of the uranium mineralization in the central mineral belt of Labrador and the geochronology of the host Precambrian suites, 1977-78; M.Sc. thesis (Kontak).
720. McLAREN, G., GODWIN, C.I., Univ. British Columbia (Geological Sciences): Minor elements in sphalerites from carbonate hosted Zn-Pb showings in northern Yukon Territory and adjacent District of Mackenzie, 1975-78; M.Sc. thesis (McLaren).
- An analytical study of minor elements in 166 sphalerites from 48 carbonate hosted showings throughout the northern Yukon and adjacent Northwest Territory. The majority of the samples come from the Mackenzie fold belt, but representatives from Coal Creek Dome, Richardson Mountains and Ogilvie Mountains are included.

721. MILLER, P., SMITH, T.E., Univ. Windsor (Geology):  
Evolution of tin bearing fluids from granitic melts, 1977-78; M.Sc. thesis (Miller).  
A geochemical study of individual minerals separated from granodiorites, granites, pegmatites and greisens is being undertaken to trace the evolution of tin bearing fluids from the original granitic magmas.
722. ROBERTSON, J.A., SPRINGER, J.S., VOS, M.A., Ontario Geol. Surv.:  
Mineral potential of Ontario, 1973-.
723. SAGE, R.P., Ontario Geol. Surv.:  
Alkalic rock-carbonatites, 1975-79.
724. SOUTHER, J.G., Geol. Surv. Can.:  
Geothermal energy resources in Canada, 1973-.
725. UMAR, P., STEVENSON, J.S., McGill Univ. (Geological Sciences):  
Mineral resource potential, Rouyn-Noranda region, Québec, 1973-78; Ph.D. thesis (Umar).  
A significant part of the research has been devoted to evaluating the strengths and inadequacies of statistical techniques when applied to resource potential evaluation, and solutions found for some of the problems of treating geological data. It has been demonstrated that statistical techniques can also be used in interpreting and explaining geological processes and concepts.
726. WATKINSON, D.H., HAK, J., PERTOLD, Z., Carleton Univ (Geology), Charles Univ. Prague:  
Mineral deposits of Czechoslovakia, 1972-80.  
Research continues on mineralogy, chemistry and petrology of Czechoslovakian ore deposits.
727. WHITEHEAD, R.E., DAVIES, J.F., CAMERON, R.A., JIRICKA, D.E., Laurentian Univ. (Geology):  
A nickel occurrence in iron-formation along an ultramafic-felsic contact, Ontario, 1977-79; M.Sc. thesis (Jiricka).  
Nickel sulphides are concentrated within a sulfide iron-formation lying at the top(?) of a felsic-volcanic sequence which is overlain(?) by ultramafic flows - to investigate stratigraphic, structural, petrologic and geochemical relationships between the felsic rocks, ultramafic flows, iron-formation and nickel occurrence in order to determine whether or not the presence of iron-formation was a factor in concentrating nickel.

MINERALOGY/CRYSTALLOGRAPHY

728. BERRY, L.G., ROBINSON, G. MIELKE, R., LANGRIDGE, R., Queen's Univ. (Geological Sciences):  
Structural lattice of glaukosphaerite, new data on  $Ni_2CO_3(OH)_2$ : Occurrence of rare earth elements in zircon, 1975-78; Ph.D. thesis (Robinson).  
X-ray and electron microprobe study of loellinite-safflorite, 1977-78; B.Sc. thesis (Langridge).  
New evidence for the structural lattice of glaukosphaerite, occurrence of new mineral,  $Ni_2CO_3(OH)_2$ ; the occurrence of rare earth elements in zircon; and to compare "safflorite" like mineral from Pennsylvania by x-ray and electron microprobe analyses with safflorites studied by Rodcliffe (1968).
729. BRISTOL, C.C., Brandon Univ. (Geology):  
Mineralogy and geochemistry of alteration at the Ruttan and Fox Lake orebodies, Manitoba, 1977-80.  
To develop mineral equations explaining geochemical processes of alteration by depositional sulphurization and by sulphide - silicate metamorphic reactions subsequent to deposition of copper - zinc mineralization in Canadian massive sulphide volcanogenic deposits. To contribute to knowledge of the chemistry of alteration of these deposits so that more efficient exploration programmes employing geochemistry may be used. ie: to contribute to a geochemical model of alteration, useful in exploration. Some preliminary field work has been completed to date. This will continue in the coming (1978) summer field season.
730. CABRI, L.J., CANMET (EMR):  
Mineralogical studies on new, poorly known, or unusual variants of platinum group elements and their deposits, 1971-79.  
**See:**  
Platinum-group minerals from Onverwacht: I Pt-Fe-Cu-Ni alloys; Can. Mineral., v. 15, p. 380-384, 1977.  
Platinum-group minerals from Onverwacht: II Platarsite, a new sulfarsenide of platinum; *ibid.*, p. 385-388, 1977.  
Platinum-group minerals from Onverwacht: III Genkinite,  $(Pt, Pd)_4Sb_3$ , a new mineral; *ibid.*, p. 389-392, 1977.
731. CABRI, L.J., CANMET (EMR):  
Mineralogical characterization of inorganics in Canadian coals, 1977-.  
To provide, on a continuing basis, mineralogical characterizations of inorganics in Canadian coals, in particular low rank coals, stressing, whenever possible, applications to current or future beneficiation or other industrial processes.
732. CAMERON-SCHIMANN, M., SMITH, D.G.W., Univ. Alberta (Geology):  
Microanalytical techniques for the quantitative analysis of uranium minerals and their application to selected Canadian uranium deposits, 1974-78; Ph.D. thesis (Cameron-Schimann).

- Wavelength dispersive electron microprobe techniques for the fully quantitative analysis of uranium-bearing minerals have been perfected and applied in the study of uranium deposits in the Charlebois Lake and Dudderidge Lake areas of Saskatchewan and the Baie Johan Beetz area of Québec. The analytical problems which have had to be faced in the development of these techniques include: (1) the hydrous nature of many uranium minerals, (2) the variable oxidation state of uranium, (3) degradation of the minerals beneath the electron beam – in particular, the mobility of radiogenic lead, (4) extreme variations in average atomic number of minerals and hence in corrections which must be applied for atomic number effects, (5) the possibility of severe continuum fluorescence effects, (6) the lack of suitable computer software for processing data for uranium lines and applying accurate corrections for matrix effects, (7) some severe spectroscopic interferences in the case of certain minerals and, by no means least (8) the lack of suitable, homogeneous and well characterized standard materials against which the analyses can be made.
733. CERNY, P., Univ. Manitoba (Earth Sciences):  
Mineralogy and petrology of pegmatites, 1971–.
- See:**  
The Tanco pegmatite at Bernic Lake, Manitoba. IX. Beryl; Can. Mineral., v. 15, p. 489-499, 1977.  
Alteration of pollucite in some pegmatites from southeastern Manitoba; Can. Mineral., vol. 16, no. 1, p. 89-96, 1978.
734. CHEN, T.T., CANMET (EMR):  
Mineralogy, geochemistry and distribution of silver and other trace elements in the Caribou deposit, New Brunswick, 1976-78.
- See:**  
Colloform and framboidal pyrite from the Caribou deposit, New Brunswick; Can. Mineral., v. 16, no. 1, p. 9-16, 1978.  
The laboratory study has been completed. A similar type of study has been carried over to the Brunswick 12 and Heath Steele deposits, New Brunswick. However only samples from grinding and flotation circuits of these two deposits are studied.
735. CLUFF, R.G., MOSSMAN, D.J., Univ. Saskatchewan (Geological Sciences):  
Geology of Mt. Washington porphyry copper occurrence, Vancouver Island, British Columbia, 1974-78; M.Sc. thesis (Cluff).
736. DEAN, R.S., CANMET (EMR):  
Mineralogy of clays and shales in Canada, 1958–.
- See:**  
Mineralogical investigation of ten glacial tills from the Kaminak Lake region, District of Keewatin, Northwest Territories; CANMET Lab. Rep. MRP/MSL 77-107 (IR), 1977.  
Clay mineral investigations of Nova Scotia bedrock to study occurrence of high-alumina minerals as part of a continuing search for non-bauxitic sources of alumina. Examination of twelve shales in an attempt to relate the rate of deterioration of these materials in highway embankments to the presence and/or abundance of expandable layer silicate minerals.
737. DUKE, J.M., Geol. Surv. Can.:  
Mineralogy of nickel deposits in serpentinized ultramafic rocks, 1975–.
738. FERGUSON, R.B., Univ. Manitoba (Earth Sciences):  
Detailed crystallography and chemistry of coexisting alkali and plagioclase feldspars from Manitoba granitic rocks, 1976-79.
739. FOSCOLOS, A.E., Geol. Surv. Can.:  
Mineralogy and chemistry of fine grained rocks in central Sverdrup Basin, 1973–.
740. GAIT, R.I., Royal Ontario Mus. (Mineralogy and Geology):  
Crystal forms of pyrite, 1977-78.  
Morphology of pyrite crystals with some studies of surface features of the faces using the scanning electron microscope.
741. GAIT, R.I., STURMAN, B.D., Royal Ontario Mus. (Mineralogy and Geology):  
Mineralogy of Tsumeb – Data on some new minerals, 1977-78.
742. GOBLE, R.J., SCOTT, S.D., Univ. Toronto (Geology):  
Chemical and physical properties of sulfide minerals, 1977-79.  
Initially, we are measuring self-diffusion coefficients of metals and of sulfur in several synthetic metallic sulfides in order to understand better the kinetics and mechanisms of sulfide reactions.
743. HEFFERNAN, K.J., MOSSMAN, D.J., Univ. Saskatchewan (Geological Sciences):  
Mineralogy of metalliferous sediments from the Atlantis II geothermal deep and the experimental recrystallization of these sediments under sub-greenschist facies of metamorphism, 1974-78; M.Sc. thesis (Heffernan).  
**See:**  
On the possible primary precipitation of atacamite and other metal chlorides in certain strabound deposits; Chemical Geol., v. 21, p. 151-159, 1978.
744. HUTCHISON, M.N., SCOTT, S.D., Univ. Toronto (Geology):  
Refinement and application of the sphalerite geobarometer, 1974-78; Ph.D. thesis (Hutchison).  
The sphalerite geobarometer is finding increasing application in the field of metamorphic petrology but a major uncertainty is the unknown effect of copper on the phase relations. Initial results suggest that we can model the Cu-Zn-Fe-S system thermodynamically and will be able to apply the geobarometer to copper-bearing systems which are ubiquitous among metamorphosed sulphide ores. The barometric phase relations of sphalerite + pyrrhotite and sphalerite + troilite + iron

- assemblages are also being investigated, the results of which will be applied to sphalerite-pyrrhotite ore assemblages of the Broken Hill massive sulphide deposit, Australia, and to the barometry of meteorites. Natural sphalerites from several massive sulphide deposits in the Appalachians, the Swedish Caledonides and Australia, have been analyzed and will be applied to the problem of unraveling their metamorphic history.
745. JAMBOR, J.L., CANMET (EMR):  
 Producibility of resources, 1977-80,  
 Determination of mineralogy of massive sulfide deposits of New Brunswick; effects of regional metamorphism on ore deposits; mineralogical characterization related to potential improvement of metal recoveries.
746. KARKHANIS, S., GOODWIN, A.M.,  
 PONNAMPERUMA, C., Univ. Maryland (Lab. Chem. Evol.), Univ. Toronto (Geology):  
 Mineralogy and trace fossil content of Archean iron-formation, Superior Province, 1977-79.  
 Detailed mineralogical studies of representative diamond drill core from the Helen Iron-Formation, Michipicoten area, Ontario reveal complex micro-facies patterns in addition to the well-known siderite, sulfide and banded chert members. Thus the latter may be subdivided into, in ascending order, dolomitic, slaty and magnetitic facies each with distinctive mineral compositions. The mineral chamosite has been identified for the first time in Archean iron-formation. Within the dolomite facies occur filamentous and algal-like structures. The possible organic origin of these structures is presently under investigation.
747. KISSIN, S.A., Lakehead Univ. (Geology):  
 Crystal chemistry and stabilities of sulphide minerals, 1976-.  
 Two articles, covering earlier phases of project work, have been written and submitted for publication. Work in the past year has centered on continued study of stannite and related minerals. Early data suggests the existence of a new species, the iron analogue of kesterite, and the confirmed existence of a cubic form of stannite, not equivalent to the problematical species isostannite. Experimental studies on the  $\text{Cu}_2\text{FeSnS}_4 - \text{Cu}_2\text{ZnSnS}_4$  pseudobinary system are continuing.
748. MACEK, J.J., FERGUSON, R.B., SCOATES, R.F.J.,  
 AMBACH, H., Univ. Manitoba (Earth Sciences):  
 New optical curves for the determination of composition and structural state of albite-twinned plagioclase crystals, 1971-78; PH.D. thesis (Macek).
749. MANDARINO, J.A., Royal Ontario Mus. (Mineralogy and Geology):  
 The gladstone-dale relationship: new constants, accuracy, and applications, 1968-78.  
 New constants for use with the gladstone-dale relationship have been derived. The greater accuracy obtainable through the use of these constants makes the relationship very valuable for checking mineralogical data (chemical composition, refractive indice, and density).
750. MANDARINO, J.A., STURMAN, B.D., Royal Ontario Mus. (Mineralogy and Geology):  
 Phosphate minerals in northeastern Yukon Territory, 1974-80.  
**See:**  
 Maricite, a sodium iron phosphate, from the Big Fish area, Yukon Territory, Canada; *Can. Mineral.*, v. 15, p. 396-398, 1977.
751. MUEHLENBACHS, K., Univ. Alberta (Geology):  
 Oxygen diffusion in silicates, crystals and melts, 1974-79.  
**See:**  
 Oxygen diffusion in vitreous silica - utilization of natural isotopic abundances; *Can. Mineral.*, v. 15, p. 179-184, 1977.
752. MYSYK, K., FERGUSON, R.B., HAWTHORNE, F.C.,  
 Univ. Manitoba (Earth Sciences):  
 The chemistry and mineralogy of the Homewood (Manitoba) meteorite, 1974-78; M.Sc. thesis (Mysyk).
753. PAUL, B.J., CERNY, P., Univ. Manitoba (Earth Sciences):  
 The Huron Claim pegmatite, southeastern Manitoba, 1976-78; M.Sc. thesis (Paul).  
 Huron Claim pegmatite is the best developed member of the Shatford Lake pegmatite group which surrounds the Lac du Bonnet quartz monzonite. It carries a moderate Be, Nb, REE, U, Th mineralization which can be taken as typical of pegmatites closely adjacent to the late potassic quartz monzonites of the English River subprovince. Field work was finished in 1977 and lab studies are in progress, revealing multiple generations of some accessory minerals and a wide variability in feldspars, both previously unsuspected.
754. PETRUK, W., HUGHSON, M.R., CANMET (EMR):  
 Mineralogy applied to ore dressing of Zn-Pb-Cn ores from northeastern New Brunswick, 1975-80.  
**See:**  
 Image analysis evaluation of the effect of grinding media on selective flotation of two Zn-Pb-Cu ores; *C.I.M. Bull.*, v. 70, no. 7:2, p. 128-135, 1977.  
 The size distributions of sphalerite, galena and chalcopryrite from Brunswick No. 12 and Heath Steele deposits have been determined in order to evaluate how fine the ore must be ground to liberate the minerals; mill products have been studied to determine mineral recoveries. The results show that a significant proportion of the sphalerite that is lost in mill tailings is free. The reason for this is being investigated. Some of the lead lost in the tailings is due to grinding of galena into slimes and conversion of the slimed galena to a lead sulphate. To fully evaluate the behaviour of minerals during flotation 86 samples from the mill of Brunswick Mining and Smelting were collected and the detailed mineralogy and chemistry of the samples is being studied.
755. PLANT, A.G., *Geol. Surv. Can.:*  
 Electron probe microanalysis, 1962-.

756. RIMSAITE, J.Y.H., Geol. Surv. Can.:  
Mineralogical research on the Rabbit Lake uranium deposit, Saskatchewan, 1975-.
- See:**  
Mineral assemblages at the Rabbit Lake uranium deposit, Saskatchewan: a preliminary report; Geol. Surv. Can., Paper 77-1B, p. 235-246, 1977.  
Occurrences of rare secondary U-and Pb-bearing mineral aggregates in uranium deposits, northern Saskatchewan: a progress report; Geol. Surv. Can., Paper 77-1C, p. 95-97, 1977.  
Layer silicates and clays in the Rabbit Lake uranium deposit, Saskatchewan; Geol. Surv. Can., Paper 78-1A, p. 303-315, 1978.
757. RIMSAITE, J.Y.H., Geol. Surv. Can.:  
Mineralogy of uranium deposits in granitic rocks in the Grenville structural province, Ontario and Quebec, 1977-.
758. ROBIN, P-Y.F., Univ. Toronto (Erindale-Geology):  
Effect of an applied stress on shear-induced coherent phase transitions in binary systems-application to the enstatite-ferrosilite series, 1974-79.
- See:**  
Angular relationships between host and exsolution lamellae and the use of the Mohr circle; Am. Mineral., v. 62, p. 127-131, 1977.  
It is possible to generalize the theory of R.S. Coe for shear-induced phase transitions to the case where some ions, e.g. Fe and Mg in pyroxenes, are able to migrate preferentially toward one or the other phase. Exsolution lamellae may therefore reflect the state of shear stress as well as pressure and temperature of the rock.
759. ROBIN, P-Y.F., Univ. Toronto (Erindale-Geology):  
Lattice strains associated with the Calcite I-II transition at 1.65 GPa, 1974-79.  
P.W. Bridgman first reported that calcite undergoes a displacive phase transition (Calcite I  $\leftrightarrow$  Calcite II) at 1.65 GPa, room temperature. Recent X-ray determinations of the structure of Calcite II (using a diamond anvil press) does not yield the strain associated with the deformation. This transition strain will be measured directly, by using strain gauges applied on single crystals undergoing the transition. The effect of the transition on the velocity of ultrasonic waves going through the sample can be studied as a function of the relative orientations of the transition strain and of the wave strain.
760. SCARFE, C.M., Univ. Alberta (Geology):  
Mineralogical study of the alteration and aging of the basaltic seafloor, 1975-81.
761. SCOTT, S.D., BOTH, R.A., SPRY, P., KISSIN, S.A., WILLIAMS, K.L., Univ. Toronto (Geology), Adelaide Univ., Lakehead Univ. (Geology), Sydney Univ:  
Metamorphism of the Broken Hill Pb-Zn-Ag massive sulfide ores, New South Wales, Australia, 1976-81; M.Sc. thesis (Spry).
- See:**  
Sulfide petrology of the Broken Hill region, New South Wales, Australia; Econ. Geol. v. 72, p. 1410-1425, 1977.  
Our studies to date have concentrated on the sulfides from which we have drawn the following conclusions: 1) with a few exceptions, pyrrhotite in the lodes was altered to monoclinic pyrrhotite, marcasite and pyrite during late-state retrograde metamorphism. All of the pyrite in the ores is clearly secondary; 2) domains of sulfide equilibrium are very small (measured in mm to cm) indicating that metamorphism of the ores was "closed system" and is incompatible with published views that wide-spread metasomatism accompanied the high-grade metamorphism; and 3) the sphalerite + pyrrhotite geobarometer indicates a confining pressure during prograde metamorphism of approximately 8 kb. Current studies are focussing on reactions between sulfides and silicates and on the origin of garnet-rich wall rocks to the ores.
762. SMITH, D.G.W., Univ. Alberta (Geology):  
High pressure minerals in shock veins in the Peace River chondritic meteorite, 1976-78.  
Shock veins in the Peace River meteorite have been investigated and the presence of ringwoodite and majorite confirmed by x-ray diffraction, petrographic and microanalytical techniques.
763. SMITH, D.G.W., CAVELL, P., Univ. Alberta (Geology):  
Quantitative analysis of clays and clay minerals by means of energy dispersive electron microprobe techniques, 1977-78.  
Energy dispersive electron microprobe techniques are being developed which will permit rapid and quantitative analysis of a wide range of clays and clay minerals. As little as a few milligrams of material may be used and procedures for clay mineral identification should be greatly simplified. It should also prove feasible to investigate cation substitutions more accurately and thoroughly than has hitherto proved possible since large numbers of analyses can be obtained simply and cheaply. Problems of impurities can be largely avoided by selecting particular size fractions by means of specially modified sedimentation techniques. However, the water content of clays can only be determined indirectly and light elements such as Li cannot be determined by this form of analysis. The special clay preparations are suitable for subsequent (or prior) x-ray diffraction studies should these be required. It is anticipated that the techniques developed will be applied in the investigation of problems such as the diagenetic formation of clay minerals from natural glasses, in the diagenetic alteration of clays after burial and in the study of systematic, regional variations of clay compositions in recent ocean and lake sediments. Direct studies of ion exchange capacities should also prove feasible. The techniques should also find many applications in other disciplines such as engineering geology, soil science, forensic science and ceramics.

764. SMITH, D.G.W., FOLINSBEE, R.E., Univ. Alberta (Geology):  
The mineralogy and classification of the Innisfree (Alberta) meteorite, 1977-78.  
Samples of the Innisfree meteorite, which fell on the evening of February 5th, 1977 near the town of that name in Alberta, Canada, are being examined by petrographic and electron microprobe techniques for the purposes of classification. Preliminary data indicate that it is a type LL6 chondrite, but further microprobe analyses will have to be carried out to establish this with certainty.
765. TRAILL, R.J., Geol. Surv. Can.:  
Studies of meteorites and other extra-terrestrial materials, 1957-.
766. TRAILL, R.J., Geol. Surv. Can.:  
X-ray diffraction analyses and mineralogical studies, 1968-.
767. VON BITTER, P.H., GAIT, R., Royal Ontario Mus. (Invert. Palaeo., Mineral. and Geol.):  
Calcite pseudomorphs from the Pleistocene of western Newfoundland - possible palaeoenvironmental indicators, 1976-78,
768. WICKS, F.J., PEAT, C., RAMIK, R.A.J., Royal Ontario Mus. (Mineralogy and Geology):  
Characterization of the serpentine minerals, 1977-.  
Serpentine minerals in the collection of the Royal Ontario Museum are being studied to further clarify the structural and chemical characteristics of this group of minerals.
769. WICKS, F.J., WHITTAKER, E.J.W., ZUSSMAN, J., Royal Ontario Mus. (Mineralogy and Geology):  
X-ray studies on serpentine minerals, 1967-77.
- See:**  
An idealized model for serpentine textures after olivine; Can. Mineral., v. 15, p. 446-458, 1977.  
Serpentine textures and serpentinization; Can. Mineral., v. 15, p. 459-488, 1977.  
A variety of serpentine mineral textures have been identified in thin section by microbeam X-ray diffraction camera and a table to aid in the identification of antigorite, chrysotile and lizardite, as seen in thin section, has been produced. An idealized three-dimensional model for the textures produced by the serpentinization of olivine has been developed and applied to the interpretation of observed textures. The serpentinization that produces the various textures have been divided into eight types depending on whether the conditions involve or do not involve, rising temperature, presence of shearing, and nucleation of antigorite.

PALEONTOLOGY

INVERTEBRATE

770. ADAMS, K.D., MOORE, R.G., COLWELL, J.A., Acadia Univ. (Geology):  
The Giagantoproductidae of the Musquodoboit Limestone (Mississippian), Nova Scotia, 1975-78; M.Sc. thesis (Adams).
771. BAMBER, E.W., Geol. Surv. Can.:  
Carboniferous and Permian biostratigraphy and coral faunas, western and northern Canada, 1971-.
772. BARNES, C.R., BERGSTRÖM, S.M., Univ. Waterloo (Earth Sciences), Ohio State Univ.:  
Ordovician conodont biostratigraphy of Spitzbergen and northern Greenland, 1971-83.
773. BARNES, C.R., CARSON, D.M., NOWLAN, G.S., MIRZA, K., Univ. Waterloo (Earth Sciences), Geol. Surv. Can., Norcen Ltd.:  
Lower Paleozoic conodont biostratigraphy of the Arctic Islands and Arctic Mainland, 1968-; M.Sc. thesis (Carson).
774. BARNES, C.R., KENNEDY, D.J., Univ. Waterloo (Earth Sciences):  
Ordovician conodont biostratigraphy, southern Rocky Mountains, Alberta and British Columbia, 1970-80.
775. BARNES, C.R., NOWLAN, G.S., McCRACKEN, A.D., UYENO, T.T., FÄHRÆUS, L.E., Univ. Waterloo (Earth Sciences), Geol. Surv. Can., Memorial Univ. (Geology):  
Late Ordovician and Early Silurian conodont biostratigraphy and paleoecology, Anticosti Island, Québec, 1975-; M.Sc. thesis (McCracken).
776. BARNES, C.R., SASS, D.B., NORD, G.L., Univ. Waterloo (Earth Sciences), Alfred Univ., U.S. Geol. Surv.:  
Conodont ultrastructure, 1965-.
777. BARNES, C.R., TARRANT, G.A., Univ. Waterloo (Earth Sciences):  
Ordovician conodont biostratigraphy and paleoecology, Ontario and Québec, 1965-; M.Sc. thesis (Tarrant).
778. BARNES, C.R., UYENO, T.T., LeFEVRE, J., Univ. Waterloo (Earth Sciences), Geol. Surv. Can., Aquitaine Co. Canada Ltd.:  
Ordovician and Silurian conodont biostratigraphy and paleoecology, Hudson Bay and Manitoba, 1969-81.

779. BOYCE, W.D., SKEVINGTON, D., FORTEY, R.A., PALMER, A.R., Memorial Univ. (Geology):  
Middle Cambrian to Lower Ordovician trilobite biostratigraphy of western Newfoundland, 1977-79; M.Sc. thesis (Boyce).  
Collections made along the St. Barbe Coast between Lonesome Cove and Eddies Cove East contain the trilobites *Ehmania borealis* Howell, *Ehmania* (*Ehmaniella*) *cloudensis* (Howell), *Elrathia? gaspensis* Kindle, (previously referred to as cf. *E. quebecensis* Rasetti), *Glyphaspis* sp., indicative of an upper Middle Cambrian *Bathyriscus-Elrathina* Zone age; the coreospirid gastropod *Latouchella* sp. and the trilobites *Blainia* sp. and cf. *Asaphiscus laeviceps* (Walcott), indicative of an uppermost Middle Cambrian *Bolaspidella* Zone age. For the first time, definite Upper Cambrian rocks are recognized north of Bonne Bay. At Bear Cove, north of Deadman's Cove, the lower Dresbachian trilobites *Arapahoia* sp., *Terranovella* cf. *T. obscura* Lochman, *Coosella* cf. *C. helena* Lochman and *Blountia* sp. were collected. These trilobites are indicative of an upper *Cedaria*-lower *Crepicephalus* Zone age. This data permits preliminary biostratigraphic correlation with the Port au Port Peninsula, 400 km to the south. A new Lower Ordovician fauna has been discovered in western Newfoundland which is older than the relatively well known Zone G faunas of the Port au Choix Peninsula. In the Boat Harbour region trilobites including *Hystricurus?* sp. indet. 1 and 2 and *Bellefontia* were found beneath zone G faunas. In the Eddies Cove West area the trilobites *Hystricurus* sp. indet. 2, *Hystricurus?* (*Paraplethopeltis?*) cf. *H?* (*P?*) *genacurvis* (Hintze) and *Lloydia* sp. were found beneath zone G faunas. These trilobites indicate the presence of Zone B-D age rocks. There may or may not be a disconformity between Zones B-D age rocks.
780. BRAUN, W.K., BROOKE, M.M., JOHNSTON, P.F., FEATHERSTONE, R.P., MATHISON, J.E., YAYCHUK, D.D., Univ. Saskatchewan (Geological Sciences):  
Biostratigraphy and microfaunas of the Devonian and Jurassic-Cretaceous Systems of western and northern Canada, 1965-; Ph.D. thesis (Johnston), M.Sc. theses (Featherstone, Mathison, Yaychuk).  
See:  
Usefulness of ostracodes in correlating Middle and Upper Devonian rock sequences in western Canada; Univ. California, Mus. Contr., no. 4, p. 65-79, 1977.  
Two papers are in press, one dealing with the establishment of a zonal scheme for the Middle and Upper Devonian sequences of western Canada, based mainly on ostracodes, and the other a monograph on systematics and biostratigraphic usefulness of Jurassic microfaunas of northeastern British Columbia and adjoining parts of Alberta. In preparation is a paper on Jurassic microfaunas of the Fernie Basin of southeastern British Columbia and adjoining parts of Montana. Close to completion are studies on Jurassic microfaunas and biostratigraphy of the Sverdrup Basin, Arctic Canada and on ostracode faunas of the Middle Devonian Slave Point Formation and adjoining Upper Devonian formations of Alberta and the southern Northwest Territories. In progress are studies on the microfaunas of the Middle-Upper Devonian formations of Saskatchewan and western Manitoba and provincialism in microfaunas of Frasnian sequences in western Canada.
781. BRIGGS, W.M., Royal Ontario Museum (Invert. Palaeo.):  
Ostracoda of the Taylor Formation, Ross Island, Antarctica, 1976-78.  
Studies have nearly been completed on the ostracodes from raised (30-50 m) unconsolidated marine sediments of the Taylor Formation (uppermost Pleistocene) on the slopes of Mt. Erebus, Ross Island, Antarctica. A total of sixty-eight podocopid ostracode species are present in the Taylor Formation here and in modern sediments of the adjacent Ross Sea. The high species diversity of the ostracodes in this area (c. 77°S lat.) is much greater than that of other high latitude areas of the Antarctic, and exceeds by 31 species the podocopid ostracode fauna reported by G.W. Müller (1908) from Gauss-station (lat. 65°S, long. 90°E). Several genera and several species are new.
782. BRIGGS, W.M., DELORME, D., Univ. Toronto (Scarborough-Geology and Life Sciences):  
Freshwater ostracodes of Late Wisconsin age from Northern Yukon, 1977-78.  
Examination of cores obtained from several lakes in the Yukon Territory has shown that shelled invertebrates, including ostracodes, have been removed from the sediment by post-depositional leaching. Emphasis is now being placed on cores from Tuktoyaktuk, Northwest Territories, and on the bluff sections of the Old Crow River in the northern Yukon.
783. CALDWELL, W.G.E., NORTH, B.R., McNEIL, D.H., McKELLAR, R.L., WATKINS, R.H., WRIGHT, C.E., Univ. Saskatchewan (Geological Sciences):  
Biostratigraphy of the Cretaceous System in the southern Interior Plains of Canada, 1961-; M.Sc. theses (McKellar, Watkins, Wright).  
See:  
Oxygen and carbon isotopic study of ammonites from the Late Cretaceous Bearpaw Formation in southwestern Saskatchewan; Can. J. Earth Sci., v. 14, no. 9, p. 2086-2100, 1977.  
The extreme eastern section of the Cretaceous System in the southern Interior Plains, that in the Manitoba escarpment, has been described in detail by D.H. McNeil. Nomenclature has been revised; the stratal sequence has been zoned, using both ammonites and foraminifers, in terms of zonal schemes previously established within the Western Interior of the continent; and the sequence has been interpreted as one deposited close to the axis of the original Western Interior basin of sedimentation. The Manitoba section compares most closely to that in eastern Colorado and western Kansas. A type area, locality, and section have been described by R.L. McKellar for the thick Lea Park Formation of Campanian age in the southern Interior Plains of Alberta and Saskatchewan. The formation has been

zoned using both foraminifers and molluscs, and it has been correlated widely within the Western Interior Cretaceous province using both lithological and palaeontological criteria. Further work on the Bearpaw Formation of southwestern Saskatchewan has shown that the well-preserved Campanian-Maestrichtian ammonite shells may be used to produce oxygen and carbon isotopic data that enable the temperature of the Bearpaw sea to be calculated with considerable accuracy. The average temperature is believed to have been about 23°C, comparable to that of the sea much farther south in Colorado.

784. CAMERON, B.E.B., Geol. Surv. Can.:  
Tertiary foraminiferal succession of western Cordillera and Pacific Margin, 1969-.
785. CHATTERTON, B.D.E., Univ. Alberta (Geology):  
Trilobite and conodont systematics and biostratigraphy of western and northern Canada, 1971-.
786. CHATTERTON, B.D.E., PERRY, D.G., Univ. Alberta, Univ. Windsor (Geology):  
Lower Devonian conodonts of the Delorme Formation, Northwest Territories, 1971-79.
- See:  
Lochkovian trilobites and conodonts from northwestern Canada; J. Paleontol., v. 51, p. 772-796, 1977.
787. CHATTERTON, B.D.E., PERRY, D.G., Univ. Alberta, Univ. Windsor (Geology):  
Silurian trilobite growth stages, 1974-79.  
Well preserved silicified growth stages of several Silurian trilobite genera have been recovered from the Delorme Formation of the western Mackenzie Mountains.
788. CHATTERTON, B.D.E., PERRY, D.G., Univ. Alberta, Univ. Windsor (Geology):  
Late Lower and Middle Devonian conodonts of northern Mackenzie and Ogilvie Mountains, Northwest Territories and Yukon, 1976-80.  
Large collections of Zlichovian through Givetian platform conodonts have been assembled through co-operative efforts with Petro-Canada which will aid in the correlation of the Ogilvie, Hume, Prongs Creek, Cranswick and Landry Formations over a wide area of the Northwest Territories and the Yukon.
789. COLLINS, D.H., RUDKIN, D.M., Royal Ontario Mus. (Invert. Palaeo.):  
A new enigmatic organism from the Burgess Shale (Middle Cambrian) of British Columbia, 1978.  
Description of a new organism of uncertain affinities from the Burgess Shale of British Columbia animal represented by approximately 60 poorly preserved individuals on a single slab.
790. COPELAND, M.J., Geol. Surv. Can.:  
Paleozoic ostracodes in Canada, 1972-.
- See:  
Additional paleontological observations bearing on the age of the Lourdes Formation (Ordovician), Port au Port Peninsula, western Newfoundland; Geol. Surv. Can., Paper 77-1B, p. 1-5, 1977.
- Silurian and Early Devonian beyrichiacean ostracode provincialism in northeastern North American; *ibid.*, p. 15-24, 1977.
- Ordovician Ostracoda, southeastern District of Franklin; Geol. Surv. Can., Bull. 269, p. 77-97, 1977.
- Early Paleozoic Ostracoda from southwestern District of Mackenzie and Yukon Territory; Geol. Surv. Can., Bull. 275, 1977.
- Redescription of the Lower Devonian beyrichiacean ostracode *Arikloedenia occidentalis* (Walcott, 1884); J. Palaeontol., v. 51, no. 2, p. 234-242, 1978.
- Early Paleozoic Ostracoda of Eastern Canada; Stratigraphic Micropaleontology of Atlantic Basin and Borderlands, Elsevier Press, p. 1-7, 1977.
791. COPPER, P., HORST, R., FAY, T., NENADOV, P., Laurentian Univ. (Geology):  
Atrypoid brachiopods.  
Ordovician-Silurian biostromes, bioherms of Manitoulin Island, 1975-77; M.Sc. thesis (Horst), B.Sc. theses (Fay, Nenadov).
792. DEAN, W.T., Geol. Surv. Can.:  
Lower and Middle Paleozoic biostratigraphy of Gaspé, Maritime region and Newfoundland, 1969-.
- See:  
The Early Ordovician trilobite genus *Missisquoia* Shaw 1951 on the southern Canadian Rocky Mountains of Alberta and British Columbia; Geol. Surv. Can., Paper 76-33, 1977.  
Preliminary account of the trilobite biostratigraphy of the Survey Peak and Outram Formations (Late Cambrian, Early Ordovician) at Wilcox Pass, southern Canadian Rocky Mountains; Geol. Surv. Can., Paper 76-34, 1977.
793. DIXON, O.A., Univ. Ottawa (Geology):  
Ordovician and Silurian heliolitid corals of Anticosti Island, Québec, and Somerset Island, Northwest Territories, 1968-.
794. ECKERT, J., VON BITTER, P.H., Univ. Toronto (Geology), Royal Ontario Mus. (Invert. Palaeo.):  
A new early Silurian (Llandoveryan) echinoderm fauna from southern Ontario, 1977-79; M.Sc. thesis (Eckert).  
A well-preserved crinoid fauna has been collected from strata of the Cataract Group in the Niagara Peninsula, southern Ontario. The Power Glenn Formation was the most productive unit examined. Early Silurian echinoderms are generally poorly known; therefore this new fauna is of palaeo-ecologic and evolutionary significant in elucidating relationships between the well-known Middle-Upper Ordovician fauna and the younger Middle Silurian fauna. The fauna consists of monobathrid and diplobathrid camerates, disparate and cladid inadunates, and one genus of flexibles, as well as asteroids and ophiuroids. Overall, the fauna has a distinctly Ordovician aspect and may be considered as a "reflect fauna."

795. ELLEN, M., McGUGAN, A., Univ. Calgary (Geology):  
Santonian/Campanian boundary Trent River,  
eastern Vancouver Island, British Columbia, 1977-  
79; M.Sc. thesis (Ellen).  
Processing and microfaunal analysis proceeding.
796. FERGUSON, L., Mount Allison Univ. (Geology):  
Permo-Pennsylvanian stratigraphy and faunas of  
north-central Ellesmere Island, Northwest  
Territories, 1961-80.
797. FERGUSON, L., Mount Allison Univ. (Geology):  
A biometrical study of the Scottish Lower  
Carboniferous Ostracod genera *Bairdia* and  
*Paraparchites*, 1969-79.  
Topotype material from near Granard, Co.  
Longford, Ireland was collected during the summer  
of 1977 and is currently being disaggregated with a  
view to establishing growth series and examining  
the variation in assemblages from the type locality  
of *Bairdia curta* McCoy. Detailed collections were  
also made from the Craigenlen section near  
Glasgow, Scotland with a view to clarify the  
stratigraphy of that section.
798. FRITZ, M.A., Royal Ontario Mus. (Invert. Palaeo.):  
Redescription of type specimens of species of  
Bryozoa, 1968-77.  
**See:**  
Redescription of type specimens of species of the  
bryozoan genera *Atactoporella*, *Homotrypa*, and  
*Homotrypella*, from the Upper Ordovician Rocks of  
the Credit River Valley, Ontario, Canada; Royal  
Ontario Mus. Life Sci. Contrib., no. 111, p. 1-24,  
1977.
799. FRITZ, M.A., Royal Ontario Mus. (Invert. Palaeo.):  
Restudy of the bryozoan genus *Stigmatella* from  
the Upper Ordovician of Workman's Creek (Meaford  
Creek), Ontario, 1977-78.
800. GALLAGHER, M., McGUGAN, A., Univ. Calgary  
(Geology):  
Recent Foraminifera, Vancouver Island Area,  
British Columbia, 1976-78; Ph.D. thesis (Gallagher).  
Distribution of foraminiferal faunas and  
relationship to substrate and water chemistry and  
temperature computer analysis.
801. GRADSTEIN, F.M., Geol. Surv. Can.:  
Biostratigraphic history of the Mesozoic and  
Cenozoic sediments of the Grand Banks, Northeast  
Newfoundland and Labrador shelves, 1974-.
802. HALL, R.L., Univ. Calgary (Geology):  
Lithostratigraphy and biostratigraphy of the Fernie  
Group (Jurassic), Alberta, 1978-.  
The Fernie Group represents sedimentation in an  
"inland" sea which continued throughout most of  
Jurassic time, but with evidence of significant  
interruptions. Comparison of ammonite and  
bivalve faunas within these rocks with faunas of  
similar age elsewhere in western North America  
indicates marine connections must have existed at  
various times between this "inland" sea and the  
Pacific Basin. To undertake a lithostratigraphic and  
biostratigraphic study of the Fernie Group,  
beginning in southwest Alberta, in an attempt to  
erect formal subdivisions, produce further docu-  
mentation of the fossil faunas and a more refined  
biostratigraphy.
803. HOFMANN, H.J., Univ. Montreal (Géologie):  
Precambrian paleontology, 1966-.  
**See:**  
On Aphebian stromatolites and Riphean  
stromatolite stratigraphy; Prec. Res., v. 5, p. 175-  
205, 1977.  
The problematic fossil *Chuarina* from the late  
Precambrian Uinta Mountain Group, Utah; Prec.  
Res., v. 4, p. 1-11, 1977.  
New stromatolites from the Aphebian Mistassini  
Group, Quebec; Can. J. Earth Sci., v. 15, no. 4,  
p. 571-585, 1978.
804. HOFMANN, H.J., Univ. Montreal (Géologie):  
Lower Paleozoic trace fossils in Ottawa-  
St. Lawrence Lowland, 1970-.
805. HOFMANN, H.J., KING, A.F., Univ. Montreal  
(Géologie), Memorial Univ. (Geology):  
Precambrian stratigraphy, sedimentology and  
paleontology of the Avalon Peninsula,  
Newfoundland, 1977-.  
Determination of biostratigraphic potential of  
microfossils in Late Precambrian of Avalon  
Peninsula is in progress.
806. HOFMANN, H.J., KING, A.F., HILL, J., Univ.  
Montreal (Geology), Memorial Univ. (Geology):  
Precambrian stratigraphy, sedimentology and  
paleontology of the Avalon Zone, eastern  
Newfoundland, 1977-79.  
A reconnaissance sampling program was initiated in  
June 1977 to locate units and sections favourable  
for yielding microfossils. In all, 78 localities were  
sampled representing 20 stratigraphic units on the  
Avalon Peninsula. While microfossils have been  
recovered from the St. John's, Cappahayden and  
Random Formations, there have been problems  
with low concentrations and metamorphism. Future  
samples will have to be much larger than normal  
and collected from areas of relatively lower grade  
metamorphism.
807. HOOPER, K., CLARK, F., Carleton Univ. (Geology):  
Foraminifera from Upper Cretaceous of the  
Carnarvon Basin, West Australia, 1976-78; M.Sc.  
thesis (Clark).
808. HOOPER, K., EXTON, J., Carleton Univ. (Geology):  
Microfaunal associations of the Liassic of  
Zambujal, West-Central Portugal, 1975-77; M.Sc.  
thesis (Exton).
809. HOOPER, K., LaROUCHE, C., Carleton Univ.  
(Geology):  
Recent deep water benthonic Foraminifera from  
Northwest Atlantic Ocean, 1975-78; M.Sc. thesis  
(LaRouche).

810. HOOPER, K., LEE, CHEN-WAH, Carleton Univ. (Geology):  
Quantitative analysis of Foraminifera from Cretaceous claystone, Darwin Area, Australia, 1976-78; M.Sc. thesis (Lee).
811. HOOPER, K., LOMAX, D., Carleton Univ. (Geology):  
Quaternary Indo Pacific microfossils, 1978-80.
812. HOOPER, K., RODRIGUES, C., Carleton Univ. (Geology):  
Quaternary microfauna and oceanography of the Gulf of St. Lawrence, 1976-78; Ph.D. thesis (Rodrigues).
813. JELETZKY, J.A., Geol. Surv. Can.:  
Monograph of the Canadian belemnites, 1959-.
814. JENKINS, W.A.M., Geol. Surv. Can.:  
Stratigraphic distribution of Lower Paleozoic organic-walled microfossils in eastern Canada, 1975-.
- See:  
Geology of the Amoco Imp. Skelly A-1 Osprey H-84 well, Grand Banks, Newfoundland; Geol. Surv. Can., Paper 77-21, 1977.
815. JOHNSON, M., JULL, R.K., Univ. Windsor (Geology):  
Paleoecology of the Middle Silurian Fossil Hill Formation, Bruce Peninsula, Ontario, 1976-78; M.Sc. thesis (Johnson).
816. JONES, B., Univ. Alberta (Geology):  
Biostratigraphic zonation of Upper Silurian platform carbonate sequences, Arctic Canada, 1977-.
- See:  
Taxonomy and intraspecific variation of *Protathyris praecursor* Kozłowski, 1929 form the Upper Silurian of Somerset Island, Arctic Canada; J. Paleontol., v. 52, no. 1, p. 8-27, 1978.  
Variation in the Upper Silurian Brachiopod *Atrypella phoca* (Salter) from Somerset and Prince of Wales Islands, Arctic Canada; J. Paleontol., v. 51, p. 459-479, 1977.  
Continued study of brachiopod faunas of the Read Bay Formation of Arctic Canada. Particular emphasis on describing and illustrating these faunas. Further development of statistical methods for examining intra- and interspecific variation of brachiopods (especially *Atrypoides* and *Protathyris*). Continued study of possibility of zoning Upper Silurian strata of Arctic Canada using the brachiopod faunas. New study of brachiopod faunas of the type section of Read Bay Formation (Members A, B and basal C) at Goodsir Creek, Cornwallis Island.
817. JULL, R.K., Univ. Windsor (Geology):  
Silurian corals from the Broken River Embayment of Queensland, Australia, 1967-78.
818. JULL, R.K., Univ. Windsor (Geology):  
Taxonomic re-evaluation and ontogenic study of Tabulata and Rugosa, 1972-80.
- To establish phylogenetic relationships of early Tabulata and rugose corals, especially with regard to ancestral origins of these two groups of corals.
819. JULL, R.K., Univ. Windsor (Geology):  
Upper Devonian corals from the Ancient Wall reef complex, Jasper National Park, Alberta, 1973-79.
820. JULL, R.K., PERRY, D.G., Univ. Windsor (Geology):  
Biostratigraphy of a late Eifilian/early Givetian sequence, Peace River area, British Columbia, 1977-78.  
An interbedded limestone/shale sequence located in the Mt. Burden area, 10 miles north of Williston Lake, British Columbia has yielded a rich fauna of brachiopods, corals, conodonts and allied elements. Apart from a small number of new taxa, the fauna compares closely to that of the upper part of the Hume Formation, McKenzie Mountain, Northwest Territories. The fauna is of interest in its occurrence in one of the southernmost Middle Devonian exposures in the northern Rocky Mountains.
821. KLEIN, K., JULL, R.K., Univ. Windsor (Geology):  
Distribution and development of bioherms in the Middle Devonian Detroit River Group near Formosa, Ontario, 1976-79; M.Sc. thesis (Klein).  
Field mapping to determine the shape, orientation and distribution of the bioherms is in progress. Subsurface cores are being examined to try and establish the exact position of the reef facies in the Detroit River Group near Formosa.
822. KOBLUK, D.R., KAROLYI (BOURQUE), M.S., Univ. Toronto (Erindale-Earth and Planetary Sci.) McMaster Univ. (Geology):  
Cavity-dwelling (coelobitic) organisms in reef cavities of Jamaica West Indies, and Bonaire, North Africa, 1978.  
Investigating organism community structure within reef cavity systems in coral reefs of northern Jamaica and Bonaire and to apply observations from these modern structure to cavity systems in Ordovician and Silurian reefs of Ontario, Québec and northern Vermont.
823. KOBLUK, D.R., PEMBERTON, S.G., Univ. Toronto (Erindale - Earth and Planetary Sci.), McMaster Univ. (Geology):  
Ichnofauna of the Guelph Formation at Warton, Ontario, 1976-78.
824. LANG, A., MCGUGAN, A., Univ. Calgary (Geology):  
Cretaceous Foraminifera and stratigraphy, southern Alberta and Montana, 1977-80; Ph.D. thesis (Lang).  
Processing and microfaunal analysis proceeding.
825. LENZ, A.C., Univ. Western Ontario (Geology):  
Llandoveryan and Wenlockian graptolites of northern Canadian Cordillera and selected areas of Arctic Islands, 1976-79.  
Graptolites of Llandovery and Wenlock age have been studied from a number of sections ranging from northern British Columbia to northern Yukon

and supplemented by some material from the Arctic Archipelago. To date all Llandoveryan zones currently recognized in Britain have been recognized in the study region. Detailed sampling has been carried out on Peel River and Blackstone River. Sampling of the Rock River and Tetlet Creek, northern Yukon, and Clearwater Creek, South Nahanni River region is planned for the summer of 1978.

826. LENZ, A.C., CHATTERTON, B.D.E., PERRY, D.G., JONES, B., Univ. Western Ontario (Geology), Univ. Alberta (Geology), Univ. Windsor (Geology):

Silurian-early Devonian biostratigraphy, taxonomy and paleoecology of shelly faunas of northern and Arctic Canada, 1976-80.

See:

Llandoveryan and Wenlockian brachiopods from the Canadian Cordillera; *Can. J. Earth Sci.*, v. 14, p. 7521-7554, 1977.

A study of brachiopods, conodonts, corals and other major invertebrates from Silurian and early Devonian carbonates, particularly from faunal and near-faunal facies of Yukon, adjacent Northwest Territories and selected sites of Arctic Islands. Samples have been collected to date from Cornwallis, Baillie Hamilton, and central Ellesmere Islands in 1976 and 1977. Project to continue in 1978 in Arctic Islands and probably Mackenzie Mountains in 1979.

827. LUDVIGSEN, R., Univ. Toronto (Geology):  
Middle and Late Ordovician trilobites of the Sunblood, Esbataottine, and Whittaker formations, District of Mackenzie, 1972-.

See:

Rapid repair of traumatic injury by an Ordovician trilolite; *Lethaia*, v. 10, p. 205-207, 1977.

828. LUDVIGSEN, R., UNiv. Toronto (Geology):  
Trilobites of Ontario, 1976-.

See:

The Ordovician trilobite *Ceraurinus* Barton in North America; *J. Paleontol.*, v. 51, p. 959-972, 1977.

More than 60 genera of trilobites occur in Ordovician, Silurian and Devonian strata of Ontario. With rare exceptions, these trilobites are insufficiently known in terms of morphology, taxonomy, distribution and ecology. A long-term program of investigation of these trilobites has been initiated. A series of taxonomic revisionary works constitutes the initial stage of this program. Treatment of the genera *Ceraurinus*, *Bathyrurus*, and *Pseudogygites* has been completed and work has been started on *Hemiargus*, *Encrinuroides*, *Achatella*, *Triarthrus*, "*Calyptaulax*", *Terataspis* and *Eomonorachus*. A guide to the trilobites of Ontario has been submitted for publication. This guide is aimed at the serious amateur collector and at students registered in paleontology and historical geology courses at Ontario universities.

829. LUDVIGSEN, R., VON BITTER, P.H., Univ. Toronto (Geology):

Trilobite and conodont biostratigraphy of the Cambrian-Ordovician boundary beds in the Rabbitkettle Formation, District of Mackenzie, 1974-.

A continuous faunal sequence through the upper part of the Rabbitkettle Formation near the Broken Skull River extends from the Late Cambrian *Saukia* Zone (trilobite) and *Proconodontus* Zone (conodont) to the Early Ordovician *Missisquoia* Zone (trilobite) and *Cordylodus proavus* Zone (conodont). This is the only such section in northern Canada and is of considerable importance in the current attempts to seek international consensus for the definition of the Cambrian-Ordovician boundary.

830. MAMET, L., ROUX, A., DODGE, D., Univ. Montréal (Géologie):

Zonation du Carbonifère mondial sur base de petits Foraminifères, 1955-.

Etude des Formations Flett, Besa River, Mattson, Mackenzie Mountains; étude des Formations Banff, Pekisko, Shunda et Turner Valley, British Columbia; étude détaillée des Foraminifères du Shunda (Alberta et British Columbia); étude du Tournaisien et Viséen d'Australie orientale; étude du Namurien de Malaisie; et étude du passage Tournaisien/Viséen dans le Somerset.

831. MATTHEWS, J.V., Jr., *Geol. Surv. Can.*:  
Quaternary fossil insects and paleoecology, 1973-.

See:

Coleoptera fossils; their potential value for dating and correlation of late Cenozoic sediments; *Can. J. Earth Sci.*, v. 14, no. 10, p. 2339-2347, 1977.

832. MCGUGAN, A., Univ. Calgary (Geology):  
Permian trace fossils, 1977.

See:

Trace fossils of problematical origin from the Permian of Banff, Alberta; *J. Paleontol.*, v. 51, no. 5, p. 1037-1040, 1977.

833. MCGUGAN, A., Univ. Calgary (Geology):  
Upper Cretaceous Foraminifera, Vancouver Island Area, British Columbia.

Taxonomy and correlation of Santonian, Campanian and Maastrichtian foraminiferal faunas, Comox and Nanaimo Basins, proceeding.

834. MEDIOLI, F.S., SCHAFER, C.T., SCOTT, D.B., THOMAS, F., Dalhousie Univ. (Geology):  
Foraminifera of the Minas Basin and their distribution, 1976-78.

This is a baseline study of distribution of Foraminifera prior to the construction of Fundy Tidal Power Dam. Should the dam be built the obvious development will be the study of the changes in distribution caused by the new structure.

835. MEDIOLI, F.S., SCOTT, D.B., SCHAFER, C.T., LABERGE, M., Dalhousie Univ. (Geology):  
Estuarine Foraminifera and their use in the classification of estuaries, 1976-80; B.Sc. thesis (Laberge).
- See:  
Temporal changes in foraminiferal distributions in Miramichi River estuary, New Brunswick; Can. J. Earth Sci., v. 14, no. 7, p. 1566-1584, 1977.
- Distribution of Foraminifera from surface sediments in Miramichi estuary are described and compared to similar data reported previously from the same estuary. Three major assemblage zones presently occupy the estuary: the river, transitional, and open bay assemblage zones. Only two assemblage zones were observed in earlier studies: river and open bay. Sedimentological and geomorphological evidence suggests that circulation patterns in the estuary have changed sufficiently in the past decade to allow the transition assemblage to replace the open bay in large parts of the estuary. A comparison is made between the distributions obtained using a cluster analysis and those obtained using a direct, intuitive approach. The two methods yield almost identical results in this study and the cluster analysis should be a valuable tool when large amounts of data must be interpreted. Similar studies have been performed in LaHave, Chezzetcook inlet and more will be performed in the next few years.
836. MITCHELL, C.E., LENZ, A.C., Univ. Western Ontario (Geology):  
Paleoecology and phylogeny of Ordovician brachiopods of the Whittaker Formation, Mackenzie Mountains, Northwest Territories, 1975-79; M.Sc. thesis (Mitchell).
837. MORGAN, A.V., MORGAN, A., Univ. Waterloo (Earth Sciences):  
Comparison of climatic parameters indicated by fossil Coleoptera of Sangamon age from Baffin Island and Southern Ontario, 1974-.
838. NASSICHUK, W.W., VON BITTER, P.H., Geol. Surv. Can., Royal Ontario Mus. (Invert. Palaeo.):  
The age of Pennsylvanian carbonate mounds, Blue Mountains and Hare Fiord, Arctic Canada, 1977-78.
839. NORRIS, A.W., Geol. Surv. Can.:  
Brachiopods of the lower Upper Devonian Waterways Formation of northeastern Alberta, 1977-.
840. PACKARD, J.J., DIXON, O.A., Univ. Ottawa (Geology):  
Read Bay Formation (Member C) on eastern Cornwallis Island, Arctic Canada, 1977-80; M.Sc. thesis (Packard).
- A general stratigraphic study of Member C of the Read Bay Formation on eastern Cornwallis Island, and detailed study of reefoid coral-stromatoporoid facies and adjacent crinoidal facies in the lower part of the formation. Sections have been examined in the Goodsir Creek and Read Bay areas; these will be studied further along with exposures in intervening areas in 1978.
841. PARKINS, W.G., DIXON, O.A., Univ. Ottawa (Geology):  
Late Silurian rugose corals of Somerset and Cornwallis Islands, Arctic Canada, 1977-81; Ph.D. thesis (Parkins).
- A diverse rugose coral fauna has been collected from the Late Silurian Read Bay Formation on Somerset and Cornwallis Islands. Involves systematic study of this fauna in conjunction with study of the depositional environments and stratigraphic distribution of the coral taxa.
842. PEDDER, A.E.H., Geol. Surv. Can.:  
S Stratigraphically important cystimorph corals from the Lower Devonian of western Canada, 1975-.
843. PERRY, D.G., Univ. Windsor (Geology):  
Siluro-Devonian brachiopods of the Delorme Formation, Mackenzie Mountains, Northwest Territories, 1971-78.
844. PERRY, D.G., Univ. Windsor (Geology):  
Zlichovian brachiopods from the Prongs Creek Formation reefs, 1977-79.
- Description and illustration of new brachiopod taxa not previously recognized in the northern Canadian Cordillera (Knorr Range, Yukon).
845. PERRY, D.G., CHATTERTON, B.D.E., Univ. Windsor (Geology), Univ. Alberta (Geology):  
Silurian conodont biostratigraphy of Delorme and Road River Formations, Northwest Territories, 1971-79.
- Many taxa characteristic of the European and Nevada late Llandovery through Pridoli have been recovered.
846. PERRY, D.G., CHATTERTON, B.D.E., Univ. Windsor (Geology), Univ. Alberta (Geology):  
Silurian trilobites from the Whittaker and Delorme Formations, Delorme Range, eastern Mackenzie Mountains, Northwest Territories, 1972-78.
847. PERRY, D.G., CHATTERTON, B.D.E., LENZ, A.C., Univ. Windsor (Geology), Univ. Alberta (Geology), Univ. Western Ontario (Geology):  
Correlation of Arctic Silurian graptolitic and shelly faunas, 1976-81.
- Very diverse brachiopod faunas, diverse but less abundant trilobite and conodont faunas have been recovered from debris flows which are interbedded with graptolitic shales near the regional carbonate-shale facies change at several localities on Cornwallis, Ellesmere, and Baillie-Hamilton Islands.
848. PERRY, D.G., JULL, R.K., Univ. Windsor (Geology):  
Tentaculites preserved in life position, 1977.
- Much discussion has centered on the life position of thick walled benthic tentaculitids. Previous interpretations include a benthic habit with either apex rooted in the sediment or with long axis parallel to the sediment-water interface; a nektobenthic habit with aperture at the sediment-water interface. None is based on direct evidence derived from a group of in situ shells.

- Tentaculites** spp. are common in current-laid thin coquinoid accumulations in the Givetian Arkona Shale near Arkona, Ontario. This horizon has yielded a mudstone nodule whose total macrofauna comprises 32 **Tentaculites** specimens in a near vertical orientation with their apertures all directed downward in relation to the sediment-water interface. The apertures were marked on the unprepared nodule by small surface depressions. Such consistent near vertical orientations of all specimens cannot be attributed to positioning by current winnowing. This orientation probably requires the virtual absence of current activity, otherwise the shells would be overturned. If they were deep burrowers they should be preserved with aperture position down more commonly. It is suggested that these **Tentaculites** lived as vertical, surficial burrowers although we are perplexed that if this was the common life mode of other tentaculitid tentaculites why it has not been recorded elsewhere.
849. PERRY, D.G., LENZ, A.C., Univ. Windsor (Geology), Univ. Western Ontario (Geology):  
Silurian trilobites of Avalanche Lake area, western Mackenzie Mountains, Northwest Territories, 1976-79.  
Extremely diverse silicified trilobite faunas have been recovered from Wenlockian beds of the Road River Formation near Avalanche Lake. Several new taxa are being described.
850. PETRYK, A.A., Québec Min. Richesses Naturelles (Energie):  
Lower and Upper Carboniferous Foraminifera and algae: biostratigraphy and taxonomy.  
Late Pennsylvanian Foraminifera (larger and smaller) from eastern North Greenland and Upper Carboniferous (Mississippian) from southwestern Alberta.
851. RIVA, J., BUSSIERES, L., Univ. Laval (Géologie et Minéralogie):  
Stratigraphy and biostratigraphy of the Middle Ordovician of the Malbaie area.  
Biostratigraphy and taxonomy of Middle and Late Ordovician graptolites, 1966-.
- See:  
The Trenton, Utica and flysch succession of the platform near Quebec City, Canada; N.E.I.G.C. 69th Ann. Meet. Quebec City, Canada, p. A8-1 to A8-37, 1977.  
Late Middle Ordovician shelf, slope, and flysch facies between Baie St. Paul and LaMalbaie, Quebec, *ibid.*, p. B9-1 to B9-26, 1977.
852. RUDKIN, D.M., Royal Ontario Mus. (Invert. Palaeo.):  
Repair of injuries to the Middle Cambrian Trilobite **Ogyopsis klotzi** (Rominger), from British Columbia, 1977-78.  
Investigation of origin of damage to margins of trilobite exoskeleton, and processes of repair.
853. RYAN, R.J., MOORE, R.G., GILES, P.S., Acadia Univ. (Geology):  
Paleontology and paleoecology of the Gays River Formation, Nova Scotia, 1976-78; M.Sc. thesis (Ryan).
854. SARJEANT, W.A.S., Univ. Saskatchewan (Geological Sciences):  
Bibliography of works on the history of geology, 1958-78.  
The preparation of this bibliography is now nearing completion. Brief biographies of all geologists listed are being prepared and cross-indexing by country of origin, countries worked in and specializations within geology has been undertaken. Sections on the history of the petroleum industry, on geological institutions and geological events have been added. It is estimated that the final work will contain some 100,000 entries and it is hoped that all eight volumes will be sent to press in the summer of 1978.
855. SCHAFER, C.T., Geol. Surv. Can.:  
In-situ environmental responses of estuarine benthonic Foraminifera, 1975-.
- See:  
Experiments on mobility and transportability of some nearshore benthonic Foraminifera species; Geol. Surv. Can., Paper 77-1C, p. 27-31, 1977.  
Temporal changes in foraminiferal distributions in Miramichi River estuary, New Brunswick; Can. J. Earth Sci., vol. 14, no. 7, p. 1566-1587, 1977.
856. SCHAFER, C.T., Geol. Surv. Can.:  
Foraminiferal ecology and sedimentary processes on the Eastern Canadian Continental Slope, 1977-.
- To determine major invertebrate biotopes and sedimentary processes in the 300-3000 M depth range, and to determine the local textural and geochemical variability and stability of modern slope sediment.
857. SCOTT, D.B., MEDIOLI, F.S., Dalhousie Univ. (Geology):  
Thecamoebians - their present distribution and possibilities as stratigraphic markers in ancient freshwater deposits, 1977-79.  
The microscopic, freshwater testaceous rhizopods grouped under the name "Thecamoebians" have often been overlooked in micropaleontology. The rare geological reports on these organisms usually occur from estuarine deposits where Thecamoebians are present as reworked and isolated specimens. Most of the work on this group has been done by biologists and their information has little applicability to geological problems. A project has been initiated here to study Thecamoebians in the lakes and rivers of the Maritimes to determine if they occur in zonations similar to those of their marine relatives, the Foraminifera. Preliminary work has shown that Thecamoebians occur in numbers comparable (100-1000/10 cm<sup>3</sup>) to those of Foraminifera. Therefore, they are capable of being useful fossils in the usually barren lake deposits. Thecamoebians are known to occur as early as Mississippian, however,

most species are known no earlier than Pliocene. More systematic investigation of fossil lake material may demonstrate Thecamoebians to be more relevant to biostratigraphy than commonly believed.

858. SCOTT, D.B., MEDIOLI, F.S., BEAUMONT, C., Dalhousie Univ. (Geology):

Foraminiferal distribution in coastal and inland marine water and its importance in the study of eustatic sea level rise and land subsidence, 1976-80; Ph.D. thesis (Scott).

This work has enabled us to measure, with an accuracy previously impossible to achieve ( $\pm 5$  cm) the sea level variations during the last few thousand years in the Halifax, Yarmouth and Pugwash areas of Nova Scotia. In the course of this investigation we have changed many of our previous ideas on sea level variations and we have abandoned the project of comparing the history of Nova Scotia sea level with that of stable areas of the world. Field trips to New Brunswick and Gaspe and our own data strongly suggest that the phenomenon of rebound is more complex than we had anticipated. We have tried to fit our information into the "peripheral bulge" theory with very encouraging results. Much field and laboratory work remains to be done along the line roughly connecting Sable Island with Rimouski.

859. SKEVINGTON, D., FINNEY, S.C., Memoiral Univ. (Geology):

Ordovician graptolite faunas of Newfoundland, 1977-80.

See:

Fossils from the Dunnage Mélange, north-central Newfoundland; Can. J. Earth Sci., v. 14, p. 1176-1178, 1977.

To investigate all actually and potentially graptolite-bearing localities/lithologies in the Ordovician of the central mobile belt, with a view to dating successions whose ages were hitherto uncertain or unknown. To measure and systematically collect potential Cambrian-Ordovician boundary stratotype sections in western Newfoundland. A preliminary investigation of sections between Port-au-Port and Table Point has been carried out, on the basis of which attention will henceforth be focussed on exposures at and to the south of Martins' Point and around the shores of St. Paul's Inlet. In due course, it is hoped to monograph all graptolite faunas from western Newfoundland and to establish a firm biostratigraphy for the Ordovician of the area.

860. SMITH, P., WESTERMANN, G.E.G., McMaster Univ. (Geology):

Lower Jurassic biostratigraphy in Oregon and Nevada, U.S.A., 1978-80; Ph.D. thesis (Smith).

1. To identify and describe the Sinemurian - Toarcian (Lower Jurassic) ammonite faunas of several formations in western Nevada and eastern Oregon. Attention will be paid to infraspecific and ontogenetic variability as well as possible manifestations of sexual dimorphism. 2. The formations involved will be correlated with their temporal equivalents on a local, regional and global

scale. 3. Ammonite palaeoecology will be studied, specifically comparing the faunas of the Nevadan "miogeosynclinal" setting with those of the "eugeosynclinal" Oregon environment.

861. SMITH, R.E., Geol. Surv. Can.:  
Lower Devonian (Gedinnian) biostratigraphy and brachiopod faunas, Prince of Wales and Bathurst Islands, District of Franklin, 1973-.

862. STAPLIN, F.L., GANNON, E.M., POCOCK, S.A.J., Imperial Oil Ltd. (Geological):

Early Tertiary and late Cretaceous paleontological correlation, surface to subsurface, Yukon coastal plane and Mackenzie Delta areas, 1976-79.

863. STEARN, C.W., McGill Univ. (Geological Sciences):  
Paleoecology of Paleozoic reef builders.

See:

The stromatoporoid coenosteum: castle or condominium?; J. Paleontol., v. 51, no. 3, p. 27, 1977.

Studies of stromatoporoids by scanning electron microscopy; Mem. Bur. Res. Geol. Min., no. 89, p. 33-40, 1977.

864. STOUGE, S.S., FAHRAEUS, L.E., Memorial Univ. (Geology):

Conodonts from the Table Head Group (Middle Ordovician), western Newfoundland, 1975-78; Ph.D. thesis (Stouge).

To interpret the distribution of conodonts in the Table Head Group, and relate the occurrence of these to the depositional environments. The type locality at Table Point, western Newfoundland, is the basis for the study but other localities on the west coast of Newfoundland have also been investigated. A biostratigraphical analysis based on conodonts is also attempted.

865. SULEK, J.A., Imperial Oil Ltd. (Geological):  
Tertiary, Cretaceous, Jurassic and Triassic Foraminifera of the Beaufort, Arctic and East Coast areas, 1975-.

866. TAYLOR, M.E., LUDVIGSEN, R., FORTEY, R.A., Univ. Toronto (Geology):

Early Paleozoic trilobite biofacies, 1975-.

Late Cambrian, Early Ordovician and Middle Ordovician trilobites from warm climatic regions can be divided into as many as four parallel benthic biofacies that are related to habitats ranging from shallow shelf to deeper water slope. In general, shallow shelf trilobite faunas were mainly stenogeographic, eurytopic, and thermophilic, whereas slope faunas were mainly eurygeographic, stenotopic, and cryophilic. These ecologic/biogeographic characteristics of shelf-to-slope biofacies parallel those shown by living marine isopod crustaceans and suggest that actualistic models can be used to interpret trilobite distributional patterns. Through the Early Paleozoic, greatest phyletic continuity was maintained between deeper water habitats. Periodic high extinction rates are shown by shallow shelf faunas. Following extinctions, recolonization of the shallow shelf was accomplished by lineages previously adapted to deeper water habitats.

867. TELFORD, P.G., VON BITTER, P.H., TARRANT, G.A., Ontario Geol. Surv., Royal Ontario Mus. (Invert. Palaeo.), Univ. Waterloo (Earth Sciences):  
Lower-Middle Devonian conodont biostratigraphy and palaeontology, Niagara Peninsula, Ontario, 1973-77; B.Sc. thesis (Tarrant).
- See:  
Lower-Middle Devonian conodont biostratigraphy and palaeoecology, Niagara Peninsula, Ontario; Royal Ontario Mus. Occ. Paper, no. 30, p. 1-16, 1977.
868. TOZER, E.T., Geol. Surv. Can.:  
Canadian Triassic Ammonoidea and Bivalvia, 1967-.
869. UYENO, T.T., Geol. Surv. Can.:  
Conodont biostratigraphy of Upper Ordovician to Devonian rocks of the Arctic Islands, 1968-.
- See:  
Subsurface stratigraphy, conodont zonation, and organic metamorphism of the Lower Paleozoic succession, Bjerne Peninsula, Ellesmere Island, District of Franklin; Can. Geol. Surv., Paper 78-1A, p. 393-398, 1978.
870. VERMA, H.M., WESTERMANN, G.E.G., Ontario Geol. Surv., Royal Ontario Mus. (Invert. Palaeo.), McMaster Univ. (Geology):  
New Upper Jurassic (Lower Tithonian) ammonites of the neighbourhood of Mombasa, Kenya and their paleobiogeographic significance, 1974-78.  
  
Systematics of the fauna including description of all the species is completed with manuscript in final stage. Some surprisingly close biogeographic affinities to the Middle East are established.
871. VERVLOET, C.C., PETRACCA, A.N., Gulf Oil Canada Ltd. (Geological Serv.):  
Biostratigraphical investigations in the Frontier area.  
  
Biostratigraphy of Imperial IOE et al Isserk E-27 (Beaufort Sea) and biostratigraphy of several (yet undisclosed) wells in the Arctic Islands and Labrador offshore area.
872. VILKS, G., Geol. Surv. Can.:  
Micropaleontology of unconsolidated sediments on the Labrador continental shelf and slope, 1973-.
873. VON BITTER, P.H., GEBERL, H.A., Royal Ontario Mus. (Invert. Palaeo.):  
Palaeoecology and biostratigraphy of Lower Carboniferous (Windsor and Codroy Groups) conodonts, Atlantic Provinces, Canada, 1971-80.
874. VON BITTER, P.H., HECKEL, P.H., Royal Ontario Mus. (Invert. Palaeo.), Univ. Iowa (Geology):  
Identification and correlation of the "Core" shales of Pennsylvanian cyclothems using conodonts, Nebraska and Iowa, U.S.A., 1977-78.
875. VON BITTER, P.H., LUDVIGSEN, R., Royal Ontario Mus. (Invert. Palaeo.), Univ. Toronto (Geology):  
Revision of the acrotretid brachiopod *Opsiconidion* from the Devonian of North America, 1977-78.
876. VON BITTER, P.H., MERRILL, G.K., Royal Ontario Mus. (Invert. Palaeo.), College of Charleston (Geology):  
Conodont distributions in the Pennsylvanian of North America - their taxonomic and palaeoecologic implications, 1968-.
- See:  
Neogondolelliform conodonts of Early and Middle Pennsylvanian age; Royal Ontario Mus. Occ. Paper, no. 29, p. 1-12, 1977.  
  
Apparatus of the Pennsylvanian conodont genus *Neognathodus*; Royal Ontario Mus. Life Sci. Contrib., no. 112, p. 1-22, 1977.
877. WADDINGTON, J.B., Royal Ontario Mus. (Invert. Palaeo.):  
Silicified Permian gastropods from Khao Phrik, Thailand, 1970-79.
878. WADDINGTON, J.B., RUDKIN, D.M., Royal Ontario Mus. (Invert. Palaeo.):  
Investigation of an unusual Middle Ordovician community-substrate relationship at Gamebridge, Ontario, 1977-78.
879. WALL, J.H., Geol. Surv. Can.:  
Reconnaissance of Mesozoic Foraminifera of Arctic Islands, 1972-.
880. WESTERMANN, G.E.G., RICCARDI, A.C., McMaster Univ. (Geology), Museo La Plata Argentina:  
Middle Jurassic ammonoid fauna and biochronology of the Argentine-Chilean Andes, Parts III and IV: Stephanocerataceae and other Superfamilies, 1976-78.  
  
Part III includes particularly the taxonomy and biostratigraphy of the eastern Pacific Eurycephalinae and of a newly named genus of the same subfamily (group of "*Indocephalites*" *gerthi* Spath). Part IV will include the Perisphinctaceae which are so essential for the global correlation of the eastern Pacific succession and the Haplocerataceae, Lytoceratina and Phylloceratina. Bathonian is very probably present but difficult to establish beyond doubt.
881. WESTERMANN, G.E.G., SATO, T., SKWARKO, S., McMaster Univ. (Geology):  
Jurassic ammonite fauna of Sula Islands and New Guinea, Indonesia and Papua-New Guinea, 1976-80.  
  
The classic ammonite localities in the Sula Islands in the Moluccas are reexamined with emphasis on lithic and faunal succession and correlation. These are the best ammonite sections in Indonesia and possibly, southeast Asia and promise to serve as key sections for a much needed standard zonal sequence of the entire faunal superprovince. In contrast to the New Guinean faunas, the Sula faunas occurs in situ and thus permit taxonomic revision.
882. WESTROP, S., LUDVIGSEN, R., Univ. Toronto (Geology):  
Systematics and paleoecology of Ordovician trilobites from the Red River Formation of Southern Manitoba, 1977-79; M.Sc. thesis (Westrop).

A large and surprisingly diverse fauna of 15 genera of trilobites has been obtained from the mottled dolomitic limestones of the Selkirk Member of the Red River Formation exposed in the Garson quarries of southern Manitoba. The carbonate petrology of the Selkirk Member (Tyndall Stone) and the systematics, age, and paleoecologic significance of the Selkirk trilobites will be investigated.

883. WIGINGTON, R.J.S., LENZ, A.C., Univ. Western Ontario (Geology):  
Age and orthid fauna of the Whittaker Formation, 1975-77; M.Sc. thesis (Wigington).

884. WILSON, M.V.H., Univ. Alberta (Zoology):  
Paleogene insects of Western North America, 1975-.

See:

New records of insect families from the freshwater Middle Eocene of British Columbia; Can. J. Earth Sci., v. 14, no. 5; p. 1139-1155, 1977.

Completion of summary of British Columbia Eocene insect fauna and of North American Paleogene insect faunas and their significance. Continued collecting especially in British Columbia Eocene and Alberta Paleocene planned.

VERTEBRATE

885. BELAND, P., RUSSELL, D.A., National Mus. Nat. Sci. (Paleobiology Div.):  
Paleoecology of dinosaur communities, 1976-79.

Comparative analysis of the trophic dynamics of large vertebrate faunas (Tertiary mammals, Recent mammals, Cretaceous dinosaurs) indicate that large dinosaurs were ectothermic. Dynamics of Mesozoic dinosaur communities (e.g., Oldman Formation, Alberta; Tendaguru Hill, Tanzania) are being studied in the light of recent field work.

886. DINELEY, D.L., LOEFFLER, E.J., BERNACSEK, G.M., Univ. Bristol (Geology):  
Studies of Canadian ostracoderm faunas, 1965-.

See:

New Acanthodians from the Delorme Formation (Lower Devonian) of the Northwest Territories, Canada; Palaeontographica, Abt. A, v. 158, p. 1-25, 1977.

Ostracoderm faunas from the Peel Sound and earlier formations in the Arctic lowlands are being further studied. The description of new taxa is proceeding well and biostratigraphic data is being assessed. Forms under scrutiny include Cyathaspididae, Pteraspidae and Osteostraci: **incertal sedis** material is also being described. The functional anatomy, modes of life and palaeoecology of the taxa present are being investigated. Aspects of Siluro-Devonian vertebrate biogeography are under consideration. Description of all available Delorme faunas is complete and now published.

887. EDMUND, A.G., Royal Ontario Mus. (Vert. Palaeo.):  
Morphology, systematics and evolution of Giant Armadillos (Pampatheriinae, Mammalia), 1961-80.

Identification of a chronocline of chlamytheres in Florida, leading from the Early Pleistocene genus **Kraglievichia** to the Rancholabrean **Holmesina** suggests an evolution in that area, rather than a full-blown immigration from South America. Discovery of a large form from Kansas has dramatically increased the known range. Many additional specimens from Florida, Texas and elsewhere add to the body of data awaiting analysis.

888. EDMUND, A.G., Royal Ontario Mus. (Vert. Palaeo.):  
Morphology, systematics and evolution of the genus **Eremotherium** (Xenarthra, Mammalia), 1961-81.

Recent discoveries of unusually well-preserved individuals in Florida and Nicaragua, as well as the recognition of possibly two unexpected North American new taxa have delayed the compiling and analysis of results. Remains of at least six individuals of one species at Daytona Beach will permit detailed monographic study of this species and the mounting of two articulated skeletons. Data collecting and analysis of this and other batches of new bones is continuing.

889. EDMUND, A.G., Royal Ontario Museum (Vert. Palaeo.):  
Review of the Giant Armadillos (Pampatheriidae) of North America; 1970-79.

Most of the giant armadillos of North America can be derived from a Blancan (lowest Pleistocene) immigrant, recently named **Kraglievichia floridanus**. There is a gradual increase in size and minor changes in morphology which continued until the animal's extinction at the end of the Pleistocene. A second phyletic line, probably of later derivation, has been recognized from Texas and Mexico, but never east of the Mississippi.

890. EDMUND, A.G., Royal Ontario Museum (Vert. Palaeo.):

Osteology and occurrence of the Giant Ground Sloth **Eremotherium** (Xenarthra, Mammalia) from the Pleistocene of Daytona Beach Florida, 1970-85.

Recent field work has produced the scattered but well-preserved remains of several individuals of **Eremotherium**, possibly of the Irvintonian land mammal stage. This sample, the best of its kind, is providing all data required for a complete skeleton is being assembled. At the same time, comparison with other North American specimens reveals that there may be three or more species, whereas previously only one was recognized.

891. EDMUND, A.G., Royal Ontario Mus. (Vert. Palaeo.):  
Investigation of Pleistocene vertebrate fossil localities, their dating and relation to surrounding marine sediments, 1972-.

Numerous pond and channel deposits in Northeastern and Southwestern Florida are producing large and varied faunas, probably representing Blancan, Irvintonian and Rancholabrean land mammal stages. These have

- been difficult to date, but recent correlations with underlying and overlying sediments of Tamiami, Caloosahatchee and Fort Thompson Formations promise at least good relative dates. Identification of suites of vertebrate and invertebrate fossils and intensive mapping of dredged sites in the Port Charlotte areas continues.
892. EDMUND, A.G., Royal Ontario Museum (Vert. Palaeo.):  
Description of a giant armadillo *Holmesina* from the Pleistocene of Kanopolis, Kansas, 1975-78.  
The discovery of a badly fragmented but otherwise well preserved skull and mandible of a giant armadillo in central Kansas by the late Professor Hibbard of the University of Michigan greatly extended northward the range of this usually coastal and semitropical animal. It proved to be closely related to forms from Florida derived from a Blanchan immigrant, and is identified as *Holmesina septentrionalis*.
893. ELLIOTT, D.K., DINELEY, D.L., Univ. Bristol (Geology):  
Siluro-Devonian vertebrates from Arctic Canada, 1974-78; PH.D. thesis (Elliott).  
Several species of cyathaspidids and pteraspids have been described and new discoveries of early small pteraspids demonstrate the possible origin of that family from small cyathaspidids. The sudden evolutionary radiation of the pteraspids in the Peel Sound and adjacent formations in the Arctic Lowlands is being studied.
894. HARRINGTON, C.R., FITZGERALD, G.R., POMEROY, M., THOMAS, C., National Mus. Nat. Sci. (Paleobiology Div.):  
Pleistocene vertebrates of the Yukon Territory, 1966-85.  
Marine vertebrates of the Champlain Sea, 1970-85.  
**See:**  
Marine mammals in the Champlain Sea and the Great Lakes; *Annals New York Acad. Sci.*, v. 288, p. 508-537, 1977.
895. RUSSELL, D.A., BELAND, P., DANIS, G.P.L., JARZEN, D.M., FOSTER, J.H., National Mus. Nat. Sci. (Paleobiology Div.):  
Cretaceous-Tertiary extinctions, 1972-80.  
**See:**  
Cretaceous-Tertiary extinctions and possible terrestrial and extraterrestrial causes; *Sylogus*, Nat. Mus. Nat. Sci. 12, 1977.  
The Cretaceous-Tertiary boundary in south-central Alberta - a reappraisal based on dinosaurian and microfloral extinctions; *Can. J. Earth Sci.*, vol. 15, no. 2, p. 284-292, 1978.  
The paleoecologic implications of the Cretaceous-Tertiary extinctions, and their chronostratigraphic duration are being investigated by means of paleomagnetic data. Samples from western Canada, Alabama, Denmark, France and New Zealand have been collected and are being analyzed for their microfossil and paleomagnetic content.
896. RUSSELL, L.S., Royal Ontario Mus. (Vert. Palaeo.):  
Tertiary mammals of Saskatchewan, 1954-.  
The Cretaceous - Tertiary transition in central Alberta, 1976-79.  
**See:**  
Tertiary mammals of Saskatchewan, Part IV: The Oligocene anthracotheres; *Royal Ont. Mus. Life Sci. Contrib.* 115, 1978.  
Research continues on the entelodont mammals.
897. SARJEANT, W.A.S., MOSSMAN, D.J., Univ. Saskatchewan (Geological Sciences):  
Vertebrate footprints from Mississippian and Pennsylvanian sediments of Nova Scotia - a historical review and the description of newly discovered forms, 1974-78.
898. SARJEANT, W.A.S., MOSSMAN, D.J., CURRIE, P., STRINGER, P., Univ. Saskatchewan (Geological Sciences), Alberta Prov. Mus., Univ. New Brunswick:  
Vertebrate footprints in the Carboniferous and Triassic rocks of the Maritime Provinces, 1976-80.  
**See:**  
Triassic reptile tracks in the Lepreau Formation, southern New Brunswick, Canada; *Can. J. Earth Sci.*, vol. 15, no. 4, p. 594-602, 1978.  
Work on Upper Carboniferous footprints from Nova Scotia is progressing steadily; type specimens in national collections are being examined and some will shortly be redescribed. Studies of Triassic tracks from New Brunswick have been completed. Further tracks from the Cretaceous of the Peace River Canyon, British Columbia, have been collected.
899. SKWARA-WOOLF, T., KUPSCH, W.O., Univ. Saskatchewan (Geology Sciences):  
Vertebrate paleontology of the Floral Formation, Saskatoon, Saskatchewan, 1975-78; M.Sc. thesis (Skwara-Woolf).  
Vertebrate fossils collected over two field seasons have been identified and described. Three extinct taxa have been recovered; of the extant taxa recovered three are no longer found in the Saskatoon area. Taxa that have been shown to be useful stratigraphic tools have been recovered but diagnostic elements are missing so they are still of limited value. Preliminary paleoecological interpretation indicates that the climate at the time the Floral Formation was deposited may have been drier and/or warmer than it is at present.
900. WELLSTEAD, C.F., CARROLL, R.L., McGill Univ. (Biology):  
Comparative and taxonomic study of the extinct amphibian families Lysorophidae and Molgophidae, 1977-80; Ph.D. thesis (Wellstead).  
The project will be an anatomical description and reconstruction of the lysorophid genera *Lysorophus* and *Cocytinus* and molgophid genera *Molgophis* and *Megamolgophis*. The planned comparative study of the musculature in extant amphibians should allow a reasonable reconstruction of the skull musculature of *Lysorophis* and a conclusion as to the probable kinesis of the skull. As the genera concerned are based on limited material originally, the results of the project may necessitate taxonomic revision.

901. WILSON, M.V.H., Univ. Alberta (Zoology):  
Paleogene freshwater fishes of Western North America, 1975-.
- See:**  
Middle Eocene freshwater fishes from British Columbia; Royal Ontario Mus. Life Sci. Contrib., no. 113, p. 1-61, 1977.  
Discovery of new Eocene fish faunas and localities in British Columbia and Washington State, and of Paleocene faunas in Paskapoo Formation of Alberta. Continued work in all these areas, with emphasis on systematic search for Paleocene faunas in Alberta.
902. WILSON, M.V.H., Univ. Alberta (Zoology):  
Cretaceous marine fishes of Western Canada, 1975-.
- Further work completed on Cretaceous fauna from Banks Island. Discovery of Cretaceous fishes in Bearpaw Formation of Alberta. Plan systematic search for additional Bearpaw fishes.
903. WILSON, M.V.H., Univ. Alberta (Zoology):  
Paleoecology of British Columbia Eocene freshwater sediments, 1975-79.
- PALEOBOTANY/PALYNOLOGY**
904. BARNETT, R.E., Royal Ontario Mus. (Invert. Palaeo.):  
Fossils of Ontario: the non-stromatolitic algae, 1977-79.
- To compile, collate and publish concise generic descriptions with plates and related data for all Precambrian and Lower Palaeozoic algae described from Ontario. This project does not include stromatolite forms which will be dealt with by a future study. Aimed at the non-specialist geologist and student who is unfamiliar with the fossil algae of Ontario.
905. BARSS, M.S., Geol. Surv. Can.:  
Palynological zonation of the Carboniferous and Permian rocks of Atlantic Provinces, Gulf of St. Lawrence and Northern Canada, 1968-.
906. BUJAK, J., Geol. Surv. Can.:  
Biostratigraphy and paleoecology (palynology) of Mesozoic and Cenozoic of the Atlantic Shelf, 1976-.
907. DORHOFER, G.G., Univ. Toronto (Geology):  
Principles of dinoflagellate cyst provincialism, 1976-78.
- Principles of dinoflagellate cyst provincialism have been elucidated from abundance data in the Cretaceous of the northern hemisphere and from comparative studies on extant dinoflagellate distribution patterns. Provinces are related to paleo-watermasses defined mainly by latitudinal temperature (climatic) gradients and also to specific ecological preferences of cyst taxa. They are further modified by paleo-currents. The distributional patterns were also linked to morphological and physiological characteristics of dinoflagellate cysts. A strong correlation of supra-generic groupings with cyst provinces favours a concept of evolution of earliest dinoflagellates from isolated high-latitude ancestral (acritarch?) communities.
908. DORHOFER, G.G., DAVIES, E.H., Univ. Toronto (Geology):  
Evolution of dinoflagellate cyst archeopyles: Evidence from the Jurassic and Lower Cretaceous of Arctic Canada and Germany, 1976-78; Ph.D. thesis (Davies).
- Jurassic to Lower Cretaceous dinoflagellate cysts from Arctic Canada and Germany demonstrate evolutionary lineages from a Late Triassic stock. These lineages have been traced in the development of tabulations and archeopyles. The tabulation evolved by fusion of plates to greater plate units from ancestral complex patterns, characterized by high and variable plate numbers to simplified ones. At the same time the protoplasm release openings (archeopyles) within the cysts became structurally simplified from disintegration types to several types (apical, intercalary, precingular) of definite cyst position. Archeopyle formation and evolution is related to a plate overlap scheme, in which plates overlap like shingles on a roof, the structure always being closed mid-dorsally (keystone plate), where all archeopyle types initiate.
909. DORHOFER, G.G., DAVIES, E.H., Univ. Toronto (Geology):  
Ultrastructure of early dinoflagellate cysts, 1977-78.
- In continuation of the research project on archeopyle evolution, ultrastructural (SEM) investigations are undertaken to reveal characteristics of earliest dinoflagellate cysts mainly from the Triassic-Lower Cretaceous of the Canadian Arctic. These throw light on early dinoflagellate evolution.
910. EDLUND, S.A., Geol. Surv. Can.:  
Vegetation distribution and relationships to surficial materials, Arctic Canada, 1976-.
911. HILLS, L.V., BRAMAN, D.R., TAN, T., BURDEN, E., SPEELMAN, H., JONES, W., GRANT-FRANCIS, D., SANGSTER, E., Univ. Calgary (Geology):  
Palynology and Pleistocene geology, stratigraphy, and sedimentation (multiple projects); Ph.D. theses (Braman, Tan, Burden, Speelman), M.Sc. theses (Jones, Grant-Francis).
- See:**  
Implications of coalification levels, Eureka Sound Formation, northeastern Arctic Canada; Can. J. Earth Sci., v. 14, no. 7, p. 1588-1597, 1977.  
Palynology and paleoecology of the Mattson Formation, northwest Canada; Bull. Can. Petrol. Geol., v. 25, no. 3, p. 631-634, 1977.  
Depositional environments, Foremost Formation (Late Cretaceous), Milk River area, southern Alberta; Bull. Can. Petrol. Geol., v. 25, no. 5, p. 929-968, 1977.
1. Devonian megaspore and miospore palynology - Imperial Formation and equivalents. Detailed sections will be measured and stratigraphy and sedimentation will be determined (Braman).
  2. Late Triassic - Lower Cretaceous dinoflagellate stratigraphy of the Sverdrup Basin. A detailed analysis of the taxonomy and stratigraphic distribution of dinoflagellates in the Sverdrup basin (Tan).

3. Palynology and paleoecology of the Foremost Formation, Milk River area, Alberta (Speelman).
4. Trace elements in coal. To determine heavy metals and trace elements in coal and their potential environmental hazard (Jones).
5. Avifauna skeletons. Description and differential diagnosis of bird skeletons from Arctic Canada. To aid in the identification of bird remains from archaeological sites in the Arctic (Grant-Francis).
6. Palynology and depositional environments of the McMurray Formation. To determine the distribution and composition of palynofloras within the McMurray Formation and to relate these to depositional environments as inferred from sedimentary structures (Burden).
7. Paleoclimates last 20,000 years (conducted in conjunction with the Nat. Mus. Can.). Currently Holocene samples from the Elk Valley are being examined for their palynological and faunal content. A compilation of Late Pleistocene-Holocene palynological publications for Canada is in progress (Hills).
8. Flora of the Beaufort Formation. Identification and age and climatic significance of fossil plants and palynomorphs from the Beaufort Formation are being made.
912. HOPKINS, W.S., Jr., Geol. Surv. Can.:  
A palynological study of the Shell Anglo Harlequin D-86, Murrelet L-15, Auklet G-14, and Osprey D-36 wells, offshore British Columbia, 1974-.
913. JANSONIUS, J., Imperial Oil Ltd. (Geological):  
Stratigraphic application of fungus spores, 1973-80.
914. JANSONIUS, J., HILLS, L.V., Imperial Oil Ltd. (Geological), Univ. Calgary (Geology):  
Genera file of fossil spores, 1965-.
- See:  
Genera file of fossil spores; Sp. Publ. Dept. Geol., Univ. Calgary, 1976; Supplement I, 1977; Supplement II, 1978.
915. JARZEN, D.M., National Mus. Nat. Sci. (Paleobiology Div.):  
Angiosperm evolution, paleoecology and paleobiogeography during the Upper Cretaceous and Lower Tertiary, 1973-.
- See:  
Angiosperm pollen as indicators of Cretaceous-Tertiary environments; Syllogeus, Nat. Mus. Sci. 12, p. 39-49, 1977.  
**Aquilapollenites** and some Santalalean genera; Grana, v. 16, p. 29-39, 1977.
916. KOBLUK, D.R., Univ. Toronto (Erindale - Earth and Planetary Sciences):  
Rates of infestation and erosion of carbonate substrates by boring algae in modern tropical reef environment, 1977-78.  
Installations consisting of numerous transparent crystals of Iceland spar calcite and aragonite were planted at 17 locations in depths down to 20 meters on the reef at Discovery Bay, Jamaica, West Indies. The locations represented a wide range of geologic environments, including reef sand channels, **Thalassia** beds, etc. One crystal was removed from each installation at 2 day intervals to provide a time series of the progression of infestation and carbonate breakdown by boring (endolithic) micro-filamentous algae.
917. LEGAULT, J.A., Univ. Waterloo (Earth Sciences):  
Palynology of the Upper Ordovician Red River, Stony Mountain and Stonewall Formations of Manitoba, 1977-81.  
A study of the palynomorphs (Chitinozoa, Acritarcha) of the Upper Ordovician Red River, Stony Mountain and Stonewall Formations of Manitoba has been undertaken. Eighty-two samples were taken from a 450-foot core, at five-foot intervals, with exact duplicate samples being retained for conodont studies. It is proposed to do 1) a taxonomic study of the palynomorphs present, 2) a biostratigraphic analysis of the microfloras, and 3) compare the palynofloras with the conodonts.
918. LEGAULT, J.A., Univ. Waterloo (Earth Sciences):  
Palynostratigraphy of the Road River Formation, Yukon, 1977-81.  
A study of the palynomorphs (Chitinozoa, Acritarcha, spores) of the Early Paleozoic (Cambrian?-Devonian) Road River Formation of the Yukon Territory and adjacent Northwest Territories, and of the Devonian Besa River Formation, British Columbia, has been undertaken. Material has been collected from the Peel River and Blackstone River areas, Yukon, from two continuous sections, 960 feet and 535 feet thick respectively, ranging from Ashgillian to Ludlovian. A further suite of 60 samples has been made available from a Devonian section at Royal Creek. The material is being prepared with a view to isolating conodonts, ostracods and palynomorphs.
919. LICHTI-FEDEROVICH, S., Geol. Surv. Can.:  
Diatom analysis and paleoecological studies of Quaternary sediments, 1972-.
920. MAMET, B.L., ROUX, A., SHALABY, H., Univ. Montréal (Géologie):  
Algues du Carbonifère et du Permien, Innuitiennes, 1977-79; thèse de doctorate (Shalaby).  
Voir:  
Algues rouges dévoniennes et carbonifères de la Téthys occidentale (partie 4); Revue de Micropaléontologie, v. 19, no. 4, p. 215-269, 1977.  
Etudes des Algues et formes associées rencontrées dans les Formations Borup Fiord, Otto Fiord et Nansen dans le Bassin de Sverdrup (Innuitiennes). Etude taxonomique de la microflore. Revision de la taxonomie des Dasycladacées et des Algues phylloides. A nouveau groupe de Microcodiacées est également à l'étude.
921. MCGREGOR, D.C., Geol. Surv. Can.:  
Silurian and Devonian spores of Canada, 1975-.
922. MOTT, R.J., Geol. Surv. Can.:  
Quaternary palynology, 1969-.

923. MUDIE, P.J., PIPER, D.J.W., COOKE, H.B.S., Dalhousie Univ. (Geology):  
 Palynological studies of Holocene marine sediments of Eastern Canada, 1976-78; Ph.D. thesis (Mudie).  
 Acid-resistant plant microfossils, e.g. pollen and dinoflagellate cysts, often comprise the most abundant and diverse microfossil assemblages in anoxic coastal bay and shelf basin sediments of eastern Canada where carbonate dissolution limits the interpretive value of calcareous microfossils. Studies are being carried out that aim to use pollen and dinocysts for determining 1) modern sedimentation rates, and 2) Holocene paleoecological events in these environments. Studies of transport-deposition processes controlling the composition, distribution and accumulation rates of the microfossils are nearing completion for selected coastal bays (Mahone and St. George's, Nova Scotia), fjord-type basins (Saguenay Fjord, Quebec and Bedford Basin, Nova Scotia) and an estuarine inlet (Chezzetcook, Nova Scotia). Paleoecological interpretation of 2 radiocarbon-dated cores from the central Labrador Shelf has been completed, providing a possible early post-glacial analogue for Nova Scotia shelf cores. Work is in progress to map the palynomorphs in surficial sediments along a transect across the central Nova Scotia shelf; these data will be used to investigate the transport-deposition processes governing the movement of fine sediment on the shelf and to interpret the Holocene paleoecological record in cores from Emerald Basin.
924. NORRIS, G., Univ. Toronto (Geology):  
 Taxonomy of Triassic-Quaternary dinoflagellate cysts.  
 Structural and functional considerations of dinoflagellates have identified tabulation and archeopyle types as key high-level taxonomic features. Wall separation, degree of contraction, and ornamentation are of less importance and have evolved repeatedly in response to environmental stress, leading to evolutionary convergence. Four sub-orders and 32 families of peridiniacean dinoflagellates have been recognized. The Triassic-Lower Jurassic taxa represent more primitive types of organization than the majority of later taxa.
925. NORRIS, G., Univ. Toronto (Geology):  
 Mesozoic palynology of the Moose River Basin, Ontario, 1976--.  
 Middle Jurassic and Albian palynofloras have been identified in the subsurface Mattagami Formation and Mistuskwia beds. Correlations within and outside the basin have been achieved and the age of the Onakawana Lignite has been determined as Albian. The spores and pollen are currently being described and illustrated. The assemblages show affinities with both western and northern Canada and with the Atlantic coastal plain.
926. NORRIS, G., ARTZNER, D., Univ. Toronto (Geology):  
 Palynology, paleoecology and biostratigraphy of the Upper Cretaceous Western Book Cliffs of east-central Utah (USA); Ph.D. thesis (Artzner).  
 Four lithologic sections, located between the towns of Price and Sunnyside (approx. 48 km apart), have yielded sufficient quantities of palynomorphs for study. The objectives, besides a detailed description of pollen, spore and dinoflagellate assemblages, will be to establish the variation in distribution of palynomorphs deposited within different sedimentary environments. Presently, approximately 100 species of dinoflagellates and 250 species of pollen and spores have been identified. These taxa suggest a Late Campanian age and are comparable with elements of the Upper Cretaceous floras from Western Canada, Australia, New Zealand and adjacent areas of the mid-continent of the United States.
927. NORRIS, G., DAVIES, E.H., Univ. Toronto (Geology):  
 Jurassic-Cretaceous stratigraphic palynology of the Sverdrup Basin, Arctic Canada; Ph.D. thesis (Davies).  
 Surface and subsurface sections of thick clastic sequences comprising the Jurassic and Lower Cretaceous (Savik to Deer Bay formations) distributed across the Sverdrup Basin have been analyzed in detail for marine and terrestrial palynofloras. Rich assemblages of dinoflagellates and miospores have allowed correlations employing both graphical chronozones and Opelzones. Basinal evolution, paleogeography and paleoecology are examined in terms of palynostratigraphy. Age determination derived from palynomorphs are compared to those from macrofossils.
928. NORRIS, G., FASOLA, A., Univ. Toronto (Geology):  
 Palynology of the Upper Cretaceous of Manitoba; PH.D. thesis (Fasola).  
 The palynological content of the Cenomanian-Senonian of the Manitoba Escarpment area is being studied in order to establish a stratigraphic zonation and determine the influence of floral provincialization on the Late Cretaceous palynofloras of the mid-continent. Nearly 250 species of pollen, spores and dinoflagellates have been identified so far from the area of southern Manitoba west of Morden. The dinoflagellates suggest a Cenomanian age for the lower part of the sequence and a Santonian age for the upper part. They show relations with assemblages described previously from Saskatchewan, Alberta, Arctic Canada and Siberia.
929. NORRIS, G., POPLAWSKI, S., Univ. Toronto (Geology):  
 Late Cretaceous-early Tertiary dinoflagellates from Alabama; Ph.D. thesis (Poplawski).  
 Several sections from the Upper Maastrichtian Prairie Bluff Chalk and Lower Tertiary Clayton Formation have been collected and examined for palynomorphs. Dinoflagellates are common and well preserved in many samples. Preliminary analysis suggests dominance of chorate cysts in the Upper Cretaceous, with proximate cysts becoming more common in the Lower Tertiary. The Cretaceous-Tertiary boundary is marked by an interval containing abundant terrestrial palynomorphs. Current work is refining taxonomy and ranges of dinoflagellate cysts.

930. OGDEN, J.G., BUJAK, A., Dalhousie Univ. (Biology): Vegetational and climatic history of the Parrsboro, Nova Scotia Area, 1977-79.

See:

Pollen analysis: State of the Art; Geogr. phys. Quat., v. 31, nos. 1-2, p. 151-159, 1977.

Gilbert and Leak Lakes are in an area suspected of being at the margin of the last ice advance of the Wisconsinan period. Gilbert Lake is a compound kettle whose southern end is held up by a terminal moraine bridging the valley of the Parrsboro River. Leak Lake is a kettle at the very head of delta deposits formed during the late-Glacial transgression of the Bay of Fundy. Sediment cores have been raised from both lakes and pollen analysis and radiocarbon stratigraphy are continuing. The watershed: lake surface area ratio of Gilbert Lake is 55, resulting in a rapid flushing rate (ca 10 times per year), and rapid sedimentation (9 m of sediment in 6000 years). Future plans include resampling both lakes, and investigation of two or three kettles at lower elevations on the delta.

931. POCOCK, S.A.J., Imperial Oil Ltd. (Geological): Jurassic and Cretaceous palynology, 1957-.

9932. SARJEANT, W.A.S., FENSOME, R.A., WHEELER, J.W., Univ. Saskatchewan (Geological Sciences):

Dinoflagellates and acritarchs in the Mesozoic; stratigraphical application in Western and Arctic Canada and use in intercontinental correlation, 1962-.

See:

A note on the age of some Kimmeridgian dinoflagellate cyst and acritarch assemblages from the Boulonnais, northern France; Rev. Micropaleontology, vol. 20, no. 1, p. 49-52, 1978.

The Jurassic dinoflagellate genus *Stephanelytron*: emendation and discussion; Micropaleontology, vol. 23, no. 3, p. 330-338, 1977.

Work has continued on the British type-section of the Jurassic and taxonomic restudy of European holotype specimens of dinoflagellate cysts. The preparation of sequences from Algeria has yielded dinoflagellate cysts in quantity only at one stratigraphical level; examination of this material will shortly commence. R.A. Fensome is now investigating spore and pollen assemblages from the Jurassic of the Yukon and Northwest Territories, and J.W. Wheeler has begun the study of late Jurassic to early Cretaceous dinoflagellate cysts from the Alborz Mountains, Iran.

933. SINGH, C., Alberta Research Council (Geology Div.): Cenomanian microfloras of the Peace River district, Alberta, 1969-78.

Detailed scanning of slides for recording the stratigraphic distribution of the microfloral species in the upper Shaftesbury, Dunvegan and lower Kaskapau formations has been completed. Distribution charts of the microspore, pollen, megaspore and microplankton species in the above units have been prepared. A report on an exclusively Cenomanian microfloral assemblage consisting of about 150 species is being currently compiled.

934. SINGH, C., Alberta Research Council (Geology Div.): Late Cretaceous-Tertiary microfloras, west-central Alberta, 1970-78.

935. SINGH, C., Alberta Research Council (Geology Div.): Palynological study of the coal-bearing Late Cretaceous strata in the Red Deer River Valley, Alberta, 1973-84.

The microfloral characteristics helpful in distinguishing between the Nevis and Ardley seams have been established and stratigraphic distribution of megaspore genera is currently being recorded.

936. STAPLIN, F.L., Imperial Oil Ltd. (Geological): Palynological correlation and ages of Triassic strata, Arctic Island, Northwest Territories, 1975-79.

937. SWEET, A.R., Geol. Surv. Can.: Palynological studies of Mesozoic and Tertiary coal measures in western and northern Canada, 1971-.

938. SWEET, A.R., Geol. Surv. Can.: Palynological study of the Tertiary coals and associated clastic rocks of the Ravenscrag and Frenchman formations, Saskatchewan, 1973-.

939. SWEET, A.R., Geol. Surv. Can.: Taxonomy and biostratigraphic distribution of Mesozoic and Paleogene megaspores, 1977-.

940. THANAIKAIMONI, G., POCOCK, S., French Inst., Pondicherry, India, Imperial Oil Ltd. (Geological): External pollen morphology and degradation of the pollen wall resulting from normal processing procedures, 1977-79.

941. UTTING, J., INRS-Pétrole, Univ. Québec: Palynological zonation of the Windsor Group (Mississippian) of Nova Scotia, 1976-77.

See:

Palynological investigation of the Windsor Group (Mississippian) of Port Hood Island and other localities on Cape Breton Island, Nova Scotia; Geol. Surv. Can., Paper 78-1A, p. 205-207, 1978.

Samples investigated from the Windsor Group of Port Hood Island are dominated by *Rugospora minuta*, *Crassispora trychera*, *Crassispora* sp. A, *Crassispora* sp. B, *Retusotriletes incohatus* and *Punctatisporites planus*. Most of the taxa recorded have a vertical distribution extending from the lower part of the macro-faunal sub-zone B to the top of sub-zone D (sub-zone 'A' is not exposed and outcrop of sub-zone E is limited), certain rare forms however, appear for the first time near the base of the Upper Windsor (sub-zone C); these include *Schopfipollenites ellipsoides*, *Acanthotriletes* sp. A, *Spelaeotriletes* sp. D, *Discernisporites* sp. A and *Knoxisporites triradiatus*. Thus two assemblage zones may be recognised, Assemblage zone I occurring in sub-zone B and Assemblage zone II in sub-zones C and D. Evidence from other localities suggests that Assemblage zone I may extend into sub-zone 'A', there-by implying that the former occurs either in beds older than sub-zone B or in sediments which are in part a lateral facies equivalent to sub-zone B. Assemblages generally similar to Assemblage

- zone II occur in beds thought to be from sub-zone E? in the Lake Enon area, but differ in that they contain in addition *Grandispora spinosa* and *Schulzospora* cf. *S. elongata*. Tentative correlation with the British Viséan suggests that the Lower Windsor assemblages are probably not older than the upper part of the Upper *Caninia* (C<sub>2</sub>S<sub>1</sub>) zone and not younger than the Lower *Dibunophyllum* (D<sub>1</sub>) zone whereas the Upper Windsor is not older than the Lower *Dibunophyllum* zone (D<sub>1</sub>) and not younger than the Upper *Posidonia* (P<sub>2</sub>) zone.
942. UTTING, J., INRS-Pétrole, Univ. Québec:  
Palynostratigraphic investigation of Upper Palaeozoic and Triassic rocks of Arctic Canada, 1976-79.  
So far investigated are samples from the Yukon and presently being studied are samples from the Permian rocks of the Panarctic et al Drake Point D-68 well.
943. UTTING, J., INRS-Pétrole, Univ. Québec:  
Palynological investigation of the Windsor Group in a borehole at Stewiacke, Nova Scotia, 1977-78.
944. UTTING, J., INRS-Pétrole, Univ. Québec:  
Study of lowermost Mesozoic and uppermost Palaeozoic cuttings and cores from wells in Franklin District, 1977-78.  
To locate more accurately the Permian/Triassic boundary in five boreholes in the Franklin District.
945. UTTING, J., INRS-Pétrole, Univ. Québec:  
Palynological investigation of Upper Palaeozoic rocks in Eastern Canada, 1977-.
- Palynological study of Windsor Group on a regional scale. So far localities have been sampled from the Magdalen Islands, Québec, eastern New Brunswick, southwestern Newfoundland and various localities in Nova Scotia.
946. WILLIAMS, G.L., Geol. Surv. Can.:  
Classification of dinocysts, 1973-.
947. WILSON, M.A., KUPSCH, W.O., Univ. Saskatchewan (Geological Sciences):  
Climatic and vegetational history of central Saskatchewan, 1977-79; Ph.D. thesis (Wilson).  
To provide an interpretation of the vegetation existing in central Saskatchewan since the retreat of the last, or Wisconsin, ice sheet. In this vicinity the retreat can be radiocarbon dated at about 8,250 ± years before present. From the vegetation it will be possible to provide an interpretation of the climatic conditions prevailing from this time to the present. In 1977 approximately seventy sediment samples were obtained from the Saskatchewan Research Council, containing material from Glacial Lake Agassiz and the overlying organic deposits. Many of the peat samples had been radiocarbon dated making them valuable stratigraphically. Unfortunately, when the samples were processed, the Glacial Lake Agassiz clays and silts contained almost no spores, pollen, or siliceous microfossils. The peats, although they do contain spores and pollen, do not constitute a workable project on their own. Accordingly, attention was turned to the lakes in central Saskatchewan and samples from three small lakes in the La Ronge region were collected. It is planned to extend the area of study by sampling lakes along the Hanson Lake road during the summer of 1978. The project includes a study of the spores and pollen which will reveal a generalized picture of the vegetation existing through time in the vicinity of the lake. Diatoms, or siliceous microfossils, will also be sampled to check the results obtained from the pollen and spores.

## PETROLOGY

### EXPERIMENTAL

948. BEAUMONT, C., RIVE, M., CHENEVOY, M., Québec Min. Richesses Naturelles:  
Etude pétrographique, géochimique et géochronologique du batholite trondhjémite de Latulipe, comté de Témiscamisque, Québec, 1977-; thèse de doctorate (Beaumont).  
Cartographie au 1:125 000 du batholite de trondhjémite de Latulipe qui avait été confondu autrefois avec les roches intrusives à chimisme potassique de la région de Ville-Marie et du lac Simard. Ce projet continue avec l'étude d'un complexe de gneiss quartzofeldspathiques dans la même région et prendra fin en Mai 1979.
949. EDGAR, A.D., CONDLIFFE, E., Univ. Western Ontario (Geology):  
Investigations of phase relations in K-rich mafic undersaturated lavas under mixed volatile (H<sub>2</sub>O and CO<sub>2</sub>) up to 35 kb total pressure, 1974-78.
950. EDGAR, A.D., CONDLIFFE, E., Univ. Western Ontario (Geology):  
The non-stoichiometry of analcime and phase relations of analcime under conditions of P<sub>H<sub>2</sub>O</sub> < P<sub>total</sub>, 1977-78.

951. FAWCETT, J.J., Univ. Toronto (Geology):  
The stability of chlorite with  $P_{\text{H}_2\text{O}} < P_{\text{total}}$ , 1977-  
Reduction of the upper thermal stability of hydrous minerals under conditions of  $P_{\text{H}_2\text{O}} < P_{\text{total}}$  is well known but experimental studies under such conditions have not yet been conducted on the chlorite mineral group. As the most common chlorite occurrences (greenschist facies) are usually associated with carbonates indicating  $P_{\text{H}_2\text{O}}$  below  $P_{\text{fluid}}$ , we have begun investigations of Mg chlorite stability using  $\text{H}_2\text{O}-\text{CO}_2$  buffers developed by Holloway et al. (1968). Preliminary experiments have been carried out on the clinocllore composition at  $P_{\text{total}} = 2\text{Kb}$ . The dehydration reaction has been traced to temperatures as low as  $640^\circ\text{C}$ . Redesign of closures for an internally heated pressure vessel has been carried out in order to study these reactions at the 5-10 Kb range.
952. GITTINS, J., Univ Toronto (Geology):  
Phase equilibrium studies applied to the petrogenesis of carbonatite complexes, 1974-.
953. KRAG, P., ANDERSON, G.M., Univ. Toronto (Geology):  
Alkali diffusion in hydrous silicate melts of alkali feldspar composition, 1975-78; M.Sc. thesis (Krag).  
Diffusion coefficients of Na and K in liquids of Ab-Or composition with 7%  $\text{H}_2\text{O}$  are investigated by microprobe analysis of diffusion couples.
954. McTAGGART, K.C., Univ. British Columbia (Geological Sciences):  
Origin of intrusive-looking hornblendites, 1977-79.
955. ROEDER, P.L., DIXON, J.M., CAMPBELL, I., JAMIESON, H., GRANT, A., THORNER, C., Queen's Univ. (Geological Sciences):  
Experimental study of basalts; M.Sc. and Ph.D. theses.  
Four experimental projects concerned with basaltic liquids are under study. The floating tendency of plagioclase in basaltic liquids has been determined using a centrifuge furnace. Plagioclase has a floating tendency of 0.03 gm/cc greater than calculated using published molar volume data. The ferric-ferrous ratio has been determined for a series of basaltic liquids which have been equilibrated under controlled oxygen fugacities. The ferric-ferrous ratio increases with increasing alkalis, being most sensitive to potassium and then sodium. The olivine-chromite equilibria has been studied experimentally and the magnesium-ferrous iron distribution has been determined for some natural samples as a function of temperature. A new equation relating the temperature and composition of olivine and chromite is proposed. Experiments using three Archean-basalts have shown that plagioclase is the first phase on the liquidus and that olivine is unlikely to have been involved in the differentiation of these basalts.
956. SCARFE, C.M., Univ. Alberta (Geology):  
Geochemical and geophysical properties of rocks and magmas at elevated temperatures and pressures, 1976-79.  
**See:**  
Viscosity of a pantellerite melt at one atmosphere; *Can. Mineral.*, v. 15, p. 185-189, 1977.  
Viscosity of some basaltic glasses at one atmosphere; *ibid.*, p. 190-194, 1977.  
Physics and chemistry of silicate melts and magmas; *ibid.*, p. 133-202, 1977.
957. TURNOCK, A.C., Univ. Manitoba (Earth Sciences):  
Melting relations of Ca-Mg-Fe pyroxenes, 1970-78.  
The experimental determination of the solidus and liquidus surfaces of Ca-Mg-Fe pyroxenes at atmospheric pressure (and oxygen fugacity of the Fe-FeO buffer) is nearly completed, and diagrams of these surfaces and isothermal sections have been constructed.

IGNEOUS

958. ARMBRUST, G.A., Univ. Ottawa (Geology):  
Petrology, geochemistry and structure of the Certac disseminated copper deposits, northwestern Québec, 1977-79.  
The Certac prospect is located in the batholithic complex along the southern margin of the greenstone belt in Le Tac Township, Québec - to study the mineralization, alteration, structure and geochemistry of the area, and compare the prospect with Phanerozoic porphyry copper deposits.
959. ARNDT, N.T., FLEET, M.E., Univ. Saskatchewan (Geological Sciences), Univ. Western Ontario (Geology):  
Crystallization of thick komatiite lava flows, 1976-78.  
**See:**  
Thick, layered peridotite-gabbro lava flows in Munro Township, Ontario; *Can. J. Earth Sci.*, v. 14, p. 2620-2637, 1977.  
The principal features of two layered komatiite lava flows in Munro and Dundonald Townships, northeast Ontario, are known from earlier investigations. These flows appear to have differentiated, following eruption as highly basic liquids, into ultramafic flow top and cumulate zones, and in one flow, a central quartz-normative gabbroic zone. Preserved in each flow is a detailed record of the fractional crystallization of a komatiitic liquid under two cooling regimes: rapid cooling in the flow top zones, and slower cooling in the cumulate zones. This record differs from the crystallization sequence that would be predicted from experimental results in that pyroxene appears to crystallize anomalously early in the lavas. To test several possible explanations of this discrepancy (alteration of the lavas, accumulation of pigeonite in spinifex textured lava, and unusual effects associated with crystallization in the rapid cooling regime), samples collected from detailed traverses across both flows will be studied petrographically and with the electron microprobe. Particular emphasis will be placed on the compositions and structures of pyroxenes in the two cooling regimes.

960. ARNDT, N.T., MARSH, B.D., Univ. Saskatchewan (Geological Sciences), John Hopkins Univ.: Separation of silicate liquids from partially molten source rocks, 1976-78.

See:

Ultrabasic magmas and high-degree melting of the mantle; *Contrib. Mineral Petrol.*, v. 64, p. 205-221, 1977.

An important factor in any explanation of ultrabasic magma formation is the degree of melting that a mantle source rock can sustain before the partial melt escapes from the region of melting. Trace element abundances in ultramafic komatiites have been used to predict that at least 60 to 80% melting of a pyrolite source must have been involved in their formation, but preliminary experimental results indicate that most magmas probably separate from their mantle sources at less than 40% melting. This apparent discrepancy, together with the light REE depleted characteristics of some komatiites, has led to the suggestion that at least two melting episodes are involved in ultrabasic magma formation. It is proposed that the separation of silicate liquids be studied experimentally in a systematic way using a development of techniques described by Arndt in 1977. Using peridotitic komatiite as starting material, experiments will be carried out in a one atmosphere quenching furnace mounted in a centrifuge at P.L. Roeder's laboratory, Queen's University. The separation of liquids will be studied at high degrees of melting when crystal settling is the dominant separation mechanism, and at lower degrees of melting when grain distortion and intergrain diffusion are the rate-controlling factors. From the experimental results, expressions will be derived that relate the liquid separation rate to factors such as the degree of melting, grain size, source mineralogy and liquid composition. These data will then be used to model magma segregation in the mantle.

961. ARTH, J., ARNDT, N.T., NALDRETT, A.J., U.S. Geol. Surv., Univ. Toronto (Physics), Univ. Toronto (Geology): Rare earth elements in komatiites and tholeiites of Munro Township and a model for their genesis, 1971-77.

See:

Komatiitic and tholeiitic lavas of Munro Township, Ontario: Their field, petrographic and chemical characteristics; *J. Petrol.*, v. 18, p. 319-369, 1977.

Genesis of Archean komatiites from Munro Township, Ontario - trace-element evidence; *Geology*, v. 5, p. 319-369, 1977.

Field and major element studies in Munro Township have suggested that komatiites are the result of the melting of a mantle source that has already undergone an earlier stage of melting. Their very magnesian nature, high Ni and Cr and low Ti and Mg/Fe ratio are explicable in this way. This study of REE, Sc, Ba, Sr, and RC is providing confirmatory evidence of this hypothesis.

962. AYER, J.A., MOORE, J.M., Jr., Carleton Univ. (Geology): The Mazinaw volcanic complex, Barrier Township, eastern Ontario, 1976-79; M.Sc. thesis (Ayer).

A field, petrographic and chemical study of a calc-alkali volcanic centre of Helikian age (ca. 1250Ma) in the Grenville Province. It rests on a thick tholeiitic succession (Tudor formation) and comprises andesite and dacite flows and pyroclastics, with synvolcanic intrusions of comparable composition. Potassic hydrothermal alteration and copper mineralization are associated. The complex is overlain by a thick carbonate succession. It is isoclinally folded and metamorphosed in lower amphibolite facies.

963. AYRES, L.D., Univ. Manitoba (Earth Sciences): Setting Net Lake porphyry molybdenum deposit, northwestern Ontario, 1972-80.

An extensive zone of subeconomic, porphyry-type molybdenite mineralization occurs in a small subvolcanic, porphyritic granodiorite-quartz monzonite stock in the Favourable Lake volcanic complex. Petrographic and geochemical studies are in progress to better document alteration associated with mineralization.

964. BALD, R.C.M., AYRES, L.D., Univ. Manitoba (Earth Sciences):

Petrography and geochemistry of basement trondhjemite, Lake of the Woods area, Ontario, 1977-79; M.Sc. thesis (Bald).

In Gundy Township, a deformed and metamorphosed trondhjemite is in apparent fault contact with the northern margin of the Lake of the Woods greenstone belt. The trondhjemite is part of an old pluton that comprised several intrusive phases, all of which were intruded by deformed and metamorphosed basaltic dikes. The intensity of deformation and metamorphism of the trondhjemite is comparable to that in the adjacent greenstone belt, but is much stronger than in the younger granitic batholiths that elsewhere form the margin of the greenstone belt. This suggests that the trondhjemite may have been basement upon which volcanoes of the greenstone belt developed. Petrographic and geochemical studies, including isotopic dating, are in progress.

965. BARAGAR, W.R.A., Geol. Surv. Can.: Volcanic stratigraphy and geochemistry of the Cape Smith belt, near Quebec, 1973-.

966. BARR, S.M., MACDONALD, A.S., Acadia Univ. (Geology):

Carboniferous-Triassic mafic and ultramafic rocks in Thailand: their petrology, geochemistry, and tectonic significance, 1975-79.

967. BARR, S.M., MACDONALD, A.S., BERRANGE, J.P., HAILE, N.S., Acadia Univ. (Geology):

Petrography, geochemistry, age and tectonic significance of gem-bearing alkaline basalts of Southeast Asia, 1974-78.

To characterize gem-bearing basalts as compared to non-gem-bearing basalts in southeast Asia, using petrography, geochemistry, age, and

- palaeomagnetism, and thus to outline possible new gem sources; to interpret the tectonic significance of this continental volcanic province; and to improve understanding of the origin of gems in basalts. Trace element geochemistry, and fission track and K-Ar age dating are continuing. Major element analyses are completed and published for Thailand, and compilation of petrologic and palaeomagnetic data for all of southeast Asia is nearing completion.
968. BARR, S.M., WHITE, C.A., TRAPASSO, L.S., Acadia Univ. (Geology):  
Petrography and geochemistry of mafic intrusions in Lower Palaeozoic metamorphic rocks of western Nova Scotia, 1977-78.  
In the Digby and Bridgetown (Torbrook Syncline) areas of western Nova Scotia numerous mafic intrusions occur within the Ordovician through Lower Devonian Halifax, White Rock, Kentville, and Torbrook Formations. These intrusions have been mapped and sampled for petrographic and geochemical studies. The purposes are to compare intrusions in the Digby and Bridgetown areas, to determine the number of different lithologies, their petrochemical affinities and possible relations to volcanic units within the White Rock Formation and the Triassic basalts, and hopefully to achieve some indication of their relative ages of emplacement.
969. BERMAN, R.G., ARMSTRONG, R.L., Univ. British Columbia (Geological Sciences):  
Petrology of Coquihalla Series volcanics, near Hope, southwestern British Columbia, 1977-78; M.Sc. thesis (Berman).  
Detailed mapping has revealed: the volcanic rocks unconformably overlie Eagle Granodiorite and Pasaytan Group; the extent of the volcanics (40 km<sup>2</sup>) is much greater than previously reported: pyroclastic rocks and rhyolite flows are invaded by basaltic-andesite domes, dykes, and sills and a diorite plug (Coquihalla Mountain). Major and trace element, K-Ar dating, Sr isotopic analyses of rocks and microprobe analyses of phenocryst phases are planned.
970. BICZOK, J., AYRES, L.D., Univ. Manitoba (Earth Sciences):  
Altered subvolcanic trondhjemite plutons in the Missi Island volcanic centre, Amisk Lake, Saskatchewan, 1977-79; M.Sc. thesis (Biczok).  
Several oval to irregular trondhjemite plutons and dike swarms were intruded into the central part of the Missi Island volcanic centre. The trondhjemite post-dates the emplacement of an extensive suite of felsic to mafic porphyry dikes and sills. It has subvolcanic characteristics and is variably altered. All of the plutonic rocks were metamorphosed during a regional metamorphic event. Both the porphyry suite and the trondhjemite appear to represent magma chambers that fed overlying volcanic units. The trondhjemite would represent a later and stratigraphically higher period of volcanism than the porphyry suite.
971. BOSTOCK, H.H., Geol. Surv. Can.:  
Volcanic rocks of the Appalachian region, 1973-.  
**See:**  
Volcanic rocks of the Appalachian Province: Roberts Arm Group, Newfoundland; Geol. Surv. Can., Paper 78-1A, p. 231-233, 1978.  
Reconnaissance paleomagnetism of the Ordovician Roberts Arm Group volcanics, Newfoundland; *ibid.*, p. 497, 498, 1978.
972. BRYAN, M.P.D., SCARFE, C.M., Univ. Alberta (Geology):  
Petrology of part of the Hackett River greenstone belt, District of Mackenzie, Northwest Territories, 1975-78; M.Sc. thesis (Bryan).
973. CASEY, J.J., SCARFE, C.M., Univ. Alberta (Geology):  
Petrology of the Heart Peaks volcanic center, northern British Columbia, 1976-78; M.Sc. thesis (Casey).  
**See:**  
Geology of the Heart Peaks volcanic center, northwestern British Columbia; Geol. Surv. Can., Paper 78-1A, p. 87-89, 1978.
974. CERNY, P., ZIEHLKE, D., GOAD, B.E., PAUL, B.J., AGWU-JONES, A., Univ. Manitoba (Earth Sciences):  
Pegmatite mineral evaluation project, Manitoba, 1976-79.  
In the Cat Lake-Winnipeg River district, a differentiation sequence is indicated from late intrusive quartz monzonite through stocks of pegmatitic granites to several types of mineralized pegmatites, all of which intrude re-activated old structures of the Bird River greenstone belt. In the Herb Lake district, laboratory work commenced on pegmatites and on three possible source rocks.
975. CHANCE, P., EDGAR, A.D., Univ. Western Ontario (Geology):  
The alkaline rocks of Eastern Iran, 1977-79; M.Sc. thesis (Chance).
976. CHUTE, M.E., AYRES, L.D., Univ. Manitoba (Earth Sciences):  
Emplacement of a porphyritic sill suite in the Missi Island volcanic centre and its associated alteration and mineralization, Amisk Lake, Saskatchewan, 1975-81; Ph.D. thesis (Chute).  
**See:**  
Missi Island volcanic centre, Saskatchewan; Geol. Surv. Can., Paper 77-1B, p. 29-31, 1977.  
At Missi Island, a complex suite of porphyritic dikes and sills ranging in composition from gabbro to quartz monzonite, was intruded into an andesitic to basaltic sequence. The dikes and sills are concentrated in two areas that appear to represent shallow magma chambers feeding volcanism higher in the sequence. They are variably altered with the intensity of alteration decreasing with decreasing age of emplacement. Disseminated pyrite, chalcopyrite, and minor molybdenite are associated with the more highly altered areas.

977. COCKER, J.D., Univ. Alberta (Geology):  
Petrology of the Nipple Stock, British Columbia, 1976-78.  
Field work is completed. Electron microprobe and isotopic analysis in progress.
978. COCKER, J.D., Univ. Alberta (Geology):  
Petrogenesis of the cordierite trondhjemites in the Wallowa Mountains, northeast Oregon, 1977-79.  
To review the petrography of the trondhjemites, analyse the major phases, and determine the initial  $^{87}\text{Sr}/^{86}\text{Sr}$  ratio.
979. COLEMAN, L.C., Univ. Saskatchewan (Geological Sciences):  
Pegmatitic segregations in the layered series of the Skaergaard intrusion, East Greenland, 1976-79.
980. CURRIE, K.L., Geol. Surv. Can.:  
Alkaline rocks in Canada, 1968-.
981. CURRIE, K.L., Geol. Surv. Can.:  
Granite studies in the Appalachians, 1973-.
- See:**  
A note on post-Mississippian thrust faulting in northwestern Cape Breton Island; Can. J. Earth Sci., vol. 14, no. 12, p. 2937-2940, 1977.  
Carmville map-area, Newfoundland, the north-eastern end of the Appalachians; Geol. Surv. Can., Paper 78-1A, p. 209-216, 1978.
982. DAVIDSON, A., Geol. Surv. Can.:  
Granite studies in the Ennadai-Rankin Inlet region, District of Keewatin, 1966-.
983. DAVIDSON, A., Geol. Surv. Can.:  
Granite studies in the Slave Province, District of Mackenzie, 1971-.
- See:**  
The Blackford Lake intrusive suite: an Apehbian alkaline plutonic complex in the Slave Province, Northwest Territories; Geol. Surv. Can., Paper 78-1A, p. 119-127, 1978.
984. DAVIES, J.F., McAULEY, J., Laurentian Univ. (Geology):  
Petrography and chemistry of "Porphyries", Dome Mine, Porcupine area, Ontario, 1976-78; M.Sc. thesis (McAuley).  
To determine whether the porphyroidal character of the felsic rocks developed as a result of metasomatism or whether it is a primary feature. The solution to this problem may have a bearing on the process by which the gold-bearing quartz veins at the Dome Mine originated.
985. EDGAR, A.D., Univ. Western Ontario (Geology):  
Subsolidus phase relations in the system analcime ( $\text{NaAlSi}_2\text{O}_6 \cdot \text{H}_2\text{O}$ )-Leucite ( $\text{KAlSi}_2\text{O}_6$ ) at 1 kb  $\text{P}_{\text{H}_2\text{O}}$ , 1973-77.
986. EMSLIE, R.F., Geol. Surv. Can.:  
Anorthosite study, Newfoundland, 1967-.
- See:**  
Paleomagnetism of the Harp Lake Complex and associated rocks; Can. J. Earth Sci., vol. 14, no. 6, p. 1187-1201, 1977.  
The Harp dikes and their relationship to the Helikian geological record in central Labrador; Can. J. Earth Sci., vol. 14, no. 12, p. 2683-2696, 1977.  
Elsonian magnetism in Labrador: age, characteristics and tectonic setting; Can. J. Earth Sci., vol. 15, no. 3, p. 438-453, 1978.
987. EMSLIE, R.F., Geol. Surv. Can.:  
Geology, petrology and economic potential of the anorthosite suite in southern Labrador, 1975-.
- See:**  
Geology of the Red Wine Mountains, Labrador: the Ptarmigan Complex; Geol. Surv. Can., Paper 78-1A, p. 129-134, 1978.
988. FAWCETT, J.J., GITTINS, J., RUCKLIDGE, J.C., BROOKS, C.K., NIELSEN, T., NIELSEN, P.A., Univ. Toronto (Geology), Univ. Copenhagen (Geology):  
Mineralogical and petrological studies in East Greenland, 1964-.
- This cooperative project between the two above named institutions has involved field work between latitudes 66°N and 69°N, with joint field parties in 1972, 1975 and 1977. Studies of igneous phenomena have covered the major axis of the Tertiary province, but have recently concentrated on the Kangerdlugssuaq region that now seems to have been a focus of unique magmatism for at least half a billion years. The region may thus prove to be the key to understanding the complex magmatic processes associated with rifting of that part of the North Atlantic region. Studies include: the Batbjerg Intrusion, Igneous Intrusion, Marble (Paleozoic) and its enclosed nodules, Tertiary lavas, and pre-drift configuration of the North Atlantic area. Kangerdlugssuaq syenites: A collection of syenite material from the Kangerdlugssuaq area was made in the summer of 1977. For the first time, fresh material has been obtained, since earlier expeditions, which did not have the use of dynamite, were unable to collect material below the deep weathered crust. The syenite intrusions, which cover several hundred square kilometres, are often host of impressive pegmatites containing astrophyllite and eudialyte. Petrological and mineralogical work will be done in Toronto and Copenhagen. Tertiary dikes: Analytical data on the Tugtulik material collected in 1973 has been accumulating. Some interesting and unexpected occurrences of leucite have been recorded, and this work will shortly be completed.

989. FERGUSON, L.J., EDGAR, A.D., CONDLIFFE, E., Univ. Western Ontario (Geology):  
The origin of the primary analcimes in the Crowsnest Pass volcanics, Alberta, 1975-78; M.Sc. thesis (Ferguson).
- See:**  
The petrogenesis and origin of the analcime in the volcanic rocks of the Crowsnest Formation, Alberta; Can. J. Earth Sci., v. 15, no. 1, p. 69-77, 1978.
990. FINDLAY, D.J., AYRES, L.D., Univ. Manitoba (Earth Sciences):  
Lang Lake - an Early Precambrian porphyry copper-molybdenum deposit, northwestern Ontario, 1975-78; M.Sc. thesis (Findlay).
- See:**  
Geol. Surv. Can., Paper 77-1B, p. 25-28, 1977.  
A subeconomic porphyry-type copper deposit occurs near the contact between andesitic volcanic rocks and a porphyritic, felsic to intermediate intrusive complex. The complex appears to be subvolcanic and is composed entirely of narrow (generally < 10m) dikes that vary subtly in texture, mineralogy, and chemistry. Investigations are in progress to determine the variation and intrusive history of the complex, the nature of pre- and syn-metamorphic alteration, and the relationship of the previous factors to mineralization.
991. GIBSON, H.M., MOORE, J.M., Jr., Carleton Univ. (Geology):  
Volcanism and sedimentation - central Darling Township, eastern Ontario, 1977-79; M.Sc. thesis (Gibson).  
An assemblage of basalts, andesites and dacites, with associated laminated cherts, sulphidic pelites, and carbonates, metamorphosed to low amphibolite facies; stratiform Cu-Zn-Pb mineralization in the succession has been the object of limited prospecting during the last decade.
992. GITTINS, J., Univ. Toronto (Geology):  
Miscellaneous problems in the mineralogy and petrology of alkalic rocks and carbonatites, 1965-.
993. GOAD, B.E., CERNY, P., Univ. Manitoba (Earth Sciences):  
Mineralogy, geochemistry, and petrology of pegmatitic granites in the Winnipeg River area, southeastern Manitoba, 1976-78; M.Sc. thesis (Goad).  
The study of four major bodies of pegmatitic granites indicates that they represent an intermediate member in a differentiation series anatectic quartz monzonite-pegmatitic granites - pegmatites. Diversified mineralogy of accessory phases and variable trace element contents show gross differences among the four bodies and within individual intrusions. At a given erosion surface, each body is accompanied by a pegmatite swarm of similar or more fractionated mineralization. Vertical differentiation within individual intrusions is indicated at some localities.
994. GODWIN, C.I., McARTHUR, M., Univ. British Columbia (Geological Sciences):  
Petrology and geochronology of the mountain diatreme, Mackenzie Mountains, Northwest Territories, 1976-78.
995. GOFF, S.P., SCARFE, C.M., Univ. Alberta (Geology):  
Igneous and metamorphic geology of the East Arm, Great Slave Lake, Northwest Territories, 1974-78; Ph.D. thesis (Goff).
996. GOODWIN, A.M., CHOU, C-L., DAVISON, W.L., Univ. Toronto (Geology) Geol. Surv. Can.:  
Trace element geochemistry of Archean granulites in Superior Province, Canada and India, 1978-80.  
Granulites represent samples of deeper crustal lithofacies and thereby provide insight into development of continental crust at depth. Trace element abundances including U, Th and REE are particularly helpful in gaining an understanding of the formative deeper crustal processes. Archean granulites are well-exposed in Pikwitonei subprovince, and Ungava region of Superior Province, Canada and in southeastern India. A suite of 36 representative samples including 6 from India are under detailed geochemical investigation.
997. GORMAN, B.E., EDGAR, A.D., Univ. Western Ontario (Geology):  
Petrology and geochemistry of the Fiskaeneset anorthosites, Western Greenland, 1975-78; Ph.D. thesis (Gorman).
998. HAMILTON, T.S., SCARFE, C.M., Univ. Alberta (Geology):  
Petrology of the Level Mountain volcanic center, northern British Columbia, 1974-78; Ph.D. thesis (Hamilton).
999. HEBIL, K., STEVENSON, J.S., McGill Univ. (Geological Sciences):  
Origin of granite breccia, Levack Mine, Sudbury, Ontario, 1976-78; M.Sc. thesis (Hebil).  
Detailed petrographic studies, particularly textural, of the several modifications of granite breccia with which the nickel ores at Levack are associated, have shown that these breccias have three diverse origins, related to the footwall migmatite, to the common Sudbury breccia, and to the ore-bearing sub-layer of the norite.
1000. HILL, J., EDGAR, A.D., Univ. Western Ontario (Geology):  
Petrochemistry of the granitic plutons in the Back River-Nose Lake area, Slave Province, Northwest Territories, 1974-78; Ph.D. thesis (Hill).
1001. HILLARY, E.M., AYRES, L.D., Univ. Manitoba (Earth Sciences):  
Petrography and geochemistry of basement trondhjemite, Favourable Lake, northwestern Ontario, 1976-78; M.Sc. thesis (Hillary).  
The oldest unit in the North Trout Lake batholith is a deformed and metamorphosed trondhjemite unit that has been dated at 2.95 b.y. by zircon methods. Although the trondhjemite is separated from the nearby Favourable Lake volcanic complex by a younger pluton, it appears to be basement to the volcanoes. Petrographic and geochemical data show that the trondhjemite is part of an old pluton.

1002. HOGARTH, D.D., GRIFFIN, W.L., Univ. Ottawa (Geology):  
Origin of lapis lazuli, 1974-78.
- See:**  
Lapis lazuli from Baffin Island - a Precambrian meta-evaporite; *Lithos*, vol. 11, no. 1, p. 37-60, 1978.
1003. HYNES, A.J., FRANCIS, D.M., ARNDT, N.T., BROOKS, C., Univ. Saskatchewan (Geological Sciences); Univ. Montréal (Geology):  
Field relationships, petrology and geochemistry of Proterozoic komatiite, 1978-.
- The komatiites of the Proterozoic (1.87 Ma) Cape Smith volcanic belt have been described briefly. The existence of well preserved peridotitic sills and highly mafic lavas of this age is particularly important because they are the youngest well documented komatiites. They lie in a tectonic environment that appears to be gradational between that of an Archean greenstone belt and a Phanerozoic geosyncline and hence represent a link between typical Archean komatiites and the picrites that are the closest Phanerozoic equivalent of the Archean rocks. A detailed study of the Cape Smith komatiites could therefore explain the abrupt decline in the abundances of komatiites at the end of the Archean, and would provide information on the specific tectonic environment in which these rocks form. A current project involving the determination of Sr isotopic compositions of Archean komatiitic and tholeiitic lavas from Munro Township, Ontario, will be broadened by the inclusion of samples of Proterozoic lavas from the Cape Smith belt. The aims are twofold: (1) to study the effects of low grade metamorphism on Sr isotopic compositions of mafic and ultramafic lavas, and (2) by using the isotopic compositions of fresh clinopyroxenes from Munro Township lavas as a datum, to deduce the primary isotopic compositions of komatiites and associated tholeiites.
1004. HYNES, A.J., FRANCIS, D.M., ERIKS, S., HEBERT, J.-J., McGill Univ. (Geological Sciences):  
The Cape Smith project, 1977-81; M.Sc. theses (Eriks, Hebert).
- A new team project undertaken to study the anatomy of a Proterozoic fold belt. The approach is to support a number of detailed studies in areas which are critical to the geologic interpretation of the belt as a whole. Prospective areas were evaluated in a reconnaissance field program conducted this past summer (1977). Projects include: 1) a comparative study of 4 gabbro-peridotite, intrusive complexes across the belt; 2) a structural analysis of the metasedimentary unit just south of Asbestos Hill; 3) a geochemical study of the mafic volcanics between Watts and Cross Lakes and between Cross and Vaillant Lakes; 4) a structural interpretation of the boundary between amphibolites and the northern gneisses near Watts Lake; and 5) a study of the sulfide mineralization at Cross Lake.
1005. IMREH, L., LECLERC, A., Québec Min. Richesses Naturelles:  
Mise en valeur des masses ultramafiques, 1972-80.
- Definition des grandes structures élaboration d'une nouvelle stratigraphie contrôle des mineralisations (Nickel) étude pétrochimique.
1006. LAMBERT, M.B., Geol. Surv. Can.:  
Archean volcanic studies in the Slave-Bear Province, District of Mackenzie, 1973-.
1007. LAMBERT, M.B., Geol. Surv. Can.:  
Archean felsic volcanic complex near Regan Lake, District of Mackenzie, Northwest Territories, 1974-.
- See:**  
The Back River Volcanic Complex - a cauldron subsidence structure of Archean age; *Geol. Surv. Can.*, Paper 78-1A, p. 153-157, 1978.
1008. LAROUCHE, C., MOORE, J.M., Jr., DIMROTH, E., Carleton Univ. (Geology):  
Granitic intrusions in the Pontiac Group South of Rouyn-Noranda, Québec, 1975-78; M.Sc. thesis (Larouche).
- Contact relations, petrography and chemistry of a complex plutonic suite, in the Lac Rémigny-Lac Barrière area, indicate 2 lines of descent: diorite-syenodiorite-monzonite, and granodiorite-quartz monzonite. The more mafic, and less siliceous rocks are older, and the two groups show close spatial and genetic relations.
1009. LAURENT, R., HEBERT, Y., HEBERT, R., BEULLAC, R., RODRIGUE, G., Univ. Laval (Géologie et Minéralogie):  
Géologie des complexes ophiolitiques des Appalaches du Québec, 1972-; thèse de doctorate (Hebert, Y.), thèse de maîtrise (Hebert, R., Beullac, Rodrigue).
- Voir:**  
Ophiolites from the northern Appalachians of Québec; *State of Oregon Bull.* 95, p. 25-40, 1977.
- Features of submarine volcanism in ophiolites from the Québec Appalachians; *Geol. Assoc. Can., Sp.*, Paper 16, p. 91-109, 1977.
1010. LEWRY, J.F., RAY, G., GILBOY, C., ROBERTS, K., Univ. Regina (Geological Sciences), *Sask. Geol. Surv.*:  
The Rottenstone Domain-Wathaman Hudsonian batholithic complex-its possible relation to fundamental Hudsonian crustal structures, 1976-79; M.Sc. thesis (Roberts).
1011. MARTIN, R.F., McGill Univ. (Geological Sciences):  
The Dunlop Bay pluton, Matagami, Québec: a study of granitization of diorite, 1976-78.
- The Dunlop Bay plutonic complex is zoned from a dioritic rim to a granitic core. Whereas the zonation in similar plutons in the Archean has been attributed to assimilation of host basic rocks in the contact zone, careful study of this pluton shows that in the core area, protracted rock-fluid interaction has led to effective conversion of diorite and granodiorite to granite. Such post-magmatic processes accompanied the cooling of the pluton; the convective systems may well have occurred in a submarine environment.

1012. MARTIN, R.F., BOWDEN, P., McGill Univ. (Geological Sciences):  
Alkali feldspars as indicators of rock-water interaction in the Ririwai ring complex, Nigeria, 1977-79.  
Although the Nigerian ring complexes are among the best known examples of anorogenic igneous activity in the world, very fundamental aspects of their petrology and mineralogy have been neglected. This first project has as objectives a careful look at feldspar mineralogy of the various intrusive and extrusive units of the Ririwai complex, a documentation of the magmatic assemblage and an analysis of the effects of superimposed waves of hydrothermal activity that ultimately led to greisen formation and Sn, Zn mineralization. This should be accompanied by a close look at the mafic and opaque minerals, that are also responding to the same post-magmatic events.
1013. MILLER, R., GITTINS, J., Univ. Toronto (Geology):  
The petrology of nepheline-bearing rocks in Monmouth and Glamorgan Townships, Ontario, Canada, 1976-; M.Sc. thesis (Miller).  
Several small plugs of iron-rich fayalite-hedenbergite nepheline syenites and related nepheline-bearing rocks have been mapped. Whole-rock chemical analysis and electron microprobe analysis of constituent minerals is in progress and has revealed that the rocks are late-stage differentiates of alkalic magmas, and are of a type previously unrecorded in the classical Haliburton-Bancroft region.
1014. MITCHELL, R.H., Lakehead Univ. (Geology):  
Petrology and geochemistry of alkaline rocks and kimberlites, 1972-.  
Mineralogy of Somerset Island, Northwest Territories, kimberlites, especially garnets and opaque oxides; petrology of the Coldwell alkaline complex, Ontario; petrology of the Freemans Cove volcanic rocks, Bathurst Island, Northwest Territories - petrological, mineralogical and geochemical studies of Recent-Tertiary undersaturated lavas including alkali basalts, nephelinites and phonolites; and studies of the upper mantle beneath Canada - evidence from lherzonite xenoliths contained in Somerset Island kimberlites and Bathurst Island alkali basalts.
1015. MOORE, J.M., Jr., MORTON, R.L., Carleton Univ. (Geology):  
Petrology and stratigraphy of metavolcanic rocks in the Grenville Province of eastern Ontario, 1976-78.  
See:  
Orogenic volcanism in the Proterozoic of Canada; Geol. Assoc. Can., Sp. Paper no. 16, p. 127-148, 1977.  
Geochemistry of Proterozoic volcanic rocks from the Grenville Province eastern Ontario; *ibid.*, p. 149-168, 1977.
- The Helikian volcanic assemblage comprises 4-5 km of submarine tholeiites, capped by up to 3 km of central calc-alkali extrusive/intrusive complexes, with intervening volcanoclastic and carbonate rocks. The basalts appear to be ensimatic. The entire assemblage is overlain by carbonate rocks. Chemical data have been previously reported. New analyses have been obtained, and demonstrate two major cycles, with a number of minor, internal cycles. Metamorphism of upper greenschist to low amphibolite facies, and penetrative deformation do not obscure numerous primary features which permit establishing the stratigraphic succession and the volcanic environments. The volcanic succession, which is dated at ca. 1250 Ma, is invaded by large trondhjemite plutons and has a close resemblance to many Archean "granite-greenstone" assemblages.
1016. MORRISON, G.W., HODDER, R.W., Univ. Western Ontario (Geology):  
A study of granitic rocks and associated mineral deposits of the Whitehorse map area, Yukon Territory, 1974-78; Ph.D. thesis (Morrison).  
The three phases of the project are essentially complete in that the stratigraphy of the Lewes River Group and especially the upper limestone unit in the area west of the Yukon River have been reinterpreted, the granitic rocks of the area have been mapped and their ages determined radiometrically and the volcanic and plutonic rock evolution has been integrated with the nature and distribution of mineral deposits of the Whitehorse Copper Belt.
1017. NALDRETT, A.J., Univ. Toronto (Geology):  
Study of komatiitic and tholeiitic rocks in Dundonald and McCart Townships, Ontario, 1972-80.  
In McCart Township, a flat-lying differentiated sill contains Ni sulfides in peridotite at its base. Work is progressing to see if it is of komatiitic or tholeiitic affinity.
1018. NALDRETT, A.J., SCOTT, R., Univ. Toronto (Geology):  
Petrology of a portion of the Bell River Complex in Boubaux Township, Québec, 1976-78; M.Sc. thesis (Scott).
1019. NICHOLLS, J., STOUT, M.Z., PROFFET, B., Univ. Calgary (Geology):  
Quaternary and Recent volcanism, and the nature of the upper mantle, 1977-78; M.Sc. thesis (Proffet).
1020. NIXON, G.T., ARMSTRONG, R.L., CASTILLO, LUIS DEL G., Univ. British Columbia (Geological Sciences):  
Petrology of Volcan Iztaccihual, central Mexico, 1974-78; PH.D. thesis (Nixon).  
Mapping is virtually completed. Another short (4 weeks) field season is planned in the spring of 1978. K/Ar dating, Sr isotope geochemistry, major and trace element analyses by XRF, and microscopic petrology are underway. Microprobe and rare earth studies are planned for 1978.

1021. PARSLow, G.R., HULBERT, L.J., Univ. Regina (Geological Sciences):  
The physical and chemical features of the Fraser Lake Gabbro, 1975-78; M.Sc. thesis (Hulbert).
1022. PEARCE, T.H., Queen's Univ. (Geological Sciences):  
Petrology of Archean igneous rocks, 1975-79.
- See:**  
On the structure of Archean greenstone belts; Precambrian Res., v. 5, p. 23-42, 1978.
- Areas of well preserved volcanic and related rocks are being studied in detail. Comparisons are then made with modern rocks which may be analogous in some respects. It is hoped that this study will further define the characteristics of Archean igneous processes and lead to a better understanding of tectonic environments in the Archean. Work has been completed on some areas of predominantly basaltic and rhyolitic rocks and work is in progress on rocks of intermediate composition (andesites). The high-iron nature of many of the basalts, particularly in the lower parts of Archean greenstone belts, is one of the most intriguing findings.
1023. RAST, N., LUTES, G., Univ. New Brunswick (Geology):  
The structure and petrology of the Pokiak granitic pluton and its metamorphic aureole, 1975-79; M.Sc. thesis (Lutes).
- See:**  
Preliminary report on the geology of a part of the Pokiak Pluton and its surrounding metasediments, south-central New Brunswick; Geol. Surv. Can., Paper 77-1B, p. 49-53, 1977.
- The project consists in the elucidation of the timing and metamorphic effects associated with the intrusion of the Pokiak granite batholith. So far a preliminary assessment of structure has been completed and a general stratigraphic succession demonstrated. At present a detailed elucidation of the metamorphic aureole is being conducted and sillimanite, garnet-cordierite, cordierite-andalusite and biotite zones of contact metamorphism recognized. In addition the examination of oblique Lamselt photographs suggests that the granite body consists of several separate intrusions. This suggestion is being investigated in detail.
1024. ROBIN, P-Y.F., Univ. Toronto (Erindale-Geology):  
Effect of regional stresses on melting of rocks, 1977-78.
- 'Tensional' or 'compressional' environments are often called upon to explain the localization of magma generation, particularly for intraplate magmatism. A fundamental question to be answered by this research is that of the effect of a stress, rather than a hydrostatic pressure, on melting.
1025. ROUSELL, D.H., Laurentian Univ. (Geology):  
Geology of the anorthositic sill at St. Charles, Ontario, 1976-78.
- See:**  
Geology of the Anorthositic Sill at St. Charles, Ontario; Geol. Surv. Can., Paper 78-1A, p. 163-168, 1978.
- Currently investigating the fabric changes which take place in the transformation from massive gabbroic anorthosite to the foliated and lineated equivalent - involves the determination of dimensional and crystallographic orientations of plagioclase, hornblende, and biotite in the two rock types.
1026. RYMPH, W., HODDER, R.W., Univ. Western Ontario (Geology):  
Petrography of volcanoclastic rocks about and within the Cofer massive sulphide body, Mineral District, Virginia, 1976-79; M.Sc. thesis (Rymph).
- To describe and explain the presence of abundant felsic rock fragments within massive sulphide.
1027. SABAG, C., ANDERSON, G.M., Univ. Toronto (Geology):  
Petrology and geochemistry of the Meggisi Lake pluton, Northwestern Ontario, 1976-78; M.Sc. thesis (Sabag).
- Two phases of granitic intrusives have been distinguished, and a petrographic and geochemical investigation of these is planned to determine what can be learned of their water content and depth at the time of intrusion.
1028. SCHAU, M., Geol. Surv. Can.:  
Volcanic rocks of the Prince Albert belt, 1972-.
- See:**  
"Komatiites" and quartzites in the Archean Prince Albert Group; Geol. Assoc. Can., Sp. Paper 16, p. 341-354, 1977.
1029. SCHAU, M., Geol. Surv. Can.:  
Geology of southeast Baker Lake, District of Keewatin, 1976-.
1030. SMITH, I.E.M., GOODWIN, A.M., Univ. Toronto (Geology):  
Petrographic development of Archean volcanic rocks, 1976-78.
- See:**  
Magma evolution in Archean volcanic piles; Geol. Soc. Am., Abstracts, p. 1181, 1977.
- REE patterns in the Abitibi greenstone belt; Proc. Geotraverse Conf., Univ. Toronto, p. 55-65, 1977.
- Archean volcanic piles in Superior Province feature a well-established uniform progression from dominant tholeiitic basalt below to greater calc-alkalic andesite above with topmost felsic (mainly dacite, some rhyolite) concentrations. The changeover from tholeiitic to calc-alkalic occurs at about 60% of the full stratigraphic thickness which is in the order of 10-15,000 m. Distinctive trace element patterns characterize tholeiitic and calc-alkalic parts respectively such that development of the upper calc-alkalic part requires some fundamental change in source material in the direction of higher oxygen fugacity. Sagging of the crust during accumulation of the volcanic pile is viewed as the probable triggering mechanism that initiated this change.

1031. SMITH, T.E., Univ. Windsor (Geology):  
 Archean magmatism and tectonics: A geochemical study of the evolution of granitic rocks in the Superior Province, 1975-80.  
 Major and trace element studies of the volcano-plutonic rocks in the Shebandowan Belt near Wawa, Ontario, indicate a systematic evolution of the crust. Early out pourings of mafic volcanic rocks with affinities to oceanic tholeiites are followed by high alumina basalts and dacites, foliated tonalites and highly saliceous potassic granites.
1032. SMITH, T.E., WALLAWENDER, M.J., Univ. Windsor (Geology):  
 The petrogenesis of the Mesozoic gabbros of San Diego County, southern California, 1976-80.  
 Major and trace element chemical compositions of approximately 15 gabbroic plutons are being used to demonstrate their origin and evolution. Special attention is being paid to the relationships between the gabbros, quartz diorites and tonalites of the Peninsula Ranges Batholith.
1033. SOUTHER, J.G., Geol. Surv. Can.:  
 Geology of the Mt. Edziza volcano, British Columbia, 1965-.
1034. STAMATELOPOULOU-SEYMOUR, K., FRANCIS, D., McGill Univ. (Geological Sciences):  
 Lac Guyer ultramafics, 1976-79; Ph.D. thesis (Stamatelopoulos-Seymour).  
 A study of the ultramafic suite at Lac Guyer, James Baie Region, Quebec, to: 1) investigate the mode of emplacement, petrochemical character and differentiation trends of the ultramafic suite; 2) establish the genetic relationship between the ultramafic unit and the associated basic and felsic volcanics; 3) investigate the extent to which secondary processes such as metamorphism have overprinted the primary chemistry and mineralogy of the ultramafic units and the effect of deformation on primary structures and textures; and 4) examine the mineralization potential and establish exploration criteria within the ultramafic belt.
1035. STEVENSON, J.S., McGill Univ. (Geological Sciences):  
 The origin of the Onaping Formation and its relation to the granophyre (micropegmatite) of the Nickel Irruptive, Sudbury, Ontario, 1970-79.  
 Further details on the petrography and chemistry of the Onaping Formation are being obtained with particular reference to its origin and probable relationship to the underlying granophyre (micropegmatite).
1036. STEVENSON, L.S., STEVENSON, J.S., Redpath Mus., McGill Univ. (Geological Sciences):  
 Feldspar replacement in dawsonite-bearing rock, Mount Royal and Mount St. Hilaire, Québec, 1976-78.  
 See:  
 Dawsonite-fluorite relationships at Montreal-area localities; Can. Mineral., v. 15, pt. 1, p. 117-120, 1977.
- Studies of replaced euhedral feldspar phenocrysts in rocks from Mount Royal and Mount St. Hilaire show they are now formed of an aggregate of dawsonite, fluorite, quartz and calcite.
1037. STEVENSON, L.S., STEVENSON, J.S., Redpath Mus., McGill Univ. (Geological Sciences):  
 Petrogenesis of dawsonite in new material from Mount St. Bruno, Québec, 1977-79.  
 New material has shown dawsonite differing greatly in mode of occurrence from that previously collected and studied from Mount St. Bruno. Petrographic and mineralogical studies of the new material are being made and comparisons made with other Monteregian dawsonite material.
1038. SUTCLIFFE, R.H., FAWCETT, J.J., Univ. Toronto (Geology):  
 Rainy Lake batholith, Ontario, 1976-79; M.Sc. thesis (Sutcliffe).  
 The granitic batholiths of Archean "greenstone and granite" terrains are relatively poorly understood, yet are of vital importance in the understanding of Archean crustal evolution. The Rainy Lake batholith in northwestern Ontario was chosen for study since the batholith contains both gneissic and massive plutonic rocks and therefore is typical of the batholiths in this part of the Superior Province. One inch to one mile mapping of the Rainy Lake batholith was initiated in 1976 and will be completed in 1978. The initial phase of research will be aimed at description and classification of lithologies, determining broad chemical trends and establishing a sequence of plutonic, metamorphic and structural events in the evolution of the batholith. Subsequently the trace element and rare earth geochemistry of the massive plutonic rocks will be studied in order to establish potential magma sources. U-Pb dating of the major phases is currently in progress to define the time span in the evolution of the batholith and to elucidate possible basement-cover relationships between the gneissic domain and supracrustal rocks.
1039. VALENCA, J., EDGAR, A.D., Univ. Western Ontario (Geology):  
 Petrogenesis of the alkaline complexes of Rio de Janeiro State, Brazil, 1975-78; Ph.D. thesis (Valenca).
1040. VOS, M.A., Ontario Geol. Surv.:  
 Lithium deposits of Ontario, 1977-79.  
 The petrology of lithium deposits and their geological environment will be examined, uses of lithium and markets for lithium bearing material will be discussed, and a distribution map of deposits and a guideline for prospectors will be included.
1041. WHEELER, C.F., SMITH, T.E., Univ. Windsor (Geology):  
 The petrology of the Mt. Poser Gabbro, southern California, 1977-; M.Sc. thesis (Wheeler).  
 Mineralogical and chemical studies of the rocks of the Mt. Poser pluton are being used to demonstrate its differentiation pattern and to show how this pattern fits in to the evolution of the Peninsular Ranges Batholith as a whole.

1042. WILLIAMS, J.G., GOODWIN, A.M., KROGH, T.E., Univ. Toronto (Geology):  
Archean gneiss belts of the Superior Province, 1976-78.  
Mapping and sampling in the northern part of the English River and Quetico gneiss belts has been carried out during the 1976 and 1977 field seasons. The detailed maps produced are being used as bases for more specific investigations into the composition, metamorphic grade, age and origin of the meta-greywackes and granitoid rocks found therein. Routine petrographic work is well underway and specimens for major and trace element analysis are in various stages of preparation. Zircons from 19 rocks from both belts have been concentrated to greater than 30% purity at the R.O.M. as part of a geochronological study.
1043. WONG, R., GODWIN, C.I., McTAGGART, K.C., Univ. British Columbia (Geological Sciences):  
Geology of Wrede Creek ultramafic complex and related mineralization, 1977-79; M.Sc. thesis (Wong).
- METAMORPHIC**
1044. APPELYARD, E.C., WOOLLEY, A.R., Univ. Waterloo (Earth Sciences):  
Geochemistry of fenites – an assessment of metasomatic gains and losses, 1976-78.  
Analyses of fenite from Sokli, Finland and Borralan, Scotland, are being re-examined using other criteria for geochemical comparison in an attempt to improve the methods of investigating metasomatic phenomena.
1045. BARAGAR, W.R.A., Geol. Surv. Can.:  
Studies in the Seal Lake volcanic province, Newfoundland, 1968-.
1046. BREAKS, F.W., BOND, W.D., Ontario Geol. Surv.:  
Metamorphism of the English River Subprovince, northwestern Ontario, 1977-79.  
This continuing study has focused upon an intact, progressive regional metamorphic facies succession developed in the northern supracrustal domain of the English River Subprovince and in contiguous metavolcanics and metasediments of the Uchi Subprovince, situated in the Lake St. Joseph-Eastern Lac Seul area. Field mapping and preliminary petrographic investigation have delineated six major facies zones and five isograds, primarily based upon assemblages engendered in ubiquitous wacke and pelitic bulk compositions: (1) chlorite-biotite zone, (2) staurolite-chlorite-biotite zone, (3) sillimanite-muscovite zone, (4) sillimanite-K-feldspar zone, (5) cordierite-almandine-K-feldspar zone, and (6) low pressure granulitic zone. Assemblages developed both in this area and elsewhere within 17,000 square miles of the English River Subprovince establishes that the regional metamorphism is restricted to pressure subdivisions pertaining to bathozones 2 and 3 of D.M. Carmichael's scheme. Future investigations will employ petrofabric analysis, petrochemistry, and mineral chemistry in order to achieve a clear understanding as to nature of mineral reactions at the various isograds.
1047. CERMIGNANI, C., LENTERS, M., ANDERSON, G.M., Univ. Toronto (Geology):  
Petrogenesis of the nepheline gneisses of the Bancroft area, 1975-78; PH.D. thesis (Cermignani), M.Sc. thesis (Lenters).
1048. CHU, P.H.T., STEVENS, G.R., COLWELL, J.A., Acadia Univ. (Geology):  
Metamorphism and tectonic development of Early Paleozoic rocks near Shelburne, Nova Scotia, 1976-78; M.Sc. thesis (Chu).  
Field work 85-90% completed, laboratory analysis (microscopic and geochemical) 95%, and writing – 20%.
1049. CURTIS, L.W., GITTINS, J., Univ. Toronto (Geology):  
Petrology of the Red Wine alkalic rock complex, Labrador, 1973-78; Ph.D. thesis (Curtis).
1050. DEVRIES, C.D.S., GHENT, E.D., SIMONY, P.S., Univ. Calgary (Geology):  
Geology of the Precambrian Shield of Somerset Island, District of Franklin, 1975-79; PH.D. thesis (DeVries).  
General petrography, study of relation between macroscopic structures and preferred orientation of selected minerals with the Universal stage; electron microprobe study of coexisting pairs of clino- and orthopyroxenes, and orthopyroxene and garnet for geothermometry and geobarometry of metabasites, and electron microprobe analyses of other significant phase assemblages.
1051. DUDLEY, J.S., GHENT, E.D., Univ. Calgary (Geology):  
Low grade lateration of the Howson subareal volcanics, Smithers, British Columbia, 1976-80; Ph.D. thesis (Dudley).  
The Howson subareal facies of the Telkwa Formation near Smithers, British Columbia, exhibits extensive development of mineral assemblages belonging to the subgreenschist zeolite regional metamorphic facies. Field relationships suggest a hydrothermal origin for these alterations. It is the aim of this research to use regional field mapping, x-ray diffraction, petrographic electron microprobe and perhaps fluid inclusion techniques in order to ascertain any distribution patterns displayed by the secondary mineral species and then to develop a model of the paleo-geothermal system thought to have been a principal cause of the alteration.
1052. FAWCETT, J.J., NIELSEN, P.A., Univ. Toronto (Geology):  
Metamorphism in the Kashabowie area, northwestern Ontario, 1971-78.
1053. FRASER, J.A., Geol. Surv. Can.:  
Metamorphism in the Canadian Shield, 1974-.
1054. FRISCH, T., Geol. Surv. Can.:  
Gneisses of the Prince Albert belt, 1972-.
1055. FROESE, E., Geol. Surv. Can.:  
Petrological studies in the vicinity of the Kisseynew Front, Manitoba, 1970-.

1056. FROESE, E., Geol. Surv. Can.:  
Petrological studies in the Sherridon area, Manitoba, 1974-.
1057. FROESE, E., Geol. Surv. Can.:  
Metamorphic map of Manitoba south of 56 degrees, 1974-.
- See:  
The graphical representation of mineral assemblages in biotite-bearing granulites; Geol. Surv. Can., Paper 78-1A, p. 323-325, 1978.
1058. GHENT, E.D., STOUT, M.Z., KNITTER, C., Univ. Calgary (Geology):  
Petrologic and geochemical studies in the Cordillera and electron microprobe study of minerals, 1976-79; M.Sc. thesis (Knitter).
- See:  
Clinopyroxene-amphibolite boudins from Three Valley Gap, British Columbia; Can. Mineral., v. 15, p. 269-282, 1977.
- A study of regional metamorphism in the Mica Creek area, and near Revelstoke, British Columbia, is in progress. Ghent and Stout are making a comparative study of geothermometry, geobarometry and metamorphic fluid compositions in pelitic rocks and calc-silicates ranging in grade from garnet to sillimanite zones. A stable isotope study on coexisting minerals from these rocks is also in progress. Knitter is studying metamorphic reactions at the kyanite-sillimanite isograd. The emphasis is on reactions in metabasaltic rocks but includes a study on geothermometry and geobarometry in associated pelitic rocks.
1059. GITTINS, J., NIELSEN, P.A., Univ. Toronto (Geology):  
The petrology of sapphirine granulites in the Wilson Lake area, Labrador, 1974-.
- This preliminary study of high-grade metamorphic rocks in central southern Labrador has consisted largely of electron microprobe analysis of sapphirine-orthopyroxene-sillimanite-cordierite relations in quartz-bearing gneisses associated with oxide-rich zones. It is concerned with metamorphic conditions in a poorly understood part of the Grenville province and with the possibility of a relationship to the metamorphism of alkalic igneous rocks in the Red Wine district of Labrador to the north.
1060. GREENWOOD, H.J., Univ. British Columbia (Geological Sciences):  
a) Determination of the role of hydrogrossular in garnet equilibria; b) Thermodynamic mixing models for anthophyllite based on Fe/Mg exchange equilibria under hydrothermal conditions, 1975-79.
- a) Hydrogrossular--garnets with hydrogrossular component have been synthesized and studied by examining displacement of the equilibrium Grossular + quartz = Anorthite + 2 Wollastonite. The displacement is measurable and it is intended to calculate the free energy of the exchange equilibrium 4 protons = 1 silicon. b) Anthophyllite-synthesis experiments are completed in the system MgO-FeO-SiO<sub>2</sub>-H<sub>2</sub>O-O<sub>2</sub> and phase relations between anthophyllite, enstatite, talc, and olivine have been outlined in good agreement with the published work of Gilbert and Popp. Experiments are now underway to exchange iron and magnesium, FeMg, between chlorite solutions and solid phases with the objective of determining thermodynamic mixing models. Solid phases are analyzed by electron microprobe, the fluid phases by atomic absorption.
1061. GREENWOOD, H.J., Univ. British Columbia (Geological Sciences):  
The stability and thermodynamic properties of the amphibole edenite, 1977-79.
- Tremolite and edenitic amphiboles have been synthesized hydrothermally for investigation of the reaction tremolite + albite = edenite + 4 quartz. Composition of the amphibole coexisting with albite and quartz will be used to estimate the displacement of the equilibrium constant due to solid solution. Experiments on the reaction albite + dolomite + quartz + H<sub>2</sub>O = edenite + calcite + CO<sub>2</sub> are underway using synthetic high albite, synthetic dolomite, and natural quartz.
1062. GREENWOOD, H.J., DUFFY, C.J., Univ. British Columbia (Geological Sciences):  
Stability of minerals in the system MgO-SiO<sub>2</sub>-H<sub>2</sub>O-HF, 1969-77; Ph.D. thesis (Duffy).
- The equilibrium phase relations of minerals in the system MgO-SiO<sub>2</sub>-H<sub>2</sub>O-HF have been determined and the thermodynamic mixing parameters of all the phases estimated. The relations between the minerals brucite, sallaite, clinohumite, chronododite, nordbergite, talc, enstatite, and quartz have been determined. Fractionization of the fluorine and hydroxyl between all phases including vapor have been determined.
1063. GREENWOOD, H.J., PIGAGE, L.C., Univ. British Columbia (Geological Sciences):  
Structure and metamorphic petrology of the Cariboo Mountains, Wells Gray Park, British Columbia, 1973-78; Ph.D. thesis (Pigage).
- See:  
Rb-Sr dates for granodiorite intrusions on the northeast margin of the Shuswap Metamorphic Complex, Cariboo Mountains, British Columbia; Can. J. Earth Sci., v. 14, p. 1690-1695, 1977.
- The Wells Gray project is a study of metamorphic and structural relations on the northeast margin of the Shuswap Metamorphic Complex. Detailed mapping has outlined two major structural provinces separated by a composite fault surface. Windermere stratigraphy (Kaza and Cariboo Groups) occurs in both provinces. The fault boundary roughly corresponds with the 1st sillimanite isograd. Within the high-grade Shuswap Complex electron microprobe data for mineral assemblages in interlayered carbonate and pelitic units are combined with linear regression techniques to outline probable metamorphic reactions. Simple statistical tests are used to evaluate the significance of the resulting reactions (linear dependencies). Metamorphic mineral assemblages are compared to experimental studies to infer pressure-temperature conditions during

- metamorphism. Solid solution effects and possible buffering of fluid compositions are considered when delineating metamorphic conditions. Rb/Sr dating of post-tectonic intrusions in the area provides a reference to relate deformation and metamorphism to the absolute geologic time scale.
1064. HOGARTH, D.D., ERDMER, P., VILLENEUVE, D., GARSON, D., WARNOCK, B., Univ. Ottawa (Geology): Igneous and metamorphic petrology of the Gatineau region, Québec, 1960-; B.Sc. theses.  
Petrochemistry of iron alkalic (acmite-hematite) and magnesian (phlogopite-diopside) metasomatites; petrochemistry of molybdenite-bearing metasomatites; petrology of the Meach Lake aplites and Quinville syenites.
1065. KNITTER, C., GHENT, E.D., SIMONY, P.S., Univ. Calgary (Geology):  
Metamorphic reactions in the sillimanite zone south of Mica Creek, British Columbia, 1977-78; M.Sc. thesis (Knitter).  
The sillimanite isograd, south of Mica Creek town, has been mapped in detail. It follows approximately the contact between the lower pelitic unit and the overlying unit of striped semipelite and amphibolite. Large amphibolite sheets occur near this contact. It is also marked by marble and calc-silicate bands. The sillimanite isograd surface dips southeast at 50°-70°. The isograd is sharp and readily definable in the field. Sillimanite and kyanite overlap only in a zone 100-300 m wide. Final positioning of the isograd and completion of sillimanite growth came after the second folding phase but before the third phase of folding.
1066. LAFONTAINE, M., HOGARTH, D.D., Univ. Ottawa (Geology):  
Uranium-thorium mineralization at the Yates Mine, Huddersfield Township, Québec, 1974-78; M.Sc. thesis (Lafontaine).
1067. LAPOINTE, P., HOGARTH, D.D., Univ. Ottawa (Geology):  
Fenitization of gneisses in Hull and Templeton Townships, Québec, 1973-78; M.Sc. thesis (Lapointe).
1068. NIELSEN, P.A., Univ. Toronto (Geology):  
Geothermometry and geobarometry of Archean and Proterozoic granulite terrains from northeastern Alberta and northern Saskatchewan, 1978.  
Mineral chemical data obtained from microprobe analyses of co-existing ferromagnesium silicates (garnet, biotite, cordierite, orthopyroxene) are being used to calculate the load pressure and temperature of formation of a suite of samples from several granulite grade terrains exposed in northeastern Alberta and northern Saskatchewan. These areas are discrete thermo-tectonic blocks of both Archean and Proterozoic (Hudsonian) age. These  $P_{load}$ -T determinations will be contoured and the resultant surfaces examined. It is expected that these P-T surfaces will provide insight into the depth of formation and mode of uplift of granulite blocks in the Canadian Shield. This will allow the construction of better models of the role of vertical tectonism in the evolution of the Canadian Shield.
1069. PIRIE, J., MACKASEY, W.O., Ontario Geol. Surv.:  
Metamorphism in Quetico Belt, Superior Province, Ontario, 1977.  
Using P-T phase diagram of Carmichael (unpublished), mineral assemblages observed indicate a path of regional metamorphism stretching from extremely low greenschist facies condition along the margins of the Quetico Belt through points at 550°C at 3kb, 700°C at 4kb to a maximum of over 720°C at 4.2kb near the centre of the Belt.
1070. REES, C., LEWRY, J.F., SIBBALD, T.I.I., Univ. Regina (Geological Sciences), Sask. Geol. Surv.:  
Metamorphic patterns and their relation to tectonism and plutonism in Precambrian Shield of northern Saskatchewan, 1976-78; M.Sc. thesis (Rees).
1071. ROBIN, P-Y.F., Univ. Toronto (Erindale-Geology):  
The mechanism of metamorphic segregation and crenulation, 1977-78.  
Formation of bands of different compositions in an originally homogeneous rock is a well documented phenomenon which has long intrigued geologists. This research attempts to explain this phenomenon.
1072. SHARPE, R.J., FAWCETT, J.J., Univ. Toronto (Geology):  
Metamorphism in the Miminiska Lake area, north-western Ontario, 1972-78; M.Sc. thesis (Sharpe).  
The Miminiska Lake area lies centrally within the Uchi volcanic-plutonic belt, a major east-west trending greenstone belt of the Superior Province. Work to date for the project includes field mapping, petrographic study, x-ray diffraction and electron microprobe analyses. Metamorphic grade increases both to the north and south from an east-west trending axis of low grade (chlorite zone) metamorphism. In the western portion of the study area the lower grade zones (chlorite, biotite) broaden out such that two chlorite zones can be distinguished; furthermore, there is some evidence to indicate the existence of andalusite and/or cordierite pseudomorphs in the biotite zone. There is only very minor development of a garnet zone, and no staurolite zone exists. In the eastern area, the metamorphic zones, from chlorite through to staurolite-andalusite, are quite well developed, but narrow quite sharply, and tend to converge to the east. Strong evidence can be put forth indicating that the isograds have been folded within a large scale synclinal structure. The observed mineral assemblages suggest that two phases of metamorphism may be preserved: a low pressure Buchan type regional metamorphism in which andalusite/cordierite formed within the biotite zone, and a more modern pressure Pyrenean type regional metamorphism culminating in the formation of staurolite and andalusite. The observed distribution of mineral assemblages, together with textural observations suggest that the main metamorphic event occurred before the main phase of deformation. It is possible that the metamorphism was preceded by or contemporaneous with a separate deformational phase.

1073. WICKS, F.J., LAMARCHE, R.Y., Royal Ontario Mus. (Mineralogy and Geology):

Serpentine mineralogy of the asbestos deposits of the Eastern Townships, Québec, 1970-79.

Detailed mineralogical studies of the chrysotile asbestos veins, the non-asbestiform serpentine veins and the host serpentinite are being carried out in order to better understand the conditions under which chrysotile asbestos and the other serpentine minerals form.

#### SEDIMENTARY

1074. KRAMERS, J.W., Alberta Research Council (Geology Div.):

Wabasca "A" oil sand deposit, Grand Rapids Formation study, northeastern Alberta, 1972-80.

1075. KRAMERS, J.W., MOSSOP, G.D., ROTTENFUSSER, B.A., Alberta Research Council (Geology Div.):

Microtextures of Alberta oil sands, 1977-.

The oil sands of Alberta display a wide variety of microtextures when viewed under the scanning electron microscope. The sand grains are angular to subangular and have relatively rough surfaces, except in the rare cases of what are thought to be multicycle grains where the surfaces are smoother and the rounding and sphericity indices higher. Readily discernible rhombs of authigenic carbonate occur in localized patches, but true carbonate cement is lacking. Morphologic determination of matrix clay is possible in samples with low oil saturation. In rich oil sands (>14% oil by weight), most of the matrix material is masked by oil that coats all grains and forms bridges between grains. The location of clay minerals can be detected as small protuberances on the smooth surface of the oil. Most of the clay particles are less than 4 microns in size and appear to adhere directly to the grain surface. Books of kaolinite project through the oil layer on some of the grains. Most of Alberta's oil sands consist of unconsolidated grains set in a binding matrix of heavy asphaltic oil. In order to minimize textural disruption, it is crucial that sampling and handling of the material be carried out with extreme care. Special preparation techniques, using incubation and vacuum treatment, minimize disturbance and desiccation artifacts. Examination of uncoated samples is possible, but there are limitations on the degree of resolution that can be obtained at high magnification. These limitations do not exist for gold coated samples.

1076. MOSSOP, G.D., Alberta Research Council (Geology Div.):

Sedimentology and petrology of the Athabasca oil sands, Alberta, 1975-82.

1077. ROBIN, P-Y.F., Univ. Toronto (Erindale-Geology):  
Analysis of pressure solution in granular sediments, 1976-78.

#### See:

Thermodynamic analysis of pressure solution at grain-to-grain contacts; Proc. 2nd Symp. Water-Rock Interaction, Sec. IV, p. 128-137, 1977.

An attempt to assess the thermodynamic basis of pressure solution and to evaluate the super-saturation of the pore-water which can be expected from pressure solution as a function of depth, grain size, and contact area.

1078. YOUNG, H.R., Brandon Univ. (Geology):

Possible evidence of former evaporites in Cambro-Ordovician Durness Limestone, northwest Scotland, 1976-78.

Quartz nodules, exhibiting the morphology of nodular anhydrite, occur in two zones near the top of the Sangomore Formation (Cambro-Ordovician Durness Group) in a section on Balnakiel Bay, northwest Scotland. The nodules, up to 4 cm in diameter, occur in thinly laminated dolomite and are composed of megaquartz and length-slow chalcedony (lutecite and quartzine). Lath-like textural relicts, outlined by opaque inclusions, and minute crystals of anhydrite occur in the megaquartz and lutecite. The quartz nodules are interpreted as silica pseudomorphs after early diagenetic anhydrite nodules which developed in a peritidal setting. Quartz nodules in stratigraphically higher parts of the Durness Group may record the existence of other peritidal sediments in the same geographic area.

#### GENERAL

1079. ARNDT, N.T., BINNS, R.A., Univ. Saskatchewan (Geological Sciences), Univ. Western Australia:

Definitions, subdivision and nomenclature of komatiites, 1976-.

The ultramafic lavas of the Barberton Mountain Land for which the term komatiite was introduced now appear to be an atypical of the rock suite as a whole. In the original definition high CaO/Al<sub>2</sub>O<sub>3</sub> ratios were stressed, but this definition cannot be universally applied because most ultramafic lavas do not have this feature. Many authors have suggested that the term komatiite be restricted to those rocks with high CaO/Al<sub>2</sub>O<sub>3</sub>; others have suggested that the definition be broadened to include the entire suite. Criteria such as chemical parameters and textural features have been suggested as diagnostic features, but no consensus has been reached. The definition and usage of the term spinifex texture, which described an important characteristic of komatiites, also is subject to confusion. In an attempt to resolve these uncertainties, questionnaires canvassing the opinions of geologists who have worked with ultramafic lavas were circulated. The tasks of compiling the answers to the questionnaires, summarizing opinions, recirculating popular views, and, if possible, developing an acceptable definition and scheme of nomenclature for the rock type, constitutes the last aspect of this proposal.

1080. BUCHANAN, R.M., CANMET (EMR):

Alumina from non-bauxite resources, 1977-78.

Appraisal of Canadian anorthosites as potential sources of aluminous materials in the event of scarcity of bauxite.

1081. MARTIGNOLE, J., NANTEL, S., Univ. Montréal (Géologie):  
 Research on the structure and petrology of the southern part of the Grenville Province, 1968-.
- See:**  
 Anorthosite-farsundite complexes in the southern part of the Grenville Province; *Geoscience Can.*, v. 4, no. 3, p. 137-143, 1977.
- Geothermometry and geobarometry in the southern part of the Grenville Province: implications on the history of the Grenville Province.
1082. MUEHLENBACHS, K., Univ. Alberta (Geology):  
 Oxygen isotope geochemistry of the oceanic crust, 1966-80.
- See:**  
 Oxygen isotope geochemistry of rocks from DSDP Leg 37; *Can. J. Earth Sci.*, v. 14, p. 771-776, 1977.
- Low temperature oxygen isotope exchange between oceanic crust and seawater; *Proc. 2nd Internat. Symp. Water Rock*, p. 1317-1326, 1977.
- The oxygen isotope study of the oceanic crust has been extended to study materials recovered by IPOD phase of DSDP. Samples from DSDP Legs 46, 49, 51, 52 and 53 are being studied. To quantitatively evaluate the "aging" of the basaltic layer of the oceanic crust.
1083. STEVENSON, J.S., McGill Univ. (Geological Sciences):  
 Environment of Nickel deposits, Thompson, Manitoba, 1969-79.
- Detailed petrography of the metasediments most closely associated with the ore bodies and related ultramafics.
1084. TRUEMAN, D., TURNOCK, A.C., Univ. Manitoba (Earth Sciences):  
 Structure and development of the Bird River greenstone belt, Manitoba, 1973-78; Ph.D. thesis (Trueman).
- Three quarters of the whole greenstone belt, 30 miles long and 6 miles wide, has been mapped by examining each outcrop. Compilation maps at 1 inch = 0.5 miles and 1 inch = 0.25 miles have been prepared. The structures of the belt and theories of their development are described in a draft thesis.
1085. TRZCIENSKI, W.E., Jr., BIRKETT, T., Ecole Polytechnique:  
 Petrology and tectonics of the Cambro-Ordovician sequence in the Quebec Appalachians, 1976-79; Ph.D. thesis (Birkett).
- See:**  
*Geol. Surv. Can.*, Paper 77-1B, p. 77-79, 1977.
- To relate the igneous and metamorphic petrology of Cambro-Ordovician age of the tectonics found in this area of Québec.
1086. TRZCIENSKI, W.E., Jr., BIRKETT, T., CHEVE, S., Ecole Polytechnique:  
 Mineralogical and petrological problems in the Canadian Appalachians, 1973-; Ph.D. thesis (Chevé).
- To understand and describe the geologic evolution of various parts of the Appalachian chain.

QUATERNARY GEOLOGY

1087. AALTONEN, R.A., DREIMANIS, A., Univ. Western Ontario (Geology):  
 Geology of the City of London, 1970-78; Ph.D. thesis (Aaltonen).
1088. ANDERSON, T.W., *Geol. Surv. Can.*:  
 Quaternary geology, Great Lakes, 1968-.
1089. ANDRIASHEK, L.D., FENTON, M.M., Alberta Research Council (Geology Div.):  
 Surficial geology Wabamun map sheet 83G, Alberta, 1973-79.
1090. ANDRIASHEK, L.D., RUTTER, N.W., FENTON, M.M., Univ. Alberta (Geology), Alberta Research Council (Geology Div.):  
 Surficial geology and glacial stratigraphy in the Cold Lake area, Alberta, 1976-78; M.Sc. thesis (Andriashek).
1. Quaternary stratigraphy and surficial geology of the Vermillion map sheet NTS 73E: (a) completion surficial geology map initiated by R. Ellwood in 1961; (b) study the Quaternary stratigraphy for the purpose of defining and tracing lithostratigraphic units; and (c) correlation of these units with those recognized in the Sand River Sheet 73-L and the Edmonton Sheet 83H.
2. Quaternary stratigraphy and environmental geology, Greater Edmonton region: (a) develop a geological and geotechnical data base appropriate for regional land use planning; and (b) evaluate this data base in the Edmonton regional planning area.
1091. ARMSTRONG, J.E., *Geol. Surv. Can.*:  
 Surficial geology of Fraser Lowland, British Columbia, 1973-.
- See:**  
 Two major Wisconsin lithostratigraphic units in southwest British Columbia; *Can. J. Earth Sci.*, vol. 14, no. 7, p. 1471-1480, 1977.
1092. BADA, J.L., KARROW, P.F., CHURCHER, C.S., STALKER, A.M., Scripps Instit. Ocean. (Ocean Res.), Univ. Waterloo (Earth Sciences):  
 Amino-acid racemization as an aid to dating Quaternary fossils (bone, shell, wood), 1976-78.

- Using calibration samples of known age, we are trying to date Late Pleistocene bones from Alberta, bones and wood from the Toronto interglacial, and shells from California raised marine terraces.
1093. BARNETT, D.M., Geol. Surv. Can.:  
Surficial geology, geomorphology and terrain performance of Melville Island, District of Franklin, 1971-.
1094. BARNETT, D.M., Geol. Surv. Can.:  
Surface geology, terrain inventory, Bathurst, Cornwallis and eastern Melville Islands, District of Franklin, 1974-.
1095. BARNETT, P.J., Ontario Geol. Surv.:  
Quaternary geology fo the Tillsonburg map-area, Ontario, 1976-78.  
  
Mapping was completed in the summer of 1976 and a preliminary map is available. Construction of preliminary drift thickness and bedrock topography maps for the area are in progress.
1096. BARNETT, P.J., Ontario Geol. Surv.:  
Quaternary geology of Renfrew County, Ontario, 1977-79.  
  
**See:**  
Quaternary geology of the Renfrew (31F/7), Cobden (31F/10) and Fort Coulonge (31F/15) areas, Renfrew and Lanark Countries; Ontario Division of Mines, M.P. 75, p. 151-153, 1977.  
  
Brudenne (31F/6) and Golden Lake (31F/11) will be mapped in 1978.
1097. BLAKE, W.Jr., Geol. Surv. Can.:  
Quaternary geochronology, Arctic Island, 1975-.  
  
**See:**  
Iceberg concentrations as an indicator of submarine moraines, eastern Queen Elizabeth Islands, District of Franklin; Geol. Surv. Can., Paper 77-1B, p. 281-286, 1977.  
  
Aspects of glacial history, southeastern Ellesmere Island, District of Franklin; Geol. Surv. Can., Paper 78-1A, p. 175-182, 1978.
1098. BLUSCO, S.M., Geol. Surv. Can.:  
Surficial geology and geomorphology Mackenzie Bay-continental shelf, 1970-.
1099. BORNHOLD, B.D., Geol. Surv. Can.:  
Offshore Quaternary geology, Arctic island channels, District of Franklin, 1973-.
1100. BROSTER, B.E., DREIMANIS, A., Univ. Western Ontario (Geology):  
Huron lobe tills west of Wyoming moraine, Ontario, 1976-78; M.Sc. thesis (Broster).  
  
**See:**  
Magnetic, physical and lithologic properties and age of till exposed along the east coast of Lake Huron, Ontario: Discussion; Can. J. Earth Sci., v. 14, p. 2169-2175, 1977.
1101. BURWASSER, G.J., Ontario Geol. Surv.:  
Quaternary geology of the Nottawasaga Bay area (NTS sheets Barrie, Orr Lake, Nottawasaga and Collingwood), Ontario, 1973-80.
1102. BURWASSER, G.J., Ontario Geol. Surv.:  
Quaternary geology of the Onion Lake and Sunshine areas, District of Thunder Bay, Ontario, 1976-81.  
  
**See:**  
Ontario Division of Mines, M.P. 75, p. 139-140, 1977.
1103. CHAUVIN, L., LASALLE, P., Québec Min. Richesses Naturelles:  
REGION DE JOUTEL-MATAGAMI, comtés d'Abitibi-Est et d'Abitibi-Ouest, Québec (1:50,000), 1977-.  
  
Les objectifs du projet sont d'établir la stratigraphie des dépôts meubles de la région et d'étudier les relations géochimiques pouvant exister entre ces dépôts et la roche de fond. La cartographie a été complétée durant l'été 1977. Un programme de forage des sédiments a été entrepris en 1977 et se poursuivra durant l'été 1978. Des analyses stratigraphiques, géochimiques et minéralogiques sont actuellement en cours sur les échantillons de ces forages et se poursuivront durant l'année.
1104. CLAGUE, J.J., Geol. Surv. Can.:  
Quaternary geology, northern Strait of Georgia, British Columbia, 1974-.
1105. CLAGUE, J.J., Geol. Surv. Can.:  
Quaternary geology, terrain inventory, Prince Rupert - Terrace area, British Columbia, 1975.  
  
**See:**  
Two major Wisconsin lithostratigraphic units in southwest British Columbia; Can. J. Earth Sci., vol. 14, no. 7, p. 1471-1480, 1977.  
  
Terrain hazards in the Skeena and Kitimat River basins, British Columbia; Geol. Surv. Can., Paper 78-1A, p. 183-188, 1978.
1106. COOPER, A.J., Ontario Geol. Surv.:  
Quaternary geology of the Strathroy-Ridgetown area, Ontario, 1976-78.
1107. COWAN, W.R., Ontario Geol. Surv.:  
Quaternary geology of the Wingham-Lucknow area, southern Ontario, 1973-79.
1108. COWAN, W.R., Ontario Geol. Surv.:  
Pleistocene stratigraphy of the Moose River Basin from recent borings, 1975-78.
1109. COWAN, W.R., Ontario Geol. Surv.:  
Quaternary geology of the Walkerton-Kincardine area, Ontario, 1975-79.  
  
**See:**  
Quaternary geology of the Walkerton (41A/3) area, Bruce and Grey Counties; Ontario Division of Mines, M.P. 75, p. 141-143, 1977.

1110. COWAN, W.R., Ontario Geol. Surv.:  
Quaternary geology of the Sault Ste Marie area, Ontario, 1976-78.
1111. COWAN, W.R., KARROW, P.F., COOPER, A.J., Ontario Geol. Surv.:  
Quaternary geology of the Kitchener area - compilation map, 1977-78.
1112. DREDGE, L.A., Geol. Surv. Can.:  
Surficial geology, Sept-Iles Cap Chat, Québec, 1971-.
1113. DREDGE, L.A., Geol. Surv. Can.:  
Quaternary geology, northeastern Manitoba, 1975-.
1114. DREIMANIS, A., BROSTER, B.E., GIBBARD, P., HICOCK, S.R., Univ. Western Ontario (Geology):  
Tills, their genesis and classification, 1970-82; M.Sc. thesis (Broster).  
  
Several progress reports presented at the X INQUA Congress at Birmingham, U.K. in 1977 on the genetic classifications of tills, the origin of water-lain tills, methods of investigation of tills.
1115. DREIMANIS, A., GRANT, D.R., GAUTHIER, R.C., Univ. Western Ontario (Geology):  
Last glaciation in the eastern North America, 1958-.
- See:**  
Late Wisconsin glacial retreat in the Great Lakes region, North America; *Annals New York Acad. Sci.*, v. 288, p. 70-89, 1977.  
  
The Canadian work group of the IGCP Project 71/1/24 and Late Pleistocene stratigraphy of southeastern Canada, Progress Report 1976; IUGS-UNESCO ICP Project 73-1-24, Rept. 4, p. 126-134, 1977.
1116. DUBOIS, J.M.M., ST-ONGE, D.A., Univ. Ottawa (Géographie);  
Géologie du quaternaire de la côte-nord de l'estuaire maritime du Saint-Laurent, 1974-78; thèse de doctorate (Dubois).
- Voir:**  
Déglaciation de la côte-nord du Saint-Laurent: analyse sommaire; *Géogr. Phys. Quat.*, v. 31, no. 3-4, p. 229-246, 1977.  
  
La prise de données sur le terrain, la cartographie préliminaire au 1:25 000 ainsi que les analyses de routine sont terminées. La carte de compilation au 1:100,000 est en bonne voie. Il reste à produire des courbes de relèvement isostatique, les cartes d'évolution paléogéographique et la rapport écrit.
1117. DYKE, A.S., Geol. Surv. Can.:  
Quaternary geology - terrain inventory Boothia Peninsula, northeast Keewatin, and Somerset and Prince of Wales Islands, 1975-.
1118. DYKE, A.S., Geol. Surv. Can.:  
Surficial and Quaternary geology of Cumberland Peninsula, Baffin Island, District of Franklin, 1977-.
- See:**  
Qualitative rates of frost heaving in gneissic bedrock on southeastern Baffin Island, District of Franklin; *Geol. Surv. Can.*, Paper 78-1A, p. 501, 502, 1978.
1119. EDWARDS, W.A.D., DREIMANIS, A., Univ. Western Ontario (Geology):  
Lithologic variations in some eskers of Southern Ontario, 1974-77; M.Sc. thesis (Edwards).
1120. EDWARDS, W.A.D., PETERSON, B.N., SHETSEN, I., Alberta Research Council (Geology Div.):  
The sand and gravel inventory of Alberta, 1976-81.  
  
The Canmore, Lethbridge, Grande Prairie and St. Paul areas have been field checked and reports will include a geological description of aggregate deposits and an assessment of their extent and potential as resources. Maps at 1:50 000 and 1:125 000 will delineate aggregate areas.
1121. FENTON, M.M., ANDRIASHEK, L.D., Alberta Research Council (Geology Div.):  
Quaternary stratigraphy and surficial geology, Sand River map sheet 73L, Alberta, 1976-78; M.Sc. thesis (Andriashek).  
  
Completed examination of west and last half of area. Sample analysis and final photo interpretation in progress.
1122. FILLON, R.H., Geol. Surv. Can.:  
Late Cenozoic paleo-oceanography of the Labrador Sea, 1975-.
1123. FITZGERALD, W.D., KARROW, P.F., Ontario Geol. Surv., Univ. Waterloo (Earth Sciences):  
Quaternary geology, Sarnia area, Ontario, 1977-79; M.Sc. thesis (Fitzgerald).  
  
Mapping completed and drilling program and analyses of samples in progress.
1124. FORBES, D.L., Geol. Surv. Can.:  
Sedimentary processes and sediments, Babbage River delta, Yukon coast, 1974-.
1125. FRENCH, H.M., HAYWARD, M., Univ. Ottawa (Geology-Geography):  
The nature of cold-climate coastal processes: (a) western and southwestern Banks Islands, Northwest Territories, and (b) the late-glacial Champlain Sea environment of the Ottawa Valley, Eastern Canada, 1978-80.  
  
Marine environments of the Champlain Sea, Ottawa Valley; M.A. thesis (Hayward).

To document and monitor the nature and rate of coastal activity on southwest Banks Islands, Canadian Arctic, notably the growth of Cape Kellett, nearshore sedimentation at Sachs Harbour, and coastal erosion in the Sachs River lowlands; to assess the influence that permafrost and pack ice have upon the effectiveness of coastal processes in high latitudes; and to deduce, from stratigraphic and geomorphic studies, the changing environment and other attributes (temperature, salinity, etc.) of the Champlain Sea, and to compare the Champlain Sea environment with that of the present western Arctic coastal environment.

1126. FULTON, R.J., Geol. Surv. Can.:  
Quaternary geology inventory, southern Labrador, 1969-.
1127. FULTON, R.J., Geol. Surv. Can.:  
Quaternary geology of the Canadian Cordillera, 1975-.
1128. GAUTHIER, R.C., Geol. Surv. Can.:  
Quaternary geology of the Bathurst area, New Brunswick, 1976-.
- See:  
Quelques interprétations de l'inventaire des dépôts de surface, péninsule nord-est du Nouveau Brunswick; Geol. Surv. Can., Paper 78-1A, p. 409-412, 1978.
1129. GEDDES, R.S., DREIMANIS, A., Univ. Western Ontario (Geology):  
Mineral exploration by stratigraphic investigations of Pleistocene deposits in the Kidd Creek Mine area, Timmins, Ontario, 1975-78; M.Sc. thesis (Geddes).
1130. GRANT, D.R., Geol. Surv. Can.:  
Quaternary geology St. Anthony - Blanc Sablon, Newfoundland, 1969-.
1131. GRANT, D.R., Geol. Surv. Can.:  
Surficial geology, Cape Breton Island, Nova Scotia, 1970-.
1132. GRANT, D.R., Geol. Surv. Can.:  
Surficial geology of Newfoundland, 1974-.
1133. GRAVENOR, C.P., HEINE, T.H., SYMONS, D.T.A., STUPAVSKY, M., Univ. Windsor (Geology):  
A paleomagnetic study of the Catfish Creek Till, Ontario, 1975-77; M.Sc. thesis (Heine).  
The Catfish Creek Till is an early Late Wisconsin drift unit of apparent widespread extent in southwestern Ontario. A total of 62 blocks were collected from 14 sites from exposures along the north coast of Lake Erie west of Port Stanley. The paleomagnetic results show an excursion of the virtual geomagnetic pole to long. 54°W, lat. 20°N when the lower part of the Catfish Creek Till was deposited. This excursion apparently lasted for a short time; during the time the upper part of the till was deposited, the virtual geomagnetic pole moved to more northerly latitudes long. 98°W, lat. 86°N. This excursion is tentatively correlated with the Laschamp event and may provide a criterion by which the lower part of the Catfish Creek Till can be identified.

1134. GRAVENOR, C.P., STUPAVSKY, M., SYMONS, D.T.A., Univ. Windsor (Geology):  
Paleomagnetism of the Seminary and Meadowcliffe Tills form the Scarborough Bluffs, Toronto, Ontario, 1977-.  
About 250 cores were collected for paleomagnetic studies from the Seminary and Meadowcliffe tills exposed along the Scarborough Bluffs at Toronto, Ontario. Lexan polycarbonate plastic tubes were driven into freshly exposed sections of the till and oriented in a conventional manner. Vertical sampling of the section revealed that the upper 50 cm of the Meadowcliffe Till, in one area, recorded a geomagnetic field excursion during which the remanence inclination changed smoothly from +46° to -7° to 55°. This excursion is probably the 33,500 yr. B.P. Laschamp event and it refines the previous estimates for the date for the top of the Meadowcliffe Till. The observed correspondence of the magnetic and climatic records for glacial tills and varved clays are examined in relationship to climate-induced sedimentologic effects and sedimentary inclination errors imposed on the magnetic records.
1135. HICOCK, S.R., DREIMANIS, A., Univ. Western Ontario (Geology):  
Pre-Fraser Pleistocene stratigraphy, geochronology and paleoecology of the Georgia Depression, British Columbia, 1976-80; Ph.D. thesis (Hicock).
1136. HODGSON, D.A., Geol. Surv. Can.:  
Surficial geology and geomorphology of central Ellesmere Island, District of Franklin, 1972-.
1137. HUGHES, O.L., Geol. Surv. Can.:  
Quaternary stratigraphy of Old Crow Basin and Porcupine River Valley, Yukon, 1968-.
- See:  
Surficial geology and terrain evaluation; Geol. Surv. Can., Paper 78-1A, p. 465, 1978.
1138. JACKSON, L.E., Geol. Surv. Can.:  
Quaternary geology, terrain inventory, Kananaskis Lakes, Alberta, 1974-.
1139. KARROW, P.F., BAKER, C.L., Univ. Waterloo (Earth Sciences):  
Till microfabrics as an indicator of direction of ice movement for clay tills near Waterloo, Ontario, 1975-78; M.Sc. thesis (Baker).  
Sampling, sectioning, and most measurements completed.
1140. KARROW, P.F., MILLER, B.B., KALAS, L., Univ. Waterloo (Earth Sciences), Kent State Univ. (Geology), CCIW:  
Glacial lake history, Huron basin, Ontario, 1968-80.  
See:  
Stratigraphy, paleontology and age of Lake Algonquin sediments in southwestern Ontario, Canada; Quat. Res., v. 5, p. 49-87, 1977.  
Study of mollusc assemblages from sites in terraces of Algonquin, Stanley, and Nipissing age completed and manuscript submitted. Further geomorphic analysis of valley terraces east of Lake Huron continuing.

1141. KARROW, P.F., MORGAN, A., HANN, B., POPLAWSKI, S., KALAS, L., Univ. Waterloo (Earth Sciences):  
Paleontology of the Toronto interglacial, 1963-.
1142. KARROW, P.F., MORGAN, A.V., SCHWERT, D.P., KALAS, L., ANDERSON, T.W., DELORME, L.D., Univ. Waterloo (Earth Sciences):  
Paleoclimates and paleontology of a marl bog, Gage Street, Kitchener, Ontario, 1974-80; Ph.D. thesis (Schwert).
1143. KARROW, P.F., PRESANT, E., KALAS, L., Univ. Waterloo (Earth Sciences), Univ. Guelph (Land Res. Sci.), CCIW:  
Victoria Street interstadial and paleosol, Guelph, Ontario, 1975-79.  
Temporary exposure in excavation has been supplemented by three borings into bedrock. Analyses of molluscs, ostracods, plants, and insects, as well as of tills and paleosol in progress. Radiocarbon dating is being attempted.
1144. KARROW, P.F., WHITE, O.L., Univ. Waterloo (Earth Sciences), Ontario Geol. Surv.:  
Urban geology, Kitchener-Waterloo, Ontario, 1959-.
1145. KLASSEN, R.W., Geol. Surv. Can.:  
Quaternary geology inventory, lower Nelson River basin, Manitoba, 1971-.
1146. MACNEILL, R.H., Nova Scotia Res. Foundation Corp. (Geophysics):  
Pleistocene geology of Nova Scotia, 1951-78.  
Most of the 50,000 scale maps are completed and expect to complete the few remaining map sheets during 1978.
1147. MARTINEAU, G., LASALLE, P., Québec Min. Richesses Naturelles:  
Comtes de Kamouraska et Rivière-du-Loup, Québec (1:50 000), 1976-.
1148. MAY, R.W., Univ. Alberta (Geology):  
Lithology and genesis of Quaternary deposits, Alberta, 1975-.  
Current studies are concentrated in two major areas: (1) the sedimentology of glaciolacustrine and glaciofluvial deposits, and (2) the geology and geotechnical aspects of tills in the Edmonton area.
1149. McCOURT, G., MAY, R.W., SCHWEGER, C., Univ. Alberta (Geology):  
Palynology and macrobotanical analysis of a Quaternary section, Bluefish River, Yukon Territory, 1977-78; M.Sc. thesis (McCourt).  
To study the palynology and macrobotanical remains of an alluvial section in the Bluefish River Basin which is located just south of the village of Old Crow in the northern Yukon. Because this area was unglaciated during the Quaternary, it is hoped to be able to document the vegetational history of the area over the last 50,000 Years B.P. Establishing a pollen record will add to the regional vegetational picture that is being established. It is also hoped to document the appearance of spruce into the area after the retreat of the Wisconsin, and to correlate the pollen record with the geologic history and entomological record of the area. By using the above correlations it may be possible to establish a paleoclimatic history of the area during the Quaternary.
1150. NETTERVILLE, J.A., Geol. Surv. Can.:  
Quaternary geology, terrain inventory, Boothia Peninsula, northeast Keewatin, and Somerset and Prince of Wales Islands, District of Franklin, 1975-.
1151. PROUDFOOT, D.N., RUTTER, N.W., Univ. Alberta (Geology):  
The subsurface stratigraphy of the Pleistocene deposits of parts of southern Alberta, 1976-79; Ph.D. thesis (Proudfoot).  
Determination and correlation of the Pleistocene stratigraphy from an analysis of field relationships observed in exposed sections, auger holes and air photos. Field work will be augmented by laboratory work. Correlation with existing local and regional stratigraphy will also be included.
1152. RAMPTON, V., Geol. Surv. Can.:  
Quaternary geology, Beaufort-Mackenzie, 1969-.
1153. RICHARD, S.H., Geol. Surv. Can.:  
Surficial geology, Tawatinaw area, Alberta, 1968-.
1154. RICHARD, S.H., Geol. Surv. Can.:  
Surficial geology, Ottawa Valley lowlands, 1974-.
1155. RUTTER, N.W., Univ. Alberta (Geology):  
Quaternary history of parts of Alberta, British Columbia and Yukon, 1976-.
1156. RUTTER, N.W., Univ. Alberta (Geology):  
Paleosols of the Prairie Provinces, 1976-78.
1157. RUTTER, N.W., CRAWFORD, R.J., HAMILTON, R., Univ. Alberta (Geology):  
Development of amino acid racemization dating techniques, 1976-.
1158. SADO, E.V., Ontario Geol. Surv.:  
Quaternary geology of the Coniston and Coppercliff map sheets, Ontario 1977-.
1159. SADO, E.V., KARROW, P.F., Ontario Geol. Surv., Univ. Waterloo (Earth Sciences):  
Till stratigraphy in the Lucan map sheet, south-western Ontario, 1978-79; M.Sc. thesis (Sado).
1160. SCHREINER, B.T., Sask. Geol. Surv. - Saskatchewan Res. Council (Geology):  
Reconnaissance Quaternary geology: NTS areas 74B, 74F and 74G, 1977-78.  
This year's mapping completed 1:250,000 reconnaissance Quaternary geology coverage of northern Saskatchewan as far north as latitude 58°N. The four-year project is being written up in one report with accompanying maps due for completion in 1978.

1161. SHARPE, D.R., Ontario Geol. Surv.:  
Quaternary geology of the Chesley-Tiverton-Wiarton areas, Ontario, 1976-78.  
A sequence of late Wisconsinan tills is exposed mainly along the Saugeen River. These tills represent ice movement from Georgian Bay - Lake Huron ice. Coarse and fine textured tills represent a general classification scheme indicating deposition of material with englacial to local ponded origins. The till units are at times multiple in nature along the valley of the Saugeen River. Large areas of lacustrine clay, silt and sand cover the region. These were deposited by a series of lakes, the last two formed extensive shoreline features and deposits.
1162. SHARPE, D.R., Ontario Geol. Surv.:  
Quaternary geology of the Bruce Peninsula, southern Ontario, 1977-79.  
**See:**  
Ontario Division of Mines, M.P. 75, p. 149-150, 1977.
1163. SHARPE, D.R., WHITE, O.L., Ontario Geol. Surv.:  
The geology of Toronto, Ontario, 1978-  
A developing program to assess, compile and report on the geology of Toronto. The style of publication will be geared to a popularized version of the city's geology presented as papers, pamphlets and possibly a guidebook.
1164. SHILTS, W.W., Geol. Surv. Can.:  
Properties and provenance of till, 1969-  
**See:**  
Anomalous uranium concentrations in till north of Baker Lake, District of Keewatin; Geol. Surv. Can., Paper 77-1B, p. 291, 292, 1977.  
Some physical and chemical properties of till derived from the Meguma Group, southeast Nova Scotia; Geol. Surv. Can., Paper 78-1A, p. 459-461, 1978.
1165. SHILTS, W.W., Geol. Surv. Can.:  
Quaternary geology inventory-geomorphic process studies, Maguse River, District of Keewatin, 1973-  
**See:**  
Surficial geology of the Baker Lake area, District of Keewatin; Geol. Surv. Can., Paper 77-1B, p. 311-314, 1977.
1166. STALKER, A.M., Geol. Surv. Can.:  
Quaternary of southern Alberta, 1965-  
**See:**  
Paleomagnetic remanence characteristics of surface tills found in the Pakowki-Pinhorn area of southern Alberta; Geol. Surv. Can., Paper 77-1B, p. 271, 272, 1977.  
The probable extent of classical Wisconsin ice in southern and central Alberta; Can. J. Earth Sci., vol. 14, no. 11, p. 2614-2619, 1977.  
Characteristic magnetization of some Middle Pleistocene sediments from the Medicine Hat area of southern Alberta; Geol. Surv. Can., Paper 78-1A, p. 487, 488, 1978.
1167. STALKER, A.M., Geol. Surv. Can.:  
Synthesis of Quaternary geology, Great Plains of Canada, 1975-.
1168. TERASMAE, J., Brock Univ. (Geological Sciences):  
Peat stratigraphy and rates of deposition, related to climate change and postglacial geological history, 1978-81.  
To determine peat deposition rates during postglacial time, and determine the factors (and their relative importance) that control peat deposition. The investigation includes studies of peat stratigraphy, palynology, paleobotany, radiocarbon dating, and other characteristics of peat deposits (decomposition, compaction, moisture and ash content, etc.). The study will be related to postglacial geological history, vegetation, and climate of the peatlands investigated.
1169. TERASMAE, J., BARNETT, P.J., Brock Univ. (Geological Sciences), Ontario Geol. Surv.:  
Late-Wisconsinan palynology, geochronology, and geology of the Tillsonburg area Ontario, 1976-78.  
Palynology and radiocarbon dating of lake sediments and peat deposits related to moraines and glacial lake shorelines have been used to establish a chronology for geological events from >12 000 to about 10 000 radiocarbon years ago, and to reconstruct the type of vegetation and environmental conditions during that time.
1170. TERASMAE, J., ZOLTAI, S.C., Brock Univ. (Geological Sciences), Fisheries-Environment Canada (Northern Forest Res. Centre):  
Postglacial peat deposition, history of vegetation, and climate changes in the forest-tundra region west of Hudson Bay, Northwest Territories, 1977-78.  
The study covers 4 peat deposits in the forest-tundra zone west of Hudson Bay (Lat. 60°37' to 62°07'N and Long. 96°32' to 97°12'W). Radiocarbon dating, palynology, and paleobotanical analyses are used to determine peat deposition rates, postglacial history of vegetation, and climatic changes.
1171. UNKAUF, J.C., RUTTER, N.W., Univ. Alberta (Geology):  
The surficial geology and Quaternary stratigraphy of the Grande Prairie area, northwest Alberta, 1976-78; Ph.D. thesis (Unkauf).
1172. VANDERVEER, D.G., SPARKES, B.G., KIRBY, F., CORNISH, J., Newfoundland Dep. Mines Energy:  
Surficial and glacial geological mapping-gravel resource inventory in Newfoundland and Labrador, 1974-  
To date four areas of insular Newfoundland (covering 1:50 000 map sheets: 1L/13, 1L/14, 1M/3, 1M/4, 1M/16, 1N/5, 1N/7, 1N/10, 1N/12, 1N/13, 1N/15, 2C/4, 11O/10, 11O/11, 11O/14, 12B/2, 12B/3, 12B/7 and 12B/8) have been released on open file. An additional four areas of insular Newfoundland (includes 1N/6, 1N/11, 2E/8, 2F/4, 2F/5+6, 12A/13, 12B/6, 12B/9, 12B/10, 12B/11, 12B/16, and 12H/3) and two areas of Labrador (includes 12P/6, 12P/7, 12P/9, 12P/10, 12P/11, 13F/2, 13F/7, 13F/8 and parts of 13F/3, 13F/4, 13C/13, and 13C/14) have been field mapped and work is progressing on releases for these areas.

1173. VILKS, G., Geol. Surv. Can.:  
Pleistocene-Holocene basin sedimentation, 1975-.
1174. VINCENT, J-S., Geol. Surv. Can.:  
Surficial geology inventory, Banks Island, District of Franklin, 1974-.
- See:**  
Lithostratigraphy of the Quaternary sediments east of Jesse Bay, Banks Island, District of Franklin; Geol. Surv. Can., Paper 78-1A, p. 189-193, 1978.
1175. WATERS, P.L., RUTTER, N.W., Univ. Alberta (Geology):  
Post-glacial landscape of Southern Alberta as interpreted from paleosols, 1976-78; M.Sc. thesis (Waters).
1176. WESTGATE, J.A., BRIGGS, N.D., PEARCE, G.W., CHOU, C-L., NIELSEN, P.A., HUGHES, O.L., PEWE, T., Univ. Toronto (Geology), Geol. Surv. Can., Univ. Arizona, Tempe:  
Quaternary tephrochronological studies in western Canada, Yukon Territory and Alaska, 1967-.
- Documentation of the discriminating characteristics, age, and extent of tephtras in late Quaternary sediments of southwestern Canada is continuing in an effort to refine the tephrostratigraphical record and identify source volcanoes (Westgate, Chou, Nielsen). Fission-track dating, mineralogical and chemical studies of sub-till tephtras in southern Alberta and Saskatchewan show that this region was glaciated several times prior to 0.5 m.y. ago. Work is in progress that will tie down the age of the first Laurentide glaciation there (Briggs, Westgate). The late Cenozoic tephrochronology of the Yukon Territory and adjacent areas of Alaska is now underway; fission-track and palaeomagnetic studies provide the chronological control (Westgate, Hughes, Briggs, Pearce, Pewe). The latter project forms part of an interdisciplinary effort aimed at reconstruction of Quaternary environments in the northern Yukon.
1177. WESTGATE, J.A., KALAS, L., EVANS, M.E., Univ. Toronto (Geology), Fisheries-Environment Canada (CCIW), Univ. Alberta (Physics):  
Quaternary geological studies in central and southern Alberta, 1974-78.
1178. WIGHTMAN, D.M., COOKE, H.B.S., Dalhousie Univ. (Geology):  
Raised marine features on the north side of Minas Basin, Nova Scotia, 1975-78; PH.D. thesis (Wightman).
- Raised deltas and an elevated outwash terrace occur on the south side of the Cobequid Hills and are being studied in an endeavour to clarify the late glacial and post-glacial history of the area. The largest delta, at Parrsboro, is being studied in detail. The deltas indicate deposition in a marine environment that was essentially non-tidal.
1179. YOUNG, H.R., WELSTED, J., Brandon Univ. (Geology, Geography):  
A geological and geomorphological study of the Brandon Hills, Manitoba, 1972-78.
- The Brandon Hills, described in the literature as end moraine are more complex in form and origin than this simple designation suggests. They can be divided into five morphological regions, at least three of which are primarily of glaciofluvial origin. A steep-sided, elongated ridge at the eastern end of the hills is interpreted as an esker. Field work has been completed.

## REMOTE SENSING

1180. BONN, F.J., BOISVERT, S.J., Univ. Sherbrooke:  
Utilisation de la thermographie dans la délimitation des sites de pellés nocturnes, 1978-79.
- Délimiter, en utilisant la thermographie aérienne, les secteurs propices aux inversions de température, et donc aux peles nocturnes.
1181. BONN, F.J., GHLAR, J., Univ. Sherbrooke:  
Utilisation des données du satellite HCMM et du concept d'inertie thermique dans l'étude du milieu naturel, 1978-81.
- Utilisation du satellite HCMM dans la délimitation des zonés thermiques du milieu naturel en s'appuyant eu particulier sur le concept d'inertie thermique.
1182. BONN, F.J., CLEMENT, P., Univ. Sherbrooke:  
Utilisation des techniques de télédétection dans l'évaluation des ressources en eau. Application au bassins de la rivière St. Francois, 1977-81.
- See:**  
Thermal infrared remote sensing of soil moisture: what can be expected from HCMM data?; 12th Int. Symp. on Remote Sensing of Environment, Univ. of Michigan Press, 1977.
- Les mesures au sol sont à présent presque terminées, il reste encore des mesures à faire
- des survols, en particulier pour l'humidité des sols. Les tests de laboratoire et l'analyse des données aériennes sont en cours.
1183. HARDY, N.E., Univ. Toronto (Geography):  
Development of a low-cost aerial photographic simulation model with multispectral capabilities, 1976-78.
- To provide a basis for the study of photographic responses to a series of conditions which are readily controllable. Multiple film-filter combinations can be employed simultaneously to record changes in the surface composition and configuration, water quality, and illumination distribution and quality. The system provides for variable processing techniques for each film type, and computation relating to irradiance variations.
1184. PARRY, J.T., HOWLAND, W., BARBER, E., McGill Univ. (Geography):  
Terrain evaluation project, 1975-78; Ph.D. thesis (Howland), M.Sc. thesis (Barber).
- Preparation of terrain factor maps (1:50 000) for surface materials, slope classes, microrelief, vegetation structure and snow conditions (1:250 000); investigation of vegetation-ground condition relationships in Caribou Hills, and vegetation-permafrost process relationships Campbell Lake area, Northwest Territories.

## ANCIENT SEDIMENTS

1185. ARENGI, J., BEALES, F.W., Univ. Toronto (Geology):  
Sedimentary evolution of the Sudbury basin, Ontario.  
The Sudbury Basin was probably initiated by meteoritic impact. The original impact site was a ring-type crater approximately 100 km in diameter with low rim relief. Instantaneous deposition of the Onaping as fallback and wash-in accompanied by slumping along rim faults resulted in a basin with little or no relief and a flat floor. Carbonate banks developed locally during initial shallow water conditions. A regional rise in relative sea level resulted in deposition of the fine-grained Onwatin sediments as turbidites and pelagic deposition. Similarities between the Onwatin and Chelmsford Formations and the upper Animikie units of Minnesota suggest deposition under the same conditions, i.e. muds deposited under anoxic conditions and turbidites deposited in response to Hudsonian tectonics.
1186. BAILES, A.H., BRISBIN, W.C., AYRES, L., FROESE, E., McRITCHIE, W.D., Univ. Manitoba (Earth Sciences), Geol. Surv. Can., Manitoba Geol. Services Br.:  
Sedimentology, regional metamorphism and significance of turbiditic greywacke and shale strata of the Kisseynew sedimentary gneiss belt at File Lake, Manitoba, 1972-78; Ph.D. thesis (Bailes).  
**See:**  
Geology of the File Lake area; Manitoba Mineral Res. Div., Geol. Rept. 78/1, 1978.
1187. BEALES, F.W., HARDY, J.L., Univ. Toronto (Geology):  
Criteria for the recognition of diverse dolomite types.  
**See:**  
The problem of recognition of occult evaporites with special reference to southeast Missouri; Econ. Geol., v. 72, p. 487-490, 1977.  
For many years sedimentary dolomite has been thought to be formed by the diagenetic alteration of calcites or aragonitic precursor grains under hypersaline conditions. More recently many geologists have been invoking hyposaline conditions due to the mixing of fresh and marine waters for the formation of wide-spread dolomite deposits. Both processes are theoretically possible and criteria are needed for a distinguishing between these and other possible dolomite geneses. The presence of gypsum/anhydrite crystallites in Viburnum trend dolomites suggests that at least these formed in hypersaline conditions.
1188. BURROWES, O.G., BAILLIE, A.D., PETRACCA, A.N., Gulf Oil Canada Ltd. (Geological Serv.):  
Facies distribution and evolution of lower Beaverhill Lake carbonates, west-central Alberta, 1977-78.  
The study area consists of approximately 800 sq. miles to the north and northwest of the producing Swan Hills and Snipe Lake oil fields. The primary objectives are: to develop a geological picture of the evaluation of the Beaverhill Lake carbonates; to determine the distribution of major facies within the Slave Point platform/bank carbonates; and thus to help delineate possible exploration targets within the Slave Point or overlying Swan Hills carbonates.
1189. CASS, J.I., RUST, B.R., Univ. Ottawa (Geology):  
Paleoenvironments of the Beekmantown Group, Ottawa Basin, 1975-78; M.Sc. thesis (Cass).  
The pre-Chazyan Beekmantown Group of the Ottawa Basin is a marine transgressive sequence deposited in a shallow restricted embayment generally sheltered from extreme water agitation. The stratigraphic sequence ranges from the Tremadoc (Demingian) to Caradoc (Portfield) Stages. A disconformity is present between the lithostratigraphic units previously called the March and Oxford formations. Preliminary conodont studies have not detected an hiatus between the Oxford and Rockcliffe formations. The regional relationships of the units support a revision of the lithostratigraphy.
1190. CHANDLER, F.W., Geol. Surv. Can.:  
Redbed sequence in Canada, 1976-.  
**See:**  
Geological environment of Aphebian red beds of the north half of Richmond Gulf, New Quebec; Geol. Surv. Can., Paper 78-1A, p. 107-110, 1978.
1191. CHANDLER, F.W., Geol. Surv. Can.:  
Proterozoic red beds of Richmond Gulf, Quebec, 1977-.  
**See:**  
Geological environment of Aphebian red beds of the north half of Richmond Gulf, New Quebec; Geol. Surv. Can., Paper 78-1A, p. 107-110, 1978.
1192. CHRISTOPHER, J.E., Sask. Geol. Surv.:  
Lower Cretaceous Mannville Formation of Saskatchewan, 1975-78.  
Completed mapping of the sub-Mannville unconformity on the Jurassic and Paleozoic beds, mapping of the pre-Mannville paleotopography, sub-Colorado unconformity, isopachs of the Dina, McLaren and Waseca members, regional correlations. Propose to complete isopachs of remaining members, delineate facies, and structural elements. Synthesize foregoing to unravel sedimentation and tectonic history.
1193. DOLPH, J.A., PETRACCA, A.N., Gulf Oil Canada Ltd. (Geological Serv.):  
1. Geological study West Willmar Field, 1977.  
2. Geological study Steelman Field for enhanced recovery, 1977-78.  
Derive geological model Steelman Field Mississippian Midale reservoir in order to assist in enhanced recovery program. Fence diagrams will be constructed. Trend surface study in progress. It will attempt to determine whether reservoir properties are related to anomalous structural features in the field.
1194. DUNN, C.E., Sask. Geol. Surv.:  
The Dawson Bay Formation in south-central Saskatchewan, 1974-78.  
Study includes stratigraphy, sedimentation, depositional environment, diagenesis, structure, groundwaters, and some paleontologic, rock mechanics, mineralogic, geochemical and geophysical observations. Of prime concern is the relationship of the strata to the underlying potash horizons of the Prairie Evaporite.

1195. FAHRIG, W.H., Geol. Surv. Can.:  
Basin analysis of the Athabasca sedimentary basin, 1968-.
1196. FLACH, P.D., MOSSOP, G.D., Alberta Research Council (Geology Div.):  
Regional inventory of the Athabasca oil sands, Alberta, 1977-81.  
To delineate regional facies trends and to map the reservoir characteristics of the Athabasca oil sands.
1197. FLACH, P.D., MOSSOP, G.D., LERBEKMO, J.F., Univ. Alberta (Geology), Alberta Research Council (Geol. Div.):  
A lithofacies analysis of the McMurray Formation, Lower Steepbank River, Alberta, 1976-77; M.Sc. thesis (Flach).  
The McMurray Formation in the Steepbank River area is composed of five lithologic units. The lower member, of coarse sandstone and conglomerate, is confined to local lows on the pre-Cretaceous unconformity. This is overlain by trough crossbedded fluvial sands of the middle A member. Above the middle A member are giant cross-beds (20 metres thick) of the middle B member. These epsilon cross-strata formed as slip-off slopes of large migrating channels. The upper member of the formation is composed of horizontally bedded tidal deposits (upper A) overlain by marine sands (upper B). Above the McMurray Formation lie the glauconitic sands of the Wabiskaw Member, Clearwater Formation.
1198. FOSCOLOS, A.E., Geol. Surv. Can.:  
Mineralogy and chemistry of fine grained rocks in central Sverdrup Basin, District of Franklin, 1973-.
1199. FUZESY, L.M., Sask. Geol. Surv.:  
The geology and hydrocarbon potential of the Winnipegosis Formation in southern Saskatchewan, 1974-78.  
The Winnipegosis is significantly fractured in many localities. Fracturing seems to be related to major structural trends and minor structural features. The possibility of there being commercial oil accumulation is good in the area. Fracture porosity is the most extensively developed and interconnected voids are also common. Sucrosic dolomites exhibit intercrystalline porosity in places; intergranular porosity is rare. The presence of several Winnipegosis oil pools, just south of the International border, in northern Montana and North Dakota is also promising for oil discovery in southern Saskatchewan.
1200. GIBLING, M.R., RUST, B.R., Univ. Ottawa (Geology):  
Sedimentation of the Siluro-Devonian clastic wedge of Somerset Island, Arctic Canada, 1973-78; Ph.D. thesis (Gibling).  
**See:**  
Siluro-Devonian sedimentation on Somerset and Cornwallis Islands, Arctic Canada; Bull. Can. Petrol. Geol., v. 25, 1978.  
The Somerset Island Formation: an Upper Silurian to ?Lower Devonian intertidal/supratidal succession, Boothia Uplift region, Arctic Canada; Can. J. Earth Sci., vol. 15, no. 2, p. 181-189, 1978.
- Deposition of the Siluro-Devonian clastic wedge of Somerset Island resulted from emergence of the Boothia Uplift. Inter/supratidal limestones and dolostones containing progradational cycles are overlain by braided river sandstones (locally cyclic), and conglomerates of alluvial fan origin. The succession has been correlated with regressive sequences of similar age on Prince of Wales and Cornwallis Islands, the uplift advancing progressively northwards with time.
1201. GLAISTER, R.P., NELSON, H.W., Imperial Oil Ltd. (Geological):  
Environmental facies and reservoir characteristics, Cretaceous Heavy Oil Sands, Alberta, 1974-.
1202. GORDANIER, W.D., AYRES, L.D., Univ. Manitoba (Earth Sciences):  
Depositional environment of formation K, Favourable Lake, northwestern Ontario, 1976-78; M.Sc. thesis (Gordanier).  
Formation K occurs on the flank of a mafic shield volcano and comprises a lower conglomerate member and an upper greywacke member with an aggregate thickness of 1 km. The conglomerate represents a subaerial alluvial fan that was gradually submerged and was covered by turbidites. The turbidites represent a regressive fan. The formation was derived from a combined volcanic-plutonic source.
1203. GRAVENOR, C.P., STUPAVSKY, M., McIELWAIN, T.A., Univ. Windsor (Geology):  
Surface texture of heavy minerals which have undergone glacial transport: use in identifying tillites and other glaciogenic deposits and relationship to vibratory motion at base of glaciers, 1976-80; B.Sc. thesis (McIelwain).  
R.L. Folk (1975) observed that about 15% of garnet grains derived from glaciated terrains exhibit distinct trails of concentric, crescentic gouges (chattermark trails) which are visible under a microscope. After treatment with a chemical etchant (phosphoric acid) these chattermark trails have been observed on several other minerals of comparable physical properties. By studying heavy minerals from detrital sediments derived from glacial and non-glacial sources these chattermark trails have been shown to be characteristic of glacially derived sediments. As such, they appear to provide a conclusive test for the glacial origin of a given sediment.
1204. HARRIS, I.M., Geol. Surv. Can.:  
Sedimentologic study and basin analysis of the eugeoclinal sedimentary rocks (Cambrian to early Devonian) of southern Nova Scotia, 1976-.
1205. HESSE, R.F., ANDERSON, T., McGill Univ. (Geological Sciences):  
Depositional environments and diagenesis of Cambro-Ordovician deep-sea sediments, Ile aux Grues, Ile aux Oies, Québec, 1978-80; M.Sc. thesis (Anderson).  
Study of the diagenesis of Cambrian graywackes and associated shales: distinction between primary and secondary (diagenetic) rock colours (red-green problem) and evaluation of the significance of primary rock colours.

1206. HESSE, R.F., OGUNYOMI, O. McGill Univ. (Geological Sciences):  
 1) Depositional environments and diagenesis of the Cambrian Charny Group, Québec, 1977-80; Ph.D. thesis (Ogunyomi).  
 Establishment of the detailed depositional environments (submarine canyon, deep-sea fan, basin plain environments) of the Cambrian Charny Group for the purpose of assessing the tectonic setting of the depositional basin.
1207. HESSE, R.F., TASSE, N., McGill Univ. (Geological Sciences):  
 The tectonic setting of the Cretaceous Flysch à Helminthoids Basin, Embrunais, French West Alps, 1977-80; Ph.D. thesis (Tasse).  
 Evaluation of the tectonic setting of Cretaceous deep-sea turbidites based on detailed sedimentological analysis of the depositional environments.
1208. HISCOTT, R.N., McMaster Univ. (Geology):  
 Sedimentology and regional implications of deep-water sandstones of the Tourelle Formation, Ordovician, Québec, 1974-77; Ph.D. thesis.  
 The Arenigian (Ordovician) Tourelle Formation crops out along the south shore of the St. Lawrence River in the Gaspé Peninsula, and occurs in the allochthonous external zone of the Québec Appalachians. The formation is dominated by thick, graded, massive sandstone layers which were deposited from turbulent suspensions. A few layers contain large indurated blocks suspended in sandstone, and were deposited from sandy debris flows. Thinning-upward sequences, channels, and an alternation of amalgamated sandstone packets and thick units of shale and ripple-drifted siltstones point to deposition on the channelized mid-fan. Detritus in sandstones of the Tourelle Formation was derived from the southeast during initiation of the Taconic orogeny. The presence of volcanic fragments, unstable heavy minerals, and detrital chromite leads to a plate tectonic model involving southeastward subduction beneath a marginal micro-continent, and obduction of a large sheet of ophiolite in the Arenigian. Much of the source area was composed of Cambrian and Lower Ordovician sandstones originally derived from the Grenville craton.
1209. HOPKINS, J.C., Univ. Calgary (Geology):  
 Reservoir inhomogeneities in lower Mannville Sandstones, Medicine River field, Alberta, 1977-78.  
 Project is aimed towards determining geometric aspects of lower Cretaceous sand bodies in the Medicine River field. 1) Gross depositional inhomogeneities, i.e. distribution of sand piles which range between the extremes of multistorey channel-fill and isolated point bar. 2) Small scale geometry - sedimentation units within major sand bodies; their grain size, continuity and reservoir properties. 3) Inhomogeneities within and between sedimentation units as a consequence of cementation and fluid access; emphasis on paragenesis of cements, particularly type and form of clay minerals whose formation post-dates oil migration; role of hydrocarbons in inhibiting cementation of sandstones.
1210. JEFFERSON, C.W., YOUNG, G.M., Univ. Western Ontario (Geology):  
 Sedimentology and stratigraphy and economic geology of the Redstone River and Coppercap Formations (Proterozoic) in the Mackenzie Mountains, Northwest Territories, 1977-79; Ph.D. thesis (Jefferson).
1211. JONES, B., OLDERSHAW, A.E., NARBONNE, G., Univ. Alberta (Geology), Univ. Calgary (Geology), Univ. Ottawa (Geology):  
 Biostratigraphic zonation of Upper Silurian platform carbonate sequences, Arctic Canada, 1977-.  
 Study of genesis of rubbly limestones in the Upper Silurian of Arctic Canada.
1212. KENDALL, A.C., SMITH, S.R., Sask Geol. Surv.:  
 Reservoir studies of Mississippian carbonates from southeastern Saskatchewan, 1977-.
- See:  
 The age of metasomatic anhydrite in Mississippian reservoir carbonates, southeastern Saskatchewan; Can. J. Earth Sci., vol. 15, no. 3, p. 424-430, 1978.  
 Microfacies mapping and detailed petrography (emphasizing diagenetic changes) of carbonate reservoirs from selected oil fields in southeastern Saskatchewan; ultimate objective the simulation modelling of production from the studied oilfields.
1213. KING, A.F., Memorial Univ. (Geology):  
 Eo-Cambrian studies on the Avalon Zone, eastern Newfoundland, 1975-.
- The Avalon Zone of eastern Newfoundland consists of Hadrynian sedimentary and volcanic rocks, locally overlain by Cambro-Ordovician sediments. Seven map-units are recognized within the Conception Group (c. 3 km thick). It is probable that this group with its tillite and Precambrian fossils is related in time to the Vendian of northern Eurasia. The overlying Hadrynian clastics (c. 8 km thick) are divided into two new groups and eleven new formations; a regional stratigraphic profile of the peninsula has been prepared in an attempt to clarify nomenclature as well as sedimentological problems. Stratigraphic and sedimentologic relationships indicate an early history of widespread marine deposition around a volcanic terrain, eventual infilling of the basin by an advancing delta (major coarsening upward sequence), intermittent deposition of volcanic ash followed by alluvial plain conditions with a rising mountain front on the northern periphery of the system. Late Hadrynian and Cambro-Ordovician sediments accumulated as tidal and offshore deposits. The Avalon Zone may represent a wide distensional belt and partly marine basin and range domain, which developed as a precursor to the actual opening of the Early Paleozoic proto-Atlantic.
1214. LAJOIE, J., GELINAS, L., VERPAELST, P., CHALOT, F., SIMARD, A., BOUCHARD, M., SANSFACON, R., Univ. Montréal (Géologie):  
 Origine des séquences rhyolitiques de Rouyn-Noranda, Québec, 1976-82; thèse de doctorat (Verpaelst, Chalot), thèse de maîtrise (Simard, Bouchard, Sansfacon).

- Les travaux préliminaires dans la région suggèrent qu'une partie importante des rhyolites est d'origine pyroclastique. Notre étude a pour but de démontrer l'hypothèse de travail et de cartographier les différents facies.
1215. LENNOX, T.R., LERAND, M.M., Gulf Oil Canada Ltd., (Geological Serv.):  
Detailed stratigraphy of Clearwater sands, Cold Lake area, Alberta, 1976-78.
1216. LERAND, M.M., Gulf Oil Canada Ltd. (Geological Serv.):  
Reservoir characterization Wabasca heavy oil sand deposit, in situ pilot site, 1977-78.  
Purpose of project is to define and describe in detail the stratigraphy and physical properties of the heavy-oil reservoir at the Gulf Oil Canada Wabasca pilot site. Information will be used by engineers to aid in situ recovery programs, and in design of experimental projects.
1217. MACQUEEN, R.W., BAMBER, E.W., MAMET, B.L., Univ. Waterloo (Earth Sciences), Geol. Surv. Can., Univ. Montreal (Geology):  
Carboniferous and Permian stratigraphy and sedimentology, Rocky Mountains of Alberta and British Columbia, 1965-80.
1218. MACQUEEN, R.W., LEGAULT, J.A., FRITZ, P., WILLIAMS, G.K., POWELL, T.G., FOSCOLOS, A.E., Univ. Waterloo (Earth Sciences), Geol. Surv. Can.:  
Nature, origin, and lateral relationships of Paleozoic basinal shale suites, western Canada, 1976-80.
1219. McILREATH, I.A., Geol. Surv. Can.:  
Stratigraphic relationships at the western edge of the Middle Cambrian facies carbonate belt, Field, British Columbia, 1972-.
1220. NELSON, H.W., GLAISTER, R.P., Imperial Oil Ltd. (Geological):  
Controls on diagenetic pore fillers in sandstones, 1974-.
1221. OLIVER, T.A., GRIFFITH, L., Univ. Calgary (Geology):  
Effects of depositional and diagenetic variations on porosity within single sandstone reservoirs, 1978-79; M.Sc. thesis (Griffith).  
To unravel the depositional and diagenetic effects on porosity distribution within single field reservoirs in the Viking and Cardium Formations of central Alberta.
1222. OLLERENSHAW, N.C., Geol. Surv. Can.:  
Cretaceous and Tertiary conglomerates and sandstones of the eastern Cordillera, 1969-.
1223. PEARSON, E.M., MACQUEEN, R.W., Univ. Waterloo (Earth Sciences):  
Sedimentology and diagenesis of the Warwick reef (Middle Silurian), southwestern Ontario, 1977-78; M.Sc. thesis (Pearson).  
Most known carbonate reefs in the Middle Silurian Guelph Formation in Ontario consist of dolomite. In contrast, the Warwick reef, as known in core, consists largely of limestone. Emphasis of the study is on describing the fabrics observable in core, and on unravelling the diagenetic history including the origin of several generations of clear calcite cement, and on relationships between primary fabrics and porosity, and secondary cements.
1224. ROTTENFUSSER, B.A., Alberta Research Council (Geology Div.):  
Peace River oil sands study, Alberta, 1975-80.  
Depositional environments, diagenesis, and mineralogy affect saturation and potential extraction of the heavy oil - data will be provided to aid in planning in situ recovery projects.
1225. SCHENK, P.E., JANSKA, L., GILES, P., Dalhousie Univ. (Geology):  
Carbonate-sulfate petrology of the Gays River mound (Carboniferous), Nova Scotia, 1976-78.
1226. SCHENK, P.E., MILLIGAN, G.C., MEDIOLI, F., JENSEN, L., Dalhousie Univ. (Geology):  
Sedimentology and stratigraphy of the Torbrook Formation (Lower Devonian), Nova Scotia, 1969-78; Ph.D. thesis (Jensen).
1227. SHEGELSKI, R.J., SCOTT, S.D., Univ. Toronto (Geology):  
Characterization and geochemistry of Archean iron formations in the Savant Lake-Sturgeon Lake greenstone belt, Northwestern Ontario, 1973-78; Ph.D. thesis (Shegelski).  
In the Savant area a thick sequence of turbidites is host to laminated quartz-magnetite bands (oxide facies) which occur on top of the finest fraction of graded beds. In the Sturgeon Lake area the predominant iron formation is carbonaceous pyritic tuffs and inter-layered pyrite-quartz units (sulphide facies) which are spatially associated with felsic pyroclastics and Cu-Zn-Ag massive sulphide ores. Detailed mapping in both areas together with whole rock analysis and petrological studies have served to outline the geological environment in which these two facies of iron formation formed. Sulphide facies formed within the felsic pyroclastic piles during calcalkaline volcanism, whereas oxide facies formed in association with a turbidite sequence during mechanical erosion of the felsic volcanic piles. Carbon isotope studies within the sulphide facies suggest that the carbon is probably of an organic origin but some anomalously light ratios indicate a re-equilibration of the carbon with methane, a process which is likely due to metamorphism. Sulphur isotope studies of pyrites from both facies suggest greater variability in the sulphide facies than in the oxide facies during sulphide deposition. Trace element ratios in pyrites associated with both facies indicate a sedimentary origin for the pyrite rather than a direct hydrothermal or magmatic origin.
1228. SHILTS, W.W., Geol. Surv. Can.:  
Mineral indicator tracing, southern Keewatin, 1970-.

1229. SIMPSON, F., Univ. Windsor (Geology):  
Cratonic-interior sedimentation and related tectonic controls, 1977-82.  
The attitudes of correlation surfaces in marine Cretaceous strata of the Western Interior have been controlled by patterns of basin evolution and rejuvenation of basement linear features, which in turn have been related to variation in the rate of plate convergence at the (Western) continental margin. The orientation of correlation surfaces in pelagic Cretaceous deposits of the Western Interior exhibits some similarities to those of pelagic deposits laid down in the Pacific Ocean. Possible plate-tectonic controls on trends in cratonic-interior solution of Paleozoic evaporite deposits (and related structural and stratigraphic effects) are under investigation.
1230. SONNENFELD, P., Univ. Windsor (Geology):  
Evaporite genesis, 1976-79.
1231. TAYLOR, G.C., Geol. Surv. Can.:  
Comparative studies of ancient and modern sedimentary environments, 1970-.
- See:**  
Bottom sediments - vicinity of Juan de Fuca and Explorer Ridges, northeast Pacific Ocean; Geol. Surv. Can., Paper 78-1A, p. 533-537, 1978.
1232. TRETTIN, H.P., Geol. Surv. Can.:  
Stratigraphy and sedimentology of Silurian and Devonian clastic formations, central Ellesmere Island, 1972-.
1233. VECSEY, G.E., Gulf Oil Canada Ltd. (Geological Serv.):  
Interrelationships of porosity and mixed water (dorag) dolomitization in the Middle Devonian biogenic carbonates in Rosevear and Hanlan area, Alberta, 1977-78.  
Dolomitization and porosity development occur underlying a widespread erosional surface. The dolomitization took place in biogenic bank deposits, and subsequently leaching developed porosity. The dolomitization type was mixed-water (dorag) dolomitization.
1234. WALTERS, K.L., KENT, D.M., Univ. Regina (Geological Sciences):  
A carbonate microfacies analysis of the Mississippian beds in the Glen Ewen Field, southeastern Saskatchewan, 1975-77; M.Sc. thesis (Walters).
1235. YOUNG, G.M., Univ. Western Ontario (Geology):  
Sedimentology and stratigraphy of the Pecors, upper Espanola and upper Gowganda Formations (Huronian), North Shore of Lake Huron, 1976-80.
- RECENT AND UNCONSOLIDATED SEDIMENTS**
1236. ADSHEAD, J.D., Geol. Surv. Can.:  
Mineralogy and geochemistry of the unconsolidated cover, central Arctic, 1976-.
- See:**  
Diatomaceous Arctic lake sediments; Geol. Surv. Can., Paper 78-1A, p. 475-480, 1978.
1237. ADSHEAD, J.D., Geol. Surv. Can.:  
Sediment budget of Arctic lakes, 1977-.
- See:**  
Diatomaceous Arctic lake sediments; Geol. Surv. Can., Paper 78-1A, p. 475-480, 1978.
1238. AMOS, C.L., Geol. Surv. Can.:  
Dynamics of coastal zones, Minas Basin, Nova Scotia, 1974-.
- See:**  
An hypothesis on the evolution of the tides in the Bay of Fundy; Geol. Surv. Can., Paper 77-1B, p. 47, 48, 1977.
1239. ASHLEY, G.M., MATHEWS, W.H., Univ. British Columbia (Geological Sciences):  
Sedimentology of a freshwater tidal system, Pitt River - Pitt Lake, British Columbia, 1974-78; PH.D. thesis (Ashley).
1240. BORNHOLD, B.D., Geol. Surv. Can.:  
Marine surficial geology and sedimentation, British Columbia, 1975-.
- See:**  
Echo sounding and subbottom profiling in Douglas Channel and Kitimat Arm, British Columbia; Geol. Surv. Can., Paper 77-1B, p. 265-268, 1977.  
Bottom sediments vicinity of Juan de Fuca and Explorer Ridges; Geol. Surv. Can., Paper 78-1A, p. 533-537, 1978.
1241. BUCKLEY, D.E., Geol. Surv. Can.:  
Multidisciplinary environmental marine geological analysis of the Miramichi Estuary and Bay, New Brunswick, 1975-1979.
1242. COAKLEY, J.P., Fisheries-Environment Canada (CCIW):  
Vertical and horizontal distribution of sand by wave generated currents, 1976-78.  
**See:**  
Processes in sediment deposition and shoreline changes in the Point Pelee area; Environment Canada Inland Waters Div. Sci. Ser. No. 79, 1977.  
Direct measurement of littoral drift in suspension at the western end of Lake Ontario (Burlington Bar). During 1977 and 1978 profiles across the surf zone will be run to measure vertical and horizontal distribution and amounts of sand carried in suspension by wave-generated currents.
1243. DAY, T.J., Geol. Surv. Can.:  
Gravel stream beds, 1975-.
- Fluvial and mass wasting processes, Banks Island, District of Franklin, 1975-.
- Dispersion in natural channels, 1975-.
- See:**  
Spatial asymmetry of a dispersing trace mass; Geol. Surv. Can., Paper 78-1A, p. 453-458, 1978.  
Observations on slopewash processes in an Arctic tundra environment, Banks Island, District of Franklin; *ibid.*, p. 516-520, 1978.

1244. EDWARDS, T.W.D., Geol. Surv. Can.:  
A study of siltation within lakes and the stratigraphy of lake bottom sediments, District of Keewatin, 1977-.
- See:**  
Postglacial diatom stratigraphy of a lake basin of the eastern Arctic shield; Geol. Surv. Can., Paper 78-1A, p. 403-407, 1978.
1245. FILLON, R.H., Geol. Surv. Can.:  
Surficial geology and paleogeology of Saglek Bank, Labrador Shelf, 1976-.
1246. GILBERT, R., Queen's Univ. (Geography):  
Sedimentation in Pangnirtung Fiord, Baffin Island, District of Franklin, 1977-79.
- Sedimentation and physical oceanography of Pangnirtung Fiord were recorded in 1977. Despite a shallow sill (12 m) and strong chemical and thermal stratification, water circulates freely to the bottom under the influence of a 6 m tide, affecting the nature and rate of sedimentation.
1247. GREENWOOD, B., Univ. Toronto (Scarborough-Geography):  
Barrier island sedimentation, 1977-80.
- See:**  
Facies relationships on a barred coast Kouchibouguac Bay, New Brunswick Canada; Soc. Econ. Paleont. Min., Spec. Publ. 24, p. 149-168, 1976.
- The aim is to establish the characteristic facies pattern generated by a retrograding barrier-lagoon sequence of sedimentary environments on a coast with a low sediment budget. The preservation potential of sub-facies is being evaluated. To further basic knowledge of the sedimentation processes in the submarine environments associated with a retrograding barrier island complex. In particular the relationships between oscillatory currents of wave origin, tidal currents, resultant sediment transport patterns (direction and rate), and the textures, bedforms and sedimentary structures in the transitional zone between the lower shoreface and inner shelf will be examined. A similar examination will be made of tidal inlet sediments. The intent is to quantify existing process-response models for barrier island sedimentation in these sub environments and to develop more accurate facies models.
1248. GREENWOOD, B., HALE, P.B., MITTLER, P.R., Univ. Toronto (Scarborough-Geography):  
Coastal sedimentation - storm wave sedimentation; sediment transport rates in nearshore zone, 1975-; M.Sc. thesis (Hale), Ph.D. thesis (Mittler).
- The relationship between bedforms (together with the resulting sedimentary structures) and complex flows near the bed in a wave-dominated environment is being investigated. Cores are taken to document structures and flow conditions are monitored using electromagnetic flowmeters. Facies characteristics are being established. Methods are being investigated whereby sediment transport vectors can be determined in the case of complex bathymetry. Relationships between high-energy storm-wave conditions and equilibrium bar forms are being explored.
1249. GREENWOOD, B., MITTLER, P.R., Univ. Toronto (Scarborough-Geography):  
Sediment parameters and the use in the reconstruction of paleoenvironments of deposition: a paleo-environmental reconstruction of Grand Bend Bay, Lake Algonquin, 1967-; M.A. thesis (Mittler).
- A continuing study of sediment properties as indicators of environments of deposition in both modern and ancient sedimentary sequences is being undertaken - to identify Key Environmental Indices and to evaluate their use in paleoenvironmental reconstruction.
1250. JANSA, L.F., Geol. Surv. Can.:  
Stratigraphy and sedimentology of the Mesozoic and Tertiary rocks of the Atlantic continental margin, 1971-.
- See:**  
Geology of the Amoco Imp Skelly A-1 Osprey H-84 well, Grand Bank, Newfoundland; Geol. Surv. Can., Paper 77-21, 1977.
1251. KEMP, A.L.W., DELL, C.I., HARPER, N.S., MacINNIS, G.A., Fisheries-Environment Canada (CCIW):  
Sedimentation rates and sedimentary budgets of the Great Lakes, 1976-77.
1252. KOSTER, E.M., Univ. Saskatchewan (Geological Sciences):  
Studies of fluvial and shallow-marine sedimentation, 1972-.
- Field work in southwest Yukon concerned with the sedimentology of paraglacial alluvial and debris-flow fans was followed by flume studies aimed at elucidating the factors which govern the development of preferred gravel fabric, a bedform called transverse ribs, and the transport of large clasts. APL computing and statistics were widely applied to the analysis of the flume data. The overall objective was to integrate findings in modern gravelly fluvial systems with those of experimental work and hydrodynamic theory: an aim of current and future research is to apply these findings to ancient braided river deposits.
1253. LUTERNAUER, J.L., Geol. Surv. Can.:  
Fraser Delta sedimentation, 1974-.
- See:**  
Kitimat submarine slump deposit(s): a preliminary report; Geol. Surv. Can., Paper 78-1A, p. 327-332, 1978.
- Sand waves on the southeastern slope of Roberts Bank, Fraser River Delta, British Columbia; *ibid.*, p. 351-356, 1978.
- The tidal regime and sedimentation patterns in Johnstone Strait, British Columbia; *ibid.*, p. 466, 1978.
1254. McCANN, S.B., Geol. Surv. Can.:  
Morphology and dynamics of the Barrier Island systems in the southern Gulf of St. Lawrence, 1977-.
- See:**  
Longshore sediment transport and a sediment budget for the Malpeque barrier system, southern Gulf of St. Lawrence; Can. J. Earth Sci., vol. 14, no. 11, p. 2429-2439, 1977.

1255. McLAREN, P., Geol. Surv. Can.:  
Coastal erosion-sedimentation, southeast Melville Island, District of Franklin, 1973-.
1256. McLAREN, P., Geol. Surv. Can.:  
Geological zonation of central Arctic coasts, 1976-.
- See:**  
Marine geological and geophysical activities in Lancaster Sound and adjacent fiords; Geol. Surv. Can., Paper 77-1A, p. 495-506, 1977.
1257. PELLETIER, B.R., Geol. Surv. Can.:  
Bottom studies of the Beaufort Sea, 1972-.
1258. RASHID, M.A., Geol. Surv. Can.:  
Geochemical transformations and reactions of organic compound in recent marine sediments, 1975-.
1259. TAYLOR, R.B., Geol. Surv. Can.:  
Coastal erosion-sedimentation, northern Somerset Island, District of Franklin, 1973-.
- See:**  
The summer climate of Cunningham Inlet, Somerset Island, District of Franklin; Geol. Surv. Can., Paper 77-1C, p. 39-48, 1977.
1260. TELLER, J.T., LAST, W., Univ. Manitoba (Earth Sciences):  
Holocene sedimentary history of the Lake Manitoba basin, 1978-79; PH.D. thesis (Last).  
  
To identify and to quantify the physical and chemical changes that have occurred in Lake Manitoba during the post-glacial period. The record of these changes will be interpreted from the sedimentary record in the lake. A total of 15 short and long sediment cores will be collected from Lake Manitoba. Various physical and chemical parameters will be measured and evaluated in these samples, including grain size, sedimentary structures, clay mineralogy, carbonate and organic carbon content, and trace element content. In addition, selected biological components in the sediment will be examined. In order to evaluate man's future potential impact on Lake Manitoba and its watershed, it is essential to identify and evaluate his previous impact in relationship to the natural evolution of the lake basin. The data obtained by this project will be a contribution to the environmental information package which is necessary to make sound lake management decisions and recommendations. It will also help in establishing the rate at which the lake is flooding southward across the Delta Marsh area.
1261. UMPLEBY, D.C., Geol. Surv. Can.:  
West Greenland Cretaceous and Tertiary, 1976-.
- See:**  
Field work in the Nûgssuaq embayment, west Greenland; Geol. Surv. Can., Paper 77-1B, p. 93-95, 1977.
1262. VILKS, G., Geol. Surv. Can.:  
Pleistocene-Holocene basin sedimentation, 1975-.

## SOIL SCIENCE

(An inventory of Agricultural Science research projects in Canada is maintained by the Canadian Agricultural Research Council. Many of these projects would be earth science oriented).

1263. BANTING, D.R., KING, R.H., Univ. Western Ontario (Geography):  
Pedogenesis and environmental change, District of Keewatin, 1976-79; Ph.D. thesis (Banting).  
  
Soils examined so far are primarily from below marine limit, reflecting varying durations of pedogenesis and varying influences of paleoclimatic episodes. Further examination of Tundra soils from well-drained positions above marine limit are sought, in order to characterize development of profiles that have experienced the climatic optimum. In addition, snow pack sites are being examined in order to assess the role of aeolian inputs since these areas experience windfall of mineral particles in addition to snow drifts.
1264. CHANG, C., VANDENBERG, A., VAN SCHAİK, J., OOSTERVALD, M., DAVISON, C., Fisheries-Environment Canada (Water Res. Br.):  
Water quality of irrigation return flow, 1977-80.
- Monitoring of changes in water quality of irrigation return flow in Alberta; studying water and salt balance, transport and transformation of various chemical constituents in saturated and unsaturated soil, finally developing a computer model or models to estimate or predict the levels of various chemical constituent loading to the surface water and ground water from existing and future irrigation projects.
1265. FRANSHAM, P.B., Geol. Surv. Can.:  
Geotechnical investigation of soils in the Ottawa Valley, 1974-.
- See:**  
Pore pressure measurements in sensitive clay slopes; Geol. Surv. Can., Paper 77-1B, p. 295-300, 1977.

1266. LUCKMAN, B.H., KING, R.H., CAWKER, K.B., KEARNEY, M.S., HOLLAND, K., BOWYER, A., Univ. Western Ontario (Geography):  
Holocene environmental change in Jasper National Park, Alberta, 1977-80; Ph.D. thesis (Kearney, Bowyer), M.Sc. thesis (Holland).
- See:**  
Lichenometric dating of Holocene moraines at Mount Edith Cavell, Jasper, Alberta; Can. J. Earth Sci., vol. 14, no. 8, p. 1809-1822, 1977.  
Distribution and characteristics of rock glaciers in the southern part of Jasper National Park, Alberta; Can. J. Earth Sci., vol. 15, no. 4, p. 540-550, 1978.  
This project is concerned with evaluating environmental change during the Holocene using geomorphic, pedological and palynological techniques. Previous related work includes dating of "Little Ice Age" (1500-1900 A.D.) moraines by dendrochronology at several sites, establishing a growth curve for *Rhizocarpon geographicum* (42 mm/century for first 100 yrs, 11.4 mm/century for the preceding 140 years) and studies of the distribution, morphology and characteristics of rock glaciers. During field research in 1977 several soil pits, sections and bog cores containing Holocene tephras and peats were sampled for pedological, palynological, tephrochronologic and sedimentological studies. Basal radiocarbon dates from peats of  $9660 \pm 280$  B.P. (BGS 465) in Tonquin Pass ( $52^{\circ}49'N$ ,  $118^{\circ}22'W$ ) and  $7770 \pm 160$  B.P. (BGS 450) in Sunwapta Pass ( $52^{\circ}13'N$ ,  $117^{\circ}13'W$ ), both close (<1 km) to "Little Ice Age" moraines, indicate that Holocene glacier/rock glacier advances were limited in extent. In many cases the "Little Ice Age" advance was the most extensive Holocene advance. Morphological evidence for earlier Holocene advances is fragmentary except where rock glaciers were formed.
1267. MOORE, T.R., McGill Univ. (Geography):  
Soil formation in northeastern Canada, 1972-77.
- See:**  
Pedogenesis in a subarctic iron-rich environment: Schefferville, Québec; Can. J. Soil Sci., v. 57, p. 35-45, 1977.
- The soils developed along a transect from the boreal through the subarctic to the arctic zones are examined and their pedogenetic processes are examined. For 10 representative soil profiles, morphological properties and chemical analyses of translocated elements show that the intensity of the main soil forming processes (organic matter accumulation, leaching, gleying, podzolization and clay mineral transformations) generally decreases northwards. This decrease is related to variations in the soil forming factors, and the processes they control, rather than to any one soil forming factor.
1268. RUTHERFORD, G.K., FISHER, A., Queen's Univ. (Geography):  
Soil genesis in the Kemptville area, southeastern Ontario, 1977-78; M.Sc. thesis (Fisher).  
The physical, chemical, mineralogical and microscopy of the soils and upper sediments of Oxford Station area near Kemptville. The genetical aspects of soil development in relation to the geomorphological distribution of the sediments is being determined.
1269. RUTHERFORD, G.K., PARSONS, M.L., Queen's Univ. (Geography):  
Mottle development in sandy gleysolic soils near Kingston, Ontario, 1977-79; M.Sc. thesis (Parsons).  
The chemistry and microscopy of mottle formation and gleying in some sandy soils near Kingston; the chemistry of mottles as determined by wet chemical and microprobe analyses and soil microscopy; the development of mottling and its chemistry will be put in relation to geomorphic situation.
1270. RUTHERFORD, G.K., TAYLOR, C.E.B., Queen's Univ. (Geography):  
The genesis, geomorphology and distribution of the soils of the Faeroe Islands, 1975-78; M.Sc. thesis (Taylor).  
Soils and water were sampled on the Faeroe Islands in the field seasons of 1975/76. The samples have been processed using standard chemical, physical and mineralogical methods and Land System maps of the soils, geomorphology, geology and vegetation have been produced. An account of the soil properties will be soon produced. The soil genesis is of particular interest as the whole archipelago is composed of rather homogeneous basalt flows.

## STRATIGRAPHY

### PRECAMBRIAN

1271. AITKEN, J.D., Geol. Surv. Can.:  
Helikian and Hadrynian stratigraphy Eastern Cordillera and Interior Platform, 1973-.
- See:**  
Progress in Helikian stratigraphy, Mackenzie Mountains; Geol. Surv. Can., Paper 78-1A, p. 481-484, 1978.  
Correlations of Helikian strata, Mackenzie Mountains - Brock Inlier - Victoria Island; *ibid.*, p. 485, 486, 1978.
1272. BARRETT, K.T., BRISBIN, W.C., Univ. Manitoba (Earth Sciences):  
Stratigraphy and structure of the metavolcanic rocks of the Carr Lake area, Kaminak greenstone belt, District of Keewatin, Northwest Territories 1976-78; M.Sc. thesis (Barrett).
1273. BENNETT, G., INNES, D.G., Ontario Geol. Surv.:  
Huronian volcanism, 1976-78.  
Huronian volcanic rocks of the Thessalon Formation in the Sault Ste. Marie, Aberdeen Lake, and Thessalon areas are predominantly subalkaline, subaerial flood basalts which overlie conglomerates and fine-grained sandstones of the Livingstone Creek Formation. A center of felsic volcanism with minor pyroclastic rocks is located a few miles east of the town of Thessalon. The metamorphism grade is lower greenschist facies. Arkose, grit and uraniferous quartz pebble conglomerate are interbedded with mafic flows near the base of the Thessalon Formation. These interflow sedimentary rocks are lithologically distinct from the underlying Livingstone Creek Formation.
1274. BRUECKNER, W.D., Memorial Univ. (Geology):  
Studies for IGCP Project 73/1/2: Precambrian in mobile zones, 1973-.  
To promote correlation between the several inliers of deformed Precambrian rocks east and west of the Atlantic Ocean (Scandinavia, U.K., Ireland, France, Iberian Peninsula Morocco, Egypt - Appalachian Belt, Canadian Shield, Greenland). Currently attempting to compile a pertinent bibliography as a tool for further studies.
1275. CAMPBELL, F.H.A., Geol. Surv. Can.:  
Geology of the Coronation Gulf area, District of Mackenzie, 1977-.
- See:**  
Geology of the Helikian rocks of the Bathurst Inlet area, Coronation Gulf, Northwest Territories; Geol. Surv. Can., Paper 78-1A, p. 97-106, 1978.
1276. CHRISTIE, R.L., Geol. Surv. Can.:  
Stratigraphy and age of Precambrian sedimentary rocks and contained sills and dykes, Thule Basin, 1967-.
1277. COUSINEAU, P., DIMROTH, E., Québec Min. Richesses Naturelles:  
La Formation de Waite, Canton De Dufresnoy, comté de Rouyn-Noranda, Québec (1:400'), 1977-; thèse de maîtrise (Cousineau).
1278. DELANEY, G.D., YOUNG, G.M., Univ. Western Ontario (Geology):  
Stratigraphy, sedimentology and economic geology of Proterozoic rocks of the Wernecke Mountains area, Yukon Territory, 1976-79; Ph.D. thesis (Delaney).
1279. DRESSLER, B., Québec Min. Richesses Naturelles:  
Geology of the north-central Labrador Trough, between lat. 56°30'N and 57°15'N, Québec, 1971-78.
1280. DUBE, C. Québec Min. Richesses Naturelles:  
Quart nord-est du canton de Manneville, comté d'Abitibi-Est, Québec (1:10 000), 1977-79.
1281. EISBACHER, G.H., Geol. Surv. Can.:  
Stratigraphy and sedimentation of the Proterozoic Rapitan Group and related rocks, Mackenzie, Wernecke and Ogilvie Mountains, District of Mackenzie and Yukon Territory, 1975-.
- See:**  
Two major Proterozoic unconformities, northern Cordillera; Geol. Surv. Can., Paper 78-1A, p. 53-58, 1978.
1282. EVANS, J., WARDLE, R.J., SMYTH, R., Newfoundland Dep. Mines Energy:  
The Nimish Formation in the Dyke Lake area, Labrador Trough: stratigraphy and petrology of the mafic volcanics and their relationship to the Knob Lake Group, 1977.
1283. GOBEIL, A., Québec Min. Richesses Naturelles:  
Etude d'une bande de roches volcano-sédimentaires au sud-ouest de Chibougamau, Québec, 1977-78.
1284. HOCQ, M., Québec Min. Richesses Naturelles:  
Partie sud du Canton d'Aiguebelle, comté d'Abitibi-Ouest, Québec (1:15 000), 1977-.
1285. HOFFMAN, P.F., Geol. Surv. Can.:  
A stratigraphic, sedimentological and structural geology study of the Wilson Island and Union Island Groups, Great Slave Supergroup and Et-Then Group, East Arm of Great Slave Lake, District of Mackenzie, 1966-.
- See:**  
Age of exotic blocks in diatreme dykes of the Athapuscow Aulacogen, Simpson Islands area, East Arm of Great Slave Lake, District of Mackenzie; Geol. Surv. Can., Paper 78-1A, p. 145, 146, 1978.
1286. HOFFMAN, P.F., Geol. Surv. Can.:  
Stratigraphy, structure and metamorphism of the eugeosynclinal rocks of the Coronation geosyncline and their relation to the Hepburn batholith, 1977-.
- See:**  
Geology of the Coronation geosyncline (Aphebian), Hepburn Lake Sheet (86J), Bear Province, District of Mackenzie; Geol. Surv. Can., Paper 78-1A, p. 147-151, 1978.
1287. IANNELLI, T., YOUNG, G.M., JACKSON, G.D., Univ. Western Ontario (Geology), Geol. Surv. Can.:  
Stratigraphy and sedimentology of some Proterozoic clastic units in the Borden Basin, western Baffin Island, Northwest Territories, 1977-81; Ph.D. thesis (Iannelli).

1288. JACKSON, G.D., Geol. Surv. Can.:  
Operation Borden, District of Franklin, 1977-  
Stratigraphy, sedimentology, and economic potential of the upper Proterozoic rocks (Eqalulik and Uluksan Groups) of northern Baffin and Bylot Islands, and the relationships between these strata and the underlying basement gneisses.
1289. JENSEN, L.S., Ontario Geol. Surv.:  
Synoptic mapping and study of the Kirkland Lake - Larder Lake areas, Ontario, 1976-79.
1290. McGLYNN, J.C., Geol. Surv. Can.:  
Stratigraphy, sedimentology and correlation of the Nonacho Group, District of Mackenzie, 1965-.
1291. MORGAN, W.C., Geol. Surv. Can.:  
Study of the Ramah Group and of Proterozoic - Archean relationships in northern Labrador, 1971-.
1292. PIRIE, J., Ontario Geol. Surv.:  
Synoptic study of Red Lake metavolcanic-metasedimentary belt, Ontario, 1978-82.  
To provide a compilation of detailed mapping completed in 1979 for the metavolcanic-metasedimentary belt as a whole. From this, correlation of the stratigraphy throughout the belt will be carried out and the petrochemistry of the volcanic rocks will be investigated with the view to better understanding the geological setting and formation of the important gold deposits in the area.
1293. RAMAEKERS, P., Sask. Geol. Surv.:  
Athabasca Sandstone project, 1975-80.  
**See:**  
Athabasca Formation, south-central edge (74G area): Reconnaissance geology; Sask. Geol. Surv., Summ. Rept., p. 157-163, 1977.
1294. RIVE, M., Québec Min. Richesses Naturelles:  
Region du Lac Chavannes, comté de Pontiac, Québec (1:125 000), 1977-.
1295. SMYTHE, R., KNIGHT, I., Newfoundland Dep. Mines Energy:  
Proterozoic supracrustal sequences of Labrador, 1977-.  
**See:**  
Correlation of the Apebian supracrustal sequences, Nain Province, northern Labrador; Newfoundland Dep. Mines Energy, Rept. 78-1, 1978.
1296. THOMPSON, P.H., MOORE, J.M., Jr., Carleton Univ. (Geology), Geol. Surv. Can.:  
The Flinton Group, Grenville Province, Eastern Ontario, 1968-.  
The Flinton Group is a suite of meta-clastic and carbonate rocks lying unconformably on older supracrustal and plutonic rocks, within the Grenville Supergroup. It has been formally divided into Formations in the region between Madoc and Ompah; these are preserved in narrow synclinal keels. Deposition occurred in an interval between major volcanism and plutonism and the subsequent Grenvillian regional metamorphism and deformation, ca. 1100 Ma.
1297. TROWELL, N.F., BLACKBURN, C.E., Ontario Geol. Surv.:  
Savant-Crow Lakes volcanic/sedimentary belt, Kenora District, Ontario, 1976-79.  
**See:**  
Savant-Crow Lake special project, Thunder Bay and Kenora Districts, Ontario; Ontario Division of Mines, M.P. 75, p. 29-50, 1977.  
Stratigraphic correlation, petrochemical evolutionary trends, depositional environments are being elucidated with particular attention to the place of mineral concentrating processes.
1298. VAN DER LEEDEN, J., RIVE, M., FYSON, W.K., Québec Min. Richesses Naturelles, Univ. Ottawa (Géologie):  
REGION DU LAC LAVOIE, Comté de Témiscamingue, Québec (1:25 000), 1977-; thèse de doctorat (van der Leeden).  
Le but est d'établir la nature du front de Grenville dans une région où viennent en contact les provinces Southern, Supérieur et Grenville. En 1977, la cartographie géologique a été effectuée uniquement dans la province de Supérieur.
1299. VERPAELST, P., GELINAS, L., LAJOIE, J., Québec Min. Richesses Naturelles, Univ. Montréal (Géologie):  
Etude des complexes rhyolitiques de la région de Rouyn-Noranda, Québec, 1976-79.
1300. YEO, G.M., YOUNG, G.M., Univ. Western Ontario (Geology):  
Stratigraphy and sedimentology of the Upper Proterozoic Rapitan Group, Northwest Territories and Yukon Territory, 1976-78; Ph.D. thesis (Yeo).
1301. YOUNG, G.M., Univ. Western Ontario (Geology):  
Proterozoic stratigraphy and sedimentology of Northwestern Canada, 1971-;  
**See:**  
Stratigraphic correlation of Upper Proterozoic rocks of northwestern Canada; Can. J. Earth Sci., vol. 14, no. 8, p. 1771-1787, 1977.
- PALEOZOIC**
1302. AITKEN, J.D., Geol. Surv. Can.:  
Lower Paleozoic stratigraphy, southern Rocky Mountains, Alberta and British Columbia, 1972-.
1303. AUSTIN, I.A., MOORE, R.G., COLWELL, J.A., Acadia Univ. (Geology):  
Time marker beds within the Windsor Group sediments, 1976-79; M.Sc. thesis (Austin).
1304. BIRON, S., ST-JULIEN, P., Québec Min. Richesses Naturelles:  
Region de Grosses Roches, comté de Matane, Québec (1:31 680), 1971-.
1305. BOLTON, T.E., Geol. Surv. Can.:  
Ordovician-Silurian biostratigraphy, Southampton Island, District of Keewatin, 1970-.  
**See:**  
Geology of Ordovician rocks, Melville Peninsula and region, southeastern District of Franklin; Geol. Surv. Can., Bull. 269, 1977.

1306. BOLTON, T.E., Geol. Surv. Can.:  
Silurian-Ordovician macrobiostratigraphy of Anticosti Island, Quebec, 1974-.
1307. CECILE, M.P., Geol. Surv. Can.:  
Lower Paleozoic basin-to-platform relationships in the Cordillera, District of Mackenzie - British Columbia, 1977-.
- See:**  
Report on Road River stratigraphy and the Misty Creek embayment, Bonnet Plume (106B), and surrounding map-areas, Northwest Territories; Geol. Surv. Can., Paper 78-1A, p. 371-377, 1978.  
Galena-sphalerite mineralization near Palmer Lake, Northwest Territories; *ibid.*, p. 472-474, 1978.
1308. CHRISTIE, R.L., Geol. Surv. Can.:  
Geological reconnaissance of eastern Devon Island and southeastern Ellesmere Island, District of Franklin, 1968-.
- See:**  
Stratigraphic reconnaissance of lower Paleozoic rocks, eastern Devon Island, Arctic Archipelago; Geol. Surv. Can., Paper 77-1B, p. 217-226, 1977.
1309. DANNER, W.R., Univ. British Columbia (Geological Sciences):  
Plate tectonics and the Upper Paleozoic of southwestern British Columbia, 1967-.
- To delineate the plate tectonic provinces of southwestern British Columbia and to recognize the stratigraphic sections in each and their distinctive lithological and paleontological suites. Continuing progress in collecting microfossils and describing them.
1310. DIXON, O.A., JONES, B., NARBONNE, G.M., Univ. Ottawa (Geology):  
Stratigraphy and sedimentology of the Leopold Formation, Eastern Somerset Island, Northwest Territories, 1975-80.
1311. FRITZ, W.H., Geol. Surv. Can.:  
Cambrian biostratigraphy of the Canadian Cordillera, 1965-.
- See:**  
Upper (carbonate) part of Atan Group, Lower Cambrian, north-central British Columbia; Geol. Surv. Can., Paper 78-1A, p. 7-16, 1978.  
Fifteen stratigraphic sections from the Lower Cambrian of the Mackenzie Mountains, north-western Canada; Geol. Surv. Can., Paper 77-33, 1978.
1312. GELDSETZER, H.H.J., Geol. Surv. Can.:  
Carboniferous and Triassic strata of Appalachian region, 1974-.
1313. GILES, P.S., Nova Scotia Mines:  
Carbonate stratigraphy, 1974-.
1314. GLOBENSKY, Y. Québec Min. Richesses Naturelles:  
Parties des régions de Lacolle et de Saint-Jean, comtés de Napierville, Laprairie, Saint-Jean et Missisquoi, Québec (1:31 680), 1975-78.
1315. HOWIE, R.D., Geol. Surv. Can.:  
Subsurface geology of the Paleozoic basins of eastern Canada, 1971-.
1316. INNIS, J., LENZ, A.C., Univ. Western Ontario (Geology):  
Stratigraphy and sedimentology of the Road River Formation, Richardson Mountains, Yukon and Northwest Territories, 1978-79; M.Sc. thesis (Innis).
1317. JONES, B., DIXON, O.A., Univ. Alberta (Geology), Univ. Ottawa (Geology):  
Biostratigraphic zonation of Upper Silurian platform carbonate sequences, Arctic Canada, 1971-.
- Continued study of sedimentology and stratigraphy of the Upper Silurian Leopold Formation of eastern Somerset Island.
1318. KENDALL, A.C., Sask. Geol. Surv.:  
The Ashern, Winnipegosis and Lower Prairie evaporite formations of the commercial potash areas, Saskatchewan, 1974-79.
1319. KOBLUK, D.R., KAROLYI (BOURQUE), M.S., Univ. Toronto (Erindale-Earth and Planetary Sciences), McMaster Univ. (Geology):  
Paleokarst in carbonate rocks as a tool in recognition and interpretation of paleo-subaerial exposure surfaces, 1976-78.
- Karst is a common, though largely overlooked feature of paleo-subaerial surfaces in carbonate rocks. This project is aimed at a documentation of karst features of utility in these ancient surfaces, and showing how interpretation of paleoclimatic conditions may be derived from these features.
1320. LIBERTY, B.A., Brock Univ. (Geological Sciences):  
Southern Ontario-trace element studies in Paleozoic carbonates, 1968-.
- Research to this point seems to indicate that it is possible to "thumb print" the various carbonate formations (Ordovician, Silurian and Devonian) on the presence, absence and, to a degree, the amounts of specific trace elements. One variable is the comparability with respect to the paleo-strike. The word "suite", as in trace element suite, is avoided in order that other workers do not interpret that the whole trace element spectrum has been investigated. The method seems moderately successful in the cases of tracing Paleozoic formations and in identifying Paleozoic bedrock fragments in tills to their respective formation. Accordingly this information is in the realm of an additional entity to be added to the description of a formation, i.e. the trace element thumb print.
1321. LIBERTY, B.A., BRAY, D., Brock Univ. (Geological Sciences):  
Geological mapping in southern Ontario, 1970-79.
- Research to this point has permitted the mapping of all the islands in the channel between the Bruce Peninsula and Manitoulin Island. There are several items to be reported: the presence of Amabel strata on Bears Rump Island, some new lithologies that were previously not known in the Guelph Formation which is the bedrock formation on all

- remaining islands (but not to include Rabbit, Club, Lonely and Halfmoon Islands, the location of sites where extremely fossiliferous Guelph strata can be found), and the completion of modern geological mapping in this specific area.
1322. MacRAE, J., McGUGAN, A., Univ. Calgary (Geology): Permian stratigraphy and sedimentology, south-eastern British Columbia, 1976-77.
- See:**  
Permian stratigraphy and sedimentology-south-western Alberta and southeastern British Columbia; Bull. Can. Petrol. Geol., v. 25, no. 4, p. 752-766, 1977.
1323. MAYR, U., Geol. Surv. Can.: Stratigraphy and correlation of lower Paleozoic subsurface sections, southern and central Arctic Islands, 1975-.
- See:**  
Subsurface stratigraphy, conodont zonation, and organic metamorphism of the Lower Paleozoic succession, Bjerne Peninsula, Ellesmere Island, District of Franklin; Geol. Surv. Can., Paper 78-1A, p. 393-398, 1978.
1324. McCUTCHEON, S.R., RUITENBERG, A.A., New Brunswick Dep. Nat. Res. (Mineral Res. Br.): Geology and mineral deposits of the Sussex-Salt Springs area, New Brunswick, 1977-82.
- To prepare detailed geologic maps (scale: one inch equals one quarter mile), resolve stratigraphic and structural problems in the map-area, prepare a paleogeographic interpretation, and determine the regional setting of ore deposits.
1325. McLEOD, M.J., RUITENBERG, A.A., New Brunswick Dep. Nat. Res. (Mineral Res. Br.): Geology and mineral deposits of the Dorchester - Hillsborough area, New Brunswick, 1977-82.
1326. MIALL, A.D., Geol. Surv. Can.: Phanerozoic stratigraphy and sedimentology of Somerset Island and northern Boothia Peninsula, 1975-.
- See:**  
The Somerset Island Formation: an Upper Silurian to ?Lower Devonian intertidal/supratidal succession, Boothia Uplift region, Arctic Canada; Can. J. Earth Sci., vol. 15, no. 2, p. 181-189, 1978.
1327. MONGER, J.W.H., Geol. Surv. Can.: Upper Paleozoic rocks of western Canadian Cordillera, 1972-.
- See:**  
Upper Paleozoic rocks of the western Canadian Cordillera and their bearing on Cordilleran evolution; Can. J. Earth Sci., vol. 14, no. 8, p. 1832-1859, 1977.
1328. MORROW, D.W., Geol. Surv. Can.: Stratigraphy, sedimentology and diagenesis of Paleozoic rocks in the southern Mackenzie Mountains and northern Rocky Mountains, Yukon Territory - British Columbia, 1975-.
- See:**  
The Prairie Creek embayment and associated slope, shelf and basin deposits; Geol. Surv. Can., Paper 78-1A, p. 361-370, 1978.
- Galena-sphalerite mineralization near Palmer Lake, Northwest Territories; *ibid.*, p. 472, 473, 1978.
1329. NARBONNE, G.M., DIXON, O.A., Univ. Ottawa (Geology): Silurian stratigraphy and depositional environments of southeastern Somerset Island, Northwest Territories, 1975-79; Ph.D. thesis (Narbonne).
- See:**  
Siluro-Devonian sedimentation on Somerset and Cornwallis Islands, Arctic Canada; Bull. Can. Petr. Geol., v. 25, 1978.
1330. NASSICHUK, W.W., Geol. Surv. Can.: Stratigraphy and paleontology of Upper Paleozoic rocks on parts of Ellesmere and Axel Heiberg Islands, District of Franklin, 1968-.
- See:**  
A new ostracode genus from upper Permian rocks in Arctic Canada; Geol. Surv. Can., Paper 78-1A, p. 389-392, 1978.
- Permian fusulinaceans and stratigraphy at Blind Fiord, southwestern Ellesmere Island; Geol. Surv. Can., Bull. 268, 1977.
1331. NASSICHUK, W.W., Geol. Surv. Can.: Carboniferous biostratigraphy in the northern Yukon, British Columbia, Alberta and Alaska, 1975-.
- See:**  
Upper Permian ammonoids from the Cache Creek Group in western Canada; J. Paleontol., vol. 51, no. 3, p. 557-590, 1977.
1332. NOBLE, J.P.A., Univ. New Brunswick (Geology): Silurian-Devonian stratigraphy and paleoenvironments, northern Appalachians, 1973-84.
- See:**  
Silurian stratigraphy and depositional environments in the Charlo-Upsalquitch area, New Brunswick, Canada; Can. J. Earth Sci., v. 14, no. 11, p. 2533-2543, 1977.
- The coastal stratigraphy of the Silurian rocks between Bathurst and Dalhousie has been described and published, the inland Upsalquitch area has been similarly studied and the area inland from Petit Roches is currently being investigated. It has been shown that the area of northern New Brunswick was one of continental fragmentation following the Taconic orogeny with rapid and local uplifts and basins formation beginning about Llandoverly C<sub>4</sub> time. Although the boundaries of these tectonic units changed throughout the Silurian because of differential vertical movements, a number of tectonic units persisted for much of this time. They include the Tetagouche Mountains, the Matapedia Basin, the Bathurst Basin, the Armstrong Brook Delta and the Chaleur Bay Shelf.

1333. NORFORD, B.S., Geol. Surv. Can.:  
Ordovician and Silurian biostratigraphy of British Columbia, Alberta, Manitoba, Yukon, Mackenzie and Franklin, 1961-.
1334. NORRIS, A.W., Geol. Surv. Can.:  
Devonian biostratigraphy of Lake Manitoba-Lake Winnipegosis region, Manitoba, 1964-.
1335. NORRIS, A.W., Geol. Surv. Can.:  
Devonian biostratigraphy of northern Yukon Territory and adjacent District of Mackenzie, 1970-.
1336. NORRIS, A.W., UYENO, T.T., McCABE, H.R., Geol. Surv. Can., Manitoba Geol. Services Br.:  
Devonian rocks of the Lake Winnipegosis-Lake Manitoba outcrop belt, southwestern Manitoba, 1967-78.
1337. OKULITCH, A.V., Geol. Surv. Can.:  
Stratigraphy and structure of the Mount Ida Group, southern British Columbia, 1972-78.
1338. PEDDER, A.E.H., Geol. Surv. Can.:  
Devonian biostratigraphy western and northern Canada, 1968-.
- See:**  
Systematics and biostratigraphic importance of Lower Devonian rugose coral genus *Exilifrons*; Geol. Surv. Can., Paper 77-1B, p. 173-180, 1977.  
Fauna and correlation of the type section of the Cranswick Formation (Devonian), Mackenzie Mountains, Yukon Territory; *ibid.*, p. 227-234, 1977.
1339. PETRYK, A.A., Québec Dep. Nat. Res. (Energy Br.):  
Geology and oil and gas exploration, Anticosti Basin, Québec, 1975-.
- See:**  
Geology and oil and gas exploration of Anticosti Island, Gulf of St. Lawrence, Québec: preliminary reconnaissance; Quebec Dep. Natural Resources, DPV 505, 1977.  
Progress made on the stratigraphy of the Silurian Gun River, Jupiter and Chicotte Formations, and the Upper Ordovician upper Vaureal and Ellis Bay formations in southcentral and southeastern Anticosti Island respectively; detailed macroscopic descriptions of lithologies represented in the composite stratigraphic section; a geological map (1:100 000) of Anticosti Island will be completed before April 1978.
1340. PICKERILL, R.K., Univ. New Brunswick (Geology):  
Paleontology, ichnology, sedimentology and stratigraphy of selected Paleozoic sequences in eastern Canada, 1977-81.
- See:**  
Enigmatic trace fossils from the Silurian Chaleurs Group of the southeastern Gaspé Peninsula, Quebec; Can. J. Earth Sci., vol. 14, no. 12, p. 2729-2736, 1977.
1341. RICHARDS, B.C., Geol. Surv. Can.:  
Carboniferous and Permian stratigraphy and sedimentation in the southwestern District of Mackenzie and southeastern Yukon Territory, 1977-.
1342. SANFORD, B.V., Geol. Surv. Can.:  
Lower Paleozoic geology of Eastern Canada, 1975-.
- See:**  
Ordovician rocks of Melville Peninsula, southeastern District of Franklin; Geol. Surv. Can., Bull. 269, p. 7-21, 1977.
1343. SCHENK, P.E., Dalhousie Univ. (Geology):  
Paleozoics of Nova Scotia - stratigraphy and sedimentology, 1963-.
1344. SCHENK, P.E., JANSKA, L.F., PIPER, D.J.W., LANE, T.E., Dalhousie Univ (Geology):  
Paleozoics of Nova Scotia - sedimentology and stratigraphy of the White Rock Formation (Silurian?), Nova Scotia, 1971-78; M.Sc. thesis (Lane).
1345. SKIDMORE, W.B., Québec Min. Richesses Naturelles:  
Stratigraphie et structure, Gaspésie Orientale, Québec.
1346. SMITH, R., DANNER, W.R., Univ. British Columbia (Geological Sciences):  
Stratigraphy and structure of the Mount Paul area near Kamloops, British Columbia, 1975-78; M.Sc. thesis (Smith).
1347. THOMPSON, R.I., Geol. Surv. Can.:  
Structure and stratigraphy of Paleozoic and lower Mesozoic rocks in Halfway River map-area, northeastern British Columbia, 1975-.
1348. THORSTEINSSON, R., Geol. Surv. Can.:  
Structure and stratigraphy of western Devon Island and Vendom Fiord map-area, Ellesmere Island, District of Franklin, 1976-.
1349. TRETIN, H.P., Geol. Surv. Can.:  
Stratigraphy, structure, and carbonate petrography of the Marble Canyon Formation (Permian) in the Marble Range, Cariboo District, British Columbia, 1967-.
1350. VALLIERES, A., St-JULIEN, P., Québec Min. Richesses Naturelles:  
Région de Trois-Pistoles et de Saint-Hubert-de-Temisouata, comtés de Rivière-du-Loup et de Rimouski, Québec (1:15 840), 1973-78; thèse de doctorat (Vallières).
- Voir:**  
Géologie de la région de Cacouna à Saint-André-de-Kamouraska; comtés de Rivière-du-Loup et de Kamouraska: rapp. prélim.; Min. Richesses Naturelles, Québec, DPV-513, 1977.

- MESOZOIC**
1351. ASCOLI, P., Geol. Surv. Can.:  
Biostratigraphic zonation (Foraminifera-Ostracoda) of the Mesozoic and Cenozoic rocks of the Atlantic Shelf, 1971-.
1352. BALKWILL, H.R., Geol. Surv. Can.:  
Structure and stratigraphy, western Queen Elizabeth Islands, District of Franklin, 1976-.
- See:**  
Lougheed Island and neighbouring small islands, District of Franklin (NTS 69C, 79D); Geol. Surv. Can., Paper 77-1B, p. 181-183, 1977.
1353. EMBRY, A.F., Geol. Surv. Can.:  
Mesozoic stratigraphy and basin analysis of eastern Sverdrup Basin, Arctic Archipelago, 1975-.
1354. GIBSON, D.W., Geol. Surv. Can.:  
Stratigraphic and sedimentological studies of the Cretaceous Gething Formation, Peace River Canyon of northeastern British Columbia, 1974-.
1355. GIBSON, D.W., Geol. Surv. Can.:  
Stratigraphic and sedimentological studies of Lower Cretaceous rocks, Rocky Mountain Foothills and Front Ranges, Alberta and British Columbia, 1975-.
- See:**  
Sedimentary facies in the Jura-Cretaceous Kootenay Formation, Crowsnest Pass area, southwestern Alberta and southeastern British Columbia; Bull. Can. Pet. Geol., vol. 25, no. 4, p. 767-791, 1977.  
The Kootenay-Nikanassin lithostratigraphic transition; Rocky Mountain Foothills of west-central Alberta; Geol. Surv. Can., Paper 78-1A, p. 379-381, 1978.  
Upper Cretaceous and Tertiary coal-bearing strata in the Drumheller-Ardley region, Red Deer River Valley, Alberta; Geol. Surv. Can., Paper 76-35, 1977.
1356. JANSA, L.F., Geol. Surv. Can.:  
Stratigraphy and sedimentology of the Mesozoic and Tertiary rocks of the Atlantic continental margin, 1971-.
1357. JANSA, L., Geol. Surv. Can.:  
Reconnaissance field study of the Mesozoic sequences outcropping on the Iberian Peninsula, 1977-.
- To provide evidence that the sedimentary sequences of the Iberian Peninsula are co-eval with similar sequences beneath the Grand Banks.
1358. JELETZKY, J.A., Geol. Surv. Can.:  
Mesozoic and Tertiary rocks of the west coast of Vancouver Island and in Quatsino Sound, British Columbia, 1949-.
1359. JELETZKY, J.A., Geol. Surv. Can.:  
Cretaceous and Jurassic of Richardson Mountains, Porcupine Plains and Eagle Plains, Yukon Territory and District of Mackenzie, 1955-.
- See:**  
Porcupine River Formation; A new Upper Jurassic sandstone unit, northern Yukon Territory; Geol. Surv. Can., Paper 76-27, 1977.  
Causes of Cretaceous oscillations of sea level in western and Arctic Canada and some general geotectonic implications; Geol. Surv. Can., Paper 77-18, 1978.
1360. LOZEJ, G.P., BEALES, F.W., Univ. Toronto (Geology):  
Strata-bound ore deposits in limestones.  
Bonet's micropaleontological zonation permitted detailed mapping and definition of the structural/stratigraphic controls that affected ore emplacement at Sierra La Encantada, Coahila.
1361. MONGER, J.W., Geol. Surv. Can.:  
Stratigraphy of the Takla Group, northwestern British Columbia, 1975-.
- See:**  
Lower Mesozoic stratigraphy, Cry Lake and Spatsizi map-areas, British Columbia; Geol. Surv. Can., Paper 78-1A, p. 21-24, 1978.  
The Triassic Takla Group in McConnell Creek map-area, north-central British Columbia; Geol. Surv. Can., Paper 76-29, 1977.
1362. POULTON, T.P., Geol. Surv. Can.:  
Mesozoic biostratigraphy and Jurassic paleontology of northern Yukon and adjacent District of Mackenzie, 1975-.
1363. POULTON, T.P., Geol. Surv. Can.:  
Jurassic biostratigraphy of selected areas of western and Arctic Canada, 1976-.
1364. PRICE, L.L., Geol. Surv. Can.:  
Geological observations at shafts of potash mines, Saskatchewan, 1964-.
1365. RAHMANI, R.A., Geol. Surv. Can.:  
Mesozoic stratigraphy and basin analysis of the western Queen Elizabeth Islands, Arctic Archipelago, 1975-.
- See:**  
Fault control on sedimentation of Isachsen Formation in Sverdrup Basin; Geol. Surv. Can., Paper 77-1B, p. 157-161, 1977.  
Geological and palynological interpretation of Eureka Sound Formation on Sabine Peninsula, northern Melville Island, District of Franklin; *ibid.*, p. 185-189, 1977.
1366. ROUSE, G.E., MATHEWS, W.H., Univ. British Columbia (Geological Sciences):  
Tertiary stratigraphy of the Quesnel Area, British Columbia, 1976-78.  
Field mapping complete, laboratory processing (palynology, age determinations, rock analysis, etc.) in progress.

1367. STOTT, D.F., Geol. Surv. Can.:  
Cretaceous stratigraphy, Peace River to 60 degrees, British Columbia, 1961-.
1368. TELFORD, P.G., NORRIS, G., VERMA, H.M., VOS, M.A., Ontario Geol. Surv.:  
Stratigraphy, fossil fuels and industrial minerals of the Moose River Basin, James Bay Lowland, 1975-80.  
Using drilling, geophysics, palynology, and limited ground mapping define the geographic and stratigraphic relationships of Mesozoic sediments in the Moose River Basin, and make an assessment of the fossil fuel and industrial mineral resource potential of the basin.
1369. TEMPELMAN-KLUIT, D., Geol. Surv. Can.:  
Stratigraphy, structure and metallogeny of the northern part of the Intermontane Belt (Whitehorse trough) in the Canadian Cordillera, 1977-.
- See:**  
Reconnaissance geology, Laberge map-area, Yukon; Geol. Surv. Can., Paper 78-1A, p. 61-66, 1978.
1370. THORSTAD, L.E., GODWIN, C.I., ARMSTRONG, R.L., Univ. British Columbia (Geological Sciences):  
Stratigraphic and structural setting of the Kutcho Creek "Formation", Cry Lake map sheet, north-central British Columbia, 1977-78; M.Sc. thesis (Thorstad).
- See:**  
Lower Mesozoic stratigraphy, Cry Lake and Spatsizi map-areas, British Columbia; Geol. Surv. Can., Paper 78-1A, p. 21-24, 1978.  
To define the stratigraphic relations and look at structural relations of rocks that host the Kutcho Creek massive sulphide deposit, briefly study the deposit, set-up chemical criteria for differentiating between Takla Formation and Kutcho "Formation", and date age of metamorphism to establish an absolute age for the major structural deformation (thrusting and isoclinal folding) in the area.
1371. TIPPER, H.W., Geol. Surv. Can.:  
Biostratigraphic study of Mesozoic rocks in the Intermontane and Insular Belts of the Canadian Cordillera, 1975-.
- See:**  
Jurassic biostratigraphy, Cry Lake map-area, British Columbia; Geol. Surv. Can., Paper 78-1A, p. 25-27, 1978.  
Northeastern part of Quesnel (93B) map-area, British Columbia; *ibid.*, p. 67, 68, 1978.
1372. WADE, J.A., Geol. Surv. Can.:  
Regional subsurface geology of Mesozoic and Cenozoic rocks of the Atlantic continental margin, 1972-.
1373. WILLIAMS, G.L., Geol. Surv. Can.:  
Biostratigraphic zonation (palynology) of the Mesozoic and Cenozoic rocks of the Atlantic Shelf, 1971-.
- See:**  
Geology of the Amoco Imp Skelly A-1 Osprey H-84 well, GrandBanks, Newfoundland; Geol. Surv. Can., Paper 77-21, 1977.
- CENOZOIC**
1374. McCANN, S.B., Geol. Surv. Can.:  
Holocene stratigraphy of Barrier Island systems, southern Gulf of St. Lawrence, 1977-.
- To determine the evolution of the barrier shorelines during the past 5000-8000 yrs, to provide a time framework for evaluating the present shoreline conditions and the effect of contemporary processes. To define the vertical extent and total volume of sediments in the barrier systems and to document these sediments in terms of their potential mineral and/or other resource applications.
1375. MIALL, A.D., Geol. Surv. Can.:  
Stratigraphy and sedimentology of the Tertiary sediments of the eastern Arctic, 1977-.
1376. YORATH, C.J., Geol. Surv. Can.:  
Stratigraphy and structure of the Pacific Continental Slope Shelf using manned and unmanned submersibles, 1977-.
- See:**  
Submersible operations on the Canadian Pacific continental margin, Report II; Geol. Surv. Can., Paper 78-1A, p. 341-349, 1978.
1377. YOUNG, F.G., Geol. Surv. Can.:  
Cenozoic geology of the Beaufort-Mackenzie Basin, 1977-.
- To develop an understanding of the geologic framework and hydrocarbon potential of the Beaufort-Mackenzie Basin through the establishment of biostratigraphic subdivisions, a stratigraphic correlation framework and appropriate nomenclature, depositional models, tectonic and burial histories, and the study of kerogen maturation.

ALBERTA

1378. BABCOCK, E.A., Alberta Research Council (Geology Div.):  
Measurement of subsurface fractures using Schlumberger 4-Arm dipmeter logs, 1973-78.
1379. SPANG, J.H., Univ. Calgary (Geology):  
Mechanical behaviour of the thrust plates in the Foothills and Front Ranges of the Canadian Rocky Mountains, 1978-80.
- Mapping a minor thrust fault has revealed three mechanical relationships between thrusting and folding in the hanging wall of the thrust. The first relationship is that in which the fault acts as a décollement surface with a fold pair developing as a result of shortening in the hanging wall. In this instance, the fold pair is a direct shortening mechanism, and the fault is an indirect shortening mechanism. The second relationship involves the propagation of the thrust at its leading edge as the hanging wall is "crumpled" toward the leading edge. Displacement across the fault decreases in magnitude toward the leading edge. At some critical interlimb angle the folds must lock, and in order for folding to continue the fault must propagate in the transport direction. The third relationship appears to involve the propagation of the thrust along the axial surface of an anticline. The axial surface of the fold is in an orientation of high resolved shear stress with respect to the regional stress field. In the internal portion of the thrust plate, the numerical dynamic analysis of calcite and dolomite twin lamellae shows that the compression axes are nearly parallel to the transport direction. The compression axes are nearly layer parallel or form at a small angle to bedding (15° or less) in the counterdip direction.

BRITISH COLUMBIA

1380. CAMPBELL, R.B., Geol. Surv. Can.:  
Geology of the Cariboo Mountains, British Columbia, 1968-.
1381. EISBACHER, G.H., Geol. Surv. Can.:  
Successor basins of the western Cordillera, British Columbia-Yukon, 1975-.
- See:  
Mid-Cenozoic paleogeomorphology and tectonic setting of the St. Elias Mountains, Yukon Territory; Geol. Surv. Can., Paper 77-1B, p. 319-335, 1977.
1382. MORRISON, M., SIMONY, P.S., GHENT, E.D., Univ. Calgary (Geology):  
Structural and metamorphic evolution of Malton Gneiss and its relation to the Hadrynian cover, British Columbia, 1977-80; Ph.D. thesis (Morrison).
- The upper contact of the Malton Gneiss, west of the Rocky Mountain Trench has been outlined. It is marked by a mylonite zone. The upper portion of the Gneiss is a zone highly deformed, strongly banded granodiorite gneiss. The overlying cover is the Hadrynian Horsethief Creek Group with complex, poly-phase structure and metamorphosed to staurolite-kyanite schist. The structural and metamorphic sequence now recognized in the cover will be followed into the Gneiss to see how much of

its fabric and mineralogy is the result of Columbia events and to what extent an earlier history survives. The relationship of the Gneiss to its cover will be examined in detail.

1383. OLLERENSHAW, N.C., Geol. Surv. Can.:  
Structural analysis of the Fernie Basin, British Columbia, 1975-.
1384. STRUIK, L., SIMONY, P., Univ. Calgary (Geology):  
Stratigraphic and structural studies, Wells area, British Columbia, 1977-79; M.Sc. thesis (Struik).
- Detailed geological mapping of some 300 km<sup>2</sup> was carried out on a scale of 1:20 000 in the Wells area of the Cariboo Mountains. The prime objective was to re-examine the stratigraphy of the Upper Paleozoic Slide Mountain Group and its relationship to the underlying Proterozoic and Lower Paleozoic Cariboo Group. The Guyet conglomerate, at the base of the Slide Mountain Group, lies on a surface which truncates underlying units. The majority of clasts in the conglomerate are not derived from the Cariboo Group, instead they are made of chert which is absent from the Cariboo Group. The conglomerate is marked by an intense cleavage affecting matrix and clasts. It is too intense to permit distinction between cleavage in clasts and matrix. If the clasts had an earlier (Caribooan) cleavage, that is not longer recognizable. New outcrop bands of the overlying Greenberry limestone member were found and these outline large-scale tight folds not previously recognized. The contrast in structural style between the Slide Mountain and Cariboo Groups is not as great as previously thought and the structural pattern of the area can be interpreted in terms of one orogenic episode. Microfossils are being separated from collections made from the Greenberry limestone and from sedimentary rocks in the overlying, largely volcanic, Antler Formation.

MANITOBA

1385. BRISBIN, W.C., Univ. Manitoba (Earth Sciences):  
Deformational history of Archean greenstone belts, 1965-.
1386. KEAY, V., BRISBIN, W.C., Univ. Manitoba (Earth Sciences):  
Structural geology of the Sickle rocks of the Eager Lake area, Lynn Lake District, Manitoba, 1977-79; M.Sc. thesis (Keay).
1387. THOMAS, M.W., BRISBIN, W.C., Univ. Manitoba (Earth Sciences):  
Deformation of the Sickle Group sedimentary rocks of the Laurie Lake area, Lynn Lake District, Manitoba, 1976-78; M.Sc. thesis (Thomas).

NEW BRUNSWICK

1388. RAST, N., DICKSON, L.W., PARKER, J.S., TENG, H.C., GRANT, R.H., Univ. New Brunswick (Geology):  
Caledonian Appalachian orogenic belt, 1971-79; Ph.D. theses (Dickson, Teng, Grant), M.Sc. thesis (Parker).

See:

Paleozoic volcanicity along the Bathurst-Dalhousie Geotraverse, New Brunswick; Geol. Assoc. Can., Sp. Paper No. 16, p. 112-124, 1977.

The project consists of the projection of wide corridors across the Appalachian and Caledonian systems in New Brunswick and British Isles. The research so far has achieved the clarification of structure and stratigraphy in southern and northern New Brunswick and the drawing of the partial structural profiles for New Brunswick as a whole. In addition granite geology in southern New Brunswick has been investigated in the context of prolonged movements and deformation. The project is designed to have structural experiments with plastic analogies in order to determine the structure of the Caledonides and Appalachians by model studies. One of the important aspects has been the correlation of New Brunswick Appalachians with the geology of Europe and some of these have been established. In particular the continuation of Variscan orogenic belt in Canada and United States has been suggested on the basis of structural, stratigraphic and petrological correlations.

1389. STRINGER, P., Univ. New Brunswick (Geology): Relation of cleavage to folding in the Caledonian-Appalachian orogenic belt, 1975-.

See:

Triassic reptile tracks in the Lepreau Formation, southern New Brunswick, Canada; Can. J. Earth Sci., vol. 15, no. 4, p. 594-602, 1978.

1. Cleavage in upright folds of Silurian greywacke in northern New Brunswick and southwest Southern Uplands, Scotland, is oblique to the axial surface. Major folds are subhorizontal, but minor folds vary in plunge and locally face downwards. Oblique cleavage and aberrant minor folds were formed during a single phase of folding under stress oblique to the direction of layer parallel shortening, related probably to décollement folding over basement during subduction.

2. Fracture cleavage in folded red beds of the Lepreau Formation in southern New Brunswick is compressional in origin. Reptile tracks discovered in the Lepreau Formation have been assigned to the ichnogenus **Isocampe**, and date the compressional events as post Middle or Upper Triassic.

3. D2 minor folds in the Tay Nappe deform spaced cleavage (S1) within unfolded inverted beds and verge northwest throughout the Flat Belt of central Perthshire, Scotland. The southeastward downward facing direction of inverted beds along S1 is modified to northwestward in the long limbs of D2 minor folds which are interpreted as resulting from simple shear. Tectonic transport of Upper Dalradian (Cambrian) rocks largely by post - D1 simple shear is proposed for the evolution of the Tay Nappe in the southern Highlands.

NEWFOUNDLAND/LABRADOR

1390. BAILEY, D.C., SMYTH, W.R., Newfoundland Dep. Mines Energy:  
Aillik project - stratigraphic and structural studies, and uranium mineralization of the Aillik Group, Labrador, 1977-81.

1391. KENNEDY, M.J., BAZINET, J.P., Brock Univ. (Geological Sciences):  
Structural development of the axial zone of the Appalachian belt in Newfoundland and its relationship to adjacent regions, 1976-78; M.Sc. thesis (Bazinet).

1392. WILLIAMS, H., Memorial Univ. (Geology):  
Geologic setting of asbestos-bearing ultramafic rocks along the Baie Verte (Newfoundland) - Brompton (Québec) line, 1976-78.

See:

Ophiolitic melange and its significance in the Fleur de Lys Supergroup; Can. J. Earth Sci., vol. 14, p. 987-1003, 1977.

The Baie Verte-Brompton line in Newfoundland and regional correlations in the Canadian Appalachians; Geol. Surv. Can., Paper 78-1A, p. 225-229, 1978.

The Baie Verte-Brompton line marked by ophiolite occurrences along its course, marks an ancient continent-ocean interface, which theoretically extends the full length of the Appalachian system. Its mafic-ultramafic rocks are interpreted as remnants of oceanic crust and mantle, and these rocks are host to the asbestos deposits that make the Canadian segment of the Baie Verte-Brompton line the world's richest asbestos belt.

NORTHWEST TERRITORIES

1393. EADE, K., Geol. Surv. Can.:  
Structural and stratigraphic study of the Precambrian rocks of southwestern Keewatin, Northwest Territories, 1968-.

1394. FALCONER, R.K.H., Geol. Surv. Can.:  
Study of the structures and origin of Baffin Bay, 1976-.

See:

Baffin Island shelf-shallow corehole drilling, 1976; Geol. Surv. Can., Paper 77-1B, p. 125-127, 1977.

Marine geophysical and geological research in Baffin Bay and the Labrador Sea, CSS Hudson 1976; *ibid.*, p. 255-260, 1977.

1395. FYSON, W.K., Univ. Ottawa (Geology):  
Structural patterns in metamorphic rocks, 1970-.

See:

The geology of the Hackett-Back River greenstone belt - second preliminary report; Geol. Surv. Can., Paper 77-1A, p. 415-423, 1977.

Shape, size, and orientation of muscovite crystals in a schist of variable metamorphic grade; Can. J. Earth Sci., v. 14, p. 185-195, 1977.

1396. OKULITCH, A.V., Geol. Surv. Can.:  
Geology of the Penrhyn Fold Belt, Melville Peninsula, District of Franklin, 1976-.

See:

Geology of the Barrow River and Hall Lake map-areas, Melville Peninsula, District of Franklin; Geol. Surv. Can., Paper 78-1A, p. 159-161, 1978.

1397. PUGH, D.C., Geol. Surv. Can.:  
Northern basin analysis program: Peel River map-area, 1971-.

1398. WILLIAMS, G.K., Geol. Surv. Can.:  
Northern basin analysis program: Great Bear River map-area (Mesozoic), District of Mackenzie, 1971-.
1399. WILLIAMS, G.K., Geol. Surv. Can.:  
Northern basin analysis program: Redstone River map-area, District of Mackenzie, 1971-.
- See:**  
Some observations on the Horn Plateau, District of Mackenzie; Geol. Surv. Can., Paper 77-1B, p. 191-196, 1977.
1400. WILLIAMS, G.K., Geol. Surv. Can.:  
Northern basin analysis program: Slave River map-area, District of Mackenzie, 1971-.
- See:**  
The Celibeta structure compared with other basement structures on the flanks of the Tathlina Hugh, District of Mackenzie; Geol. Surv. Can., Paper 77-1B, p. 301-310, 1977.  
  
An update of subsurface information, Cretaceous rocks, Trout Lake area southern Northwest Territories; Geol. Surv. Can., Paper 78-1A, p. 545-553, 1978.
1401. YOUNG, F.G., Geol. Surv. Can.:  
Northern basin analysis program: Firth River and Horton River map-areas, District of Mackenzie and Yukon Territory, 1971-.
- See:**  
The mid-Cretaceous flysch and phosphatic ironstone sequence, northern Richardson Mountains, Yukon Territory; Geol. Surv. Can., Paper 77-1C, p. 67-74, 1977.
- NOVA SCOTIA**
1402. GRAVES, M.C., ZENTILLI, M., Dalhousie Univ. (Geology):  
Tectonic and metallogenetic history of Nova Scotia between the Acadian orogeny and the opening of the central North Atlantic Ocean, 1975-78; Ph.D. thesis (Graves).  
  
This project has been focussing on the role of basic magmatism in the metallogenetic and tectonic history of Nova Scotia since the Acadian Orogeny. Field work and sample collection is now complete. Thirty dykes and plugs have been sampled as well as over 30 locations of Carboniferous or Triassic volcanic rocks. Paleomagnetic laboratory work on over 350 samples is nearing completion and a programme of dating by K/Ar and <sup>40</sup>Ar/<sup>39</sup>Ar techniques is beginning.
1403. KEPPIE, J.D., Nova Scotia Dep. Mines:  
Structural and metamorphic studies, 1974-.
- See:**  
Tectonics of southern Nova Scotia; Nova Scotia Dep. Mines, Paper 77-1, 1977.  
  
Plate tectonic interpretation of Paleozoic world maps (with emphasis on circum-Atlantic orogens and southern Nova Scotia); Nova Scotia Dep. Mines, Paper 77-3, 1977.
1404. STEVENS, G.R., Acadia Univ. (Geology):  
Primary crystallization structures as control of cooling and fabric development in Triassic Basalts, Bay of Fundy, Nova Scotia, 1975-78.
1405. TRAPASSO, L.S., STEVENS, G.R., Acadia Univ. (Geology):  
Tectonic and metamorphic history of the Torbrook syncline, Nova Scotia, 1977-78; M.Sc. thesis (Trapasso).
- ONTARIO**
1406. BAER, A.J., Univ. Ottawa (Geology);  
Structural studies in the Grenville Province, 1978-.
- Studies of specific areas (mainly North Bay area) to verify that most deformation occurred by simple shear. Development of a model of the Grenville Province as a mega shear zone between two rigid blocks of crust.
1407. BRIGHT, E.G., Ontario Geol. Surv.:  
Regional structure and stratigraphy of the Eels Lake area, Haliburton and Peterborough counties, Ontario, 1977-78.
- See:**  
Regional structure and stratigraphy of the Eels Lake area, Ontario; Ontario Division of Mines; M.P. 75, p. 110-117, 1977.  
  
To better define the regional stratigraphy and structure of the Grenville Supergroup of metasediments and metavolcanics and concurrently delineate the geological and related metallogenic controls of the uranium deposits in the Bancroft region.
1408. BROWN, B., BRISBIN, W.C., Univ. Manitoba (Earth Sciences):  
Deformational history of the eastern Lake of the Woods greenstone belt, Ontario, 1974-78; Ph.D. thesis (Brown).
1409. CULSHAW, N., Univ. Ottawa (Geology):  
Origin of domal structures in Grenville rocks, Bancroft, Ontario, 1976-79; Ph.D. thesis.
1410. DALES, R.G., SCHWERDTNER, W.M., Univ. Toronto (Geology):  
Deformation of massive sulphide lenses and their wall rocks, Benny belt, Ontario, 1975-78; M.Sc. thesis (Dales).  
  
Sulphide mineralization in the Benny belt is found as small, massive lenses and stratiform disseminations in meta-volcanic rocks. They have been metamorphosed (amphibolite facies) and deformed resulting in pronounced foliation and lineation in both silicate minerals and pyrite. Various alternative mechanisms of deformation which would account for the observed features have been proposed.
1411. DAVIES, J.F., GUTTMAN, M.A., Laurentian Univ. (Geology):  
A petrofabric study of the Pearl Lake felsic schist; Ontario, 1978; M.Sc. thesis (Guttman).

See:

Structural interpretation of the Timmins mining area, Ontario; *Can. J. Earth Sci.*, v. 14, p. 1046-1053, 1977.

The Pearl Lake felsic schist (previously called Pearl Lake porphyry) has been interpreted as a felsic volcanic rock that has undergone multiple deformation and in which late-stage quartz and albite metacrysts have developed. Late-stage metasomatism was responsible not only for development of quartz and albite metacrysts but was accompanied by copper mineralization. Petrofabric analysis of quartz albite and sericite by petrofabric methods and x-ray goniometry is intended to substantiate the conclusion that the quartz and albite are post-deformation metacrysts.

1412. EVERITT, R.A., ROUSELL, D.H., Laurentian Univ. (Geology):

Fracture analysis of Sudbury Basin, 1975-78; M.Sc. thesis (Everitt).

1413. KARBOSKI, F., MOORE, J.M., Jr., BROWN, R.L., Carleton Univ. (Geology):

Structure and stratigraphy of metamorphosed sedimentary and volcanic rocks south of Calabogie, Eastern Ontario, 1977-79; M.Sc. thesis (Karboski).

Metasediments of the Flinton Group, and underlying units of sedimentary and volcanic origin, are to be mapped northeast from Flower Station; to extend known structure and stratigraphy into the granulite facies terrain of the Ottawa Valley.

1414. MORGAN, J., SCHWERDTNER, W.M., Univ. Toronto (Geology):

Structural evolution of Finlayson Lake greenstone belt: Emplacement of the Marmion Lake pluton, Ontario, 1976-80; M.Sc. thesis (Morgan).

1415. ROBTIN, P-Y.F., BAU, A.F.S., Univ. Toronto (Erindale-Geology):

Investigation of the general relationships between fault attitude, fault motion, preexisting fabric and mylonite fabric: application to the Quetico fault, 1976-78.

In many areas of the Precambrian Shield characterized by little relief it is difficult to determine the attitudes of major faults. Also the absence of reliable stratigraphic markers makes a determination of direction and sense of slip unreliable. Studies of rock fabric associated with, or modified by the fault motion should provide us with this information.

1416. SCHWERDTNER, W.M., MASON, D., Univ. Toronto (Geology):

Internal structure and lithology of Irene-Eltrut Lakes granitoid complex, Ontario, 1975-79.

1417. STESKY, R.M., HALLS, H.C., Univ. Toronto (Geology):

Structural analysis of shatter cones from the Slate Islands meteorite impact site, northern Lake Superior, Ontario, 1976-78.

Slate Islands, in northern Lake Superior, is the probable site of a meteorite impact. A characteristic feature of such impacts is the

presence of shatter cones, conical fracture surfaces resulting from the interaction of the shock-wave with inhomogeneities in the rock. The cones are thought to point towards the shock source. The cones characteristically have linear ridges or striations which radiate from the cone apex. We have located shatter cones at more than thirty sites around the islands and have made extensive measurements of striation orientation at each site. Using a least-squares curve-fitting computer programme developed for this purpose, we have calculated the orientation and shape of the average cone at each site. Without making any structural corrections, the cones point predominantly up and towards the centre of the island group. Using paleomagnetic pole-position data, we have corrected the shatter cone orientations at a number of sites for the post-shock block rotations. The calculated impact point is near the geometric centre of the island group at a height of 1 km above the present surface. At a few sites, where the rock is strongly foliated, the cones are elliptic in shape, as well as being anomalously oriented. Current work centres on characterizing the physical anisotropy of these rocks, principally by compressibility and elastic wave velocity measurements, to relate this anisotropy to the geometry of the cones and hence to understand better the shock wave-rock interactions. In addition, we are examining the crack fabric of a few selected rocks to search for the presence of shock-induced cracks, a possible further indicator of shock level and source direction.

1418. STONE, D., SCHWERDTNER, W.M., GOODWIN, A.M., CURRIE, J.B., STESKY, R.M., Univ. Toronto (Geology):

The Sydney Lake fault, 1975-79; Ph.D. thesis (Stone).

See:

The Sydney Lake fault zone; Proc. 1977 Geotraverse Conf., Univ. Toronto, 1977.

1419. STOTT, G.M., SCHWERDTNER, W.M., Univ. Toronto (Geology):

The mechanism of emplacement of a crescent-shaped pluton within the Shebandowan greenstone belt, Ontario, 1977-80; Ph.D. thesis (Stott).

QUEBEC

1420. BAER, A.J., Univ. Ottawa (Geology):

A study of textures in the Lac St. Jean Anorthosite, Québec, 1974-78.

Tructolitic anorthosite shows no deformation after crystallization of olivine, but orthopyroxene reaction rims are well developed. Gabbroic anorthosite systematically shows deformation of orthopyroxene, so that the latter crystallized before final consolidation. At the time of emplacement the anorthosite must have been under 30 km of crust. This would give a total of 60-70 km and implies that emplacement took place during or shortly after the Grenvillian event.

1421. BEAUDIN, J., SKIDMORE, W.B., ST-JULIEN, P., Québec Min. Richesses Naturelles: Région du Mont Albert, comté de Matane, Québec (1:15 840), 1975-78; thèse de doctorat (Beaudin).
- Voir:**  
Région du Mont Albert, comté de Matane; (rapport intérimaire); Min. Richesses Naturelles, Québec, DPV-495, 1977.
1422. BISSONNETTE, R., BAER, A.J., Univ. Ottawa (Geology):  
Structure and petrology of the Borgia anorthosite (Latuque, Québec), 1974-78; M.Sc. thesis (Bissonnette).  
The anorthosite forced its way up diapirically into already folded and metamorphosed gneisses. Petrological relationships indicate a depth of emplacement of 25-30 km. Emplacement was contemporaneous with the last regional deformation or later. It is thus probably syn- or post-Grenvillian event.
1423. CHARBONNEAU, J.-M., GLOBENSKY, Y., ST-JULIEN, P., Québec Min. Richesses Naturelles: Région du Lac Selby, comté de Missisquoi, Québec (1:15 840), 1974-78; thèse de doctorat (Charbonneau).
1424. DE ROMER, H.S., Concordia Univ. (Geology):  
Stratigraphy and structure of the Lake Massawippi and Fitch Bay area, Québec, 1974-79.  
A study of the Massawippi Lake - Fitch Bay area reveals complex stratigraphic and structural relations in Cambro-Ordovician Magog and Ascot rocks. These are unconformably overlain by fossiliferous Silurian and Devonian rocks. Imbrication within the units resulted in complex juxtaposition of slices and slivers.
1425. DUCHARME, D., HUBERT, C., BELAND, J., Univ. Montréal (Géologie):  
Analyse stratigraphique intégrée des roches ordoviciennes et siluriennes de l'anticlinorium d'Aroostook-Matapédia en Gaspésie, Québec, 1977-78; thèse de maîtrise (Ducharme).  
Identifier, décrire et départager dans les roches de la ceinture d'Aroostook-Matapédia des séquences flysch (gréseux et calcaire) de nature parautochtone et d'autres ensembles caractérisés par une tectonique polyphasée correspondant à des éléments allochtones, possiblement des nappes mises en place par gravité.
1426. GARIÉPY, C., HUBERT, C., BROOKS, C., Univ. Montréal (Géologie):  
Stratigraphie et géochimie des laves cambriennes du Groupe de Caldwell dans la région du Lac Etchemin, Appalaches du Québec, 1976-78; thèse de maîtrise (Gariépy).  
Stratigraphie et géochimie des laves du Groupe de Caldwell afin de déterminer le milieu tectonique de ces laves et de les localiser dans le cadre de l'évolution de l'orogénèse Taconique.
1427. MARTIGNOLE, D.J., MANTEL, S., Univ. Montréal (Géologie):  
Recherches pétrographiques et structurales dans le sud de la Province de Grenville, Québec, 1968-.
1428. SMITH, J., ROBIN, P.-Y.F., Univ. Toronto (Erindale-Geology):  
Analysis of fabric and deformation mechanisms in mylonitized harzburgites from Mont Albert and Thetford Mines, Québec, 1975-78.  
Detailed analysis of the fabric and deformation mechanisms of mylonitized harzburgites, at the base of ophiolite complexes, is expected to yield important information regarding the conditions of deformation and of emplacement of these bodies. It may, in the long term, help understand the mechanics of rifting and/or subduction.
1429. THEBERGE, R., HUBERT, C., BELAND, J., Univ. Montréal (Géologie):  
Analyse stratigraphique intégrée des roches ordoviciennes et siluriennes de l'anticlinorium d'Aroostook-Matapédia en Gaspésie, Québec, 1977-78; thèse de maîtrise (Théberge).  
Identifier, décrire et départager dans les roches de la ceinture d'Aroostook-Matapédia des séquences flysch (gréseux et calcaire) de nature parautochtone et d'autres ensembles caractérisés par une tectonique polyphasée correspondant à des éléments allochtones, possiblement des nappes mises en place par gravité.
1430. VAN DER LEEDEN, J., Univ. Ottawa (Geology):  
Nature of Grenville Front in western Québec, 1976-79; Ph.D. thesis.
- SASKATCHEWAN**
1431. LEWRY, J.F., SIBBALD, T.I.I., Univ. Regina (Geological Sciences), Sask. Geol. Surv.:  
Thermotectonic models of the western part of the Precambrian Shield in northern Saskatchewan, 1975-.
- See:**  
Variation in lithology and tectonometamorphic relationships in the Precambrian basement of northern Saskatchewan; Can. J. Earth Sci., v. 14, no. 6, p. 1453-1467, 1977.
- YUKON TERRITORY**
1432. COOK, D.G., Geol. Surv. Can.:  
Structural studies in the Mackenzie Arc, Franklin Mountains and Colville Hills, Yukon and District of Mackenzie, 1975-.
1433. NORRIS, D.K., Geol. Surv. Can.:  
Structural geology of northern Yukon Territory and northwestern District of Mackenzie, 1969-.
- See:**  
Geology and hydrocarbon resources northern mainland and offshore Canada; Geol. Surv. Can., Paper 77-1C, p. 81-83, 1977.  
The Geology of the Bonnet Plume Basin, Yukon Territory; Geol. Surv. Can., Paper 76-8, 1977.

1434. TEMPELMAN-KLUIT, D., Geol. Surv. Can.:  
Stratigraphy, structure and metallogeny of Pelly  
Mountains, and Yukon Plateau, Yukon Territory,  
1973-.

GENERAL

1435. HARRIS, I.M., Geol. Surv. Can.:  
Structural and stratigraphic synthesis of the  
Phanerozoic rocks of Eastern Canada, 1973-.
1436. HAYNES, S.J., Brock Univ. (Geological Sciences):  
Metallogeny and plate tectonics, southern Iran,  
1976-78.

The line of continental suturing, in the Fars region of Iran, is marked by a belt of ultramafic rocks, containing chromite bodies, that were thrust up during continental collision in the late Cretaceous. After epeirogenic uplift this belt was overlain by continental red beds and evaporites containing Pb-Cu deposits of possible Sabkha origin. To the south stratabound Pb-Zn deposits in Permian carbonates are present in the miogeoclinal wedge. To the north, a Tertiary-Quaternary volcanic belt developed on renewed northward movement of the Arabian Plate. This belt contains porphyry copper and various hydrothermal vein deposits.

1437. KING, L.H., Geol. Surv. Can.:  
Bedrock and surficial geology, Grand Banks, 1973-80.

See:

Paleocontinental slopes of East Coast Geosyncline (Canadian Atlantic margin); Can. J. Earth Sci., vol. 14, no. 11, p. 2553-2564, 1977.

1438. LONCAREVIC, B.D., Geol. Surv. Can.:  
Study of the Boundaries of lithospheric plates,  
1977-.

To determine the crustal structure of the Reykjanes Ridge by seismic refraction gravity and magnetic methods in order to extend our understanding of the magmatic processes which lead to the accretion of new material to the edges of the lithospheric plates and possible metallogeny of sulphide ore bodies.

1439. RANALLI, R., TANCZYK, L., MANN, R., HWU, C-R.,  
Carleton Univ. (Geology):  
Rheological properties of lithosphere and mantle  
and their bearing on geodynamic processes, 1975-  
81; M.Sc. theses (Tanczyk, Mann, Hwu).

See:

Correlation between length and offset in strike-slip faults; Tectonophysics, v. 37, p. T1-T7, 1977.

The project focuses on the problem of the determination of the rheology of the tectonically active layers of the earth and on the quantitative analysis of geodynamic processes. It is at present developing along three main lines: (1) rheology of the lithosphere and mantle - the rheological properties of an olivine upper mantle, including partial melting in the low-velocity zone, have been estimated by direct comparison of high-temperature creep mechanisms. The variation of power-creep viscosity with depth in the mantle has been roughly estimated under the assumption of constant activation energy and activation volume;

(2) quantitative analysis of selected geodynamic features - using analytical and numerical techniques from the theories of elasticity and plasticity and the method of finite elements, the stresses and displacements at passive continental margins (i.e. Atlantic and Arctic type) are being computed. An analysis of the tectonic evolution of the Rocky Mountains Foreland Belt is also underway; and (3) state of stress in the lithosphere - palaeomagnetic data on strikes and palaeolatitudes of dykes are being compiled and statistically analysed to detect any deviations from randomness possibly related to membrane stresses in the lithosphere.

1440. ROBIN, P-Y.F., Univ. Toronto (Erindale-Geology):  
Objective methods of determining natural strain in rocks for diverse assumptions regarding the competency contrast between host and strain marker, 1976-79.

See:

Determination of geologic strain using randomly oriented strain markers of any shape; Tectonophysics, v. 42, p. T7-T16, 1977.

A major concern of the geologist trying to unravel geologic deformations is the discovery, assessment and use of natural strain gauges. The purpose of this research is to find or improve methods of evaluating the natural strain recorded by the rock from the deformation of inert markers, and from measurement of distances between centers of markers (center-point method).

1441. SOUTHER, J.G., Geol. Surv. Can.:  
Study of the Cenozoic evolution of the western  
Cordillera, 1977-.

1442. SPOONER, E.T.C., BARRETT, T.J., Univ. Toronto  
(Geology), Univ. Oxford:  
The sequence and structure of ophiolitic and  
associated rocks in eastern Liguria, Italy, 1975-78;  
Ph.D. thesis (Barrett).

See:

Ophiolitic breccias associated with allochthonous oceanic crustal rocks in the East Ligurian Apennines, Italy - a comparison with observations from rifted oceanic ridges; Earth Planet. Sci. Lett., v. 35, p. 79-91, 1977.

The Jurassic ophiolitic and associated rocks of the eastern Italian Riviera between Genoa and La Spezia are peculiar in that they are characterised by extremely complex stratigraphies and an abundance of breccia units which contain large amounts of plutonic mafic and ultramafic fragments as well as a volcanic-clastic component. Pelagic sediments, in particular metal enriched radiolarian cherts, can rest stratigraphically on both plutonic gabbroic rocks and ultramafics. These relationships have been described and interpreted in terms of a model which involves formation at a rifted oceanic spreading ridge (e.g. Mid-Atlantic Ridge) as opposed to a smooth ridge (e.g. East Pacific Rise).

1443. WILSON, B., SCHWERDTNER, W.M., Univ. Toronto  
(Geology):  
Origin and evolution of Archean greenstone belts -  
a simulation of the structure of greenstone belts by  
means of centrifuged models, 1978-80; Ph.D. thesis  
(Wilson).

1444. AYRES, L.D., Univ. Manitoba (Earth Sciences):  
Favourable Lake volcanic complex, northwestern Ontario, 1965-.
- See:  
Importance of stratigraphy in Early Precambrian volcanic terranes: cyclic volcanism at Setting Net Lake, northwestern Ontario; Geol. Assoc. Can., Sp. Paper 16, p. 243-264, 1977.
1445. AYRES, L.D., Univ. Manitoba (Earth Sciences):  
Stratigraphy of an andesitic to basaltic stratovolcano, Amisk Lake, Saskatchewan, 1977-79.
- Preliminary work has documented a subaqueous to subaerial transition in the upper part of the volcano. The subaqueous units are mainly pillowed flows, whereas the subaerial units are mainly amygdaloidal flows, some of which contain well developed pipe amygdules. Pyroclastic units occur throughout the sequence. At the transition, hyaloclastic rocks and flow-foot breccia are present.
1446. BARAGAR, W.R.A., Geol. Surv. Can.:  
Volcanology of the Yellowknife Group, District of Mackenzie, 1962-.
1447. BRIGGS, N.D., Univ. Toronto (Scarborough-Geology):  
Lateral variations in Whakamaru ignimbrite, Central-North Island, New Zealand, 1967-78.
- The Whakamaru Ignimbrite is one of the most extensive and best exposed of the New Zealand Quaternary ash-flow deposits. Lateral variations within this unit have been determined from data collected at 12 vertical sections spaced from the source area to the distal edges. This research has shown that: 1) the ignimbrite comprises a composite sheet of nonwelded to densely welded, crystal-rich rhyolitic tuff. The porosity of the ignimbrite increases, and degree of welding and devitrification decreases, as it grades from a single compound cooling unit near source to a series of separate simple cooling units at the distal edges. These changes mainly reflect a thinning of flows and loss of heat with increasing distance from source. 2) There are significant, generally systematic changes in the size and percentage of minerals in the ignimbrite that reflect the changing capacity and competence of the turbulent ash flows during deposition.
1448. CAR, D., AYRES, L.D., Univ. Manitoba (Earth Sciences):  
Facies analysis of a dacitic volcanoclastic unit, Lake of the Woods, northwestern Ontario, 1975-78; M.Sc. thesis (Car).
- A 4 km thick, vertically dipping volcanoclastic sequence has been examined for a strike length of 16 km. The sequence comprises heterolithic breccia, oligomictic conglomerate, ash-flow tuff, greywacke, and minor flows. All of the volcanoclastic units have been transported varying distances and were largely deposited in a subaqueous environment. Volcanism was mainly subaerial, but the vent is not in the presently exposed section.
1449. DIMROTH, E., LICHTBLAU, A.P., COUSINEAU, P., LEDUC, M., SANSCHAGRIN, Y., DENARCKE, J., Univ. du Québec à Chicoutimi:  
Volcanologie et sédimentologie d'une zone volcanosédimentaire archéenne, 1975-81; thèse de maîtrise.
- Etude de l'organisation et de l'histoire thermique des coulées de basalte; étude de l'histoire thermique et de la composition des coulées pyroclastiques; étude du métamorphisme des laves basaltiques; étude de la volcanologie et sédimentologie de certaines roches pyroclastiques.
1450. HARGREAVES, R., AYRES, L.D., Univ. Manitoba (Earth Sciences):  
Morphology and geochemistry of basalt flows, Utik Lake, Manitoba, 1975-78; M.Sc. thesis (Hargreaves).
- A well exposed flow sequence at Utik Lake contains 3 major flow types: 1. pillowed flows, 2. simple massive flows and 3. complex massive flows with incomplete basal pillows and flow top breccia. The pillowed flows formed by a processes of budding analogous to that which forms subaerial pahoehoe toes. One lateral transition from a massive to a pillowed unit was observed. The flow top breccia is strongly altered with addition of Ca and Mn and depletion of Al.
1451. STEVENS, G.R., LIEW, M., Acadia Univ. (Geology):  
Geochemistry and petrology of Triassic tachylite glass, North Mountain, Nova Scotia, 1976-78.
- Tachylite glass selvages and internal layers occur at several localities of the North Mountain Basalt (Triassic) of the Bay of Fundy Shore, Nova Scotia. One unit reaches a thickness of one meter. Refractive indices range between 1.59 and 1.62, and gravity between 2.75 and 3.00. Most samples reveal some devitrification, though in general the glasses are remarkably fresh. Fifteen major element analyses of the glass have been made and compared with published analyses of the contiguous basalts. Glass compositions indicate a fractionation trend similar to that of the Palisades Sill, with high values for both felsic and mafic indices. The associated basalts are tholeiites whose average composition equates with the average world Triassic basalt, with low felsic and mafic indices. The AMF differentiation trend coincides with that of the Skaergaard.
1452. THURSTON, P.C., HODDER, R.W., Univ. Western Ontario (Geology):  
Cyclical volcanism in the Uchi - Confederation Lakes area, Ontario, 1976-78; Ph.D. thesis (Thurston).

## ORGANIZATIONS REPORTING

Acadia University,  
Department of Geology,  
Wolfville, Nova Scotia  
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Agriculture Canada,  
Soil Research Institute,  
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Department of Zoology,  
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M1C 1A4

Toronto University,  
Department of Physics,  
Toronto, Ontario  
M5S 1A7

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Western Ontario University,  
Department of Geophysics,  
London, Ontario  
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Windsor University,  
Department of Geology,  
Windsor, Ontario  
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LIST OF GRANT AWARDS IN THE EARTH SCIENCES FOR 1977

DEPARTMENT OF ENERGY, MINES AND RESOURCES, RESEARCH AGREEMENTS

BRITISH COLUMBIA

University of British Columbia

Clowes, R.M. (Geophysics and Astronomy)  
Interpretation of an ocean bottom seismometer refraction profile recorded northwest of Explorer Ridge, \$4500.00

Clowes, R.M. (Geophysics and Astronomy)  
Interpretation of a marine deep seismic sounding survey in Winona Basin off Canada's west coast, \$5600.00

Ellis, R.M. (Geophysics and Astronomy)  
Seismic refraction across the Southern Rocky Mountain trench, \$3600.00

Mathews, W.H. (Geological Sciences)  
Urban geology - greater Vancouver area and an experimental model of glacial abrasion, \$2200.00

Osborn, T.R. (Oceanography)  
Comparison of wave measurements with predictions using wind measurements, \$2900.00

Quick, M.C. (Civil Engineering)  
Megaripple sedimentation processes in the Fraser River Delta, \$6000.00

Simon Fraser University

Huntley, D.J. (Physics)  
Thermoluminescence dating of ocean sediments, \$4500.00

ALBERTA

University of Alberta

Lambert, R.St. J. (Geology)  
Geochronology and origin of the Malton Gneiss and related complexes, British Columbia, \$3000.00

Lerbekmo, J.F. (Geology)  
Paleomagnetic correlations in continental upper Cretaceous and Paleocene sediments of Alberta, \$3700.00

May, R.W. (Geology)  
Scanning electron microscope (SEM) study of Quaternary sediments, \$1900.00

Rankin, D. (Physics)  
Magnetotelluric measurements on the Churchill-Superior boundary, \$5300.00

Rutter, N.W. (Geology)  
Paleosols of the Prairie Provinces, \$2300.00

Scarfe, C.M. (Geology)  
The petrology of the Level Mountains volcanic centres, northern British Columbia, \$3000.00

University of Calgary

Hills, L.V. (Geology)  
Carpology of the Beaufort Formation, \$4500.00

Simony, P.S. (Geology)  
Metamorphic and structural evolution of a portion of the southern Canoe River area, British Columbia, \$6000.00

SASKATCHEWAN

University of Saskatchewan

Braun, W.K., Caldwell, W.G.E. (Geological Sciences)  
Biostratigraphy and microfaunas of the Mesozoic rocks in western Canada, \$6000.00

Forester, R.W. (Geological Sciences)  
Oxygen, hydrogen, and carbon isotope study of some uranium ore deposits in Saskatchewan, \$4250.00

King, M.S. (Geological Sciences)  
Thermal conductivity of permafrost materials, \$3600.00

Saskatchewan Research Council

Dyck, J.H. (Physics)  
Correlation of characteristics of coal in Saskatchewan with geophysical borehole logs, \$11 000.00

MANITOBA

University of Manitoba

Ayres, L.D. (Earth Sciences)  
Precambrian porphyry copper and molybdenum deposits in Ontario and Saskatchewan, \$16 450.00

Green, A.G. (Earth Sciences)  
Investigation of the Precambrian crustal structure using observatory records, \$2000.00

ONTARIO

Carleton University

Brown, R.L. (Geology)  
Structure, stratigraphy and metamorphic history of the Selkirk Mountains (Big Bend), British Columbia, \$7000.00

Ranalli, G. (Geology)  
Probabilistic seismic risk analysis, \$1500.00

Watkinson, D.H. (Geology)  
Ni-Cu-Fe sulphide-carbonate-silicate relationships in altered ultramafic rocks, \$6250.00

Laurentian University

James, R.S. (Geology)  
Gabbro-anorthosite intrusions in the Southern Province, Sudbury region, Ontario, \$3000.00

McMaster University

Clarke, W.B. (Physics)  
Development of a new prospecting method for uranium - measurements of  $^3\text{He}/^4\text{He}$ , He, Ne and tritium in groundwater and lakes, \$8700.00

Crocket, J.H. (Geology)  
Gold mineralization in Archean greenstone belts: a study of genetic relationships using neutron activation analysis, \$9000.00

Ford, D.C. (Geography)  
Radiometric geochronology and geothermometry of Pleistocene cave deposits in Canada, \$15 000.00

- McCann, S.B. (Geography)  
Quaternary stratigraphy and deglaciation of the Burin Peninsula, Newfoundland, \$4500.00
- McNutt, R.H. (Geology)  
Evolution of a greenstone belt, \$14 000.00
- Risk, M.J. (Geology)  
Sediment in the Minas Basin, Bay of Fundy, \$9500.00
- Queen's University
- Nichol, I. (Geological Sciences)  
Factors affecting lake sediment composition in the Canadian Shield, \$15 000.00
- Price, R.A. (Geological Sciences)  
Tectonic analysis of the southeastern Cordillera in Canada, \$7000.00
- University of Toronto
- Beales, F.W. (Geology)  
Paleomagnetism applied to the study of Mississippi Valley-type ore deposits and their host rocks, \$9500.00
- Dunlop, J. (Geophysics)  
Multicomponent magnetizations and metamorphic overprinting in the paleomagnetism of Precambrian rocks, \$4000.00
- Goodwin, A.M. (Geology)  
Nature and origin of English River and Quetico Gneiss, Western Superior Province, \$5000.00
- Ludvigsen, R. (Geology)  
Ordovician trilobite biostratigraphy of the northern Cordillera, \$6100.00
- Naldrett, A.J. (Geology)  
Platinum group elements and other trace elements in magmatic Ni-Cu sulfide ores associated with different host rocks, \$8000.00
- Norris, G. (Geology)  
Jurassic-Cretaceous palynostratigraphy of western and Arctic Canada: a comparative study with European stratotypes, \$2970.00
- Ritchie, J.C. (Botany)  
Ostracode analysis of late Wisconsin lacustrine sediments from northern Yukon, \$6000.00
- Schwerdtner, W.M. (Geology)  
Internal structure and emplacement of Irene-Eltrut Lakes granitic complex, northwestern Ontario, \$6000.00
- Strangway, D.W. (Geology)  
Applications of audio-frequency magnetotellurics, \$18 000.00
- Westgate, J.A. (Geology)  
Fission track dating of late Cenozoic bentonites and pyroclastic deposits in the Yukon Territory and adjacent area of Alaska, \$6000.00
- University of Waterloo
- Appleyard, E.C. (Earth Sciences)  
Alteration zones associated with volcanogenic sulphide deposits in the Roberts Arm Group, central Newfoundland, \$4800.00
- Legault, J.A. (Earth Sciences)  
Palynological investigation of the Road River and Besa River formations, northwestern Canada, \$5950.00
- Macqueen, R.W. (Earth Sciences)  
Geology of Devonian radioactive and metal-bearing shales, Pine Point region, District of Mackenzie, \$2500.00
- Reardon, E.J. (Earth Sciences)  
Precipitation and dissolution of manganese oxyhydroxides on stream sediment and their relation to mineral exploration, \$6000.00
- Roberts, R.G. (Earth Sciences)  
A study of the volcanic and structural setting of gold deposits associated with volcanic and volcanic-sedimentary rocks, \$4480.00
- University of Windsor
- Gravenor, C.P. (Science and Mathematics)  
Paleomagnetism of the Seminary and Meadowcliffe Tills in the Toronto area, \$3000.00
- QUEBEC
- Ecole Polytechnique
- David, M. (Génie minéral)  
Automatisation des calculs géostatistiques de ressources minérales, avec référence spéciale aux problèmes de l'uranium, \$13 000.00
- Gélinas, L. (Génie minéral)  
Etude des complexes rhyolitiques de la région de Rouyn-Noranda, \$7000.00
- Pham, V.N. (Géophysique)  
Cartographie des résistivités apparentes par les méthodes de profilage magnéto-tellurique, tellurique et géomagnétique, \$6600.00
- Université Laval
- Seguin, M.-K. (Géologie)  
Paléomagnétisme des ophiolites des Appalaches du sud de Québec et des volcaniques de la Gaspésie, \$5000.00
- Institute National de la Recherche scientifique
- Achab, A. (INRS-Pétrole)  
Etude palynologique de Paléozoïque inférieur de l'Est du Canada et des Illes de l'Arctique, \$5200.00
- McGill University
- Bird, J.B. (Geography)  
Periglacial geomorphic processes in east Baffin Island, \$3700.00
- Carson, M.A. (Geological Sciences)  
Prediction of earthflow-susceptible slopes in Champlain mud deposits, Lachute region, Québec, \$500.00
- Doig, R. (Geological Sciences)  
Rb-Sr isotopic study of the Seven-Islands anorthosite suite, \$3000.00
- Hesse, R. (Geological Sciences)  
Labrador Sea sediments, \$5500.00

Jensen, O.G. (Mining and Metallurgical Engineering)  
VLF (wave-tilt, Radiohm) and LF applications to near  
horizontal multilayer and simply discontinuous geological  
structures, \$12 000.00

Université de Montréal

Gray, J.T. (Géographie)  
Le pergélisol et les masses de glace dans le sol dans le  
géosynclinal du Labrador, sur la côte ouest de la  
Baie d'Ungava, \$4000.00

Hofmann, H.J. (Géologie)  
Precambrian stratigraphy, sedimentology and paleontology  
of the Avalon Peninsula, Newfoundland, \$7000.00

Hubert, C. (Géologie)  
Analyse stratigraphique intégrée des roches ordoviciennes  
et siluriennes de la ceinture d'Aroostook-Matapédia en  
Gaspésie, Appalaches du Québec,

Mamet, B. (Géologie)  
Upper Paleozoic microfacies (foraminifers and algae),  
\$8500.00

Université du Québec à Chicoutimi

Dimroth, E. (Sciences Appliquées)  
Volcanologie physique et sédimentologie d'un bassin  
volcano-sédimentaire archéen, \$9000.00

Université du Québec à Montréal

de Boutray, B. (Sciences de la Terre)  
Cartographie des dépôts meubles sur la côte ouest de la  
Baie d'Ungava, \$2500.00

Université du Sherbrooke

Dubois, J.M.M. (Géographie)  
Géologie quaternaire de la Côte Nord du Saint-Laurent,  
\$2500.00

NOVA SCOTIA

Dalhousie Univeristy

Huntley, D.A. (Oceanography)  
Direct measurements of coastal waves and currents,  
Miramichi Bay, New Brunswick, \$5000.00

Ogden, J.G., III (Biology)  
Pollen and radiocarbon stratigraphy of the late  
Quaternary environments in the Parrsboro, Nova Scotia  
area, \$5500.00

Pielou, E.C. (Biology)  
Interpretation of the geographic and depth distribution of  
recent Foraminifera, \$5000.00

Piper, D.J.W. (Geology)  
Geological study of La Have Bay, Green Bay and Medway  
Harbour, and nearby coastal bays, Nova Scotia, \$12 000.00

Zentilli, M. (Geology)  
Distribution of uranium in minerals from selected ore  
environments, \$5000.00

Nova Scotia Research Foundation

Bidgood, D.E.T. (Geophysics Division)  
The interpretation and evaluation of gravity  
measurements in southern Cape Breton Island, Nova  
Scotia, \$5000.00

NEWFOUNDLAND

Memorial University

Murthy, G.S. (Physics)  
Paleomagnetic investigations of Precambrian and younger  
rock units from the Island of Newfoundland and their  
bearing on the interpretation of Newfoundland geologic  
structure, \$6000.00

Stewart, I.C.F. (Physics)  
Seismotectonic studies of Newfoundland, \$1000.00

Williams, H. (Geology)  
Geological setting of asbestos-bearing ultramafic rocks  
along the Baie Verte Lineament, Newfoundland, \$6700.00

Wright, J.A. (Physics)  
Heat production and heat flow in Newfoundland, \$2500.00

DEPARTMENT OF FISHERIES AND ENVIRONMENT CANADA,  
WATER RESOURCES RESEARCH SUPPORT PROGRAM, RESEARCH AGREEMENTS

University of British Columbia

Clarke, G.K.C. (Geophysics and Astronomy)  
Glacier beds: their relationship to ice dynamics and erosion, \$11 000.00

Univeristy of Alberta

Gill, D. (Geography)  
Potential environmental modification of the Slave River Delta by upstream river developments, \$9500.00

University of Saskatchewan

Gray, D.M. (Hydrology)  
Hydrology of the Prairie environment, \$90 000.00

University of Guelph

Kay, B.D. (Land Resource Science)  
Development of a model to describe subsurface transport of solutes as a consequence of freezing conditions, \$9000.00

McMaster University

Crockett, J.H. (Geology)  
Geochemical pathway studies of arsenic, selenium and palladium in freshwater systems by neutron activation analysis, \$14 000.00

Emery, J.J. (Civil Engineering and Engineering Mechanics)  
Finite element simulation in glacier flow, \$9000.00

Ford, D.C. (Geography)  
Hydrology of canyon basins in the Mackenzie Mountains, Northwest Territories, \$12 500.00

Kramer, J.R. (Geology)  
Geochemical factors and terrain response to environmental contaminants, \$18 500.00

Woo, M-K (Geography)  
Hydrology of nival-regime basins in the vicinity of Resolute, Cornwallis Island, Northwest Territories, \$8500.00

University of Toronto

Ritchie, J.C. (Biology)  
Ostracode analysis of late Wisconsin lacustrine sediments from northern Yukon, \$5000.00

Dalhousie University

Ogden, J.G. (Chemistry)  
Stream ecosystem impact of prospective lead and zinc mining at Gay's River, Nova Scotia, \$7000.00

DEPARTMENT OF INDIAN AND NORTHERN AFFAIRS, GRANTS IN THE NATURAL SCIENCES

University of British Columbia

Godwin, C. and Chronic, F. (Geological Sciences)  
Geology of the Guano showing, Yukon, \$10 238.00

University of Western Ontario

Hodder, R.W. and Morrison, G.W. (Geology)  
Granitic rocks and associated mineral deposits of the Whitehorse map-area, Yukon, \$13 781.00

Young, G.M. and Delaney, G.D. (Geology)  
Physical stratigraphy of the Proterozoic rocks of the northern Wernecke Mountains, Yukon, \$10 234.00

Young, G.M. and Jefferson, C.W. (Geology)  
Study of copper mineralization in the Mackenzie Mountains, Northwest Territories, \$9313.00

Young, G.M. and Yeo, G.M. (Geology)  
Iron formation in the Rapitan Group, Yukon and Northwest Territories, \$15 469.00

NATIONAL RESEARCH COUNCIL OF CANADA EARTH SCIENCE OPERATING GRANTS

Achab, A. INRS-Pétrole Québec-Ste-Foy	Etude des chitinczcaires de l'Ordovicien inférieur et moyen de la province de Québec	Barnes, C.R. Earth Sciences Waterloo	Lower Paleozoic conodont biostratigraphy, paleoecology and ultrastructure
Adamowski, K. Civil Engineering Ottawa	Stochastic analysis of hydrologic cycle	Barnes, W.C. Geological Sciences British Columbia	Organic geochemistry and sedimentology of lacustrine and shallow marine sediments of southwestern British Columbia
Addison, J.R. Physics McGill	Electrical properties of artificial sea ice at microwave frequencies	Barr, S.M. Geology Acadia	Petrochemical, geochronological and geothermal studies in Thailand: 1) Discrimination between gem-bearing and non-gem-bearing alkali basalts 2) Origin of mafic/ultra-mafic belts 3) Age and evolution of crystalline basement 4) Measurement of geothermal gradient
Aldridge, K.D. Physics York	1) Non-axisymmetric inertial oscillations in spherical shells of rotating fluid 2) Coordinate system for the study of core dynamics. (New study)	Bartlett, G.A. Geological Sciences Queen's	Depositional environments and the socio-economic potential of the Canadian continental margins and adjoining coastal zone
Anderson, G.M. Geology Toronto	Metasomatic and ore-forming solutions	Bauer, A. Mining Eng. Queen's	Factors affecting the sensitivity of slurried explosives
Anderson, M.M. Biology Memorial	Contributions to palaeontology and stratigraphy, mainly Newfoundland	Bayliss, P. Geology Calgary	Applied crystallographic-mineralogy
Appleyard, E.C. Earth Sciences Waterloo	Studies of metasomatic and altered rocks	Beales, P.W. Geology Toronto	Limestone studies and strata-ground mineral deposits
Armbrust, G.A. Geology Ottawa	Petrochemistry of a volcanic belt, related intrusions and associated areas of mineralization	Beaumont, C. Oceanography Dalhousie	Rheology of the crust and lithosphere
Armon, J.W. Geography McMaster	1) Current action and sediment movement at two tidal inlets undergoing contrasting developments. 2) Sand movement by wind across the foreshore of a high dune coast	Beck, A.E. Geophysics Western	Geothermal studies, pure and applied
Armstrong, R.J. Geological Sciences British Columbia	Geochronometry of cordilleran igneous and metamorphic rocks	Becker, A. Génie minéral Polytechnique	Nouvelles techniques de la prospection électromagnétique
Aumento, F. Geology Dalhousie	Detailed geological investigation of the oceanic crust	Beland, J. Géologie Montréal	Etude structurale de la zone de Matapédia des Appalaches Québécoises
Ayres, L.D. Earth Sciences Manitoba	Early Precambrian volcanism and granitic plutonism in the western part of the superior province, Ontario and Manitoba - a contribution to early crustal evolution	Bell, K. Geology Carleton	Application of Sr isotopes to the petrogenesis of igneous rocks
Baadsgaard, H. Geology Alberta	Isotope geology of Precambrian polymetamorphic rocks	Berger, A.R. Geology Memorial	The geology of northeastern Newfoundland, with emphasis on the Plutonic and Metamorphic rocks
Bachinski, D.J. Geology New Brunswick	Metamorphism of sulfide - rich rocks	Beswick, A.E. Geology Laurentian	Determination of the primary geochemical characteristics of Precambrian volcanism and nature of the early upper mantle
Baer, A.J. Geology Ottawa	1) Relationships between anorthosites and granulite facies 2) Structural studies in the Grenville Province	Black, T.A. Soil Science British Columbia	Evapotranspiration from forests
Bailey, R.C. Physics Toronto	Geomagnetic variation and magnetotelluric interpretation and tectonic structures	Bourque, P.A. Géologie Laval	Etude des ensembles carbonatés "récifaux" du Siluro-Dévonien de la Gaspésie. Leur paléogéographie et paléoécologie
Ballivy, G. Génie civil Sherbrooke	Etude du comportement de matériaux naturels fissurés. 1) Processus d'initiation à la rupture des argiles fissurées 2) Etude de l'efficacité de l'injection du roc	Bowen, A.J. Oceanography Dalhousie	The dynamics of coastal waters and sediments
Baracos, A. Civil Engineering Manitoba	A coordinated study of Winnipeg clays with regard to: 1) Strength-deformation 2) Causes of anisotropic behaviour and variations 3) Practical applications, and reliability of results * with L.Domashuk, J.Graham (Manitoba)	Braun, W.K. Geological Sciences Saskatchewan	Microfaunas and biostratigraphy of western Canada
		Brindle, J.R. Sciences pures Québec-Rimouski	Etat écologique de cinq régions importantes de l'estuaire du St-Laurent

Bristol, C.C. Geology Brandon	1) Ore mineralogy, orebody zoning and FeS, CdS, MnS contents of sphalerites from the Ruttan Lake Mine. 2) Alteration and metamorphic history of the Ruttan Lake orebody	Carmichael, C.M. Geophysics Western	Geomagnetism
Brookes, I.A. Geography York	Multiple glaciation in Newfoundland: geologic and biologic approaches	Carroll, R.L. Redpath Museum McGill	Evolution and functional anatomy of Paleozoic and Early Mesozoic reptiles
Brookfield, M.E. Land Resource Sc Guelph	1) Jurassic evolution of the Pacific margins 2) Anatomy of ancient aeolian sand bodies and basins 3) Pleistocene palaeoenvironments and stratigraphy of the Bowmanville area, Ontario 4) Ordovician palaeoenvironments and hardgrounds in central southern Ontario	Casteel, R.W. Archaeology Simon Fraser	Holocene paleotemperature
Brooks, C. Géologie Montréal	The evolution of Precambrian Shields (with special reference to Canada) as determined by geochemical, isotopic and geochronologic analysis	Cawker, K.B. Geography Western	* Principal investigator B.H. Luckman (West. Ont.)
Brown, A.C. Génie minéral Polytechnique	Etude métallogénique des gisements stratiformes de métaux non-ferreux	Cerny, P. Earth Sciences Manitoba	Mineralogy and petrology of pegmatites
Brown, J.D. Civil Engineering N. S. T. C.	Performance of end bearing piles in fractured sedimentary rock	Chao, G.Y. Geology Carleton	Descriptive, comparative and structural studies of rare minerals from Mont St. Hilaire, Quebec
Brown, R.L. Geology Carleton	Structural studies in the Canadian Cordillera	Chapman, C.H. Physics Toronto	Seismic body wave theory
Brown, T.H. Geological Sciences British Columbia	Phase equilibria and ore genesis	Charbonneau, R. INRS-Eau Québec-Ste-Foy	Modélisation de l'évolution du manteau neigeux à l'échelle du bassin versant. La démarche est essentiellement déterministe et tient compte de la complexité introduite par l'hétérogénéité spatiale du phénomène
Brueckner, W.D. Geology Memorial	Studies for IGCP project 73/1/2: Precambrian in mobile zones	Chase, R.L. Geological Sciences British Columbia	Tectonics, petrology and sedimentation of the continental margin of British Columbia and related plate margins and seamount chains of the northeast Pacific Ocean
Bryan, R.B. Geography Toronto	Interaction of surface flow and intense rainfall in entrainment of soil particles	Chatterton, B.D.E. Geology Alberta	Conodont and trilobite systematics and biostratigraphy in western and northwestern Canada
Bunting, B.T. Geography McMaster	Studies of fire effect (pyrolysis) on organic matter of Brunisol and Podzolic soils in central Ontario, and its influence on mineral weathering	Cherry, J.A. Earth Sciences Waterloo	Contaminant behaviour in groundwater flow systems
Burley, B.J. Geology McMaster	1) Study of alkaline intrusions by experimental and field techniques. 2) Study of mineralogy of minerals commonly occurring in and associated with alkaline rocks	Chesworth, W. Land Resource Sc Guelph	Geochemistry of weathering
Burwash, R.A. Geology Alberta	Petrologic control of uranium and thorium accumulation in crystalline rocks	Chou, C.L. Geology Toronto	Trace element geochemistry of terrestrial, meteoritic and lunar samples
Byrne, P.M. Civil Engineering British Columbia	Analytical methods in soil and soil-structure interactive problems	Church, M.A. Geography British Columbia	Studies of hydraulics of gravel rivers
Calder, P.N. Mining Eng. Queen's	Artificial support systems for rock masses	Church, W.R. Geology Western	1) Pre-Mesozoic crustal evolution of the North Atlantic region: ophiolites; eclogite-granulite complexes; alkali gabbro-peralkaline granite associations 2) Geology of the northern Grenville Province: the garnet-bearing metadiabases; 3) Ultramafic rocks of the Thompson belt
Caldwell, W.G.E. Geological Sciences Saskatchewan	Biostratigraphic studies in the cretaceous system of western Canada	Churcher, C.S. Zoology Toronto	Investigation and description of the quaternary mammalian faunas of Canada and comparison with those from other continents
Campanella, R.G. Civil Engineering British Columbia	In situ testing and field behaviour of soil	Clark, A.H. Geological Sciences Queen's	The origin and delimitation of metallogenetic provinces at active and older convergent and collisional plate boundaries
Campbell, P.A. Geology Calgary	Geochemistry, mineralogy and isotope studies of rocks and ore deposits	Clark, G.S. Earth Sciences Manitoba	Rubidium-Strontium isotopic age investigations in the Precambrian of Manitoba
Cannon, W.H. Physics York	1) Applications of long baseline interferometry to geophysics and planetary science 2) Terrestrial gravity and tests of theories of general relativity	Clarke, D.B. Geology Dalhousie	Petrogenesis of igneous rocks: 1) Basic rocks from accreting plate margins 2) Appalachian granites 3) Origin of Kimberlites

Clarke, G.K.C. Geophys./Astron. British Columbia	Glaciology: field study, theory and instrumentation	Davies, J.F. Geology Laurentian	The relation of mineralization to lithologic stratigraphic and geochemical variations in volcanic sequences, Timmins area, Ontario * with R.E. Whitehead (Laurentian)
Clarke, W.B. Physics McMaster	Investigations of isotope patterns in nature	Day, J.C. Geography Waterloo	A shoreline classification system to minimize impacts of water resource developments
Clowes, R.M. Geophys./Astron. British Columbia	Controlled source reflection/refraction seismology on land and at sea for crustal/upper mantle investigations	De Albuquerque, C.A.R. Geology Saint Mary's	Studies on the geochemistry of igneous and metamorphic rocks
Cogley, J.G. Geography Trent	Water and energy balance studies of arctic catchments	De Vries, J. Soil Science British Columbia	Hydrologic behaviour of soils of the urban-rural fringe area of the lower Fraser Valley
Collerson, K.D. Geology Memorial	Crustal development of Archean rocks in the Main Province, Labrador	Deutsch, E.R. Physics Memorial	Rock magnetism and geological structure in the Newfoundland region
Cooke, H.B.S. Geology Dalhousie	1) Studies on the quaternary in Nova Scotia and P.E.I. 2) Studies on the neogene of Africa and the near East	Dickinson, W.T. Engineering Guelph	Statistical characteristics of hydrologic variables
Cooke, R.C. Oceanography Dalhousie	Pressure-regulated reactions in the sea	Dimroth, E. Sc. appliquées Qué-Chicoutimi	Volcanologie physique et sédimentologie d'un bassin volcano-sédimentaire Archéen
Copper, P. Geology Laurentian	Paleoecology, evolution and morphology of Ordovician to Devonian atrypoid brachiopods on a global basis	Dixon, J.M. Geological Sciences Queen's	Experimental model and field study of finite strain, progressive deformation and fabric in large and small scale geological structures, and experimental study of the influence of gravity on the crystallization of basaltic liquids
Cormier, R.F. Geology St. F. Xavier	Rubidium-strontium dating of rocks and minerals from the northern Appalachians	Dixon, O.A. Geology Ottawa	1) Ordovician-Silurian faunas and sedimentary facies, central Canadian Arctic 2) Ordovician-Silurian faunas and paleoecological studies, Anticosti Island
Cossa, D.J. INRS-Océanolog. Québec-Rimouski	Biogéochimie du Cadmium en milieu estuarien	Doig, R. Geological Sciences McGill	Geological applications of isotopic analysis
Crampton, C.B. Geography Simon Fraser	A study of synergistic interactions involving permafrost in a biophysical classification of Arctic and subarctic terrain	Domaschuk, L. Civil Engineering Manitoba	* Principal investigator A. Baracos (Manitoba)
Crocket, J.H. Geology McMaster	Application of isotopic and minor element distributions to geological problems	Donaldson, J.A. Geology Carleton	Comparative studies of Precambrian sedimentary rocks
Crossley, D.J. Mining/Metal. Eng. McGill	Physical properties and dynamical behaviour of the earth's core	Donnay, G. Geological Sciences McGill	Relation of physical and chemical properties to crystal structure
Cruden, D.M. Geology Alberta	Stability of natural slopes in rock	Dosso, H.W. Physics Victoria	Geomagnetic variations and electromagnetic modelling
Cumming, G.L. Physics Alberta	Geophysical investigations in western Canada	Dostal, J. Geology Saint Mary's	Geochemical studies on some igneous and metamorphic rocks
Currie, J.B. Geology Toronto	Mechanics and development of fractures in sedimentary strata: fracture porosity in carbonate and sandstone rocks	Drake, J.J. Geography McGill	Snowmelt system and water quality investigations in Quebec
D'Anglejan, B.F. Marine Sci. Centre McGill	Suspended matter transport and composition, and sedimentation processes near the benthic boundary layer in subarctic estuaries	Drapeau, G. INRS - Energie Québec-Rimouski	Sédimentologie et chronologie des sédiments marins dans la région L'Île-Verte - Saguenay
Danner, W.R. Geological Sciences British Columbia	Plate tectonics and the upper paleozoic of southern British Columbia	Dreimanis, A. Geology Western	Last ice age deposits in east-central and south-western Canada and their correlations with other regions
Darling, R.G. Génie minéral Polytechnique	Applied litho-geochemistry	Du Berger, R. Sc. appliquées Qué-Chicoutimi	Études sismiques dans la région du Haut-Saguenay
David, M. Génie minéral Polytechnique	Développements géostatistiques pour l'inventaire de réserves et de ressources minérales	Dudas, M.J. Soil Science Alberta	1) Mineralogical transformations in sulphur contamination soils 2) Biogeochemical nature of mercury in forested soils 3) Mineralogical and micromorphological investigations of paleosols in Alberta
Davidson-Arnott, R.G.D. Geography Guelph	Nearshore morphology and sedimentation equilibrium associated with barred shorelines		

Dunlop, D.J. Physics Toronto	Magnetism of terrestrial and lunar rocks and their synthetic equivalents	Flint, J.J. Geological Sciences Erock	Distribution of longitudinal stream profiles in channel networks
Durand, M. Sciences de la terre Qué-Montréal	Etude des implications de la géologie urbaine pour l'aménagement et la construction à Montréal	Polinsbee, R.E. Geology Alberta	Geochemistry, economic geology and geochronology of ancient cratons and later ore-bearing sedimentary basins
Edgar, A.D. Geology Western	Geochemical and experimental studies of igneous rocks and minerals	Ford, D.C. Geography McMaster	1) Groundwater flow and cavern genesis in soluble rocks 2) Quaternary dating & palaeothermometry 3) karst studies in Canada 4) geomorphology of the Mackenzie Mountains
Edwards, R.N. Physics Toronto	Magnetotelluric and magnetometric resistivity studies	Forester, R.W. Geological Sciences Saskatchewan	Oxygen, carbon, and hydrogen isotopic studies of igneous and metamorphic rocks
Eisenstein, Z. Civil Engineering Alberta	1) Application of elasto-plastic constitutive models to analysis of earth structures 2) Soil-structure interaction problems 3) Properties of overconsolidated soils by pressuremeter testing	Fox, R.C. Geology/Zoology Alberta	Upper cretaceous and lower tertiary vertebrates from western Canada
El-Sabh, M. Sciences pures Québec-Rimouski	1) Circulation pattern and its implication on the primary production west of Anticosti Island 2) Circulation dynamics in the lower St. Lawrence Estuary	Francis, D.M. Geological Sciences McGill	* Principal investigator A.Hynes (McGill)
Ellis, R.M. Geophys./Astron. British Columbia	Seismic crustal and array studies	Fredlund, D.G. Civil Engineering Saskatchewan	Behavior of swelling clays
Elrick, D.E. Land Resource Sc Guelph	Transport phenomena in natural porous media	Freeze, R.A. Geological Sciences British Columbia	Applications of mathematical models of subsurface flow in geological engineering
Emery, J.J. Civ Eng/Eng Mech McMaster	1) Seismic response of large foundation systems and underground openings 2) Simulation of creep and creep rupture problems involving rock, cohesive soils and ice	French, H.M. Geography Ottawa	Thermokarst, ground ice and weathering studies, Western Arctic Islands
Evans, L.J. Land Resource Sc Guelph	Quantitative studies in pedogenesis on northern soils	Frenette, M. Génie civil Laval	1) Colmatage naturel des milieux poreux 2) Ecoulement secondaire dans les courbes de rivières 3) Hydrodynamique des estuaires, tributaires du Fleuve St-Laurent
Evans, M.E. Physics Alberta	Palaeomagnetism of western Canadian rocks and rock magnetic studies	Frind, E.O. Earth Sciences Waterloo	Digital modelling of groundwater flow systems
Fahraeus, L.E. Geology Memorial	Paleozoic conodonts and Upper Cambrian, Ordovician, and Silurian bio- and chrono-stratigraphy	Fritz, P. Earth Sciences Waterloo	1) Stable and radioactive isotopes in hydrogeology with special emphasis on organic compounds and processes 2) Paleoenvironmental studies using <sup>13</sup> C in organic freshwater sediments and <sup>18</sup> O and <sup>13</sup> C in freshwater mollusks
Farguhar, R.M. Physics Toronto	Geochronology and isotope studies	Fryer, B.J. Geology Memorial	Igneous and sedimentary geochemistry of the Precambrian
Farrar, E. Geological Sciences Queen's	Potassium-argon geochronology	Fryer, B.J. Geology Western	Igneous and sedimentary geochemistry of the Precambrian
Farvolden, R.N. Earth Sciences Waterloo	Analyses of groundwater regime using environmental isotopes and response to recharge and pumping	Fyfe, W.S. Geology Western	Solid earth hydrosphere interaction
Fawcett, J.J. Geology Toronto	Experimental and field studies in igneous and metamorphic petrology	Fyson, W.K. Geology Ottawa	Structural patterns in metamorphic rocks
Ferguson, R.B. Earth Sciences Manitoba	Crystal-chemical studies of rock-forming and ore minerals	Gangloff, P. Géographie Montréal	Paléogéographie de la région de Montréal entre 11 000 et 9 000 BP
Finn, W.D.L. Applied Science British Columbia	1) Yielding and deformation of soils. 2) Seismic response of ground, slopes and earth dams. 3) Simulated earthquake testing of soils. 4) Seismic water pressures against dams. 5) Soil-structure interaction. 6) Geotechnical engineering in ocean	Gardner, J.S. Geography Waterloo	Magnitude and frequency characteristics of the mass transfer of debris on mountain slopes
Fleet, M.E.L. Geology Western	Crystallographic and chemical studies on ore and silicate minerals	Garland, G.D. Physics Toronto	Electrical and thermal properties of the crust and upper mantle
		Garrett, C.J.R. Oceanography Dalhousie	Physical oceanography

Gaskin, P.N. Civil Engineering Queen's	Effect of pressure and temperature gradient on frost heaving	Greenwood, B. Geography Toronto	Coastal sedimentation: morphology and process in a microtidal, storm-surge, barred coastline
Gelinas, L. Génie minéral Polytechnique	Géochimie des éléments majeurs et mineurs des roches volcaniques de la ceinture volcanique de l'Abitibi, région Rouyn-Noranda	Greenwood, H.J. Geological Sciences British Columbia	Geological phase equilibrium studies
Gelinas, P.J. Géologie Laval	Hydrogeology and hydraulic properties of glacial deposits	Greggs, R.G. Geological Sciences Queen's	1. Sedimentology and paleocurrent analysis of the Lower Paleozoic succession, southeastern Ont. 2. Conodont biostratigraphy of the Durness Formation, northwestern Scotland
Ghent, E.D. Geology Calgary	Petrologic and geochemical studies in the cordillera and electron microprobe study of minerals	Gretener, P.E. Geology Calgary	Quantitative structural geology (mechanism of thrust faulting)
Gilbert, R. Geography Queen's	Physical limnology and lacustrine sedimentation in the eastern Canadian Arctic - comparison of proglacial and non-glacial environments	Grill, E.V. Inst. Oceanography British Columbia	The geochemistry of trace metals in British Columbia coastal waters and sediments
Gill, D.E. Génie minéral Polytechnique	1) Le poinçonnement des roches dans les trous de sonde. 2) Résistance des roches à long terme en atmosphères corrosives. 3) Théorie de chargement des revêtements des scuterrains	Grundy, H.D. Geology McMaster	The crystal chemistry of the silicates and related minerals
Gittins, J. Geology Toronto	Petrogenesis of alkalic rocks and carbonatite complexes	Gwyn, Q.H.J. Geography Toronto	Stratigraphic, hydrogeologic, and geotechnical investigations of quaternary deposits, Southern Ontario
Godwin, C.I. Geological Sciences British Columbia	Geochronology, geochemistry and metallogeny of Skeena Arch, Intermontane Belt, central British Columbia	Hajnal, Z. Geological Sciences Saskatchewan	1) Seismic investigation of deep seated structures in Saskatchewan 2) Seismic investigation of Precambrian contact zones
Goodwin, A.M. Geology Toronto	Origin of crust: nature and tectonic development of primitive earth's crust	Hall, D.H. Earth Sciences Manitoba	Deep magnetism and seismic structure of the crust-mantle system beneath the Superior Craton
Gough, D.I. Physics Alberta	Magnetometer array studies and paleomagnetism	Hall, J.M. Geology Dalhousie	Investigations of the nature and motion of crustal plates as determined from magnetic studies and deep drilling investigations
Govett, G.J.S. Geology New Brunswick	Geochemical exploration for deeply buried sulphide deposits and processes of element migration associated with sulphide deposits	Halls, H.C. Geology Toronto	Paleomagnetism of Precambrian rocks
Graham, J. Civil Engineering Manitoba	* Principal investigator A. Baracos (Manitoba)	Harris, S.A. Geography Calgary	Late glacial and postglacial geomorphology and climate in the south-eastern Rocky Mountains
Gravenor, C.P. Geology Windsor	Surface textures of heavy minerals which have undergone glacial transport: use in identifying tillites and other glaciogenic deposits and relationship to vibratory motion at the base of glaciers	Harrison, R.S. Earth Sciences Manitoba	Early diagenesis and porosity evolution in carbonate sequences
Gray, D.M. Agric. Eng. Saskatchewan	Simulation of the hydrologic cycle	Haugh, B.N. Geology Toronto	Paleobiology of Paleozoic crinoids (Echinodermata)
Gray, J. Physics Alberta	An investigation of long term climatic and environmental changes by stable isotope analyses of tree ring material	Hayatsu, A. Geophysics Western	Study of initial argon by K-Ar isochron method
Gray, J.T. Géographie Montréal	Projet 1) Régime thermique dans le pergélisol et le mclisol sur la Côte sud-ouest de la Baie d'Ungava Projet 2) Le régime thermique des sols sur les sommets de Mont Jacques Cartier et Mont Albert, Gaspésie	Haynes, S.J. Geological Sciences Brock	Tectonic setting and genesis of radioactive pegmatites, Southeastern Ontario, particularly Peterborough County
Green, A.G. Earth Sciences Manitoba	Common reflection point survey of a Greenstone Belt near Flin Flon, Manitoba	Helmstaedt, H. Geological Sciences Queen's	1) Fabrics of metamorphic rocks and tectonic settings of mineral deposits. 2) Tectonic history of xenoliths from kimberlites
Greenhouse, J.P. Earth Sciences Waterloo	Groundwater and environmental geophysics	Hendry, H.E. Geological Sciences Saskatchewan	Studies in clastic sedimentology
		Henley, R.W. Geology Memorial	Geochemical aspects of metallogeny in Archaean and younger fold belts
		Heroux, Y. INRS-Pétrole Québec-Ste-Foy	Signification de la réflectance sur kérogènes par comparaison diagenèse-catagénèse minérale et organique pour application aux séries du paléozoïque inférieur et moyen en tant que roche-mère

Hesse, F.R. Geological Sciences McGill	Clastic sedimentary sequences (processes and environments of deposition, diagenesis, tectonic significance)	Ingram, R.G. Marine Sci. Centre McGill	Circulation and mixing in the St. Lawrence estuary and their relation to distribution of non-physical oceanographic variables
Hickin, E.J. Geography Simon Fraser	River channel migration: its character, causes and controls	James, N.P. Geology Memorial	Facies anatomy and diagenetic evolution of Paleozoic shelf carbonates: northern Maritime Appalachians
Hill, A.R. Geography York	The contribution of intensive farming to nitrogen and phosphorus levels in groundwater and rivers in the Alliston area, Ontario	James, R.S. Geology Laurentian	Petrology and geochemistry of igneous and metamorphic rocks
Hillaire-Marcel, C. Sciences de la terre Qué-Montréal	Exemples d'applications des paléotempératures isotopiques: le Lac de Deschailions et la Mer de Tyrrell	Jensen, O.G. Mining/Metallurgy McGill	1) Earth mechanics - response of earth to gravitational radiation 2) Seismology - non-linear communications theory applied in seismology
Hills, L.V. Geology Calgary	Palynological and pleistocene research	Jeremic, M. Mineral Eng. Alberta	Deformation and failure of coal mine pillars in western Canada
Hodgson, C.J. Geological Sciences Queen's	Metallogenic studies of Canadian ore-bearing environments	Johnson, P.G. Geography/Planning Ottawa	Mass movement in Alpine environments. The application of catastrophic and steady state models of flow
Hodych, J.P. Physics/Geology Memorial	1) The effect of stress upon the magnetization of rock. 2) The magnetic properties of ultramafic rocks	Jolly, W.T. Geological Sciences Erock	Chemical and metamorphic petrology of Canadian Archean and other volcanic provinces, with emphasis on the prehnite-pumpellyite facies of regional metamorphism
Hofmann, H.J. Géologie Montréal	Precambrian and lower Paleozoic paleontology and stratigraphy	Jones, F.W. Physics Alberta	Electromagnetic induction in the earth
Hogarth, D.D. Geology Ottawa	1) Igneous and metamorphic history of S. Gatineau region. 2) Metamict minerals. 3) Genesis and nature of sodalite group minerals. 4) Petrology of "soapstone", S. Baffin Island	Jopling, A.V. Geography Toronto	Continuous monitoring of density flows in a lacustrine environment
Hooper, K. Geology Carleton	1) Modern foraminiferal fauna of the Gulf of St. Lawrence. 2) Foraminiferal fauna of the eastern Canadian continental slope and abyss. 3) Neogene Atlantic and Indopacific foraminiferal faunas. 4) Microfaunal/floral study of lower jurassic sediments of Portugal	Jull, R.K. Geology Windsor	1) Corallite development and microstructures in rugose and tabulate corals 2) Taxonomy and stratigraphy of Upper Devonian corals from Western Canada, and of Siluro-Devonian faunas of Ontario
Howarth, P.J. Geography McMaster	Remote sensing in geomorphological and hydrological studies	Kanasewich, E.R. Physics Alberta	Geophysical investigation of the crust and mantle
Hron, F. Physics Alberta	Dynamic properties of seismic waves in structurally complicated media	Karrow, P.F. Earth Sciences Waterloo	Quaternary environments during the last 125,000 years
Hubert, C. Géologie Montréal	Analyse stratigraphique intégrée des roches ordoviciennes et siluriennes de la ceinture d'Aroostook-Matapédia dans la Gaspésie, Appalaches du Québec	Keen, M.J. Geology Calhousie	Marine geophysical research on the eastern seaboard of Canada
Hughes, C.J. Geology Memorial	Volcanic and granitic rocks of eastern Newfoundland	Kehlenbeck, M.M. Geology Lakehead	Structural and petrological investigations leading to the tectonic evolution of parts of the Superior Province
Huntley, D.A. Oceanography Calhousie	Field measurement of nearshore and surf zone hydrodynamics	Kennedy, M.J. Geology Erock	Structural development of the axial zone of the Appalachian Belt in Newfoundland and its relationship to adjacent regions
Hutchinson, R.W. Geology Western	Origin and metallogenic relationships of mineral deposits: especially of precambrian nickel and base metal sulfide, gold, iron and pegmatite deposits	Kenney, T.C. Civil Engineering Toronto	Properties and behaviours of soils and rocks
Hynes, A.V. Geological Sciences McGill	1) Geotraverse of the Cape Smith fold belt 2) Ultramafic magma project 3) Petrological study of the rift-related volcanic rocks of southeastern Quebec * with D.M.Francis (McGill)	Kesler, S.E. Geology Toronto	Geology and geochemistry of island arc ore deposits and related intrusive rocks
		Kimberley, M.M. Geology Toronto	Diagenesis and the origins of sedimentary ores
		King, A.F. Geology Memorial	EO-Cambrian studies on the Avalon and western platforms of Newfoundland
		King, M.S. Geological Sciences Saskatchewan	Mechanical and electrical properties of rocks and soils

King, R.H. Geography Western	* Principal investigator B.H. Luckman (West. Ont.)	Langford, P.F. Geological Sciences Saskatchewan	Environment of pitchblende deposition in the Beaverlodge area, Saskatchewan
Kisak, F. Mathématiques Polytechnique	Modelage magnétotellurique par éléments finis	Langleben, M.P. Physics McGill	Drift and thermal regime of sea ice
Kissin, S.A. Geology Lakehead	Crystal chemistry and stabilities of sulphide minerals	Laurent, R. Géologie Laval	Géologie des complexes ophiolitiques des Appalaches du Québec
Klován, J.E. Geology Calgary	Morphometric applications to paleozoic fossils	Le Blond, P.H. Inst. Oceanography British Columbia	Long waves and coastal oceanography
Koster, E.H. Geology Concordia	Studies of fluvial and shallow-marine sedimentation	Lebel, J. Sciences pures Québec-Rimouski	Les ions majeurs du St-Laurent et du Saguenay: variations et équilibres
Koster, E.H. Geological Sciences Saskatchewan	Studies of fluvial and shallow-marine sedimentation	Lefebvre, G. Génie civil Sherbrooke	Etude des caractéristiques de consolidation et de résistance au cisaillement des argiles cimentées
Krahn, J. Civil Engineering Saskatchewan	Slope stability in Cretaceous and Tertiary bedrock formations	Legault, J.A. Earth Sciences Waterloo	Early Paleozoic palynomorphs and palyostratigraphy
Kramer, J.R. Geology McMaster	Geochemical ligand speciation in natural waters	Lenz, A.C. Geology Western	Lower and middle paleozoic paleontology, biostratigraphy and fossil community analyses
Krogh, T.E. Geology Toronto	Research in geochronology techniques, tests and applications to geological problems	Lerbekmo, J.F. Geology Alberta	1) Sedimentation and correlation of upper cretaceous and paleocene continental coal-bearing formations in Alberta 2) Genesis of petroleum reservoir rocks in Alberta and the North West Territories
Krouse, H.R. Physics Calgary	Stable isotope fractionation studies	Lesperance, P.J. Géologie Montréal	Biostratigraphie de l'ordovicien supérieur au dévonien inférieur de Québec
Krupicka, J. Geology Alberta	Petrology of reworked crystalline rocks	Levinson, A.A. Geology Calgary	Exploration and environmental geochemistry
Kugler-Gagnon, M.M.M. Géographie Ottawa	1) Impact sur le milieu physique 2) Site expérimental en milieu en voie d'urbanisation	Lewis, J.E. Geography McGill	Urban climate and land-cover: surface energy exchange as a function of urban terrain characteristics
Kukalova-Peck, J. Geology Carleton	Morphology and evolution of Paleozoic insects of North America, Europe and USSR with reference to phylogeny of Recent insects	Lo, K.Y. Fac. of Eng. Sci. Western	Stresses and deformations in underground structures
Kumarapeli, P.S. Geology Concordia	1) Age of the Grenville dike swarm - a key indicator of the age of the St. Lawrence Rift system 2) Studies on the tectonic environment of the Boston-Ottawa seismic zone	Logan, A. Geology New Brunswick	1) Ecology of recent reef-dwelling brachiopods, Caribbean 2) Recent brachiopod ecology, Mediterranean Sea
Kupsch, W.O. Geological Sciences Saskatchewan	Quaternary chronostratigraphy of the Interior Plains, Canada	Loubat, H. Sciences de la terre Qué-Montréal	1) Pétrologie des Ophiolites archéennes. 2) Pétrologie des ultramafites draguées
La Rochelle, P. Génie civil Laval	Propriétés fondamentales et comportement des argiles sensibles	Luckman, B.H. Geography Western	Holocene environmental change in Jasper National Park * with R.H. King, K.B. Cawker (West. Ont.)
Ladanyi, B. Génie minéral Polytechnique	1) Capacité portante des fondations profondes en pergélisol 2) Capacité portante des pieux caissons de haute capacité forés dans la roche 3) Problèmes géotechniques du stockage souterrain	Ludvigsen, R. Geology Toronto	Biostratigraphy and community paleoecology of Ordovician trilobites from the northern Cordillera
Lajoie, J. Géologie Montréal	1) Sédimentologie du flysch cambro-ordovicien des Appalaches du Québec 2) Etude sédimentologique des volcanoclastiques de Rouyn-Noranda	MacLean, W.H. Geological Sciences McGill	Phase relations and field studies pertaining to magmatic and massive volcanogenic sulfide ore deposits
Lajtai, E.Z. Geology New Brunswick	Fracture studies of selected New Brunswick rocks	MacRae, N.D. Geology Western	Geochemistry of sulfur in mafic rocks
Lambert, R.S.J. Geology Alberta	Isotopic and geochemical researches applied to continental margin plate tectonics and Archean continental structure	Mackay, J.R. Geography British Columbia	Permafrost and the growth of ground ice, western Arctic Coast and western Canadian cordillera
		Macqueen, R.W. Earth Sciences Waterloo	Nature, origin, and lateral relationships of Paleozoic basinal shale suites, Western Canada

Mahaney, W.C. Geography York	1) Geomorphological and pedological research programme and laboratory, York University, Downsview, Ontario 2) Holocene stratigraphy, Rouge River and West Duffin Creek drainage basins, south-central Ontario	Medioli, F.S. Geology Dalhousie	Foraminiferal distribution in coastal and inland marine water and its importance in the study of eustatic sea level rise and land subsidence
Malpas, J.G. Geology Memorial	1) A petrochemical and field study of West and Central Newfoundland ophiolites with particular reference to spinel petrogenesis 2) Petrochemical study of kimberlitic and alkaline intrusions Saqlek, Labrador 3) Investigation of hydrothermal and magmatic processes in ophiolites and on ocean ridges	Mereu, R.F. Geophysics Western	Deep and shallow seismic sounding research
Mamet, B.L. Géologie Montréal	Microfaciès carbonatés du Paléozoïque. Etude de la microfaune et de la microflore. (Stratigraphie, écologie, taxonomie)	Michel, B. Génie civil Laval	Propriétés mécaniques de la glace
Mansinha, L. Geophysics Western	1) Rotational dynamics of the earth 2) Exploration methods	Middleton, G.V. Geology McMaster	Field and experimental studies of clastic sediments
Martignole, J. Géologie Montréal	Recherches pétrologiques et structurales dans le sud de la province tectonique de Grenville	Mitchell, R.H. Geology Lakehead	Petrology and geochemistry of kimberlites and alkaline rocks
Martin, R.F. Geological Sciences McGill	Magmatic and metamorphic processes in the genesis of "igneous" rocks	Mitchell, R.J. Civil Engineering Queen's	Behaviour of sensitive clay soils: 1) Behaviour of sensitive soils under cyclic loadings 2) Landslide mechanics, monitoring and management 3) Analysis and design of flexible tunnel linings in sensitive clays
Martini, I.P. Land Resource Sc Guelph	Quantitative studies of sands and sandstones	Moore, J.M. Geology Carleton	1) Stratigraphy, structure and metamorphism of the Grenville Supergroup 2) Metamorphism of Precambrian volcanic rocks and ores
Massiera, M. Génie civil Moncton	Etude des sols très compressibles sous chargement bi-dimensionnel en relation avec le comportement de hauts remblais autoroutiers	Morgan, A.V. Environmental Sci. Waterloo	An analysis of Late Pleistocene climatic fluctuations using fossil Coleoptera * with M.A. Morgan (Waterloo)
Mathews, R.W. Biolog. Sciences Simon Fraser	Paleoecology of postglacial vegetation in coastal and interior biogeoclimatic zones of British Columbia	Morgan, M.A. Biology Waterloo	* Principal investigator A.V. Morgan (Waterloo)
Mathews, W.H. Geological Sciences British Columbia	Sedimentology, geomorphology and Cenozoic geochronology in southern British Columbia	Morgenstern, N.R. Civil Engineering Alberta	1) Geotechnical behaviour of frozen ground and ice 2) Geotechnical behaviour of Athabasca tar sand 3) Geotechnical behaviour of stiff clays and shales
May, R.W. Geology Alberta	1) Lithology and genesis of quaternary deposits 2) Application of statistical methods to the analysis of geologic data 3) Palynology of quaternary sediments	Morin, J.P. Génie civil Sherbrooke	1) Semelles superficielles sur des argiles cimentées 2) Le tassement des ouvrages sur fondations superficielles dans les argiles cimentées
McCann, S.B. Geography McMaster	1) Quaternary stratigraphy and deglaciation in southern Newfoundland 2) Cliff erosion in the Minas Basin, Bay of Fundy	Morton, R.D. Geology Alberta	Studies on the nature and origin of uranium deposits in northern and western Canada
McCaughey, J.H. Geography Queen's	Radiation and energy balance components in a forested watershed prior and post logging - Montmorency P.Q.	Mossman, D.J. Geological Sciences Saskatchewan	Petrology of ore deposits in the precambrian shield and environs
McGowan, C. Zoology Toronto	Systematics of ichthyosaurs (Reptilia) and Moas (Aves) and an investigation into the functional morphology of the heterocercal tail in selachians (Elasmobranchii)	Mothersill, J.S. Faculty of Science Lakehead	Utilization of the glacial and post-glacial sedimentary sequence in Thunder Bay to determine the sedimentary, paleomagnetic and climatic history of the Holocene and late Pleistocene in the northwestern Lake Superior area
McGugan, A. Geology Calgary	1) Cretaceous micropaleontology (foraminifera) 2) Upper Paleozoic micropaleontology (conodonts) 3) Cambrian micropaleontology (problematica)	Mountjoy, E.W. Geological Sciences McGill	Carbonate sedimentation and diagenesis of Paleozoic and Pleistocene reef and shelf margins and slopes
McNutt, R.H. Geology McMaster	1) Geochemical studies of Archean rocks 2) Geochemical studies of Andean Mesozoic and Cenozoic rocks	Muecke, G.K. Geology Dalhousie	1) Development of a computerized neutron activation analysis and radiometric laboratory for geochemical studies on rocks and minerals. 2) Petrochemical, isotopic and mineralogical studies on metamorphic and igneous rocks
Meagher, E.P. Geological Sciences British Columbia	Structure and crystal chemistry of silicate minerals	Muehlenbachs, K. Geology Alberta	Stable isotope exchange experiments and their application to geological problems
		Muller, P. Geography McGill	Glaciological research on Axel Heiberg Island (N.W.T.)

Munro, D.S. Geography Toronto	Energy exchange and water loss from a swamp	Pajari, G.E. Geology New Brunswick	1) The geology and petrochemistry of Silurian and Devonian volcanic rocks, southwestern New Brunswick 2) The geology of the central mobile belt to the Avalon platform zone in northeastern Newfoundland
Murray, J.W. Inst. Oceanography British Columbia	Marine geology of inland waterways of southwestern British Columbia		
Murthy, G. Physics Memorial	Remanent magnetism of anorthosites as an additional tool in tracing the past positions of continents	Palmer, H.C. Geophysics Western	Paleomagnetism of Canadian and South American rock units
Naldrett, A.J. Geology Toronto	Field and experimental studies relating to the origin of ultramafic and related mafic rocks and their associated Ni-Cu ore deposits	Papezik, V.S. Geology Memorial	Study of chemistry, stratigraphy and tectonic setting of volcanic rocks of the Avalon Zone, Newfoundland
Nelson, S.J. Geology Calgary	Palaeozoic correlations	Parslow, G.R. Geological Sciences Regina	1) Evaluation of uranium distribution in lake water and sediment 2) Mineralogy, petrology & sulphide potential of layered gabbros in the Lynn Lake area 3) Uranium migration and deposition within the Athabasca formation
Nichol, I. Geological Sciences Queen's	Geochemical exploration in Canada		
Nicholls, J.W. Geology Calgary	Petrology and geochemistry of peralkaline and related rocks, Itcha Mountains, British Columbia; chemical analysis of rocks and minerals; molar volumes of pyroxenes	Patterson, R.J. Geological Sciences Queen's	1) Interstitial water quality as an indicator of groundwater inputs to lakes 2) Chemical quality of vadose zone waters 3) Feasibility study for an automatic sampler incorporating ion exchange resin
Nickling, W.G. Geography Guelph	Rates and mechanics of rock glacier flow in the icefield ranges, Yukon Territory	Pearce, G.W. Earth Sciences Toronto	Magnetic measurements of lunar and terrestrial samples
Nkemdirim, L.C. Geography Calgary	The urban heat island of Calgary	Pearce, T.H. Geological Sciences Queen's	Petrology of archean igneous rocks
Noble, J.P. Geology New Brunswick	1) Silurian-Devonian stratigraphy and Paleoenvironments - N. Appalachians 2) Ecology of recent and fossil brachiopods	Peirce, J.W. Geology Dalhousie	Paleomagnetic and magnetic investigations into spreading centre processes and the evolution of oceanic crust
Norris, G. Geology Toronto	Biostratigraphy, biogeography, and paleoecology of Mesozoic - Cenozoic microspores, dinoflagellates, and other microplankton	Perrault, G. Génie minéral Polytechnique	Recherche en minéralogie et en cristallographie
Norum, D.I. Agric. Eng. Saskatchewan	Heat and mass transfer in soil profiles under frozen and unfrozen conditions	Perry, D.G. Geology Windsor	Biostratigraphy, taxonomy, paleoecology of Siluro-Devonian brachiopods, conodonts, trilobites of northern Canada
Nuffield, E.W. Geology Toronto	Crystal chemistry of the ore minerals	Pham, V.N. Génie minéral Polytechnique	Application de la magnéto-tellurique dans une étude tridimensionnelle de la structure et de la tectonique profondes de la région minière de Rouyn-Noranda
Nyland, E. Physics Alberta	Automated geophysical data analysis and interpretation	Pickard, G.L. Inst. Oceanography British Columbia	B.C. inlet study
Oke, T.R. Geography British Columbia	The energy and water balances of urban areas	Pickerill, R.K. Geology New Brunswick	Paleontology, ichnology, sedimentology and stratigraphy of selected Paleozoic sequences in eastern Canada
Oldenburg, D.W. Geophys./Astron. British Columbia	Interpretation of direct current resistivity measurements	Piper, D.J.W. Geology Dalhousie	1) Processes of deposition of fine clastic sediments in the ocean. 2) Marine quaternary of Atlantic Canada
Oldershaw, A.E. Geology Calgary	Genesis and diagenesis of sedimentary rocks	Platt, R.G. Geology Lakehead	Petrogenetic studies of alkaline and related rocks of N. W. Ontario
Ongley, E.D. Geography Queen's	Design and application of continuous-flow centrifugation in fluvial suspended sediment studies - sediment-related phosphorus and trace metal flux	Pounder, E.R. Physics McGill	Ice drift
Osborn, G.D. Geology Calgary	Pleistocene geology, geomorphology, engineering geology	Price, A.G. Geography Toronto	Snowmelt hydrology in a forested environment; snowmelt runoff prediction using the energy balance approach
Ouellet, M. INRS-Eau Québec-Ste-Foy	Aspects paléolimnologiques et sédimentologiques des lacs du Québec	Price, R.A. Geological Sciences Queen's	Cordilleran tectonics, and the nature and significance of variations in tectonic style

Protz, R. Land Resource Sc Guelph	1) Genesis of Northern Ontario Gleysolic, Podzolic and organic soils 2) Quantification of chemical and physical changes on individual mineral grains during soil genesis 3) Quantification of soil structure 4) Computer modelling of soil development	Ross, J.V. Geological Sciences British Columbia	A) Structural stratigraphic and metamorphic studies in south central British Columbia. b) Structural and mechanical properties of common silicate minerals
Quigley, R.M. Fac. of Eng. Sci. Western	1) Application of clay mineralogy and soil chemistry to problems of pollutant migration through clay soils, pipeline impact on soil fertility and soil bonding 2) Continued study of cyclic bluff instability and coastal erosion on Lakes Erie and Huron	Rouse, W.R. Geography McMaster	Radiation heat and water budgets of high latitude surfaces. Radiation and temperature in polluted urban atmospheres
Ranalli, G. Geology Carleton	Global tectonics and the rheology of the earth	Roy, M. Génie civil Laval	1) Etude des pieux flottants dans les argiles sensibles. 2) Mesure in situ de la résistance au cisaillement des argiles sensibles à l'aide du pressiomètre auto-foreur
Rankin, D. Physics Alberta	Magnetotellurics and micropulsations	Rucklidge, J.C. Geology Toronto	Geological studies with X-ray spectroscopy and diffraction
Rast, N. Geology New Brunswick	Caledonian Appalachian orogenic belt	Russell, L.S. Geology Toronto	The Cretaceous-Tertiary transition in central Alberta
Raymond, G.P. Civil Engineering Queen's	1) Stability and settlement of footings on soft soil 2) Stability, contact stress and settlement of repeatedly loaded footings on sands	Russell, R.D. Geophysics British Columbia	1) Isotope ratio studies 2) Geophysical instrumentation
Reardon, E.J. Earth Sciences Waterloo	1) Mineral solubility and stability of ion pairs and complexes in natural waters 2) Study of hydrothermal and low temperature ore formation and appraisal of geochemical techniques used in exploration	Rust, B.R. Geology Ottawa	Studies of alluvial sediments, ancient and modern
Reynolds, P.H. Physics/Geology Dalhousie	1) Potassium-argon dating of Nova Scotian granites, metamorphic rocks, and mineral deposits. 2) Argon-40/argon-39 dating of upper Precambrian volcanic rocks from Atlantic Canada. 3) Metallgenesis in Nova Scotia: a sulphur isotope study	Rutherford, G.K. Geography Queen's	Soil microscopy and anion exchange processes in soils
Risk, M.J. Geology McMaster	1) Bioerosion of carbonates. 2) Benthic fauna of the Thorold Sandstone	Rutter, N.W. Geology Alberta	Quaternary history of parts of Alberta, British Columbia and Yukon and development of amino acid racemization dating techniques
Riva, J.F. Geology Laval	Study and zonation of middle and late ordovician graptolites of North America	Sarjeant, W.A.S. Geological Sciences Saskatchewan	Dinoflagellates and acritarchs of the mesozoic: stratigraphical application in Western and Arctic Canada and use in intercontinental correlation
Roberts, M.C. Geography Simon Fraser	The impact of urbanization on the hydrology of selected watersheds, Surrey, B.C.	Sauer, E.K. Civil Engineering Saskatchewan	Geological factors in slope instability in Saskatchewan
Robin, P.Y.F. Geology Toronto	Phase changes and physical properties (seismic and electrical) in the earth's crust, and their investigations under high pressures	Saunderson, H.C. Geography Wilfrid Laurier	Sedimentology of the Guelph, Ariss, Eramosa and Norwood Eskers
Rochester, M.G. Physics Memorial	Theoretical solid-earth geophysics and planetary physics	Scarfe, C.M. Geology Alberta	Geochemical and geophysical properties of rocks and magmas at elevated temperatures and pressures
Roe, L.M. Geology Laurentian	Petrography and distribution of Breccia zones near Sudbury, Ontario	Schenk, P.E. Geology Dalhousie	Sedimentologic-stratigraphic studies of the early through late Paleozoics sedimentary rock of Nova Scotia
Roeder, P. Geological Sciences Queen's	Electron probe and experimental studies of basaltic rocks	Schloessin, H.H. Geophysics Western	Physical properties of earth materials at mantle conditions
Roegiers, J.C. Civil Engineering Toronto	1) Influence of the permeability factor in hydraulic fracturing. 2) Development of a 'Université de Liège' cell	Schuepp, P.H. Agric. Physics Macdonald Coll.	Micrometeorological model experiments
		Schwarcz, H.P. Geology McMaster	Isotopic geochemistry and Pleistocene geochronology
		Schwartz, F.W. Geology Alberta	Investigation of regional water quality
		Schwerdtner, W.M. Geology Toronto	Paleostain analysis in the Canadian Shield
		Scott, S.D. Geology Toronto	Petrology and geochemistry of sulfide ores and minerals

Sequin, M.K. Géologie Laval	Paléomagnétisme des ophiolites	Starkey, J. Geology Western	The petrofabric analysis of deformed rocks of known geological history by optical microscopy, X-ray diffraction and electron microscopy. The determination of deformation mechanisms, attendant geochemical changes and the structures of deformed crystals
Selvadurai, A.P.S. Civil Engineering Carleton	1) Consolidation effects of soil - foundation interaction 2) Testing of soils by the use of ground anchors	Stauffer, M.R. Geological Sciences Saskatchewan	Structures in rocks
Shaw, D.M. Geology McMaster	Geochemical studies of minerals and rocks	Stearn, C.W. Geological Sciences McGill	Paleoecology of paleozoic reefs
Shaw, J. Geography Alberta	Processes of deposition from turbidity currents in pro-glacial lakes	Steiner, J. Geology Alberta	Rb/Sr dating of Pre-Pleistocene tillites
Shoemaker, E.M. Mathematics Simon Fraser	Studies in geophysics and glaciology	Stelck, C.R. Geology Alberta	Phytoplanktonic - foraminiferal zonation of the Mid-Cretaceous of northeastern British Columbia
Simpson, F. Geology Windsor	Cratonic-interior sedimentation and related tectonic controls	Stesky, R.M. Earth Sciences Toronto	Seismic and electrical properties of rocks at high pressure temperature and differential stress
Sinclair, A.J. Geological Sciences British Columbia	Mineral deposits and metallogeny in the Canadian Cordillera	Stevens, R.K. Geology Memorial	Paleozoic evolution of Newfoundland
Skevington, D. Geology Memorial	Graptolite faunas of the North Atlantic region: morphology, taxonomy, zonation and correlation	Stewart, I.C.F. Physics Memorial	Seismotectonic studies of Newfoundland
Skippen, G.B. Geology Carleton	A field and experimental study of the metamorphism of pelitic and calcisilicate rocks	Stimpson, B. Mineral Eng. Alberta	Mechanics of caving in jointed rock masses
Slawson, W.F. Geophys./Astron. British Columbia	Oxygen isotopes in hydrological studies	Strangway, D.W. Geology Toronto	Magnetic and electrical studies of geological significance
Slaymaker, H.O. Geography British Columbia	Rates of sediment production, sediment transport and sediment yield in Southern Coast Mountains, B.C.	Stringer, P. Geology New Brunswick	Relation of cleavage to folding in the Caledonian-Appalachian orogenic belt
Smith, D.G. Geography Calgary	Dynamics and sedimentology of sandbars in the William River, northwest Saskatchewan	Strong, D.P. Geology Memorial	Geochemical, petrological and metallogenic studies in the Appalachian-Caledonian orogen
Smith, D.G.W. Geology Alberta	Applications of electron microprobe analysis in mineralogy, economic geology and petrology	Sundby, B. Sciences pures Québec-Rimouski	Estuarine geochemical processes
Smith, D.L. Geological Sciences Queen's	Environmental sedimentology and lithic stratigraphy of Jurassic carbonates, Southwestern England and Scotian Shelf	Sutterlin, P.G. Geology Western	Statistical and numerical analysis of quantitative data from a computer-processable SAFRAS file containing data on approximately 10,000 samples of Pleistocene materials from Canada
Smith, F.G. Geology Toronto	Computer programs for statistical processing and compilation of mineral compositions	Symons, D.T.A. Geology Windsor	Paleomagnetism and boundary geotectonics of the Superior Geologic Province
Smith, T.E. Geology Windsor	Archean magmatism and tectonics: a geochemical study of the evolution of granitic rocks in the Superior Province and subsidiary projects	Tavenas, F.A. Génie civil Laval	1) Etude du comportement des argiles sensibles en état d'élasticité et de fluage 2) Application des concepts d'état limite aux calculs des ouvrages dans les argiles sensibles
Smylie, D.E. Physics York	Dynamics of the earth	Taylor, C.H. Geography Trent	1) Runoff production in an inter-drumlin swale 2) Effects of urbanization on streamflow of a small basin in Peterborough, Ontario
Sonnenfeld, P. Geology Windsor	Evaporite formation	Teller, J.T. Earth Sciences Manitoba	Late Wisconsinan and Holocene sedimentary history of the Lake Manitoba basin
Spang, J.H. Geology Calgary	Mechanical behavior of the thrust plates in the foothills and front ranges of the Canadian Rocky Mountains	Terasmae, J. Geological Sciences Brock	Quaternary paleoecology, geochronology, and climatic changes in eastern and northeastern Canada
St-Julien, P. Géol./minéralogie Laval	Contexte structural des complexes ophiolitiques des Appalaches du Québec		
St-Onge, D.A. Géographie Ottawa	Geomorphological studies in central Alberta		

Thomson, S. Civil Engineering Alberta	Investigations of laboratory and in-situ properties and behaviour of overconsolidated clays and soft rocks (pleistocene and upper cretaceous) of Western Canada	Weaver, J.T. Physics Victoria	Electromagnetic induction in the earth and oceans
Trembath, L.T. Geology New Brunswick	Factors affecting the crystallization of feldspar in synthetic and natural systems	Webber, G.R. Geological Sciences McGill	Investigations in applied geochemistry
Trenhaile, A.S. Geography Windsor	1) Shore platforms in Newfoundland; 2) Shore platforms in the Canadian Maritimes	Webber, L.R. Land Resource Sc Guelph	Groundwater pollution
Trzcienski, W.E. Génie minéral Polytechnique	Etudes minéralogiques et pétrologiques à l'aide de la microsonde	West, G.F. Physics Toronto	Regional and applied geophysics
Turek, A. Geology Windsor	Geochronology of Lake Superior region	Westermann, G.E.G. Geology McMaster	Jurassic ammonites and cephalopod shell function
Turnock, A.C. Earth Sciences Manitoba	Stability of pyroxenes	Westgate, J.A. Geology Toronto	1) Quaternary tephrochronology of the Yukon Territory & adjacent areas of Alaska 2) Quaternary geology of southern and central Alberta
Ulrych, T.J. Geophys./Astron. British Columbia	1) Application of communication theory to geophysics and astronomy 2) Interpretation and reduction of potential field data	Whitehead, R.E.S. Geology Laurentian	* Principal investigator J.F. Davies (Laurentian)
Utting, J. INRS-Pétrole Québec-Ste-Foy	Palyinological investigation of Upper Palaeozoic rocks in Eastern Canada	Williams, G.D. Geology Alberta	Coal deposits in the deep subsurface of the Canadian Plains
Vaid, Y.P. Civil Engineering McMaster	Stress-strain and strength properties (including time effects) of natural soils and materials from reclaimed lands	Williams, H. Geology Memorial	Zonal subdivision of the northern Appalachians and correlations throughout the southern Appalachians and Caledonides of Europe
Van de Poll, H.W. Geology New Brunswick	1) Palaeoclimatic influence on the economic geology and lithostratigraphy of the carboniferous succession of eastern Canada. 2) Sedimentation in the shallow marine coastal environment of the Northumberland Strait	Wilson, H.D.B. Earth Sciences Manitoba	1) Rare earths, precious metals, and radioactive metals in the Archean volcanic sequence 2) The stratigraphic succession in gneissic mobile belts
Vanicek, P. Surveying Eng New Brunswick	Earth tides and crustal movement research	Wilson, J.T. Physics/Geology Toronto	Tectonics research with special reference to plume mechanisms
Veizer, J. Geology Ottawa	1) Chemical evolution of sediments during the Precambrian 2) Geochemical facies indicators in carbonates 3) Recycling processes and their simulation	Wilson, M.V.H. Zoology Alberta	Late Cretaceous and early Tertiary fishes of western North America
Vreeken, W.J. Geography Queen's	1) Soil variability in Lacustrine clays. 2) Stratigraphy of Bog Marl deposits	Wilson, N.E. Civ Eng/Eng Mech McMaster	Shear strength and consolidation characteristics of soils under cyclic loading
Walker, R.G. Geology McMaster	Development of facies models for ancient depositional environments	Woo, M.K. Geography McMaster	1) Hydrology of nival-regime basins in the high Arctic 2) Impact of Hydro powerline installation across a natural swamp in southern Ontario
Wangersky, P.J. Oceanography Dalhousie	The carbon cycle in the open ocean	Wynne-Edwards, H.R. Geological Sciences British Columbia	Geological evolution of Canadian Continental Crust
Wardlaw, N.C. Geology Calgary	Reservoir properties of sedimentary rocks	Yong, R. Civ Eng/App Mech McGill	Influence of composition, physico-chemical forces and bond development on engineering properties of soils
Warkentin, B.P. Renewable Dev. Res Macdonald Coll.	Forces holding water in clay soils	York, D. Physics Toronto	Isotope studies and age determinations
Warren, H.V. Geological Sciences British Columbia	New and improved techniques in exploration geochemistry	Young, G.M. Geology Western	Studies of Precambrian supracrustal rocks
Watkinson, D.H. Geology Carleton	Relation of ore deposits to igneous rocks	Zentilli, M. Geology Dalhousie	1) Metallogenic studies in Nova Scotia. 2) Metallogenic studies in Central Andes
Watt, W.E. Civil Engineering Queen's	Prediction and simulation of discharge for urban and rural drainage basins		