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NATIONAL ADVISORY COMMITTEE ON RESEARCH IN THE GEOLOGICAL SCIENCES

CURRENT RESEARCH IN THE GEOLOGICAL SCIENCES IN CANADA, 1968-69

Compiled by J. F. Henderson

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CONTENTS

CURRENT RESEARCH IN THE GEOLOGICAL SCIENCES IN CANADA, JUNE, 1968 - MAY, 1969

INTRODUCTION

The research projects listed in this compilation have been obtained mainly from the universities, federal and provincial departments of mines, and other non-industrial institutions carrying on research in the geological sciences in Canada. With the exception of some projects contributed by some of the larger oil companies, the bibliography does not include research by mining and oil company geologists. The survey was made between October and December 1968 and records research in progress from about June 1968 to May 1969.

The compilation is useful in enabling research workers to see who are working in similar fields and on similar problems. It indicates lines of geological research receiving the greatest attention and, by inference, those being neglected. It also serves to record the large number of research projects undertaken as graduate theses in our universities, of which the results are available only in manuscript form in university libraries.

Success in assembling project titles for a compilation such as this depends on the response of institutions and research workers. Acknowledgment is made in particular to those who assembled and forwarded the data on research projects in the institutions under their direction. However, in spite of general excellent cooperation, many projects on which no information was received are not included. Readers carrying on projects in geology or projects in allied sciences of direct interest to geologists which they consider should be included, should notify the Secretary, National Advisory Committee on Research in the Geological Sciences, 601 Booth Street, Ottawa. They will be placed on the list of those to receive the forms on which contributors forward information on their research projects in November of each year. This compilation is a cooperative undertaking.

Use of the Compilation

In this compilation, projects are grouped under main headings that cover the different branches of the geological and allied sciences. The reader can thus find out readily the research in progress in the field in which he is interested. Many projects that seem to fall equally well under more than one heading are repeated under these headings. An author index lists after each author the numbers of projects, as listed in the bibliography, on which he is currently engaged. Thus by reference to the author index, the fields of research and projects of any worker may be found.

AREAL GEOLOGY

Alberta

1. Berg, T.E., Research Council of Alberta:
   Geology of the Oyen area, N.T.S. Sheet 72M, Alberta, 1968-.

2. Carrigy, M.A., Green, R., Mellon, G.B., Research Council of Alberta:
   Alberta bedrock mapping, 1962-69.
   Maps and final report on bedrock geology of northern Alberta (north 56° latitude) are in preparation. See Geology of the Chinchago River and Clear Hills (north half) map-areas, Alberta; Alta. Res. Council Rept. 62-8.

3. Godfrey, J.D., and others, Research Council of Alberta:
   Laboratory studies, Precambrian geology of northeastern Alberta, 1958-.
   See Alta. Res. Council Contribution Papers 382, 397.

4. Havard, C.J., Geol. Surv. Canada:
   Stratigraphy and structure of Lower Cretaceous sedimentary rocks of the Waterton-Castle River area, Alberta, 1967-69.

5. Mountjoy, E.W., McGill Univ.:
   Mount Robson southeast map-area 83E SE, 1959-.
   Study includes regional study and mapping of structures and stratigraphy of Rocky Mountains in Alberta and British Columbia. See Geol. Surv. Can., Map 47-1963.

6. Ollerenshaw, N.C., Geol. Surv. Canada:
   Burnt Timber Creek area, Alberta, 1962-71.
   See Burnt Timber Creek; Geol. Surv. Can., Map 11-1965.
   Lake Minnewanka East and West (foothills part) and Wildcat Hills West, Alberta, 1966-72.
   See Panther culmination; Geol. Surv. Can., Map 24-1967.
   Limestone Mountain, Marble Mountain and Fallentimber West map-areas, 1964-71.
   See Preliminary account of the geology of Limestone Mountain map-area, Southern Foothills, Alberta; Geol. Surv. Can., Paper 68-24, 1968.

British Columbia

7. Barr, S. (Miss), Univ. of British Columbia:
   Geology of Strait of Juan de Fuca, 1969-70; M.Sc. thesis.
   Shipboard investigations planned for 1969 include continuous seismic profiling in the Strait, and bottom sampling. Possibly an attempt will be made to correlate marine geological features of the Strait with the geology of the southern part of Vancouver Island.

8. Campbell, R.B., Geol. Surv. Canada:
   Geology of the Cariboo Mountains, British Columbia, 1959-72.
   This continuing investigation stresses the solution of structural and stratigraphic problems of significance, to an understanding of the Tectonic history of the eastern Cordillera. See Geol. Surv. Can., Paper 68-1, 1968 and Map 15-1967.

9. Carr, J.M., British Columbia Dept. of Mines and Petroleum Resources:
Geology of the Brenda Lake area, British Columbia, 1966-68.
An investigation of the ore controls affecting the Brenda copper-molybdenum orebody and adjacent similar mineralization. See Ann. Rept. of the Minister of Mines and Petroleum Resources, 1967, pp. 183-210.

10. Carter, N.C., British Columbia Dept. of Mines and Petroleum Resources:
Geology and mineral deposits of the Alice Arm area, British Columbia, 1 inch to 1 mile, 1968-69.
See Ann. Rept. of the Minister of Mines and Petroleum Resources, 1967, pp. 41-50.

11. Grove, E.W., British Columbia Dept. of Mines and Petroleum Resources:
Revision of the geology of the Portland Canal area, British Columbia, 1964-68.
Geology and mineral deposits of the Anyot map-area, Portland Canal, British Columbia, 1964-68.
A study of the litho-structural controls of sulphide deposits in the area, including alteration-metalization studies of the individual deposits. See Ann. Rept. of the Minister of Mines and Petroleum Resources, 1965, pp. 57-61, and 1966, pp. 41-42.

12. Leech, G.B., Geol. Surv. Canada:
Kananaskis Lakes, British Columbia, 1 inch to 4 miles, 1962-65.
See Cretaceous strata in the west face of the Rocky Mountains; Geol. Surv. Can., Paper 67-1A, pp. 72-73, 1967.

13. Muller, J.E., Geol. Surv. Canada:
Geology, stratigraphy, petrology and mineral deposits of northern Vancouver Island (N.T.S. 102I, 92L, 92E, 92K).
See Geol. Surv. Can., Paper 69-1A, 1969.

14. Muller, J.E., Carson, D.J.T., Geol. Surv. Canada:
Geology and mineral deposits of Alberni map-area, Vancouver Island and Gulf Islands, British Columbia.
Regional geology, stratigraphy, petrology and mineral deposits of the central part of Vancouver Island in the Strait of Georgia (N.T.S. 92F).

15. Northcote, K.E., British Columbia Dept. of Mines and Petroleum Resources:
Geology and mineral deposits of the Port Hardy area, Vancouver Island, British Columbia, 1 inch to 1/2 mile, 1968-70.
Includes production of geologic map and detailed study of important mining properties.

16. Roddick, J.A., Hutchison, W.W., Geol. Surv. Canada:
Coast Mountains project, British Columbia, 1967-71.
A continuing investigation of the Coast Mountains between Vancouver and southeast Alaska with special emphasis on the development of plutonic rocks. See Coast Mountains project, British Columbia; Geol. Surv. Can., Paper 68-1, 1968, and Recording geological field data for machine retrieval and processing; Western Miner, February, 1968.

17. Wheeler, J.O., Geol. Surv. Canada:
Lardeau West, British Columbia, 1 inch to 4 miles, 1965-69.
Reconnaissance study of part of the core zone of the Eastern

Cordilleran fold belt and embracing Slocan and northern Kootenay Arc districts. See Lardeau (west half) map-area, British Columbia; Geol. Surv. Can., Paper 68-1A, pp. 56-58, 1968.

Big Bend map-area, British Columbia, 1 inch to 4 miles, 1959-70.
Reconnaissance study of part of the core zone of the Eastern Cordilleran fold belt. See Big Bend map-area, British Columbia; Geol. Surv. Can., Paper 64-32, 1964.

Manitoba

18. Bailes, A.A., Manitoba Mines Branch:
Structural geology and metamorphic petrology of the Guay Lake and Wimapedi Lake areas, Manitoba, 1968-71.

19. Cranstone, D.A., Manitoba Mines Branch:
Geological mapping in the Setting Lake area (Pakwa Lake and Pistol Lake, east half, map sheets) and geological study of the entire Manitoba nickel belt, 1968-72.

20. Davison, W.L., Geol. Surv. Canada:
Geology of southern Indian Lake area, Manitoba, 1968-69.

21. Ermanovics, I.F., Geol. Surv. Canada:
Hecla-Carroll Lake map-area, Manitoba and Ontario, 1968.
Includes mapping of the distribution of primary and altered Archean greenstones in large areas of the Precambrian Shield, underlain by phases of repeated granodiorite intrusion.

22. Haugh, I., Manitoba Mines Branch:
Southern Indian Lake area, Manitoba, 1969-71.
Includes geological and structural field studies with geophysical and laboratory support.

23. Haugh, I., Elphick, S.C., Manitoba Mines Branch:
Structural and petrologic studies in the Kettle Rapids - Moose Lake area, northern Manitoba, 1968-69.

24. McCabe, H.R., Bannatyne, B.B., Manitoba Mines Branch:
Geology of the Gypsumville - Lake St. Martin area, Manitoba, 1968-69.

25. Turek, A., McRitchie, W.D., Weber, W., Manitoba Mines Branch:
Project Pioneer - a field and laboratory study in the Rice Lake - Beresford Lake area, Manitoba, in cooperation with the Dept. of Geology, Univ. of Manitoba, 1966-70.
See Preliminary Rb-Sr geochronology of the Rice Lake - Beresford Lake area, southeastern Manitoba; Can. Jour. Earth Science, vol. 5, No. 6 (in press).

New Brunswick

26. Anderson, F.D., Geol. Surv. Canada:
McKendrick Lake map-area, New Brunswick, 1 inch to 1 mile, 1966-68.
See McKendrick Lake map-area, New Brunswick; Geol. Surv. Can., Paper 68-1A, pp. 2-4, 1968.

27. Kranck, K. (Miss), Bedford Institute, Nova Scotia:
Subsurface geology of Northumberland Strait, 1966-69.
Echograms, continuous seismic records and piston cores are used to study the post-glacial history and bedrock structure of Northumberland Strait.

28. Skinner, R., Geol. Surv. Canada:
Tuadook Lake map-area, New Brunswick, 1968-70.
An area in the central part of the Miramichi Highlands underlain by Cambro-Ordovician to Silurian and/or Devonian sedimentary and volcanic rocks intruded by Upper Ordovician(?) and Devonian granites and granodiorites. See Tuadook Lake map-area, New Brunswick; Geol. Surv. Can., Paper 69-1A, 1969.

29. Williamson, D.H., Laurentian Univ.:
Stratigraphy and structure of the basement complex of the northeastern part of Caledonia Mountain, southeastern New Brunswick, 1962-70.
The geological mapping phase has been completed. Investigations and analyses of the different lithologies are presently underway for the purpose of establishing plutons to this sequence. A geological map of the area is in preparation.

Newfoundland and Labrador

30. Anderson, F.D., Geol. Surv. Canada:
Belleoram map-area, Newfoundland, 1 inch to 4 miles, 1960-69.
See Structural studies in the Baie d'Espoir Group, Newfoundland; in Geol. Assoc. Can., Spec. Paper No. 4, Geology of the Atlantic region, pp. 193-200, 1967.

31. Brueckner, W.D., Memorial Univ. of Newfoundland:
Avalon Peninsula and sediment studies, Newfoundland.
See Geology of the eastern part of the Avalon Peninsula, Newfoundland - a summary; Amer. Assoc. Petrol. Geol., Memoir (in press).

32. Cockburn, G.C., Univ. of Western Ontario:
The geology of the Confusion Bay region and adjacent areas of the Burlington Peninsula, Newfoundland, 1967-69; thesis project.
An investigation of the structural and metamorphic histories of the Pacquet Harbour, Grand Cove, and Cape St. John Groups of the Burlington Peninsula with the view of establishing the age of metamorphism of the Pacquet Harbour and Grand Cove Groups.

33. Koh, I.S., Memorial Univ. of Newfoundland:
Trepassey area, Avalon Peninsula, southeastern Newfoundland, 1967-69; M.Sc. thesis.

34. Misra, S.B., Memorial Univ. of Newfoundland:
Biscay Bay - Cape Race area, Avalon Peninsula, Newfoundland, 1966-69; M.Sc. thesis.

35. Mullins, J., Newfoundland Dept. of Mines, Agriculture and Resources:
Geology, St. Catherines (east half) map-area, 1968-69.
Involves detailed geological mapping and geochemical sampling of stream sediments and soil.

36. Stevenson, I.M., Geol. Surv. Canada:
Northwest River map-area, Labrador and Quebec, 1 inch to 4 miles, 1965-70.
See Winokapau Lake - Lac Brûlé map-areas; Geol. Surv. Can., Paper 67-69, 1969.

37. Taylor, F.C., Geol. Surv. Canada:
Operation Torngat, reconnaissance geology of northeastern Quebec and northern Labrador, 1966-70.

38. Williams, H., Memorial Univ. of Newfoundland:
Petrology, age, and stratigraphy of eruptive rocks and basal Cambrian strata, Strait of Belle Isle, Newfoundland, 1968-70.
Preliminary field investigations (1968) indicate that mafic volcanic rocks occur in association with red and purplish arkosic sandstone that is lithologically similar to the Lower Cambrian Bradore Formation of southeastern Labrador.

Nova Scotia

39. Benson, D.G., Geol. Surv. Canada:
Antigonish Highlands and Antigonish Basin areas, Nova Scotia, 1964-70.

40. King, L.H., MacLean, B., Thurber, E., Bedford Institute, Nova Scotia:
Studies of bedrock and surficial geology - Scotian Shelf, 1964-.
Bedrock geology - A program to map the near surface structure and stratigraphy of the bedrock underlying the entire Scotian Shelf is being conducted utilizing continuous seismic-reflection profiles and sample data obtained through dredging operations. Profiles representing some 4,000 miles of traverse have been accumulated, and are being interpreted utilizing differences in acoustical characteristics and unconformable relationships to delineate rock units. Surficial geology - Interpretations of the surficial geology is based upon a detailed study of echograms, examination of bottom samples, continuous seismic reflection profiles, radiogenic ages and paleontological data. Work currently in progress will provide surficial geological coverage for the whole of the Scotian Shelf. Chart 4040, Halifax-Sable I., is ready for final drafting, sampling for chart 4012, Yarmouth-Halifax has been completed and sampling for chart 4041, Banquereau-Misaine, comprising the eastern third of the Scotian Shelf is about 80 per cent complete. See On the sediments and stratigraphy of the Scotian Shelf; GAC Spec. Paper No. 4, Geology of the Atlantic Region, 1967.

41. Marlowe, J.I., Bedford Institute, Nova Scotia:
Structure and stratigraphy of bedrock on the Continental Shelf off Nova Scotia, 1964-68.
Analyses of samples obtained by dredging across outcropping formations in a submarine canyon are compiled with seismic and topographic data to provide descriptive information on the stratigraphic section exposed in the canyon. See The geology of part of the Continental Slope near Sable Island, Nova Scotia; Geol. Surv. Can., Paper 65-38, 1965.

42. Pelletier, B.R., Bedford Institute, Nova Scotia; Swift, D.J., Old Dominion College, Norfolk, Virginia:
Marine geological studies in the Bay of Fundy, 1965-.

Northwest Territories

43. Aitken, J.D., Cook, D.G., Ayling, M.E., Balkwill, H.R., Yorath, C.J., Fulton, R.J., Klassen, R.W., Chamney, T.P., MacKenzie, W.S., Macqueen, R.W., Geol. Surv. Canada:
Operation Norman - Geology of the Mackenzie Plains, Northwest Territories, 1968-71.
A helicopter supported reconnaissance bedrock and surficial geological study of the Lower Mackenzie River area (125,000 square miles). See Geol. Surv. Can., Paper 69-1, 1969.

44. Bell, R.T., Geol. Surv. Canada:
Study of the Hurwitz Group in the eastern part of the Rankin-Ennadai belt, 1967-69.
See Geol. Surv. Can., Paper 68-36, 1968.

45. Bostock, H.H., Geol. Surv. Canada:
Itchen Lake map-area, District of Mackenzie, 1964-69.
The final report will include descriptions of gold-bearing sulphide-arsenide deposits at Point, Itchen, and Contwoyto Lakes. See Geol. Surv. Can., Paper 66-24, 1966.

46. Christie, R.L., Geol. Surv. Canada:
Regional geology and stratigraphy, Arctic Archipelago - a continuing study.
Particular attention is being paid to the Precambrian crystalline terrane; to the distribution and ages of the late Precambrian sedimentary rocks and their contained sills and dykes; and to the stratigraphy of the lower Paleozoic rocks exposed along the eastern margin of the Paleozoic sedimentary basin. See Bache Peninsula, Ellesmere Island, Arctic Archipelago; Geol. Surv. Canada, Memoir 347.

47. Eade, K.E., Geol. Surv. Canada:
Ennadai Lake map-area, District of Keewatin, 1 inch to 4 miles, 1968-70.
A study of the stratigraphy and structure of the Aphebian sedimentary rocks and of the post-orogenic fluorite-bearing granites which intrude the sedimentary rocks.

48. Heywood, W.W., Geol. Surv. Canada:
Geology of northern District of Keewatin and southern Melville Peninsula, 1960-69.
Includes study of petrology, structure, and metamorphism of Precambrian terrain mapped on Operations Back River (1960) and Wager (1964). See Geological notes, northeastern District of Keewatin and southern Melville Peninsula, District of Franklin, Northwest Territories; Geol. Surv. Can., Paper 66-40, 1966.

49. Jackson, G.D., Blusson, S.L., Davidson, A., Morgan, W.C., Geol. Surv. Canada:
Operation Bylot - a helicopter reconnaissance survey of about 52,000 square miles of northwest Baffin Island, 1967-68.
See Geol. Surv. Can., Paper 68-1, 1968, pp. 144-45.

50. Kerr, J.Wm., Geol. Surv. Canada:
Stratigraphy and structure, central Ellesmere Island, Northwest Territories, 1961-69.
The investigation will produce a 1 inch to 4 miles map of those

parts of central Ellesmere Island underlain by Lower and Middle Paleozoic rocks. Separate reports will be produced on the stratigraphy of these rocks. See Stratigraphy of central and eastern Ellesmere Island, Arctic Canada, Part I, Proterozoic and Cambrian; Geol. Surv. Can., Paper 67-27, 1967.

Stratigraphy and structure, S.W. Ellesmere Island and N.W. Devon Island, Northwest Territories, 1967-72.

Stratigraphic studies, Arctic Canada, 1961-.

Studies on various problems of stratigraphy and correlation in the Arctic Islands. See New Nomenclature for Ordovician rock units of the eastern and southern Queen Elizabeth Islands, Arctic Canada; Bull. Can. Petrol. Geol., vol. 15, No. 1, 1967.

51. Kerr, J.Wm., Temple, P.G., Geol. Surv. Canada:

Stratigraphy and structure, Bathurst Island, Northwest Territories, 1963-69.

The objective is to produce a report and a 4 mile geological map. The area covers the region of intersection of two major fold belts and demonstrates the history of the western side of the Boothia Uplift. See Tectonic history of the Boothia Uplift and Cornwallis Fold Belt, Arctic Canada; Bull. A.A.P.G., vol. 49, No. 7, pp. 905-926, 1965.

52. Trettin, H.P., Geol. Surv. Canada:

Lower Paleozoic sediments, Foxe Basin, northeastern Melville Peninsula, and parts of northern and central Baffin Island, Northwest Territories, 1968-70.

See Geology and petroleum potential of lower Paleozoic sediments-Foxe Basin, northeastern Melville Peninsula and parts of northern and central Baffin Island; Geol. Surv. Can., Paper 69-1, 1969.

Lower Paleozoic geology of northern Ellesmere Island, 1965-69.

See Pre-Mississippian geology of the United States Range and Hazen Plateau, northeastern Ellesmere Island; Geol. Surv. Can., Paper 68-1, pp. 212-219, 1968.

Ontario

53. Ayres, L.D., Ontario Dept. Mines:

Favourable Lake-Poplar Hill compilation sheet, District of Kenora (Patricia Portion), 1968-70.

Involves geological mapping of selected areas in addition to compilation of available data. See Ont. Dept. Mines Summary of Field Work, 1968.

Setting Net Lake area, District of Kenora (Patricia Portion), 1968-70.

See Ont. Dept. Mines Summary of Field Work, 1968.

Trout Lakes area, District of Kenora (Patricia Portion), 1968-69.

See Trout Lake area, South Trout Lake sheet; Ont. Dept. Mines, Prel. Map P422, and Rathouse Bay sheet, P439, 1968.

54. Baer, A.J., Geol. Surv. Canada:

Geology of the Precambrian Shield in the Rivière Gatineau map-area, Quebec and Ontario, 1968-.

55. Bennett, G., Riley, R.A., Ontario Dept. Mines:
Operation Lingman Lake, District of Kenora (Patricia Portion), 1967-68.
Geological mapping at 1 inch to 2 miles. See Ont. Dept. Mines Prelim. Maps P426, P427, P428, P429, P430, P431, P432, P433, and P434.

56. Bennett, G., Thurston, P.C., Gisueve, J.G., Ontario Dept. Mines:
Operation Pukaskwa, Districts of Algoma and Thunder Bay, 1968-69.
Geological mapping at scales of 1 inch to 1 mile and 1 inch to 2 miles.

57. Bright, E.G., Ontario Dept. Mines:
Moher-Hutt area, District of Sudbury, 1968-69.
See Ont. Dept. Mines Summary of Field Work, 1968.
Beemer-Zavitz area, District of Sudbury, 1967-69.
See Ont. Dept. Mines Summary of Field Work, 1967.
Halliday and Midlothian townships, District of Sudbury and Timiskaming, 1966-69.
See Ont. Dept. Mines Summary of Field Work, 1967 and 1968.

58. Card, K.D., Ontario Dept. Mines:
Bay of Islands - McGregor Bay area, District of Sudbury, 1967-68.
Part of the continuing study of the stratigraphy, age relations, and tectonics of the Proterozoic rocks of the Southern Province in Ontario. See Ont. Dept. Mines Summary of Field Work, 1968.
Louise-Eden area, District of Sudbury, 1968-70.
See Ont. Dept. Mines Summary of Field Work, 1968.

59. Card, K.D., McIlwaine, W.H., Meyn, H.D., Ontario Dept. Mines:
Operation Maple Mountain, Districts of Nipissing, Sudbury, and Timiskaming, 1969.
A reconnaissance survey of the area bounded approximately by Long. 80°W-81°W, Lat. 47°N-47°30'N, with semi-detailed work in several areas of economic interest.

60. Coates, M.E., Ontario Dept. Mines:
Black Sturgeon area, District of Thunder Bay, 1967-69.
See Ont. Dept. Mines Summary of Field Work, 1967.

61. Davies, J.C., Ontario Dept. Mines:
Fort Frances area, District of Rainy River, 1964-68.
Atikwa Lake area, District of Kenora, 1966-69.
See Atikwa Lake area; Ont. Dept. Mines, Maps 387 and 388.
North part of Shoal Lake, District of Kenora, 1968-69.
See Ont. Dept. Mines Summary of Field Work, 1968.

62. Ermanovics, I.F., Geol. Surv. Canada:
Hecla-Carroll Lake map-area, Manitoba and Ontario, 1968.
Includes mapping of the distribution of primary and altered archean greenstones in large areas of the Precambrian Shield, underlain by phases of repeated granodiorite intrusion.

63. Fenwick, K.G., Ontario Dept. Mines:
Finlayson Lake area, District of Rainy River, 1967-69.
See Ont. Dept. Mines Summary of Field Work, 1967 and 1968.
Tashota-Onoman area, District of Thunder Bay, 1968-71.
Fredart-Whitemud Lakes area, District of Kenora (Patricia Portion), 1965-70.
See Ont. Dept. Mines Summary of Field Work, 1965, 1966 and 1967.

64. Frarey, M.J., Geol. Surv. Canada:
Western North Channel area, Ontario, 1956-69.
Chiefly concerns Huronian stratigraphy and structure between Sault Ste. Marie and Blind River, Ontario. See Bruce Mines, Ontario; Geol. Surv. Can., Map 32-1962.
Lake Panache - Collins Inlet map-areas, 1964-70.
A general revision of earlier work with emphasis on Huronian stratigraphy and relationship of Southern Province to Grenville Province in this area, and nature of boundary.

65. Geul, J.J.C., Ontario Dept. Mines:
Crooks township and the Prince and Jarvis locations, District of Thunder Bay, 1968-70.
See Ont. Dept. Mines Summary of Field Work, 1968.
Purdee and Devon townships and the Stuart location, District of Thunder Bay, 1967-69.
See Ont. Dept. Mines Prelim. Maps P466, P467.

66. Giblin, P.E., Ontario Dept. Mines:
Batchawana area, District of Algoma, 1964-69.
See Ont. Dept. Mines Summary of Field Work, 1967, pp. 38-40.

67. Giguere, J.F., Ontario Dept. Mines:
Granitehill Lake area, District of Thunder Bay, 1967-68.
See Ont. Dept. Mines Prelim. Map P473.

68. Guillet, G.R., Ontario Dept. Mines:
Geology and scenery of Algonquin Park, 1968-72.

69. Harris, F.F., Ontario Dept. Mines:
Rainy Lake area, District of Rainy River, 1968-70.
1 inch to 1/4 mile mapping of Walter, Halkirk and Farington townships in Rainy River district. See Ont. Dept. Mines Summary of Field Work, 1968.

70. Jensen, L.S., Ontario Dept. Mines:
Geology of Melba and Bisley townships, District of Timiskaming, Ontario, 1968; M.Sc. thesis.

71. Johnston, F.J., Ontario Dept. Mines:
Vermilion-Abram Lakes area, District of Kenora.
See Ont. Dept. Mines Summary of Field Work, 1967.

72. Kustra, C.R., Thurston, P.C., Ontario Dept. Mines:
Obonga-Leigh Lakes area, District of Thunder Bay, 1966-69.
See Ont. Dept. Mines Summary of Field Work, 1967.

73. Leahy, E.J., Ontario Dept. Mines:
Nighthawk Lake area, District of Cochrane, 1964-68.
Geological mapping of Cody, Macklen, Carman and Thomas townships.
See Ont. Dept. of Mines Prelim. Map P356, 1966.

74. Lovell, H., Ontario Dept. Mines:
Eby and Otto townships, District of Timiskaming, 1967-69.
See Eby township preliminary map; Ont. Dept. Mines, 1968.
Bourkes area, District of Timiskaming, 1965-69.
See Ont. Dept. Mines Prelim. Map P409, 1967.

75. Lumbers, S.B., Ontario Dept. Mines:
Burwash, North Bay, and Tomiko areas, Districts of Nipissing, Parry Sound, and Sudbury, 1964-70.
Reconnaissance mapping at 1 mile to 1 inch of a 6,000 square mile region in the northwestern part of the Grenville Province. Main emphasis is placed on the lithology and regional structure of this region which includes a portion of the Grenville Front. Geochronologic studies by T.E. Krogh, Carnegie Institution of Washington are also being carried out. See Ont. Dept. Mines Summary of Field Work, 1968.

76. Mackasey, W.O., Ontario Dept. Mines:
Dorothea, Sandra and Irwin townships, District of Thunder Bay, 1967-69.
1 inch to 1/4 mile mapping of geology and mineral deposits in part of the Sturgeon River gold belt. See Ont. Dept. Mines Prelim. Maps P479, P480, and P481, 1968.
Walter's and Leduc townships, District of Thunder Bay, 1968-69.
See Ont. Dept. Mines Summary of Field Work, 1968.

77. McIlwaine, W.H., Ontario Dept. Mines:
Leith-Corkill area, District of Timiskaming, 1968-70.
See Ont. Dept. Mines Summary of Field Work, 1968.
Gowganda area, District of Timiskaming, 1966-70.
A project to remap the Gowganda silver camp at a scale of 1 inch to 1/4 mile. The area includes Nicol, Haultain, Milner, and Van Hise townships. See Ont. Dept. Mines Summary of Field Work, 1968.

78. Meyn, H.D., Ontario Dept. Mines:
Grigg and Stobie townships, District of Sudbury, Ontario, 1967-69.
See Ont. Dept. Mines Summary of Field Work, 1968.
Roberts-Fraleck area, District of Sudbury, Ontario, 1966-68.
See Ont. Dept. Mines Summary of Field Work, 1967.

79. Middleton, R.S., Ontario Dept. Mines:
Magnetic survey of Robb-Jamieson townships, District of Cochrane, Ontario, 1968-69.
Detailed remnant magnetism and magnetic susceptibility control will be used in the interpretation of the map. Known geological information, other geophysical surveys and the interpreted magnetic map will be combined to give a "total coverage" geological map.

80. Milne, V.G., Ontario Dept. Mines:
Reeves-Kenocaming area, District of Sudbury, 1966-68.
The area includes the Reeves mine of the Canadian Johns-Manville Co. Ltd., which has recently commenced asbestos production and the iron ore deposit of the Kukatush Mining Corp. (Ontario) Ltd. See Ont. Dept. Mines Summary of Field Work, 1966 and 1967, Prelim. Maps P418, P419, P464, and P465.
Manitouwadge-Wawa compilation map (Manitouwadge Sheet), Districts of Algoma and Thunder Bay, 1966-68.

81. Pryslak, A.P., Ontario Dept. Mines:
Tustin-Bridges area, District of Kenora, 1967-69; M.Sc. thesis, Univ. of Manitoba.

82. Pyke, D.R., Ontario Dept. Mines:
Adams and Eldorado townships, District of Timiskaming, 1968-70.
Fallon and Fasken townships, District of Timiskaming, 1968-69.
See Ont. Dept. Mines Summary of Field Work, 1968.

Langmuir and Blackstock townships, District of Timiskaming, 1967-68.
See Ont. Dept. Mines Prelim. Maps P444 and P445.

83. Riley, R.A., Ontario Dept. Mines:
Mulcahy township (North Half), District of Kenora (Patricia Portion), 1968-69.
See Ont. Dept. Mines Summary of Field Work, 1968, and Misc. Paper No. 22, 1968.
Glasgow-Rennie area, Districts of Algoma and Sudbury, 1966-69.
See Ont. Dept. Mines Summary of Field Work, 1966, and Prelim. Report 1966-1.

84. Robertson, J.A., Ontario Dept. Mines:
Cutler area, District of Algoma, 1964-68.
See Ont. Dept. Mines Prelim. Maps P245, P246, P317, P318, P319, and P320.
Massey area, Districts of Algoma and Sudbury, 1966-69.
See Ont. Dept. Mines Prelim. Maps P377, P378 and P438.

85. Robertson, J.A., Card, K.D., Ontario Dept. Mines:
Geology and scenery, Sudbury-Sault Ste. Marie area, 1969-70.

86. Shklanka, R., Ontario Dept. of Mines:
Bruce Lake area, District of Kenora (Patricia Portion), 1966-69.
See Ont. Dept. Mines Prelim. Map P379.

87. Trowell, N.F., Ontario Dept. of Mines:
Watcumb-Clarkdon area, District of Kenora, 1968-69.

Prince Edward Island

88. Prest, V.K., Geol. Surv. Canada:
Geology of Prince Edward Island, 1953-70.
Includes the mapping of bedrock, glacial and postglacial deposits.
See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

Quebec

89. Allard, G.O., Quebec Dept. of Natural Resources (part time), Athens Univ.:
Northwest quarter, Lemoine township, District of Chibougamau, 1 inch to 1,000 feet, 1966-68.
The aim is a detailed study of the Lac Doré Complex and the Lac Chibougamau Pluton and a detailed survey of structures which might be worth exploring for ore deposits.

90. Baer, A.J., Geol. Surv. Canada:
Geology of the Precambrian Shield in the Rivière Gatineau map-area, Quebec and Ontario, 1968-.

91. Béland, J., Gentile, F., Univ. de Montréal:
Stratigraphie et structure du Dôme Lemieux, Co. Gaspé-Nord, Québec, 1966-68; thèse de maîtrise (Gentile).
Une revue des principaux problèmes géologiques de la région du Dôme Lemieux. Analyse de la tectonique, la sédimentation, et la mise en place des roches ignées.

92. Béland, J., Hocq, M., Univ. de Montréal:
Géologie de la région de St-Paulin (tectonique, pétrographie), 1965-68; candidat à la maîtrise (Hocq).
Ce projet met en évidence les relations spatiales entre les différents niveaux de gneiss et aussi entre les gneiss et les intrusions noritiques et quartzmonzonitiques. Une étude pétrographique et tectonique a été entreprise, précisant les relations temps/espace.

93. Chown, E.H., Loyola College:
Geology of the Otish Mountains, Quebec, 1963-70.
Includes basin analysis of Otish Mountains group (Proterozoic), petrology and geochemistry of Otish Mountains gabbro, and structure of the Otish Mountains.

94. de Römer, H.S., Quebec Dept. of Natural Resources:
Rivière Madeleine-Nord, townships of Lesseps, Deslandes, and Boisbuisson, county of Gaspé-Nord, 1 inch to 1,000 feet, 1966-.
Detailed mapping of the volcanic and sedimentary formations surrounding the McGerrigle granitic massif. Project was started on south side of the granitic mass in 1964 by J.L. Robert who carried it eastwardly in 1965 and 1966 (Prelim. Rept. 540, 549, and 562); the project was carried northward, on the west side of the intrusion, by P. Girard in 1965 (Prelim. Rept. 563); on the east side it is being carried northward since 1966 by H.S. de Römer (report on 1966 and 1967 field seasons to be published in 1969). The area is the site of important copper mineralizations.

95. Dimroth, E., Quebec Dept. of Natural Resources:
Central Labrador Trough, Quebec, 1963-74.
Current work includes stratigraphy of upper part of sequence, petrology of tholeiitic and spilitic gabbro, tectonics, post-tectonic carbonatite and kimberlite intrusions and extrusions and the study of metamorphic facies series east of the Trough. See The evolution of the central segment of the Labrador Geosyncline: Part I, Stratigraphy, facies and paleogeography; N.Jb. Geol. Paleont., Abh., vol. 132, 1, pp. 22-59, 1968.

96. Duquette, G., Mathieu, A., Quebec Dept. of Natural Resources:
Northwest quarter, McCorkill township, Chibougamau district, 1 inch to 1,000 feet, 1962-.
Part of a program which aims at mapping in detail an economically important section of the Chibougamau greenstone belt. See Northwest quarter of McKenzie township; Que. Dept. Nat. Res., Prelim. Rept. 573.

97. Globensky, Y., Quebec Dept. of Natural Resources:
Geology and micropaleontology of the Grondines map-area, St. Lawrence Lowlands, Quebec, 1968-69.

98. Hogarth, D.D., Wong, A., Univ. of Ottawa:
Geology of Hull township (south part), Quebec, 1959-; M.Sc. thesis (Wong).
Involves regional mapping and petrological investigations; emphasis on study of carbonatites; study of mica-bearing veins; and study of optical properties of micas (with G.H. Faye, Mines Branch).

99. Imreh, L., Quebec Dept. of Natural Resources:
Southwest quarter, Baby township, Temiskaming county, 1 inch to 1,000 feet, 1968-70.

Initial phase of a program of detailed mapping in an area of basic volcanic rocks intruded by granodiorite and quartz porphyry masses. The area is known to contain Cu and Ni mineralizations.

100. Kretz, R., Univ. of Ottawa:
Geology of the Otter Lake-Fort Coulonge area, Quebec, 1955-.
See Growth of phlogopite crystals in marble from Quebec; I.M.A. Symposium 1966, pp. 85-93, 1968.

101. Laurin, A.-F., Quebec Dept. of Natural Resources:
Manicouagan-Outardes River area, 1968-69.
Part of a program, started in 1965, designed to allow completion of mapping of the Grenville Province in Quebec by 1972. This program involves study of the increase in metamorphic grade in the Grenville rocks southeast of the Grenville Front and its relation to intrusions of massifs of the anorthosite-charnockitic suite.

102. MacIntosh, J.A., Quebec Dept. of Natural Resources:
Northeast quarter, Clericy township, District of Rouyn-Noranda, 1 inch to 1,000 feet, 1967-68.
Study of an area underlain by mafic to felsic flows and pyroclastic rocks and acid intrusions.

103. Osborne, F.F., Université Laval:
Geology of Province of Quebec, 1968-71.

104. Pouliot, G., Hocq, M., Université Laval:
Pétrologie et tectonique des roches Grenville de la région Pipmuacan (Est), 1968-71; thèse de doctorat (Hocq).

105. Rondot, J., Ministère des Richesses Naturelles du Québec:
Région du Lac Flamand, Québec, 1967-69.
Reconnaissance géologique à l'ouest de la rivière St-Maurice entre St-Michel-des-Saints et Sanmaur (Lac Flamand). Série charnockitique et groupes métasédimentaires de la province de Grenville.

106. Stevenson, I.M., Geol. Surv. Canada:
Northwest River map-area, Labrador and Quebec, 1 inch to 4 miles, 1965-70.
See Winokapau Lake - Lac Brûlé map-area; Geol. Surv. Can., Paper 67-69, 1969.

107. Taylor, F.C., Geol. Surv. Canada:
Operation Torngat, reconnaissance geology of northeastern Quebec and northern Labrador, 1966-70.

108. van de Walle, M., Quebec Dept. of Natural Resources:
Southwest quarter, Verneuil township, Val d'Or district, 1 inch to 1,000 feet, 1968-71.
Initial phase of a program of detailed mapping in an area of volcanic rocks, comprising rhyolitic masses, intruded by granitic massifs.

Saskatchewan

109. Bell, C.K., Geol. Surv. Canada:
Milliken Lake map-area, Saskatchewan, 1954-70.

A compilation of the results of detailed mapping carried out on Crackingstone Peninsula between 1954 and 1958. See Geol. Surv. Can., Map 11-1962.

110. Chakrabarti, A.K., Saskatchewan Dept. of Mineral Resources:
Trade Lake area (east half), 1968-69.
See Summary Rept. of Geological Surveys in Saskatchewan, 1968.

111. Johnston, W.G.Q., Saskatchewan Dept. of Mineral Resources:
Reindeer Lake South 64D-SW, Saskatchewan, 1968-70.
Initial program of compilation of previous mapping supported by aeromagnetic and geochemical studies, and detailed work with mineral deposits. See Summary Rept. of Geological Surveys in Saskatchewan, 1968.

112. Koster, F., Saskatchewan Dept. of Mineral Resources:
Burchnall Lake area (west half), 1968-70; Ph.D. thesis.
Part of regional study being carried out in the area north of Uranium City. See Summary Rept. of Geological Surveys in Saskatchewan, 1968.

113. Rath, U., Univ. of Alberta:
Petrology and economic mineralogy of the Janice Lake area, Saskatchewan, 1968-69; M.Sc. thesis.
Establishing a "type area" for certain metasedimentary assemblages associated with the Wallaston Lake trend, Saskatchewan. Description of the petrology and economic mineralogy associated with these rocks. Attempt at a correlation with previous work.

114. Scott, B.P., Saskatchewan Dept. of Mineral Resources:
Combe Lake area (west half), 1 inch to 1 mile, 1968-69.
See Summary Rept. of Geological Surveys in Saskatchewan, 1968.

115. Stauffer, M.R., Mukherjee, A.C., Ahuja, S., Univ. of Saskatchewan:
Geology of the Saskatchewan portion of the Canadian Shield, 1966-;
Ph.D. thesis (Mukherjee), M.Sc. thesis (Ahuja).

116. Wallis, R.H., Saskatchewan Dept. of Mineral Resources:
Dufferin Lake area (west half), 1 inch to 1 mile, 1968-69.
Study of metasedimentary succession in earlier Precambrian; also relation with overlying Athabasca Formation. See Summary Rept. of Geological Surveys in Saskatchewan, 1968.

General Problems

117. Berger, A.R., Pitcher, W.S., Univ. of Toronto:
Geology of Donegal, Eire, 1966-69.
See Caledonian chronology and structural development of northwestern Donegal, Eire; Geol. Soc. Amer., Annual Meeting 1968 (Mexico City).

118. Morton, R.D., Univ. of Alberta:
Geology of the Bamble Sector of the Fennoscandian Shield in southern Norway, 1961-70.
The work is providing the first large scale maps of the district and forms the basis of a thorough geochronological study. The

nature and origin of metalliferous ore deposits are being described and future exploratory geochemical and geophysical programs planned in conjunction with members of Trondheim University. The structural nature of the western margins of the Oslo graben is being reviewed. See The nodular metamorphic rocks from the environs of Kragerø, S. Norway; Norsk Geologisk Tidsskrift, vol. 45, pp. 1-20, 1965.

DATA STORAGE, RETRIEVAL AND MANIPULATION

119. Agterberg, F.P., Geol. Surv. Canada:
Markov processes in geology, 1967-.
See Computer techniques in geology; Earth Science Reviews, vol. 3, pp. 47-77, 1967.
Computer-oriented research on mineral deposits, 1967-.
The distribution of gold mines and its relationship to geology in the Noranda - Val d'Or area, Quebec is now under investigation. See Application of trend analysis in the evaluation of the Whalesback Mine, Newfoundland; Can. Inst. Min. Metal., Spec. vol. 9, pp. 77-88, 1968.

120. Bhattacharyya, B.K., Geol. Surv. Canada:
Quantitative interpretation of aeromagnetic data, 1962-.
At present investigations are being carried out to develop reliable methods of automatic compilation and treatment of high resolution aeromagnetic data recorded digitally on magnetic tape. The interpretation of small amplitude, short wavelength features observed in the data is also receiving a great deal of attention. See Some general properties of potential fields in space and frequency domain: a review; Geoexploration, vol. 5, pp. 127-143, 1967.

121. Carlson, V.A., Research Council of Alberta:
"HYDRODAT", data storage and retrieval system, 1967-.
"CARDEX" data storage system, 1956-.

122. Clark, D.A., Pasenkopf, W., Mobil Oil Canada Ltd.:
Geological well data system, 1969-70.
A geological well data system is being developed using a method of coding stratigraphic data which will allow for the recording of any stratigraphic section encountered together with a system of correlating tops. Provides for (1) re-interpretations and revisions of correlation without changing original data and (2) can be used to correlate with tops anywhere else in the world.

123. Clark, D.A., Solohub, J., Chi, J., Mobil Oil Canada Ltd.:
Discriminant function analysis of digital mechanical log data, 1968-69.
The purpose is to determine the feasibility and applicability of discriminant function analysis as an aid in distinguishing hydrocarbon from non-hydrocarbon bearing zones and distinguishing lithology types.
Application of man-machine interaction with the computer via 2250 CRT device to geological problems, 1967-.
A number of applications using the IBM 2250 CRT graphics unit are being developed. These include: (1) trend surface analysis

(completed March 1968); (2) lithofacies analysis (under development); (3) multivariate statistical analysis (latter half of 1969).

124. Clark, D.A., Solohub, J., Mobil Oil Canada Ltd.:
Multiple regression analysis of structural data, 1968-69.
An investigation of the possibility of using multiple regression to predict the occurrence of deep horizons from shallower horizons, and to investigate the significance (geologically) of anomalies encountered.

125. Dawson, K.R., Geol. Surv. Canada:
Development and supervision of geochemical data bank (Geodat), 1964-.
The backlog of rock and mineral analyses by the Geological Survey of Canada are now on master tapes and include analyses reported between 1956 and the end of December 1966. The master tape will be exhaustively tested and checked against data in conventional form. Retrieval requests will be acted on early in 1969.

126. Ek, J., Visiting Scientist, Geol. Surv. Canada:
Accumulation and statistical study of data on stream sediment geochemical anomalies in Nova Scotia, 1968.
A preliminary report on the distribution of copper, lead and zinc in stream sediments of parts of northeastern Nova Scotia has been submitted for publication in the Geological Survey paper series reports.

127. Kipling, R.W., Univ. of Saskatchewan:
Data processing for Precambrian ore deposits, 1968-69; M.Sc. thesis.

128. McGee, B.A., Geol. Surv. Canada:
To develop and coordinate the preparation of an index to geological data as a pilot study for a National Index, 1966-69.
Completion of pilot study by April 1, 1969, is proposed.

129. Paquet, R., Quebec Dept. of Natural Resources:
National Index of maps of Quebec, 1968-.
Preparation of an index of the maps published by the Department and those kept in the files in manuscript form.

130. Sinclair, A.J., Univ. of British Columbia:
Factor analysis applied to geochemical data, 1968-.

131. Smith, F.G., Univ. of Toronto:
Computation and plotting of crystal-liquid equilibria in multicomponent systems, 1963-73.
The number of significant papers, books, reports, etc., on salt systems with an alkali halide as a compound was found to be unexpectedly large. Approximately 2,200 items have been fully processed for selection and printing of bibliographic lists by computer, using Boolean combinations of descriptors of subject matter. This will be completed before proceeding with the data processing and plotting. See Machine plotting of liquidus data of binary and ternary salt systems; Canadian Mineralogist, vol. 9, pt. 2, pp. 180-190, 1967.
Grain growth in metamorphic rocks, 1965-73.
The extensive literature on grain growth is being searched and each item is being coded with descriptors of the subject matter for selection and printing of bibliographic lists by computer.

132. Sutterlin, P.G., DePlancke, J., Univ. of Western Ontario:
Development of a computer-processible file for mineral deposits data, 1968-71.

133. Sutterlin, P.G., May, R.W., Zodrow, E.L., Univ. of Western Ontario:
Statistical and numerical analysis of geological data, 1968-; thesis projects (May and Zodrow).
R.W. May is investigating statistical routines in an attempt to classify Pleistocene deposits on the basis of measurable till parameters and E.L. Zodrow is investigating the nature of data obtained from mineral assays in an attempt to ascertain how these data can be used in the prediction of ore grade.

134. Whitmore, D.R.E., Geol. Surv. Canada:
Development and supervision of mineral deposits data bank, 1968-.
Some 3,000 entries (deposits) were made in the file during 1968. Retrieval programs for various types of output are being developed.

ENGINEERING GEOLOGY

135. Barron, K., Coates, D.F., Gyenge, M., Hedley, D., Yu, Y., Mines Branch, Dept. of Energy, Mines and Resources:
Stability of slopes in rock, 1963-.
Areas under investigation include: the determination of stress distribution in typical slopes by iterative processes using computers; attempts to predict slope failures by applying fracture criteria to the results obtained from stress distribution studies; cooperative field studies of particular open pit mines to determine slope deformation under stable and unstable conditions; instrument development for measurements of both stresses and displacements in slopes; and field studies on the use of artificial support as a means of stabilizing slopes or as a means of increasing slope angle. See Planning of slopes in shale and other rocks; A.S.C.E. Water Res. Engin. Conf., Denver, Colorado, May 16-20, 1966.

136. Bozozuk, M., Burn, K.N., Crawford, C.B., Eden, W.J., Mitchell, R.J., Division of Building Research, National Research Council:
Geotechnical properties of eastern marine clay, 1951-.
Both field and laboratory studies are being conducted on the "Champlain Sea" clay of the St. Lawrence lowlands. Field studies are concerned with landslide occurrences, settlement observations of highway embankments and the effect of volume change due to seasonal variations in soil moisture. Attempts are also being made to measure the loading of piles due to negative skin friction caused by subsiding clay layers. Laboratory investigations are being continued on the stress deformation characteristics of the clay. See Quick clays of Eastern Canada; Eng. Geol., vol. 2, No. 4, pp. 239-265, 1968.

137. Brown, R.J.E., Division of Building Research, National Research Council:
Permafrost distribution in Canada, 1953-.
Observations on the occurrence of permafrost throughout the permafrost region of Canada, with emphasis on the southern fringe area, are being collected continuously by direct field observations, review of the technical literature, and reports from other individuals and agencies. Accompanying this collection of information is

the study of the climatic and terrain factors comprising the permafrost environment as a means of improving the understanding of and ability to predict the distribution and occurrence of permafrost. See Permafrost map of Canada; Can. Geogr. Jour., February 1968, pp. 56-63.

138. Chagnon, J.-Y., Quebec Dept. of Natural Resources:
Landslides and quick clays in Quebec.
The study of landslides and quick clays in a continuing project. Numerous samples were collected in 1967 and landslides were studied in 5 different localities.
Study of clays near Desbiens, Lake St-John area.
A seismic survey and a drilling program were carried out to learn something of the thickness and physical properties of the clays in the area. Samples will be studied for their mechanical behaviour and their possible use in the ceramics industry.
Dam site investigations - 6 sites in 1968.
Vane investigation and a large scale seismic survey were conducted in 1968.

139. Charlesworth, H.A.K., Gough, D.I., Univ. of Alberta:
Portage Mountain Damsite, Alberta, 1967-77.
Study of seismic activity associated with filling of the reservoir.

140. Hamilton, J.J., Division of Building Research, National Research Council:
Western Canada soils, 1960-.
Ground movements and soil moisture contents are being measured and compared with weather records at four locations in Manitoba and Saskatchewan in order to study climatic influences on these factors. A number of buildings are under observation to study the influence of ground movements on structures. See Settlement of an embankment on Leda clay; Can. Geotech. Jour., vol. V, No. 1, February 1968, pp. 17-28.

141. Johnston, G.H., Division of Building Research, National Research Council:
Observations at Inuvik, Northwest Territories, 1954-.
The evaluation of the performance of various engineering facilities, e.g. building foundations, airstrip, roads, utilidors, etc. constructed on permafrost were continued by means of ground temperature and pile movement surveys. Depth of thaw surveys at sites having different soil and surface cover conditions in undisturbed areas and under buildings were carried out. Observations of the ground thermal regime and strains in structural members of the new wharf at Inuvik - begun in 1966 were continued. Instrumentation for the study of a duct ventilated building foundation was installed and ground temperatures measurements begun.
Kelsey generating station - dyke studies, 1958-.
The performance of dykes constructed on permafrost in the southern fringe area of the permafrost region in northern Manitoba is being studied by means of ground temperature and dyke movement observations. See Dykes on permafrost, Kelsey generating station, Manitoba; 21st Can. Soil Mechanics Conf., Winnipeg, September 1968.
Permafrost at Thompson, Manitoba, 1961-.
Reconnaissance surveys including drilling and probing and terrain evaluation were carried out in the vicinity of Thompson to determine the occurrence and distribution of permafrost. Ground temperature and other instrumentation was installed at selected sites.

Observations of permafrost occurrence and the ground thermal regime were continued in the Thompson townsite by means of visual examination of conditions in excavations, soil sampling, and ground temperature measurements.

142. Johnston, G.H., Walt, G.L., Division of Building Research, National Research Council:
Anchorage in permafrost, 1965-.
Sustained load testing of grouted and screw type anchors installed in 1967 at a test site at Gillam, Manitoba was completed in 1968. Long term sustained load testing of similar anchors installed in 1967 at a test site at Thompson, Manitoba - begun in 1967 - was continued.

143. King, M.S., Univ. of Saskatchewan:
Mechanical state of rock approaching failure, 1967-72.
The initial aim of this research is to determine the static stress-strain relationships and acoustic wave velocities on rock samples approaching failure under triaxial loading conditions. The rock samples will be tested in a hydraulic compression machine which has been stiffened to eliminate machine "bounce" at failure of the rock sample. It is then proposed to perform harmonic analyses on microseismic "noise" produced when a rock approaches failure, both in the laboratory and underground in a mine. This research will lead to a better understanding of the mechanism of rock failure, with applications in the prediction of earthquakes.

144. Lajtai, E.Z., Jain, S.K., Univ. of New Brunswick:
Strength of discontinuous rocks, 1965-; M.Sc. thesis (Jain).
A continuing project investigating the strength of simulated discontinuous rocks (models) under direct shear and triaxial loading. Several subprojects investigating the direct shear strength of partially separated rock joints have been completed. Investigations of same in a triaxial stress field are underway. See Shear strength of weakness planes in rock; Inter. Jour. Rock Mech. and Min. Sci. (in press).

145. Locker, G., Research Council of Alberta:
Engineering properties of Upper Cretaceous-Tertiary shales in central Alberta, 1967-69; thesis project, Univ. of Alberta:

146. Lorberg, E., Univ. of Alberta:
Investigation of three-dimensional geometry of a landslide southwest of Edmonton, Alberta, 1967-69; M.Sc. thesis.

147. Neilson, J.M., Queen's Univ.:
Landsliding in clays, 1968-.
See Erosion of landsliding at Victoria Generating Station, Ontonagon county, Michigan; Geol. Soc. Amer., Eng. Geol. Div. Case Histories (in press).

148. Owen, E.B., Geol. Surv. Canada:
Engineering geology of dam sites and other construction projects, northwestern Ontario, 1967-69.
See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.
Engineering geology and mapping, Welland Canal, Ontario, 1962-72.
See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

149. Penner, E., Division of Building Research, National Research Council:
Ground temperatures and frost action, 1948-.
Studies of adfreezing of soils to foundations and subsequent heaving have been extended. See Particle size as a basis for predicting frost action in soils; Soils and Foundations, Japan (in press).

150. Pouliot, G., Loiselle, A., Ballivy, Ecole Polytechnique:
Minéralogie et propriétés géotechniques des argiles de la Baie James, 1968-70; thèse de maftrise (Ballivy).
Les travaux envisagés peuvent se subdiviser ainsi: minéralogie et composition chimique des argiles, etudes de diffraction-X pour déterminer le fabrique des argiles, propriétés géotechniques des argiles.

151. Pouliot, G., Loiselle, A., Nguyen duy Khiem, Ecole Polytechnique:
Minéralogie et propriétés géotechniques des argiles d'Outarde, 1967-69; thèse de maftrise (duy Khiem).
Les travaux envisagés peuvent se subdiviser ainsi: minéralogie et composition chimique des argiles, etudes de diffraction-X pour déterminer le fabrique des argiles, propriétés géotechniques des argiles.

152. Stauffer, M.R., Univ. of Saskatchewan:
Experimental rock deformation.

153. Tervo, R., Geller, L., Lyall, K., Mines Branch, Dept. of Energy, Mines and Resources:
Rock breakage, 1965-75.
The fracture characteristics of rock particles are being determined in a specially designed impact tester in which the size distributions after fracture can be controlled and reproduced. Studies of the combined effect of thermal and mechanically induced stresses are planned.

154. van Heerden, W.L., Grant, F., Mines Branch, Dept. of Energy, Mines and Resources:
Ground control (field studies relating to stress measurement), 1966-.
See A comparison of two methods for measuring stress in rock; Int. Jour. Rock Mech. Min. Sci., vol. 4, pp. 367-382, Pergamon Press Ltd., London (1967).

GEOCHEMISTRY

155. Abbey, S., Sen Gupta, J.G., Courville, S., Champ, W.H., Hill, F.C., Geol. Surv. Canada:
Analysis of rocks and minerals, 1938-.
See Analysis of rocks and minerals by atomic absorption spectroscopy, Part 2. Determination of total iron, magnesium, calcium, sodium and potassium; Geol. Surv. Can., Paper 68-20, 1968.

156. Armstrong, C.W., Edgar, A.D., Hutchinson, R.W., Piotrowski, J.M., Univ. of Western Ontario:
Mechanisms of genesis of complex zoned lithium pegmatites, and related studies, 1965-69; Ph.D. thesis (Armstrong).
Field and laboratory studies are aimed at finding a mechanism

by which the complex zoning pattern of certain lithium pegmatites, may be explained by crystallization and replacement within a restricted system. See $LiAlSi_2O_6$ (spodumene) transition from 5,000-45,000 lb./in^2 P_{H_2O}; Mineral Mag. Spec. I.M.A. vol., pp. 222-231, 1968.

157. Arnold, R.G., Malik, O., Univ. of Saskatchewan:
Phase equilibrium studies in the Fe-Ni-S system, 1966-70; Ph.D. thesis (Malik).
Phase equilibrium studies in the Fe-Ni-S system are being carried out at both high and low temperatures to aid in the interpretation of natural assemblages.

158. Azzaria, L.M., Université Laval:
The geochemistry of mercury applied to mineral exploration, 1969-70.
See A method of determining traces of mercury in geologic materials; Geol. Surv. Can., Paper 66-54, pp. 13-26, 1967.

159. Baragar, W.R.A., Goodwin, A.M., Geol. Surv. Canada; Moddle, D.A., Ontario Dept. Mines; Washington, R.A., Atomic Energy of Canada:
Trace gold content in Archean volcanic rocks, 1965-.
The trace gold content in Archean volcanic rocks of the Canadian Shield is being investigated by means of neutron activation techniques.

160. Baumann, A., Geol. Surv. Canada (N.R.C. Postdoctorate Fellow):
Geochemical study of black shales and associated sulphide deposits, 1968.
The purpose is the determination of metals in black shales in the eastern part of the Canadian Shield to evaluate their potential as low grade ore deposits. Other problems of interest are the relationship of these sediments to nearby ore deposits and the sedimentary processes and environment leading to the formation of these fine-grained sediments in Precambrian time.

161. Bell, K., Univ. of Toronto:
Sr isotope variations in crustal rocks, 1968-.
Acid lavas from East Africa will be analyzed. Data may give evidence for the source of the lavas and possibly provide information about the Sr^{87}/Sr^{86} ratios in the mantle beneath the East African crust.

162. Bird, G.W., Fawcett, J.J., Univ. of Toronto:
Stability of the muscovite-chlorite-quartz assemblage, 1968-71; Ph.D. thesis (Bird).
See Phase relationships of chlorites in the system $MgO-Al_2O_3-SiO_2-H_2O$; Amer. Mineral., vol. 51, pp. 353-380, 1966.

163. Boulay, R.A., Geol. Surv. Canada:
Sedimentological study of the Papaskwasati Basin, Quebec, 1968-.
A joint study with the Quebec Department of Natural Resources to investigate the sedimentology and geochemistry of the Basin, north of Lake Mistassini, Quebec. Information obtained from 32,000 feet of core is being used to outline the stratigraphy, sedimentology and possible geochemical trends in the Basin.

164. Boyle, R.W., Geol. Surv. Canada:
Lead and sulphur isotope geology of Keno and Galena Hills, Yukon Territory, 1958-69.

Geochemistry of gold deposits, 1965-70.

A detailed account of the geochemistry of gold and its deposits, with notes on geochemical prospecting for the element, is being prepared for publication.

Geochemical study of mineral deposits in Bathurst-Newcastle area, New Brunswick, 1957-.

A geochemical investigation of gossans in New Brunswick base metal area is now underway. See Geochemistry of Pb, Zn, Cu, As, Sb, Mo, Sn, W, Ag, Ni, Co, Cr, Ba, and Mn in the waters and stream sediments of the Bathurst-Jacquet River district, New Brunswick; Geol. Surv. Can., Paper 65-42, 1965.

165. Burwash, R.A., Univ. of Alberta:

Average crustal composition of the western Canadian Shield, 1965-70.

XRF analyses of individual rocks and composite samples are being compiled for the buried and exposed Shield areas of western Canada. These are being compared with physical properties to establish the relationship of magnetic and gravity surveys to regional petrology.

166. Cabri, L.J., Mines Branch, Dept. of Energy, Mines and Resources:

Phase equilibrium studies in the Cu-Fe-S, Ag-Sb-Hg, Fe-Co-Ni-As-S, Fe-S and related systems, 1965-.

To closely determine equilibrium relations, stability fields and conditions for metastable relations in sulphide systems, and thereby to further the knowledge of sulphide ore deposits. See A new copper-iron sulphide; Econ. Geol., vol. 62, pp. 910-925, 1967.

Sulphide synthesis, 1964-.

Sulphide minerals of closely controlled compositions are synthesized to provide material for other investigations, and to provide fundamental data on phase equilibrium relationships in certain sulphide systems. See Iron-iron interaction in iron-containing zinc sulphide; Can. Mineral., vol. 9, Pt. 4, pp. 453-467, 1968.

167. Caley, Wm., Roeder, P.L., Queen's Univ.:

Iron-nickel distribution between olivine and metal, 1967-69; M.Sc. thesis (Caley).

An experimental study to determine the distribution of Fe and Ni between a metallic phase and olivine in equilibrium with a basaltic melt. See The stability of olivine and pyroxene in the Ni-Mg-Si-O system; Amer. Mineral., vol. 53, 1968.

168. Cameron, E.M., Geol. Surv. Canada:

Geochemical study of Proterozoic Papaskwasati Group, Lake Mistassini, Quebec, 1968-69.

Samples collected from four drill cores which form an east to west section across the basin are being analyzed by direct-reading emission spectrometry.

Geochemistry of carbonate rocks, 1963-68.

See A geochemical profile of the Swan Hills Reef; Can. Jour. Earth Sci., vol. 5, p. 287, 1968.

169. Campbell, F.A., Univ. of Calgary:

Chemical and mineralogic composition of the Rainbow Formation, 1967-69.

X-ray diffraction and fluorescence analysis have been used to give a detailed analysis of the distribution of anhydrite, dolomite and calcite in the basin.

170. Campbell, F.A., Krouse, R., Lusk, J., Univ. of Calgary:
S-isotope partitioning in sulphide assemblages, 1965-71.
This is a continuing project involving studies of natural and synthetic materials with a view to determining the partitioning of S^{34}/S^{32} between various sulfide species. See A reconnaissance study of some western Canadian lead-zinc deposits; Econ. Geol., vol. 63, No. 4, pp. 349-359, 1968.

171. Cermignani, C., Univ. of Toronto:
Geochemistry of the marbles in the Tweed area, 1968-69; M.Sc. thesis.

172. Cholach, M.S., Morton, R.D., Univ. of Alberta:
A geochemical and mineralogical study of certain silver-rich galena-anglesite veins in the 60 mile district, Yukon Territory, 1968-69; M.Sc. thesis (Cholach).
A geochemical soil-survey has been initiated within the 60 mile district to facilitate a study of the distribution of silver-rich galena-anglesite veins within the metamorphic sequence. The mineralogy of the ore-deposits is being studied to determine their primary constituents and the effect of secondary oxidation.

173. Coleman, L.C., Smith, J.R., Univ. of Saskatchewan:
Bedrock geochemistry, Hanson Lake area, Saskatchewan, 1962-70.
See Preliminary Report in the geology of the Hanson Lake west area, Saskatchewan, Part 2. Interior geochemical results; Sask. Res. Council, Geol. Div., Circular 2, 1966.

174. Colwell, J.A., Acadia Univ.:
Petrology and geochemistry of Triassic basalt, Nova Scotia, 1968-70.
A study of chemical variation and differentiation within and among the flows with emphasis on mineral occurrences (e.g. copper) as they relate to the petrology and chemistry of the basalts.

175. Crerar, D.A., Univ. of Toronto:
Solubility of quartz in NaOH solutions at high temperatures, 1967-68; M.Sc. thesis.

176. Crocket, J., McMaster Univ.:
Platinum metal geochemistry of meteorites, 1966-70.
See Precious metal abundances in some carbonaceous and enstatite chondrites; Geochim. et Cosmochim. Acta, vol. 31, p. 1615, 1967.

177. Crocket, J., Chyi, L., McMaster Univ.:
Platinum metal geochemistry at the Strathcona Mine, Sudbury, Ontario, 1964-70; Ph.D. thesis (Chyi).
Platinum metal geochemistry at the Mt. Albert dunite, Gaspé, Quebec, 1965-68; M.Sc. thesis (Chyi).

178. Crocket, J., Schwarcz, H., Burnie, S., McMaster Univ.:
Sulfur isotope geochemistry of the White Pine copper deposit, 1967-70; M.Sc. thesis (Burnie).

179. Currie, K.L., Geol. Surv. Canada:
Geochemistry of Canadian craters, 1966-68.
The project compares the composition of igneous rocks to those of crater country rocks to evaluate the hypothesis that the igneous rocks result from wholesale melting of the country rocks. See On the geochemistry of some large Canadian craters; Nature, vol. 218, p. 457, 1968.

180. Currie, K.L., Ermanovics, I.F., Geol. Surv. Canada:
Diffusion studies in supercritical water, 1962-70.
Currently, water rich parts of the system Q-Or-Ab-H_2O are being investigated. A theoretical study of transport phenomena in dense fluids is continuing. See On the solubility of albite in supercritical water; Amer. Jour. Sci., vol. 266, p. 321, 1968.

181. Darling, R., Ecole Polytechnique:
Geochemical exploration in the Preissac-Lacorne area, Quebec, 1968-70.
Study of trace element distributions in minerals separated from granitic rocks which are related to pegmatitic and hydrothermal vein concentrations of Li, Mo, Be. Analysis of water, stream sediments, and soils for selected elements that may be useful in surficial geochemical exploration for such metal concentrations.

182. Davies, J.L., New Brunswick Dept. of Natural Resources:
Geology and geochemistry of the volcanic rocks of the Tetagouche Group, New Brunswick, 1964-70.

183. de Albuquerque, C.A.R., Shaw, D.M., McMaster Univ.:
Investigations on the geochemistry of thallium, 1968-69.
Distribution of thallium in rocks, minerals and meteorites, abundances of thallium in the earth's crust, mantle, and in meteorites. See The geochemistry of Ga, In and Tl; Phys. and Chem. of Earth, vol. 2, pp. 164-211, 1957.

184. Delavault, R.E., Manson, R.J., Univ. of British Columbia:
Spectrographic analytical methods for trace elements in rocks, soils and plants, 1967-70.
Current investigations are on spark spectroscopic determination of trace elements after solvent extraction.

185. Descarreaux, J., Université Laval:
Etude géochimique des roches volcaniques de l'Abitibi, 1967-70; thèse de doctorat.
La région étudiée s'étend de Cadillac à Matagami. La teneur des éléments majeurs et de quelques éléments mineurs sera déterminée.

186. Dostal, J., McMaster Univ.:
The concentration and distribution of rare earths in coexisting skarn minerals, 1968-69; M.Sc. thesis.

187. Dyck, W., Geol. Surv. Canada:
Development of radiochemical exploration methods using radon, 1968-69.
See Radon-222 emanations from a uranium deposit; Econ. Geol., vol. 63, pp. 288-289, 1968.

188. Eade, K.E., Fahrig, W.F., Geol. Surv. Canada:
Element abundances in the Canadian Shield, 1962-69.
See The chemical evolution of the Canadian Shield; Can. Jour. Earth Sci., vol. 5, pp. 1247-1252, 1968.

189. Edgar, A.D., Mottana, A., Church, W.R., MacRae, N.D., Univ. of Western Ontario:
Geochemistry and petrology of eclogites, 1966-70.
See Chemistry, mineralogy and petrology of an eclogite from

the type locality (Sanalpe, Austria); Contrib. Min. Pet., vol. 18, pp. 338-346, 1968.

190. Emslie, R.F., Geol. Surv. Canada; Lindsley, D.H., Geophysical Laboratory, Washington, D.C.:
Experimental studies bearing on the genesis of anorthositic instrusions, 1967-.
Experimental investigations designed to shed light on the origin of anorthositic rocks. See Effect of pressure on the boundary curve in the system diopside-albite-anorthite; Ann. Rept., Geophysical Lab., Carnegie Institution of Washington, Yearbook 66, pp. 479-480, 1968.

191. Emslie, R.F., Geol. Surv. Canada: Roeder, P.L., Queen's Univ.:
Olivine - liquid equilibrium in basaltic melts, 1966-69.
The distribution of iron and magnesium between olivine and liquid in basaltic melts has been investigated experimentally and compared with distribution data from natural lavas. The results have an important bearing on understanding iron enrichment processes during fractional crystallization of basaltic magmas.

192. Farquhar, R.M., Univ. of Toronto:
Lead isotope variations in Canadian Shield galenas, 1960-.
A preliminary study of lead isotope ratios in galenas from Grenville rocks and overlying sediments has been completed. A search will be started in the Superior provinces for evidence of the ancient ($>4 \times 10^9$ yr.) event observed in Yellowknife galenas. See Lead isotope ratios from the Cobalt-Noranda area, Canada; Can. Jour. Earth Sci., vol. 2, p. 361, 1965.

193. Fawcett, J.J., James, R.S., Univ. of Toronto:
Stability of the Mg-Fe chlorites, 1966-69.
See Phase relationships of chlorites in the system MgO-Al_2O_3-SiO_2-H_2O; Amer. Mineral., vol. 51, pp. 353-380, 1966.

194. Fleet, M.E.L., Univ. of Western Ontario:
Geochemistry and structure of sulphide minerals, 1967-.
A crystal structure analysis of the hexagonal 3A,2C pyrrhotite is in progress. See The superstructures of two synthetic pyrrhotites; Can. Jour. Earth Sci., vol. 5, No. 5, p. 1183, 1968.

195. Folinsbee, R.E., Baadsgaard, H., Cumming, G.L., Krouse, R.H., Sasaki, A., Fritz, P., Rich, A., Univ. of Alberta:
A study of carbonatites using isotope methods, 1966-68.

196. Folinsbee, R.E., Baadsgaard, H., Cumming, G.L., Krouse, R.H., Smith, D.G.W., Sasaki, A., Univ. of Alberta:
Study of Canadian meteorites, 1960-.
Recovery and description of meteorites using sophisticated techniques (photographic and seismic tracking; electron microprobe, chemical, X-ray and isotopic methods of study.

197. Folinsbee, R.E., Cumming, G.L., Krouse, R.H., Baadsgaard, H., Sasaki, A., Fritz, P., Jackson, S.A., Greig, J., Univ. of Alberta:
Stratiform lead zinc deposits of the world, 1965-71; Ph.D. theses (Jackson and Greig).
Special emphasis on telethermal lead zinc occurrences in carbonate basins (Pine Point, Mississippi Valley, Waulsortian Bank of Ireland, Silesia (Poland); employing isotopic methods of investigation, oxygen, carbon, sulfur, and lead.

198. Garrett, R.G., Geol. Surv. Canada:
Geochemical study of economic elements in glacial till, 1968-69.
The application of soil, till and stream sediment sampling and chemical analysis as an exploration tool is being investigated. During the summer of 1968 a detailed study was made in the Manitouwadge area, Ontario which underlined the need for close cooperation between geochemist and Pleistocene geologist.

199. Gélinas, L., Ecole Polytechnique:
Etude Géochimique des meta-gabbros et des amphibolites des régions des Lacs Thevenet, Gabriel et Fort Chimo, Nouveau-Québec, 1966-70.
Etude de la composition chimique des méta-gabbros et des amphibolites, étude de la répartition des éléments majeurs entre les minéraux en fonction de l'accroissement du métamorphisme; application de la loi de Nernst.

200. George, P.T., Jolliffe, A.W., Queen's Univ.:
A geochemical study of ores and rocks in the Porcupine-Kirkland Lake area, 1962-69; M.Sc. thesis (George).

201. Gibb, F.G.F., Univ. of Toronto:
Experimental investigations of the phase relations and partial fusion of natural and synthetic peridotites, 1966-.
Natural and synthetic ultrabasic rocks are being studied experimentally under conditions of controlled oxygen fugacity at varying total pressures and the experimental products are studied analytically by means of the electron microprobe.
Petrological, mineralogical and experimental studies on ultrabasic minor intrusions, 1963-.
Current research is being concentrated principally on analytical (electron microprobe) studies of the mineralogy and experimental studies of the phase relations of Tertiary dykes from the Isle of Skye. See Flow differentiation in the xenolithic ultrabasic dykes of the Cuillins and the Strathaird Peninsula, Isle of Skye, Scotland; Jour. Petrol., vol. 9.

202. Gibson, S., Shaw, D.M., McMaster Univ.:
Strontium partition in the diopside-anorthite system, 1968-69; M.Sc. thesis (Gibson).
Experimental crystallization of liquid and solid phases containing Sr, with E.M.P. analyses to measure partition ratios.

203. Gill, J.E., McGill Univ.:
Behaviour of sulphides at elevated temperatures and pressures, 1955-.
See Recent research on sulphides at McGill University; Can. Inst. Min. & Metall., Bull., vol. 58, No. 641, pp. 994-997, 1965.

204. Gillieson, A.H.C.P., Dibbs, H.P., Moloughney, P.E., McMahon, C., Mines Branch, Dept. of Energy, Mines and Resources:
Determination of gold at the parts per billion level in rocks by neutron activation analysis combined with fire-assay preconcentration, 1968-69.

205. Gillieson, A.H.C.P., McMahon, C., Mines Branch, Dept. of Energy, Mines and Resources:
Direct determination of oxygen in rocks and minerals by activation analysis using a fast-neutron generator, 1967-71.

Fast-neutron activation is virtually the only method for the direct determination of oxygen in materials. The present work is directed towards improving the precision of neutron activation analysis, particularly for high contents of oxygen, such as occur for example in silicates.

206. Goodwin, A.M., Geol. Surv. Canada:
Sulphur isotope abundances in Archean volcanic and sedimentary rocks, 1965-.
This program is an outgrowth of related studies of sulphur isotope abundances in the Michipicoten and Woman River iron formations of Ontario recently completed in collaboration with H.G. Thode and J. Monster of McMaster University.

207. Govett, G.J., Univ. of New Brunswick:
Sedimentary geochemistry of iron, 1964-.

208. Grieve, R.A.F., Fawcett, J.J., Univ. of Toronto:
Phase relations of chloritoid at water pressures up 10 kb., 1967-70.

209. Gunn, B., Ambrosii, G., Univ. of Montreal:
Geochemistry of the granitic complex, Chibougamau region, Quebec, 1968-70; Ph.D. thesis (Ambrosii).
Samples were recently collected from four batholiths, the Bourbeau Mountain, Chibougamau Lake, Opemisca Lake and Obatagamau Lake batholiths. The rocks are potassium-poor diorites, tonalite quartz tonalite, and soda granodiorite. Conclusions may be drawn as to the nature of the primitive Archean crustal composition.

210. Gunn, B., Brooks, C., Univ. of Montreal:
Geochemistry of the Noranda metavolcanics, 1968-.

211. Gunn, B., Univ. of Montreal; Carmen, M., Univ. of Houston:
The petrology and geochemistry of the West Texas igneous province, 1966-.

212. Gunn, B., Univ. of Montreal; Combs, D.S., Univ. of Otago, New Zealand:
Geochemistry of Pitcairn Island, South Pacific, 1966-.
A series of alkali basalts, hawaiites, mugearites, trachytes, are highly differentiated, and similar to those of New Zealand and Samoa. The end members are of two types, quartz bearing and nepheline bearing. The place of certain basanitic rocks is uncertain and more work may have to be done.

213. Gunn, B., Univ. of Montreal; Duquette, G., Quebec Dept. of Natural Resources:
Geochemistry of the Chibougamau metavolcanics; 1967-.
Seventy samples collected in the Chibougamau area have been analysed. These volcanics are of pre-Kenoran age (2.5 billion years) and consist of tholeiitic lavas and intercalated tuffaceous greywackes. Metamorphism to the greenschist facies together with thermal metamorphism in zone concentric about younger diorite-tonalite batholiths have resulted in albitisation of feldspar and chloritisation of olivine pyroxene.

214. Gunn, B., Watkins, N., Univ. of Montreal:
Geochemistry of Steen basalts, Oregon, 1967-.

215. Gunn, B., Watkins, N., Haskin, M., Univ. of Montreal:
Geochemistry of Icelandic lavas and dikes, 1966-69.
See The petrochemical effect of the simultaneous cooling of acid and basic magmas; Geochim. Cosmoch. Acta (in press).

216. Haughton, D., Roeder, P.L., Queen's Univ.:
Solubility of sulphur in basaltic melts, 1967-70; Ph.D. thesis (Haughton).
A experimental study to determine the solubility of sulphur in basaltic melts as a function of oxygen and sulphur fugacity.

217. Hill, R., Roeder, P.L., Queen's Univ.:
Stability of spinel in basaltic melts, 1964-68; Ph.D. thesis (Hill).
An experimental study to determine the stability and composition of the chromite magnetite solid solution in basaltic melts as a function of oxygen fugacity and temperature. See Stability of spinel in basaltic melts; Abstract, Geol. Soc. Amer. Meeting, 1967.

218. Hitchon, B., Research Council of Alberta (in cooperation with agencies in Calgary, Denver, Berkley and Louisiana):
Geochemistry of formation waters, oils and gases, Western Canada - a continuing project.
Two papers on fluid flow in Western Canada (Water Resources Research), and one in a special volume on geochemistry of brines, are in press. See Geochemistry of natural gas in Western Canada; Amer. Assoc. Petrol. Geol., Mem. 9, pp. 1995-2025, 1968.

219. Hornbrook, E.H.W., Geol. Surv. Canada:
Development of biogeochemical exploration methods for metallic mineral deposits for winter use, 1968-69.
The effectiveness of new and modified biogeochemical exploration methods in detecting the silver vein deposits at Silverfields Mining Corp. Ltd., Hi Ho Silver Mines Ltd., and Agnico Silver Mines Ltd., in the Cobalt, Ontario area, was evaluated during the summer of 1968. Approximately 2,000 soil and vegetation samples were collected, prepared, and analyzed in field laboratories. The samples were analyzed for Ag, Co, Ni, Mn, Cu, Pb, and Zn content. A preliminary examination of the results shows that these elements are preferentially concentrated in the A rather than the B horizon. Certain elements are also preferentially concentrated in specific organs of white birch and trembling aspen. Anomalous areas can be correlated with the position of the silver bearing veins on each of the three properties. See Biogeochemical prospecting for molybdenum in west-central British Columbia; Geol. Surv. Can. (in press).

220. Iwasaki, H., Bright, N.F.H., Rowland, J.F., Webster, A.H., Mines Branch, Dept. of Energy, Mines and Resources:
Studies in the titanium-oxygen system, 1965-68.
This study was aimed at elucidating certain outstanding problems in the behaviour of compositions close to the stoichiometric TiO composition, which exhibit somewhat unusual stability relationships with varying temperature and the polymorphic behaviour of the oxide Ti_3O_5, one form of which is closely related to the minerals pseudobrookite, $Fe_2O_3.TiO_2$ and anosovite, a substituted Ti_3O_5. See The Polymorphism of the oxide Ti_3O_5; Jour. of the Less-Common Metals (in press).

221. James, R.S., Fawcett, J.J., Univ. of Toronto:
Stability and phase relations of the intermediate Mg-Fe chlorites, 1967-69.
In the present study a complete range in the FeO/MgO ratio of chlorites between clinochlore and daphnite will be examined at pressures to 100 kilobars; a variety of buffers will be used to establish known oxygen fugacity conditions in the system.

222. Jensen, L.S., Univ. of Saskatchewan:
Geology and trace elements of Melba and Bisley townships, Ontario, 1968-69; M.Sc. thesis.

223. Jongejan, A., Wilkins, A.L., Mines Branch, Dept. of Energy, Mines and Resources:
High-temperature phase equilibrium studies in the system CaO-Nb_2O_5-TiO_2-SiO_2 and the relevant subsystems, 1962-69.
Study of the range of temperature and compositional stability leading to the formation of niobium-bearing perovskite, titanium-bearing pyrochlores, etc. The studies in the four-component system have furnished an explanation of the non-occurrence of sphene, $CaO.TiO_2.SiO_2$, in the Oka, P.Q., deposits, although all the requisite constituent oxides are present.

224. Kemp, A.L.W., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Great Lakes sediment organic program, 1967-.
Chemical studies are being made to identify the organic materials in the sediments of Lakes Ontario, Erie and Huron. Surface samples are collected by Shipek samplers and a geological description of the sample, measurement of pH and Eh of the sediment made onboard ship. Subsamples are taken for chemical analysis and stored at $0^{\circ}C$ and analyzed in shore laboratories. Deeper samples are being taken with piston and gravity corers and treated as the surface samples.

225. Kim, K.T., Burley, B.J., McMaster Univ.:
The system of nepheline-albite-orthoclase at 6KB water pressure, 1967-71; Ph.D. thesis (Kim).
The investigation is designed to shed light on the role of analcite in determining the shape of the liquidus of the system at high water pressures.

226. King, L.H., Rashid, M.A., Bedford Institute, Dartmouth, Nova Scotia:
Organic geochemistry.
In an attempt to characterize organic matter associated with the sediment samples from the Scotian Shelf, the organic extracts are being examined for their functional group content, specifically carboxyl, phenolic and alcoholic hydroxyls and carbonyls, and for molecular weight distribution. Results indicate that in general the marine material has lower acidic properties, higher carbonyl group content and higher molecular weight compared to organic matter of soils and coals. See Molecular weight distribution measurements on humic and fulvic acid fractions from marine clays on the Scotian Shelf; Geochemica et Cosmochimica Acta (in press).

227. Kirkham, R.V., British Columbia Dept. of Mines and Petroleum Resources:
Mineralogical and geochemical study of the zonal distribution of ores in the Hudson Bay Range, British Columbia, 1963-68.
A study of a typical hypogene-zoned mining district to determine what geologic processes may have been responsible for the zoning. See British Columbia Minister of Mines 1966 Ann. Rept., pp. 86-91.

228. Kliske, A.E., Chevron Standard Ltd.:
Evaporite rock petrography and geochemistry, 1966-.

229. Kramer, J.R., McMaster Univ.:
Nutrient enrichment studies, Great Lakes, 1958-.
See Chemistry and water quality, Great Lakes; Spec. Publ. Am. Soc. Civil Eng. and Eng. Inst. of Can., 1968.
Thermodynamic properties of minerals in sedimentary environment, 1960-.
See Mineral water equilibria in silicate weathering; XXIII Int. Geol. Cong., Prague, Proc. vol. 6.

230. Kramer, J.R., Houston, Wm., McMaster Univ.:
Nucleation of $CaCO_3$'s with respect to amino acids, 1968-69.

231. Kretschmar, U., Clark, L.A., McGill Univ.:
Subsolidus phase relations of arsenopyrite, 1968-70; Ph.D. thesis (Kretschmar).
It is hoped to refine and extend to lower temperatures the arsenopyrite solvus curves and clarify the role of this mineral in applied temperature and pressure studies.

232. Kuo, H., Crocket, J., McMaster Univ.:
Platinum metal geochemistry of deep sea sediments, 1967-70; M.Sc. thesis (Kuo).
A study of platinum metals in deep sea pelagic sediments designed to look for evidence of platinum metals of cosmogenic origin. See Palladium, iridium and gold of interplanetary origin in deep-sea manganese nodules; Geochim. Cosmochim. Acta, vol. 32, 1968.

233. Lachance, G.R., Geol. Surv. Canada:
X-ray emission analysis, 1960-.
A comprehensive investigation on the calculation of fundamental coefficients from basic principles that could be used to correct for inter-elemental effects in X-ray emission analysis is almost completed. See A practical solution to the matrix problem in X-ray analysis; Canadian Spectroscopy, vol. 11, No. 2 and 3, 1966.

234. Lake, R.H., Bright, N.F.H., Mines Branch, Dept. of Energy, Mines and Resources:
Studies in the tin-oxygen system, 1967-69.

235. Ledoux, R., Université Laval:
Etude de la décomposition de la muscovite, de la phlogopite et de la biotite, 1968-70.
Les micas sont décomposés par des traitements avec NaCl - Na T P B (tétrapphenyl-bore-sodium) en y perdant les cations interlamellaires. Les phases de décomposition sont étudiées par rayons-X et par infrarouge.

236. Lerbekmo, J.F., Univ. of Alberta:
Chemical correlation of bentonites in the Edmonton Formation, central Alberta, 1966-70.

237. Levinson, A.A., Univ. of Calgary:
Geochemistry and mineralogy of the Mackenzie drainage basin, 1967-.
All aspects of the chemistry of the waters, nature of the clay minerals being transported and deposited in the delta, etc., are

being considered. See Major element composition of the Mackenzie River at Norman Wells, N.W.T., Canada; Geochim. Cosmochim. Acta (in press).
Hydrothermal syntheses at low temperatures and pressures, 1967-.
Mineral reactions and transformations (particularly those involving clay-carbonates-quartz minerals) at temperatures and pressures approximating burial of sediments in deltas. See Low temperature hydrothermal synthesis of montmorillonite, ammonium-micas, and ammonium-zeolites; Earth and Planetary Science Letters (in press).

238. Liberty, B.A., Univ. of Guelph:
Detailed study of Paleozoic carbonate rocks, southern Ontario, 1966-.
To determine identity and relative abundance of trace elements with application to soil micronutrients and medical research.

239. Liu, C., Memorial Univ. of Newfoundland:
Geochemistry of a bog in the vicinity of a geochemical anomaly, 1967-68; M.Sc. thesis.

240. Manconi, J.W., Loyola College:
Thermoluminescence of natural zircons (low temperation) and origin of Tl in the ZiO_2-SiO_2 system, 1968-.

241. McCartney, W.D., Callahan, J., Queen's Univ.:
Research in exploration geochemistry, 1968-69; Ph.D. thesis (Callahan).
Use of trace element contents of the magnetic and non-magnetic heavy mineral separates from stream sediments in evaluating mineral potential in an area near Churchill Falls, Labrador. See Preliminary application of heavy mineral analyses to metallogeny of Carboniferous areas, Nova Scotia and New Brunswick; Geol. Surv. Can., Paper 64-29, 1964.

242. McDougall, D.J., Loyola College:
Thermoluminescence of geological material, chemical reactivity and thermoluminescence, geothermometry by thermoluminescence and "tunneling" processes in fluorite, 1963-70.
See A "Lattice Defect-Free Energy" approach to replacement processes in ore deposition; Econ. Geol., vol. 63, pp. 671-681, 1968.

243. Moore, J.C.G., Mount Allison Univ.:
Rock geochemistry as an aid in the search for orebodies in New Brunswick, 1963-70.
Study of the distribution of trace elements around base metal sulphide deposits in northern New Brunswick; usefulness of mercury halos is being investigated.

244. Morse, R.H., McCartney, W.D., Queen's Univ.:
Geochemistry of radar and radium in the surficial environment, 1968-69; Ph.D. thesis (Morse).
The geochemical dispersion of the uranium decay products radium and radon is being studied in the Bancroft area. Radon is abundant in surface water, while radium is concentrated in associated sediments. The objective is to determine whether all the radon is coming from the sediments or if some is coming from uranium concentrations in rocks. Geochemical prospecting applications will be stressed.

245. Muysson, J.R., Shaw, D.M., McMaster Univ.:
Calibration of geochemical standard samples.

Continued analytical efforts to improve on the knowledge of major and trace element abundances in widely used reference standard rocks and minerals.

246. Naldrett, A.J., Univ. of Toronto; Brown, G.M., Univ. of Durham:
Study of chemical equilibria between Fe-Mg pyroxenes and Fe sulfides, 1967-70.
By studying tie-line relations between sulfides and pyroxenes as a function of oxygen fugacity and temperature it will be possible to establish the extent to which sulfides have equilibrated with their host rocks and hence determine whether they are magmatic or hydrothermal. See Reaction between pyrrhotite and enstatite-ferrosilite solid solutions; Ann. Rept. Director Geophysical Laboratory, Carnegie Institution of Washington, Year Book '66, pp. 427-429.

247. Naldrett, A.J., Clarke, T., Univ. of Toronto:
Study of chemical equilibria between Fe-Ni olivines and Fe-Ni sulphides, 1968-70; M.Sc. thesis (Clarke).
The purpose is to investigate tie-line relations between Fe-Ni olivines and Fe-Ni sulfides at different oxygen pressures with a view to determining whether subsolidus reactions between natural olivines and sulfur-bearing solutions can give rise to economic deposits of Fe-Ni sulfides.

248. Nebesar, B., Mines Branch, Dept. of Energy, Mines and Resources:
High-precision chemical analysis of sulphidic materials - differential spectrophotometric determination of sulphur, 1965-69.
See Differential spectrophotometric determination of sulphur; Paper No. 4, 1968 Pittsburg Conf. on Analytical Chemistry and Applied Spectroscopy, March 3 to 8, 1968, Cleveland, U.S.A.

249. Nriagu, J.O., Univ. of Toronto:
Solubility of galena under hydrothermal conditions, 1967-69; Ph.D. thesis.

250. O'Nions, R.K., Smith, D.G.W., Baadsgaard, H., Morton, R.D., Univ. of Alberta:
Geochemical factors in isotope geology, 1961-.
Includes U-Pb systematics in sphene-zircon-monazite assemblages, Rb-Sr thermal migration in granite and effects of weathering and diagenesis on Rb-Sr and K-Ar systems in bentonite materials.

251. Perrault, G., Ecole Polytechnique:
Analytical methods for trace element studies of rocks, 1965-68.
Analytical methods of determination of trace element constitution of rocks are being tested: atomic absorption spectrophotometry, X-ray fluorescence, colorimetric and emission spectrography. See Spectrophotométrie d'absorption atomique: une mise en garde sur la préparation des étalons de comparaisons; Canadian Spectroscopy, vol. 11, No. 1, January 1966.

252. Petruk, W., Mines Branch, Dept. of Energy, Mines and Resources:
Mineralogy and geochemistry of the silver deposits in the Cobalt and Gowganda areas, Ontario, 1964-69.
A study of the sulphides and sulph-antimonides to determine the varieties of minerals present, to establish the compositions and physical properties of those that can have variable compositions, and to correlate them with the mineralogical and geological characteristics of the deposits. See Mineralogy and origin of the Silverfields silver deposit in the Cobalt area; Econ. Geol. 63, pp. 512-531, 1968.

253. Platt, R.G., Sood, M.K., Edgar, A.D., Univ. of Western Ontario:
Phase relations in the systems diopside ($CaMgSi_2O_6$) - albite ($NaAlSi_3O_8$) - leucite ($KAlSi_2O_6$) and diopside ($CaMgSi_2O_6$) - nepheline ($NaAlSiO_4$) - sanidine ($KAlSi_3O_8$) from 1 atm to 1 kb P_{H_2O}, 1968-70; Ph.D. theses (Platt and Sood).
These systems form joins in the system diopside - nepheline - kalsilite - silica and the object is to study the effect of diopside on the residual liquidus in the undersaturated part of the nepheline - kalsilite - silica system. Results of the phase relations will be used to explain genesis of undersaturated alkaline rocks and the formation of pseudoleucites.

254. Rambaldi, E., Univ. of Ottawa:
Study of feldspars and muscovite in metamorphic rocks of the Oak Lake-Tangamong Lake area, Peterborough-Hastings district, Ontario, 1966-69; Ph.D. thesis.
Chemical (atomic absorption) analysis of coexisting plagioclase, potash feldspar, and muscovite and determination of the distribution of sodium, potassium and other elements among these minerals.

255. Reeve, D.A., Bright, N.F.H., Mines Branch, Dept. of Energy, Mines and Resources:
High-temperature phase-equilibrium studies in the system $CaO-Ta_2O_5-SiO_2$, 1966-68.
See Phase relations in the system $CaO-Ta_2O_5-SiO_2$; Annual Meeting, American Ceramic Society, Chicago, April, 1968 (Rept. No. MS-PP-68-14).

256. Ripley, L.G., Mines Branch, Dept. of Energy Mines and Resources:
Growth of single crystals of base metal sulphides of controlled composition, 1964-.
The program which originated with the growth of cubic zinc sulphide has expanded to include hexagonal zinc sulphide and the cubic disulphides of iron, nickel and cobalt. Investigational work involving the other sulphides of iron, nickel and cobalt as well as the sulphides of copper and manganese is underway. The main growth techniques used have been vapour transport, chemical vapour transport, hydrothermal and flux. In the near future, the arsenides and the arsenosulphides of iron, nickel and cobalt will be attempted.

257. Roeder, P.L., Queen's Univ.:
Distribution of elements between co-existing phases in basaltic melts, 1964-.
See Experimental data for the systems $MgO-FeO-Fe_2O_3-CaAl_2Si_2O_8-SiO_2$ and their petrologic implications; Am. Jour. Sci., vol. 264, pp. 428-480, 1966.

258. Rojkovic, I., Jolliffe, A.W., Queen's Univ.:
Geochemistry of U-Ag-Co-Ni-Bi veins, 1968-69.

259. Schwarcz, H., Shieh, Y.-N., McMaster Univ.:
Oxygen isotope study of ancient evaporitic sulphates, 1968-69.

260. Shieh, Y.-N., McMaster Univ.:
Construction of BrF_5 line for extraction of oxygen from silicates and oxides for oxygen isotope analysis, 1968-69.

261. Shimazaki, H., Clark, L.A., McGill Univ.:
The effect of additive metals and oxides on melting relations in the $FeS-FeO-Fe_3O_4-SiO_2$ system, 1968-70.

A continuation of work on melting relations in the FeS-FeO-Fe_3O_4-SiO_2 system.

The synthesis of $(Cu,Fe)S_2$ phase, 1968-70.

This work is based on the natural occurrence of fukuchilite (Cu_3FeS_8) and the synthesis of the copper disulphide phase.

262. Siddeley, G., Geol. Surv. Canada:
The geochemical composition of ultramafic rocks and its relation to their contained mineral deposits, 1968-69.

Approximately 750 samples have been collected for analysis from 50 localities between Lynn Lake (Manitoba) and the Western townships (Quebec). Each sampling locality may be classified as either ore-bearing, high-potential, barren, or unknown-potential. Geochemical comparisons will be made between the known-potential groups. If significant differences are determined, the geochemical data for the unknown-potential localities will be examined and their potentials classified. The chemical values (major and trace elements) will also be used towards a geochemical census of Canadian ultramafic rocks.

263. Sinclair, A.J., Univ. of British Columbia:
Factor analysis applied to geochemical data, 1968-.

264. Sinclair, A.J., LeCouteur, D., Livingstone, W., Univ. of British Columbia:
Lead isotope studies in the Canadian Cordillera, 1968-70; Ph.D. theses (LeCouteur and Livingstone).

Includes investigation of common lead isotope abundances for deposits in Anvil district, Yukon Territory and East Kootenay district and the Beaverdell area, British Columbia. Both projects being done in conjunction with field geological investigations and supplementary laboratory work.

265. Sinclair, A.J., Dawson, K.M., Mathews, W.H., Univ. of British Columbia:
Trend surface analysis of minor elements in sulphides, 1965-; Ph.D. theses (Dawson and Livingstone).

A study on pyrites from Endako mine has been completed and a study on minor elements in galena and sphalerite from the Beaverdell area is underway. See Trend surface analysis of minor elements in sulfides of the Slocan mining camp, British Columbia; Econ. Geol., vol. 62, pp. 1095-1101, 1967.

266. Skippen, G.B., Carleton Univ.:
Phase relations in metamorphosed carbonates, 1967-.

Phase relations among the minerals quartz, calcite, dolomite, talc, tremolite, diopside, forsterite, enstatite and wollastonite are being investigated experimentally in the system CaO-MgO-SiO_2-C-O-H. See Igneous and metamorphic reactions involving gas equilibria; Res. in Geochem., vol. II, P.H. Abelson, Editor, John Wiley and Sons, New York, 1967.

267. Smith, F.G., Univ. of Toronto:
Computation and plotting of crystal-liquid equilibria in multicomponent systems, 1963-73.

The number of significant papers, books, reports, etc., on salt systems with an alkali halide as a compound was found to be unexpectedly large. Approximately 2,200 items have been fully processed for selection and printing of bibliographic lists by computer, using Boolean combinations of descriptors of subject matter. This will be completed before proceeding with the data processing and plotting.

See Machine plotting of liquidus data of binary and ternary salt systems; Can. Mineral., vol. 9, pt. 2, pp. 180-190, 1967.

268. Smith, J.R., Saskatchewan Research Council:
Geology and geochemistry of the Precambrian in Saskatchewan, 1959-.
This project involves a study of the relationship between trace metal distribution in rocks and base metal ores in Saskatchewan. See Preliminary Report on the Geology and Geochemistry of the Hanson Lake West area, Saskatchewan. Part 2: Interim Geochemical Results, 1966.

269. Stanton, M.S., Chevron Standard Ltd.:
Petroleum chemistry, 1967-.

270. Thomas, R.L., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Inorganic geochemistry of Great Lakes sediments, 1967-.
A detailed examination of the spacial distribution of major and trace elements in the top sediments of Lake Ontario. The geochemistry of a series of deep cores is also to be undertaken in order to evaluate diagenesis and the effects of pollution, in addition to leading to an understanding of the historical evolution of the lake sediments. The distribution and cycles of iron, sulphur, phosphorus and organic carbon are to be studied in detail. See A note on the relationship of grain size, clay content, quartz and organic carbon in some Lake Erie and Lake Ontario sediments; Jour. Sed. Petrol. (in press).

271. Trueman, E.A., Clark, A.H., Queen's Univ.:
Minor element studies on sulphides, oxides, and silicates from the Copper Mountain area, British Columbia, 1968-69; M.Sc. thesis (Trueman).
This study forms part of a more comprehensive metallogenetic project in south-central British Columbia.

272. Usik, L. (Miss), Geol. Surv. Canada:
Development of biogeochemical exploration methods for metallic mineral deposits applicable to bog, muskeg and swamp areas, 1968.
A brief paper is being prepared which reviews the literature on the subject and suggests some general ideas on the use of bogs and muskegs in prospecting for mineral deposits.

273. Vanden Berg, A., Research Council of Alberta:
Groundwater movement and groundwater chemistry in the Hand Hills-Bullpound Creek area, Alberta, 1963-68.
See Chemistry of groundwater in the Hand Hills Lake area; Res. Council Alta (in press).

274. van Everdingen, R.O., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Bedrock aquifers of Western Canada, 1963-.
Investigation of hydrochemistry and hydrodynamics in the Western Sedimentary Basin, using information available from petroleum files and data obtained from field investigations. See Studies of formation waters in Western Canada: Geochemistry and Hydrodynamics; Can. Jour. Earth Sci., vol. 5, p. 523, 1963.

275. van Loon, J.C., Univ. of Toronto:
Determination of platinum metals in ores and concentrates, 1960-.
See A critical review of atomic aborption, spectrographic and X-ray fluorescence methods of platinum metals analyses; Talanta, 1968 (in press).

Use of specific ion electrodes in the analysis of natural materials, 1967-.

See The rapid determination of fluoride in mineral fluorides using a specific ion electrode; Analytical Letters, vol. 1, p. 393, 1968.

Determination of individual rare earths in minerals using atomic absorption spectrophotometry, 1968-69.

276. van Loon, J.C., Keohler, R., Univ. of Toronto:
Investigation of atomic fluorescence as a method of analysis, 1968-.

277. van Loon, J.C., Parissis, C., Univ. of Toronto:
Rapid scheme of an silicate analysis based on atomic absorption spectrophotometry, 1967-68.

See Rapid scheme of silicate analysis based on the lithium metaborate fusion followed by atomic absorption spectrophotometry: I. Determination of silica; Analytical Letters, vol. 1, p. 519, 1969.

278. von Volborth, A., Dalhousie Univ.:
Development of a computerized fast-neutron activation and x-ray laboratory for "total" analysis of rocks and ores, 1968-71.

Computerized nondestructive x-ray and fast-neutron activation analysis as performed in the author's laboratory in Nevada permits the determination of all major constituents of a rock as well as some 30 regularly determined trace elements. This results in approximate total analysis which in turn permits computerized treatment in order to introduce the necessary corrections. Classical methods are also developed for support information. The intention is to apply these methods to Canadian granitic rocks and to develop a similar laboratory as now is operating in Nevada. See Total nondestructive analysis of CAAS (Canadian Association of Applied Spectroscopy) syenite; Advances in x-ray analysis, vol. 11, Plenum Press, 1968.

279. Wardlaw, N.C., Univ. of Saskatchewan:
Geochemistry and petrology of Middle Devonian Kee Scarp carbonates in the Norman Wells - Fort Good Hope area, Northwest Territories, 1967-69.

Regional variations of such elements as iron, manganese, phosphorus, magnesium and strontium in carbonate formations have been documented, as have regional variations in the lithology of carbonate formations. This study is an attempt to determine the chemical composition of specific components in ancient limestones, such as various types of organic material, cements and matrices. Once the composition of individual components is known, it should then be possible to account for variations in the bulk chemistry of carbonate rocks in terms of variations in visible components.

280. Warren, H.V., Delavault, R.E., Fletcher, K., Brabec, D., Manson, R., Univ. of British Columbia:
Arsenic, lead, silver and selenium in rock, soil and vegetal matter, 1967-70; thesis projects (Brabec and Manson).

The prime interest is in exploring all ways by which geochemistry may be used to find ore. The "normal" and what are anomalous amounts of various elements in rocks, soils, and vegetal matter are being established. We are also making discoveries about mineral concentrations of these elements in food products used by animals and man. See The arsenic content of Douglas Fir as a guide to some gold, silver and base metal deposits; C.I.M.M. Bull., vol. 61, No. 675, pp. 860-866, 1968.

281. Webber, G.R., McGill Univ.:
Application of instrumental methods of analysis to geological materials, 1959-.
See Determination of zirconium in rocks by X-ray fluorescence using scattered radiation to correct for matrix effects; Canadian Spectroscopy, vol. 12, No. 3, pp. 105-110, 1967.

282. Williams, G.D., Univ. of Alberta:
Geochemical differentiation of depositional environments, 1966-70.
See Chemical composition of shales of the Mannville Group (Lower Cretaceous) of central Alberta, Canada; Bull. Amer. Assoc. Petrol. Geol., vol. 49, No. 1, p. 81, 1965.

283. Williams, H.H., McMaster Univ.:
F, Br, Cl in limestones and dolomites, 1967-69; Ph.D. thesis.

284. Wolfe, W.J., Ontario Dept. of Mines:
Geochemistry of stream sediments and bedrock, Pukaskwa region, districts of Algoma and Thunder Bay, Ontario, 1968-69.
The -80 mesh fractions of stream sediment samples have been analysed for cold extractable THM and hot HCl-HNO_3 extractable Cu, Pb, Zn, Ni, Co, Mn and Mo. These results are compared with trace element data obtained from systematically collected specimens of bedrock as a means of evaluating the effects of glacially transported overburden on the regional distribution of metal background in surficial materials. See Ont. Dept. Mines Summary of Field Work, 1968.

285. Wolfe, W.J., Austria, V., New Brunswick Dept. of Natural Resources:
Regional geochemistry of stream and spring sediments, New Brunswick, 1965-70.
Systematic regional sampling of stream and spring sediments, and analysis for 8 to 10 trace elements is followed by detailed examination of specific areas for the purpose of (a) developing criteria for distinguishing between significant and non-significant anomalies; and (b) obtaining fundamental information on the mobility of elements in the surficial environment. See The Cu, Pb, Zn, Mn and Mo content of stream and spring sediments, parts of Charlotte, St. John and Kings counties, New Brunswick; N.B. Dept. Nat. Res., Report of Investigation No. 6.

286. Wynne-Edwards, H.R., Fuh, T.-M., Queen's Univ.:
Geochemical correlation of rocks on either side of the Grenville Front at Val d'Or, Quebec; 1967-69; Ph.D. thesis (Fuh).
A test by geochemical correlation, using five sample areas, of the hypothesis that the Archaean rocks near Val d'Or, including the Abitibi greenstone belt, continue eastward in the Grenville province. See Mont Laurier and Kempt Lake map-areas, Quebec; Geol. Surv. Can., Paper 66-32, 32 p., 1966.

GEOCHRONOLOGY

287. Aumento, F., Geol. Surv. Canada:
Geology of the mid-Atlantic ridge near 45°N, 1966-70.
See Potassium-argon ages and spreading rates on the mid-Atlantic ridge at 45°N; Science, vol. 161, No. 3848, pp. 1338-1339, 1968.

288. Bell, K., Univ. of Toronto:
Sr isotope variations in crustal rocks, 1968-.
Acid lavas from East Africa will be analysed. Data may give evidence for the source of the lavas and possibly provide information about the Sr^{87}/Sr^{86} ratios in the mantle beneath the East African crust.

289. Carter, N.C., British Columbia Dept. of Mines and Petroleum Resources:
Age of some porphyry type mineral deposits in west-central British Columbia, 1967-69; Ph.D. thesis, Univ. of British Columbia.
Samples for potassium-argon age determinations were collected from 18 porphyry type copper and molybdenum deposits to determine the age of mineralization. To date, some 20 samples have been analyzed; between 40 and 50 will have been completed by mid-1969. See The age of some mineral deposits in British Columbia; Can. Inst. Min. Met. Bull., Nov. 1968.

290. Chrismas, L., Baadsgaard, H., Folinsbee, R.E., Fritz, P., Krause, H.R., Sasaki, A., Univ. of Alberta:
Geochronology of a geologically-young, metamorphosed area, 1966-.

291. Clark, A.H., Farrar, E., Thompson, R.I., Queen's Univ.:
Geochronological studies in the Andean Cordillera of northern Chile on Latitude 26° south, 1968-72; Ph.D. thesis (Thompson).
The geosynclinal to post-orogenic evolution of the Andes in this region will be clarified by field mapping and potassium-argon and fossil fission track dating of representative specimens collected along a traverse across the western flank of the Cordillera.

292. Crocket, J., Schwarcz, H., Schindler, J., McMaster Univ.:
Re-Os age method, 1966-72; Ph.D. thesis (Schindler).
A project designed to further develop the Re-Os dating method and to investigate its application in the dating of sulfide ores.

293. Farquhar, R.M., Univ. of Toronto:
Lead isotope variations in Canadian Shield galenas, 1960-.
A preliminary study of lead isotope ratios in galenas from Grenville rocks and overlying sediments has been completed. A search will be started in the Superior Provinces for evidence of the ancient ($>4 \times 10^9$ yr.) event observed in Yellowknife galenas. See Lead isotope ratios from the Cobalt-Noranda area, Canada; Can. Jour. Earth Sci., vol. 2, p. 361, 1965.

294. Farrar, E., Queen's Univ.:
Geochronology, 1966-.
The equipment required to perform K-Ar and Fossil Fission Track age determinations has been set up in this laboratory. Argon determinations are made by fusing mineral samples in vacuo and analyzing the resultant gases by isotope dilution in a mass spectrometer. Fossil Fission Track age determinations have been attempted on several muscovite and glass samples.

295. Farrar, E., Quirt, S., Queen's Univ.:
Geochronology, 1968-; M.Sc. thesis (Quirt).
It is intended to perfect the techniques involved in the measurement of extremely small quantities of argon in order that young basalts from the Atlantic sea floor may be dated.

296. Farrar, E., Thompson, R.I., Queen's Univ.:
Geochronology, 1968-.
It is intended to date a variety of minerals by both the K-Ar method and the Fossil Fission Track method in order that the value of the latter method may be established.

297. Gibbins, W.W., McMaster Univ.:
Rb-Sr isotopic studies on the Murray granite and Sudbury norite, Sudbury, Ontario, 1968-71; Ph.D. thesis.

298. Green, D.C., Baadsgaard, H., Cumming, G.L., Folinsbee, R.E., Godfrey, J.D., Koster, F., Burwash, R.A., Coleman, L., Univ. of Alberta:
Precambrian geochronology in Western Canada, 1959-.
Geochronology in the Yellowknife area (with R.E. Folinsbee), in northeastern Alberta Shield (with J.D. Godfrey), in northwestern Saskatchewan (with F. Koster), in central Saskatchewan (with L. Coleman) and in the east arm of Slave Lake and basement core studies (with R.A. Burwash). See Geochronology of the Yellowknife area, N.W.T., Canada; Can. Jour. Earth Sci., vol. 5, pp. 725-735, 1968.

299. McGugan, A., Univ. of Calgary:
Paleontological rhythms and geochronology.
See Possible use of algal stromatolite rhythms in geochronology; Abstract, Geol. Soc. Amer., Ann. Mag., 1967.

300. Moorhouse, W.W., Adams, J.C., Univ. of Toronto:
Nature and origin of inclusions in the inclusion norite, one of the margin intrusions on the North Range of the Sudbury irruptive; geochronology of the Sudbury irruptive and the Murray granite, 1964-70.
It is hoped to carry out chemical analyses on various types of inclusions in the inclusion norite, north range, Sudbury, which have already been studied in considerable detail optically, in order to determine the possible provenance of the inclusions. The age work on the Sudbury eruptive and Murray granite (by Adams) is directed to obtaining a satisfactory isochron on the norite (if possible) and to see if any difference can be found between the Murray granite and what appear to be dikes which may have been remobilized by the heat of the eruptive. These investigations are by Rb/Sr methods.

301. Morton, R.D., Univ. of Alberta:
Geology of the Bamble Sector of the Fennoscandian Shield in southern Norway, 1961-70.
The work is providing the first large scale maps of the district and forms the basis of a thorough geochronological study. The nature and origin of metalliferous ore deposits are being described and future exploratory geochemical and geophysical programs planned in conjunction with members of Trondheim University. The structural nature of the western margins of the Oslo graben is being reviewed. See The nodular metamorphic rocks from the environs of kragerø, S. Norway; Norsk Geologisk Tidsskrift, vol. 45, pp. 1-20, 1965.

302. O'Nions, R.K., Morton, R.D., Univ. of Alberta:
Geochronology of the Precambrian of southern Norway, 1968-69; Ph.D. thesis (O'Nions).
Study includes K-Ar dating of micas and hornblendes; U-Pb dating of sphene, zircon, allanite etc. and Rb/Sr whole rock isochron dating.

303. Parker, M.L., Geol. Surv. Canada:
Dendrochronological investigations, 1968-70.
Study of the tree ring record in various parts of Canada to provide chronological and climatological data in order to date post-glacial events and to relate available weather data to other kinds of evidence for reconstruction of past environments. See Geol. Surv. Can., Paper 69-1, Part A, 1969.

304. Roddic, G., Farrar, E., Queen's Univ.:
Geochronology, 1968-; M.Sc. thesis (Roddic).
In conjunction with a metallogenic study of a large area in south-central British Columbia, to study in detail the absolute ages as indicated by K-Ar in various parts of the Tulameen ultramafic bodies and Hedley mafic complex.

305. Shafiquallah, M., Tupper, W.M., Cole, T.J.S., Carleton Univ.:
Geochronology of alkalic and carbonatite masses in the Ottawa Valley and St. Lawrence Rift System, 1966-69; Ph.D. thesis (Shafiquallah).

306. Sinclair, A.J., LeCouteur, D., Livingstone, W., Univ. of British Columbia:
Lead isotope studies in the Canadian Cordillera, 1968-70; Ph.D. theses (LeCouteur and Livingstone).
Includes investigation of common lead isotope abundances for deposits in Anvil district, Yukon Territory and East Kootenay district and the Beaverdell area, British Columbia. Both projects being done in conjunction with field geological investigations and supplementary laboratory work.

307. Turek, A., McRitchie, W.D., Weber, W., Manitoba Mines Branch:
Project Pioneer - a field and laboratory study in the Rice Lake-Beresford Lake area, Manitoba in cooperation with the Dept. of Geology, Univ. of Manitoba, 1966-70.
See Preliminary Rb-Sr geochronology of the Rice Lake-Beresford Lake area, southeastern Manitoba; Can. Jour. Earth Science, vol. 5, No. 6 (in press).

308. White, W.H., Sinclair, A.J., Univ. of British Columbia:
K-Ar study of Topley instrusions and Endako molybdenum mine, 1966-69.
Dating biotites and muscovites from different phases of Topley instrusions and from hydrothermal alteration zones associated with Endako molybdenite deposit.

309. York, D., Baksi, A.K., Univ. of Toronto:
Chronology of the ocean floors, 1968-; Ph.D. thesis (Baksi).

310. York, D., Gittins, J., Univ. of Toronto:
Dating of the carbonatites of Canada, 1963-70.
See The ages of carbonatite complexes in eastern Canada; Can. Jour. Earth Sci., vol. 4, p. 651, 1967.

311. York, D., Yanase, Y., Univ. of Toronto:
Geochronology of the Canadian Shield, 1966-; Ph.D. thesis (Yanase).
See Rb-Sr whole-rock and K-Ar mineral ages of rocks from the Superior Province near Kirkland Lake, northeastern Ontario, Canada; Can. Jour. Earth Sci., vol. 5, p. 699, 1968.

GEOMORPHOLOGY AND GLACIOLOGY

312. Barnett, D.M., Geol. Surv. Canada:
Proglacial geomorphology, Generator Lake, Baffin Island, 1965-71.
Model study of the proglacial lacustrine environment relating modern glaciofluvial processes to former glacial, lacustrine and related landforms and deposits associated with former and present levels of Generator Lake. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

313. Barlett, G.A., Vilks, G., Ramsay, A.T.S., Bedford Institute of Oceanography:
Ecostratigraphy of the North Atlantic, 1968-69.
The interrelationship of the biomass and watermass of the North Atlantic and Caribbean Sea. Utilization of this information as a climatic and paleoclimatic index in the development of a theory on glaciation. See Planktonic foraminifera in watermasses and bottom sediments from the Grand Banks to the Caribbean Sea; Maritime Sediments, vol. 3, No. 4, 1968.

314. Bik, M.J.J., Geol. Surv. Canada:
Geomorphology of Cypress Hills and adjoining parts of southern Alberta, 1965-71.
Work in the 1968 field season concentrated largely on gradient, origin, and along-valley correlation of river terraces, terrace deposits and associated proglacial deposits. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

315. Bremner, J.M., Kucera, R.E., Murray, J.W., Univ. of British Columbia:
Beach processes and black sands at Wreck Bay, British Columbia, 1968; M.Sc. thesis (Bremner).
An attempt to understand the geomorphic, oceanographic and sedimentologic processes that are operating in the Wreck Bay.

316. Broscoe, A.J., Westgate, J.A., Thomson, S., Currie, D.V., Univ. of Alberta; Bayrock, L.A., Berg, T.E., Research Council of Alberta; Rutter, N.W., Geol. Surv. Canada; Kinisky, J.J., Meteorologist:
Steele glacier terminus area, Yukon Territory, glacial geology and hydrology, 1967-69.
The date gained in the field in 1968 is now being evaluated; several papers on the glacial geology and hydrology of the glacier are planned.

317. Buckley, J.T., Geol. Surv. Canada:
Geomorphological map, Gatineau Park, Quebec, 1967-70.
To provide a map and description of landforms and surface deposits of the park area and environs.

318. David, P.P., Université de Montréal:
Sand dune occurrences of Canada, 1967-70.
A map showing the distribution of sand dune in Canada is being prepared. Dune areas will be classified according to a set of parameters established from the study of selected dune areas in Canada.
Study of selected sand dune areas in Canada, 1965-69.
Several areas of sand dune occurrences representing different environment of dune development were selected from Quebec, Ontario, Manitoba and Saskatchewan. In each area the morphology, structure, and stratigraphy of the dunes was studied; the physical properties of

the dune sands and source deposits was determined; the rates of advance of active dunes were measured; and the chronology of dune-development was established. In an area in Saskatchewan the movement of sand over a sand dune was studied and its relation to the local wind regime is being evaluated.

319. Elson, J.A., Thomas, R., Doak, R., McGill Univ.:
Denudation processes, 1966-; M.Sc. theses (Thomas and Doak).
Chemical denudation and slope processes on Mont. St. Hilaire, Quebec, and in other selected localities are being measured to determine the rate of lowering of the earth's surface at present and since deglaciation.

320. Fisher, D.A., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Drainage beneath the Salmon Glacier, 1968-70.
Fluorescent dye is dropped in the ice-dammed Summit Lake and water samples from the Salmon River are analyzed. Distinct dye-waves occur about 40 hours after dye drops thus indicating continuous seepage. Present studies focus on the nature of the channel beneath the glacier.

321. Gray, J.T., Geol. Surv. Canada:
Mass wasting forms and processes in a mountain environment; Ph.D. thesis, McGill Univ.:
See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

322. Grove, E.W., British Columbia Dept. of Mines and Petroleum Resources:
Glacialogical studies in the Stewart-Bowser-Unuk area (Portland Canal) British Columbia, 1964-.
Includes ecological-biological collections from glaciers - i.e. iceworms, trees etc. and relating to glacial processes.

323. Hattersley-Smith, G., Defence Research Board:
Geophysical research in the Arctic, 1963-.
Includes glaciological, meteorological, and oceanographic studies in northwestern Ellesmere Island. See Glacial features of Tanquary Fiord and adjoining areas of northern Ellesmere Island, N.W.T.; Jour. of Glaciology, vol. 8, No. 52, 1969 (in press).

324. Hodgson, D.A., Geol. Surv. Canada:
Submarine morphology off the northeast Baffin Island coast, Northwest Territories, 1967-70.
A project designed to extend knowledge of erosional and depositional landforms to areas below present sea level by continuous profiling with an echo sounder.

325. Klassen, R.W., Burwasser, G.J., Willy, A.J., Univ. of Saskatchewan:
Surficial geology of the Duck Mountain map-area, 1968-70; M.Sc. thesis (Burwasser).
The area contains a variety of landform types including various continental glacial moraines, glacio-lacustrine sediments, possible glacial tectonic features on local and regional scales.

326. Lewis, C.P., Geol. Surv. Canada:
Geomorphology of delta lakes, Mackenzie Delta, 1967-69; Ph.D. thesis, Univ. of British Columbia.
To determine the mechanisms and stages of development involved in the division of delta lakes by reversing-flow channels. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

327. Løken, O.H., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Barnes ice cap studies, Baffin Island, Northwest Territories, 1965-72.
The ice cap is regarded as a model ice sheet and present investigations cover the mass balance distribution, surface movements, horizontal strain rate and the surface form of the ice cap. Future investigations will include deep drilling, glacial temperature and the formation of shear moraines. See Mass balance observations on the Barnes Ice Cap, Baffin Island, Canada; I.U.G.G. General Assembly, International Association of Scientific Hydrology, Berne, 1967, Pub. No. 79, 1968.

328. Mackay, J.R., Geol. Surv. Canada (part-time), Univ. of British Columbia:
Geomorphic processes, Mackenzie Valley - Arctic Coast.
Multi-faceted study of geomorphic features and processes related to permafrost and to fluvial, lacustrine, coastal, eolian and mass wasting activity in a permafrost environment involving ice-shove boulder pavements, ground temperature gradients in bore-holes, wind abrasion, pingos, soil freezing pressures, heat budget studies, and glacial and postglacial history.

329. McDonald, B.C., Geol. Surv. Canada:
Sedimentology and morphology of eskers, 1968-72.
Investigation of eskers and associated features involving their classification, form, sedimentology, and origin. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

330. Mathews, W.H., Univ. of British Columbia:
Geographic variations in Snow Creep pressures, southern British Columbia, 1962-.
Geothermometry - Granduc area, Stewart, and Mt. Seymour, British Columbia, 1966-69.

331. Mathews, W.H., Mackay, J.R., Univ. of British Columbia:
Soil Creep - Garibaldi, British Columbia, 1958-69.
Soil creep, rock creep, and the effects of needle ice and snow creep in soil movement have been investigated for 10 years. The studies have involved the rate of movement of soil stripes, rock streams, loose boulders in different slopes, etc. The mass transport of loose surface material has been estimated.

332. Ommanney, C.S.L., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Glacier inventory, 1968-73.
All glaciers in Canada will be tabulated with information on their geographical and UTM coordinates, size, length, width, altitude range, volume, orientation, etc. Information will be stored on magnetic tape for future analysis.

333. Savage, J.C., Neave, K.G., Univ. of Toronto:
Icequakes on the Athabasca glacier, 1966-69; Ph.D. thesis (Neave).
Seismicity and nature of faulting on a glacier. See Trans. Am. Geophysical Union, vol. 49, p. 300, 1968 (abstract only).

334. Stanley, A.D., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Glacier surges, 1966-69.
Hydrological investigations are underway at Fox Glacier. Surface velocity of Steele Glacier is studied on the basis of terrestrial photogrammetry, and surface elevation changes are measured from recent

topographic maps. See Observations on the surging Steele Glacier; Can. Jour. Earth Sci. (in press).

335. Stanley, A.D., and collaborators, Inland Waters Branch, Dept. of Energy, Mines and Resources:
Glacier mass balance studies, 1965-74.
A transect of five glaciers between the Coast Mountains near Vancouver and the eastern flanks of the Rocky Mountains have been selected to study the transmontane variations in mass balance parameters. These parameters are related to climatic variations in the same area. See Mass balance studies on glaciers in Western Canada, 1965; Geographical Bull., vol. 8, No. 1, pp. 81-107, 1966.

336. St-Onge, D.A., Geol. Surv. Canada:
Quaternary geology and geomorphology of Whitecourt area, Alberta.
Geologic mapping of Quaternary deposits and compilation of detailed geomorphological map. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

337. Weber, J.R., Andrieux, P., Observatories Branch, Dept. of Energy, Mines and Resources:
Ice thickness determinations on the Penny Ice Cap, Baffin Island, 1965-68.
The first successful radar echo soundings through glacier ice in Canada were carried out in 1965 on an outlet glacier of the Penny Ice Cap. An unmodified 440 MHZ SCR-718 radar altimeter, of the type readily and inexpensively available on the surplus market, was used. The radar soundings were generally in agreement, within the range of the reading accuracy of the oscilloscope (± 15m), with those depths obtained seismically, gravimetrically, and by the electric resistivity method. The minimum and maximum recorded depths were 45 m and 550 m, respectively.

GEOPHYSICS

Electrical

338. Ahrens, P.H., Collett, L.S., Geol. Surv. Canada:
Audio frequency studies, 1964-70.
The purpose is to study the frequency dispersion effect with audio and sub-audio frequencies of in-phase and quadrature measurements of rocks and soils in the field.

339. Becker, A., Geol. Surv. Canada:
Time domain EM theory, 1968-.
The general object is to establish quantitative relationships between the electrical parameters of the ground and the response of electromagnetic pulse instrumentation. See Simulation of time domain airborne electromagnetic system response; presented at 38th annual meeting of the Society of Exploration Geophysicists on October 2, 1968 in Denver, Colorado.

340. Collett, L.S., Geol. Surv. Canada:
Electrical rock properties, 1967-68.
Prototype equipment is being constructed to measure resistivity of unconsolidated sample cores of clays and tills by a non-contact method.

AFMAG/VLF surveys, 1968-70.

An AFMAG survey was flown in the Upper Nelson River of Manitoba (3,500 line miles) and in the Uranium City area of Saskatchewan (660 line miles) to test the usefulness of the method to detect faults and shear zones where they are known and to check if other unknown lithological features are detected especially beneath the overburden and sedimentary cover. A small VLF survey was flown as a test area northwest of Wabowden, Manitoba, to check its relative response in relation to AFMAG data.

341. Collett, L.S., Becker, A., Geol. Surv. Canada:
Airborne input surveys, 1966-70.

The Barringer INPUT system was chosen to determine its usefulness as a method of supplementing more conventional methods of geological mapping. Flight tests were made over the Palaeozoic basin east of Ottawa, Project Pioneer and Winkler areas in Manitoba and an area southeast of Drumheller, Alberta. The data output is in a digital format on magnetic tape for ease of handling by computer.

342. Garland, G.D., Dyck, A.V., Peltier, R., Tammemagi, H., Univ. of Toronto:
Electrical conductivity of the crust and mantle, 1964-; M.Sc. theses (Dyck, Peltier, Tammemagi).

The investigation of crustal electrical conductivity beneath Iceland has been concluded, the results having been reported in the following publications. At present, work is in progress on an area in Manitoba, crossing the Superior-Churchill boundary, and across the Lake Superior area of thickened crust. See In situ measurement of thermal conductivity in the presence of transverse anisotropy; Jour. Geophys. Res., vol. 73, pp. 5477-5584, 1968, and Magnetotelluric deep-sounding experiments in Iceland; Earth and Plan. Sci. Letters, vol. 4, pp. 469-474, 1968.

343. Ghosh, M.K., Univ. of Toronto:
Shallow exploration by electromagnetic methods, 1968-69; M.Sc. thesis.

Application of frequency sounding to shallow exploration in the field of engineering geophysics, groundwater hydrology.

344. Glenn, W.E., Queen's Univ.:
Design of an electromagnetic well logging device for use in water wells, 1967-69; M.Sc. thesis.

345. Palacky, J., Univ. of Toronto:
A study of I.P. prospecting methods, 1969-; Ph.D. thesis.

346. Seguin, M.K., Université Laval:
Electromagnetic modelling for different geometric configurations, 1967-70.

The effect of EM field on remanent magnetism and vice-versa.

347. Speirs, D., Queen's Univ.:
Resistivity mapping of Paleozoic-Precambrian interface in Kingston area, Ontario, 1968-69; M.Sc. thesis.

348. Strangway, D.W., Goldstein, M., Univ. of Toronto:
Electromagnetic exploration, 1968-; Ph.D. thesis (Goldstein).

Measurements of the electric and magnetic fields associated with artificial sources will be investigated in order to throw light on the nature of magnetotelluric problems.

Gravity

349. Berkhout, A.W.J., Observatories Branch, Dept. of Energy, Mines and Resources:
Interpretation of the gravity field - Somerset and Prince of Wales Islands, Northwest Territories, 1965-68; Ph.D. thesis, Queen's Univ.

350. Bidgood, D.E.T., Take, W.F., Nova Scotia Research Foundation:
Gravity study of a Horton graben in central Nova Scotia, 1967-.
Three gravity profiles across an area of Horton rocks bounded by major faults gave positive anomalies. Geophysical and geological interpretation indicates presence of dense rocks below the Horton.

351. Boyd, J.B., Stephens, L.E., Observatories Branch, Dept. of Energy, Mines and Resources:
Gravity survey in the southern Canadian Cordillera, 1968-69.
Regional gravity mapping of the Cordillera was completed between longitudes 114° and 121° and latitudes 49° and 51° and in the vicinity of Williams Lake. Data is being assembled to correct simple Bouguer anomalies for terrain effects. A survey over the Guichon Batholith revealed a 20 mgal negative anomaly over this feature.

352. Burke, K.B.S., Gendzwill, D.J., Univ. of Saskatchewan:
A gravity study in the Amisk Lake area, Saskatchewan, 1965-68; Ph.D. thesis (Gendzwill).
A gravity and density study indicate the gravity field and rock densities are strongly correlated with the different rock units that underlie the area. Three new procedures are developed for the quantitative interpretation of the gravity anomalies associated with the outcropping rock units. The application of these and other procedures indicates that all the anomalies can be explained as the effect of bodies ranging in depth from 1 to 4.7 kilometers and below a depth of 5 kilometers the density variations become insignificant.

353. Emslie, R.F., Geol. Surv. Canada; Sobczak, L.W., Observatories Branch, Dept. of Energy, Mines and Resources:
Gravity investigations over the Morin anorthosite intrusion, Quebec, 1968-69.
A number of gravity profiles have been measured over the Morin intrusion and surrounding rocks to obtain information on the size and configuration of the intrusion at depth.

354. Gendzwill, D.J., Saskatchewan Research Council:
Gravity investigation, Amisk Lake - Flin Flon area, Saskatchewan, 1965-68; Ph.D. thesis (Univ. of Saskatchewan).
A detailed investigation (about 3 stations per square mile) of the gravity anomalies associated with volcanic, sedimentary and intrusive rocks in the area. Large anomalies provide information on the thickness of volcanics and depth of granodiorites.

355. Gibb, R.A., van Boeckel, J.J.G.M., Hornal, R.W., Observatories Branch, Dept. of Energy, Mines and Resources:
Interpretation of gravity surveys Ontario-Quebec mining belt, 1964-68.
The results of the gravity surveys made during the 1946 to 1963 period are presented as a Bouguer anomaly map (scale: 1:500,000). The area is studded with many granite batholiths of variable composition which are outlined by intense negative gravity anomalies. The whole region is regarded as one great roof pendant and on the assumption that the volcanic and sedimentary rocks of the area are everywhere

floored by granite, it is possible to estimate the thicknesses of the volcanic belts using the gravity results but the depths to which the granite extends cannot be determined by the gravity method alone. A preliminary interpretation using two- and three-dimensional models to simulate major geological bodies indicates that many of the dense volcanic belts in the area extend to depths ranging from 3 to 5 km. See A preliminary analysis of the gravity anomaly field in the Timmins-Senneterre mining areas; Gravity Map Series, Dom. Obs. No. 58 (in press).

356. Goodacre, A.K., Cooper, R.V., Observatories Branch, Dept. of Energy, Mines and Resources:
Underwater gravity survey of the Gulf of St. Lawrence, 1968.
A Bouguer anomaly map of the Gulf of St. Lawrence is being produced at a scale of 1:1,000,000. See The results of underwater gravity surveys in the Gulf of St. Lawrence; Gravity Map Series, No. 86, Dom. Obs. (in press).

357. Goodacre, A.K., Weber, J.R., Cooper, R.V., Observatories Branch, Dept. of Energy, Mines and Resources:
Gravity survey of Hudson Bay, 1965-69.
Work is in progress to combine surface and underwater gravity measurements in the Bay so that all available gravity measurements in the Bay will be incorporated in the gravity map.
Gravity measurements in the Great Lakes, 1964-69.
Reconnaissance underwater gravity measurements were made in Lake Superior in 1964. Regional gravity measurements were commenced in Lake Ontario and Lake Erie in 1968 and will be completed in 1969. The results will be compiled in the form of a Bouguer anomaly map and published in the Dominion Observatory Gravity Map Series. See A reconnaissance underwater gravity survey of Lake Superior: The earth beneath the Continents; Geophysical Monograph, No. 10, AGU, pp. 56-65.

358. Halpenny, J., Burke, W.E.F., Observatories Branch, Dept. of Energy, Mines and Resources:
Gravity survey in northwestern Ontario and eastern Manitoba, 1968-69.
Regional gravity coverage has been completed in the Kenora, Red Lake, Sandy Lake areas of Ontario and along the shores of Lake Winnipeg. Preliminary results show good correlation with local geology.

359. Hornal, R.W., Observatories Branch, Dept. of Energy, Mines and Resources:
Interpretation of the gravity anomalies in the Bear and Slave geological provinces, Northwest Territories, 1966-69.
A study of the regional gravity survey from Great Slave Lake to Victoria Island and from Dubawnt Lake to Great Bear Lake is in progress. The anomalies correlate well with structural trends and geological formations. A large positive gravity anomaly north of Coppermine is due to late Proterozoic flood basalts which underlie Palaeozoic rocks except in the areas of the Minto Arch and the Coppermine River where up to four kilometres of basalt are exposed. A belt of positive anomaly parallels the rocks of the Snare Group from Great Slave Lake to Great Bear Lake and may represent basic intrusions along the geosyncline. A gravity high over the east arm of Great Slave Lake may be related to basic sills and dykes intruding the rocks of the Great Slave and Et-then Groups. A steep gravity gradient between massive granite of Archaean age and gneisses of Proterozoic age marks the boundary of the Churchill and Slave geological provinces between Artillery Lake and the Back River. See The

gravity anomaly field in the Coppermine area, N.W.T.; Gravity Map Series, Dom. Obs. Map No. 45 (in press), and Gravity anomalies over the northwestern Canadian Shield (in preparation).

360. Hornal, R.W., Burke, W.E.F., Observatories Branch, Dept. of Energy, Mines and Resources:
Gravity survey in central Labrador, 1968-69.
More than 1,000 gravity stations were observed between Schefferville and the Labrador Coast. Preliminary results reveal a large gravity high of 70 to 100 mgal southeast of Cartwright and other smaller highs over the Benedict Mountains and several of the anorthosite bodies in this area. The Grenville low appears to terminate at about the longitude of Goose Bay.

361. Innes, M.J.S., Gibb, R.A., Whitehead, J., Observatories Branch, Dept. of Energy, Mines and Resources:
Gravity map of Canada, 1966-68.
The second edition of the Gravity Map of Canada at a scale of 1 inch:40 miles in four sheets is based on data obtained up until the end of 1966. The map is in colour and shows Bouguer anomalies contoured at intervals of 10 mgal. All the data shown are available on request, to the petroleum and mining industries, the universities and other interested agencies. The cost of this service will be partly covered by a nominal charge to all users. See A new gravity anomaly map of Canada: an aid to mineral exploration; Proceedings of the Canadian Centennial Conference on Mining and Groundwater Geophysics, 1967, Geol. Surv. Can.(in press).

362. Jacoby, W.R., Observatories Branch, Dept. of Energy, Mines and Resources:
Interpretation of the gravity anomalies in the Anstruther area, Ontario, 1967-69.
A detailed study of the negative gravity anomalies over granites in the Anstruther area, Ontario has been commenced. Computer methods are being used to formulate 2-D and 3-D models of the granite batholiths.

363. Sobczak, L.W., Jacoby, W.R., Observatories Branch, Dept. of Energy, Mines and Resources:
A gravity survey of the Kinmount geophysical test range, 1967-68.
Gravity was one of several geophysical methods of mineral exploration demonstrated at the Kinmount test range. The gravity method, in this instance, could not be used alone for the direct detection of mineralized zones found by other geophysical methods. However, a band of amphibolite flanked on either side by known mineralized zones was outlined by a positive gravity anomaly. Analysis of residual anomalies suggests that this band extends to a depth of at least 1200 feet. The mass excess of the larger mineralized zone is estimated to be of the order of 4 metric tons/cm. See A gravity survey of the Kinmount geophysical test range, Cavendish township, Ontario; Geol. Surv. Can., Paper (in press).

364. Tanner, J.G., Observatories Branch, Dept. of Energy, Mines and Resources:
Interpretation of gravity field of Quebec and Labrador, 1964-69.
The gravity interpretation concentrates on regional problems including studies of the anomalies associated with structural province boundaries and anorthosite intrusions.

365. Walcott, R.I., Observatories Branch, Dept. of Energy, Mines and Resources:
Interpretation of the gravity anomaly field in northern Saskatchewan, 1967-68.

The most striking feature in the area is a central belt of unusually intense anomalies bounded on the northwest and southeast by areas of low gravity relief. The width of the gravity highs and lows are in the range 40 to 70 kilometers and indicate large scale variations in mean crustal density of the basement rocks. That is, the gravity maps show a variation in crustal lithology of very great wavelength, a variation which is not indicated on existing small scale geological maps. In detail, however, where adequate large scale geological mapping does exist a correlation between surface geology and gravity is indicated. For instance north of Stony Rapids the gravity high is closely related to norites and metavolcanics of unusually high density and the gravity low appears to be related to alkaline granite. See The gravity field of northern Saskatchewan; Gravity Map Series, Dom. Obs. Nos. 16-20 (in press).

Isostatic studies, 1968-69.

This study involves a statistical study of elevation and gravity in the region of the interior plains of Canada. The deformation of the underlying rocks in response to variations in topographic load is also being examined. The project is intended to be extended into Western and Eastern Canada as gravity and elevation data become available. The research is two fold: (1) to obtain residual (isostatic) anomaly maps for subsequent geological analysis; (2) an investigation of isostatic processes and fundamental problems of large scale gravity interpretation.

366. Weber, J.R., Goodacre, A.K., Observatories Branch, Dept. of Energy, Mines and Resources:

Interpretation of gravity anomalies in Hudson Bay, 1965-68.

The gravitational effect of a two-layer model based on seismically determined depths has no correlation with the observed gravity anomalies. This lack of agreement may be due to lateral variations of the acoustic compressional wave velocity within the crust. A basic difficulty in correlating gravity and seismic results is the uncertainty in the relation between compressional wave velocity and density for rocks in the crust and upper mantle. See An analysis of the crust-mantle boundary in Hudson Bay from gravity and seismic observations; Can. Jour. Earth Sci., vol. 5, No. 5, 1968.

Heat Flow

367. Garland, G.D., Wright, J.A., Univ. of Toronto:

Heat flow measurements using in situ determination of thermal conductivity, 1965-; Ph.D. thesis (Wright).

A practicable method of measuring thermal conductivity even in cased holes, and for anisotropic rocks, has been devised. Heat flow measurements have been made in Quebec, P.E.I. and Nova Scotia, and the method will be employed in other holes as they become available. See In situ measurement of thermal conductivity in the presence of transverse anisotropy; Jour. Geophys. Res., vol. 73, pp. 5477-5584, 1968.

368. Jessop, A.M., Judge, A.S., Lewis, T., Cermak, V., Observatories Branch, Dept. of Energy, Mines and Resources:

Geothermal research, 1962-.

See Three measurements of heat flow in Eastern Canada; Can. Jour. Earth Sci., vol. 5, No. 1, pp. 61-68, 1968.

369. Mathews, W.H., Univ. of British Columbia:
Geothermometry - Granduc area, Stewart, and Mt. Seymour, British Columbia, 1966-69.

Magnetic and Paleomagnetic

370. Charbonneau, B.W., Geol. Surv. Canada:
A Grenville Front magnetic anomaly, 1968-69.
Entails ground geological and magnetic studies coupled with subsequent laboratory work to explain a large aeromagnetic anomaly approximately 50 miles long by 10 miles wide with a peak amplitude of 2,000 gammas above background values. The magnetic anomaly corresponds to a zone of amphibolites, mixed gneiss and granite gneiss which have been intruded by minor bodies of gabbro and one body of carbonatite-like material. See Geol. Surv. Can., Paper 69-1, 1969.

371. Charbonneau, B.W., Morley, L.W., MacLaren, A.S., Geol. Surv. Canada:
Magnetic anomaly map of Canada, 1965-76.
Compilation of this map involves the technique of removing the magnetic gradient in steps. The first phase was completed in Sept. 1968 culminating in Geol. Surv. Can., Map 1255A, 5 colours, on a scale of 1:5,000,000. Extra data, not available at the time of printing are now being added and a revised edition should be published by 1973.

372. Dunlop, D., West, G.F., Univ. of Toronto:
Monodomain grain studies; Ph.D. thesis (Dunlop).
The program of research on the thermo-magnetic properties of materials containing dispersions of very fine ferromagnetic grams was completed in early 1968. It was shown that the Neel theory, modified to include the effects of grain to grain interaction can quantitatively explain nearly all experiments. The distribution functions needed by the theory to describe statistically the properties of the grains and their interactions can be derived from a set of preliminary measurements on the specimens. Once this is done, the outcome of any further thermo-magnetic experiment can be quantitatively predicted. See Monodomain grain theory - experimental verification; Science, vol. 162, No. 3850, pp. 256-257, 1968.

373. Graterol, V., West, G.F., Univ. of Toronto:
Paleomagnetism of the Sudbury Basin; M.Sc. thesis (Graterol).
A study of the paleomagnetism of a section across the north side of the Sudbury Irruptive at the Strathcona Mine, a region where a careful petrological study has been done by A. Naldret of the Department of Geology. The direction of NRM found was the same as that of Soper and of Hood. Differences between directions of the norite, transition zone, and granophyre were carefully sought but not detected. Considerable differences were found, however, in the magnetic mineralogy and magnetic properties of the formations.

374. Hodych, J., West, G.F., Univ. of Toronto:
Piezomagnetic phenomena; Ph.D. thesis (Hodych).
The instrument system, whereby two components of remanent or induced magnetization of a specimen in a furnace and a uniaxial compression press (or in a hydrostatic press) are measured by dual astatic magnetometers, was finally perfected. A large number of

experiments were made during the summer and are now being analysed. It is expected that it will be possible to state empirical laws for the general piezo-thermomagnetic properties of isotropic rocks.

375. Hood, P.J., Geol. Surv. Canada:
Magnetic gradient techniques, 1963-.
This is primarily a theoretical study, which involves the derivation of formulae for the first vertical derivative over various geometrical models, an analysis of the resultant theoretical curves obtained from the formulae by computer programming, and the development of comprehensive interpretation methods which utilize the various diagnostic parameters, e.g. half widths, of the theoretical curves. See Vertical gradient studies: dipping dyke case and Euler's differential equation; Geol. Surv. Can., Paper 68-1, Pt. A, pp. 14-18, 1968.

376. Hood, P.J., Gross, H., Geol. Surv. Canada:
Portable susceptibility meter, 1965.
The objective is to develop an induction device for measuring the magnetic susceptibility of rocks in situ to aid in the field correlation of magnetic data and geology. See The Carey Foster in situ susceptibility meter; Geol. Surv. Can., Paper 65-22, 1967.

377. Hood, P.J., Sawatzky, P., Geol. Surv. Canada:
High resolution aeromagnetic survey system, 1968-.
Design and fabrication of a light-weight digitally-recording high resolution aeromagnetic survey system for installation in a Queenair B80 aircraft. See High sensitivity aeromagnetic digital recording system; Geol. Surv. Can., Paper 68-1, Pt. B, pp. 29-30, 1968.

378. Hood, P.J., Sawatzky, P., Bower, M.E., Geol. Surv. Canada; Godby, E.A., Baker, R.C., Davis, N., National Aeronautical Establishment:
Ocean aeromagnetics, 1962-.
The objectives are: (1) to conduct high resolution aeromagnetic surveys over the Canadian Continental Shelves for purposes of delineating sedimentary basins, and (2) to obtain and study magnetic imprinting of oceanic rocks, ocean floor spreading and continental drift. See Aeromagnetic profiles across the Reykjanes Ridge southwest of Iceland; Jour. Geophys. Res., vol. 73, No. 24, 1968.

379. Irving, E., Observatories Branch, Dept. of Energy, Mines and Resources, in collaboration with Donaldson, A., Carleton Univ.:
Paleomagnetism of Precambrian rocks of Hornby Bay region, Great Bear Lake, Northwest Territories, 1968-70.

380. Irving, E., Roy, J.L., Observatories Branch, Dept. of Energy, Mines and Resources:
Magnetic properties of ocean floor rocks, 1968-.
See Measurement of polarity in oceanic basalt; Can. Jour. Earth Sci., vol. 5, p. 1319, 1968.

381. Kornik, L.J., Geol. Surv. Canada:
Regional aeromagnetic-geologic correlation of a portion of the Churchill Province, 1965-.
A regional study to correlate geology with magnetic patterns and anomalies by means of in situ magnetic susceptibility and remanent magnetism measurements of oriented samples. Magnetic susceptibility and remanent magnetism data from a large area in Manitoba and Saskatchewan were gathered to assist in an interpretation of the

regional magnetic anomalies. See Regional magnetic susceptibility survey in Manitoba and Saskatchewan; Geol. Surv. Can., Paper 68-1, Pt. B, pp. 18-22, 1968.

382. Larochelle, A., Schwarz, E.J., Symons, D.T.A., Pearce, G.W., Christie, K.W., Geol. Surv. Canada:
Research in paleomagnetism and rock magnetism, 1958-.
Includes designs of new instruments, development of techniques of interpretation, studies on fundamental magnetic properties of rocks and minerals and of paleomagnetic data. See Paleomagnetism of the Monteregian Hills: new results; Jour. Geophys. Res., vol. 73, No. 10, 1968, and Magnetic phases in natural pyrrhotite $Fe_{.89}S$ and $Fe_{.91}S$; Jour. Geom. and Geoel., vol. 20, No. 2, 1968.

383. Middleton, R.S., Ontario Dept. of Mines:
Magnetic survey of Robb-Jamieson townships, District of Cochrane, Ontario, 1968-69.
Detailed remnant magnetism and magnetic susceptibility control will be used in the interpretation of the map. Known geological information, other geophysical surveys and the interpreted magnetic map will be combined to give a "total coverage" geological map.

384. Park, J.K., Observatories Branch, Dept. of Energy, Mines and Resources:
Chemical demagnetization of rocks.
The techniques for this work are being developed, the objective being to obtain a method for discovering which magnetic components are responsible for the magnetization of red sediments.

385. Robertson, W.A., Observatories Branch, Dept. of Energy, Mines and Resources:
Paleomagnetism of the Proterozoic rocks of Lake Superior region, 1967-75.
A systematic paleomagnetic survey of the thick late Precambrian sequences in this region is being undertaken to determine the variations in the field at this time.

386. Robertson, W.A., Roy, J.L., Observatories Branch, Dept. of Energy, Mines and Resources:
Paleomagnetism of the Proterozoic of Canada, 1967-80.
Involves the determination of the direction and intensity of the earth's magnetic field as expressed in the Proterozoic rocks particularly the Keeweenawan of Canada. The work will include detailed studies (both of direction and intensity) of restricted age ranges to obtain the age relations of normally and reversely magnetized rocks, and to set up palaeomagnetic time horizons in conjunction with radiogenic dating. Where possible results will be used to test the validity of extrapolating the hypothesis of the dipole field and secular variation back into Precambrian time. See Dating the Precambrian palaeomagnetically; Can. Jour. Earth Sci. (in press).

387. Roy, J.L., Observatories Branch, Dept. of Energy, Mines and Resources:
Paleomagnetism of Devonian and Mississippian Formations, 1968-71.
The purpose is to complete a polar wandering curve of the apparent dipole field from Devonian to Permian.
Paleomagnetism of the Cumberland Group (Carboniferous) of Nova Scotia, 1967-69.
Paleomagnetism of the Fisset Brook Formation (Carboniferous), Nova Scotia, 1967-72.

388. Roy, J.L., Park, J.K., Observatories Branch, Dept. of Energy, Mines and Resources:
Magnetic properties of some Mississippian formations, 1965-68.

389. Roy, J.L., Robertson, W.A., Park, J.K., Observatories Branch, Dept. of Energy, Mines and Resources:
Palaeomagnetism of the Carboniferous rocks of Eastern Canada, 1969-.
Directions of remanent magnetization of Carboniferous rocks from the Maritime Provinces are being tested for stability, and pole positions calculated from those that appear to be magnetized in the direction of the magnetic field when they were formed. The aim of the work is to elucidate the movement of North America relative to the pole in the Carboniferous period and give the pattern of reversals of the earth's magnetic field for this period for comparison with other continents.

390. Strangway, D.W., Patel, J., Univ. of Toronto:
Paleointensity of the Earth's magnetic field, 1968-; Ph.D. thesis (Patel).
This work is in preparation for studies on returned lunar samples. Intensity studies have been done on a variety of volcanic rocks and will continue. See Magnetic paleointensity of a recent basalt from Flagstaff, Arizona; Jour. Geophys. Res., vol. 73, No. 22, 1968.

391. Strangway, D.W., Stesky, R., Watts, R., Redman, D., Univ. of Toronto:
Paleomagnetism, 1968-; M.Sc. thesis (Stesky), Ph.D. thesis (Watts).
The main thrust of this research is to study the magnetism in sediments. Eocene, varved sediments (Green River) are being studied in an attempt to find secular variation. Magnetic stratigraphy and the mineralogy of the series of sediment cores from the mid-Atlantic ridge are also under investigation. Permian, evaporite, banded sediments from New Mexico show sufficient magnetization to look for secular variation in the Permian.

392. Thomas, M.D., N.R.C. Postdoctorate Fellow, Geol. Surv. Canada:
Aeromagnetic interpretation - central British Columbia, 1968-69.
Includes geological interpretations of total force aeromagnetic maps of the Western Cordillera by correlating aeromagnetic patterns, ground magnetic and susceptibility measurements with known geology and extrapolating these results to new areas. See Aeromagnetic interpretation in central British Columbia; Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

393. Washkurak, S., Geol. Surv. Canada:
Overhauser magnetometer, 1963-.
The design, construction and testing of an Overhauser continuous reading nuclear magnetometer. See A master proton precession magnetometer; Geol. Surv. Can., Paper 66-2, pp. 29-30, 1966.

394. York, D., Baksi, A.K., Univ. of Toronto:
Chronology of reversals of geomagnetic field, 1965-; Ph.D. thesis (Baksi).
See The age of the Steens Mountain geomagnetic polarity transition; Jour. Geophys. Res., vol. 72, p. 6299, 1967.

Radioactivity

395. Doig, R., McGill Univ.:
Study of the natural radiation environment, 1962-68.
See The natural gamma-ray flux: in situ analysis; Geophysics, vol. 33, pp. 311-328, 1968.

Seismic

396. Barr, K.G., Tyrlik, W.T., Berry, M.J., Forsyth, D.A., Bone, M.N., Observatories Branch, Dept. of Energy, Mines and Resources:
Seismic crustal studies throughout Canada, 1964-.
Studies of the crust and upper mantle throughout Canada including the Arctic by seismic means, including theoretical studies: a project near Yellowknife is nearing publication, recent Cordilleran and Polar Continental Shelf Projects are under active analysis, and a major field operation along the Grenville Front has just been successfully completed. See Evidence for variations in Upper Mantle velocity in the Hudson Bay area; Earth Science Symposium on Hudson Bay, Geol. Surv. Can., Paper (in press), 1968.

397. Bidgood, D.E.T., Nova Scotia Research Foundation:
Hammer seismic surveys in groundwater studies, 1965-.
Refraction and reflection hammer seismic methods are used to study depth of bedrock surface and nature of superficial deposits.

398. Bidgood, D.E.T., Jost, A., Nova Scotia Research Foundation:
Gravity surveys in Nova Scotia, 1966-.
Existing gravity coverage in central and northern Nova Scotia with stations at 1,000-foot intervals along roads, tracks and cut lines is being systematically checked and recalculated on a digital computer. Data files will be set up on magnetic disc. A single plotting routine is used to prepare station location maps. Other computer programs are used to do trend surface analysis and the plotting and contouring of new data, trend surfaces, and residuals.

399. Bidgood, D.E.T., Zwicker, D., Nova Scotia Research Foundation:
Sparker surveys in Nova Scotian coastal waters, 1967-.
Continuous seismic profiler traverses in the Bay of Fundy, Canso Strait, Halifax Harbour and Cape Sable areas have been carried out to study bottom sediments and bedrock structure. Part of this work was carried out in conjunction with Dalhousie University.

400. Charlesworth, H.A.K., Gough, D.I., Univ. of Alberta:
Portage Mountain damsite, Alberta, 1967-77.
Study of seismic activity associated with filling of the reservour.

401. Dampney, C., Dainty, A., Kingwell, L., West, G.F., Univ. of Toronto:
Seismology, theory and computation - a continuing project; M.Sc. thesis (Kingwell), Ph.D. thesis (Dumpney).
Programs have been developed to compute theoretical seismograms for two dimensional wave propagation in a half space and in two-half spaces in contact, using adaptations of formulae derived by Sherwood; and to compute the leading modes and complete seismograms for a point source in a layered elastic medium. Tests show

that published leading mode seismograms of Gilbert and Laster can be duplicated and new examples of more seismological interest are being computed. A theoretical study has been made of the effectiveness of a small (about 8 seismometer) array in improving signal to noise ratio in seismic recording. The results have application mainly in seismic refraction surveying. It appears that a small array and very simple processing can be useful.

402. Leblanc, G., Université Laval:
Etude préliminaire de la micro-séismicité de la région située su nord-ouest de la ville de Quebec, 1967-70.
La vallée du St-Laurent, au nord de Québec, est connue comme une zone assez active au point de vue séismique. Le but de la présente étude est de déterminér à l'aide des très petits tremblements de terre la courbe qui caractérise toute la séismicité de la région.
Etude théorique d'une méthode visant à déterminer la croûte terrestre à l'aide de l'analyse de signaux séismiques, 1967-69.
La croûte agit sur le signal séismique comme un filtre. Son influence est considérable et très caractéristique. Partant de modèles probables, des filtres théoriques sont calculés et appliqués à une approximation de l'impulsion. Par comparaison avec le séismogramme enregistré, on tente de choisir le filtre optimum, qui théoriquement se doit de correspondre à la structure de la croûte à la station. See Truncated crustal transfer functions and fine crustal structure determination; Bull. Seismol. Soc. Amer., vol. 57, pp. 719-733, 1967.

403. Gantela, C., Univ. of Saskatchewan:
Interpretation of Hudson Bay crustal seismic data, 1968-69; M.Sc. thesis.
A study of initial and converted ware arrivals using particle motion analysis of available three component arrays from 1965 Hudson Bay experiments.

404. Gendzwill, D.J., Saskatchewan Research Council:
Geophysical measurements in Saskatchewan potash mines, 1964-68.
Geophysical methods are being used to monitor the thickness of salt formation.

405. Grant, A.C., Bedford Institute, Nova Scotia:
Seismic profiles survey of Ungava Bay-Hudson Strait, 1966-68.
Seismic profiles survey of the Continental Shelf off Labrador, 1967-69; Ph.D. thesis Dalhousie Univ.
See Seismic profiles investigation of the Continental Margin, northeast of Newfoundland; Can. Jour. Earth Sci., vol. 5, No. 5, pp. 1187-1198, 1968.

406. Halls, H., Dampney, C., West, G.F., Univ. of Toronto:
Seismology, Lake Superior - laboratory work; Ph.D. theses (Halls and Dampney).
The measurements of p wave velocity in core specimens from the Lake Superior region at confining pressure to 2k were completed. A detailed analysis of the data, particularly on the basalt samples, shows the effects of density, porosity, texture, mineral composition and metamorphic grade on the velocity. The results are being integrated with the interpretation of the twenty-odd refraction profiles obtained in the past three summers. Two-dimensional seismic model studies are being carried on again. Attention has been given to quantitative calibration of the system by comparing experimental with

exact theoretical seismograms. The frequency spectrum and radiation pattern of the transducers has been obtained. Methods of constructing 2-dimensional models containing an irregular velocity interface have been explored.

407. Halls, H., Kunar, L., West, G.F., Univ. of Toronto:
Seismology, Lake Superior - field work; Ph.D. theses (Halls and Kunar).
Eleven additional seismic refraction profiles were obtained in Lake Superior during August using the single ship sonobuoy method.

408. Hasegawa, H.S., Observatories Branch, Dept. of Energy, Mines and Resources:
Crustal studies by deconvolution of teleseisms, 1966-.
Slow speed frequency-modulated tape systems are used to understand how local crustal structure affects the character of the seismic signal. Research in both the time and frequency domains is necessary on the digital tapes generated. Work in the plains area is published, and data has now been collected in two shield areas and is under analysis. See Crustal characteristics from short period P waves; Bull. Seismol. Soc. Amer., 1968 (in press).

409. Hobson, G.D., Geol. Surv. Canada:
Hammer seismic surveys, 1962-.
Shallow seismic methods, both refraction and reflection techniques, can be applied to the definition of problems in mining, engineering and groundwater studies. Reflected shear waves have been recorded on a hammer seismograph to determine thickness of glacial ice. See Hammer seismic survey, Moncton map-area, New Brunswick 21 1/2; Geol. Surv. Can., Paper 65-43, 1965.
Seismic methods in the Canadian Shield, 1963-.
Seismic reflection and refraction techniques should be able to define structure within the shield areas. Proterozoic basins can be defined and interfaces have been detected at depth. The possibility of delineating orebodies will be investigated using frequency and amplitude parameters as well as velocity variations.

410. Hobson, G.D., Geol. Surv. Canada, and Inland Waters Branch, Dept. of Energy, Mines and Resources:
Seismic surveys - Great Lakes, 1966-.
To conduct continuous profiling marine seismic investigations of the water-bottom interface, the nature of the unconsolidated bottom sediments and stratification within those materials, and the bedrock topography underlying the unconsolidated materials. A repetitive source, electrical or electromagnetic, is used to initiate seismic energy which is detected by hydrophones. Side-scanning sonar devices will be used to assist in the identification of bottom materials. The acoustical properties of the bottom sediments will also be studied. These experiments are complementary to the sedimentary and limnological studies carried out concurrently.

411. Hobson, G.D., Overton, A., Geol. Surv. Canada:
Marine seismic - Gulf of St. Lawrence, 1964-69.
Two-ship marine seismic refraction experiments to investigate the thickness, nature and attitude of the sedimentary rocks underlying the Gulf of St. Lawrence to the depth of the crystalline basement.

412. Lennox, D.H., Carlson, V.A., Research Council of Alberta:
The seismic method in exploring for buried channels near Stavely, Alberta, 1958-68.

413. Manchee, E.B., Weichert, D.H., Anglin, F., Basham, P.W., Whitham, K., Observatories Branch, Dept. of Energy, Mines and Resources:
Array seismology, 1962-.
This project embraces research into detection and identification methods for explosions as well as general research into the characteristics of earthquakes and earth structure as they may be delineated by a medium aperture array. The outputs of U.K.A.E.A.-type arrays are analysed by analogue-digital means in Ottawa. See Upper Mantle structure under the Churchill Province of the Canadian Shield, east of the Yellowknife seismic array; Jour. Phys. Earth, March, 1969.

414. Milne, W.G., Smith, W.E.T., Rogers, G.C., Whitham, K., Observatories Branch, Dept. of Energy, Mines and Resources:
Seismic regionalization of Canada, including microearthquake studies - a continuing study.
Seismicity of Canada including epicentral and magnitude determinations, strain release maps, earthquake recurrence relations and extreme value theorem estimates of ground accelerations and intensities. In addition strong motion studies are being conducted on the west coast, and microearthquake studies pursued in the Arctic, British Columbia, and Eastern Canada. See Distribution of earthquake risk in Canada; Bull. Seismol. Soc. Amer., 1968 (in press).

415. Savage, J.C., Hastie, L.M., Univ. of Toronto:
Dislocation models of faulting, 1966-68; Ph.D. thesis (Hastie).
Fitting of dislocation models to observed geodetic fault displacements. See Steketee's paradox; Bull. Seismol. Soc. Amer., vol. 59, No. 1, 1969.

416. Savage, J.C., Neave, K.G., Univ. of Toronto:
Icequakes on the Athabasca glacier, 1966-69; Ph.D. thesis (Neave).
Seismicity and nature of faulting on a glacier. See Trans. Amer. Geophysical Union, vol. 49, p. 300, 1968 (abstract only).

417. Simard, P.P., Germain, M., Quebec Dept. of Natural Resources:
Seismic surveys at Pointe du Lac, Yamachiche and Sorel, Quebec, 1968.
The purpose was to obtain a profile of the bedrock in areas covered by 150 to 200 feet of clay over a layer of sand containing pockets of gas. The survey will serve to test the theory that the gas accumulations may have been helped by domal configurations of the bedrock.

418. Stevens, A.E., Hodgson, J.H., Observatories Branch, Dept. of Energy, Mines and Resources:
Earthquake mechanisms from P and S waves - a continuing study.
A study of earthquake focal mechanisms from the analysis of distribution patterns and other physical characteristics of body and surface waves, including research into improving our knowledge of focal mechanisms. See A study of P nodal solutions (1922-1962) in the Wickens-Hodgson catalogue; Bull. Seismol. Soc. Amer., vol. 58, pp. 1071-1082, 1968.

419. Take, W.F., Nova Scotia Research Foundation:
Geological interpretation of hammer-seismic bedrock data, 1967-.
The objective is the development of a practical method whereby bedrock formations and lithologies may be identified by a consideration of the possible formations involved, their lithological associations, seismic velocities, and expressive topography.

420. Tiffin, D.L., Murray, H.W., Univ. of British Columbia:
Continuing seismic profiling in the Strait of Georgia, British Columbia, 1966-68; Ph.D. thesis (Tiffin).
An attempt to outline the distribution of the Recent and Pleistocene sediments in the Strait of Georgia and to show the structure of the underlying bedrock. See Mapping the offshore shelf with continuous seismic; Oilweek, vol. 7, No. 38, pp. 48-51, 1966.

421. Wickens, A.J., Observatories Branch, Dept. of Energy, Mines and Resources:
Surface wave studies, 1962-.
A study of mean crustal and upper mantle structure for all major geological units in Canada using the seismic network of long period instruments. See A crust-mantle profile from Mould Bay, Canada to Tucson, Arizona; Bull. Seismol. Soc. Amer., 1968 (in press).

General Problems

422. Bhattacharyya, B.K., Geol. Surv. Canada:
Quantitative interpretation of aeromagnetic data, 1962-.
At present investigations are being carried out to develop reliable methods of automatic compilation and treatment of high resolution aeromagnetic data recorded digitally on magnetic tape. The interpretation of small amplitude, short wavelength features observed in the data is also receiving a great deal of attention. See Some general properties of potential fields in space and frequency domain: a review; Geoexploration, vol. 5,pp. 127-143, 1967.

423. Bidgood, D.E.T., Blanchard, J.E., Take, W.F., Nova Scotia Research Foundation:
Geophysical investigations of evaporites in Nova Scotia, 1956-.
Gravity, magnetic, seismic, bore hole geophysical and geological logs, provide data on occurrance and mineral prospects of salt intrusions in Nova Scotia. See Geophysical investigations of evaporites in Nova Scotia; Proc. Can. Centennial Conf. on Mining and Groundwater Geophys. (in press).

424. Darnley, A.G., Grasty, R.L., Geol. Surv. Canada:
Airborne gamma-ray spectrometry, 1966-71.
The objective is to develop an airborne gamma-ray spectrometer system for making contoured maps of K, U and Th content of surface materials. See Airborne gamma-ray spectrometer experiments over the Canadian Shield; I.A.E.A. Symposium on the Use of Nuclear Techniques in the Prospecting and Development of Mineral Resources (in press).

425. Darnley, A.G., Slaney, V.R., Grasty, R.L., Geol. Surv. Canada:
Gamma-ray support, 1967-71.
Ground and laboratory investigations (geological, geophysical, geochemical and petrological) to complement airborne investigations and also to provide ground calibration for quantitative use of airborne data. See Evaluation of airborne gamma-ray spectrometry in the Bancroft and Elliot Lake areas of Ontario, Canada; Proc., Fifth Symposium on Remote Sensing of Environment, Univ. of Michigan, Ann Arbor, Michigan.

426. de la Cruz, S., Tozer, D.C., Univ. of Toronto:
Studies in thermal convection, 1968-69; M.Sc. thesis (de la Cruz).

The motivation is to model certain aspects of convection expected to occur on a large scale in the Earth. However, such studies are of considerable hydrodynamic interest. The liquid is directly heated throughout its bulk by alternating current, the liquid being constrained by parallel horizontal rigid boundaries. The upper boundary is maintained at a fixed temperature. The temperature of the lower boundary is observed, which also gives information about the pattern of flow. Previous studies have indicated unusual convection cell shapes with this mode of heating and we wish to examine this with a liquid of higher Prandtl number. The influence of lateral boundaries on possible modes of motion of such a convecting layer will also be studied.

427. Dence, M.R., Robertson, P.B., Observatories Branch, Dept. of Energy, Mines and Resources:
Shock metamorphism in Canadian craters, 1962-.
Deformation attributed to high-pressure shock waves has been identified at sixteen Canadian craters. A scheme of progressive shock deformation or metamorphism has been worked out from the material available from these craters and is in substantial agreement with recent experimental studies of similar minerals. This work is progressing in collaboration with American workers and with Canadian investigators at D.R.B. Suffield Research Station where rock materials have been shocked by large TNT explosions. See Shock zoning at Canadian Craters: petrography and structural implications; Contr. Dom. Obs., vol. 8, No. 26, 1968.

428. Dence, M.R., Robertson, P.B., Innes, M.J.S., Halliday, I., Griffin, A.A., Popelar, J., Observatories Branch, Dept. of Energy, Mines and Resources:
Geological and geophysical studies of Canadian craters, 1953-.
The recognition of the Charlevoix (La Malbaie) Quebec and Mistastin Lake, Labrador craters raises the number of ancient meteorite craters in Canada to 16. Gravity data are available for 14 of these craters, notably for the Manicouagan and Sudbury structures and are currently being interpreted by J. Popelar and M.R. Dence. Further drilling at the Brent crater in 1967 was successful in yielding two holes which, with previous drilling results, give a detailed profile of the entire crater. These cores are being studied by M.R. Dence. Sedimentary sections of the core are being studied by Prof. F.W. Beales, Univ. of Toronto and heat-flow measurements have been taken by Prof. A. Beck, Univ. of Western Ontario. See On the possibility of a catastrophic origin for the Great Arc of Eastern Hudson Bay; Contr. Dom. Obs., vol. 4, No. 29, 1968.

429. Gendzwill, D.J., Dyck, J., Pepper, T.P., Saskatchewan Research Council:
Geophysical prospecting for groundwater in southern Saskatchewan, 1963-70.
Evaluation and development of geophysical methods, particularly electrical, gravity, seismic, and well logging techniques in their application to groundwater problems.

430. Hastie, L.M., Univ. of Toronto:
Study of dislocation effects by holography, 1966-69; Ph.D. thesis.
The intention is to use the holographic imaging technique to study the displacements at the free surface of a large elastic body containing a buried dislocation with application to tectonics.

431. Hattersley-Smith, G., Defence Research Board:
Geophysical research in the Arctic, 1963-.
Includes glaciological, meteorological, and oceanographic studies in northwestern Ellesmere Island. See Glacial features of Tanquary Fiord and adjoining areas of northern Ellesmere Island, N.W.T.; Jour. of Glaciology, vol. 8, No. 52, 1969 (in press).

432. Haugh, I., Manitoba Mines Branch:
Southern Indian Lake area, Manitoba, 1969-71.
Includes geological and structural field studies with geophysical and laboratory support.

433. King, M.S., Univ. of Saskatchewan:
Mechanical state of rock approaching failure, 1967-72.
The initial aim of this research is to determine the static stress-strain relationships and acoustic wave velocities on rock samples approaching failure under triaxial loading conditions. The rock samples will be tested in a hydraulic compression machine which has been stiffened to eliminate machine "bounce" at failure of the rock sample. It is then proposed to perform harmonic analyses on microseismic "noise" produced when a rock approaches failure, both in the laboratory and underground in a mine. This research will lead to a better understanding of the mechanism of rock failure, with applications in the prediction of earthquakes.

434. King, M.S., Garg, O.P., Univ. of Saskatchewan:
Static and dynamic elastic properties of rocks, 1967-71; M.Sc. thesis (Garg).
The elastic properties of sedimentary rocks are being measured by static and dynamic techniques. The static elastic moduli and ultrasonic compressional and shear-wave velocities are measured simultaneously on each rock sample as it is subjected to changes in triaxial loading conditions. This research will lead to a better understanding of the reasons for the elastic moduli of rocks measured under static conditions differing from those determined by dynamic techniques. See Ultrasonic compressional and shear-wave velocities in confined rock samples; Fifth Canadian Symposium on Rock Mechanics, 1968.

435. Koulomzine, T., Lavoie, C., Ecole Polytechnique:
Comparative study of electrical and electromagnetic methods as applied to the search for sulphide deposits, 1966-69; M.Sc. thesis (Lavoie).
Three known cases have been chosen where a body of pyrite is covered by a thick mantle 70-100' of particularly wet clay overburden topped by a swamp. The problem is to determine which geophysical method will give positive indications in spite of particularly difficult conditions.

436. Koulomzine, T., Lamontagne, Y., Nadeau, A., Sylla, N'F., Ecole Polytechnique:
Study of methods of interpretation of magnetic and gravity anomalies, 1968-70; M.Sc. theses (Lamontagne, Nadeau, Sylla).
Using a GE-234 computer, 3,294 curves of magnetic anomalies caused by prisms, lenses and combined prisms have been calculated. It is hoped to construct secondary master curves to separate field curves into their symetric and antisymetric components which are amenable to simple interpretation by logarithmic master curves.

437. Koulomzine, T., and graduate students, Ecole Polytechnique:
Systematic study of the geophysical properties of the unconsolidated rocks of the St. Lawrence Lowlands, 1966-69.

438. Lennox, D.H., Carlson, V.A., Bukhari, S.A., Research Council of Alberta:
Geophysics in groundwater exploration, 1957-.
See Geometric coefficients for use in numerical resistivity analysis; Res. Coun. Alta., Bull. 19, 234 p., 1966.

439. McGrath, P., Hood, P.J., Geol. Surv. Canada:
Geophysical study of the Appalachian region, 1967-.
A study of all available geophysical data in order to throw light on the geology of the Appalachian region with particular emphasis on areas where the sediments might be oil-bearing. In situ magnetic susceptibility data and drill cores for remanence measurements were collected in southern New Brunswick during the summer of 1968 to assist in the interpretation of aeromagnetic anomalies. See An interpretation of the Miramichi Bay magnetic anomaly, New Brunswick; Maritime Sediments, vol. 4, No. 1, pp. 11-13, 1968.

440. Savage, J.C., Pandit, B.I., Univ. of Toronto:
Internal friction in rocks, 1967-69; Ph.D. thesis (Pandit).
Measurement of internal friction in rocks over a broad frequency range to determine attenuation mechanism. See Evidence for a linear attenuation mechanism; Geophysics, vol. 32, pp. 1003-1014, 1967.

441. Savage, J.C., White, W.R.H., Univ. of Toronto:
Rayleigh wave dispersion, 1968.
A new method of mapping the dispersive characteristics of the Pacific basin. See A new method of analyzing the dispersion of oceanic Rayleigh waves; Jour. Geophys. Res. (in press).

442. Slaney, V.R., Geol. Surv. Canada:
High altitude photography and satellite imagery, 1968-.
An investigation of the use of colour and other films from high altitude aircraft for geological purposes and evaluation of satellite imagery as a source of geological information.

443. Slaney, V.R., Gross, H., Geol. Surv. Canada:
Infrared scanning, 1966-.
An investigation of the applicability of the airborne I.R. linescanner for geological and hydrological purposes. See Airborne infrared scanning survey along the shorelines of the Lower Great Lakes; Proc. 2nd Seminar on Air Photo Interpretation in the Development of Canada, Ottawa, March, 1967.

444. Sobczak, L.W., Weber, J.R., Roots, E.F., Observatories Branch, Dept. of Energy, Mines and Resources:
Geophysical investigations over the Queen Elizabeth Islands and the continental margin, 1967-69.
The results of gravity and aeromagnetic surveys over the Queen Elizabeth Islands, Continental Shelf, and Continental Margin and of a seismic survey across the Queen Elizabeth Islands are interpreted. The gravity anomalies over the Queen Elizabeth Islands can generally be explained by surface geology but a large positive anomaly on the Continental Margin is attributed to the transition from continental crust to intermediate crust which may or may not be oceanic.

445. Stacey, R.A., Goodacre, A.K., Cooper, R.V., Observatories Branch, Dept. of Energy, Mines and Resources:
West Coast geophysical survey, 1966-.
Areas include Cape Flattery to Cobb Seamount (gravity, magnetic and bathymetric measurements), Strait of Georgia (gravity, magnetic, bathymetric and continuous seismic profiling), Juan de Fuca Strait (gravity, magnetic and bathymetric measurements), and gravity, magnetic, bathymetric and C.S.P. (to 500 fathoms only) perpendicular to coast of Vancouver Island between Cape Flattery and Ucleulet.

446. Weber, J.R., Andrieux, P., Observatories Branch, Dept. of Energy, Mines and Resources:
Ice thickness determinations on the Penny Ice Cap, Baffin Island, 1965-68.
The first successful radar echo soundings through glacier ice in Canada were carried out in 1965 on an outlet glacier of the Penny Ice Cap. An unmodified 440 MHz SCR-718 radar altimeter, of the type readily and inexpensively available on the surplus market, was used. The radar soundings were generally in agreement, within the range of the reading accuracy of the oscilloscope (± 15 m), with those depths obtained seismically, gravimetrically, and by the electric resistivity method. The minimum and maximum recorded depths were 45 m and 550 m, respectively.

447. Wyder, J.E., Geol. Surv. Canada:
Borehole and related geophysical techniques, 1968-.
Evaluation of potential use of borehole geophysical techniques as tools for studying Quaternary deposits. Present capability includes: electrical, caliper, neutron-neutron, natural gamma, gamma-gamma, temperature and fluid resistivity. 40,000 feet of logging has been completed. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

MINERAL DEPOSITS

Base Metals

448. Allen, D.G., Clark, A.H., Queen's Univ.:
Mineralogy and geochemistry of the Galore Creek copper deposit, British Columbia, 1967-69; Ph.D. thesis (Allen).
A study of the sulphide and alteration minerals of porphyry copper deposit, stressing phase relationships in systems involving biotite, K-feldspar, sphalerite, pyrite, and magnetite.

449. Beales, F.W., Univ. of Toronto:
Limestone petrography and paleoecology - a continuing study.
Present emphasis of research is on stratigraphic aspects of lead-zinc mineralization of Mississippi Valley-type; with particular interest in the sedimentary paleoecology of the host limestones and the bearing this may have on the mineralization. See Pine Point - a stratigraphical approach; Can. Inst. Min. & Met., Bull., July, 1968.

450. Beaton, W.D., McGill Univ.:
Cobalt and nickel content of the major sulphide minerals from the Lake Dufault Mine, Quebec, 1965-69; Ph.D. thesis.

451. Beswick, A.E., Laurentian Univ.:
Alkali metal distributions between sanidine, levcite, phlogopite and granite glass, 1965-70.
The objective is to obtain partition coefficients for the transition metals which would then be applied to the rocks of the Sudbury nickel irruptive in the hope of further elucidating the genetic history of these rocks and their associated ores. See The distribution of potassium and rubidium between sanidine and phlogopite; Abstract, Geol. Soc. Amer., Annual Meeting, 1968.

452. Blecha, M., McGill Univ.:
The origin of the Breton breccia, Batchawana area, Ontario, 1967-68; Ph.D. thesis.

453. Boyle, R.W., Geol. Surv. Canada:
Lead and sulphur isotope geology of Keno and Galena Hills, Yukon, 1958-69.

454. Brown, A., Queen's Univ.:
A structural investigation of the Opemiska Mine, 1961-68; Ph.D. thesis.
An exhaustive structural study involving all observable structural elements.

455. Campbell, F.A., Univ. of Calgary:
Equilibration of sphalerite in natural sulphide assemblages, 1967-69.
This is a continuing project which employs microprobe analytic data to determine the degree and scale of equilibration in natural sulfide assemblages. See Composition of sphalerite from Quemont Mine, Quebec; Econ. Geol., vol. 63 (in press).

456. Carr, J.M., British Columbia Dept. of Mines and Petroleum Resources:
Geology of the Brenda Lake area, British Columbia, 1966-68.
An investigation of the ore controls affecting the Brenda copper-molybdenum orebody and adjacent similar mineralization. See Minister of Mines, B.C., Ann. Rept, 1967, pp. 183-210.

457. Carter, N.C., British Columbia Dept. of Mines and Petroleum Resources:
The age of some porphyry type mineral deposits in west-central British Columbia, 1967-69; Ph.D. thesis, Univ. of British Columbia.
Samples for potassium-argon age determinations were collected from 18 porphyry type copper and molybdenum deposits to determine the age of mineralization. To date, some 20 samples have been analyzed, between 40 and 50 will have been completed by mid-1969. See The age of some mineral deposits in British Columbia; Can. Inst. Min. Metal., Bull., Nov. 1968.

458. Chamberlain, J.A., Geol. Surv. Canada:
Geology of Canadian nickel and platinum group deposits, 1963-.
See Some geochemical factors in nickel exploration: in Guidelines to Prospecting; Can. Min. Jour., May 1968.

459. Clark, L.A., McGill Univ.:
Some aspects of the genesis of stratiform cupriferous pyrite deposits in Cyprus, 1967-70.
Investigation of field relations, ore textures and chemical aspects of associated alteration.

Genesis of stratiform base metal sulfide ores of volcanic affinity in Japan, Kuroko deposits, 1966-69.
Investigation covers field relations, ore textures, and mineralogy, alteration, chemical study of rhyolite composition changes, and sulfur isotopes.

460. Clark, A.H., Farrar, E., Queen's Univ.:
Metallogenetic and geochronological studies of the copper province of the northern Chilean Andes, 1967-72.
The time-space relationships of copper and related mineralization in this important province are under study, utilizing radiometric dating of ores and their host rocks, and geochemical investigations of intrusive volcanic and sedimentary units.

461. Clark, A.H., Lortie, R.B., Zentilli, M., Queen's Univ.:
Genesis and environment of formation of disseminated, strata-bound copper deposits, Copiapo region, northern Chile, 1967-71; M.Sc. thesis (Lortie), Ph.D. thesis (Zentilli).
Reconstruction of the volcano-sedimentary paleogeography of the uppermost Cretaceous Hornitos Formation is contributing to an understanding of the genesis and controls of this potentially important type of copper deposit associated with continental pyroclastics.

462. Cranstone, D.A., Manitoba Mines Branch:
Geological mapping in the Setting Lake area (Pakwa Lake and Pistol Lake, east-half, map sheets) and geological study of the entire Manitoba nickel belt, 1968-72.

463. Crocket, J., Chyi, L., McMaster Univ.:
Platinum metal geochemistry at the Strathcona Mine, Sudbury, Ontario, 1964-70.

464. Crocket, J., Schwarcz, H., Burnie, S., McMaster Univ.:
Sulfur isotope geochemistry of the White Pine copper deposit, 1967-70; M.Sc. thesis (Burnie).

465. Desjardins, R.H., Queen's Univ.:
Copper mineralization in the Lower Albanel Group, O'Sullivan township, Quebec, 1967-79; M.Sc. thesis.

466. Ek, J. (visiting scientist), Geol. Surv. Canada:
Accumulation and statistical study of data on stream sediment geochemical anomalies in Nova Scotia, 1968.
A preliminary report on the distribution of copper, lead and zinc in stream sediments of parts of northeastern Nova Scotia has been submitted for publication in the Geological Survey Paper Series reports.

467. Fenwick, K.G., Michigan Technological Univ.:
Syngenetic or epigenetic origin of the pyrite occurrence northeast of Finlayson Lake, Ontario, 1967-69; M.Sc. thesis.

468. Folinsbee, R.E., Cumming, G.L., Krouse, R.H., Baadsgaard, H., Sasaki, A., Fritz, P., Jackson, S.A., Greig, J., Univ. of Alberta:
Stratiform lead-zinc deposits of the world, 1965-71; Ph.D. theses (Jackson and Greig).
Special emphasis on telethermal lead-zinc occurrences in carbonate basins (Pine Point, Mississippi Valley, Waulsortian Bank of Ireland, Silesia (Poland); employing isotopic methods of investigation, oxygen, carbon, sulfur, and lead.

469. Gale, G.H., Memorial Univ. of Newfoundland:
Primary dispersion patterns of trace elements associated with several base metal deposits in the volcanic rocks of the Notre Dame Bay area, Newfoundland, 1967-68; M.Sc. thesis.

470. Gill, J.E., McGill Univ.:
Behaviour of sulphides at elevated temperatures and pressures, 1955-.
See Recent research on sulphides at McGill University; Can. Inst. Min. and Metall., Bull., vol. 58, No. 641, pp. 994-997, 1965.

471. Girard, P., McGill Univ.:
The copper deposit of Madeleine Mines Ltd., Gaspé Nord, Quebec, 1967-70; thesis project.

472. Goble, R.J., Morton, R.D., Univ. of Alberta:
Paragenesis of the copper deposits in the Grinnell Formation-Purcell series, of southwestern Alberta and southeastern British Columbia, 1968-70; M.Sc. thesis (Goble).
The Grinnell Formation has been found to carry widespread deposits of chalcocite and bornite and, to a lesser extent, of chalcopyrite. This mineralization is mainly confined to the quartzites and argillites of the upper member of the formation and has been found to some extent in all areas where this member occurs. Mineralization is also found in and adjacent to diorite dykes and sills and quartz-siderite veins intruded into the formation in some areas. The purpose of this project is to attempt to determine the origin and mode of occurrence of these deposits.

473. Govett, G.J., Mersereau, T.G., Univ. of New Brunswick:
Geochemical orientation, St. Stephen nickel occurrences, 1967-69; M.Sc. thesis (Mersereau).

474. Govett, G.J., Pilch, P., Univ. of New Brunswick:
Secondary dispersion base metals in vicinity of specific Bathurst ore deposits, 1968-70; M.Sc. thesis (Pilch).

475. Gummer, P., McCartney, W.D., Queen's Univ.:
Geology of a massive, in part concordant, sulphide deposit with associated barite in the Bathurst camp, New Brunswick, 1968-69; M.Sc. thesis (Gummer).

476. Hutchinson, R.W., Johnson, A.E., Bertrand, C., Harron, G.A., Univ. of Western Ontario:
Genetic studies of base metal massive sulphide ore deposits, 1964-; Ph.D. theses (Johnson and Bertrand), M.Sc. thesis (Harron).
Several individual studies (of certain mines or areas) are included within this broad heading. The investigations are broadly based to study conditions of primary sulfide syngenesis as well as secondary sulfide metamorphism. Laboratory and field investigations are included and comparisons between different deposits in differing geological settings are emphasized. See Origin of Canadian massive sulfide ores reconsidered by comparison to Cyprus deposits; CIMM Bull. vol. 58, No. 641, pp. 972-986 and 992-993, 1965.

477. Kindle, E.D., Geol. Surv. Canada:
Geology of copper deposits in Canada, 1960-.
See Copper and iron resources, Whitehorse copper belt, Yukon Territory; Geol. Surv. Can., Paper 63-41, 1964.

478. Koulomzine, T., Lavoie, C., Ecole Polytechnique:
Comparative study of electrical and electromagnetic methods as applied to the search for sulphide deposits, 1966-69; M.Sc. thesis (Lavoie).
Three known cases have been chosen where a body of pyrite is covered by a thick mantle 70-100' of particularly wet clay overburden topped by a swamp. The problem is to determine which geophysical method will give positive indications in spite of particularly difficult conditions.

479. Longe, R., McGill Univ.:
Experimental investigation of strata-bound sulfide deposits, 1966-68; Ph.D. thesis.

480. Mackasey, W.O., Michigan Technological Univ.:
Geology of the Jaculet Mine, Chibougamau, Quebec, 1966-69; Ph.D. thesis.
Study of the general geology of the mine, including a comparison of the No. 1 and No. 2 copper zones. Trace element study of chalcopyrite within the mine.

481. McCartney, W.D., Vasquez, J., Queen's Univ.:
Fluid inclusion and some trace element observations in a Pine Point orebody, Northwest Territories, 1966-68; M.Sc. thesis (Vasquez).

482. Moore, J.C.G., Mount Allison Univ.:
Rock geochemistry as an aid in the search for orebodies in New Brunswick, 1963-70.
Study of the distribution of trace elements around base metal sulphide deposits in northern New Brunswick; usefulness of mercury halos is being investigated.

483. Naldrett, A.J., Univ. of Toronto; Brown, G.M., Univ. of Durham:
Study of chemical equilibria between Fe-Mg pyroxenes and Fe sulfides, 1967-70.
By studying tie-line relations between sulfides and pyroxenes as a function of oxygen fugacity and temperature it will be possible to establish the extent to which sulfides have equilibrated with their host rocks and hence determine whether they are magmatic or hydrothermal. See Reaction between pyrrhotite and enstatite-ferrosilite solid solutions; Ann. Rept. Director Geophysical Laboratory, Carnegie Institution of Washington, Year Book 1966, pp. 427-429.

484. Naldrett, A.J., Clarke, T., Univ. of Toronto:
Study of chemical equilibria between Fe-Ni olivines and Fe-Ni sulphides, 1968-70; M.Sc. thesis (Clarke).
The purpose of this study is to investigate tie-line relations between Fe-Ni olivines and Fe-Ni sulfides at different oxygen pressures with a view to determining whether subsolidus reactions between natural olivines and sulfur-bearing solutions can give rise to economic deposits of Fe-Ni sulfides.

485. Naldrett, A.J., Graterol, M. (Mrs.), Univ. of Toronto:
Study of the mineralogy of Marbridge No. 3 and No. 4 ore deposits, 1968-69; M.Sc. thesis (Graterol).
These deposits of Fe-Ni sulfides have the unusual mineralogy millerite-pentlandite-pyrite. A pronounced zoning across each deposit indicates a close relation between the composition of the sulfides and the edges of their host peridotites.

486. Naldrett, A.J., Mainwaring, P., Univ. of Toronto:
Study of relations between sulfides and silicates in a portion of the Duluth gabbro, 1968-71; Ph.D. thesis (Mainwaring).

487. Naldrett, A.J., Moorhouse, W.W., Greenman, L., Univ. of Toronto:
Study of footwall breccias in the vicinity of the Strathcona Mine, 1967-70; Ph.D. thesis (Greenman).
See A study of the Strathcona Mine and its bearing on the origin of the nickel-copper ores of the Sudbury district, Ontario; Jour. Petrol., vol. 8, pp. 453-531, 1967.

488. Naldrett, A.J., Moorhouse, W.W., Hewins, R.H., Univ. of Toronto:
Study of rocks marginal to the nickel irruptive in the vicinity of the Strathcona and Fecunis Mines, Sudbury, Ontario, 1967-70; Ph.D. thesis (Hewins).
See A study of the Strathcona Mine and its bearing on the origin of the nickel-copper ores of the Sudbury district, Ontario; Jour. Petrol., vol. 8, pp. 453-531, 1967.

489. O'Donnell, N.D., Univ. of Western Ontario:
Investigation of an indicator train of sulphide ore at Gull Pond, Newfoundland, 1967-69; M.Sc. thesis.

490. Roscoe, W.E., McGill Univ.:
Geology of the Caribou base metal deposit, Bathurst area, New Brunswick, 1967-69; M.Sc. thesis.
Petrological study of wallrocks and sulphides; volcanic-sedimentary stratigraphy.

491. Ruitenberg, A.A., New Brunswick Dept. of Natural Resources:
Geology and mineral deposits of southern New Brunswick, 1967-70.
A long term project to examine in detail and evaluate the mineral potential of this part of the Province. Special emphasis will be placed on the structural control for base metal occurrences in this area. See Geology and mineral deposits of the Passamaquoddy Bay area; New Brunswick Dept. of Natural Resources (in press).

492. Sangster, D.F., Geol. Surv. Canada:
Geology of lead and zinc deposits in Canada, 1965-.
The project was initiated to carry out long-term comprehensive research on the geology of lead and zinc deposits in order to provide a geological basis for exploration and an assessment of lead and zinc potential in Canada. See Some chemical features of lead-zinc deposits in carbonate rocks; Geol. Surv. Can., Paper 68-39, 1968, and Relative sulphur isotope abundances of ancient seas and strata-bound sulphide deposits; Geol. Assoc. Can. Proc., vol. 19, pp. 79-91, 1968.

493. Sauvé, P., Université Laval:
Etude pétrologique d'un filon-couche gabbroique contenant une minéralisation de cuivre et nickel, 1966-70.
Ce filon-couche affleure dans le géosynclinal du Labrador à l'ouest de Fort Chimo. Il montre une différentiation marquée. Des sulfures de cuivre et nickel sont disséminés dans la partie inférieure du filon.

494. Scott, S.A., McGill Univ.:
Trace element study of ores from the Temagami Mine, Temagami, Ontario, 1965-69; M.Sc. thesis.

495. Sherwood, H.G., Nova Scotia Technical College:
Quantitative mineralogy of forty-five Canadian base metal sulphide ore deposits, 1964-68; Ph.D. thesis, Univ. of Manitoba.
Determinations were made on composite samples by point counting and x-ray diffraction methods. Q-mode factor analysis was utilized in interpretation of the data as well as conventional graphical methods.

496. Shimazaki, H., Clark, L.A., McGill Univ.:
The synthesis of $(Cu,Fe)S_2$ phase, 1968-70.
This work is based on the natural occurrence of Fukuchilite (Cu_3FeS_8) and the synthesis of copper disulfide phase ($CuS_{1.9}$).

497. Sims, W.A., McGill Univ.:
Heavy minerals as potential indications of sulphide deposits, Gaspé area, Quebec, 1964-69; Ph.D. thesis.

498. Stevenson, J.S., McGill Univ.:
Detailed studies of the nickel orebodies and their geological environment, Thompson, Manitoba, 1966-.

499. Suffel, G.G., Hutchinson, R.W., Hattie, D.W., Univ. of Western Ontario:
Genesis of some Turkish massive sulphide ores and comparison with features seen in Canadian deposits, 1968-; M.Sc. thesis (Hattie).
Massive sulphide deposits of two contrasting types are present in Turkey and may be compared to similar Canadian deposits. Samples have been collected and a detailed geochemical and geological study of these is commencing. See Remarks on some sulphide deposits in volcanic extrusives; Can. Min. Metall., Bull., vol. 58, No. 642, pp. 1057-1063, 1965.

500. Suffel, G.G., Hutchinson, R.W., Ridler, R.H., Univ. of Western Ontario:
Genesis and metamorphism of massive sulphide ores of base metals - occurrence, mineralogy and geochemistry of associated precious metals, 1966-.
Numerous and important base metal deposits in the Canadian Shield associated with Archaean volcanic complexes have long been regarded as tectonically late hydrothermal selective replacements. Recent thinking by a growing group of geologists places the deposits as cogenetic with the volcanics, and metamorphosed and remobilized with the host rocks. This research is designed to establish the latter process beyond serious dispute and attempt to explain some of the complicated history involved. See Massive sulphide late diabase relationships, Horne Mine - genetic and chronological implications; Can. Jour. Earth Sci., vol. 5, No. 3, Pt. 1, pp. 421-432, 1968.

501. Sutherland-Brown, A., British Columbia Dept. of Mines and Petroleum Resources:
Copper and molybdenum deposits of British Columbia, 1967-.

502. Tauchid, M., Tupper, W.M., Carleton Univ.:
Geology and geochemistry of the sulfide deposit at Murdockville, Quebec, 1966-69.

503. Tempelman-Kluit, D.J., Geol. Surv. Canada:
Anvil Vangorda sulphide deposits, Yukon Territory, 1967-69.
A study of the relationship between the lead-zinc massive sulphide deposits and their host rocks in the hope that it may be of

value in further exploration for such deposits in central Yukon. See Geologic setting of the Faro, Vangorda and Swim base metal deposits, Yukon Territory (105K); Geol. Surv. Can., Paper 68-1A, pp. 43-52, 1968.

504. Touborg, J., Univ. of Ottawa:
Origin of sulphides and sulphide textures in the Mattagami region, Quebec, 1968-70; Ph.D. thesis.
With particular attention to effects of metamorphism on sulphides.

505. Tupper, W.M., Carleton Univ.:
Geology and geochemistry of the sulfide deposits in the volcanic piles at Bathurst, New Brunswick, and Rio Tinto, Spain.

506. Upadhyay, H.D., Memorial Univ. of Newfoundland:
Mineralogy and petrography of the Gullbridge copper deposit, Newfoundland, 1968-69; M.Sc. thesis.

507. van Ingen, R., McGill Univ.:
Some relations of Cu-Zn and Mo ore formation to granite emplacement in the Eastern townships, Quebec, 1964-; Ph.D. thesis.

508. Whitmore, D.R.E., Geol. Surv. Canada:
Whalesback comprehensive mine study, Newfoundland, 1964-69.
Some 120 samples have been completed and an additional 500 have been submitted for rapid chemical analysis. A preliminary paper is in preparation.

Ferrous Metals

509. Dorr, A., McGill Univ.:
The Magnetite Bay iron formation, 1967-68; M.Sc. thesis.

510. Govett, G.J., Univ. of New Brunswick:
Sedimentary geochemistry of Iron, 1964-.

511. Gross, G.A., Geol. Surv. Canada:
Mode of occurrence and origin of the iron deposits, Mary River, Baffin Island, 1965-68.

512. Gross, G.A., McLeod, C.R., Geol. Surv. Canada:
Geology of iron and manganese deposits in Canada, 1957-.
See Geology of iron deposits in Canada: Vol. II - Iron deposits in the Appalachian and Grenville regions of Canada; Geol. Surv. Can., Econ. Geol. Rept. No. 22, vol. II, 1967.

513. King, A.F., Memorial Univ. of Newfoundland:
Collection from Wabana iron ore deposit, Newfoundland, 1968.
Mining at the Wabana mines on Bell Island, has ceased. Permission has been obtained to make a collection of drill cores and mine plans. The objective is to obtain a reference collection from the deposit, suitable for sedimentological and geochemical studies.

514. Kish, L., Quebec Dept. of Natural Resources:
Opaque oxides in mafic and ultramafic intrusions and anorthosite bodies of Quebec, 1968-69.

A two-year project aiming at a systematic study of the genetic, chemical, and economical aspects of the Fe-Ti concentrations associated with basic and ultrabasic rocks and anorthosite bodies.

515. Little, A.M., Gregory, A.F., Carleton Univ.:
Investigations of the geophysical and geological environment of selected mineral deposits in the Grenville Province - Part 1, Hilton Mines magnetite deposit, 1968-70; M.Sc. thesis (Little).

516. Moorhouse, W.W., Univ. of Toronto:
Organic remains in the Gunflint iron formation, and their significance in the origin of the iron formation, 1960-.
An investigation by various optical techniques of organic and pseudo-organic structures, in various phases of the iron formation. See Fossils from the Animikie, Port Arthur, Ontario; Trans. Roy. Soc. Can., vol. 56, series III, section III, p. 97, 1962.

517. Papezik, V.S., Colman-Sadd, S., Memorial Univ. of Newfoundland:
Mineralogy and petrology of metamorphic iron deposits near Stephenville, Newfoundland, 1968-70; M.Sc. thesis (Colman-Sadd).
Study of magnetite-hematite lenses in the Indian Head Range that are similar to the much larger metamorphic iron deposits of the Adirondacks.

518. Paquet, J., McGill Univ.:
Iron formation northeast of Ville Marie, Quebec, 1965-68; M.Sc. thesis.

519. Rodriguez, S.E., Queen's Univ.:
Petrographic and mineralographic studies of the Sokoman iron formation, Elrose Creek area, Labrador, 1966-68; M.Sc. thesis.

520. Sugaki, A. (Research Associate), Geol. Surv. Canada:
A study of mineral phase relationships in the strataform iron deposits in the Michipicoten iron-formations, Ontario, 1968.
Microscopic study on ore specimens and drill cores from the George W. MacLeod, Sir James and Lucy Mines to describe and define mineral phases and textures, and their relationships in the carbonate, oxide and sulphide facies in Algoma type iron formation. From the results the depositional environment and metamorphism of the cherty siderite, pyrite and magnetite deposits will be interpreted.

Radioactive Deposits

521. Barua, M.C., McCartney, W.D., Queen's Univ.:
Geology of uranium and molybdenum prospects in the Makkovic area, Labrador and their genetic implications, 1967-70; Ph.D. thesis (Barua).

522. Cameron, A.R., Hacquebard, P.A., Birmingham, T.F., Donaldson, J.R., Geol. Surv. Canada:
Uranium possibilities in lignite, 1966-71.
The objective is to check the radioactivity of Tertiary lignite deposits with a view toward delineating areas that are geologically favourable for the occurrence of uranium. Much of the data

gathered to date have been field measurements on low rank coals in Saskatchewan and British Columbia.

523. Cameron, E.M., Geol. Surv. Canada:
Geochemical study of Proterozoic Papaskwasati Group, Lake Mistassini, Quebec, 1968-69.
Samples collected from four drill cores which form an east to west section across the basin are being analyzed by direct-reading emission spectrometry.

524. Cargill, D.G., Queen's Univ.:
Structural study of an area northeast of Eldorado Mine, Saskatchewan, 1968-69; M.Sc. thesis.
A detailed study of the structure between the St. Louis Fault and the Donaldson Fault, with particularly attention to the structural control of the pitchblende mineralization in this area.
Fracture control of mineralization adjacent to St. Louis Fault, Beaverlodge area, northern Saskatchewan, 1967-69; M.Sc. thesis.

525. Dyck, W., Geol. Surv. Canada:
Development of radiochemical exploration methods using radon, 1968-69.
See Radon-222 emanations from a uranium deposit; Econ. Geol., vol. 63, pp. 288-289, 1968.

526. Fratta, M., Geol. Surv. Canada:
Pegmatitic uranium deposits of the Grenville Province, 1968; Ph.D. thesis.
The objective is to classify pegmatitic uranium deposits and their geological environment to determine the origin of each subtype and thus to analyze the uranium potential within each part of the Province.
Uranium mineralization from near Otter Lake and Calumet Island, Quebec, 1968-70; Ph.D. thesis.
A genetic study with particular reference to primary uranium minerals.

527. Hubert, C., Vallières, A., Caty, J.-L., Université de Montréal:
Lithostratigraphie et mise en place du minerai uranifère des roches sédimentaires précambriennes des bassins de Pepeshquasati et du Lac Indicateur, Québec, 1968-71.
Cette étude sert à établir la lithostratigraphie très détaillée des roches sédimentaires de ces deux bassins et à comprendre le contexte sédimentologique en relation avec la mise en place du minérai uranifère. Voir Tectonics of part of the Sillery in the Chaudière-Matapedia segment of the Quebec Appalachians; Roy. Soc. Can., Spec. Pub. No. 10, pp. 31-40, 1967.

528. Little, H.W., Geol. Surv. Canada:
Geology of uranium and thorium deposits of Canada, 1967-.
See Favourable geological environments for uranium prospecting; Can. Mining Jour., vol. 89, No. 5, pp. 51-54, May, 1968.

529. Macdonald, J.A., McGill Univ.:
Processes of surficial dispersion of uranium in the vicinity of some pitchblende deposits, Beaverlodge, Saskatchewan, 1964-68; Ph.D. thesis.

530. Morse, R.H., McCartney, W.D., Queen's Univ.:
Geochemistry of radon and radium in the surficial environment, 1968-

69; Ph.D. thesis (Morse).

The geochemical dispersion of the uranium decay products radium and radon is being studied in the Bancroft area. Radon is abundant in surface water, while radium is concentrated in associated sediments. The objective is to determine whether all the radon is coming from the sediments or if some is coming from uranium concentrations in rocks. Geochemical prospecting applications will be stressed.

531. Robertson, J.A., Ontario Dept. of Mines:
Uranium and thorium deposits of northern Ontario, 1966-.
See Uranium and thorium deposits of northern Ontario; Ont. Dept. Mines, Mineral Resources Circular No. 9.

532. Ruzicka, V. (N.R.C. Postdoctorate Fellow), Geol. Surv. Canada:
Comparison between Canadian and East European uranium deposits, 1968-69.

533. Smith, A.Y., Geol. Surv. Canada:
Development of geochemical exploration methods for uranium, 1967-69.

Field work in 1968 was devoted to testing radon in surface waters over large areas as a reconnaissance prospecting tool for uranium. Over 1,650 sq. miles in the Bancroft, Ontario region were sampled including both lakes and streams and 560 sq. miles in the Elliot Lake, Ontario region were sampled including lake waters only. In both areas the radon content of lake waters was very low but in stream waters at Bancroft, radon levels were markedly higher and anomalies much more clearly defined. Statistical treatment of the data is underway and should clarify some of the parameters in the distribution of radon-222 in surface waters. See Use of radon-222 in surface waters for uranium geochemical prospecting; Can. Mining Jour., pp. 100-103, April, 1968.

Other Metals

534. Baragar, W.R.A., Goodwin, A.M., Geol. Surv. Canada; Moddle, D.A., Ont. Dept. of Mines; Washington, R.A., Atomic Energy of Canada:
Trace gold content in Archean volcanic rocks, 1965-.

The trace gold content in Archean volcanic rocks of the Canadian Shield is being investigated by means of neutron activation techniques.

535. Barua, M.C., McCartney, W.D., Queen's Univ.:
Geology of uranium and molybdenum prospects in the Makkovic area, Labrador and their genetic implications, 1967-70; Ph.D. thesis (Barua).

536. Boyle, R.W., Geol. Surv. Canada:
Geochemistry of gold deposits, 1965-70.

A detailed account of the geochemistry of gold and its deposits, with notes on geochemical prospecting for the element, is being prepared for publication.

537. Boyle, R.W., Dass, A.J., Geol. Surv. Canada:
Wall rock alteration study of native silver deposits, Cobalt and Gowganda areas, Ontario, 1967-69; Ph.D. thesis, Carleton Univ. (Dass).

538. Clark, A.H., Farrar, E., Haynes, S.J., Queen's Univ.:
Relationships between granitic differentiation and tin-tungsten mineralization in the Hercynian metallogenetic province of northern Portugal, 1967-70; Ph.D. thesis (Haynes).
The inter-relationships are being studied through geochemical and isotopic investigations of barren and mineralized intrusions.

539. Dass, A.J., Tupper, W.M., Carleton Univ.:
Geology and geochemistry of the wall rocks surrounding the Silver veins at Cobalt, Ontario, 1966-69; Ph.D. thesis (Dass).
The ore veins are mantled by a large alteration halo and the inter-flow sediments are greatly enriched in the ore elements suggesting a genetic association.

540. Ferguson, S.A., Ontario Dept. of Mines:
Gold deposits of Ontario, 1968-69.

541. Hornbrook, E.H.W., Geol. Surv. Canada:
Development of biogeochemical exploration methods for metallic mineral deposits for winter use, 1968-69.
The effectiveness of new and modified biogeochemical exploration methods in detecting the silver vein deposits at Silverfields Mining Corp. Ltd., Hi Ho Silver Mines Ltd., and Agnico Silver Mines Ltd., in the Cobalt, Ontario area, was evaluated during the summer of 1968. Approximately 2,000 soil and vegetation samples were collected, prepared, and analyzed in field laboratories. The samples were analyzed for Ag, Co, Ni, Mn, Cu, Pb, and Zn content. A preliminary examination of the results shows that these elements are preferentially concentrated in the A rather than the B horizon. Certain elements are also preferentially concentrated in specific organs of white birch and trembling aspen. Anomalous areas can be correlated with the position of the silver bearing veins on each of the three properties. See Biogeochemical prospecting for molybdenum in west-central British Columbia; Geol. Surv. Can. (in press).

542. Jackson, E.V., New Brunswick Dept. of Natural Resources:
Granitic rocks of New Brunswick, 1967-70.
A comprehensive study of the geology, mineralogy, structure and chemistry of the granitic rocks of the Province was initiated in 1967. Special emphasis will be placed on the application of this information to the search for deposits of W, Sn and Mo minerals. See Welsford granite study; N.B. Dept. of Natural Resources, Map Series 68-2, 1968.

543. Jambor, J.L., Geol. Surv. Canada:
Study of non-metallic vein minerals and wall-rock alteration, Cobalt Camp, 1966-70.
The project will also include petrographic, microprobe, and x-ray studies of differentiation in the Nipissing diabase, Cobalt-Gowganda area.

544. Mahajan, S.K., McGill Univ.:
Molybdenite deposits in Preissac township, Quebec, 1967-69; Ph.D. thesis.

545. McIlwaine, W.H., Ontario Dept. of Mines:
Gowganda area, District of Timiskaming, 1966-70.

A project to remap the Gowganda silver camp at a scale of 1 inch to 1/4 mile. The area includes Nicol, Haultain, Milner, and Van Hise townships. See Ont. Dept. Mines Summary of Field Work, 1967.

546. Mulligan, R., Geol. Surv. Canada:
Geology of Canadian lithophile metals (Li, Be, Sn, W, and Mo), 1961-.
Metallogenic study of the beryllium-tin province of the Cassiar batholith, 1965-69.

547. Pouliot, G., Ecole Polytechnique:
Carbonate minerals in the carbonatite intrusion at Oka, Quebec, 1966-68.
The work is largely completed and a manuscript is being prepared for publication. After determining bulk Nb_2O_5 of the 150 samples, carbonate minerals were separated from these and a number of physical properties investigated. These include: fluorescence in U.V.; lattice spacings (211), (122); R.I, 2V; infrared spectra (2 4 fundamentals). Atomic absorption methods were used to determine Ba, Sr, Mn, Fe, Mg in the carbonate minerals. Attempts have been made to correlate the chemistry of the carbonate with Nb_2O_5 content of the rock, and with the various physical properties investigated.

548. Prochnau, J.F., McGill Univ.:
Gold deposits in the Chibougamau district, Quebec, 1965-68; M.Sc. thesis.

549. Robinson, B.W., Morton, R.D., Univ. of Alberta:
Geology, geochemistry and origin of the Echo Bay silver deposits, Great Bear Lake, Northwest Territories, 1968-70; Ph.D. thesis (Robinson).
K-Ar dating is being done to elucidate the geological history of the area. Mineralogical investigation of the ores, rock analysis and possibly high pressure syntheses together with sulphur and oxygen isotope studies are planned in connection with the origin of these deposits. Theories of origin will be tested against other similar deposits.

550. Rose, E.R., Geol. Surv. Canada:
Geology of titanium and titaniferous deposits of Canada, 1958-.
See Titanium in Canada; Can. Min. Jour., vol. 84, No. 4, pp. 89-92, 1963.
Geology of vanadium deposits in Canada, 1963-.
See Vanadium occurrences in Canada; Geol. Surv. Can., Paper 66-57, 1967.
Geology of rare earth deposits of Canada, 1967-.
See Rare earths of the Grenville Sub-Province, Ontario and Quebec; Geol. Surv. Can., Paper 59-10, 1959.

551. Watkinson, D.H., Univ. of Toronto:
Experimental study of relationships between niobium mineralization and carbonatites, 1967-69.
See Experimental study of relationships between niobium mineralization and carbonatites; Abstract, Geol. Soc. Amer., Annual Meeting, 1968.

552. White, W.H., Sinclair, A.J., Univ. of British Columbia:
K-Ar study of Topley intrusions and Endako molybdenum mine, 1966-69.
Dating biotites and muscovites from different phases of Topley intrusions and from hydrothermal alteration zones associated with Endako molybdenite deposit.

Industrial Minerals

553. Babet, P.H. (Mrs.), Research Council of Alberta:
Compilation of data on industrial minerals of Alberta, 1965-69.
Report on ceramic clays and shales of Alberta in preparation. See Some aspects of bentonite in Alberta; Res. Coun. Alta., Rept. 66-2, 1966.

554. Bérard, J., Ecole Polytechnique:
Les calcaires de la région de Montréal et leur comportement dans les bétons à ciment Portland, 1966-70.

555. Bidgood, D.E.T., Blanchard, J.E., Take, W.F., Nova Scotia Research Foundation:
Geophysical investigations of evaporites in Nova Scotia, 1956-.
Gravity, magnetic, seismic, borehole geophysical and geological logs, provide data on occurrance and mineral prospects of salt intrusions in Nova Scotia. See Geophysical investigations of evaporites in Nova Scotia; Proc. Can. Centennial Conf. on Mining and Groundwater Geophysics (in press).

556. Butler, J., Bartlett, G., Fong, C., Newfoundland Dept. of Mines, Agriculture and Resources:
Silica assessment project, 1965-68.
Involves geological mapping, diamond drilling and quantitative analysis for SiO_2, Fe_2O_3, Al_2O_3, MgO, CaO, Na_2O, K_2O.

557. Carrigy, M.A., Research Council of Alberta:
Silica sand deposits in the vicinity of Edmonton, Alberta, 1968-.

558. Chagnon, J.-Y., Quebec Dept. of Natural Resources:
Study of clays near Desbiens, Lake St-John area.
A seismic survey and a drilling program were carried out to learn something of the thickness and physical properties of the clays in the area. Samples will be studied for their mechanical behaviour and their possible use in the ceramics industry.

559. Corbin, B.D., Acadia Univ.:
Distribution and origin of barium minerals in Nova Scotia, 1968-70; M.Sc. thesis.

560. Crocket, J., Mitchell, R., McMaster Univ.:
Sr isotope studies on kimberlite, 1965-70.
A study of genesis of diamond-bearing kimberlite pipes from South Africa by strontium isotope methods.

561. Fong, C., Newfoundland Dept. of Mines, Agriculture and Resources:
Dolomite assessment, Newfoundland, 1968-69.
An investigation of the dolostones of Newfoundland for high magnesia sequences.

562. Fowler, J., Nova Scotia Dept. of Mines:
Investigation of clay deposits, Musquodoboit Valley, Halifax county, Nova Scotia, 1967-68.
The purpose is to develop economic deposits of refractory clays in the Province. Three deposits have been outlined. Recent research has indicated that the iron content, giving the clays a reddish color, can be removed by leaching with hot hydrochloric acid solution thus converting the clay to a high duty refractory.

563. Gendzwill, D.J., Saskatchewan Research Council:
Geophysical measurements in Saskatchewan potash mines, 1964-68.
Geophysical methods are being used to monitor the thickness of salt formation.

564. Gibbs, G.D., McGill Univ.:
Oils and waxes in asbestos, 1967-69.

565. Guillet, G.R., Ontario Dept. of Mines:
Clay and shale resources of Ontario, 1963-69.
See The clay products industry of Ontario; Ont. Dept. Mines, Industrial Mineral Rept. No. 22, 1967.
Mineral fillers in Ontario, 1964-70.

566. Halferdahl, L.B., Research Council of Alberta:
Fort McMurray clay, 1965-.
Analyses of clay underlying the oil sands near Fort McMurray have shown that the clay, where sampled, is not residual and does not have particularly promising ceramic properties.

567. Hamilton, J.B., New Brunswick Dept. of Natural Resources:
Industrial mineral investigations, New Brunswick, 1963-70.
Barite and silica occurrences in the Province have been investigated, and gypsum-anhydrite deposits studied in 1968. Investigations of the sand and gravel resources will be started in 1969. See Silica in New Brunswick; N.B. Dept. Nat. Res., Rept. of Investigations No. 2, 1968.

568. Hamilton, W.N., Research Council of Alberta:
Salt in Alberta, 1966-69.
Four salt formations of the Elk Point Group in east-central Alberta have been defined in terms of purity, thickness, extent, and depth. Two of these, the thicker and more extensive Prairie evaporite and upper Lotsberg salts, have also been defined in terms of "brinability".
Dolomite in Alberta, 1967-69.
A reconnaissance survey of the physical and chemical properties of quarryable Alberta dolomites, toward determining this suitability for industrial use.
Gypsum test-drilling in northeastern Alberta, 1968-.
See Subsurface gypsum deposits near Fort McMurray Alberta (in preparation).

569. Hewitt, D.F., Ontario Dept. of Mines:
Industrial mineral resources of the Bolton area, Ontario, 1968-69.
Industrial mineral resources of the Hamilton area, Ontario, 1967-69.
Sand and gravel in southern Ontario, 1967-69.

570. King, M.S., Acar, K.Z., Univ. of Saskatchewan:
Rheological properties of Prairie Evaporites at elevated temperatures, 1967-71; M.Sc. thesis (Acar).
The long-term mechanical properties of the Prairie Evaporites are being studied at elevated temperatures in order to obtain their equations of state. Knowledge of the equations of state of halite and sylvinite is basic to studies of the feasibility of mining evaporites at depths greater than 3,500 feet by conventional means, and increasing the recovery of potash mines already producing.

571. Kupsch, W.O., Vonhof, J.A., Univ. of Saskatchewan:
Tertiary sands and gravels in Western Canada, 1965-69; Ph.D. thesis (Vonhof).

572. Maurice, O.D., Sirois, R., Paquet, R., Quebec Dept. of Natural Resources:
Investigations of industrial minerals and building stone occurrences in Quebec.
A continuing program of investigation, with the purpose of advising owners as to the value of industrial mineral deposits and to furnish information regarding the extraction and marketing of their products.

573. McLaws, I.J. (Mrs.), Research Council of Alberta:
Sulphur in northern Alberta, 1968.
A summation of pertinent material is being compiled.
Uses and specifications of sand and gravel, 1968.
Detailed information is currently being compiled as a general reference manual for Alberta.

574. Murray, D.A., Nova Scotia Dept. of Mines:
Assessment of limestone and dolomite deposits, Mainland, Nova Scotia, 1967-70.
The purpose is to determine the quantity and quality of the limestone and dolomite for industrial uses.

575. Papezik, V.S., Keats, H.F., Memorial Univ. of Newfoundland:
Mineralogy of a pyrophyllite deposit near Foxtrap, Newfoundland, 1968-70; M.Sc. thesis (Keats).
Detailed study of the phase assemblages in the system SiO_2-Al_2O_3-K_2O-H_2O as represented by altered rhyolitic rocks in and around the Foxtrap Quarry.

576. Scafe, D.W., Research Council of Alberta:
Alberta bentonite studies, 1968-.
To obtain fundamental mineral compositions of Alberta bentonites, as well as additional data on the behaviour of montmorillonite in general, a sequence of procedures is being employed. The methods include size analyses (sand, silt, clay) further fractionation of the clay using a supercentrifuge, petrographic and x-ray analysis of all fractions and exchangeable cations on each clay fraction.

577. Take, W.F., Nova Scotia Research Foundation:
Photolinear patterns associated with intrusive salt bodies in Nova Scotia, 1967-.
Strong photolinear patterns, apparently caused by continued movement of intrusive salt bodies, assist in the interpretation of gravity data and the location of near surface extensions of salt.

578. Tiphane, M., Quebec Dept. of Natural Resources (part time), Univ. of Montreal:
Asbestos deposits in Quebec, 1968-.
Compilation of information on asbestos deposits.

579. Vos, M.A., Ontario Dept. of Mines:
Survey of stone resources along the Niagara Escarpment, 1967-69.
Includes outlining of potential areas of quarry development along the Niagara Escarpment. See Ont. Dept. Mines Summary of Field Work, 1968.

580. Wardlaw, N.C., Reinson, G., Univ. of Saskatchewan:
Basal anhydrites of the Prairie Evaporite Formation, Saskatchewan, 1968-69; M.Sc. thesis (Reinson).
Structures and textures in this basal anhydrite are superficially similar to Recent supratidal anhydrites forming in the subkhas of the Persian Gulf. This study is an attempt to document the structures and textures of the Prairie Evaporite anhydrites and to relate these rocks to the associated carbonates below and halite above. See Barren halite bodies in the sylvinite mining zone at Esterhazy, Saskatchewan; Can. Jour. Earth Sci., vol. 5, pp. 1221-1238, 1968.

Petroleum

581. Charbonnier, R.P., Draper, R.G., Harper, W.H., Yates, A., Mines Branch, Dept. of Energy, Mines and Resources:
Directory of reservoir data and analyses of typical Canadian crude oils, 1964-.

582. Clark, D.A., Chi, J., Sozohub, J., Mobil Oil of Canada, Ltd.:
Discriminant function analysis of digital mechanical log data, 1968-69.
The purpose is to determine the feasibility and applicability of discriminant function analysis as an aid in (1) distinguishing hydrocarbon from non-hydrocarbon bearing zones and (2) distinguishing lithology types.

583. Dickie, G.F., Univ. of Alberta:
Characteristics of oil and gas pools relative to the structure and stratigraphy of Alberta, 1968-70; Ph.D. thesis.

584. Draper, R.G., Montgomery, D.S., Wanless, R.K., Mines Branch, Dept. of Energy, Mines and Resources:
The variation of the sulphur isotope ratio of the bituminous sand from the McMurray Formation as a function of the oxygen content of the bitumen, 1967-.

585. Fleming, J., Newfoundland Dept. of Mines, Agriculture and Resources:
Petroleum and natural gas in Newfoundland and Labrador - exploration and potential, 1968-69.
Involves a research of all literature, summary of past activity and resumé of the geology of the areas that have potential for gas and oil.

586. Glaister, R.P., Maiklem, W.R., Bebout, D.G., Imperial Oil Enterprises Ltd., Calgary:
Evaporite - carbonate relationships, 1968-70.
The main objectives of the project are; to develop a descriptive classification of evaporites; to determine the environment of deposition of evaporites; to determine the sequence, timing and pattern of evaporite-carbonate basin filling; to determine the character and pattern of diagenesis of evaporites and associated carbonates; and to determine the source potential of evaporites. The Middle Devonian Elk Point Basin has been selected as a model for this project.

587. Gretener, P.E., Labute, G., Univ. of Calgary:
Differential compaction around a Leduc Reef, central Alberta, 1968; M.Sc. thesis (Labute).
Quantitative study of differential compaction around the Wizard Lake Reef involving computation of the compaction of the Ireton in time, growth of the compaction structure in the Nisku in time, and estimation of the maximum eroded thickness at the Pre-Cretaceous unconformity.

588. Hitchon, B., Research Council of Alberta - in cooperation with agencies in Calgary, Denver, Berkley and Louisiana:
Geochemistry of formation water, oils and gases, Western Canada - a continuing study.
Two papers on fluid flow in Western Canada (Water Resources Research), and one in a special volume on Geochemistry of Brines are in press. See Geochemistry of natural gas in Western Canada; Amer. Assoc. Petrol. Geol., Mem. 9, pp. 1995-2025, 1968.

589. Howie, R.D., Geol. Surv. Canada:
Structure and stratigraphy of the Stony Creek oil and gas field, New Brunswick, 1964-68.
See Stony Creek gas and oil field, New Brunswick; natural gases of North America; Amer. Assoc. Petrol. Geol., Mem. 9, vol. 2, pp. 1819-1832, 1968.

590. Jeffries, F.S., Imperial Oil Ltd., Calgary:
Computer processing of digital wireline logs, 1965-69.
Over 100,000 wireline logs have been recorded in wells drilled for oil in western Canada. These logs contain a wealth of information about the characteristics of the sediments deposited in the western Canada Basin. Successful computer methods for processing these logs would dramatically increase the effectiveness of commercial exploitation of these sediments. See Reservoir volume calculations with a well data system; The Log Analyst, vol. 9, No. 3, p. 3, May 1968.

591. Landes, R.W., Imperial Oil Ltd., Calgary:
Petroleum occurrence studies, 1968-73.
A selective study of petroleum occurrences with emphasis on those which may indicate Canada's future oil and gas discoveries with respect to area, depth, size and quality of petroleum. Approximately 600 basins and 800 important petroleum accumulations will be studied. The current study was preceded by two of the same general nature. See Geosciences in the Petroleum Industry; Roy. Soc. Can., Spec. Pub. No. 11, pp. 129-185, 1968.

592. MacGillivray, J., McGill Univ.:
Porosity variations, Leduc Formation, Golden Spike Field, 1968-70; M.Sc. thesis.

593. Magara, K. (N.R.C. Postdoctorate Fellow), Geol. Surv. Canada:
Compaction of shales and fluid movements in shales, 1967-69.
Shale porosity distributions of Cretaceous formations in Alberta and Saskatchewan subsurface have been determined. By using these data, erosion thicknesses of the uppermost formations may be estimated and a relation between anomalously high shale porosity and anomalously high fluid pressure in the subsurface obtained. It is possible to estimate permeability changes in shales by using fluid pressure gradient (derived from the shale porosity distribution) and Darcy's Law. The integration of these permeability changes with porosity values can be used to establish a relation between shale porosity and permeability, which is essential in the discussion of fluid migration in shales. See Upward and downward migrations of fluids in the subsurface; Can. Petrol. Geol., Bull., 1969 (in press).

594. Mason, G.D., Quebec Dept. of Natural Resources:
Stratigraphic study in the East Gaspé Basin, 1967-68; Ph.D. thesis, Carleton Univ.:
A study of the petroleum possibilities in the Lower Devonian formations of eastern Gaspé Peninsula, with special emphasis on the Gaspé limestone - Gaspé sandstone transition. Diamond drilling of the limestone-sandstone transition was carried out at widely separated localities and a total of 1,120 feet of core was obtained.

595. McCrossan, R.G., Ball, N.L., Geol. Surv. Canada:
Environment of oil and gas in Western Canada, 1968-69.
The compilation and statistical study of oil and gas pool data from Western Canada.

596. McGrath, P., Hood, P.J., Geol. Surv. Canada:
Geophysical study of the Appalachian region, 1967-.
A study of all available geophysical data in order to throw light on the geology of the Appalachian region with particular emphasis on areas where the sediments might be oil-bearing. In situ magnetic susceptibility data and drill cores for remanence measurements were collected in southern New Brunswick during the summer of 1968 to assist in the interpretation of aeromagnetic anomalies. See An interpretation of the Miramichi Bay magnetic anomaly, New Brunswick; Maritime Sediments, vol. 4, No. 1, pp. 11-13, 1968.

597. Porter, J.W., Canadian Superior Oil Co.; Fuller, J.G., Amerada Petroleum Corp.:
Evaporite formations with petroleum reservoirs in the Devonian and Mississippian of Alberta, Saskatchewan and North Dakota.
See Amer. Assoc. Petrol. Geol., Bull, April 1969.

598. Schmidt, V., Budwill, A., Mobil Oil Canada Ltd.:
Diagenesis of Middle Devonian reefs and associated sediments, Rainbow area, Alberta, 1968-69.
Includes petrographic study of carbonate and sulfate diagenesis to find out; (1) relative time sequence of diagenetic events; (2) interrelationship between depositional environment and early diagenetic alteration; and (3) significance of early diagenesis in stabilizing reef sediments and affecting reservoir properties.

599. Simard, P.P., Germain, M., Quebec Dept. of Natural Resources:
Seismic surveys at Pointe du Lac, Yamachiche and Sorel, Quebec, 1968-.
The purpose was to obtain a profile of the bedrock in areas covered by 150 to 200 feet of clay over a layer of sand containing pockets of gas. The survey will serve to test the theory that the gas accumulations may have been helped by domal configurations of the bedrock.

600. Stanton, M.S., Chevron Standard Ltd.:
Petroleum chemistry, 1967-.

601. Staplin, F.L., Imperial Oil Ltd., Calgary:
Sedimentary organic matter, organic metamorphism, and oil and gas occurrence, 1963-.
Includes identification and characterization of organic debris in sediments; metamorphic state or "rank" of exine, cuticles and other organic matter in sediments; and application to oil and gas exploration, source rock identification, etc. See Sedimentary organic matter, organic metamorphism, and oil and gas occurrence; Can. Petrol. Geol. Bull. (in press).

602. Trettin, H.P., Geol. Surv. Canada:
Lower Paleozoic sediments, Foxe Basin, northeastern Melville Peninsula, and parts of northern and central Baffin Island, Northwest Territories, 1968-70.
See Geology and petroleum potential of Lower Paleozoic sediments, Foxe Basin, northeastern Melville Peninsula and parts of northern and central Baffin Island; Geol. Surv. Can., Paper 69-1, 1969.

603. Wardlaw, N.C., Statham, K., Univ. of Saskatchewan:
Reservoir properties, lithology and depositional environments of Middle Devonian Kee Scarp Formation, Norman Wells, Northwest Territories, 1967-69; M.Sc. thesis (Statham).
Includes obtaining capillary pressure curves for various typical rock types in and near the Norman Wells oilfield. This is being done using mercury injection techniques. An attempt is being made to relate the capillary pressure curves to visual observations and measurements of the pores in the rock and to establish the relationship between various types and sizes of pores and the rock components with which they are associated. An attempt is being made to relate reservoir properties to overall lithology and to an inferred environment of formation.

604. White, W.I., Saskatchewan Dept. of Mineral Resources:
Geology and petroleum deposits of the North Hoosier area, west-central Saskatchewan, 1968.
A study of the stratigraphic interval from the base of the Bakken Formation to the top of the Viking Formation in an area comprising about 7 townships which includes two oil pools, part of one gas pool and several other petroleum-bearing horizons. The study is based upon the investigation of all cores, cuttings and logs in the area. Its purpose is to elucidate the geology, which is complicated by an enormously large hiatus, and thereby facilitate the selection of future drilling locations.

Coal and Peat

605. Botham, J.C., and others, Mines Branch, Dept. of Energy, Mines and Resources and Geol. Surv. Canada:
Study of coking characteristics of coal relevant to its petrographic constitution, 1956-.

606. Cameron, A.R., Donaldson, J.R., Babu, S.K., Nakayanagi, Y., Geol. Surv. Canada:
Petrographic examination of coking coals from Michel, British Columbia, 1961-.
The objective is to study the petrography of the coal seams in the Fernie Basin in order to determine coking properties and to prepare seam profiles for correlation and environmental studies. See The petrology of the No. 10 (Balmer) coal seam in the Natal area of the Fernie Basin, British Columbia; Geol. Surv. Can., Paper 68-35, 1968.

607. Donaldson, J.R., Ball, N.L., Hacquebard, P.A., McCrossan, R.G., Geol. Surv. Canada:
Correlation of coal and hydrocarbon properties in Lower Cretaceous of Alberta, 1968-69.
Study of a few samples from cores to test reflectance method in Western Canada Basin. If effective the project will be expanded to include well cuttings from a larger area with a view to mapping metamorphic levels of the basin.

608. Hacquebard, P.A., Donaldson, J.R., Birmingham, T.F., Barss, M.S., Geol. Surv. Canada:
Environmental and facies studies of coal, 1962-.
Includes fundamental research on the origin of coal constituents and deposition of coal by coal petrological, palynological and sedimentological investigations. See Carboniferous coal deposition associated with flood-plain and limnic environments in Nova Scotia; Geol. Soc. Amer., Special Paper 114 (in press).

609. Price, L.L., Geol. Surv. Canada:
Mesozoic stratigraphy of Hudson Bay Lowlands, 1967-70.
Includes study of coal deposits of the southern part of Hudson Bay Lowlands.

General Problems

610. Agterberg, F.P., Geol. Surv. Canada:
Computer-oriented research on mineral deposits, 1967-.
The distribution of gold mines and its relationship to geology in the Noranda-Val d'Or area, Quebec is now under investigation. See Application of trend analysis in the evaluation of the Whalesback Mine, Newfoundland; Can. Inst. Min. Metal., Spec. vol. 9, pp. 77-88, 1968.

611. Arnold, R.G., Saskatchewan Research Council:
Studies of ore deposits, 1959-.
A study of the physico-chemical relationships of natural and synthetic ore-forming minerals are studied. See Range in composition and structure of 82 natural terrestrial pyrrhotites; Can. Min. vol. 9, p. 31, 1967.

612. Arnold, R.G., Sangameshwar, S., Univ. of Saskatchewan:
Comparative study of sulfide and silicate mineralogy in ores of the Flin Flon area, Saskatchewan and Snow Lake area, Manitoba, 1967-71; Ph.D. thesis (Sangameshwar).
The structure and compositions of sulfides and silicates in ore deposits of the two areas are being studied to determine if they are genetically related.

613. Azzaria, L.M., Université Laval:
The geochemistry of mercury applied to mineral exploration, 1967-70.
See A method of determining traces of mercury in geologic materials; Geol. Surv. Can., Paper 66-54, pp. 13-26, 1967.

614. Baumann, A. (N.R.C. Postdoctorate Fellow), Geol. Surv. Canada:
Geochemical study of black shales and associated sulphide deposits, 1968.
The purpose is the determination of metals in black shales in the eastern part of the Canadian Shield to evaluate their potential as low grade ore deposits. Other problems of interest are the relationship of these sediments to nearby ore deposits and the sedimentary processes and environment leading to the formation of these fine-grained sediments in Precambrian time.

615. Bishop, D., Nova Scotia Research Foundation:
Manganese mineralization as a guide to sulphide deposits at depth, 1967-70.
Considerable work on similar occurrences in the western United States has led to a theory that manganese oxides and the trace elements they contain may be from deep seated sources and indicative of base metal and silver ores at depth.

616. Boyle, R.W., Geol. Surv. Canada:
Geochemical study of mineral deposits in Bathurst-Newcastle area, New Brunswick, 1957-.
A geochemical investigation of gossans in New Brunswick base metal area is now underway. See Geochemistry of Pb, Zn, Cu, As, Sb, Mo, Sn, W, Ag, Ni, Co, Cr, Ba, and Mn in the waters and stream sediments of the Bathurst-Jacquet River district, N.B.; Geol. Surv. Can., Paper 65-42, 1965.

617. Cabri, L.J., Mines Branch, Dept. of Energy, Mines and Resources:
Phase equilibrium studies in the Cu-Fe-S, Ag-Sb-Hg, Fe-Co-Ni-As-S, Fe-S, and related systems, 1965-.
To closely determine equilibrium relations, stability fields and conditions for metastable relations in sulphide systems, and thereby to further the knowledge of sulphide ore deposits. See A new copper-iron sulfide; Econ. Geol. vol. 62, pp. 910-925, 1967.

618. Campbell, F.A., Krouse, R., Luck, J., Univ. of Calgary:
S-isotope partitioning in sulphide assemblages, 1965-71.
This is a continuing project involving studies of natural and synthetic materials with a view to determining the partitioning of S^{34}/S^{32} between various sulfide species. See A reconnaissance study of some Western Canadian lead-zinc deposits; Econ. Geol. vol. 63, No. 4, pp. 349-359, 1968.

619. Carter, N.C., British Columbia Dept. of Mines and Petroleum Resources:
Geology and mineral deposits of the Alice Arm area, British Columbia, 1/2 inch to 1 mile, 1968-69.

See Annual Report of the Minister of Mines and Petroleum Resources, pp. 41-50, 1967.

620. Cholach, M.S., Morton, R.D., Univ. of Alberta:
A geochemical and mineralogical study of certain silver-rich galena-anglesite veins in the 60 mile district, Yukon Territory, 1968-69; M.Sc. thesis (Cholach).
A geochemical soil-survey has been initiated within the 60 mile district to facilitate a study of the distribution of silver-rich galena-anglesite veins within the metamorphic sequence. The mineralogy of the ore-deposits is being studied to determine their primary constituents and the effect of secondary oxidation.

621. Clark, A.H., Queen's Univ.:
Mineralogy and geochemistry of the Yiöjärvi copper-tungsten deposit, southwest Finland, 1960-.
Recent microprobe studies have confirmed the occurrence in this unmetamorphosed Precambrian deposit of several previously-unrecognized ore minerals which permit the more precise estimation of the temperatures prevailing during hypogene ore deposition. See Electron microprobe analysis of mackinawite from the Yiöjärvi deposit, Finland; Neues Jahrbuch f. Mineralogie, Monats., vol. 8, pp. 259-268, 1968.
Pyrrhotite relationships in selected ore deposits and rocks, 1963-.
During the present year, attention is being focused on the rare, very iron-deficient hexagonal pyrrhotites (in part copper-bearing) and on "asymetrically-split" monoclinic pyrrhotites in ores and sediments.
Mineralogy and geomorphological controls of supergene alteration in the Copiapo region of the southern Atacama Desert, Chile, 1965-70.
A chronology integrating supergene alteration stages and episodes in the landform evolution of northern Chile, supported by radiometric dating of key volcanic units, has been determined. This work has also led to a new analysis of the uplift history of the Andean Cordillera in this region. Microprobe and x-ray studies of supergene sulphide and oxide minerals have defined the assemblages characteristic of the supergene zones, and indicate the need for modification of present concepts of the low-temperature phase relationships in the copper-rich portion of the system (Cu-Fe-S(-O). See A chronology of landform evolution and supergene mineral alteration, southern Atacama Desert, Chile; Applied Earth Science, Institution of Mining and Metallurgy, London, November, 1968.

622. Clark, A.H., Armstrong, R.C., Queen's Univ.:
Phase equilibria in ore mineral systems, 1968-; M.Sc. thesis (Armstrong).
Experimental studies will be integrated with metallogenetic investigations of the Cordillera of North and South America.

623. Clark, A.H., Lydon, J.W., Queen's Univ.:
Sedimentary and metamorphic controls of strata-bound lead-zinc-silver mineralization, Arecena region, southern Spain, 1968-70; M.Sc. thesis (Lydon).

624. Clark, A.H., McBride, D.E., Queen's Univ.:
Factors affecting metal concentration during sedimentation and metamorphism of Precambrian carbonaceous shales, 1968-71; M.Sc. thesis (McBride).

625. Colwell, J.A., Acadia Univ.:
Petrology and geochemistry of Triassic basalt, Nova Scotia, 1968-70.
A study of chemical variation and differentiation within and among the flows with emphasis on mineral occurrences (e.g. copper) as they relate to the petrology and chemistry of the basalts.

626. Crocket, J., Church, D., McMaster Univ.:
Electron probe studies of the Cobalt area ores, 1967-70; M.Sc. thesis (Church).
Study of Cu, Bi, Ni, and Fe in the arsenide ores.

627. Crocket, J., Schwarcz, H., Schindler, J., McMaster Univ.:
Re-Os age method, 1966-72; Ph.D. thesis (Schindler).
A project designed to further develop the Re-Os dating method and to investigate its application in the dating of sulfide ores.

628. Darling, R., Ecole Polytechnique:
Geochemical exploration in the Preissac-Lacorne area, Quebec, 1968-70.
Study of trace element distributions in minerals separated from granitic rocks which are related to pegmatitic and hydrothermal vein concentrations of Li, Mo, Be. Analysis of water, stream sediments, and soils for selected elements that may be useful in surficial geochemical exploration for such metal concentrations.

629. Dugas, J., and other officers, Quebec Dept. of Natural Resources:
Metallogenic map of the Province of Quebec, 1965-.
An annotated bibliography on metallic mineralization in part of the Labrador Trough is completed and a similar bibliography on the Cape Smith-Wakeham Bay area is being prepared. A mineral deposits map of the Chibougamau area has been compiled; legends for mineral deposit maps and for metallogenic maps have been devised; classification of ore deposits and experimentation of the legends are in progress; work is progressing on mineral deposits inventory forms and on production sheets for all mines in Quebec, past as well as present. See Metallogenic maps in Quebec, their preparation and use; Can. Inst. Min. Met., Bull., January 1967.

630. Eastwood, G.E.P., British Columbia Dept. of Mines and Petroleum Resources:
Inventory of metalliferous mineral deposits of Vancouver Island, British Columbia, 1967-69.
Compilation of available data on the metalliferous deposits of Vancouver Island on standard inventory cards. This will form part of the projected inventory of British Columbia mineral deposits.

631. Folinsbee, R.E., Baadsgaard, H., Cumming, G.L., Krouse, R.H., Sasaki, A., Fritz, P., Chrismas, L., Univ. of Alberta:
Craigmont orebody, British Columbia, 1966-68.
Study of source of metals (Cu, Fe, Rb, Sr) and non-metals (sulfur, carbon and oxygen) in the pyrometasomatic ore deposit at Craigmont.

632. Forsythe, L.H., Saskatchewan Dept. of Mineral Resources:
Economic geology of the MacKay-Sulphide Lakes area, Saskatchewan, 1968-70.
Detailed study of mineral showings, prospects, and economic mineral deposits in the Stanley area (west) and Nemeiben Lake area

(east) to supplement geological study that has been carried on over past 5 years. See Summary Rept. of Geological Surveys in Saskatchewan, 1968.

633. Friedlaender, C.G.I., Dalhousie Univ.:
Tridymite Dunbrack prospect, Musquocoboit River, Nova Scotia, 1967-69.
See Canadian Mineralogist, vol. 9, p. 572, 1968.

634. Fyles, J.T., British Columbia Dept. of Mines and Petroleum Resources:
Rossland mining camp, British Columbia, 1968-69.
Study of the structure with special reference to the molybdenum mineralization.

635. Garrett, R.G., Geol. Surv. Canada:
Geochemical study of economic elements in glacial till, 1968-69.
The application of soil, till and stream sediment sampling and chemical analysis as an exploration tool is being investigated. During the summer of 1968 a detailed study was made in the Manitouwadge area, Ontario which underlined the need for close cooperation between geochemist and Pleistocene geologist.

636. George, P.T., Jolliffe, A.W., Queen's Univ.:
A geochemical study of oresand rocks in the Porcupine-Kirkland Lake area, 1963-69; M.Sc. thesis (George).

637. Gibson, D.W., Geol. Surv. Canada:
Triassic stratigraphy and petrology in the Foothills and Front Ranges of Western Canada, 1962-.
A detailed study of the Triassic rocks in the Foothills and eastern Rocky Mountains of Alberta and British Columbia to provide data on the character, structure, distribution, age, stratigraphic relationships, origin of the bedrock, and other geological data required to evaluate the oil, gas, and mineral potentialities of the region. See Triassic stratigraphy between Athabasca and Brazeau Rivers of Alberta; Geol. Surv. Can., Paper 68-11, 1968.

638. Godfrey, K.V., Anderson, J.A.W., Mines Branch, Dept. of Energy, Mines and Resources:
Estimation of the parameters of mineral deposits, 1968-.
This project is designed to improve the estimation of mineral deposit parameters used in controlling and optimizing the extraction of an orebody.

639. Goodwin, A.M., Geol. Surv. Canada:
Volcanic studies in the Timmins-Kirkland Lake-Noranda region as part of the program of volcanic studies in Canada, 1965-68.
See Volcanic studies in the Timmins-Kirkland Lake-Noranda region of Ontario and Quebec; Geol. Surv. Can., Paper 68-1, Pt. A, pp. 135-137, 1968.

640. Grove, E.W., British Columbia Dept. of Mines and Petroleum Resources:
Geology and mineral deposits of the Anyot map-area, Portland Canal, British Columbia, 1964-68.
A study of the litho-structural controls of sulfide deposits in the area including alteration-metalization studies of the individual deposits. See Annual Rept., B.C. Minister of Mines, pp. 57-61, 1965, and pp. 41-42, 1966.

Distribution of mineralization along the fringe area of the Bowser Basin, northwest British Columbia, 1965-68.

641. Hacquebard, P.A., Donaldson, J.R., Geol. Surv. Canada:
Rank studies of coal and carbonaceous matter, 1967-70.
The objective is to obtain information on local and regional changes in organic metamorphism of sedimentary rocks, with application towards the search for oil and gas, structural geology and possibly areas of mineralization. See Coal metamorphism and hydrocarbon potential in the Upper Paleozoic of Eastern Canada; Geol. Soc. Amer. Program, 1968 Annual Meeting (abstract).

642. Hale, W.E., Austria, V.B., Univ. of New Brunswick:
Mineral zoning and geochemical orientation associated with a Devonian granite stock in New Brunswick, 1968-70; M.Sc. thesis (Austria).

643. Hale, W.E., Sevillano, A.C., Univ. of New Brunswick:
Carboniferous as a metallogenic epoch in northern Appalachians, 1967-71, M.Sc. thesis (Sevillano).

644. Hobson, G.D., Geol. Surv. Canada:
Seismic methods in the Canadian Shield, 1963-.
Seismic reflection and refraction techniques should be able to define structure within the Shield areas. Proterozoic basins can be defined and interfaces have been detected at depth. The possibility of delineating orebodies will be investigated using frequency and amplitude parameters as well as velocity variations.

645. Hutchinson, R.W., Univ. of Western Ontario:
Geochemistry and mineral paragenesis of Danakil potash deposits, Ethiopia, 1968-70.
The Danakil evaporites are the youngest known marine evaporites in the world. They are therefore least affected by burial and by denteric-metamorphic changes and study of the processes of bittern salt deposition here should be applicable to older deposits elsewhere.

646. Innes, M.J.S., Gibb, R.A., Whitehead, J., Observatories Branch, Dept. of Energy, Mines and Resources:
Gravity map of Canada, 1966-68.
The second edition of the Gravity Map of Canada at a scale of 1 inch to 40 miles in four sheets is based on data obtained up until the end of 1966. The map is in colour and shows Bouguer anomalies contoured at intervals of 10 mgal. All the data shown are available on request, to the petroleum and mining industries, the universities and other interested agencies. The cost of this service will be partly covered by a nominal charge to all users. See A new gravity anomaly map of Canada: an aid to mineral exploration; Proceedings of the Canadian Centennial Conference on Mining and Groundwater Geophysics, 1967, Geol. Surv. Can. (in press).

647. Johnston, W.G.Q., Saskatchewan Dept. of Mineral Resources:
Reindeer Lake South 64D-SW, Saskatchewan, 1968-70.
Initial program of compilation of previous mapping supported by aeromagnetic and geochemical studies, and detailed work with mineral deposits. See Summary Rept. of Geol. Surveys in Sask., 1968.

648. Jolliffe, A.W., Queen's Univ.:
George Agicola's Bermannus: a dialogue on minerals and metals, 1964-69.
This represents Agicola's first scientific work-published 26 years before his De re metallica. It marks the first modern approach to minerals and metals and also has considerable significance in the emergence of chemistry as a science.

649. Kipling, R.W., Univ. of Saskatchewan:
Data processing for Precambrian ore deposits, 1968-69; M.Sc. thesis.

650. Kirkham, R.V., British Columbia Dept. of Mines and Petroleum Resources:
Mineralogical and geochemical study of the zonal distribution of ores in the Hudson Bay Range, British Columbia, 1963-68.
A study of a typical hypogene-zoned mining district to determine what geologic processes may have been responsible for the zoning. See B.C. Minister of Mines Ann. Rept., pp. 86-91, 1966.

651. Kretschmar, U., Clark, L.A., McGill Univ.:
Subsolidus phase relations of arsenopyrite, 1968-70;
It is hoped to refine and extend to lower temperatures the arsenopyrite solvus curves and clarify the role of this mineral in applied temperature and pressure studies.

652. Lajtai, E.Z., Szabo, N.L., Univ. of New Brunswick.
Glacial transportation at Mount Pleasant, New Brunswick, 1968-70; Ph.D. thesis (Szabo).
The objective is to correlate drift petrology with source areas with special emphasis on the distribution of ore minerals in drift around the exposed orebody of Mount Pleasant.

653. LaSalle, P., Ministère des Richesses Naturelles:
Géologie des sédiments quaternaires du lac St-Jean et de la région de Québec.
Voir Field trip of Quaternary geology, Saguenay River-Lac St-Jean; Min. Rich. Nat. Québec, 1968.

654. Lee, H.A., Geol. Surv. Canada:
Mineral indicator techniques of mineral exploration, 1962-69.
See An Ontario kimberlite occurrence discovered by application of the glaciofocus method to a study of the Munro esker; Geol. Surv. Can., Paper 68-7, 1968 and Paper 69-1, Pt. A, 1969.

655. Leech, G.B., Geol. Surv. Canada:
General metallogeny of Canada, 1966-.
Emphasis has been on Canada's contribution to the Metallogenic Map of North America (Commission for the Geological Map of the World) in association with the Canadian Metallogenic Map Committee. Two trial geological (sensu lato) basemaps were developed from contrasting legends. The first draft of the Canadian part of the mineral deposits display includes some 700 symbols, each of which contains information on the geological class, mineralogy, age, size, and environment of the deposit or group of deposits it represents.

656. MacRae, N.D., Univ. of Western Ontario:
Geochemical relations of silicate-oxide-sulphide assemblages on mafic rocks, 1968-.

Chemical distribution of elements in coexisting minerals may be used to partially simplify crystallization histories of individual intrusions. This process will be used to attack as yet unexplainable problems of the Great Lakes Nickel mafic intrusion (Fort William, Ontario) and of the Munro Lake sill (Matheson, Ontario). For comparison, a suite of samples from the well-studied Stillwater complex (Montana) will be collected and examined. Examination of the natural rock suites will be supplemented by limited experiments on the synthetic phase systems concerned.

657. McAllister, A.L., Bhatia, D.M.S., Univ. of New Brunswick:
Facies changes in iron formation, Brunswick No. 12 mine, Bathurst, New Brunswick, 1966-69; M.Sc. thesis (Bhatia).

658. McCartney, W.D., and graduate students, Queen's Univ.:
Study of trace element content and variations in sulphides of selected ore deposits, 1966-.

659. McCartney, W.D., Callahan, J., Queen's Univ.:
Research in exploration geochemistry, 1968-69; Ph.D. thesis (Callahan).
Use of trace element contents of the magnetic and non-magnetic heavy mineral separates from stream sediments in evaluating mineral potential in an area near Churchill Falls, Labrador. See Preliminary application of heavy mineral analyses to metallogeny of Carboniferous areas, Nova Scotia and New Brunswick; Geol. Surv. Can., Paper 64-29, 1964.

660. McDougall, D.J., Loyola College:
Thermoluminescence of geological material, chemical reactivity and thermoluminescence, geothermometry by thermoluminescence and "tunneling" processes in fluorite, 1963-70.
See A "lattice defect-free energy" approach to replacement processes in ore deposition; Econ. Geol., vol. 63, pp. 611-681, 1968.

661. McGlynn, J.C., Geol. Surv. Canada:
Geology and economic minerals of Canadian Precambrian Shield, 1965-68.

662. McLeod, C.R., Geol. Surv. Canada:
Wall chart for the microhardness and reflectivity of ore minerals, 1968.

663. Milligan, G.C., Chatterjee, A.K., Dalhousie Univ.:
Investigations of the George River series, Cape Breton, 1962-68; Ph.D. thesis (Chatterjee).
The object is to discover, in the known sulphide occurrences, a guide for the search for others.

664. Milne, V.G., Ontario Dept. of Mines:
Ore deposits of the Manitouwadge area, District of Thunder Bay, Ontario, 1968-70.
See Ont. Dept. Mines Summary of Field Work, 1968.

665. Morrison, B., Saskatchewan Research Council:
Natural potential studies, 1967-69.
Investigation of sources of atmospheric, tree, and snow potentials and their relation to mineral deposits.

666. Muller, J.E., Geol. Surv. Canada:
Geology, stratigraphy, petrology and mineral deposits of northern Vancouver Island (N.T.S. 102I, 92L, 92E, 92K)
See Geol. Surv. Can., Paper 69-1A, 1969.

667. Muller, J.E., Carson, D.J.T., Geol. Surv. Canada:
Geology and mineral deposits of Alberni map-area, Vancouver Island and Gulf Islands, British Columbia.
Regional geology, stratigraphy, petrology and mineral deposits of the central part of Vancouver Island in the Strait of Georgia (N.T.S. 92F).

668. Northcote, K.E., British Columbia Dept. of Mines and Petroleum Resources:
Geology and mineral deposits of the Port Hardy area, Vancouver Island, British Columbia, 1 inch to 1/2 mile, 1968-70.
Includes production of geologic map and detailed study of important mining properties.

669. Nuffield, E.W., Univ. of Toronto:
A crystallo-chemical study of the ore minerals, 1945-.
The present study is a joint one with Dr. D.C. Harris of the Mines Branch, Ottawa on a new mineral with an unusual composition, namely a copper telluro-selenide. See Studies of mineral sulphur-salts: xx - Berryite, a new species; Can. Mineral., vol. 8, Pt. 4, pp. 407-413, 1966.

670. Palacky, J., University of Toronto:
A study of I.P. prospecting methods, 1969-; Ph.D. thesis.

671. Potter, R.R., New Brunswick Dept. of Natural Resources:
Metallogenic investigations in New Brunswick, 1965-70.
Includes the examination and evaluation of all known mineral occurrences in the Province. The regional factors controlling their distribution in space and time will be investigated. See Metallogenic investigations, Kennebecasis Zone, in New Brunswick; N.B. Dept. of Natural Resources, Information Circular 67-1, 1967.

672. Preto, V.A., British Columbia Dept. of Mines and Petroleum Resources:
Mineral deposits of the Copper Mountain-Kennedy Mountain area, British Columbia, 1968-.
Mapping of the area (1 inch to 1,000 feet) with particular reference to structure, metamorphism, and other controls of ore deposition.

673. Procyshyn, E.L., McCartney, W.D., Queen's University:
Metallogeny of south-central British Columbia, 1968-70; Ph.D. thesis (Procyshyn).
A study of the relationship of mineral deposits and occurrences to the tectonic, stratigraphic and plutonic evolution of the region. See Metallogeny of post-Precambrian geosynclines; Geol. Surv. Can., Paper 65-6, pp. 33-42, 1965.

674. Riley, R.A., Jolliffe, A.W., Queen's Univ.:
The Steeprock "buckshot" ore - an archaean bauxite?, 1964-69; M.Sc. thesis (Riley).
See Stratigraphy of the Steeprock Group, Steeprock Lake, Ontario; Geol. Assoc. Can., Spec. Paper No. 3, June 1966.

675. Roberts, R.G., Univ. of Waterloo:
The metamorphism of base metal sulphide deposits of volcanic affinity, 1968-70.

676. Rojkovic, I., Jolliffe, A.W., Queen's Univ.:
Geochemistry of U-Ag-Co-Ni-Bi veins, 1968-69.

677. Sangster, A.L., McCartney, W.D., Queen's Univ.:
Metallogeny of the southwestern Grenville Province, 1966-69; Ph.D. thesis (Sangster).
The mineral occurrences of the Grenville Group in Ontario are being studied to determine their structural and stratigraphic control as related to the tectonic and metamorphic history of the area. See Metamorphic trace element zoning in the New Calumet zinc deposit, Quebec, Canada; Geol. Soc. Amer., Program Abstract, 1968 Annual Meeting, Mexico City.

678. Sears, P., Université Laval:
The distribution of mercury in base metal and gold deposits of the Province of Quebec, 1967-69; M.Sc. thesis.

679. Sherwood, H.G., Nova Scotia Technical College:
Quantitative determination of pyrite, pyrrhotite, and magnetite in ore samples using the differential thermal analysis method, 1969-70.
A study of the potential of the D.T.A. method for determining or estimating within certain limits, the amounts of these minerals in ore samples.

680. Siddeley, G., Geol. Surv. Canada:
The geochemical composition of ultramafic rocks and its relation to their contained mineral deposits, 1968-69.
Approximately 750 samples have been collected for analysis from 50 localities between Lynn Lake (Manitoba) and the Western Townships (Quebec). Each sampling locality may be classified as either ore-bearing, high-potential, barren, or unknown-potential. Geochemical comparisons will be made between the known-potential groups. If significant differences are determined, the geochemical data for the unknown-potential localities will be examined and their potentials classified. The chemical values (major and trace elements) will also be used towards a geochemical census of Canadian ultramafic rocks.

681. Sims, W.A., Mount Allison Univ.:
Study of heavy minerals, Eastern Gaspé, 1944-.

682. Sinclair, A.J., LeCouteur, D., Livingstone, W., Univ. of British Columbia:
Lead isotope studies in the Canadian Cordillera, 1968-70; Ph.D. theses (LeCouteur and Livingstone).
Includes investigation of common lead isotope abundances for deposits in Anvil district, Yukon Territory and East Kootenay district, and the Beaverdell area, British Columbia. Both projects are being done in conjunction with field geological investigations and supplementary laboratory work.

683. Sinclair, A.J., Dawson, K.M., Mathews, W.H., Livingstone, W., Univ. of British Columbia:
Trend surface analysis of minor elements in sulphides, 1965-; Ph.D. theses (Dawson and Livingstone).

The study of Slocan sulphides is completed and will be written up shortly. A similar study has been completed on pyrite from Endako Mine and a study on minor elements in galena and sphalerite from the Beaverdell area is underway. See Trend surface analysis of minor elements in sulphides of the Slocan mining camp, British Columbia, Canada; Econ. Geol., vol. 62, pp. 1095-1101, 1967.

684. Smith, J.R., Saskatchewan Research Council:
Geology and geochemistry of the Precambrian in Saskatchewan, 1959-.
This project involves a study of the relationship between trace metal distribution in rocks and base metal ores in Saskatchewan. See Preliminary Report on the Geology and Geochemistry of the Hanson Lake West area, Saskatchewan - Part 2: Interim Geochemical Results, 1966.

685. Smitheringale, W.G., Memorial Univ. of Newfoundland:
Distribution of trace elements in and around mineral deposits, 1966-.

686. Sobczak, L.W., Jacoby, W.R., Observatories Branch, Dept. of Energy, Mines and Resources:
A gravity survey of the Kinmount Geophysical Test Range, 1967-68.
Gravity was one of several geophysical methods of mineral exploration demonstrated at the Kinmount test range. The gravity method, in this instance, could not be used alone for the direct detection of mineralized zones found by other geophysical methods. However, a band of amphibolite flanked on either side by known mineralized zones was outlined by a positive gravity anomaly. Analysis of residual anomalies suggests that this band extends to a depth of at least 1,200 ft. The mass excess of the larger mineralized zone is estimated to be of the order of 4 metric tons/cm. See A gravity survey of the Kinmount Geophysical Test Range, Cavendish township, Ontario; Geol. Surv. Can., Paper (in press).

687. Sutherland-Brown, A., British Columbia Dept. of Mines and Petroleum Resources:
Distribution of mineralization in British Columbia and metallogenesis, 1967-.

688. Sutterlin, P.G., DePlancke, J., Univ. of Western Ontario:
Development of a computer-processible file for mineral deposits data, 1968-71.

689. Sutterlin, P.G., May, R.W., Zodrow, E.L., Univ. of Western Ontario:
Statistical and numerical analysis of geological data, 1968-; thesis projects (May and Zodrow).
R.W. May is investigating statistical routines in an attempt to classify Pleistocene deposits on the basis of measurable till parameters and E.L. Zodrow is investigating the nature of data obtained from mineral assays in an attempt to ascertain how these data can be used in the prediction of ore grade.

690. Trueman, E.A., Clark, A.H., Queen's Univ.:
Minor element studies on sulphides, oxides, and silicates from the Copper Mountain area, British Columbia, 1968-69; M.Sc. thesis (Trueman).
This study forms part of a more comprehensive metallogenetic project in south-central British Columbia (see McCartney and Procyshyn).

691. Usik, L. (Miss.), Geol. Surv. Canada:
Development of biogeochemical exploration methods for metallic mineral deposits applicable to bog, muskeg and swamp areas, 1968.
A brief paper is being prepared which reviews the literature on the subject and suggests some general ideas on the use of bogs and muskegs in prospecting for mineral deposits.

692. Warren, H.V., Brabec, D., Delavault, R.E., Manson, R., Fletcher, K., Univ. of British Columbia:
Arsenic, lead, silver and selenium in rock, soil and vegetal matter, 1967-70; thesis projects (Brabec and Manson).
The prime interest is in exploring all ways by which geochemistry may be used to find ore. The "normal" and what are anomalous amounts of various elements in rocks, soils, and vegetal matter are being established. Unusual concentrations of these elements in food products used by animals and man are also being discovered. See The arsenic content of Douglas Fir as a guide to some gold, silver and base metal deposits; C.I.M.M. Bull., vol. 61, No. 675, pp. 860-866, 1968.

693. Whitmore, D.R.E., Geol. Surv. Canada:
Development and supervision of mineral deposits data bank, 1968-.
Some 3,000 entries (deposits) were made in the file during 1968. Retrieval programs for various types of output are being developed.

694. Wightman, J.F., Acadia Univ.:
Silica vein mineral paragenesis in Triassic basalt, southwest Nova Scotia, 1968-69; M.Sc. thesis.
A study of the varieties, sequence, and emplacement mechanisms of silica minerals in veins of a fault zone in Triassic basalt near Centerville, Nova Scotia.

695. Wolfe, W.J., Ontario Dept. of Mines:
Geochemistry of stream sediments and bedrock, Pukaskwa region, Districts of Algoma and Thunder Bay, Ontario, 1968-69.
The -80 mesh fractions of stream sediment samples have been analyzed for cold extractable THM and hot $HCl-HNO_3$ extractable Cu, Pb, Zn, Ni, Co, Mn and Mo. These results are compared with trace element data obtained from systematically collected specimens of bedrock as a means of evaluating the effects of glacially transported overburden on the regional distribution of metal background in surficial materials. See Ont. Dept. Mines Summary of Field Work, 1968.

696. Wolfe, W.J. Austria, V., New Brunswick Dept. of Natural Resources:
Regional geochemistry of stream and spring sediments, New Brunswick, 1965-70.
Systematic regional sampling of stream and spring sediments, and analysis for 8 to 10 trace elements is followed by detailed examination of specific areas for the purpose of (a) developing criteria for distinguishing between significant and non-significant anomalies; and (b) obtaining fundamental information on the mobility of elements in the surficial environment. See The Cu, Pb, Zn, Mn and Mo content of stream and spring sediments, parts of Charlotte, St. John and Kings counties, New Brunswick; N.B. Dept. of Nat. Res., Rept. of Investigation No. 6.

MINERALOGY

Specific Minerals

697. Appleyard, E.C., Univ. of Waterloo:
Silica-poor amphiboles from calc-silicate rocks in Lyndoch township, Ontario, 1966-70.
One of the major mineral constituents is an amphibole with an apparently uniquely low silica content (approximately 5.25 Si atoms in the structural formula). The current study treats the paragenesis and crystal chemistry of this mineral.

698. Aumento, F., Geol. Surv. Canada:
Study of serpentine group minerals, 1966-69.
See A serpentine mineral showing diverse strain relief mechanisms; Amer. Mineral., vol. 52, pp. 1399-1413, 1967.

699. Bachechi, F., Univ. of Toronto:
A crystallographic investigation of Montbrayite, Au_2Te_3, 1966-69; Ph.D. thesis.
See New data on the system Ag-Te; Amer. Mineral., Sept.-Oct., 1968.

700. Bayliss, P., Univ. of Calgary:
Crystallographic studies of pyrite group, 1964-72.
See The crystal structure of geodorffite (III) a distorted and disordered pyrite structure; Min. Mag., vol. 36, pp. 940-947, 1968.

701. Campbell, F.A., Univ. of Calgary:
Equilibration of sphalerite in natural sulphide assemblages, 1967-69.
This is a continuing project which employs microprobe analytic data to determine the degree and scale of equilibration in natural sulfide assemblages. See Composition of sphalerite from Quemont Mine, Quebec; Econ. Geol., vol. 63 (in press).

702. Campbell, F.A., Krouse, R., Lusk, J., Univ. of Calgary:
S-isotope partitioning in sulphide assemblages, 1965-71.
This is a continuing project involving studies of natural and synthetic materials with a view to determining the partitioning of S^{34}/S^{32} between various sulfide species. See A reconnaissance study of some Western Canadian lead-zinc deposits; Econ. Geol., vol. 63, No. 4, pp. 349-359, 1968.

703. Chao, G.Y., Carleton Univ.:
Studies on minerals from Mt. St. Hilaire, Quebec - some new mineral species, 1967-69.

704. Chao, G.Y., Chen, T.T., Carleton Univ.:
Studies on minerals from Mt. St. Hilaire, Quebec - soda amphiboles, 1967-69; M.Sc. thesis (Chen).
See Minerals from the nepheline syenite, Mt. St. Hilaire, Quebec; Can. Mineral., vol. 9, Pt. 1, 1967.

705. Chen, S.M., Burley, B.J., Grundy, H.D., McMaster Univ.:
Crystallography of cancrinite, 1968-69; M.Sc. thesis (Chen).
Investigation of the variation of cancrinite properties with

chemical composition, and investigation of crystal structures and superlattices existing in the cancrinites.

706. Farrell, D.M., Mines Branch, Dept. of Energy, Mines and Resources:
Determination of the course of structural changes and of the kinetics of conversion of magnetite through maghemite to α-hematite by infrared spectroscopy, 1968-69; M.Sc. thesis, Univ. of Ottawa.
The importance of the three materials in the treatment of iron ores and their close association with the ferrite types of magnetic ceramics are the reasons for the investigation.

707. Fawcett, J.J., James, R.S., Univ. of Toronto:
Stability of the Mg-Fe chlorites, 1966-69.
See Phase relationships of chlorites in the system $MgO-Al_2O_3-SiO_2-H_2O$; Amer. Mineral., vol. 51, pp. 353-380, 1966.

708. Grundy, H.D., McMaster Univ.:
Crystallography of the silicate minerals, 1968-.
Current studies include the cancrinite solid solution series.

709. Hawthorne, F.C., McMaster Univ.:
Crystallography and chemistry of Hastingsite, 1968-70; M.Sc. thesis.

710. Hogarth, D.D., Univ. of Ottawa:
Paragenesis of lapis lazuli of Sikeria and Baffin Island, Northwest Territories, 1967-70.
Rare-earth silicates, 1961-69.
Includes intermediate members of the spencite-tritomite group.

711. Jambor, J.L., Geol. Surv. Canada:
Studies of new and rare minerals, 1961-.
See New lead sulfantimonides from Madoc, Ontario: Part 3 - syntheses, paragenesis, origin; Can. Mineral., vol. 9 Pt. 4, pp. 505-521, 1968.

712. James, R.S., Fawcett, J.J., Univ. of Toronto:
Stability and phase relations of the intermediate Mg-Fe chlorites, 1967-69.
In the present study a complete range in the FeO/MgO ratio for chlorites between clinochlore and daphnite will be examined at pressures to 10 kilobars, a variety of buffers will be used to establish known oxygen fugacity conditions in the system.

713. Kingston, P.W.E., Queen's Univ.:
The naturally occurring cobalt iron sulpharsenide minerals, 1966-68; Ph.D. thesis.
Includes x-ray crystallographic, magnetic susceptibility, and chemical analytical studies of the naturally occurring Co-Fe minerals - alloclasite, glaucodot, danaite, arsenopyrite, and cobaltite.

714. Lin, H.C., Berry, L.G., Queen's Univ.:
Crystal structure of a rare-earth bearing silicate mineral from Kipawa, Quebec, 1967-.

715. Lin, S.B., Burley, B.J., McMaster Univ.:
Atomic structure of scapolite, 1968-71; Ph.D. thesis (Lin).

716. Papezik, V.S., Keats, H.F., Memorial Univ. of Newfoundland:
Mineralogy of a pyrophyllite deposit near Foxtrap, Newfoundland, 1968-70; M.Sc. thesis (Keats).
Detailed study of the phase assemblages in the system SiO_2-Al_2O_3-K_2O-H_2O as represented by altered rhyolitic rocks in and around the Foxtrap Quarry.

717. Perrault, G., Le Page, Y., Ecole Polytechnique:
Diffractometry of clinopyroxenes, 1962-68; D.Sc. thesis (Le Page).
The position parameters were refined from approximately 350 I_{hkl} by least squares analyses. Approximately 2,000 I_{hkl} are being collected: it is hoped to use these to arrive at some values for the thermal agitation parameters.

718. Perrault, G., Richard, P., Ecole Polytechnique:
Crystal chemistry of niobium, 1968-75; D.Sc. thesis (Richard).
Includes acquisition of new data on specific materials: Nb_2O_5, the silicate of niobium, alloys of niobium, etc., crystal structure determination of Y-Nb_2O_5 and other oxides, and structure determination of a new silicate of niobium.

719. Rambaldi, E., Univ. of Ottawa:
Study of feldspars and muscovite in metamorphic rocks of the Oak Lake-Tangamong Lake area, Peterborough-Hastings district, Ontario, 1966-69; Ph.D. thesis.
Chemical (atomic absorption) analysis of coexisting plagioclase, potash feldspar, and muscovite and determination of the distribution of sodium, potassium and other elements among these minerals.

720. Rimsaite, J.Y.H. (Miss.), Geol. Surv. Canada:
Study of mica group minerals and associated host rocks, 1959-.
The purpose is to evaluate the geological and petrological importance of the principal types of mica. Studies continue on: geochemistry, mineralogy and petrology of mica-bearing rocks; micas from uncommon rocks; anionic framework of micas which differs from that of the ideal mica; and adsorption of atmospheric argon, and loss of radiogenic argon in principal species of micas heated under controlled conditions. See Geochemistry, mineralogy and petrology of poly-mica rocks; XXIII International Geological Congress, Prague, 1968, Proceedings of Section 6, Geochemistry, pp. 44-66.

721. Salter, D.L., Appleyard, E.C., Univ. of Waterloo:
Montmorillonite and palygorskite from the Norsk Nefelin mine at Lillebukt, Stjernøy, north Norway, 1968-69.

722. Scott, J.D., Queen's Univ.:
The crystal structure of franckeite, 1966-69; Ph.D. thesis.
Crystal structures of the binary tin sulphides have been determined and these results are to be used in interpreting tin-sulphur bonding in the complex lead-antimony-tin sulfosalt, franckeite. The crystal structure of the subcell of franckeite is being determined and the full cell (Z = 98) will be attempted.

General Problems

723. Abbey, S., Champ, W.H., Courville, S., Hill, F.C., Sen Gupta, J.G., Geol. Surv. Canada:
Analysis of rocks and minerals.

See Analysis of rocks and minerals by atomic absorption spectroscopy, Part 2: Determination of total iron, magnesium, calcium, sodium and potassium; Geol. Surv. Can., Paper 68-20, 1968.

724. Arnold, R.G., Sangameshwar, S., Univ. of Saskatchewan:
Comparative study of sulfide and silicate mineralogy in ores of the Flin Flon area, Saskatchewan and Snow Lake area, Manitoba, 1967-71; Ph.D. thesis (Sangameshwar).
The structure and compositions of sulfides and silicates in ore deposits of the two areas are being studied to determine if they are genetically related.

725. Baleshta, T.M., Dibbs, H.P., Mines Branch, Dept. of Energy, Mines and Resources:
Surface and bulk electrical properties of minerals, 1965-69.
The objectives are to determine the electrical behaviour of mineral surfaces with relation to their bulk electrical properties and the interaction of the surface with other phases. See Iron-iron interaction in iron-containing zinc sulphide; Can. Mineral., vol. 9, p. 453, 1967.

726. Bayliss, P., Deere, R., Univ. of Calgary:
The mineralogy of Lower Jurassic in west-central Alberta, 1967-68; thesis project (Deere).

727. Bird, G.W., Fawcett, J.J., Univ. of Toronto:
Stability of the muscovite-chlorite-quartz assemblage, 1968-71; Ph.D. thesis (Bird).
See Phase relationships of chlorites in the system $MgO-Al_2O_3-SiO_2-H_2O$; Amer. Mineral., vol. 51, pp. 353-380, 1966.

728. Corbin, B.D., Acadia Univ.:
Distribution and origin of barium minerals in Nova Scotia, 1968-70; M.Sc. thesis.

729. Coy-Yll, R., Ecole Polytechnique:
Cathodoluminescence in minerals, 1967-69.
The scanning system of an electron microprobe is being used for the study of local cathodoluminescence in minerals. The electronic states involved in cathodoluminescent spectra is interpreted on the basis of ligand field theory: the behaviour of decay curves, saturation of cathodoluminescent intensity and its variations with incident current and high voltage have been measured. See Quelques aspects de la cathodoluminescence des minéraux; Chem. Geology, 1968 (in press).

730. Coy-Yll, R., Emond, A., Ecole Polytechnique:
The Kossel technique and defects in minerals, 1967-69; M.Sc. thesis (Emond).
A new scanning Kossel-line camera has been constructed. The appearance of Kossel-lines on photographic film serves as an indication of the relative perfection of a crystal. Small elastic stresses present in plastic minerals (halite and galena have been examined) cause small changes in lattice constants and produce corresponding shifts in the Kossell-line positions of these minerals. It thus becomes possible to study the magnitude and distribution of such stresses in single minerals, which are connected with a particular tectonic action.

731. Coy-Yll, R., Soudière, J., Ecole Polytechnique:
Electron probe analyses of minerals uncertainty, 1968-69.
The theory of electron probe microanalysis of minerals is being reviewed and experimental methods proposed.

732. Dean, R.S., Mines Branch, Dept. of Energy, Mines and Resources:
Mineralogy of argillaceous materials in Canada, 1958-.
See Ceramic clays and shales of Ontario; Mines Branch Research Rept. R175, Oct., 1966.

733. Donaldson, J.A., Carleton Univ.:
Heavy minerals in Proterozoic sandstones of the western Canadian Shield, 1968-72.

734. Donaldson, J.A., Carleton Univ., Dean, R.S., Mines Branch, Dept. of Energy, Mines and Resources:
Clay minerals in Proterozoic sediments, 1967-69.

735. Faye, G.H., Mines Branch, Dept. of Energy, Mines and Resources:
The correlation of absorption spectra with structures of minerals and inorganic complexes, 1965-.
Optical absorption studies are also being made on andalusite, kyanite, and spinel. See The polarized optical absorption spectra of tourmaline, cordierite, chlorotoid and vivianite: ferrous-ferric electronic interaction as a source of pleochroism; Amer. Mineral., vol. 53, p. 1174, 1968.

736. Fleet, M.E.L., Univ. of Western Ontario:
Geochemistry and structure of sulphide minerals, 1967-.
A crystal structure analysis of the hexagonal 3A,2C pyrrhotite is in progress. See The superstructures of two synthetic pyrrhotites; Can. Jour. Earth Sciences, vol. 5, No. 5, p. 1183, 1968.

737. Folinsbee, R.E., Baadsgaard, H., Cumming, G.L., Krouse, R.H., Smith, D.G.W., Sasaki, A., Univ. of Alberta:
Study of Canadian meteorites, 1960-.
Recovery and description of meteorites using sophisticated techniques (photographic and seismic tracking; electron microprobe, chemical, X-ray and isotopic methods of study).

738. Foscolos, A.E., Geol. Surv. Canada:
Clay mineral investigations, 1968-.
Investigations of clay synthesis, clay diagenesis, halmyrolysis, equilibria, clay mineral separation from marine sediments and transformation of fresh water clays on contact with sea-water. See Cation-exchange equilibrium constants of aluminum saturated montmorillonite and vermiculite clays; Soil Science Soc. of Amer., Proc. vol. 32, pp. 350-354, 1969.

739. Gabe, E.J., Hall, S.R., Rowland, J.F., Mines Branch, Dept. of Energy, Mines and Resources:
Crystal-structure analysis of minerals, 1968-.
See Computer programs for X-ray crystallography; Mines Branch Research Repts. R189 and R191.

740. Gillieson, A.H.C.P., Farrell, D.M., Mines Branch, Dept. of Energy, Mines and Resources:
Infrared vibration spectra of sulphide minerals, 1966-69.

Most of the experimental work has been completed and the interpretation of the spectra is well underway. By use of a UNIVAC Computer, the bond strengths of the atomic linkages are being calculated. From these and the vibration frequencies, there can be derived parameters of interest and importance, e.g. specific heat, elastic constants, entropy, enthalpy, and free energy.

741. Grieve, R.A.F., Fawcett, J.J., Univ. of Toronto: to
Phase relations of chloritoid at water pressures up/10kb., 1967-70.

742. Harris, D.C., Mines Branch, Dept. of Energy, Mines and Resources:
Electron-probe microanalysis of ore minerals, 1968-.
Characterization of copper selenides, 1968-.
A new copper selenide mineral from the Northwest Territories is being characterized in terms of its composition and crystallographic parameters. Other copper selenides are being analyzed by electron-probe microanalysis.

743. Hughson, M.R., Mines Branch, Dept. of Energy, Mines and Resources:
High temperature X-ray diffraction analysis with Rigaku-Denki camera, 1967-69.

744. Jambor, J.L., Geol. Surv. Canada:
Study of non-metallic vein minerals and wall-rock alteration, Cobalt Camp, 1966-70.
The project will also include petrographic, microprobe, and X-ray studies of differentiation in the Nipissing diabase, Cobalt-Gowganda area.

745. Karrow, P.F., Salter, D.L., Univ. of Waterloo:
Mineralogy of glacial deposits, 1968-70.
Study is being concentrated on clay minerals and heavy minerals.

746. Lachance, G.R., Geol. Surv. Canada:
X-ray emission analysis, 1968-.
A comprehensive investigation on the calculation of fundamental coefficients from basic principles that could be used to correct for inter-elemental effects in X-ray emission analysis is almost completed. See A practical solution to the matrix problem in X-ray analysis; Canadian Spectroscopy, vol. 11, No. 2 and 3, 1966.

747. Levinson, A.A., Univ. of Calgary:
Geochemistry and mineralogy of the Mackenzie drainage basin, 1967-.
All aspects of the chemistry of the waters, nature of the clay minerals being transported and deposited in the delta, etc., are being considered. See Major element composition of the Mackenzie River at Norman Wells, N.W.T., Canada; Geochimica et Cosmochimica Acta, 1968 (in press).

748. Libby, W.G., Univ. of British Columbia:
Vein and amygdule mineral zonation of Metchosin basalt, Vancouver Island, British Columbia, 1968-69.

749. McLeod, C.R., Geol. Surv. Canada:
Wall chart for the microhardness and reflectivity of ore minerals, 1968-.

750. Naldrett, A.J., Graterol, M. (Mrs.), Univ. of Toronto:
Study of the mineralogy of Marbridge No. 3 and 4 ore deposits, 1968-69; M.Sc. thesis (Graterol).
These deposits of Fe-Ni sulfides have the unusual mineralogy millerite-pentlandite-pyrite. A pronounced zoning across each deposit indicates a close relation between the composition of the sulfides and the edges of their host peridotites.

751. Nickel, E.H., Mines Branch, Dept. of Energy, Mines and Resources:
The fundamental properties of sulphides and related minerals, 1964-.
This study seeks to relate the physical, chemical and optical properties of sulphides and bonding. See Structural stability of minerals with the pyrite, marcasite, arsenopyrite and löllingite structures; Can. Mineral, vol. 9, pp. 311-321, 1968.

752. Nuffield, E.W., Univ. of Toronto:
A crystallo-chemical study of the ore minerals, 1945-.
The present study is a joint one with Dr. D.C. Harris of the Mines Branch, Ottawa on a new mineral with an unusual composition, namely a copper telluro-selenide. See Studies of mineral sulphursalts: xx - berryite, a new species; Can. Mineral., vol. 8, Pt. 4, pp. 407-413, 1966.

753. Owens, D.R., Mines Branch, Dept. of Energy, Mines and Resources:
Mineralogical investigation of Canadian ores in conjunction with mineral processing research, 1953-.
A wide range of ores is currently being studied mineralogically in connection with the development and exploration of Canadian ore deposits.

754. Papezik, V.S., Gibbons, R.V., Memorial Univ. of Newfoundland:
Study of arsenic-antimony minerals in volcanic rocks near Moreton's Harbour, Notre Dame Bay, Newfoundland, 1967-69; M.Sc. thesis (Gibbons).
Veins of arsenopyrite and stibnite occur in Ordovician volcanic rocks associated with numerous dykes. X-ray study may indicate P-T conditions of mineralization. See Native arsenic in Newfoundland; Can. Mineral., vol. 9, Pt. 1, pp. 101-108, 1967.

755. Perrault, G., Ecole Polytechnique:
Preparation de standards minéraux pour la microsonde électronique, 1966-70.
Includes collection, examination and analyses of materials to cover the feldspar field, the clinopyroxenes, and many others. The pyrochlore minerals are being tested on the probe to determine whether they would constitute suitable mineral standards.
Mineralogy of Mont St. Hilaire, Quebec, 1964-70.
Continuing work on the definition of two new minerals: UK-19-1 and UK-19-2 a silicate of sodium and a silicate of niobium. See Polylithionite from St. Hilaire, P.Q.; Min Assoc. Can., Annual Meeting, Halifax, Sept. 1966.

756. Perrault, G., Le Page, Y., Ecole Polytechnique:
Programmation électronique pour les recherches en cristallographic, 1966-70; thèse de doctorat (Le Page).
Continuing development of new crystallographic calculations programs. See Calcul et tracés de synthèses de Fourier et de Patterson par une calculatrice électronique; 34é congrès annuel de l'ACFAS, Québec, Nov. 1966.

Une modification à l'appareil Bond pour la fabrication de spécimens sphériques pour les mesures radiocristallographiques, 1966-68; thèse de doctorat (Le Page).

The most recent proto-types designed still give slightly elliptical specimens for many mineral species. We are attempting to produce with this instrument, specimens of a sphericity compatible with the high accuracy one can attain in intensity measurements. See Un appareil Bond modifié pour la préparation d'echantillons sphériques pour les études cristallographiques; 34é congrès annuel de l'ACFAS, Québec, Nov. 1966.

757. Petruk, W., Mines Branch, Dept. of Energy, Mines and Resources:
Mineralogy and geochemistry of the silver deposits in the Cobalt and Gowganda areas, Ontario, 1964-69.

A study of the sulphides and sulph-antimonides to determine the varieties of minerals present, to establish the compositions and physical properties of those that can have variable compositions, and to correlate them with the mineralogical and geological characteristics of the deposits. See Mineralogy and origin of the Silverfields silver deposit in the Cobalt area; Econ. Geol. 63, pp. 512-531, 1968.

758. Plant, A.G., Lachance, G.R., Delabio, R.N., Geol. Surv. Canada:
Electron probe microanalysis, 1962-.

Current research includes: procedures and methods in electron probe microanalysis; mineralogy of mid-Atlantic Ridge rocks; mineralogy of selected meteorites; and mineralogy of weloganite-bearing rocks from Montreal. See Weloganite, a new strontium zirconium carbonate from Montreal Island, Canada; Can. Mineral., vol. 9, Pt. 4, pp. 468-477, 1968.

759. Ripley, L.G., Mines Branch, Dept. of Energy, Mines and Resources:
Growth of single crystals of base metal sulphides of controlled composition, 1964-.

The program which originated with the growth of cubic zinc sulphide has expanded to include hexagonal zinc sulphide and the cubic disulphides of iron, nickel and cobalt. Investigational work involving the other sulphides of iron, nickel and cobalt as well as the sulphides of copper and manganese is underway. The main growth techniques used have been vapour transport, chemical vapour transport, hydrothermal and flux. In the near future, the arsenides and the arsenosulphides of iron, nickel and cobalt will be attempted.

760. Rucklidge, J.C., Univ. of Toronto:
Electron probe studies of platinum metal minerals, 1967-.

See Electron microprobe investigations of some platinum metal minerals from Ontario; Can. Mineral. (in press).

761. Rucklidge, J.C., Fawcett, J.J., Gasparini, E.L., Univ. of Toronto:
Mineralogical studies on basalts, 1966-.

See A geological expedition to the Tertiary basalt region of Scoresby Sund, East Greenland; Nature, vol. 212, p. 603, 1966.

762. Salter, D.L., Univ. of Waterloo:
Clay mineralogy of Cretaceous sediments from northern Ontario, 1967-69.

The clay mineralogy of samples mainly from boreholes is being evaluated by X-ray diffraction methods. Apart from the fact that the mineralogy of these sediments is little known, an object of the

investigation is to find mineralogical characteristics which may assist in correlation problems.

Clay mineralogy of some Pleistocene deposits of southern Ontario, 1968-69.

The objective is to evaluate the clay mineralogy of argillaceous glacial sediments with a view to using clay mineral assemblages as a means of differentiating between successive glacial episodes of deposition.

763. Sherwood, H.G., Nova Scotia Technical College:
Quantitative mineralogy of forty-five Canadian base metal sulphide ore deposits, 1964-68; Ph.D. thesis, Univ. of Manitoba.

The quantitative mineralogies of forty-five Canadian base metal sulphide ore deposits are presented. Determinations were made on composite samples by point counting and X-ray diffraction methods. Q-mode factor analysis was utilized in interpretation of the data as well as conventional graphical methods.

764. Sirois, L.L., Mines Branch, Dept. of Energy, Mines and Resources:
Determination of electrical characteristics of metallic oxides and silicate minerals, 1966-.

765. Steacy, H.R., Gauthier, C.H.R., Geol. Surv. Canada:
Systematic reference series of the National Mineral Collection and collection of minerals and ore suites, 1955-.

This series currently contains examples of some 1,600 different minerals, from Canada and abroad. The series offers a continuing repository for Canadian minerals and specimen material accruing from mineralogical research.

766. Stevenson, J.S., McGill Univ.:
Mineralogical studies of ashed lung tissue, 1951-.

767. Stevenson, J.S., Stevenson, L.S. (Mrs.), McGill Univ.:
Mineralogy and petrology of manganese nodules from the "Challenger" Expedition recently discovered in the paleontology collection of the Redpath Museum, 1968-69.

768. Traill, R.J., Geol. Surv. Canada:
Catalogue of Canadian minerals, 1958-69.

The manuscript will be completed in February, 1969. Canadian minerals are listed in alphabetical order, and localities of occurrence are given. Chemical analyses are reported.

PALEONTOLOGY

769. Anderson, M.M., Memorial Univ. of Newfoundland:
Contributions to Newfoundland and Burmese paleontology, 1967-.

Includes a study of Precambrian fossils from the Conception beds near Mistaken Point on the south coast of the Avalon Peninsula and of the fauna of the Padaukpin beds of Devonian age in northern Burma.

770. Barnes, C.R., Univ. of Waterloo:
Electron microscopy of the internal growth structures of conodonts, 1967-70.

Conodonts from the Caradocian (Ordovician) of Wales, 1965-70.

771. Barss, M.S., Hacquebard, P.A., Geol. Surv. Canada:
Carboniferous and Permian palynology, 1955-.
To determine the spore content of the Upper Paleozoic succession of Canada as an aid to stratigraphy and for worldwide correlations and to study taxonomy of new forms and adequately describe them.

772. Bartlett, G.A., Queen's Univ. and Bedford Institute:
Geology of the Atlantic continental margins, 1966-.
A detailed paleontologic interpretation of the Mesozoic and Cenozoic sediments from the Continental Shelf and Slope of both the western and eastern Atlantic. Thick sequences in eastern Canadian waters suggest both Tethyan and West Indian affinity. Paleontological, sedimentological and structural evidence implies that the Canadian Continental Shelf is a continuation of the Gulf Coast and Atlantic Coastal Plain physiographic province. See Tertiary stratigraphy on the Continental Slope off Nova Scotia; Maritime Sediments, vol. 4, No. 3, pp. 22-37, 1968.
Effects of pollution on marine micro-organisms, 1966-69.
A comparison of microfaunal distribution in polluted and non-polluted shallow marine and brackish water environments. This enables the establishment of a "pollution index" based on micro-organisms and provides a rapid means of determining the degree and method of pollution. This study also includes a comprehensive analysis of temporal and lateral microfaunal distribution. See Recent foraminifera and thecamoebina in Miramichi River and Bay; BIO Cont. 70, Special Publication Cushman Found. Foram. Res. (in press).
Microstructure of micro-organisms, 1967-.
The interpretation, with the aid of electron microscopes and microprobe analyzers, of the detailed morphological characteristics of micro-organisms and to determine if a relationship exists between these characteristics and evolutionary sequences, specific, generic and familial associations; the application of this information to establish more natural faunal classifications which will aid in more accurate biostratigraphic correlations.
Shallow water ecological studies of benthonic foraminifera in eastern Canada and the United States, 1964-69.
A detailed environmental analysis of shallow water bays throughout the Atlantic Provinces is conducted on a weekly or bimonthly basis. These studies enable a comprehensive analysis of growth, physiology, reproduction and faunal-watermass relationships in the natural environment. This information is utilized in the paleoecologic reconstructions of ancient environments. See Foraminifera distribution in Tracadie Bay, Prince Edward Island; Geol. Surv. Canada, Paper 66 20, 1966.

773. Bartlett, G.A., Tapley, S.G. (Miss), Bedford Institute:
Foraminiferal ecology in shallow water environments, 1968; M.Sc. thesis (Miss Tapley).
The application of statistics in micropaleontology to determine if the size of microfaunal specimens and the species content of microfaunal assemblages are related to environmental variation.

774. Bartlett, G.A., Vilks, G., Ramsay, A.T.S., Bedford Institute:
Ecostratigraphy of the North Atlantic, 1968-69.

The interrelationship of the biomass and watermass of the North Atlantic and Caribbean Sea. Utilization of this information as a climatic and paleoclimatic index in the development of a theory on glaciation. See Planktonic foraminifera in watermasses and bottom sediments from the Grand Banks to the Caribbean Sea; Maritime Sediments, vol. 3, No. 4, 1968.

775. Beerbower, J.R., McMaster Univ.:
Paleoecologic study of evolutionary dynamics of marine biocoenoses, 1965-.

776. Bolton, T.E., Geol. Surv. Canada:
Silurian coral faunas of Eastern and Arctic Canada, 1952-.
Study and description of coral faunas from the Silurian system principally of Manitoulin Island, Ontario, Anticosti Island, Quebec, and Arctic Canada to determine finer faunal zonations and detailed assemblages. See Silurian faunal assemblages, Manitoulin Island, Ontario; Michigan Basin Geol. Soc., Guidebook to Annual Field Excursion, pp. 38-49, 1968.

777. Bray, R., McMaster Univ.:
Ecologic succession in mid-Devonian brachiopod clusters, 1965-69; Ph.D. thesis.

778. Caldwell, W.G.E., Grabec, J., Univ. of Saskatchewan:
Devonian faunas of northwestern Canada, 1960-; M.Sc. thesis (Grabec).
Grabec is studying the origin of the dolomites of the Manetoe and associated formations in the southern Mackenzie Mountains.

779. Chamney, T.P., Geol. Surv. Canada:
Mesozoic micropaleontology - foraminifera, a continuing project.
Primarily being applied to northern Canada but considerable service determinations are contributed for the western interior sedimentary basins in the south. See Albian of the Yukon; Geol. Surv. Can., Paper 67-1, and Cretaceous of the Anderson Plains, District of Mackenzie; Geol. Surv. Can., Paper 69-1 (in press).

780. Chiang, K.K., Univ. of Western Ontario:
Silurian brachiopods of Manitoulin Island and Bruce Peninsula, Ontario, 1967-69; M.Sc. thesis.

781. Churcher, C.S., Royal Ontario Museum:
Revision of the sabre toothed cat genus Smilodon, 1961-.
Investigation of the Pleistocene Mammalian faunas near Medicine Hat, Alberta, 1965-.
Faunal identification of the Equidae in the Ape-Man bearing caves, Transvaal, South Africa, 1968.
Description of new Palaeotragus from the Fort Terman, Kenya, Upper Miocene, 1968.
See Mammoth from the Middle Wisconsin of Woodbridge, Ontario; Can. Jour. Zool., vol. 46, No. 3, pp. 219-221.

782. Collins, D.H., Royal Ontario Museum:
The origin of the Actinocerida, 1967-69.
A new Lower Ordovician nautiloid fauna from Turkey suggests that the actinocerids were derived from the endocerids.
Buoyancy and balance in chambered cephalopods, 1967-69.
Study of the shell and siphuncular tube structures in Nautilus, Spirula, Sepia and very well preserved fossil nautiloids and

ammonoids with the optical microscope and the "Stereoscan" scanning electron microscope has permitted a reassessment of the role these structures play in the function, and hence the evolution, of the chambered cephalopod shell. See Siphuncular tube of Nautilus; Nature, London, No. 216, pp. 916-917, Dec. 1967.

783. Copeland, M.J., Geol. Surv. Canada:
Ordovician and Silurian ostracoda from Anticosti Island, Quebec, 1964-.
See Ostracods from the Vaurial Formation (Upper Ordovician) of Anticosti Island, Quebec; Geol. Surv. Can., Bull. (in press).

784. Cox, R.L., Geol. Surv. Canada:
Cretaceous Dinoflagellates from Saskatchewan, 1966-69; Ph.D. thesis Stanford Univ.
The objective is to establish a fossil dinoflagellate reference section for the Western Canada Sedimentary Basin.

785. Craig, J., Jansonius, J., Imperial Oil Ltd., Calgary:
Evaluation of scolecodonts (fossil worm jaws) for stratigraphic application, 1967-69.
Assemblage plates of dispersed scolecodonts of Ordovician, Silurian, and Devonian age show gross differences from one system to another; there is indication that significant evolutionary change can be recognized and applied to zoning within a stage (f. i.: Frasnian). The systematics for dispersed elements must be drastically reviewed and rationalized, before they can be utilized effectively.

786. Delorme, L.D., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Paleohydrogeology, 1965-70.
See Pleistocene freshwater Ostracoda from Yukon, Canada; Can. Jour. Zool., vol. 46, No. 5, pp. 859-876, 1968.

787. Dixon, O.A., Univ. of Ottawa:
Faunas and paleoecology of top Ordovician and basal Silurian rocks of Anticosti Island, Quebec, 1968-69.
Analysis of successive faunas in a continuous sedimentary sequence spanning the Ordovician-Silurian boundary.

788. Elphinstone, N.P., Mobil Oil Canada Ltd.,
Palynology research, 1967-69.
Includes studies of value of cuttings in palynology dating program and of Paleocene-Maestrichtian and Cretaceous-Jurassic index fossils.

789. Ferguson, L., Mount Allison Univ.:
Sexual dimorphism in fossil brachiopods, 1967-68.
See Possible brood pouches and sexual dimorphism in the productid brachiopod Megousia Muir-Wood and Cooper 1960; International Paleontological Union Symposium, Prague, August, 1968.
Study of the Scottish Carboniferous Ostracod genera Bairdia and Paraparchites, 1965-70.
Stratigraphic and paleoecologic study of the Permo-Pennsylvanian productid genus Waagenoconcha Chao from the Yukon and Northwest Territories, 1960-70.
Study of some arthropodan trackways from Joggins, Nova Scotia, 1966-70.

See The recovery of some large track-bearing slabs from Joggins, Nova Scotia; Maritime Sediments, vol. 2, No. 3, pp. 128-130, July, 1966.

Compaction-distortion of fossil brachiopods and its bearing on taxonomy, 1959-69.

See Distortion of Crurithyris urei (Fleming) from the Visean rocks of Fife, Scotland; Jour. of Paleont., vol. 36, No. 1, pp. 115-119, 1962.

790. Ferrigno, K.F., Univ. of Western Ontario:

Conodonts of the Dundee limestone at St. Mary's, Ontario, 1966-68; M.Sc. thesis.

The conodont fauna of the Middle Devonian Dundee Formation and its stratigraphic distribution in the quarry at St. Mary's are examined in detail.

791. Fox, R.C., Univ. of Alberta:

Late Cretaceous microvertebrates from Alberta, 1966-.

Under a continuing program to survey small fossil vertebrates from Upper Cretaceous rocks in Alberta approximately 40 tons of fossiliferous rock matrix from two sites in the late Campanian Oldman Formation were field processed during the summer of 1968. Prospecting in the early Campanian Milk River Formation led to the discovery in the summer of 1968 of eight microvertebrate sites, three of which have yielded mammalian fossils; these include diverse taxa of multituberculates (Allotheria) and marsupials (Metatheria) and one taxon of placentals (Eutheria). The mammalian fossils from the Milk River Formation include the oldest late Cretaceous mammals from North America and the oldest marsupial and positive placental mammals known. The mammalian fossils from the Milk River Formation are accompanied by assemblages of actinopterygian fishes, salamanders and lizards that are at least as taxonomically diverse as those already recovered from the Oldman Formation, Alberta. The Milk River marsupials represent a distinctly more primitive grade of dental evolution than that seen in the Oldman forms. The Milk River placental seems well isolated dentally from late Cretaceous North American and East Asian placentals already known. See Studies of Late Cretaceous vertebrates: II. Generic diversity among multituberculates; Systematic Zool., vol. 17, No. 3, pp. 339-342, Sept. 1968.

792. Fritz, W.H., Geol. Surv. Canada:

Lower Cambrian trilobites from the Sekwi Formation, Northwest Territories, 1965-69.

Late Middle Cambrian trilobites from the Corner of the Beach Formation, Quebec, 1968-.

Middle Cambrian trilobites from the Burgess Shale, 1966-70.

793. Globensky, Y., Quebec Dept. of Natural Resources:

Geology and micropaleontology of the Grondines map-area, St. Lawrence Lowlands, Quebec, 1968-69.

794. Greggs, R.G., Queen's Univ.:

Paleogeographical study of Upper Cambrian faunal zones of North America, 1965-.

795. Greiner, H.R., Univ. of New Brunswick:

Biocoenose to thanatocoenose on a tropical coral reef, 1967-69.

796. Greiner, H.R., Varma, C.P., Univ. of New Brunswick:
Microfauna and age of the Bonaventure Formation, Chaleur Bay area.

797. Greiner, H.R., Yoon, T.N., Univ. of New Brunswick:
Facies, paleoecology and faunal zonation of the Cambrian of the Atlantic Provinces, 1967-69; M.Sc. thesis (Yoon).

798. Hofmann, H.J., Geol. Surv. Canada:
Precambrian paleontology, 1966-.
A systematic study of Precambrian fossils and pseudofossils in Canada with particular emphasis on stromatolites. See Precambrian fossils(?) near Elliot Lake, Ontario; Science, vol. 156, No. 5774, pp. 500-504, 1967.

799. Hooper, K., Carleton Univ.:
Pleistocene and Holocene foraminifera of Eastern Canada.

800. Hopkins, W.S., Jr., Geol. Surv. Canada:
Mesozoic palynology and biostratigraphy, Western and Northern Canada, 1968-.
Although this project is largely concerned with Mesozoic palynology of Arctic Canada, work will include other parts of Canada and may be extended to include the palynology of the Cretaceous-Tertiary boundary. See Subsurface miocene rocks, British Columbia-Washington; Geol. Soc. Amer., Bull., vol. 79, pp. 763-768, 1968.

801. Hughes, R.D., Memorial Univ. of Newfoundland:
Newfoundland archeocyathids, 1965-.

802. Jackson, D.E., Univ. of Alberta:
Late Silurian - Early Devonian monograptids in Yukon and Northwest Territories, 1967-69.
See New materials of Late Silurian (Pridolian) and Early Devonian monograptus in Yukon and Northwest Territories, Canada; Geol. Surv. Can., Bull. 184 (in press).

803. Jansonius, J., Imperial Oil Ltd., Calgary:
Index of the genera of the sporae dispersae, 1964-72.
A card file of generic diagnoses, supplemented with notes on the type species, and a sketch of the latter; reference to author and publication; stratigraphic occurrence. The priority rules and other criteria of the International Code of Botanical Nomenclature are applied strictly, and English translations are given for taxa published in other languages. Subsequent significant emendations of the diagnoses are also added. The project has received informal cooperation of various individuals. See Spore nomenclature and the proposals of the Lille palynologists; Pollen et Spores, vol. 10, No. 1, pp. 177-188, 1968.
Classification of chitinozoa, 1964-.
See Systematics of the chitinozoa; Rev. Paleobotan. Palyn., vol. 1, pp. 345-360, 1967.

804. Jeletzky, J.A., Geol. Surv. Canada, Mackenzie, G., Jr., United States Geol. Surv:
Coleoidea volume of the treatise on invertebrate paleontology, 1963-70.
The preparation of an authoritative summary of present knowledge of this molluskan subclass. See Coleoid and orthscerid

cephalopods of the Rhaetian Zlambach Marl from Fischerwiesc near Aussee, Styria (Austria); O. Kühn's Jubilaeum Volume of Annalen des Naturhist. Museums, Vienna Vol. 71, 1967.

805. Karrow, P.F., Anderson, T., Univ. of Waterloo:
Palynology of late and postglacial bogs, southwestern Ontario, 1968-71; Ph.D. thesis (Anderson).

806. Karrow, P.F., Clarke, A.H., Anderson, T., Univ. of Waterloo:
Pleistocene paleontology of glacial lake deposits, 1964-69; Ph.D. thesis (Anderson).
Study of Lake Algonquin deposits reveals the widespread presence of molluscs, pollen, and ostracods. Wood and peat has also been found and will be dated.

807. Karrow, P.F., Duthie, H.C., Fernando, C.H., Rani, R.G., Hui, H.T., Univ. of Waterloo:
Pleistocene paleontology of the Toronto interglacial, 1964-69.
Present studies are being concentrated on diatom and molluscan assemblages. See Diatom assemblages from Pleistocene interglacial beds at Toronto, Ontario; Can. Jour. of Botany, vol. 45, pp. 2249-2261, 1967.

808. Kisko, L.M., Royal Ontario Museum:
Status of Canis dirus from Peru, 1965-70.

809. Legault, J.A. (Miss.), Geol. Surv. Canada:
Chitinozoams and acritarchs from the Hamilton Group (subsurface) of southern Ontario, 1966-70; Ph.D. thesis, Univ. of Oklahoma.

810. Lespérance, P.J., Bertrand, R., Université de Montréal:
Biométrie de certains trinucléides (trilobita) ordoviciens, 1968-70; thèse de maîtrise (Bertrand).
Cryptolithus sera surtout étudié.

811. Logan, A., Univ. of New Brunswick:
Re-study of type-species of Paleozoic bivalve genera belonging to the Orders Arcoida, Mytiloida and Pterioida, 1969-71.

812. Ludvigsen, R., Univ. of Western Ontario:
Brachiopods of the Michelle Formation, Yukon, 1968-70; M.Sc. thesis.

813. Mamet, B., Université de Montréal:
Etude de la paléoécologie des Foraminifères Carbonifères, 1966-.
(Avec W. Bamber et R.W. McQueen de la Commission géologique du Canada.) Etude pétrologique et microfaunique du Banff, Pekisho, Shunda, Mount Head et Livingstone de l'Alberta. Voir Foraminiferal zonation of the Lower Carboniferous Connor Lakes section, British Columbia; Can. Petrol. Geol., Bull., vol. 16, No. 1, pp. 147-166, 1968.
Zonation du Carbonifère inférieur marin par microfaciès en Alberta, Colombie-Britannique, et le Nord-Est des Etats-Unis, 1966-.
Zonation du Carbonifère des Territoires du Nord-Ouest, avec W. Bamber de la Commission Géologique du Canada. Voir Foraminifera, Etherington Formation (Carboniferous), Alberta, Canada; Can. Petrol. Geol., Bull., vol. 16, No. 2 (June), pp. 167-179, 1968.

814. McAndrews, J.H., Calkin, P., Royal Ontario Museum:
Relation of geology to pollen and seed stratigraphy of glacial lakes, 1968-69.

See Paleoecology of the Seminary and Mirror Po l peat deposits; Land, Life and Water, Univ. of Manitoba Press, Winnipeg, pp. 253-269, 1967.

815. McAndrews, J.H., Royal Ontario Museum, Lewis, C.F.M., Geol. Surv. Canada: Modern and postglacial pollen studies of Lake Ontario sediments, 1968-70.

816. McAndrews, J.H., Norris, G., Royal Ontario Museum: Microfossil assemblages of southern Ontario lakes over the past 1,000 years, 1967-68.
See Pollen evidence for the protohistoric development of the "Big Woods" in Minnesota, U.S.A.; Rev. of Paleobot. and Palynol., vol. 4 (in press).

817 McAndrews, J.H., Wright, H.E.Jr., Royal Ontario Museum: Relation of vegetation and pollen rain of arid lands, 1962-69.
See Modern pollen rain in western Iran, and its application to plant geography and vegetational history; Jour. Ecol., vol. 55, pp. 415-443, 1967.

818. McGregor, D.C., Geol. Surv. Canada: Devonian plant microfossils of eastern Canada, 1960-.
Spores and other palynomorphs from Devonian strata of the Gaspé Peninsula, northern New Brunswick and the Hudson Bay Lowland, are being described and their biostratigraphic significance assessed. See Composition and range of some Devonian spore assemblages of Canada; Rev. of Paleobot. and Palynol., vol. 1, pp. 173-183, 1967.

819. McGugan, A., Univ. of Calgary: Paleontological rhythms and geochronology.
See Possible use of algal stromatolite rhythms in geochronology; Abstract, Geol. Soc. Amer., Ann. Mag., 1967.

820. McGugan, A., Langhus, B., Univ. of Calgary: Taxonomy and biostratigraphy of Mesozoic foraminifera; M.Sc. thesis (Langhus).
It is planned to study the internal structures of certain foraminifera. See Liassic foraminifera from Whitepark Bay, Co. Antrim; Irish Naturalists Jour., vol. 15, No. 4, 1965.

821. McIntyre, D.J., Chevron Standard Ltd.: Mesozoic and Tertiary palynology of northwestern Canada, 1966-.

822. McRoberts, J.H.E., Queen's Univ. and Bedford Institute: Planktonic foraminifera in sediments on the mid-Atlantic ridge, 1968-69; M.Sc. thesis.
Microfaunal analyses, test microstructure, coiling directions, test composition and fauna - watermass relationships are being investigated for an interpretation of paleoclimatology and paleoceanography of the north Atlantic.

823. Medioli, F., Barbieri, F., Dalhousie Univ.: Calcareous Nannoplankton of the Cretaceous of western Canada and foraminiferal distribution on the N. Scotian Shelf, 1968-69.

824. Moorhouse, W.W., Univ. of Toronto: Organic remains in the Gunflint iron formation, and their significance in the origin of the iron formation, 1960-.

An investigation by various optical techniques of organic and pseudo-organic structures, in various phases of the iron formation. See Fossils from the Animikie, Port Arthur, Ontario; Trans. Roy. Soc. Can., vol. 56, ser. III, sec. III, p. 97, 1962.

825. Mott, R.J., Geol. Surv. Canada:
Palynological studies, central Saskatchewan, 1965-69.
See Palynological studies in central Saskatchewan: Part I, Contemporary pollen spectra from surface samples: Part II, Late-glacial and postglacial vegetation and climatic history; Geol. Surv. Can., Paper (in press).

826. Noble, J.P.A., Univ. of New Brunswick:
Environmental influence on faunal evolution and distribution in epeiric seas, 1967-72.

827. Norford, B.S., Geol. Surv. Canada:
Monograph of the brachiopod family Trimerellidae, 1966-71.
A monograph of a family of bizarre brachiopods that are intermediate in morphology between the two great divisions of brachiopods, the inarticulata and the articulata. The family is restricted to the interval Middle Ordovician to Upper Silurian and most of the known occurrences are in Canada. See A well-preserved Dinobolus from the Sandpile Group (Middle Silurian) of northern British Columbia; Paleontology, vol. 3, pp. 242-244, 1960.

828. Norris, A.W., Geol. Surv. Canada:
Paleobiogeography of the Devonian period in the western hemisphere, 1968.
A paper is being prepared as a contribution to the introductory volume of the Treatise on Invertebrate Paleontology. It will include a succinct yet comprehensive discussion of the fossil invertebrate faunas of the period with emphasis on the marine realm, along with comment on the terrestrial and fresh water invertebrates. Dr. H.K. Erben, University of Bonn is preparing a similar paper on Devonian in the eastern hemisphere.

829. Norris, G., Univ. of Toronto:
Mesozoic palynology and paleoecology, 1967-.
Miospores and dinoflagellates from Cretaceous intervals in North America. A taxonomic and paleoecologic investigation.
Paleozoic palynomorphs of Ontario, 1968-.
Investigation of Lower Paleozoic spores and acritarchs.

830. Norris, G., McAndrews, J.H., Univ. of Toronto:
Microfossil assemblages of southern Ontario lakes over the past 1,000 years, 1969-.
Study of fresh water dinoflagellates and their distinction from marine cysts.

831. O'Brien, F.H.E., Memorial Univ. of Newfoundland:
Fauna of the Clam Bank Formation, Port au Port Peninsula, western Newfoundland, 1968-69; M.Sc. thesis.

832. Petryk, A.A., Univ. of Saskatchewan:
Lower Carboniferous foraminifera of the Banff region, Alberta, 1966-68; Ph.D. thesis.

833. Pocock, S.A.J., Imperial Oil Ltd., Calgary:
Cretaceous and Tertiary palynology of the coastal region of British Columbia, 1962-70.
A general investigation of the palynology of Cretaceous and Tertiary sediments of the British Columbia coastal region and their value in correlation. See The Cretaceous of Vancouver, British Columbia, Canada; Amer. Assoc. Petrol. Geol., Bull., vol. 47, No. 11, pp. 1928-1942.
Upper Cretaceous palynology of southern Alberta, 1968-.
An investigation of the palynological content and their possible value in correlation over the area. Particular attention is being given to the possibility of correlation of non-marine deposits between the Alberta Plains and the foothills of the Rocky Mountains to the west. This project is in its preliminary stages.
Jurassic palynology of Western Canada, 1962-70.
A comprehensive investigation of the palynology of Canadian Jurassic sediments including erection of zonal system based upon palynological taxa. See The Jurassic-Cretaceous boundary in northern Canada; Rev. of Paleobot. and Palynol., vol. 5, pp. 129-136, 1967.

834. Pocock, S.A.J., Jansonius, J., Imperial Oil Ltd., Calgary:
Morphology of gymnospermous pollen, 1960-.
Concerns aspects of the evolution and development of gymnospermous pollen through time and the taxonomy and description of fossil gymnospermous pollen grains. The project represents a spare time interest rather than an organized project aimed at commercial application. See Redescription of some fossil gymnospermous pollen-Chasmatosporites, Marsupipollenites, Ovalipollis; Can. Jour. of Botany (in press).

835. Ramaekers, P.P.J., Univ. of Toronto:
The vertebrate fauna of the Willwood Formation, Lower Eocene of Wyoming, 1967-70; Ph.D. thesis.
A study of fossil collections from the Willwood Formation in the Royal Ontario Museum and the National Museum of Natural Sciences. The project will also serve as a test for a proposed method of using computerized data in the description of mammalian dentitions.

836. Riccardi, A.C., McMaster Univ.:
Mesozoic invertebrate faunas of Argentina, 1968-70.
This investigation is centred mainly towards a study of ammonite faunas from the Middle Jurassic beds of Argentina. The study will result in the revision of old and new sections and faunas. A study of some invertebrate faunas from Cretaceous beds of Argentina will also be carried out.

837. Riva, J., Université Laval:
Middle and Upper Ordovician graptolite faunas of the St. Lawrence Lowlands of Quebec, 1966-.
The Normanskill-Canajoharie-Utica faunas of Middle Ordovician have been analyzed and the results published in the Laverdière volume of the Naturaliste Canadien of December 1968. See Middle-Upper Ordovician graptolite faunas of the St. Lawrence Lowlands and of Anticosti; A.A.P.G. Memoir (Gander Volume) in press.

838. Russell, L.S., Royal Ontario Museum:
Tertiary mammals of Saskatchewan: Part II - The Oligocene fauna, 1954-70.

This project was almost completed in 1956. It is now being revised to incorporate studies of large collections more recently obtained by the Saskatchewan Museum of Natural History and the Royal Ontario Museum. See Tertiary mammals of Saskatchewan: Part I - The Eocene fauna; Royal Ont. Museum, Life Sci. Contrib. 67, 33 pp., 1965.

839. Schafer, C.T., Bedford Institute, Nova Scotia:
Ecology of shallow water benthonic foraminifera in coastal waters of Prince Edward Island, Nova Scotia and northeastern United States, 1967-.
See Preliminary survey of the distribution of living benthonic foraminifera in Northumberland Strait; Maritime Sediments, vol. 3, No. 4, pp. 105-108, 1967.
Quantitative survey of foraminiferal test deposition rates in coastal waters and continental shelf of Nova Scotia, 1968-.

840. Schafer, C.T., Sen Gupta, B.K., Bedford Institute, Nova Scotia:
Ecology and pollution sensitivity of benthonic foraminifera, St. Lucia, West Indies, 1968-72.

841. Schafer, C.T., Vine, R., Mason, C., Bedford Institute, Nova Scotia:
Development of systems for quantitative sampling of planktonic foraminifera, 1968-.

842. Schau, M., McMaster Univ.:
Geology, paleontology and paleoecology of Early Mesozoic carbonate banks, Canadian Cordillera, 1969-.

843. Schweger, C.E., Univ. of Alberta:
Paleoecology of the Onion Portage archeological site and Middle Kobuk River valley, northwestern Alaska, 1967-70; Ph.D. thesis.
The Onion Portage archeological site contains a stratigraphic record of 9 cultures spanning approximately 13,000 years. Periglacial geology, seed and pollen analysis and soils are areas of investigation being used to piece together a paleoenvironmental record of the site. Ultimately a regional chronology of climatic events and their influence on the vegetation will be gained and a picture of human, arctic, paleoecology established.

844. Sen Gupta, B.K., Bedford Institute, Nova Scotia:
Distribution and ecology of foraminifera on the Grand Banks of Newfoundland, 1966-68.
This investigation deals primarily with the ecology and distribution of benthonic foraminifera in the bottom sediments of the Grand Banks. The field and laboratory studies have been finished. See Distribution of foraminifera in the sediments of the Grand Banks; Maritime Sediments, vol. 3, pp. 61-63, 1967.

845. Sen Gupta, B.K., Schafer, C.T., Bedford Institute, Nova Scotia:
Foraminiferal ecology in the leeward bays of St. Lucia, West Indies, 1968-72.
A comparative ecologic study of shallow-water tropical, benthonic foraminifera. Three bays on the leeward side of St. Lucia have been sampled and physical and chemical parameters of bottom waters measured. See Benthonic foraminiferal ecology in Port Castries Bay, St. Lucia; Maritime Sediments, vol. 4 (in press).

846. Singh, Ch., Research Council of Alberta:
Lower Cretaceous microfloras of the Peace River district, Alberta, 1965-69.
Laboratory and identification work are now finished, and the data currently are being compiled and typed for publication.

847. Snead, R., Research Council of Alberta:
Microfloral study of the Cretaceous-Tertiary boundary in the Alberta Plains, 1965-69; Ph.D. thesis, Univ. of Alberta.
Final report (Research Council Bulletin) is in preparation.

848. Srivastava, S.K., Bihl, G., Snead, R, Eliuk, L., Univ. of Alberta:
Palynology of the Late Cretaceous of Alberta, 1964-; graduate student studies.
See Fungal elements from the Edmonton Formation (Maestrichtian), Alberta, Canada; Can. Jour. of Botany, vol. 46, pp. 1115-1118, 1968.

849. Stelck, C.R., Given, M., Anan-Yorke, R., Univ. of Alberta:
Foraminifera of the Upper Cretaceous of western Canada, 1950-; M.Sc. theses (Given and Anan-Yorke).
See Lower Cretaceous section, Mount Belcourt, northeastern British Columbia; Bull. Can. Petrol. Geol., vol. 11, No. 1, pp. 64-72, 1963.

850. Stearn, C.W., McGill Univ.:
Stromatoporoids in the Devonian carbonates of western Canada, 1954-.
This is a particular aspect of the general problems of stromatoporoid taxonomy, phylogeny, classification and paleoecology and part of a long range program to further our understanding of this whole group of fossils. See A preliminary study of the distribution of stromatoporoids on the southern flank of the Ancient Wall carbonate complex, Alberta; Int. Symposium on Devonian System, vol. 2, pp. 797-806, 1968.

851. Terasmae, J., Brock Univ.:
Quaternary paleoecology and palynology, 1952-.
Geolimnology of selected southern Ontario lakes. A study of natural and introduced (post-settlement) factors bearing on the eutrophication of small lakes. Palynological studies pin-point the time of settlement in the sediment cores. Paleoecology, geology and vegetation history of the Point Pelee National Park area. See Some problems of Quaternary palynology in the western mainland region of the Canadian Arctic; Geol. Surv. Can., Paper 68-23, 1968.

852. Terasmae, J., Mott, R.J., Geol. Surv. Canada:
Quaternary stratigraphic palynology of Canada, 1956-.
Palynological, paleobotanical, limnological, and sedimentological investigations of Quaternary deposits in various parts of Canada involving stratigraphic correlation of Quaternary deposits and events, determination of the history of postglacial and subrecent environments, and establishment of standard pollen stratigraphic sequences. See Some problems of the Quaternary palynology in the western mainland region of the Canadian Arctic; Geol. Surv. Can., Paper 68-23, 1968.

853. Thusu, B., Univ. of Ottawa:
Microfossils and paleoecology of the Silurian Rochester shale, Niagara Escarpment, Ontario, 1968-70; Ph.D. thesis.

Includes establishment of a zonal scheme using microfossils (primarily ostracods) and study of various aspects, including paleoecology, of a change of facies within the Rochester shale.

854. Thusu, B., Harland, R., Patterson, T., Univ. of Alberta:
Microplankton of the Upper Cretaceous of western Canada, 1965-; graduate student studies.
See Angiosperm microflora of the Dunvegan Formation (Upper Cenomanian) Peace River, Alberta, Canada; Abstract, Geol. Soc. Amer., 1968 Annual Meeting Program, p. 296, 1968.

855. Truscott, M.G., Univ. of Saskatchewan:
Paleontology and paleoecology of the diatomaceae of the Sturgeon Lake marl of Saskatchewan, 1967-69; M.A. thesis.
Involves a description of the diatom flora found at 6" intervals in two sections of marl lake sediment and of the paleoenvironment that might be determined from the flora.

856. Usher, J.L., Queen's Univ.:
The Arctic Silurian brachiopod genus, Atrypella, 1963-68.

857. Vicencio, R., Westermann, G.E.G., McMaster Univ.:
Taxonomy and biostratigraphy of Callovian ammonites in the central and southern Andes, 1966-69; Ph.D. thesis (Vicencio).

858. Vilks, G., Bedford Institute, Nova Scotia:
Planktonic foraminifera in the north Atlantic Ocean and Caribbean Sea, 1968-.
The project is designed to correlate living planktonic foraminifera to different water masses in the ocean. See Planktonic foraminifera - their significance in water masses and bottom sediments from the Grand Banks to the Caribbean Sea; Maritime Sediments, vol. 3, No. 4, Oct. 1967.

859. Vilks, G., Bedford Institute, Nova Scotia, Igbal, J., Dalhousie Univ.:
Recent foraminifera in the Canadian Arctic Archipelago, 1962-; Ph.D. thesis (Igbal).
See Recent foraminifera in the Canadian Arctic; Micropaleontology (in press).

860. Wagner, F.J.E. (Miss.), Bedford Institute, Nova Scotia:
Deep-water molluses of the eastern Caribbean Sea, 1968-.
Pleistocene and Recent molluses of the Canadian Arctic and Sub-Arctic regions, 1960-.
See Faunal study, Hudson Bay and Tyrrell Sea; Hudson Bay Symposium Volume, 1968.

861. Wall, J.H., Research Council of Alberta:
Cretaceous microfaunas of northern Alberta, 1962-.
Study of the foraminiferal assemblages from Cretaceous outcrops in the northern Alberta Plains (north of 56° latitude) is continuing with the emphasis on determination of their stratigraphic significance.

862. Wall, J.H., Given, M.M., Research Council of Alberta:
Bearpaw microfaunal studies, 1966-; M.Sc. thesis, Univ. of Alberta (Given).
Outcrop and subsurface sections of the Late Cretaceous Bearpaw Formation in southern and east-central Alberta are being examined for their microfaunal content.

863. Walton, H.S., Chevron Standard Ltd.:
Paleozoic palynology, 1960-.
See New data on the Devonian-Carboniferous boundary in western Canada; Abstract, Internat. Symposium Devonian System, Calgary, Canada, A.S.P.G., 1967.

864. Warwick, W., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Reconnaissance of the Chironomidae of Lake Ontario, 1968-.
The study of the midge (Chironomidae) fauna of Lake Ontario is proposed to define the taxonomy of the Great Lakes midge fauna with special reference to the larval forms; to outline the distribution of the midge fauna; to define the ecological relationships of the larval fauna with its environment; to utilize the study of recent larval forms to provide a key to the identification of fossilized larval head capsules; and to study the palaeo distribution of fossilized midge remnants in lake cores.

865. Waterhouse, J.B., Univ. of Toronto:
Brachiopod subdivisions of the world Permian, 1968-69.
See Proposal of series and stages for the Permian of New Zealand; Trans. Roy. Soc. N.Z. Geol., vol. 5 (6), pp. 161-180, 1967.
New Zealand Permian stages, 1968.
See New Zealand Permian stages: a rejoinder; N.Z.J. Geol. Geophys., vol. 11, No. 1, pp. 165-273.
Upper Paleozoic Pectinacean types, 1967-68.
See Etheripecten, a new Aviculopectinid genus from New Zealand; N.Z.J. Geol. Geophys., vol. 6, pp. 193-196, 1963.
Pholadomyacea (Bivalve) evolution from Upper Paleozoic to Recent, 1967-69.
See On the validity of the Permian bivalve family Pachydomidae Fischer; J.Aust. Geol. Soc., vol. 13, No. 2, pp. 543-559, 1966.
Upper Paleozoic brachiopods Stepanoviella and Kozlowskia, 1967-69.
See Redescription of the Permian brachiopod Anidanthus springsurensis Booker.; Trans. Roy. Soc. N.Z. Geol., vol. 5, No. 10, pp. 235-243, 1968.
Descriptions of Tomiopsis (brachiopoda) from Canadian Permian, 1968-69.
See Cool-ater faunas from the Permian of the Canadian Arctic; Nature, vol. 216, No. 5110, pp. 47-49, 1967.
Key brachiopod species for zoning Upper Paleozoic of Canada, 1968-69.
See New species of Megousia Muir-Wood and Cooper and allied new genus from the Permian of Australia and North America; Jour. Paleont., vol. 42, No. 5, pp. 1171-1185, 1968.

866. Waterhouse, J.B., Univ. of Toronto, Bamber, W., Geol. Surv. Canada:
Upper Paleozoic brachiopod zones of Yukon, 1962-69.

867. Waterhouse, J.B., Piyasin, S., Univ. of Toronto:
Permian brachiopods from Khao Phrik, Thailand, 1966-69; M.Sc. thesis (Piyasin).

868. Westermann, G.E.G., McMaster Univ.:
Sexual dimorphism in fossil Metazoa and taxonomic implications, 1965-68.
Various authors from Canada, U.S.A., U.K., France, Norway, Sweden, Germany and U.S.S.R. describe and discuss the occurrence and taxonomic significance of sexual dimorphism in the phyla brachiopoda, Mollusca, Arthropoda, Echinodermata, Vertebrata. To be published by Schweizerbarth, W. Germany (an International Symposium, Prague 1968).

869. Westermann, G.E.G., Getty, Th.A., McMaster Univ.:
New Jurassic ammonites from New Guinea, 1966-68; Ph.D. thesis (Getty).
This fauna has a bearing on our knowledge of the relationship during the Middle Jurassic between the Thethian and Indo-Pacific faunal realms.

870. Wilson, M.V.H., Univ. of Toronto and Royal Ontario Museum:
Fossil fishes from the Tertiary of British Columbia, 1968-69; M.A. thesis.
The well-preserved fossil fishes from Horsefly River, Kamloops, and Princeton, British Columbia, have not been studied as a fauna since the pioneer work of Lambe. In this project the collections of the National Museum of Natural Sciences, the Royal Ontario Museum, and the University of British Columbia are being studied together. This will provide the first comprehensive review of the fauna and should assist in correlation of Tertiary deposits in the interior of British Columbia.

PETROLOGY AND PETROGRAPHY

British Columbia

871. Froese, E., Geol. Surv. Canada:
Pelitic gneisses and migmatites from the Thor-Odin gneiss dome, British Columbia, 1965-68.
This study deals with gneisses and migmatites characterized by the mineral assemblage quartz + plagioclase + K-feldspar + biotite + garnet + sillimanite. Phase equilibria among these silicates and between the silicates and accessory opaque minerals are used to deduce the quench conditions of metamorphism. See Geol. Surv. Can., Paper 66-2, pp. 46-48, 1966.

872. Irvine, T.N., Geol. Surv. Canada:
Petrology of the ultramafic rocks of the Aileen Lake area, British Columbia, 1965-70.
See Geol. Surv. Can., Paper 68-1A, pp. 110-111, 1968.

873. Lavoie, S., Fawcett, J.J., Univ. of Toronto:
Petrology of some Tertiary Plateau basalts from Westwald, British Columbia, 1968-70; M.Sc. thesis (Lavoie).
See Alteration products of olivine and pyroxene in flood basalts from the Isle of Mull; Mineral. Magazine, vol. 35, pp. 55-68, 1965.

874. Libby, W.G., Univ. of British Columbia:
A tectonic study of the Wark and Colquitz gneiss complex of southern Vancouver Island, 1966-69.
Petrographic evidence indicates that the Wark gabbro-diorite is intrusive into the metamorphic Colquitz quartz diorite gneiss. Other metamorphic rocks in the complex do not fit comfortably in either the Wark or Colquitz categories but appear also to predate the Wark intrusions. See Petrography of the Wark-Colquitz Complex, Vancouver Island, British Columbia; Abstract, Can. Mineral., vol. 9, p. 575, 1968.
Vein and amygdule mineral zonation of Metchosin Basalt, Vancouver Island, British Columbia, 1968-69.

875. Paterson, I., Univ. of British Columbia:
Glaucophane schists at Pinchi Lake, British Columbia, 1967-70; Ph.D. thesis.
A belt of glaucophane schists is associated with ultramafic bodies.

876. Reesor, J.E., Froese, E., Geol. Surv. Canada:
Structural and petrological study of the Pinnacle Peaks gneiss dome, British Columbia, 1967-69.
Stratigraphic and structural continuity has been established between rocks of the Shuswap metamorphic complex and bordering unmetamorphosed rocks. Although metamorphic boundaries indicate steep temperature gradients, there is no break in the sequence of metamorphic zones. See Geol. Surv. Can., Paper 68-1A, pp. 111-112, 1968.

877. Richards, T.A., Univ. of British Columbia:
The Chilliwack batholithic complex, 1966-69; Ph.D. thesis.
A study of mid- to late-Tertiary plutons near the International Border - part of the Cordilleran Structural Project.

878. Sinclair, A.J., Libby, W.G., Nguyen, K.K., Childs, J.F., Univ. of British Columbia:
Nelson plutonic rocks, British Columbia, 1965-68; M.Sc. theses (Nguyen and Childs).
See Age of the northern part of the Nelson batholith; Can. Jour. Earth Sciences, vol. 5, pp. 955-957, 1968.

879. Sutherland-Brown, A., British Columbia Dept. of Mines and Petroleum Resources:
Aiyansh lava flow, British Columbia, 1966-69.
A study of the most recent lava flow in Canada.

Manitoba

880. Haugh, I., Manitoba Mines Branch:
Structural and petrologic studies in the Kettle Rapids - Moose Lake area, northern Manitoba, 1968-69.

881. Scoates, R.F.J., Manitoba Mines Branch:
Ultramafic rocks of Manitoba, 1969-70.

*New Brunswick

Newfoundland and Labrador

882. Berger, A.R., Univ. of Toronto:
Studies on granites and associated metamorphic rocks, Notre Dame Bay, Newfoundland, 1967-.
An investigation into the structural setting, regional relationships and internal fabric of certain granitic plutons. Problems include the origin and significance of "flow" fabrics in granites and their use as deformation indicators, and the relationships between "aureole" metamorphics and granite formation.

***For New Brunswick see projects 1023, 1025, 1026, 1027 which are listed incorrectly under Quaternary Geology.**

883. Church, W.R., Univ. of Western Ontario:
Metamorphic rocks of the Burlington Peninsula, Newfoundland and County Donegal, Ireland, 1963-.
See Metamorphic rocks of the Burlington Peninsula and adjoining areas of Newfoundland, and their bearing on Continental Drift in the North Atlantic; in M. Kay, ed., The Gander Conference on Continental Drift in the North Atlantic, A.A.P.G. Memoir (in press).

884. Emslie, R.L., Wynne-Edwards, H.R., Wares, R., Queen's Univ.:
Mineralogical variations in part of the Michikamau anorthosite mass, Labrador, 1966-69; M.Sc. thesis (Wares).
A study of variations in olivine and plagioclase using the electron microprobe.

885. Hughes, C.J., Memorial Univ. of Newfoundland:
Harbour Main volcanics and granites of Newfoundland, 1966-71.
To obtain an understanding of igneous activity in its tectonic setting during Late Precambrian and Paleozoic time in E. Newfoundland.

886. Neale, E.R.W., and graduate student, Memorial Univ. of Newfoundland:
Geological study of silicic volcanic complex between southwest Arm and Mic Mac Lake, G.B., Newfoundland, 1968-71.
This volcanic complex has been mapped in reconnaissance fashion (G.S.C. Paper 62-28) and represents a cauldron subsidence feature that is genetically related to silicic lavas and tuffs within flanking Silurian sequences. The petrology and structure will be studied in detail and its relationship to the adjacent sequences tested by means of petrology, chemical comparisons and isotopic dating. See Relationship of the Fleur de Lys Group to younger groups of the Burlington Peninsula, Newfoundland; Geol. Assoc. Can., Spec. Paper No. 4, pp. 139-169, 1967.
Form, origin and tectonic significance of the silicic porphyry body between Nipper's Harbour and Confusion Bay, Newfoundland, 1968-71.
Large asbestos-bearing bodies of ultrabasic rock occur within the mass of porphyry - it is important to discover whether or not these represent the floor of a thin tabular body or inclusions 'suspended' in a much thicker mass.

887. Neale, E.R.W., Williams, H., Kennedy, M.J., King, A., Smitheringale, W.G., Hughes, C.J., and graduate students, Memorial Univ. of Newfoundland:
Phase 1 of "Anatomy of the Appalachian Mobile Belt in the Notre Dame Bay region of Newfoundland, 1969-75.
This will be a team study in which faculty members and graduate students will integrate their individual research projects to contribute towards the major structural, petrologic and economic problems in this complex. Phase 1 will concentrate on the western part of the study area, i.e. the Burlington and Springdale Peninsulas.

888. Papezik, V.S., Memorial Univ. of Newfoundland:
Petrology and structure of the Harbour Main Group, Avalon Peninsula, Newfoundland, 1966-.

Northwest Territories

889. Baragar, W.R.A., Geol. Surv. Canada:
Studies in the Seal Lake volcanic province, Northwest Territories, 1968-.
An investigation of the nature and type of volcanism that characterizes each of the Seal Lake, Croteau, and Letitia Groups, to determine the volcanic history of each in relation to the history of the groups; and to determine, if possible, the relationship of the volcanism to the associated mineral deposits. This is part of a larger investigation of volcanic rocks of the Canadian Shield that to date includes studies of the Yellowknife, Noranda, Coppermine, and Kaladar (Grenville) volcanic assemblages. See Volcanic studies in the Seal Lake area, Labrador; Geol. Surv. Can., Paper 69-1, 1969.

890. Irvine, T.N., Geol. Surv. Canada:
Petrologic study of the Muskox Intrusion, 1962-70.
See Ultramafic rocks of the Muskox Intrusion, N.W.T., Canada; in Ultramafic and related rocks, P.J. Wyllie, ed., J. Wiley and Sons, New York.

891. Kretz, R., Univ. of Ottawa:
Study of pegmatite bodies near Yellowknife, 1960-70.
Includes chemical (atomic absorption) analysis of muscovite, potash feldspar, and albite at intervals across a pegmatite dyke. See Study of pegmatite bodies and enclosing rocks, Yellowknife-Beaulieu region, District of Mackenzie; Geol. Surv. Can., Bull. 159, 1968.

Nova Scotia

892. Amos, J.S., Acadia Univ.:
Crystallization mechanism and texture of a Triassic basalt flow, Bay of Fundy, Nova Scotia, 1967-69; M.Sc. thesis.
A study of morphology and textures of key minerals within a single Triassic basalt flow as a guide to interpretation of crystallization.

893. Colwell, J.A., Acadia Univ.:
Petrology and geochemistry of Triassic basalts, Nova Scotia, 1968-70.
A study of chemical variation and differentiation within and among the flows with emphasis on mineral occurrences (e.g. copper) as they relate to the petrology and chemistry of the basalts.

894. Rao, I.R., Acadia Univ.:
Petrologic and structural effects of granite implacement on metasediments of the Meguma Group, western Nova Scotia, 1968-70; M.Sc. thesis.

895. Sinha, R., Friedlaender, C.G.I., Dalhousie Univ.:
Petrology of the North Mountains, Nova Scotia, 1966-69; Ph.D. thesis (Sinha).

896. Stevens, G.R., Acadia Univ.:
X-ray primary fabric analysis of Triassic basalt flows and dikes of Nova Scotia, 1968-70.

897. Tsai, C.-L., Acadia Univ.:
Petrology of Border phases of Devonian granite, western Nova Scotia, 1968-70; M.Sc. thesis.

898. von Volborth, A., Dalhousie Univ.:
Geology and geochemistry of porphyritic granites in Halifax Co., Nova Scotia, 1968-71.

899. Wightman, J.F., Acadia Univ.:
Silica vein mineral paragenesis in Triassic basalt, southwest Nova Scotia, 1968-69; M.Sc. thesis.
A study of the varieties, sequence, and emplacement mechanisms of silica minerals in veins of a fault zone in Triassic basalt near Centerville, Nova Scotia.

Ontario

900. Breaks, F.W., Shaw, D.M., McMaster Univ.:
Origin of the Silent Lake granite, Ontario, 1968-69; M.Sc. thesis (Breaks).
Study of a granite containing abundant sillimanitic nodules.

901. Fabbri, A., Univ. of Ottawa:
Study of the Sparrow Lake gneiss structure, Muskoka district, Ontario, 1968-70; Ph.D. thesis.
Detailed macroscopic and microscopic study of a basin-like structure in layered gneisses.

902. Gibbins, W.W., McMaster Univ.:
Rb-Sr isotopic studies on the Murray granite and Sudbury norite, Sudbury, Ontario, 1968-71; Ph.D. thesis.

903. Griep, J., Shaw, D.M., McMaster Univ.:
Tallan Lake - Duck Lake metagabbro complex, Ontario, 1968-69; M.Sc. thesis (Griep).
Geochemical-petrological study of a possible inverted stratiform differentiated sheet.

904. Jambor, J.L., Geol. Surv. Canada:
Study of non-metallic vein minerals and wall-rock alteration, Cobalt Camp, 1966-70.
The project will also include petrographic, microprobe, and X-ray studies of differentiation in the Nipissing diabase, Cobalt-Gowganda area.

905. Jennings, D.S., Shaw, D.M., McMaster Univ.:
Stratigraphy and metamorphic history of the Hermon Formation, southeastern Ontario, 1964-69; Ph.D. thesis (Jennings).
A study of mineral equilibria, metamorphic history and original rock composition in a well-defined belt of Grenville metasedimentary and metavolcanic rocks.

906. Kretz, R., Univ. of Ottawa:
Structure and petrology of the Bala mixed-gneiss syncline, Muskoka district, Ontario, 1968-70.

907. Mason, I.M., McMaster Univ.:
Petrology of the Whitestone anorthosite, Dunchurch, Ontario, 1964-69; Ph.D. thesis.

908. Moorhouse, W.W., Adams, J.C., Univ. of Toronto:
Nature and origin of inclusions in the inclusion norite, one of the marginal intrusions on the North Range of the Sudbury irruptive; geochronology of the Sudbury irruptive and the Murray granite.
It is hoped to carry out chemical analyses on various types of inclusions in the inclusion norite, north range, Sudbury, which have already been studied in considerable detail optically, in order to determine the possible provenance of the inclusions. The age work on the Sudbury irruptive and Murray granite (by Adams) is directed to obtaining a satisfactory isochron on the norite (if possible) and to see if any difference can be found between the Murray granite and what appear to be dikes which may have been remobilized by the heat of the erruptive. These investigations are by Rb/Sr methods.

909. Mummery, R.M., McMaster Univ.:
Petrology and geochemistry of the Murray granite, Sudbury, Ontario, 1968-; M.Sc. thesis.

910. Naldrett, A.J., Gasparini, E., Rucklidge, J.C., Univ. of Toronto, Bray, J.G., Podolsky, T., Int. Nickel Co. of Canada:
The petrology of the Sudbury nickel irruptive, 1967-70.
Detailed petrographic and electron-probe studies are being made of 4 traverses across the nickel irruptive in order to determine whether cryptic variation is present in the body and hence throw light on the nature of this intrusion. See Phase layering and cryptic variation in the Sudbury nickel irruptive; Abstract, Can. Mineral., vol. 9, Pt. 4, 1968.

911. Naldrett, A.J., Moorhouse, W.W., Greenman, L., Univ. of Toronto:
Study of footwall breccias in the vicinity of the Strathcona mine, 1967-70; Ph.D. thesis (Greenman).
See A study of the Strathcona mine and its bearing on the origin of the nickel-copper ores of the Sudbury district, Ontario; Jour. Petrol., vol. 8, pp. 453-531, 1967.

912. Naldrett, A.J., Moorhouse, W.W., Hewins, R.H., Univ. of Toronto:
Study of rocks marginal to the nickel irruptive in the vicinity of the Strathcona and Fecunis mines, Sudbury, Ontario, 1967-70; Ph.D. thesis (Hewins).
See A study of the Strathcona mine and its bearing on the origin of the nickel-copper ores of the Sudbury district, Ontario; Jour. Petrol., vol. 8, pp. 453-531, 1967.

913. Naldrett, A.J., Peredery, W., Univ. of Toronto:
Study of rocks between the Sudbury nickel irruptive and the overlying Onaping Formation, 1968-71; Ph.D. thesis (Peredery).
The purpose is to determine whether or not the unusual rocks at the top of the nickel irruptive are related to the impact of a meteorite.

914. Oldershaw, M.A., Schwerdtner, W.M., Univ. of Toronto:
Orientation of elongate and platy minerals in Glamorgan gabbro, County of Haliburton, Ontario, 1967-70.
The objectives are: (1) analysis of fluidal texture in Glamorgan gabbro; (2) determination of fundamental differences between igneous and metamorphic mineral lineations; and (3) relationship between gneissosity, schistosity and fluidal texture in metagabbros.

915. Pacesova, M., Shaw, D.M., McMaster Univ.:
Thallium-rubidium-potassium partition in Blue Mountain nepheline syenites, Ontario, 1968-69; M.Sc. thesis (Pacesova).
Involve spectrographic analysis of separated mineral samples to study element fractionations.

916. Shaw, D.M., McMaster Univ.:
Metamorphic history of the Apsley paragneiss, southeastern Ontario, 1958-.
A study of the original composition of the Apsley gneiss and its geochemical response to intrusion of the Loon Lake pluton. See Geology of Chandos township; Ont. Dept. Mines, Geol. Rept. No. 11, 1958.

917. Wynne-Edwards, H.R., Hasan, Z.U., Krause, J.B., Queen's Univ.:
Metamorphic isograds in the Frontenac Axis, Ontario, 1968-70; Ph.D. thesis (Krause).
A study of the texture and geochemistry of the metamorphic rocks of the Frontenac Axis designed to locate with precision various metamorphic reactions principally controlled by total pressure, water vapour pressure, and temperature. See Westport map-area, Ontario, with special emphasis on the Precambrian rocks; Geol. Surv. Can., Mem. 346, 142 p., 1967.

918. Wynne-Edwards, H.R., Shaw, C.M.E., Queen's Univ.:
Structure and petrology of a gabbro body at Leo Lake, 1963-70; M.Sc. thesis (Shaw).
Detailed mapping and petrological investigation of an anular gabbro body in the Frontenac Axis. See Gananoque map-area, Ontario; Geol. Surv. Can., Map 17, 1962.

919. Wynne-Edwards, H.R., Wallach, J., Queen's Univ.:
Structures in grey gneiss at Parham, Ontario, 1967-69; Ph.D. thesis (Wallach).
The structure and petrology of a grey gneiss complex near Parham is to be compared to those of surrounding rocks of the Grenville Group to assess the relative ages of the two categories of rocks, and test the hypothesis that the grey gneiss represents basement. See Geology of Tichborne (East Half) map-area, Ontario; Geol. Surv. Can., Paper 64-56, 5 p., 1965.

920. Watkinson, D.H., Univ. of Toronto:
Partial melting of marbles of the Haliburton-Bancroft area, Ontario, 1968-70.
A field and laboratory (experimental) study of structures, textures and mineralogy of marbles that are suggestive of partial fusion during high-grade metamorphism.

See also items 1044, 1046, 1047, (p. 138, 139) 1054 (p. 140) 1078, 1079 (p.143)

Quebec

921. Doig, R., Barton, J., McGill Univ.:
Geochronology of alkaline rocks associated with the St. Lawrence graben structure, 1965-; M.Sc. thesis (Barton).
See Age of carbonatites and other alkaline rocks in Quebec; Can. Jour. Earth Sci., vol. 15, No. 6, 1968.

922. Emslie, R.F., Geol. Surv. Canada:
Geology and petrology of the Morin intrusion, Quebec, 1964-69.
The Morin anorthositic complex is one of a large group of such intrusions in the Grenville Province. Field investigations have been completed and petrological studies are proceeding in an attempt to clarify relationships among various units of the intrusion and to provide a coherent explanation of its evolution.

923. Gélinas, L., Ecole Polytechnique:
Etude géochimique des meta-gabbros et des amphibolites des régions des Lacs Thevenet, Gabriel et Fort Chimo, Nouveau-Québec, 1966-70.
Etude de la composition chimique des méta-gabbros et des amphibolites, étude de la répartition des éléments majeurs entre les minéraux en fonction de l'accroissement du métamorphisme; application de la loi de Nernst.

924. Gunn, B., Ambrosii, G., Université de Montréal:
Geochemistry of the granitic complex, Chibougamau region, Quebec, 1968-70; Ph.D. thesis (Ambrosii).
Samples were recently collected from four batholiths, the Bourbeau Mountain, Chibougamau Lake, Opemisca Lake and Obatagamau Lake batholiths. The rock are potassium-poor diorites, tonalite, quartz tonalite, and soda granodiorite. Conclusions may be drawn as to the nature of the primitive Archaean crustal composition.

925. Gunn, B., Barraud, C., Université de Montréal:
The relationship between the St. Calixte troctolite and the Chetsey anorthosite, Quebec, 1969-70; M.Sc. thesis (Barraud).
Fifty rock analyses have been made in order to show whether these two rock types may be considered part of the one layered lopolithic intrusion, or whether they are merely parallel intrusions.

926. Gunn, B., Université de Montreal, Duquette, G., Quebec Dept. of Natural Resources:
Geochemistry of the Chibougamau metavolcanics; 1967-.
Seventy samples collected in the Chibougamau area have been analyzed. These volcanics are of Pre-Kenoran age (2.5 billion years) and consist of tholeiitic lavas and intercalated tuffaceous greywackes. Metamorphism to the greenschist facies together with thermal metamorphism in zone concentric about younger diorite-tonalite batholiths have resulted in albitization of feldspar and chloritization of olivine pyroxene.

927. Mahaffy, D.F., McGill Univ.:
Blotchy gabbro of the Hopes Advance Bay area, Ungava, Quebec, 1965-69; M.Sc. thesis.

928. Nixon, C., Univ. of Ottawa:
Study of a diabase dyke, Gatineau Park, Quebec, 1967-69; M.Sc. thesis.

Detailed examination of chemical composition, texture, and mineral composition at intervals across a vertical diabase dyke.

929. Philpotts, A.R., Hodgson, C., Marchand, M., Duke, M., Webb, A., McGill Univ.:
Monteregian dyke rocks.
As graduate theses research, Marchand is studying the ultrabasic and eclogitic nodules found in these rocks; Duke is studying experimentally the melting relationships of these rocks; Webb is investigating the oxygen fugacities under which these rocks crystallized; Hodgson has just completed a detailed petrochemical study of all the Monteregian dyke rocks. See Ile Ronde breccia, Montreal; Can. Jour. Earth Sci., vol. 4, pp. 507-513, 1967.

930. Pouliot, G., Woussen, G., Université de Montréal:
Pétrologie et pétrochimie de l'intrusion de la Montagne de Brome, Québec, 1968-71; thèse de doctorat (Woussen).

931. Sauvé, P., Université Laval:
Etude pétrologique d'un filon-couche gabbroique contenant une minéralization de cuivre et nickel, 1966-70.
Ce filon-couche affleure dans le géosynclinal du Labrador à l'ouest de Fort Chimo. Il montre une différentiation marquée. Des sulfures de cuivre et nickel sont disséminés dans la partie inférieure du filon.

932. Valiquette, G., Ecole Polytechnique:
Etude des conditions de stabilité de la kaersutite dans la monzodiorite de Brome, 1968-70.
Les monzodiorites à néphéline de la colline de Brome contiennent une quantité importante de kaersutite dont nous avons fait quelques analyses préliminaires à la microsonde. Ces monzodiorites, qui affleurent sur d'autres collines montérégiennes, en particulier sur Shefford et le Mont-Royal, possèdent une composition particulière qui les rend difficiles à situer correctement dans l'axe d'évolution du magma. Nous avons entrepris d'étudier la stabilité des kaersutites naturelles dans des conditions hydrothermales à des P_{H_2O} de 500, 1,000, et 2,000 bars en utilisant la technique des tampons (buffers) pour contrôler la fugacité d'oxygène. Nous étudierons également en parallèle la stabilité de cristallisation de la roche elle-même sous des conditions de P_{O_2} contrôlée par les mêmes techniques.

933. Wynne-Edwards, H.R., Kehlenbeck, M.M., Queen's Univ.:
Boundary relationships between the Pipmuacan anorthosite body and the Lac Rouvray gneiss complex, Quebec, 1966-69; Ph.D. thesis (Kehlenbeck).
A study of the tectonic history and crystallization of part of the Lac St. Jean anorthosite complex, with special emphasis on the textures, deformation, and recrystallization of the anorthosite.

934. Wynne-Edwards, H.R., Westoll, N.D.S., Queen's Univ.:
Anorthosite and mangerite of the Morin mass, Quebec, 1968-70.
Involves a geochemical study of the mangerite and anorthosite of the Morin mass to re-examine the range and nature of the chemical variations, and to test the rival hypotheses of crystal fractionation and anatexis as the origin of the mangerite. See Mont Laurier and Kempt Lake, map-areas, Quebec (a preliminary report of the Grenville Project); Geol. Surv. Can., Paper 66-32, 32 p. and Map 11-66, 1966.

General Problems

935. Anderson, G.M., Univ. of Toronto:
Mineral chemistry of nepheline syenite pegmatites, 1968-76.

936. Armstrong, C.W., Edgar, A.D., Hutchinson, R.W., Piotrowski, J.M., Univ. of Western Ontario:
Mechanisms of genesis of complex zoned lithium pegmatites, and related studies, 1965-69; Ph.D. thesis (Armstrong).
Field and laboratory studies are aimed at finding a mechanism by which the complex zoning pattern of certain lithium pegmatites may be explained by crystallization and replacement within a restricted system. See $LiAlSi_2O_6$ (spodumene) transition from 5,000-45,000 lb./in^2 P_{H_2O}; Mineral Mag. special I.M.A. vol., pp. 222-231, 1968.

937. Aumento, F., Geol. Surv. Canada:
Geology of the mid-Atlantic Ridge near 45°N, 1966-70.
See Potassium-argon ages and spreading rates on the mid-Atlantic Ridge at 45°N.; Science, vol. 161, No. 3848, pp. 1338-1339, 1968.

938. Beswick, A.E., Laurentian Univ.:
Transition metal distributions between olivines, pyroxenes and spinels, 1968-71.
It is hoped that these investigations will furnish partition coefficients which will have geothermometric applications to both igneous and metamorphic mineral assemblages and which will allow a quantitative evaluation of the behaviours of the alkali metals during the late stages of magmatic differentiation.
Alkali metal distributions between sanidine, levcite, phlogopite and granite glass, 1965-70.
The objective is to obtain partition coefficients for the transition metals which would then be applied to the rocks of the Sudbury nickel irruptive in the hope of further elucidating the genetic history of these rocks and their associated ores. See The distribution of potassium and rubidium between sanidine and phlogopite; Abstract, Geol. Soc. Amer., Annual Meeting, 1968.

939. Blackburn, C.E., Univ. of Western Ontario:
The eclogites of the Sesia Lanzo zone, western Alps: their petrology and structural relationships, 1967-70; Ph.D. thesis.
The eclogites of this zone are distinct from those of the Alpine belt, classified as ophiolitic eclogites by Swiss workers. Preliminary investigation of the Sesia eclogites shows them to be intermediate in character between ophiolitic eclogites and those found in gneiss and migmatite complexes.

940. Chase, R.L., Univ. of British Columbia:
Submarine geology of the Antilles and mid-Atlantic Ridge, 1964-69.
One incomplete manuscript describes basalt dredged from the mid-Atlantic Ridge and Barracuda scarp; another deals with C.S.P. from the Lesser Antilles; and a third describes the eastern margin of the Antilles. See Geology of the North Slope of the Puerto Rico Trench; Deep Sea Rev. No. 15, pp. 197-317, 1968.

941. Church, W.R., Univ. of Western Ontario:
Eclogites, ariegites and associated ultramafic rocks, 1963-.

This project is concerned currently with examining newly found occurrences of eclogite in the Fleur de Lys metamorphic complex of northeast Newfoundland, and of garnet-bearing amphibole ariegite in the Bay of Islands ultramafic complex of western Newfoundland. See Eclogites, in H.H. Hess, basalts, the Poldervaart Treatise on rocks of basaltic composition, vol. 2, pp. 755-798, 1968.

942. Clark. A.H., Queen's Univ.:
Mineralogy and chemistry of Jurassic-Pleistocene andesitic volcanics, Copiapo region, northern Chile, 1968-71.
Representative, radiometrically-dated specimens of andesitic lavas and pyroclastics are under study in an attempt to clarify the evolution of this dominant magma-type during the geosynclinal and post-orogenic stages in the development of the Andean mobile belt.

943. Coates, D.F., Zahary, G., Herger, G., Mines Branch, Dept. of Energy, Mines and Resources:
Classification of rocks, 1962-70.
Progress to date consists of widespread agreement on the classification of the rock substance and some agreement on that for the rock mass, with new ideas being developed to improve the latter. See A recommended rock classification for rock mechanics purposes; Bull., Can. Inst. Min. Metal., Oct. 1968.

944. Crocket, J., Mitchell, R., McMaster Univ.:
Sr isotope studies on kimberlite, 1965-70.
A study of genesis of diamond-bearing kimberlite pipes from South Africa by strontium isotope methods.

945. Currie, K.L., Geol. Surv. Canada:
Alkaline rocks in Canada, 1968-73.
The objective is to compile an annotated list of alkaline rock occurrences in Canada, to establish the petrographic types of alkaline rocks, to map type bodies in detail, and to conduct petrologic experiments to investigate problems of petrology of alkaline rocks. See Carbonatite and alkaline igneous rocks in the Brent Crater, Ontario; Nature, vol. 215, No. 5102, p. 125, 1967.

946. Douglas, J.A.V., Geol. Surv. Canada:
Meteorite studies, 1965-.
The investigation of the mineralogy and petrology of Canadian meteorites. See Amphibole: first occurrence in an enstate chondrite; Abstract, 31st Annual Meeting of Meteoritical Society, 1968.

947. Edgar, A.D., Mottana, A., Church, W.R., MacRae, N.D., Univ. of Western Ontario:
Geochemistry and petrology of eclogites, 1966-70.
See Chemistry, mineralogy and petrology of an eclogite from the type locality (Sanalpe, Austria); Contrib. Min. Pet., vol. 18, pp. 338-346, 1968.

948. Edgar, A.D., Piotrowski, J.M., Sood, M.K., Parker, L.M., Univ. of Western Ontario:
Melting relations and crystallization sequences of alkaline rocks, 1964-70; M.Sc. thesis (Parker), Ph.D. thesis (Sood).
See Melting relations of undersaturated alkaline rocks from southern Greenland in comparison to those of Africa and Canada; Medd. om Grønland Bd. 181, Mo. 9, pp. 1-62, 1968.

949. Emslie, R.F., Geol. Surv. Canada:
Geology and petrology of the Michikamau intrusion, Labrador, 1962-.
Detailed investigations are providing insight into the origin of the intrusion and the mechanism of its emplacement into the crust.

950. Emslie, R.F., Geol. Surv. Canada, Lindsley, D.H., Geophysical Lab., Washington, D.C.:
Experimental studies bearing on the genesis of anorthositic intrusions, 1967-.
Experimental investigations designed to shed light on the origin of anorthositic rocks. See Effect of pressure on the boundary curve in the system diopside-albite-anorthite; Ann. Rept., Geophysical Lab., Carnegie Institution of Washington, Yearbook 66, pp. 479-480, 1968.

951. Emslie, R.F., Geol. Surv. Canada, Roeder, P.L., Queen's Univ.:
Olivine - liquid equilibrium in basaltic melts, 1966-69.
The distribution of iron and magnesium between olivine and liquid in basaltic melts has been investigated experimentally and compared with distribution data from natural lavas. The results have an important bearing on understanding iron enrichment processes during fractional crystallization of basaltic magmas.

952. Emslie, R.F., Geol. Surv. Canada, Sobczak, L.W., Observatories Branch, Dept. of Energy, Mines and Resources:
Gravity investigations over the Morin anorthosite intrusion, Quebec, 1968-69.
A number of gravity profiles have been measured over the intrusion and surrounding rocks to obtain information on the size and configuration of the intrusion at depth.

953. Fahrig, W.F., Geol. Surv. Canada:
Diabase dykes of the Canadian Shield, 1961-70.
See The paleomagnetism of the Michikamau anorthosite intrusion, Labrador; Can. Jour. Earth Sci., vol. 5, pp. 1139-1144, 1968.

954. Folinsbee, R.E., Baadsgaard, H., Cumming, G.L., Krouse, R.H., Sasaki, A., Fritz, P., Rich, A., Univ. of Alberta:
A study of carbonatites using isotope methods, 1966-68.

955. Gélinas, L., Ecole Polytechnique:
Programmation des calculs pétrochimiques, 1967-.

956. Gibb, F.G.F., Univ. of Toronto:
Experimental investigations of the phase relations and partial fusion of natural and synthetic peridotites, 1966-.
Natural and synthetic ultrabasic rocks are being studied experimentally under conditions of controlled oxygen fugacity at varying total pressures and the experimental products are studied analytically by means of the electron microprobe.
Petrological, mineralogical and experimental studies on ultrabasic minor intrusions, 1963-.
Current research is being concentrated principally on analytical studies of the mineralogy and experimental studies of the phase relations of Tertiary dykes from the Isle of Skye. See Flow differentiation in the xenolithic ultrabasic dykes of the Cuillins and the Strathaird Peninsula, Isle of Skye, Scotland; Jour. Petrol., vol. 9, 1968.

957. Gibson, S., Shaw, D.M., McMaster Univ.:
Strontium partition in the diopside-anorthite system, 1968-69; M.Sc. thesis (Gibson).
Experimental crystallization of liquid and solid phases containing Sr, with E.M.P. analyses to measure partition ratios.

958. Goodwin, A.M., Geol. Surv. Canada:
Volcanic studies in the Timmins-Kirkland Lake-Noranda region as part of the program of volcanic studies in Canada, 1965-68.
See Volcanic studies in the Timmins-Kirkland Lake-Noranda region of Ontario and Quebec; Geol. Surv. Can., Paper 68-1, Pt. A, pp. 135-137, 1968.

959. Govett, G.J., Univ. of New Brunswick:
Primary dispersion in Cyprus volcanics, 1967-69.

960. Gunn, B., Université de Montréal, Carmen, M., Univ. of Houston:
The petrology and geochemistry of the West Texas igneous province, 1966-.

961. Gunn, B., Université de Montréal, Combs, D.S., Univ. of Otago:
Geochemistry of Pitcairn Island, South Pacific, 1966-.
A series of alkali basalts, hawaiites, mugearites, trachytes, are highly differentiated and similar to those of New Zealand and Samoa. The end members are of two types, quartz bearing and nepheline bearing. The place of certain basanitic rocks is uncertain and more work may have to be done.

962. Gunn, B., Université de Montréal, Grindley, G., New Zealand Geol. Surv.:
Affinities of the Kirkpatrick basalts, Antarctica, 1966-.
A group of tholeiitic lavas collected about 200 miles from the South Pole have been analyzed. These show them to be very similar to the Jurassic Ferrar Dolerites which underlie them. Some are granophyric and extremely iron rich.

963. Gunn, B., Watkins, N., Université de Montréal:
Geochemistry of Steen basalts, Oregon, 1967-.

964. Herzer, R.H., Murray, J.W., McTaggart, K.C., Univ. of British Columbia:
Marine geology of Bowie Seamount, northeastern Pacific Ocean, 1967-68; M.Sc. thesis (Herzer).
A study of a submarine volcano approximately 105 miles due west of the Queen Charlotte Islands. It is hoped this research will shed some light on the age, structure and history of this submarine feature, which could have useful application to ancient counterparts in the geologic record.

965. Hutchinson, R.W., Armstrong, C., Univ. of Western Ontario:
Nature and origin of rare element pegmatite deposits, 1967-; Ph.D. thesis (Armstrong).
Studies are centred on the geology and minerals of the unique Montgary pegmatite in Manitoba. They include work on its Sa-Ta-Nb minerals and on alkali ratios in its K mineral phases.

966. MacRae, N.D., Univ. of Western Ontario:
Geochemical relations of silicate-oxide-sulphide assemblages on mafic rocks, 1968-.
Chemical distribution of elements in coexisting minerals may be used to partially simplify crystallization histories of individual

intrusions. This process will be used to attack as yet unexplainable problems of the Great Lakes nickel mafic intrusion (Fort William, Ontario) and of the Munro Lake sill (Matheson, Ontario). For comparison, a suite of samples from the well-studied Stillwater complex (Montana) will be collected and examined. Examination of the natural rock suites will be supplemented by limited experiments on the synthetic phase systems concerned.

967. Martignole, J., Université de Montréal:
Evolution pétrographique et structurale des formations catazonales dans le sud de la Province de Grenville, 1965-72.
Etude pétrographique et structurale des formations catazonales au NE de Montréal afin de déterminer l'évolution de la stratigraphie, du métamorphiste et du magnétisme dans le sud de la Province de Grenville. Voir Découverte du disthène dans le sud de la Province tectonique de Grenville, et signification pétrogénétique de ce minéral dans le facier granulite; C.R. Acad. Sc. Paris, Q. série D. 23 septembre 1968.

968. Moorhouse, W.W., Univ. of Toronto:
Classification of Archean volcanic rocks, 1966-69.
An investigation of methods of classifying Archean volcanic rocks: (a) on the basis of texture, in this connection an illustrated atlas comparing textures of Archean and modern volcanics is being prepared for publication. (b) on the basis of chemistry, a computer program is being developed (with the assistance of Dr. F. Chayes, Geophysical Laboratory, Washington) by which it is hoped to establish objective statistical parameters for classifying analyses using computerized techniques; analyses of modern volcanics are being collected to establish the limits of composition of volcanics as named. (c) on the basis of possible chemical changes resulting from the pervasive alteration of these rocks.

969. Peach, P.A., Brock Univ.:
A study of Grenville granites, 1964-.
Petrological and chemical studies on samples of acid intrusives in the Grenville leading to determining relationship between age and composition.
An index of Grenville rocks, 1968-.
Includes development of an index of rocks from the Grenville province to provide information on the source of boulders in the drift of southern Ontario.

970. Philpotts, A.R., McGill Univ.:
Liquid immiscibility in alkaline rocks, 1967-.
See Role of liquid immiscibility in alkaline rock genesis; Rept. 23rd International Geol. Congress, Prague, vol. 2, pp. 175-188.
Decarbonation reactions in impure potassic dolomite, 1967-.
See Kalsilite, diopside and melilite in a sedimentary xenolith from Brome Mountain, Quebec; Nature, vol. 214, pp. 1322-1323.

971. Philpotts, A.R., Medford, G., McGill Univ.:
Magmatic convection models, 1967-69; M.Sc. thesis (Medford).
See Igneous structures and mechanism of emplacement of Mount Johnson, a Monteregian intrusion, Quebec; Can. Jour. Earth Sci., vol. 5, pp. 1131-1137, 1968.

972. Pouliot, G., Coulomb, J.J., Ecole Polytechnique:
Mineralogy and paragenesis of feldspars in some economically important granites, 1968-70; M.Sc. thesis (Coulomb).
Tertiary granitic rocks with which are associated major Mo deposits have been collected from B.C., Montana, Colorado and New Mexico. Several subprojects will originate from this broader project. The research involves principally the systematic mineralogical and chemical study of each of these occurrences, in trying to determine similarities and/or differences in their origin.

973. Rimsaite, J.Y.H. (Miss), Geol. Surv. Canada:
Study of mica group minerals and associated host rocks, 1959-.
The purpose is to evaluate the geological and petrological importance of the principal types of mica. Studies continue on: geochemistry, mineralogy and petrology of mica-bearing rocks, micas from uncommon rocks, anionic framework of micas which differs from that of the ideal mica, and adsorption of atmospheric argon, and loss of radiogenic argon in principal species of micas, heated under controlled conditions. See Geochemistry, mineralogy and petrology of poly-mica rocks; XXIII International Geological Congress, Prague, 1968, Proceedings of Section 6, Geochemistry, pp. 44-66.

974. Rucklidge, J., Fawcett, J.J., Gasparini, E.L., Univ. of Toronto:
Mineralogical studies on basalts, 1966-.
See A geological expedition to the Tertiary basalt region of Scoresby Sund, East Greenland; Nature, vol. 212, p. 603, 1966.

975. Skippen, G.B., Carleton Univ.:
Phase relations in metamorphosed carbonates, 1967-.
Phase relations among the minerals quartz, calcite, dolomite, talc, tremolite, diopside, forsterite, enstatite and wollastonite are being investigated experimentally in the system CaO-MgO-SiO_2-C-O-H. See Igneous and metamorphic reactions involving gas equilibrium; Research in Geochemistry, vol. II, P.H. Abelson, ed., John Wiley and Sons, New York, 1967.

976. Smith, D.G.W., Westgate, J.A., Univ. of Alberta:
Chemical and petrological characterization of ash deposits by electron probe analysis, 1968-.
A rapid and objective electron probe technique has been developed for characterizing recent volcanic ash deposits on the basis of their glass shard composition. This technique will be applied to the investigation of the many ash deposits in the Quaternary of Western North America in an attempt to identify sources and determine the chemistry and affinities of the source magmas. The possibility of variation in composition of erupting magma with time will be investigated by sampling a succession of layers from certain exposures showing grading and depositional discontinuities within the ash beds. An attempt will be made to extend the technique to bentonites by investigating the chemistry of the primary crystalline mineral suites of these rocks. See Electron probe technique for characterizing pyroclastic deposits; Abstract, G.S.A. Meeting, Mexico City, 1968.

977. Smith, F.G., Univ. of Toronto:
Grain growth in metamorphic rocks, 1965-73.
The extensive literature on grain growth is being searched and each item is being coded with descriptors of the subject matter for selection and printing of bibliographic lists by computer.

978. Watkinson, D.H., Univ. of Toronto:
Experimental studies of carbonatite-alkalic rock genesis, 1968-69.
See The limestone assimilation hypothesis; Nature, vol. 204, pp. 1053-1054.

979. Winkler, H.G., Wynne-Edwards, H.R., Pirie, J., Queen's Univ.:
Anatexis in a grey gneiss, 1967-69; Ph.D. thesis (Pirie).
A detailed study of a single outcrop to determine the source of the granitic (mobilisate) fraction in a quartzofeldspathic gneiss, using mineralogical and chemical analyses, electronprobe studies, and experimental work.

980. York, D., Gittins, J., Univ. of Toronto:
Dating of the carbonatites of Canada, 1963-70.
See The ages of carbonatite complexes in eastern Canada; Can. Jour. Earth Sci., vol. 4, p. 651, 1967.

QUATERNARY GEOLOGY AND GROUNDWATER

Alberta

981. Bayrock, L.A., Research Council of Alberta:
Surficial geology of the Edmonton area, N.T.S. Sheet 83H, Alberta, 1958-.
Mapping is in final stages and should be completed in 1968. Preliminary report with maps of 83H - 1,2,3,4,7,8,9,10,13,14,15, and 16 (12 maps) to a scale of 1:50,000 will be completed by spring of 1969. It is planned to write a final report on the area by spring of 1970 accompanied by a colored map on a scale of 1:150,000. Additional field checking and drilling will be done during the summer 1969, and the results will be incorporated in the final report. See Res. Coun. Alberta, Prelim. Rept. 62-6.

982. Bayrock, L.A., Berg, T.E., Research Council of Alberta;
Sedimentation of glacial lakes, 1968-.
Glacial deposits of the City of Edmonton and vicinity, 1965-.
See Res. Coun. Alberta, Rept. 66-1, 1966.

983. Berg, T.E., Research Council of Alberta:
Surficial geology of the Medicine Hat area, N.T.S. Sheet 72L, Alberta, 1965-68.
Periglacial phenomena in Alberta, 1965-.
Investigations of fossil ice-wedge phenomena near Wainwright, Alberta, show that permafrost was present in the area after retreat of the Late Wisconsin ice. See Fossil sand wedges at Edmonton, Alberta, Canada; Biuletyn Peryglacjalny (in press).

984. Bik, M.J.J., Geol. Surv. Canada:
Geomorphology of Cypress Hills and adjoining parts of southern Alberta, 1965-71.
Work in the 1968 field season concentrated largely on gradient, origin, and along-valley correlation of river terraces, terrace deposits and associated proglacial deposits. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

985. Carlson, V.A., Research Council of Alberta:
Alberta hydrogeological information map series M = 1:50,000: NTS 82P; Drumheller sheet, 1968.
Bedrock topography of the Drumheller area, 1966-69.
Bedrock topography of the Medicine Hat map-area, 1967-69.
Bedrock topography of the Oyen map-area, 1968-69.
Extent and thickness of a buried gravel deposit in the Bassano-Wolf Lake area, 1966-69.

986. Clissold, R.J., Research Council of Alberta:
Groundwater mapping in the Red Deer area, 1966-68; M.Sc. thesis, Univ. of Alberta, 1967.

987. Currie, D.V., Research Council of Alberta:
An evaluation of the groundwater budget for the Tri-Creek watershed, Alberta, 1966-70.

988. Dunn, D.E., Research Council of Alberta:
Groundwater resources of the Stettler area, 1962-68; Ph.D. thesis, Univ. of Illinois, 1967.

989. Gabert, G.M., Research Council of Alberta:
Provincial observation-well network, 1956-.
Alberta hydrogeological information map series M = 1:50,000: NTS 83B; Rocky Mountain House sheet, 1968-69.
Bedrock topography of the Edson area, 1961-68.
See Bedrock topography and surficial aquifers, Edson area, Alberta; Res. Coun. of Alberta, Rept. 68-1, 1968.
Investigations for groundwater in the Red Deer area, central Alberta, 1965-70.
Groundwater hydrology of a buried channel aquifer near Devon, Alberta, 1965-68; M.Sc. thesis, Univ. of Alberta.
Groundwater hydrology of the Edmonton area, 1963-68.

990. Geiger, K.W., Research Council of Alberta:
Groundwater geology of Lethbridge and vicinity, 1963-68.
Bedrock topography of National Topographic system map-area 82I, Alberta, 1964-68.
See Bedrock topography of the Gleichen map-area, Alberta; Res. Coun. of Alberta, Rept. 67-2, 14 p., 1968.
Groundwater conditions and changes near the Waterton Dam, 1964-68.

991. Geiger, K.W., Lennox, D.H., Research Council of Alberta:
Tabulation and publication of water-well data, Alberta, 1964-68.
See Water-well records, southern Alberta, townships 1 to 10 (complete to December 31, 1964); Res. Coun. of Alberta, Prelim. Rept. 65-4, 1966.

992. Kahil, A., Univ. of Alberta:
Groundwater geology of Alberta and adjacent areas, 1966-70; Ph.D. thesis.

993. Kahil, A., Toth, J., Research Council of Alberta:
Investigation of the dewatering possibilities of the tar sands overburden near Ft. McMurray, 1968-71; Ph.D. thesis (Kahil).

994. LeBreton, E.G., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series M = 1:250,000: NTS 83A; Red Deer sheet, 1966-69.

995. Lennox, D.H., Carlson, V.A., Research Council of Alberta:
The seismic method in exploring for buried channels near Stavely, Alberta, 1958-68.

996. Lorberg, E., Univ. of Alberta:
Investigation of three-dimensional geometry of a landslide southwest of Edmonton, Alberta, 1967-69; M.Sc. thesis.

997. Ozoray, Gy., Research Council of Alberta:
Alberta hydrogeological information map series M = 1:50,000: NTS 83G; Wabamun Lake sheet, 1968-69.

998. Quist, L.G., Queen's Univ.:
Evaluation of groundwater potential, Red Deer, Alberta, 1968-69; M.Sc. thesis.
This research project is under joint supervision of the Research Council of Alberta (Water Resources Division) and Queen's University.

999. Quist, L.G., Gabert, G.M., Research Council of Alberta:
Hydrogeological investigations at Red Deer, 1968-69; M.Sc. thesis (Quist).

1000. Ramsden, J., Westgate, J., Univ. of Alberta:
Till fabric studies in the Edmonton area, Alberta, 1967-69; M.Sc. thesis (Ramsden).
About 40 three-dimensional fabrics have been measured on the two till units. A Fortran IV program is being used on the University's 18M 360 computer to produce stereographic projections of the fabric data. The results are providing information about fabric variability within a till unit, and ice flow directions in the area. Reorientation of the fabric of the lower till in places by the later glacier has been well documented by fabric data in conjunction with other evidence of ice movement directions. See Pleistocene stratigraphy of the Edmonton area, Alberta, Canada; Abstract, Geol. Soc. Amer., Rocky Mountain Section, Program pp. 83-84, 1968.

1001. Roed, M., Research Council of Alberta:
Surficial geology of the Edson area, NTS Sheet 83F, Alberta, 1964-68; Ph.D. thesis, Univ. of Alberta.
See The Athabasca Valley erratics train, Alberta, and Pleistocene ice movements across the Continental Divide; Can. Jour. Earth Sci., vol. 4, pp. 625-632 and Edson, Res. Coun. Map 32 (in press).

1002. Rutter, N.W., Geol. Surv. Canada:
Quaternary geology, Bow River valley, 1967-69.
See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1003. Stalker, A.M., Geol. Surv. Canada:
Quaternary of southern Alberta, 1965-.
Comprises stratigraphic and chronologic studies of Quaternary deposits and vertebrate paleontologic and archeologic studies.

1004. Stevenson, D.R., Research Council of Alberta:
An evaluation of the groundwater budget and its significance within the hydrologic balance for the Marmot Creek Basin, Alberta, 1964-69.

An evaluation of the groundwater budget and its significance within the hydrologic balance for the Streeter Basin, Alberta, 1964-69.
An evaluation of the groundwater budget of the Cache Percotte and Whiskeyjack Basins near Hinton, Alberta, 1965-69.

1005. St-Onge, D.A., Geol. Surv. Canada:
Quaternary geology and geomorphology of Whitecourt area, Alberta. Geological mapping of Quaternary deposits and compilation of detailed geomorphological map. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1006. Tokarsky, O., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series M = 1:250,000, NTS 84C-4 and 5; Grimshaw-Cardinal Lake area (a pilot map), 1965-69; M.Sc. thesis, Univ. of Alberta.
Alberta hydrogeological reconnaissance map series M = 1:250,000, NTS 84F; Bison Lake sheet, 1967-69.
Alberta hydrogeological reconnaissance map series M = 1:250,000, NTS 84K; Mount Watt sheet, 1967-69.

1007. Toth, J., Research Council of Alberta:
Investigations for groundwater in the Three Hills area, Alberta, 1965-68.
See Res. Coun. of Alberta, Bull. 24, 1968.

1008. Vanden Berg, A., Research Council of Alberta:
Groundwater movement and groundwater chemistry in the Hand Hills-Bullpound Creek area, Alberta, 1963-68.
See Chemistry of groundwater in the Hand Hills Lake area; Res. Coun. of Alberta (in press).

1009. Vanden Berg, A., Lennox, D.H., Research Council of Alberta:
Analysis of pump test results, 1962-68.
See Safe yield of a well field in a leaky-artesian strip aquifer; Groundwater 6(2), pp. 30-36, 1968.

1010. Westgate, J.A., Univ. of Alberta:
Stratigraphic studies of the Quaternary deposits of the Edmonton area, Alberta, 1965-.
See Pleistocene stratigraphy of the Edmonton area, Alberta, Canada; Abstract, Geol. Soc. Amer., Rocky Mountain Section, Program, pp. 83-84, 1968.

1011. Westgate, J.A., Univ. of Alberta, Green, R., Research Council of Alberta, Matthews, J., Univ. of Alberta:
Stratigraphy and paleoecology of Pleistocene preglacial sediments at Watino, Alberta, 1966-69; Ph.D. thesis (Matthews).

British Columbia

1012. Achard, R.A., Geol. Surv. Canada:
Quaternary geology, Columbia River project reservoirs, 1965-72.
See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1013. Grove, E.W., British Columbia Dept. of Mines and Petroleum Resources:
Glacialogical studies in the Stewart-Bowser-Unuk area (Portland Canal), British Columbia, 1964-.
Includes ecological-biological collections from glaciers - i.e., iceworms, trees etc. and relating to glacial processes.

1014. Heginbottom, J.A., Geol. Surv. Canada:
Quaternary geology, Taseko Lakes, British Columbia, 1968-70.
Quaternary mapping with emphasis on less mountainous parts of area of interest for forestry and ARDA programs. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1015. Mathews, W.H., Univ. of British Columbia:
Geographic variations in Snow Creep pressures, southern British Columbia, 1962-.

1016. Mathews, W.H., Mackay, J.R., Univ. of British Columbia:
Soil creep - Garibaldi, British Columbia, 1958-69.
Soil creep, rock creep, and the effects of needle ice and snow creep in soil movement have been investigated for 10 years. The studies have involved the rate of movement of soil stripes, rock streams, loose boulders in different slopes, etc. The mass transport of loose surface material has been estimated.

1017. Rutter, N.W., Geol. Surv. Canada:
Quaternary geology of Peace River reservoir area, 1966-68.
See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

See also project 1083, p. 143.

Manitoba

1018. Elson, J.A., McGill Univ.:
Problems of glacial Lake Agassiz, 1964-70.
Includes stratigraphy of the various basins, history of outlets, moraines and ice borders, and nature and chronology of the beaches. See Geology of glacial Lake Agassiz; in Life, Land and Water, W.J. Mayer-Oakes, ed., Univ. of Manitoba Press, pp. 37-95, 1967.

1019. Klassen, R.W., Geol. Surv. Canada:
Quaternary geology, Duck Mountain, Manitoba-Saskatchewan, 1968-71.
Distribution and stratigraphy of Quaternary deposits and investigation of buried bedrock topography including major buried valleys. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1020. Stauffer, M.R., Wardlaw, N.C., Univ. of Saskatchewan:
Glacial geology of the interlake area in central Manitoba, 1966-68.

New Brunswick

1021. Brown, D.D., Farvolden, R.N., Univ. of Western Ontario:
Sea-water intrusion of an island aquifer, Taylor Island, Shippegan, New Brunswick, 1967-69; thesis project (Brown).

An investigation of the dynamics of sea-water intrusion, particularly with diffusion zone under varying flow patterns and rates.

1022. Gadd, N.R., Geol. Surv. Canada:
Quaternary geology, southwest New Brunswick, 1967-70.
This project will provide background for groundwater investigations of the New Brunswick Department of Mineral Resources and includes study of glacial dispersion patterns in the area of Mount Pleasant tin mineralization. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

*1023. Jackson, E.V., New Brunswick Dept. of Natural Resources:
Granitic rocks of New Brunswick, 1967-70.
A comprehensive study of the geology, mineralogy structure and chemistry of the granitic rocks of the Province was initiated in 1967. Special emphasis will be placed on the application of this information to the search for deposits of W, Sn and Mo minerals. See Welsford granite study; Dept. of Natural Resources, Map Series 68-2, 1968.

1024. Lajtai, E.Z., Szabo, N.L., Univ. of New Brunswick:
Glacial transportation at Mount Pleasant, New Brunswick, 1968-70; Ph.D. thesis (Szabo).
The objective is to correlate drift petrology with source areas with special emphasis on the distribution of ore minerals in drift around the exposed orebody of Mount Pleasant.

*1025. McAllister, A.L., Pajari, G.E., Soong, K., Univ. of New Brunswick:
Petrochemistry of Carboniferous volcanic rocks, 1968-; M.Sc. thesis (Soong).
Three theses on this topic have been summarized in "Carboniferous Volcanic and Sedimentary Rocks of the Mount Pleasant area, New Brunswick" by H.W. van de Poll, Mineral Resources Branch, Dept. of Natural Resources, New Brunswick, Report of Investigation No. 3, 1967.

*1026. Pajari, G.E., Trembath, L.T., Fyffe, L.R., Univ. of New Brunswick:
The St. George calc-alkaline complex, New Brunswick, 1966-69; M.Sc. thesis (Fyffe).

*1027. Pajari, G.E., Trembath, L.T., Gemmell, D.E., Pringle, G.J., Univ. of New Brunswick:
Petrochemistry and mineralogy of the Triassic volcanics in the Bay of Fundy region, 1964-69; M.Sc. theses (Gemmell and Pringle).

Newfoundland and Labrador

1028. Grant, D.R., Geol. Surv. Canada:
Quaternary geology, Goose Bay-Lake Melville, Labrador, 1968-69.
Quaternary mapping as background for "biophysical land classification" pilot project of Dept. of Forestry and Rural Development. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1029. O'Donnell, N.D., Univ. of Western Ontario:
Investigation of an indicator train of sulphide ore at Gull Pond, Newfoundland, 1967-69; M.Sc. thesis.

* These projects should have been listed under Petrology and Petrography - New Brunswick on p. 117.

Nova Scotia

1030. Bidgood, D.E.T., Nova Scotia Research Foundation:
Hammer seismic surveys in groundwater studies, 1965-.
Refraction and reflection hammer seismic methods are used to study depth of bedrock surface and nature of superficial deposits.

1031. MacNeill, R.H., Acadia Univ.:
Till fabric analysis in Nova Scotia, 1968-69.
Analysis of till fabrics in various parts of Nova Scotia to attempt to decipher the ice movement directions.

1032. Sum Sum Tang, P., Acadia Univ.:
Relation of bedrock lithology and distance above bedrock to mineralogic and lithologic content of till, 1968-70; M.Sc. thesis.

1033. Vagners, U.J., Acadia Univ.:
Study of Quaternary sediments in the Maritime Provinces, 1968-72.
A study of the texture and mineralogy of the tills.

Northwest Territories

1034. Barnett, D.M., Geol. Surv. Canada:
Proglacial geomorphology, Generator Lake, Baffin Island, 1965-71.
Model study of the proglacial lacustrine environment relating modern glaciofluvial processes to former glacial, lacustrine and related landforms and deposits associated with former and present levels of Generator Lake. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1035. Blake, W.Jr., Geol. Surv. Canada:
Quaternary reconnaissance, southern Ellesmere Island, Northwest Territories, 1962-70.
Reconnaissance of glacial geology and geomorphology with special emphasis on study of regional pattern of postglacial uplift in Arctic Canada. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1036. Church, M., Geol. Surv. Canada:
Ekalugad outwash plain, Baffin Island, 1966-70; Ph.D. thesis, Univ. of British Columbia.
See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1037. Fulton, R.J., Klassen, R.W., Geol. Surv. Canada:
Quaternary reconnaissance, Northwest District of Mackenzie, 1968-70.
The area includes a 400 mile segment of the Mackenzie River valley, Great Bear Lake Basin, and important areas on the northern and western periphery of Laurentide glaciation. Field work concentrated on Quaternary stratigraphy, determining the northern limit of Late Wisconsin ice advance, delineating the pattern of deglaciation, and unravelling the glacial lake history of Great Bear Lake Basin. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1038. Fyles, J.G., Geol. Surv. Canada, Hills, L.V., Univ. of Alberta, French, H.N., Univ. of Ottawa:
Quaternary reconnaissance, western Arctic Islands, 1964-.
Included, in 1968, (1) stratigraphic subdivision and paleobotanical sampling of the Beaufort Formation (L.V.H.); (2) determination of mode of development and history of valleys entrenched into the Beaufort Formation (H.M.F.); and (3) delineation of glacial features, particularly the coastal moraine (J.G.F., L.V. H., H.M.F.). See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1039. Hodgson, D.A., Geol. Surv. Canada:
Quaternary reconnaissance, northeastern Baffin Island, 1968-70.
See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1040. Mackay, J.R., Geol. Surv. Canada (part-time), Univ. of British Columbia:
Geomorphic processes, Mackenzie Valley - Arctic Coast.
Multi-faceted study of geomorphic features and processes related to permafrost and to fluvial, lacustrine, coastal, eolian and mass wasting activity in a permafrost environment involving ice-shove boulder pavements, ground temperature gradients in boreholes, wind abrasion, pingos, soil freezing pressures, heat budget studies, and glacial and postglacial history. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1041. Mathews, W.H., Mackay, J.R., Univ. of British Columbia:
Quaternary geology, Fort Good Hope area, Northwest Territories, 1968-69.

1042. Ritchie, J.C., Geol. Surv. Canada (part-time), Dalhousie Univ:
Quaternary stratigraphy, Mackenzie Delta - Arctı Coast, 1965-70.
Includes reconstruction of vegetation sequence and environment since deglaciation using palynological and related techniques. In 1968 organic sediment cores in several lakes were collected. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

Ontario

1043. Ambrose, J.W., and other members of the Dept. of Civil Engineering and Dept. of Geol. Sciences, Queen's Univ.:
Study of the groundwater regimen in Prince Edward county, Ontario, 1968-.
A joint research project by the Depts. of Civil Engineering and Geological Sciences.

1044. Appleyard, E.C., Univ. of Waterloo:
Syn-orogenic nepheline rocks of eastern Ontario and northern Norway, 1965-70.
The objectives are three-fold: (1) to elucidate the chronology of metamorphism, plutonism and deformation during the Grenville orogeny, especially as exemplified by the igneous and metasomatic alkaline gneisses of eastern Ontario. (2) To establish as far as possible the relationship between individual alkaline rock occurrences and local structures and also between the whole alkaline belt and regional aspects of structure metamorphism and plutonism; to seek the controlling factors for the restricted development of such rocks in the Haliburton-Renfrew area. (3) To investigate the petrogenesis of the entire suite of alkaline rocks with a view to determining the

origin and source of the parent alkaline magma and metasomatizing fluids, the differentiation of the same and the relationship to the respective orogenies in time and place.

1045. Bik, M.J.J., Geol. Surv. Canada:
Surficial deposits and geomorphology, Central Research Forest, Ontario, 1968-69.
Includes detailed stratigraphy to a depth of 16 feet across the project area and 1/2,400 mapping of surficial deposits. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

*1046. Blecha, M., McGill Univ.:
The origin of the Breton breccia, Batchawana area, Ontario, 1967-68; Ph.D. thesis.

*1047. Carmichael, D.M., McGill Univ.:
Metamorphic studies in Whetstone Lake area, Ontario, 1964-70.
Detailed mapping is continuing in the biotite and garnet zones, where a complex grid of intersecting metamorphic isograds is superbly developed. See Intersecting isograds in the Whetstone Lake area, Ontario; Abstract, Geol. Soc. Amer., Annual Meeting, Mexico City, 1968.

1048. Cowan, W.R., Ontario Dept. of Mines:
Pleistocene geology of the Brantford area, 1968-70.
See Ont. Dept. of Mines, Summary of Field Work, 1968.

1049. Dreimanis, A., Geol. Surv. Canada (part-time), Univ. of Western Ontario:
Quaternary geology, Port Stanley, Ontario, 1968-69.
See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1050. Dreimanis, A., Berti, A.A., Feenstra, B.H., and others, Univ. of Western Ontario:
Stratigraphic correlations of glacial deposits between Lake Huron and St. Lawrence Lowland, 1958-; Ph.D. thesis (Berti); M.Sc. thesis (Feenstra).

1051. Farvolden, R.N., Univ. of Western Ontario:
Response of an aquifer to a dewatering program, 1968-70.
Specifications for the new alignment of the Welland Canal call for a permanent dewatering program at several points. The effects of pumping in this program will be important to nearby residents and will depend on the pattern of transmissibility, storage coefficients, and "leakage". Monitoring of the effects by St. Lawrence Seaway Authority will provide data for analyses of the hydrogeologic regime.

1052. Farvolden, R.N., Gale, J., Univ. of Western Ontario:
Analysis of the bedrock topography of southwestern Ontario, 1967-70; thesis project (Gale).
The bedrock topography of southwestern Ontario is being compiled and mapped to a scale of 1:250,000, using existing data, both published and unpublished. The accuracy of the surface will be tested using new data (water well records).

1053. Fitzpatrick, M.M., Queen's Univ.:
Groundwater supply investigations in the Kingston area, 1965-.
An adequate supply of groundwater in the Kingston area can usually be obtained at the interface between the Paleozoic and

*These projects should have been listed under Petrology and Petrography, Ontario, p. 120 .

Precambrian rocks if this is above the water table. Mapping of this boundary is essential to provide information on the best drilling sites for water supply. Seismic investigations have been attempted but were unsuccessful and have been abandoned; resistivity methods hold more promise and are being attempted at the present time; electric logging of water wells has been helpful in detailing Paleozoic stratigraphy and may be the answer to water quality studies.

1054. Fox, J.S., Carmichael, D.M., McGill Univ.:
Metamorphism of chloritoid- and staurolite-bearing rocks west of Sudbury, Ontario, 1968-70; M.Sc. thesis (Fox).

1055. Gwyn, H.J., Univ. of Western Ontario:
Heavy mineral investigations in southern Ontario, 1968-71; Ph.D. thesis.
The purpose of this study is to establish a heavy mineral standard for differentiation of the various glacial lobes in southern Ontario, by analysing the "terminal grades" of heavy minerals in tills, particularly along the Paleozoic-Precambrian contact from Lake Superior to St. Lawrence Valley.

1056. Harrison, J.E., Geol. Surv. Canada:
Quaternary geology, North Bay-Mattawa, Ontario, 1968-70; Ph.D. thesis, Univ. of Syracuse.
Quaternary mapping with special emphasis on the sequence of events and environments relating to outlets of the Great Lakes.
See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1057. Henderson, E.P., Geol. Surv. Canada:
Regional glacial geology, eastern Ontario lowland, 1965-.
Includes investigation of regional relations and events involved in glaciation, Champlain Sea, and subsequent changes in the eastern Ontario lowland between the Ottawa and St. Lawrence Rivers.
See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.
Quaternary geology, Kingston area, north half, 1968-70.
See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1058. Hore, R.C., Fleischer, F.C., Sweetman, A.P., Renzoni, C.L., Barouch, M., Fligg, E.K., McDougall, R., Ontario Water Resources Commission:
Venison Creek IHD representative basin study, 1965-74.
To study the hydrologic conditions in a river basin representative of sand plain conditions in southern Ontario.
Wilton Creek IHD representative basin study, 1965-74.
To study the hydrologic characteristics in a river basin representative of limestone plain conditions in southern Ontario. Research into all aspects of water balance studies under these conditions.
East and Middle Oakville Creeks IHD representative basin study, 1965-74.
To study the hydrologic characteristics in a river basin representative of clay and clay-till plains in southern Ontario. Research into all aspects of water balance studies under these conditions including geophysical surveys to study overburden characteristics.
Bowmanville, Soper and Wilmot Creeks IHD representative basin study, 1965-74.
To study the hydrologic characteristics in river basins representative of moraine, till and clay areas in southern Ontario.

Blue Springs Creek IHD representative basin study, 1965-74.
To study the hydrologic characteristics in a river basin representative of kame, till and bedrock conditions in southern Ontario. A cooperative study with the University of Guelph.

1059. Hore, R.C., Ostry, R.C., Clissold, R.J., Ontario Water Resources Commission:
IHD - International field year on the Great Lakes, 1968-71.
To study the movement of groundwater in representative areas of the Lake Ontario drainage basin in order to assess the total groundwater contributions to the lake.

1060. Hore, R.C., Renzoni, C.L., Fligg, E.K., Ontario Water Resources Commission:
Northern Ontario water resources survey, geophysical study, 1968.
To provide data on overburden thickness, sand and gravel formations and depth to water table and to assess groundwater resources in areas where little geologic information is available.

1061. Karrow, P.F., Geol. Surv. Canada:
Quaternary geology, Stratford-Conestogo area, Ontario, 1965-71.
See Geol. Surv. Can., Paper 68-1, Pt. A, 1969.

1062. Karrow, P.F., Anderson, T., Univ. of Waterloo:
Palynology of late and postglacial bogs, southwestern Ontario, 1968-71; Ph.D. thesis (Anderson).

1063. Karrow, P.F., Clarke, A.H., Anderson, T., Univ. of Waterloo:
Pleistocene paleontology of glacial lake deposits, 1964-69; Ph.D. thesis (Anderson).
Study of Lake Algonquin deposits reveals the widespread presence of molluscs, pollen, and ostracods. Wood and peat have also been found and will be dated.

1064. Karrow, P.F., Feenstra, B.H., Univ. of Waterloo:
Quaternary geology of the Stratford-Conestogo area, Ontario, 1965-71.
See Geol. Surv. Can., Paper 68-1A, pp. 169-171, 1968.

1065. Karrow, P.F., Duthie, H.C., Fernando, C.H., Rani, R.G., Hui, H.T., Univ. of Waterloo:
Pleistocene paleontology of the Toronto interglacial, 1964-69.
Present studies are being concentrated on diatom and molluscan assemblages. See Diatom assemblages from Pleistocene interglacial beds at Toronto, Ontario; Can. Jour. of Botany, vol. 45, pp. 2249-2261, 1967.

1066. Lewis, C.F.M., Geol. Surv. Canada:
Post-glacial uplift of Huron Basin, 1965-71.
Detailed mapping and investigation of past and present shoreline forms and deposits to assess changes in lake level and evidence of tilt of basin during past 6,000 years. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1067. May, R.W., Univ. of Western Ontario:
Chemical investigation of tills of southern Ontario, 1968-70; Ph.D. thesis.
The purpose is to find out the principal chemical differences between the tills of various lobes in southern Ontario, and to

develop rapid methods for correlation of tills, using small samples. Application to mineral exploration will be considered also.

1068. Mellary, A.A., Ontario Water Resources Commission:
Aquifer characteristics of the overburden and bedrock in the township of Wainfleet, Ontario, 1968-69.
The determination of the hydraulic characteristics of the sands and gravels in the lower part of the overburden and those of the Salina and Guelph rock formations with special regard to water quality and the establishment of the local and regional flow pattern.

1069. Mellary, A.A., Jeffs, D.N., Ontario Water Resources Commission:
Aquifer test in a sand plain at Bothwell, Ontario, 1966-68.
A drilling and pumping test program to determine the aquifer characteristics of a shallow sand plain at Bothwell, Ontario. See Geol. Assoc. Can., Proceedings, vol. 19, 1968.

1070. Mellary, A.A., Singh, B.A., Ontario Water Resources Commission:
Aquifer characteristics of the Guelph and Lockport formations in the township of Sullivan, Ontario, 1967-69.
The determination of the hydraulic characteristics of the Guelph and Lockport formations and the establishment of the local and regional flow pattern.

1071. Mirynech, E., Brock Univ.:
Surficial geology of Trenton-Belleville-Kingston area, Ontario, 1960-.

1072. Peach, P.A., Brock Univ.:
An index of Grenville rocks, 1968-.
Includes development of an index of rocks from the Grenville province to provide information on the source of boulders in the drift of southern Ontario.

1073. Pikula, R., Wilkins, R., Wang, K.T., Ontario Water Resources Commission:
Water resources survey of the Albany River drainage basin, 1967-69.
The objectives are to establish the hydrologic regimes of the main river and principal tributaries, to map the geology, vegetation, soil and other hydrologic features and to interpret the relationships of these parameters to streamflow characteristics.

1074. Salter, D.L., Univ. of Waterloo:
Clay mineralogy of some Pleistocene deposits of southern Ontario, 1968-69.
The objective is to evaluate the clay mineralogy of argillaceous glacial sediments with a view to using clay mineral assemblages as a means of differentiating between successive glacial episodes of deposition.

1075. Sibul, U., Choo-Ying, A., Kendrick, G., Ontario Water Resources Commission:
Water resources survey of the Upper Nottawasaga River drainage basin, 1968-69.
The objectives are to collect and interpret data on the occurrence, availability and quality of surface waters and groundwaters, present a hydrologic budget and prepare a detailed account of water use in the basin.

1076. Sibul, U., Fleischer, F.C., Morrison, W.D., Ontario Water Resources Commission:

Water resources survey of the Big Otter Creek drainage basin, 1965-69.

The objectives are to collect and interpret data on the occurrence, availability and quality of surface waters and groundwaters, and to present a hydrologic budget and prepare a detailed account of water use in the basin.

1077. Speirs, D., Queen's Univ.:
Resistivity mapping of Paleozoic-Precambrian interface in Kingston area, Ontario, 1968-69; M.Sc. thesis.

*1078. Stevenson, J.S., McGill Univ.:
Comprehensive petrological and mineralogical study of the Sudbury Basin Irruptive, Ontario, 1951-.

See The Sudbury Irruptive: some petrogenetic concepts based on recent field work; XXIII International Geological Congress, Proceedings, vol. 4, pp. 27-35, 1968.

*1079. Trzcienski, W.E.Jr., Carmichael, D.M., McGill Univ.:
Metamorphic reactions at the staurolite and kyanite isograds, Whetstone Lake area, Ontario, 1968-71; Ph.D. thesis (Trzcienski).

1080. Yakutchik, T.J., Singh, B.A., Sibul, U., Ontario Water Resources Commission:
Water resources survey of the Big Creek drainage basin, 1964-69.

Objectives are to collect and interpret data on the occurrence, availability and quality of surface waters and groundwaters, and to present a hydrologic budget and prepare a detailed account of water use in the basin.

*These projects should have been listed under Petrology and Petrography, Ontario, p.120.

Prince Edward Island

1081. Carr, P.A., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Sea water intrusion problems in Prince Edward Island and New Brunswick, 1965-68.

A method has been developed for determining the coefficients of transmissibility and storage from groundwater levels that fluctuate with the tides. See Salt-water intrusion studies in the Maritimes; Maritime Sediments, vol. 3, No. 4, October, 1967.

1082. Prest, V.K., Geol. Surv. Canada:
Geology of Prince Edward Island, 1953-70.

Includes the mapping of bedrock, glacial and postglacial deposits. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1083. Ryckborst, H., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Hydrology of the Bonaparte River Basin, British Columbia, 1967-69.

An analysis of hydrographs and corresponding pluviographs gives the runoff characteristics of a representative basalt - area in the Cariboo. Data from experimental meteorological stations, experimental river gauging stations and groundwater wells is used for this analysis. The objective is to relate groundwater flow to river flow and to predict spring floods. It can be shown that all river flow is derived from groundwater and that only five percent of the area contributes to riverflow.

Quebec

1084. Dessureault, R., Ministère des Richesses naturelles du Québec:
Inventaire des eaux souterraines dans la région du Lac St-Jean, Saguenay, 1967-69.
Au cours de l'année on a fait près de 7,000 pieds de forage, un levé sismique et des levés ponctuels dans 4 municipalités de la région en quête d'eau souterraine.

1085. Grenier, C., Ministère des Richesses naturelles du Québec:
Inventaire des formations aquifères dans 6 municipalités rurales du Québec, 1966-69.
Premièrement inventorier des formations aquifères et expérimenter différentes méthodes de travail. Deuxiémement trouver une solution au problème d'approvisionnement en eau de certaines municipalités rurales. Les travaux sur le terrain sont terminés et on peut dire que le but fixé a été atteint. Le rapport devrait être terminé en 1969.

1086. Grenier, C., Gélinas, P., Ministère des Richesses naturelles du Québec:
Ile d'Orléans et région nord de Québec, 1968-72.
Un inventaire des puits existants suivi d'une étude hydrochimique a été entrepris pendant l'été 1968 de même qu'une compilation des cartes géologiques.

1087. LaSalle, P., Ministère des Richesses naturelles du Québec:
Géologie des sédiments quaternaires du lac St-Jean et de la région de Québec.
Voir Field trip of Quaternary geology, Saguenay River-Lac St-Jean; Min. Rich. Nat. Québec, 1968.
Prospection utilisant les eskers de l'Abitibi.

1088. Marot, A., Ministère des Richesses naturelles du Québec:
Levés hydrogéologiques ponctuels, 1968.
Il s'agit d'études ponctuelles dans des municipalités rurales à faible population qui veulent développer ou améliorer une source d'approvisionnement en eau souterraine. On a visité 16 de ces municipalités rurales et chaque étude a fait l'objet d'un petit rapport résumant les conditions existantes.

1089. Prévôt, J.-M., Ministère des Richesses naturelles du Québec:
Etude des ressources hydriques du bassin de la rivière Yamaska, 1969-72.
L'étude consistera en un inventaire des eaux souterraines du bassin.
Inventaire des eaux souterraines dans les comtés de St-Hyacinthe - Rouville, 1967-69.
Ce projet consiste à mettre en évidence les nappes d'eau souterraine dans les deux comtés en vue d'alimentations ponctuelles. Pour cette étude on a procédé à une inventaire hydrogéologique, une prospection hydrochimique et géophysique ainsi qu'à une campagne de forages.

1090. Radziminska-LaSalle, Y., Ministère des Richesses naturelles du Québec:
Minéraux lourds des eskers de l'Abitibi, 1968-70.

1091. Rochette, F., Ministère des Richesses naturelles du Québec:
Bassin du ruisseau des Eaux Volées, Forét Montmorency, 1967-74.

Au cours de 1968, il s'est fait des forages de reconnaissance, un levé sismique et l'installation de quelques piézomètres. Un rapport préliminaire des travaux effectués sur le terrain et des données recueillies à ce jour sera préparé en 1969.

1092. Shilts, W.W., Geol. Surv. Canada:
Quaternary geology, Sherbrooke area, Quebec, 1967-69; Ph.D. thesis, Syracuse Univ.
See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1093. Simard, G., Ministère des Richesses naturelles du Québec:
Lac Aylmer - St-François, 1966-71.
Il s'agit de déceler en quels points le bassin versant nord est non étanche et de localiser ces zones d'écoulement. Des travaux sismiques, des forages, une étude à l'infra-rouge ont été faits jusqu'à ce jour.
Bassin de la rivière Eaton, 1965-74.
Il s'agit d'évaluer la contribution des eaux souterraines dans le bilan hydrologique du bassin et de connaître les paramètres hydrogéologiques pour le futur. Nous sommes au stage de l'exploration et de l'estimation des potentialités aquifères en vue de faire une carte hydrogéologique.

Saskatchewan

1094. Christiansen, E.A., Whitaker, S.H., Saskatchewan Research Council:
Groundwater geology in Saskatchewan, 1959-.
The objective of these groundwater studies is to delineate subsurface formations capable of supplying useable quantities of groundwater. This is being done by an extensive test drilling program. See Pleistocene stratigraphy of the Saskatoon area, Saskatchewan, Canada; Can. Jour. Earth Sci., V.S., p. 1168, 1968.

1095. Gendzwill, D.J., Dyck, J., Pepper, T.P., Saskatchewan Research Council:
Geophysical prospecting for groundwater in southern Saskatchewan, 1963-70.
Evaluation and development of geophysical methods, particularly electrical, gravity, seismic, and well logging techniques in their application to groundwater problems.

1096. Klassen, R.W., Geol. Surv. Canada:
Quaternary geology, Duck Mountain, Manitoba-Saskatchewan, 1968-71.
Distribution and stratigraphy of Quaternary deposits and investigation of buried bedrock topography including major buried valleys. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1097. Klassen, R.W., Burwasser, G.J., Willy, A.J., Univ. of Saskatchewan:
Surficial geology of the Duck Mountain map-area, 1968-70; M.Sc. thesis (Burwasser).
The area contains a variety of landform types including various continental glacial moraines, glacio-lacustrine sediments, possible glacial tectonic features on local and regional scales.

1098. Meneley, W.A., Saskatchewan Research Council:
Groundwater hydrology studies in Saskatchewan, 1964-.
This project includes hydrologic evaluation of major aquifer systems, exploration and development of small groundwater supplies

and a regional observation well program. See Geology and groundwater resources of the Melfort area (73-A) Saskatchewan; Map No. 6, 1967.

1099. Mott, R.J., Geol. Surv. Canada:
Palynological studies, central Saskatchewan, 1965-69.
See Palynological studies in central Saskatchewan: Part I, Contemporary pollen spectra from surface samples: Part II, Late-glacial and postglacial vegetation and climatic history; Geol. Surv. Can., Paper (in press).

1100. Vonhof, J.A., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Effect of brine ponds on the groundwater flow regimen, Saskatchewan, 1967-.
The effect of large artificial brine ponds (liquid waste of potash industry) on the groundwater flow regimen is being studied in an area in southeastern Saskatchewan. The main objective is to determine the rate of brine infiltration in the various geological models and to recommend alternative solutions to the brine disposal problem .

Yukon Territory

1101. Hughes, O.L., Geol. Surv. Canada:
Surficial geology, Aishihik Lake and southwestern Yukon, 1965-70.
See Geol. Surv. Can., Paper 68-1, Pt. A, p. 168, 1968.
Quaternary stratigraphy of Old Crow Basin and Porcupine River valley, 1968-70.
See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1102. Rampton, V., Geol. Surv. Canada:
Quaternary geology, Snag-Kluane Lake area, Yukon Territory, 1965-69; Ph.D. thesis, Univ. of Minnesota.
See Geol. Surv. Can., Paper 68-1, Pt. A, pp. 179-180, 1968.

General Problems

1103. Banerjee, I., Geol. Surv. Canada:
Research on varved clays, 1967-68.
The stratigraphy, sedimentary structures, texture and mineralogical composition of varved sediments as they relative to the environment of deposition.

1104. Blake, W.Jr., Geol. Surv. Canada:
Pumice on raised beaches, eastern Arctic Canada, 1968-73.
A study of the elevation, age, and origin of pumice to aid in investigation of pattern of isostatic readjustment and correlation of raised marine features in the whole of the northeast Atlantic area. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1105. Brown, R.J.E., Division of Building Research, National Research Council:
Permafrost distribution in Canada, 1953-.
Observations on the occurrence of permafrost throughout the permafrost region of Canada, with emphasis on the southern fringe

area, are being collected continuously by direct field observations, review of the technical literature, and reports from other individuals and agencies. Accompanying this collection of information is the study of the climatic and terrain factors comprising the permafrost environment as a means of improving the understanding of and ability to predict the distribution and occurrence of permafrost. See Permafrost map of Canada; Can. Geogr. Jour., pp. 56-63, February, 1968.

1106. Carlson, V.A., Research Council of Alberta:
"HYDRODAT", data storage and retrieval system, 1967-.

1107. Coward, J.C., Ford, D.C., McMaster Univ.:
Resistance-capacitance and computer analog investigation of aspects of the development of groundwater flownets in soluble carbonate rocks, 1968-71; Ph.D. thesis (Coward).

1108. Craig, B.G., Geol. Surv. Canada:
Quaternary geology, Hudson Bay Lowland, 1967-69.
See Late-glacial and postglacial history of the Hudson Bay region: in Proc. Earth Science Symposium on Hudson Bay; Geol. Surv. Can., Paper 68-53, 1969.

1109. David, P.P., Geol. Surv. Canada (part-time), Univ. of Montreal:
Sand dunes and sand movement, 1967-70.
Classification and disruption of dunes and dune areas; determination of mode of formation, environment of origin, chronology, rate of movement, and relationship to present and past wind directions. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.
Study of selected sand dune areas in Canada, 1965-69.
Several areas of sand dune occurrences representing different environments of dune development were selected from Quebec, Ontario, Manitoba and Saskatchewan. In each area the morphology, structure, and stratigraphy of the dunes was studied; the physical properties of the dune sands and source deposits was determined; the rates of advance of active dunes were measured; and the chronology of dune-development was established. In an area in Saskatchewan the movement of sand over a sand dune was studied and its relation to the local wind regime is being evaluated.

1110. Delorme, L.D., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Paleohydrogeology, 1965-70.
See Pleistocene freshwater ostracoda from Yukon, Canada; Can. Jour. Zoology, vol. 46, No. 5, pp. 859-876, 1968.

1111. Dreimanis, A., Univ. of Western Ontario:
Extinction of mastodons in the Great Lakes region, 1967-68.
See Extinction of mastodons in eastern North America - testing a new climatic-environmental hypothesis; Ohio Jour. Sci., vol. 68, pp. 257-272, 1968.

1112. Garrett, R.G., Geol. Surv. Canada:
Geochemical study of economic elements in glacial till, 1968-69.
The application of soil, till and stream sediment sampling and chemical analysis as an exploration tool is being investigated. During the summer of 1968 a detailed study was made in the Manitouwadge area, Ontario which underlined the need for close cooperation between geochemist and Pleistocene geologist.

1113. Ghosh, M.K., Univ. of Toronto:
Shallow exploration by electromagnetic methods, 1968-69; M.Sc. thesis.
Application of frequency sounding to shallow exploration in the field of engineering geophysics, groundwater hydrology.

1114. Gilliland, J.A., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Groundwater observation well program - network design, 1965-.
Involves research into criteria to be used for establishing a national network oriented towards recovering "resource" information, and to develop a recorder operating on the variable time principle.

1115. Glenn, W.E., Queen's Univ.:
Design of an electromagnetic well logging device for use in water wells, 1967-69; M.Sc. thesis.

1116. Grant, D.R., Geol. Surv. Canada:
Recent coastal submergence, Nova Scotia and Prince Edward Island, 1966-69; Ph.D. thesis, Cornell Univ.
An investigation of submergence phenomena, shoreline forms and deposits, and shallow-water sediments to determine extent, age and rate of recent coastal submergence and its effects on coastal configuration and roads, docks, etc. See Geol. Surv. Can., Paper 68-1, Pt. A, pp. 163-164, 1968.

1117. Hobson, G.D., Geol. Surv. Canada:
Hammer seismic surveys, 1962-.
Shallow seismic methods, both refraction and reflection techniques, can be applied to the definition of problems in mining, engineering and groundwater studies. Reflected shear waves have been recorded on a hammer seismograph to determine thickness of glacial ice. See Hammer seismic survey, Moncton map-area, New Brunswick 12 I/2; Geol. Surv. Can., Paper 65-43, 1965.

1118. Karrow, P.F., Salter, D.L., Univ. of Waterloo:
Mineralogy of glacial deposits, 1968-70.
Study is being concentrated on clay minerals and heavy minerals.

1119. Lee, H.A., Geol. Surv. Canada:
Mineral indicator techniques of mineral exploration, 1962-69.
See An Ontario kimberlite occurrence discovered by application of the glaciofocus method to a study of the Munro esker; Geol. Surv. Can., Paper 68-7, 1968 and Paper 69-1, Pt. A, 1969.

1120. Lennox, D.H., Carlson, V.A., Bukhari, S.A., Research Council of Alberta:
Geophysics in groundwater exploration, 1957-.
See Geometric coefficients for use in numerical resistivity analysis; Res. Coun. of Alberta, Bull. 19, 234 p., 1966.

1121. Lewis, C.F.M., Geol. Surv. Canada:
Quaternary geology, Great Lakes, 1968-.
Systematic investigation of unconsolidated deposits to determine Quaternary stratigraphy, history, and paleoecology, and to identify processes active in the lakes during the Quaternary. Studies closely integrated with related projects of the limnogeology group of the Canada Centre for Inland Waters, and concentrated

in 1968 primarily in Lake Ontario and Lake Erie. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1122. Lissey, A., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Hydrology of pingos, 1968-69.
Water level recession analyses coupled with piezometer installations are contemplated to determine the groundwater discharge characteristics associated with open-system pingos in the Yukon. This project will serve as the initial investigation into a more comprehensive project dealing with the general process of recharge and discharge of groundwater in permafrost regions.

1123. Matthews, J., Univ. of Alberta:
Quaternary paleoenvironments in the Kotzebue Sound region of western Alaska, 1967-70; Ph.D. thesis.
The Cape Decitt locality near Deering Alaska exposes Pleistocene sediments ranging in age from mid-Pleistocene to late Wisconsin. The entire sequence consists of sediments (silts and sands) deposited on cold (possibly tundra) environments. Fossil insects, vertebrates and both plant macrofossils and microfossils are abundant in all units of the exposure. Using the evidence of these fossils it is hoped to document the type of tundra environment which exists at this site at various times since the mid-Pleistocene.

1124. McDonald, B.C., Geol. Surv. Canada:
Quaternary geology, Hudson Bay Lowland, 1967-69.
See Glacial and interglacial stratigraphy, Hudson Bay Lowland: in Proc. Earth Science Symposium on Hudson Bay; Geol. Surv. Can., Paper 68-53, 1969.

1125. Morris, D.W., Univ. of New Brunswick:
Sedimentology (Pleistocene geology, sediment transport and budget problems), 1962-69.

1126. Neilson, J.M., Queen's Univ.:
Landsliding in clays, 1968-.
See Erosion of landsliding at Victoria Generating Station, Ontonagon county, Michigan; Geol. Soc. Amer., Eng. Geol. Div. Case Histories (in press).

1127. Parker, M.L., Geol. Surv. Canada:
Dendrochronological investigations, 1968-70.
Study of the tree ring record in various parts of Canada to provide chronological and climatological data in order to date postglacial events and to relate available weather data to other kinds of evidence for reconstruction of past environments. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1128. Smith, D.G.W., Westgate, J.A., Univ. of Alberta:
Chemical and petrological characterization of ash deposits by electron probe analysis, 1968-.
A rapid and objective electron probe technique has been developed for characterizing recent volcanic ash deposits on the basis of their glass shard composition. This technique will be applied to the investigation of the many ash deposits in the Quaternary of western North America in an attempt to identify sources and determine the chemistry and affinities of the source magmas. The possibility of variation in composition of erupting magma with

time will be investigated by sampling a succession of layers from certain exposures showing grading and depositional discontinuities within the ash beds. An attempt will be made to extend the technique to bentonites by investigating the chemistry of the primary crystalline mineral suites of these beds. See Electron probe techniques for characterizing pyroclastic deposits; Abstract, G.S.A. Meeting, Mexico City, 1968.

1129. Sutterlin, P.G., May, R.W., Zodrow, E.L., Univ. of Western Ontario:
Statistical and numerical analysis of geological data, 1968-; thesis projects (May and Zodrow).
R.W. May is investigating statistical routines in an attempt to classify Pleistocene deposits on the basis of measurable till parameters and E.L. Zodrow is investigating the nature of data obtained from mineral assays in an attempt to ascertain how these data can be used in the prediction of ore grade.

1130. Terasmae, J., Mott, R.J., Geol. Surv. Canada:
Quaternary stratigraphic palynology of Canada, 1956-.
Palynological, paleobotanical, limnological, and sedimentological investigations of Quaternary deposits in various parts of Canada involving stratigraphic correlation of Quaternary deposits and events, determination of the history of postglacial and subrecent environments, and establishment of standard pollen stratigraphic sequences. See Some problems of the Quaternary palynology in the western mainland region of the Canadian Arctic; Geol. Surv. Can., Paper 68-23, 1968.

1131. Toth, J., Research Council of Alberta:
Genetic relation between various morphologic and geologic phenomena, 1968-69.
Quantitative formulation of the concept "hydraulic connection", 1967-68.
See Groundwater in sedimentary (clastic) rocks; Proc. Nat. Symp. on Groundwater Hydrology, Amer. Water Resources Assn., pp. 91-102, 1967.

1132. Westgate, J.A., Smith, D.G.W., Tomlinson, M. (Miss), Univ. of Alberta:
Quaternary tephrochronology in western Canada, 1966-; M.Sc. thesis (Miss Tomlinson).
General objectives include characterization of Quaternary pyroclastic deposits in western Canada; delineation of fallout area of each investigated pyroclastic deposit, including thickness and textual variations; and determination of source and age of each layer. See An electron probe technique for characterising pyroclastic deposits by their glass-shard composition; Abstract, Geol. Soc. Amer., Annual Meeting (Mexico City), 1968.

1133. Wyder, J.E., Geol. Surv. Canada:
Borehole and related geophysical techniques, 1968-.
Evaluation of potential use of borehole geophysical techniques as tools for studying Quaternary deposits. Present capability includes: electrical, caliper, neutron-neutron, natural gamma, gamma-gamma, temperature and fluid resistivity. 40,000 feet of logging has been completed. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1134. van Everdingen, R.O., Inland Waters Branch, Dept. of Energy, Mines and Resources:

Bedrock aquifers of western Canada, 1963-.
Investigation of hydrochemistry and hydrodynamics in the Western Sedimentary Basin, using information available from petroleum files and data obtained from field investigations. See Studies of formation waters in western Canada: Geochemistry and Hydrodynamics; Can. Jour. Earth Sci., vol. 5, p. 523, 1968.

SEDIMENTATION AND SEDIMENTARY PETROLOGY

1135. Asad, A., McGill Univ.:
Distribution and hydrodynamic concentration of heavy minerals in beach placers, 1967-69; M.Sc. thesis.

1136. Asthana, V., Bedford Institute, Nova Scotia:
Coastal geodynamics, 1968-.
Study and compilation of data on the nature of sediment distribution in a hydrodynamically turbulent environment.

1137. Asthana, V., Clark, D.F., Drapeau, G., Grant, A.C., Kranck, K., Marlowe, J.L., Bedford Institute, Nova Scotia:
Coastal geodynamics program, 1968-.
Measurement of parameters, collection of observations, and interpretation of compiled data pertaining to processes affecting the dynamics of unconsolidated sedimentary bodies along coasts and in adjacent nearshore areas. Initial emphasis is being placed on coastal areas of Nova Scotia, with periodic observations on a year-round basis.

1138. Banerjee, I., Geol. Surv. Canada:
Research on varved clays, 1967-68.
The stratigraphy, sedimentary structures, texture and mineralogical composition of varved sediments as they relate to the environment of deposition.

1139. Barnes, W., Univ. of British Columbia:
Precambrian stratigraphic studies, southeastern British Columbia, 1962-.
Combined stratigraphic/sedimentologic study; present investigations concentrated in the southern Purcell Range and the adjacent parts of the Rocky Mountain Trench. See Correlation of and facies changes in the carbonaceous, calcareous, and dolomitic formations of the Precambrian Belt-Purcell Supergroup; Geol. Soc. Amer., Bull., vol. 77, pp. 1399-1426, 1966.

1140. Barr, S. (Miss), Univ. of British Columbia:
Geology of Strait of Juan de Fuca, 1969-70; M.Sc. thesis.
Shipboard investigations planned for 1969 include continuous seismic profiling in the Strait, and bottom sampling. Possibly an attempt will be made to correlate marine geological features of the Strait with the geology of the southern part of Vancouver Island.

1141. Bartlett, G.A., Bedford Institute, Nova Scotia:
Scanning electron microscope, 1967-68.
Bedford Institute programs include special morphological studies on microfauna and particularly the pore and internal structure; surficial study of sand grains in an attempt to obtain genetic

significance of the various textural features; experimentation on sedimentary dynamics in combination with other laboratory equipment; observations on biological process; and observations on clay particles with emphasis on shape and size analysis.
Geology of the Atlantic continental margins, 1966-.

A detailed paleontologic interpretation of the Mesozoic and Cenozoic sediments from the Continental Shelf and slope of both the Western and Eastern Atlantic. Thick sequences in eastern Canadian waters suggest both Tethyan and West Indian affinity. Paleontological, sedimentological and structural evidence implies that the Canadian Continental Shelf is a continuation of the Gulf Coast and Atlantic Coastal Plain physiographic province. See Tertiary stratigraphy on the Continental Slope off Nova Scotia; Maritime Sediments, vol. 4, No. 3, pp. 22-37, 1968.
The Mid-Atlantic ridge, 1966-.

Various aspects of deep-sea oozes in ponded basins and seamounts on the mid-Atlantic Ridge are being investigated. These studies concern: age of sediments associated with the ridge: significance of deep-sea carbonate lithification: rates of seafloor spreading based on relative and absolute ages of microfauna.
Shallow water ecological studies of benthonic foraminifera in eastern Canada and the United States, 1964-69.

A detailed environmental analysis of shallow water bays throughout the Atlantic Provinces is conducted on a weekly or bimonthly basis. These studies enable a comprehensive analysis of growth, physiology, reproduction and faunal-watermass relationships in the natural environment. This information is utilized in the paleoecologic reconstruction of ancient environments.

1142. Bartlett, G.A., Vilks, G., Ramsay, A.T.S., Bedford Institute, Nova Scotia:
Ecostratigraphy of the North Atlantic, 1968-69.

The inter-relationship of the biomass and watermass of the North Atlantic and Caribbean Sea. Utilization of this information as a climatic and paleoclimatic index in the development of a theory on glaciation. See Planktonic foraminifera in watermasses and bottom sediments from the Grand Banks to the Caribbean Sea; Maritime Sediments, vol. 3, No. 4, 1968.

1143. Baumann, A., Geol. Surv. Canada (N.R.C. Postdoctorate Fellow):
Geochemical study of black shales and associated sulphide deposits, 1968.

The purpose is the determination of metals in black shales in the eastern part of the Canadian Shield to evaluate their potential as low grade ore deposits. Other problems of interest are the relationship of these sediments to nearby ore deposits and the sedimentary processes and environment leading to the formation of these fine-grained sediments in Precambrian time.

1144. Bayliss, P., Deere, R., Univ. of Calgary:
The mineralogy of Lower Jurassic in west-central Alberta, 1967-68; thesis project (Deere).

1145. Bayrock, L.A., Berg, T.E., Research Council of Alberta:
Sedimentation of glacial lakes, 1968-.

1146. Beales, F.W., Univ. of Toronto:
Limestone petrography and paleoecology.

Present emphasis is on stratigraphic aspects of lead-zinc mineralization of Mississippi Valley-type; with particular interest

in the sedimentary paleoecology of the host limestones and the bearing this may have on the mineralization. See Pine Point - a stratigraphical approach; Can. Inst. Min. Metall., Bull, July, 1968.

1147. Beales, F.W., Oldershaw, A.E., Univ. of Toronto:
Petrology and lithofacies of the sedimentary fill of the Brent meteorite crater, Ontario, 1967-70.
Sedimentation in the Brent meteorite crater, Algonquin Park, Ontario. Essentially a background study of sedimentation rates, bed forms and patterns of deposition in a continental, lacustrine environment of probable Cambro-Ordovician age. The origin of lacustrine evaporites and dolomites, and statistical analysis of laminae and banding are also being considered.

1148. Bidgood, D.E.T., Zwicker, D., Nova Scotia Research Foundation:
Sparker surveys in Nova Scotian coastal waters, 1967-.
Continuous seismic profiler traverses in the Bay of Fundy, Canso Strait, Halifax Harbour and Cape Sable areas have been carried out to study bottom sediments and bedrock structure. Part of this work was carried out in conjunction with Dalhousie Univ.

1149. Boulay, R.A., Geol. Surv. Canada:
Sedimentological study of the Papaskwasati Basin, Quebec, 1968-.
A joint study with the Quebec Department of Natural Resources to investigate the sedimentology and geochemistry of the Basin, north of Lake Mistassini, Quebec. Information obtained from 32,000 feet of core is being used to outline the stratigraphy, sedimentology and possible geochemical trends in the basin.

1150. Bremner, J.M., Kucera, R.E., Murray, J.W., Univ. of British Columbia:
Beach processes and black sands at Wreck Bay, British Columbia, 1968; M.Sc. thesis (Bremner).
An attempt to understand the geomorphic, oceanographic and sedimentologic processes that are operating. It is of economic interest because of the occurrence of placer minerals.

1151. Buckley, D.E., Bedford Institute, Nova Scotia:
Clay-inorganic associations in aquatic environments, 1966-69; Ph.D. thesis, Univ. of Alaska.

1152. Carrigy, M.A., Research Council of Alberta:
Petrology of nonmarine Upper Cretaceous-Tertiary sandstones, 1961-.
A report describing the results of the study will be published as a Research Council Bulletin in 1969.

1153. Carter, L., Murray, J.W., Univ. of British Columbia:
Topography and bottom sediments in Barkley Sound and adjacent continental shelf, southwestern British Columbia, 1968-; M.Sc. thesis (Carter).
An attempt to trace sediment movement from the source areas adjacent to the Alberni Canal, down the Canal to Barkley Sound and then out onto the Continental Shelf and slope.

1154. Chandler, F.W., Univ. of Western Ontario:
Sedimentology and stratigraphy of the Huronian rocks of Harrow township and surrounding areas, Ontario, 1965-69; thesis project.

See Possible glacial origin for three Precambrian (Huronian) conglomerates, north shore of Lake Huron; Abstract, 16th Annual Inst. on Lake Superior Geology, Superior, Wisconsin, pp. 42-43, 1968.

1155. Chase, R.L., Univ. of British Columbia:
Submarine geology of the Antilles and mid-Atlantic Ridge, 1964-69.
One incomplete manuscript describes basalt dredged from the mid-Atlantic Ridge and Barracuda scarp; another deals with C.S.P. from the Lesser Antilles; and a third describes the eastern margin of the Antilles. See Geology of the north slope of the Puerto Rice Trench; Deep Sea Rev., No. 15, pp. 297-317, 1968.

1156. Chase, R.L., Bremner, M.N., Univ. of British Columbia:
Geology of features ascribed to sea-floor spreading off the west coast of Canada, 1969-; Ph.D. thesis (Bremner).
In 1969 a cruise of 2 to 4 weeks is planned in cooperation with Dr. Roger Stacey, Gravity Division, Dominion Observatory. Features to be examined are the southern part of Queen Charlotte Islands Fault Zone, the Explorer Trench, and the Juan de Fuca Ridge. Techniques will include continuous seismic profiling, dredging and coring and a gravity meter and magnetometer survey.

1157. Clack, W.J., McGill Univ.:
Recent carbonate reef sedimentation, Carriacou Island, West Indies, 1966-69; Ph.D. thesis.
A study of carbonate sedimentation on the east coast of Carriacou to investigate rates of sedimentation, transportation, and the usefulness of statistical parameters in relation to sedimentary environments.

1158. Clark, A.H., McBride, D.E., Queen's Univ.:
Factors affecting metal concentration during sedimentation and metamorphism of Precambrian carbonaceous shales, 1968-71; M.Sc. thesis (McBride).

1159. Coakley, J.P., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Sedimentological studies in the Great Lakes, 1968-.
This will include: (1) a statistical study of the distribution of heavy mineral assemblages in certain nearshore areas of Lakes Ontario, Erie and Huron, to be applied to problems of sediment provenance and dispersal which will entail computerized trend and variance analyses and possibly involve use of radioactive of fluorescent tracer techniques; (2) compilation of a sediment facies map of Lake Ontario using data already collected by Dr. C.F.M. Lewis of the Geological Survey and augmented by additional sampling where necessary; (3) continuation of development of computer programs for calculating sediment particle size and mass parameters.

1160. Costello, R., Walker, R.G., McMaster Univ.:
Sedimentology of Pleistocene outwash channels in southern Ontario, 1967-69; M.Sc. thesis (Costello).
Sedimentological features leading to an interpretation of the history of channel cutting and filling, and an interpretation of paleoflow parameters, are being examined.

1161. Danner, W.R., Univ. of British Columbia:
Origin of bedded radiolarian cherts and of Jasper, 1967-.

An attempt to determine whether the bedded radiolarian cherts are organic or volcanic in origin and whether they represent shallow water or deep water deposition, and studies on the origin of different rocks usually classified as jasper.

1162. David, P.P., Geol. Surv. Canada (part-time), Univ. of Montreal:
Sand dunes and sand movement, 1967-70.
Classification and description of dunes and dune areas; determination of mode of formation, environment of origin, chronology, rate of movement, and relationship to present and past wind directions. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.
Study of selected sand dune areas in Canada, 1965-69.
Several areas of sand dune occurrences representing different environments of dune development were selected from Quebec, Ontario, Manitoba and Saskatchewan. In each area the morphology, structure, and stratigraphy of the dunes were studied; the physical properties of the dune sands and source deposits were determined; the rates of advance of active dunes were measured; and the chronology of dune-development was established. In an area in Saskatchewan the movement of sand over a sand dune was studied and its relation to the local wind regime is being evaluated.

1163. Donaldson, J.A., Carleton Univ.:
Heavy minerals in Proterozoic sandstones of the western Canadian Shield, 1968-72.
Comparative petrology of Precambrian sandstones in Canada, 1968-72.
Includes summary of published information supplemented by studies of representative samples from major Precambrian basins with emphasis on composition, texture, and primary structures.

1164. Donaldson, J.A., Carleton Univ., Dean, R.S., Mines Branch, Dept. of Energy, Mines and Resources:
Clay minerals in Proterozoic sediments, 1967-69.

1165. Drapeau, G., Bedford Institute, Nova Scotia:
Distribution of bottom sediments in the Strait of Belle Isle, 1968.
Bottom sediments of the south-western portion of the Scotian Shelf, Nova Scotia, 1964-69; Ph.D. thesis.

1166. Foscolos, A.E., Geol. Surv. Canada:
Clay mineral investigations, 1968-.
Investigations of clay synthesis, clay diagenesis, halmyrolysis, equilibria, clay mineral separation from marine sediments and transformation of fresh water clays on contact with sea water. See Cation-exchange equilibrium constants of aluminum saturated montmorillonite and vermiculite clays; Soil Science Society of Amer. Proc. vol. 32, pp. 350-354.

1167. Gees, R.A., Dalhousie Univ.:
Geochemistry and geochronology of the Bermuda Rise, surface textures of beach and dune sand grains, distribution of the Quaternary sediments in the Lake Constance Basin, Europe, and grain shape of beach, dune, and river sands.

1168. Gees, R.A., Drapeau, G., Dalhousie Univ.:
Sediment distribution on the south-eastern shelf of Nova Scotia, 1967-69; Ph.D. thesis (Drapeau).

1169. Gees, R.A., Lyall, A.K., Dalhousie Univ.:
Sediment distribution in the Cape Sable area, Nova Scotia, 1969; Ph.D. thesis (Lyall).

1170. Gees, R.A., Stewart, J., Dalhousie Univ.:
Sedimentology and stratigraphy of selected basin areas of the mid-Atlantic Ridge, 1969; M.Sc. thesis (Stewart).

1171. Glaister, R.P., Maiklem, W.R., Bebout, D.G., Imperial Oil Enterprises Ltd., Calgary:
Evaporite - carbonate relationships, 1968-70.
The main objectives of the project are: to develop a descriptive classification of evaporites; to determine the environment of deposition of evaporites; to determine the sequence, timing and pattern of evaporite-carbonate basin filling; to determine the character and pattern of diagenesis of evaporites and associated carbonates; and to determine the source potential of evaporites. The Middle Devonian Elk Point Basin has been selected as a model for this project.

1172. Godden, C.A., Pelletier, B.R., Bedford Institute, Nova Scotia:
Shallow water rotary rock core drill, 1966-68.
This drill is electrically powered from ships supply and is remotely operated on the seafloor to a height of 1,000 feet from a control panel onboard ship. Drill is designed to penetrate a combination of unconsolidated sediment or bedrock to a depth of 1l4 feet.

1173. Gopalaswamy, T.K.N., Queen's Univ.:
Carbonate petrology of the Grenadines Bank, West Indies, 1968-70; Ph.D. thesis.
The field work was done in conjunction with that of officers of the Bedford Institute, Dartmouth, Nova Scotia, and the samples consist of carbonate sands and algae balls from the deeper waters on the top of the bank. This area is adjacent to that being studied by Greggs, Smith, and Usher.

1174. Gordon, A., Patel, I., Univ. of New Brunswick:
Provenance of basal Cambrian and Carboniferous conglomerates of the Saint John region, New Brunswick, 1968-70.

1175. Greggs, R.G., Smith, L., Usher, J.L., Queen's Univ.:
Shallow water carbonate sedimentation adjacent to volcanic islands, West Indies, 1968-.
A study of the ecologic relations of the fauna and flora to the carbonate and terrigenous sediment now being formed and deposited in the shallow waters adjacent to the southern Grenadines, West Indies. The field work was done in conjunction with that of Miss K. Kranck of the Bedford Institute, Dartmouth, Nova Scotia.

1176. Halferdahl, L.B., Research Council of Alberta:
Stream deposits, Alberta, 1957-69.
Analyses of the data obtained on the composition and distribution of alluvial sediments has shown that the factors controlling the distribution of gravel in rivers in Alberta include the size of the river, the sources of the pebbles in the gravel, and the effects of drainage changes due to glacier drainage and stream piracy. The effects of abrasion on different rock types have resulted in high concentrations of quartzite pebbles in some of the gravels.

1177. Herzer, R.H., Murray, J.W., McTaggart, K.C., Univ. of British Columbia:
Marine geology of Bowie Seamount, northeastern Pacific Ocean, 1967-68; M.Sc. thesis (Herzer).
A study of a submarine volcano approximately 105 miles due west of the Queen Charlotte Islands. It is hoped this research will shed some light on the age, structure and history of this submarine feature, which could have useful application to ancient counterparts in the geologic record.

1178. Hobson, G.D., Geol. Surv. Canada and Inland Waters Branch, Dept. of Energy, Mines and Resources:
Seismic surveys - Great Lakes, 1966-.
To conduct continuous profiling marine seismic investigations of the water - bottom interface, the nature of the unconsolidated bottom sediments and stratification within those materials, and the bedrock topography underlying the unconsolidated materials. A repetitive source, electrical or electromagnetic, is used to initiate seismic energy which is detected by hydrophones. Side-scanning sonar devices will be used to assist in the identification of bottom materials. The acoustical properties of the bottom sediments will also be studied. These experiments are complementary to the sedimentary and limnological studies carried out concurrently.

1179. Hodgson, D.A., Geol. Surv. Canada:
Submarine morphology off the northeast Baffin Island coast, Northwest Territories, 1967-70.
A project designed to extend knowledge of erosional and depositional landforms to areas below present sea-level by continuous profiling with an echo sounder.

1180. Hopkins, J.C., McGill Univ.:
Sedimentation near the margins of two Upper Devonian reef complexes, Jasper National Park, Alberta, 1968-70; Ph.D. thesis.

1181. Hubert, C., Vallières, A., Caty, J.-L., Université de Montreal:
Stratigraphie des roches cambro-ordoviciennes de la région de St-Malachie, Québec, 1967-70; thèse de maftrise (Vallières), thèse de doctorat (Caty).
Voir Tectonics of part of the Sillery in the Chaudière - Matapedia segment of the Quebec Appalachians; Roy. Soc. Can., Special Pub. No. 10, p. 31-40, 1967.
Lithostratigraphie et mise en place du minerai uranifère des roches sédimentaires précambriennes des bassins de Pepeshquasati et du Lac Indicateur, Québec, 1968-71.
Cette étude sert à établir la lithostratigraphie très détaillée des roches sédimentaires de ces deux bassins et à comprendre le contexte sédimentologique en relation avec la mise en place du minérai uranifère.

1182. James. N., McGill Univ.:
Carbonate diagenesis of a portion of the Coral Reef Cap, Barbados, West Indies, 1968-71; Ph.D. thesis.

1183. Jamieson, E.R., Saskatchewan Dept. of Mineral Resources:
Stratigraphy and sedimentology of the Interlake group in southern Saskatchewan, 1967-69.

1184. Kemp, A.L.W., Inland Waters Branch, Dept. of Energy, Mines and Resources:

Great Lakes sediment organic program, 1967-.
Chemical studies are being made to identify the organic materials in the sediments of Lakes Ontario, Erie and Huron. Surface samples are collected by Shipek samplers and a geological description of the sample, measurement of pH and Eh of the sediment made onboard ship. Subsamples are taken for chemical analysis and stored at 0°C and analyzed in shore laboratories. Deeper samples are being taken with piston and gravity corers and treated as the surface samples.

1185. Kent, D.M., Saskatchewan Dept. of Mineral Resources:
Stratigraphy and sedimentation of the Mississippian Madison Group in eastern Saskatchewan, 1968-70.
See Geology of the Upper Devonian Saskatchewan Group and equivalent rocks in western Saskatchewan and adjacent areas; Sask. Dept. Min. Res., Rept. No. 99, 1968.

1186. Khan, S.N., Univ. of Alberta:
Size-sorting distribution of clayey sandstones: a comparison of techniques, 1968-69; M.Sc. thesis.

1187. King, L.H., MacLean, B., Thurber, E., Bedford Institute, Nova Scotia:
Studies of bedrock and surficial geology - Scotian Shelf, 1964-.
Bedrock geology - A program to map the near surface structure and stratigraphy of the bedrock underlying the entire Scotian Shelf is being conducted utilizing continuous seismic-reflection profiles and sample data obtained through dredging operations. Profiles representing some 4,000 miles of traverse have been accumulated, and are being interpreted utilizing differences in acoustical characteristics and unconformable relationships to delineate rock units. Surficial geology - Interpretations of the surficial geology is based upon a detailed study of echograms, examination of bottom samples, continuous seismic reflection profiles, radiogenic ages and paleontological data. Work currently in progress will provide surficial geological coverage for the whole of the Scotian Shelf. Chart 4040, Halifax-Sable Island, is ready for final drafting, sampling for chart 4012, Yarmouth-Halifax has been completed and sampling for chart 4041 Banquereau-Misaine, comprising the eastern third of the Scotian Shelf is about 80 per cent complete. See On the sediments and stratigraphy of the Scotian Shelf; GAC Spec. Paper No. 4, Geology of the Atlantic Region, 1967.

1188. Kliske, A.E., Chevron Standard Ltd.:
Evaporite rock petrography and geochemistry, 1966-.

1189. Kranck, K., Bedford Institute, Nova Scotia:
Tidal current control of surficial bottom sediments in Northumberland Strait, 1962-68.
Sediments and bedrock of St. George Bay, Nova Scotia, 1966-69.
A detailed grab-sampling and continuous seismic survey has been completed.

1190. Kranck, K., Clark, D.F., Bedford Institute, Nova Scotia:
Tidal current transport of suspended sediments, 1967-.

1191. Kuo, H., Crocket, J., McMaster Univ.:
Platinum metal geochemistry of deep sea sediments, 1967-70; M.Sc. thesis (Kuo).

A study of platinum metals in deep-sea pelagic sediments designed to look for evidence of platinum metals of cosmogenic origin. See Palladium, iridium and gold of interplanetary origin in deep-sea manganese nodules; Geochim. Cosmochim. Acta, vol. 32, 1968.

1192. Lajoie, J. Léonard, M.A., Mathey, B., Héroux, Y., Chagnon, A., Université de Montréal:
Paléogéographie de séquences siluro-ordoviciennes dans les Appalaches du Québec, 1964-; thèse de maîtrise (Mathey, Héroux, Chagnon), thèse de doctorat (Léonard).
Titres des travaux: 1. Anatomie du flysch de St-Fabien, Cté de Rimouski. 2. Sédimentologie des flysch de la région de Trois-Pistoles. 3. Provenance de la fraction grossière du flysch de St-Simon. 4. Sur la provenance du flysch de Berthier. 5. Mise en place d'un horizon deconglomérat calcaire, région de Trois Pistoles. 6. Formation des boulets de canon. 7. Remplacement du lutum dans les wackes.

1193. Lawson, D.E., Univ. of Waterloo:
Recent sediments of the Shediac Bay area, New Brunswick, 1966-.
A study of the form, fabric and grain-size distribution of near shore sediments towards a fuller understanding of their significance and genesis.
Sedimentology of the Memramcook and Petitcodiac Rivers and their estuary, southeastern New Brunswick, 1966-.
Sedimentology and stratigraphy of the Torridonian of parts of Wester Ross and Sutherland, northwest Scotland, 1962-70.
Includes study of a volcanic ash-flow and mud-flow complex within the lower Torridonian; major and trace element content of Torridonian grey shales; and possible marine phytoplanktonic fossils from Torridonian grey shales. See Lithofacies and correlation within the lower Torridonian; Nature, vol. 207, No. 4998, pp. 706-708, 1965.

1194. Lerbekmo, J.F., Univ. of Alberta:
Sedimentary structures in the Lower Edmonton Delta, central Alberta, 1968-71.

1195. Levinson, A.A., Univ. of Calgary:
Hydrothermal syntheses at low temperatures and pressures, 1967-.
Mineral reactions and transformations (particularly those involving clay-carbonates—quartz minerals) at temperatures and pressures approximating burial of sediments in deltas. See Low temperature hydrothermal synthesis of montmorillonite, ammonium-micas, and ammonium-zeolites; Earth and Planetary Science Letters, 1968 (in press).
Geochemistry and mineralogy of the Mackenzie drainage basin, 1967-.
All aspects of the chemistry of the waters, nature of the clay minerals being transported and deposited in the delta, etc., are being considered. See Major element composition of the Mackenzie River at Norman Wells, N.W.T., Canada; Geochim. et Cosmochim. Acta, 1968 (in press).

1196. MacDougall, J.D., Bedford Institute, Nova Scotia:
Mineralogy and geochemistry of recent sediments in Fitzwilliam Strait and Marie Bay, Northwest Territories, 1967-68; M.Sc. thesis (McMaster Univ.).

1197. Mackenzie, W.S., Geol. Surv. Canada:
Devonian stratigraphy, Lower Mackenzie River area (Operation Norman), 1968-71.
Stratigraphy, sedimentology, and correlation of Lower Paleozoic rocks of the area. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1198. Macqueen, R.W., Geol. Surv. Canada:
Lower Paleozoic stratigraphy, Lower Mackenzie River area (Operation Norman), 1968-71.
Stratigraphy, sedimentology, and correlation of Lower Paleozoic rocks of the area. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1199. Macqueen, R.W., Bamber, E.W., Geol. Surv. Canada:
Mississippian stratigraphy, sedimentology, and correlation, Rocky Mountains and Foothills, 1963-.
A continuing study from the Crowsnest Pass area of southern Alberta to the Jasper area of west-central Alberta. See Stratigraphy and facies relationships of the Upper Mississippian Mount Head Formation, Rocky Mountains and Foothills, southwestern Alberta; Bull. Can. Petrol. Geol., vol. 16, No. 3, 1968.

1200. Macqueen, R.W., Price, L.L., Geol. Surv. Canada:
Carbonate-evaporite cycles in the Souris River Formation, Saskatchewan, 1967-69.
The purpose is to compare the Devonian carbonate-evaporite cycles with modern supratidal carbonate-evaporite cycles from the Persian Gulf and Caribbean area. Data have been obtained from cores, and from observations made on anhydrite-dolomite relationships as seen on the walls of a potash mine shaft. See Carbonate-evaporite cycles, Souris River Formation, Saskatchewan; Geol. Surv. Can., Paper 68-1A, pp. 202-203, 1968.

1201. Marlowe, J.I., Bedford Institute, Nova Scotia:
Geological investigations on Aves Ridge and in the Grenada Trough, eastern Caribbean Sea, 1967-.
Stratigraphic and geochemical aspects of unconsolidated sediment and bedrock of the above areas are being investigated, with emphasis on carbonate and pyroclastic deposits. See Geological reconnaissance of parts of Aves Ridge; Proceedings volume, 5th Caribbean Geological Conference, St. Thomas, U.S., vol. 1 (in press).

1202. McDonald, B.C., Geol. Surv. Canada:
Sedimentology and morphology of eskers, 1968-72.
Investigation of eskers and associated features involving their classification, form, sedimentology, and origin. See Geol. Surv. Can., Paper 69-1, Pt. A, 1969.

1203. McGlynn, J.C., Geol. Surv. Canada:
Stratigraphy and sedimentology of Nonacho Group, Northwest Territories and study of its relations to surrounding granitic gneisses, 1969-70.

1204. McRoberts, J.H.E., Queen's Univ. and Bedford Institute, Nova Scotia:
Planktonic foraminifera in sediments on the mid-Atlantic Ridge, 1968-69; M.Sc. thesis.
Microfaunal analyses, test microstructure, coiling directions, test composition and fauna - watermass relationships are being investigated for an interpretation of paleoclimatology and paleoceanography of the north Atlantic.

1205. Miall, A.D., Univ. of Ottawa:
Sedimentary history of the Devonian Peel Sound Formation, Prince of Wales Island, Northwest Territories, 1966-69; Ph.D. thesis.
Includes detailed analysis of ancient alluvial fan deposits and broad relationships of continental and marine facies in relation to tectonic setting. See The Peel Sound Formation (Devonian) of Prince of Wales and adjacent islands; A Preliminary Report (Arctic), vol. 21, pp. 84-91.

1206. Middleton, G.V., McMaster Univ.:
Intertidal sand bars of the Minas Basin, Bay of Fundy, 1968-.
At this stage, the project is to produce a 16 mm. motion picture, illustrating sedimentation phenomena investigated during an NSF Senior Science Seminar in Minas Basin, 1968.

1207. Middleton, G.V., Costello, R., McMaster Univ.:
Experimental production of sole markings, 1967-; M.Sc. thesis (Costello).

1208. Middleton, G.V., Neal, W.J., McMaster Univ.:
Factors controlling turbidite bed thickness (experimental flume studies), 1967-69.

1209. Middleton, G.V., Parkash, B., McMaster Univ.:
Mechanics of deposition of greywackés, Cloridorme Formation (Ordovician), Gaspé, 1966-68; Ph.D. thesis (Parkash).

1210. Morris, D.W., Univ. of New Brunswick:
Sedimentology (Pleistocene geology, sediment transport and budget problems), 1962-69.

1211. Mountjoy, E.W., McGill Univ.:
Upper Devonian Miette and Ancient Wall reef complexes, Alberta, 1960-.
Includes gross stratigraphic relationships, petrology and detailed examination of reef margins in order to determine depositional history and environments. Work is being carried out in conjunction with Dr. C.W. Stearn's paleoecology studies on stromatoporoids of the Ancient Wall complex. See Factors governing the development of the Frasnian, Miette and Ancient Wall reef complexes, (banks and biostromes), Alberta: in First World Symposium on the Devonian System, vol. 2, pp. 387-408, 1968.

1212. Mountjoy, E.W., Clack, W.J., Pendlebury, G.B., McGill Univ.:
Carbonate sedimentation Carriacou, Grenadines, West Indies, 1966-69; Ph.D. thesis (Clack), McSc. thesis (Pendlebury).
To determine origin and controlling processes of various types of calcareous and terrigenous sediments and compare this with Barbados and other areas in the Caribbean region.

1213. Mountjoy, E.W., and graduate students, McGill Univ.:
Recent sediments west coast of Barbados and Carriacou, 1964-.
Includes the study of sea floor morphology, distribution of marine flora and fauna, reefs and associated sediments. The origin and processes controlling distribution of the various types of calcareous and terrigenous sediments and their relationship to organisms are being investigated as well as their geochemistry. Comparison of present and Pleistocene reefs; carbonate cementation processes and beach rock.

1214. Mukherji, K.K., Univ. of Western Ontario:
Petrology of the Black River limestones in southwestern Ontario, 1964-68; Ph.D. thesis.
The sedimentary petrology of twenty-two sections - texture, fabric, insoluble residues, Ca/Mg ratio - of the Black River from Georgian Bay to Kingston suggests that a four-fold division exists.
Stratigraphy and petrology of Black River rocks in southwestern Ontario with application of thermoluminescence study for surface correlation, 1964-70.
The thermoluminescence study will be initiated shortly to provide further support to various facies and stratigraphic interpretations, regional correlation and trace element geochemistry.
See Regional petrology of Black River limestones in the Ordovician of southwestern Ontario, Canada; Abstract, Intl. Meeting, Geol. Assoc. Can., Tech. Program, Kingston, 1968.

1215. Murray, J.W., Univ. of British Columbia;
Structure of continental margin west of Vancouver Island, British Columbia, 1967-.
A continuous seismic profile project on the continental shelf and slope off Vancouver Island. To date, approximately 950 miles of seismic profiles have been obtained using a 5,000 joule sparker.

1216. Murray, J.W., Grill, E.V., Macdonald, R.D., Univ. of British Columbia:
Marine geology of Upper Jervis Inlet, British Columbia, 1966-68; M.Sc. thesis (Macdonald).
An attempt to understand the physio-chemical processes involved in the present deposition of manganese oxide on submarine ridge near the head of a British Columbia fjord. See Todorokite in manganese nodules from a British Columbia fjord; Nature, vol. 219, No. 5152, pp. 358-359, July 27, 1968.

1217. Murray, J.W., Kellerhals, P., Univ. of British Columbia:
Boundary Bay tidal flats, Fraser River Delta, British Columbia, 1965-.
Involves a reconnaissance of sediment distribution, of current measurements, sedimentary structure and sedimentation rates on a Fraser River Delta tidal flat. See Tidal flats at Boundary Bay, Fraser River Delta, British Columbia; Bull. Can. Petrol. Geol., vol. 16, No. 4, December 1968.

1218. Neal, W.J., McMaster Univ.:
Sedimentology of some carbonate beds in the St. Roch Formation (Cambrian), Quebec, 1968-69.

1219. Oldershaw, A.E., Univ. of Toronto:
Sedimentology and diagenesis of carbonate rocks; diagenesis in cherts, 1967-69.
Specific aspects of the investigation include: cement fabrics in carbonate sands, recrystallization in ancient microcrystalline carbonates, textural and diagenetic studies in bedded cherts. Methods used include: electron microscopy, electron probe microanalysis and various staining techniques. See Electron-microscopic examination of Namurian bedded cherts, North Wales (Great Britain); Sedimentology, vol. 10 (in press).

1220. Parviainen, E.A.U., Univ. of Western Ontario:
Sedimentology of Lower Huronian polymictic conglomerates, 1968-71; thesis project.

1221. Pelletier, B.R., Bedford Institute, Nova Scotia:
Sedimentary environments and models of sediment transport in Hudson Bay, 1961-.
Distribution and description of sediments in Hudson Bay are given and related to the marine environment of deposition such as bathymetric zones; as well, models of sediment transport are designed to show the contribution by the marine agent and the contribution by ice rafting. This is based on textural analysis and distribution, and an assumption of the hydrodynamic environment in the various bathymetric zones under consideration. See Submarine physiography, bottom sediments and models of sediment transport in Hudson Bay; Geol. Surv. Can., Earth Science Symposium on Hudson Bay , Geol. Surv. Can., Paper 68-53, 1968.
Sedimentation in Arctic Waters, 1960-.
Distribution and description of sediments from Arctic environments such as lake, river, inshore and open ocean are given and related to origin and mode of sedimentary transport. See Sedimentation in Arctic waters of the western Queen Elizabeth Islands, District of Franklin, Canada; Maritime Sediments, vol. 3, No. 4, pp. 90-99.

1222. Pendlebury, G., McGill Univ.:
Patch reef sedimentation, eastern Carriacou, West Indies, 1967-69; M.Sc. thesis.
Study of patch reef sedimentation to determine sediment contributed by patch reefs and whether sedimentation affects distribution of patch reefs.

1223. Pounder, D.A., Chevron Standard Ltd.:
Sedimentology, diagenesis and stratigraphy of carbonate rocks, 1959-.
The major sphere of work is in carbonate petrography. One special field which has been investigated in depth is the roles of algae in carbonate deposition.

1224. Pullen, M., Univ. of British Columbia:
Sedimentation in Pitt Lake, British Columbia, 1967-69; Ph.D. thesis.

1225. Radziminska-LaSalle, Y., Ministère des Richesses naturelles du Québec:
Recherches sur les minéraux lourds de la région de Péribonka: provenance, minéralogie, 1967-69.

1226. Ross, J.D., Amerada Petroleum Corp.:
Reef/off-reef relationships in the Devonian of the Kananaskis Lakes area, Alberta, 1968-69; M.Sc. thesis (Univ. of North Dakota).
Includes reconnaissance geologic mapping of the Kananaskis and Spray mountain ranges and measured sections of the Upper Devonian, Fairholme group which illustrate reef and off-reef environments.

1227. Rukavina, N.A., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Great Lakes nearshore sedimentology program, 1967-.
A program of sedimentological studies in the nearshore zone (0-20 metres) of the Canadian Great Lakes to identify and classify the materials, processes and morphology of the zone, and develop a comprehensive model of the mechanics of nearshore sedimentation. Field operations are conducted from a specially-designed pontoon

boat, and consist of surface sampling and coring, echo sounding, underwater television and photography, and bottom observations by divers. Laboratory analyses provide textural, mineralogic and structural data for the samples. See Rapid inspection of soft sediment cores by X-radiography; Proceedings, Tenth Conference on Great Lakes Research, pp. 143-148, 1967.

1228. Rust, B.R., Univ. of Ottawa:
Sedimentology of the braided Donjek River, Yukon Territory, 1967-69.

Bedforms and lithofacies are being studied in three reaches of the river: a zig-zag reach between tributary fans, a straight reach, and a meandering reach with internal braids. See The sedimentology of a braided river; Jour. Sedimentary Petrol. (in press).

1229. Rust, B.R., Univ. of Ottawa, Yole, R.W., Carleton Univ.:
Sedimentary history of the St. Clair River Delta, Ontario, 1968-70.

Includes studies of changes in facies distribution during delta development and provenance of delta sediments.

1230. Schenk, P.E., Harris, I.M., Wilson, R.F.A., Dalhousie Univ.:
Paleocurrent, basin analysis, and petrology of the Meguma Group, Lower Paleozoic, Nova Scotia, 1969-71; Ph.D. thesis (Harris), M.Sc. thesis (Wilson).

A 12,000 square-mile area of Meguma outcrop has been studied using a 3-mile grid. Lithology, metamorphism, type and orientation of primary sedimentary structures, and textures are measured or described at every location point. Orientated thin-sections of basal portions of arenite layers are described and classified. This is the first over-all sedimentologic study of the main rock mass of Nova Scotia. The second phase of detailed logs has begun. Approximately 11,000 feet have been measured. See A study of sedimentary structures in the Goldenville Formation, eastern Nova Scotia; Maritime Sediments, vol. 4, pp. 1-3, 1968.

1231. Schenk, P.E., Murray, D.A., Dalhousie Univ.:
Study of the depositional environment, fauna, and flora of the Windsor Group (Mississippian) of Nova Scotia, 1967-69; M.Sc. thesis (Murray).

This study is concerned with field relations, carbonate petrology, identification of fauna and flora, paleoecology, insoluble-residue analysis, and elemental analysis to interpret the paleoenvironment and chrono-stratigraphy of the Windsorian Stage (Mississippian). See Significance of algal stromatolites to paleoenvironmental and chronostratigraphic interpretations of the Windsorian Stage (Mississippian) of the Maritime Provinces; Spec. Pub. on Maritime Geology; Geol. Soc. Can., 1968.

1232. Schmidt, V., Budwill, A., Mobil Oil Canada Ltd.:
Diagenesis of Middle Devonian reefs and associated sediments, Rainbow area, Alberta, 1968-69.

Includes petrographic study of carbonate and sulfate diagenesis to find out relative time sequence of diagenetic events; interrelationship between depositional environment and early diagenetic alteration; significance of early diagenesis in stabilizing reef sediments and affecting reservoir properties.

1233. Schultheis, N., McGill Univ.:
Source and origin of the Cadomin conglomerate, between Cadomin and the Blackstone River, Alberta, 1968-70; M.Sc. thesis.

1234. Sly, P.G., Inland Waters Branch, Dept. of Energy Mines and Resources:
Underwater photography, 1967-.
Development of underwater television and photographic techniques to provide immediate visual control and records of sampling procedures and methods. Underwater television will also be used to provide rapid visual surveys of small areas under detailed investigation. Underwater photography will be used as a standard procedure, to record lake floor materials and environments immediately before sampling.
Evaluation of Great Lakes bottom sampling program, 1967-.
Involves sampling on grid patterns, the patterns being designed to indicate the lithological variances of bed materials. The study is designed to provide an indication of the sample concentrations necessary for various inventory and detailed (special) sampling programs in the Great Lakes.
Bottom sampling equipment, 1967-.
Involves the trial, evaluation, design, and development of field sampling equipment for taking cores, bed samples, and suspended load samples; and appraisal of vertical and oblique echo sounding equipment.
Sedimentometer development, 1967-.
Includes trial evaluation, design, and development of laboratory equipment to provide rapid semi-automatic particle size analyses and separations; synthesis of sands and spherical glass beads, to provide standard materials for laboratory calibration; development of sedimentation tubes for the rapid analysis of sand from bucket samples and cores (1-20 gm subsamples).

1235. Smith, L., Queen's Univ.:
Erosional aspects of Devonian correlations, Western Canada, 1967-.
A study of the effects of erosion on the Devonian rocks of Western Canada, leading to a space-time reconstruction of the Devonian in that area. Work has been focused, so far, on the depositional aspects of rocks of this time and a better balance between the two is sought.
Environmental relations of terrigenous to carbonate sediment, east coast of Grenada, West Indies, 1968-.
The east coast of Grenada offers a distinct contrast between areas of terrigenous sediment deposition and areas of carbonate sediment formation. An understanding of this difference will aid regional sedimentation studies of ancient rocks.

1236. Stanton, M.S., Chevron Standard Ltd.:
Marine geology, 1967-.

1237. Strangway, D.W., Stesky, R., Watts, R., Redman, D., Univ. of Toronto:
Paleomagnetism, 1968-; M.A. thesis (Stesky), Ph.D. thesis (Watts).
The main thrust of this research is to study the magnetism in sediments. Eocene, varved sediments (Green River) are being studied in an attempt to find secular variation. Magnetic stratigraphy and the mineralogy of the series of sediment cores from the mid-Atlantic ridge are also under investigation. Permian, evaporite, banded sediments from New Mexico show sufficient magnetization to look for secular variation in the Permian.

1238. Thomas, R.L., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Inorganic geochemistry of Great Lakes sediments, 1967-.
A detailed examination of the spacial distribution of major and trace elements in the top sediments of Lake Ontario. The geochemistry of a series of deep cores is also to be undertaken in order to evaluate diagenesis and the effects of pollution, in addition to leading to an understanding of the historical evolution of the lake sediments. The distribution and cycles of iron, sulphur, phosphorus and organic carbon are to be studied in detail. See A note on the relationship of grain size, clay content, quartz and organic carbon in some Lake Erie and Lake Ontario sediments; Jour. Sed. Petrol. (in press).

1239. Tiphane, M., Université de Montréal:
Recent sediments in the Gulf of St. Lawrence, 1961-69.
The study of cores from the Gulf of St. Lawrence is progressing and a compilation of the results should come out before the end of 1969. See Recent sediments in the Baie-des-Chaleurs area; Marine Geology (in press).

1240. Tovell, W.M., Royal Ontario Museum:
Topography and bottom deposits between Tobermory and Fitzwilliam Island, Georgian Bay, 1965-70.
See Bathymetry and bottom deposits at the entrance to Georgian Bay north of Bruce Peninsula, Ontario; Spec. Paper No. 3 (abstracts), Eleventh Conference on Great Lakes Research, pp. 65-66, 1967.

1241. van de Poll, H.W., New Brunswick Dept. of Natural Resources:
Sedimentation and paleocurrents in the Carboniferous basins of New Brunswick, 1965-70.
Paleocurrent directions and maturing indices are used to assist in the mapping of Pennsylvanian strata of New Brunswick. See Pennsylvanian sedimentation in the central basin of New Brunswick; N.B. Dept. of Natural Resources, Information Circular 68-1, 1968.

1242. Vopni, L.K., Univ. of Alberta:
Petrology of the Horn Plateau reef complex (Middle Devonian), Northwest Territories, 1968-69; M.Sc. thesis.

1243. Walker, R.G., McMaster Univ.:
Sedimentary structures in turbidites - their use as indicators of proximal and distal depositional environments, 1966-.
Internal sedimentary structures, especially ripple-drift cross-lamination, are being studied as paleoenvironment indicators in turbidite formations. See Turbidite sedimentary structures and their relationship to proximal and distal depositional environments; Jour. Sed. Petrol., vol. 37, pp. 25-43.
Basin filling - the transition from turbidite to shallow water sediments, 1966-.
Several different basins are being studied in order to make some general conclusion regarding the occurrence of turbidites and shallow-water sediments in basin-fill sequences of different tectonic settings. See The juxtaposition of turbidite and shallow-water sediments: study of a regressive sequence in the Pennsylvanian of North Devon, England; Jour. of Geol. (in press).

1244. Walker, R.G., Pett, J., McMaster Univ.:
Relationship of sole marks to internal sedimentary features of turbidites, 1967-69; M.Sc. thesis (Pett).

A first attempt to relate the erosive marks of turbidity currents (flute marks) to the internal sedimentary structures. The study should lead to a better understanding of the erosional and early depositional phases of turbiditycurrents.

1245. Wardlaw, N.C., Univ. of Saskatchewan:
Geochemistry and petrology of Middle Devonian Kee Scarp carbonates in the Norman Wells - Fort Good Hope area, Northwest Territories, 1967-69.

Regional variations of such elements as iron, manganese, phosphorus, magnesium and strontium in carbonate formations have been documented, as have regional variations in the lithology of carbonate formations. This study is an attempt to determine the chemical composition of specific components in ancient limestones, such as various types of organic material, cements and matrices. Once the composition of individual components is known, it should then be possible to account for variations in the bulk chemistry of carbonate rocks in terms of variations in visible components.

1246. Wardlaw, N.C., Reinson, G., Univ. of Saskatchewan:
Basal anhydrites of the Prairie Evaporite Formation, Saskatchewan, 1968-69; M.Sc. thesis (Reinson).

Structures and textures in this basal anhydrite are superficially similar to Recent supratidal anhydrites forming in the sabkhas of the Persian Gulf. This study is an attempt to document the structures and textures of the Prairie Evaporite anhydrites and to relate these rocks to the associated carbonates below and halite above. See Barren halite bodies in the sylvinite mining zone at Esterhazy, Saskatchewan; Can. Jour. Earth Sciences, vol. 5, pp. 1221-1238, 1968.

1247. Wardlaw, N.C., Statham, K., Univ. of Saskatchewan:
Reservoir properties, lithology and depositional environments of Middle Devonian Kee Scarp Formation, Norman Wells, Northwest Territories, 1967-69; M.Sc. thesis (Statham).

Includes obtaining capillary pressure curves for various typical rock types in and near the Norman Wells oilfield. This is being done using mercury injection techniques. An attempt is being made to relate the capillary pressure curves to visual observations and measurements of the pores in the rock and to establish the relationship between various types and sizes of pores and the rock components with which they are associated. An attempt is being made to relate reservoir properties to overall lithology and to an inferred environment of formation. If this can be accomplished it might be possible to extrapolate trends in reservoir properties to other areas.

1248. Warwick, W., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Reconnaissance of the Chironomidae of Lake Ontario, 1968-.

The study of the midge (Chironomidae) fauna of Lake Ontario is proposed to define the taxonomy of the Great Lakes midge fauna with special reference to the larval forms; to outline the distribution of the midge fauna; to define the ecological relationships of the larval fauna with its environment; to utilize the study of recent larval forms to provide a key to the identification of fossilized larval head capsules; and to study the paleo distribution of fossilized midge remnants in lake cores.

1249. Williams, G.D., Univ. of Alberta:
Geochemical differentiation of depositional environments, 1966-70.
See Chemical composition of shales of the Mannville Group (Lower Cretaceous) of central Alberta, Canada; Bull. Amer. Assoc. Petrol. Geol., voll. 49, No. 1, p. 81, 1965.

1250. Williams, G.D., Ahmad, G., Univ. of Alberta:
Recent fluvial and related sediments in western Canada, 1966-70; M.Sc. thesis (Ahmad).
See Origin of shale - pebble conglomerate; Bull. Amer. Assoc. Petrol. Geol., vol. 50, No. 3, p. 573, 1966.

1251. Wood, J., Univ. of Western Ontario:
Sedimentology of the Upper Huronian rocks of the Rawhide Lake - Flack Lake area, 1966-69; thesis project.

1252. Yole, R.W., Carleton Univ., Rust, B.R., Ottawa Univ.:
Sedimentation and stratigraphy of a modern delta, Lake St. Clair, Ontario, 1967-70.

1253. Yole, R.W., Sanford, L.P., Carleton Univ.:
Petrology and microfacies analysis of Ordovician rocks, eastern Ontario, 1966-70; Ph.D. thesis (Sanford).

STRATIGRAPHY AND PALEONTOLOGY

Precambrian

1254. Boulay, R.A., Geol. Surv. Canada:
Sedimentological study of the Papaskwasati Basin, Quebec, 1968-.
A joint study with the Quebec Department of Natural Resources to investigate the sedimentology and geochemistry of the Basin, north of Lake Mistassini, Quebec. Information obtained from 32,000 feet of core is being used to outline the stratigraphy, sedimentology and possible geochemical trends in the basin.

1255. Chandler, F.W., Univ. of Western Ontario:
Sedimentology and stratigraphy of the Huronian rocks of Harrow township and surrounding areas, Ontario, 1965-69; thesis project.
See Possible glacial origin for three Precambrian (Huronian) conglomerates, north shore of Lake Huron; (abstract) 16th Annual Inst. on Lake Superior Geology, Superior, Wisconsin, pp. 42-43, 1968.

1256. Church, W.R., Univ. of Western Ontario:
Stratigraphy and structure of the Proterozoic rocks of the Manitoulin Island, Elliot Lake and Sudbury regions of northern Ontario, 1963-.
See The Penokean and Hudsonian orogenies in the Great Lakes region, and the age of the Grenville Front; Program, 14th Annual Inst. on Lake Superior Geology, pp. 16-18, 1968.

1257. Gill, J.E., McGill Univ.:
Precambrian geology, 1950-.

See Principles and limitations of Precambrian stratigraphy; Geol. Assoc. Can., Spec. Paper No. 3, Precambrian Symposium, June 1966.

1258. Hobson, G.D., Geol. Surv. Canada:
Seismic methods in the Canadian Shield, 1963-.
Seismic reflection and refraction techniques should be able to define structure within the Shield areas. Proterozoic basins can be defined and interfaces have been detected at depth. The possibility of delineating orebodies will be investigated using frequency and amplitude parameters as well as velocity variations.

1259. Jennings, D.S., Shaw, D.M., McMaster Univ.:
Stratigraphy and metamorphic history of the Hermon Formation, southeastern Ontario, 1964-69; Ph.D. thesis (Jennings).
A study of mineral equilibria, metamorphic history and original rock composition in a well-defined belt of Grenville metasedimentary and metavolcanic rocks.

1260. McGlynn, J.C., Geol. Surv. Canada:
Stratigraphy and sedimentology of Nonacho Group, Northwest Territories and study of its relations to surrounding granitic gneisses, 1969-70.

1261. Robertson, J.A., Ontario Dept. of Mines:
Regional Huronian studies and related topics.
See Zircon correlation with special reference to the granitic rocks of the north shore of Lake Huron; Ont. Dept. Mines, Misc. Paper 21.

1262. Robertson, J.A., Card, K.D., Ontario Dept. of Mines, Frarey, M.J., Geol. Surv. Canada:
Federal-Provincial Committee on Huronian stratigraphy, 1966-77.
The committee is required to; (1) review the recent extensive field programs of the two government agencies and report on present knowledge of the Huronian Supergroup; (2) reach a concensus on a comprehensive stratigraphic succession and apply suitable stratigraphic nomenclature in conformity with the American Code of Stratigraphic Nomenclature; (3) measure, delineate, and describe type and reference sections for formations and groups. Items 1 and 2 have been carried out and work is underway on 3.

1263. Rousell, D.H., Laurentian Univ.:
A structural sedimentary study of the Chelmsford and Onwatin formations of the Sudbury Basin, 1968-70.

1264. Young, G.M., Univ. of Western Ontario:
Stratigraphy, sedimentation, paleoclimatology and geochemistry of Early Proterozoic rocks, 1964-.
See Early Proterozoic stratigraphy of the North Atlantic continents - a comparison; (abstract), Internat. Geol. Congress, Czechoslovakia 1968, p. 131.

Cambrian to Silurian

1265. Aitken, J.D., Geol. Surv. Canada:
Pre-Devonian stratigraphy, Alberta, 1961-71.

See Classification and environmental significance of cryptalgal limestones and dolomites, with illustrations from the Cambrian and Ordovician of southwestern Alberta; Jour. Sed. Petrol., vol. 37, pp. 1163-1178, 1967.

1266. Aitken, J.D., Fritz, W.H., Geol. Surv. Canada, Whittington, H.B., Cambridge Univ.:
Stratigraphy and paleontology of Burgess shale, southern Rocky Mountains, 1966-71.
A completely new interpretation of the stratigraphic and facies relationships of the Stephen Formation and the Burgess shale in the vicinity of the famous fossil quarry. Continuing detailed study of the faunas by Fritz is bringing out further paleontological confirmation of the published interpretation. See Burgess shale project, British Columbia; Geol. Surv. Can., Paper 68-1A, pp. 190-192, 1968.

1267. Barnes, C.R., Univ. of Waterloo:
Conodont biostratigraphy of the Wilderness Stage (Middle Ordovician) in New York State, Ontario and Quebec, 1966-71.
See Stratigraphy and sedimentary environments of some Wilderness (Ordovician) limestones, Ottawa Valley, Ontario; Can. Jour. Earth Sci., vol. 4, pp. 209-245, 1967.

1268. Bassaget, J.-P., Ministère des richesses naturelles du Québec:
Etude du groupe de Wakeham sur la côte nord du St-Laurent, à l'est de Baie Johan-Beetz, 1968.
Etude de la stratigraphie du groupe et de la tectonique régionale.

1269. Bolton, T.E., Geol. Surv. Canada:
Silurian and Ordovician macro-biostratigraphy, Anticosti Island, Quebec, 1957-70.
Systematic investigation of trilobite faunas within Upper Ordovician cores and Ordovician-Silurian surface units.

1270. Bolton, T.E., Copeland, M.J., Geol. Surv. Canada:
Silurian-Ordovician macro- and micro-biostratigraphy, Lake Timiskaming and Lake Nipissing, Ontario, 1968-70.
Description of important faunal elements and correlation with similar eastern Canada assemblages, commencing with the echinoderm fauna.

1271. Davies, J.L., New Brunswick Dept. of Natural Resources:
Geology and geochemistry of the volcanic rocks of the Tetagouche Group, New Brunswick, 1964-70.

1272. Greggs, R.G., Queen's Univ.:
Upper Cambrian biostratigraphy of Alberta and British Columbia, 1959-.
See Upper Cambrian Formations, southern Rocky Mountains of Alberta - an interim report; Geol. Surv. Can., Paper 66-49, 1968.

1273. Jamieson, E.R., Saskatchewan Dept. of Mineral Resources:
Stratigraphy and sedimentology of the Interlake group in southern Saskatchewan, 1967-69.

1274. Macqueen, R.W., Geol. Surv. Canada:
Lower Paleozoic stratigraphy, Lower Mackenzie River area (Operation Norman), 1968-71.

Stratigraphy, sedimentology, and correlation of Lower Paleozoic rocks of the area. See Lower Paleozoic stratigraphy, Operation Norman 1968; Geol. Surv. Can., Paper 69-1A, 1969.

1275. McAllister, A.L., de Carle, A.L., Univ. of New Brunswick:
Rocks of the Mascarene Group, Charlotte county, New Brunswick, 1964-69; M.Sc. thesis (de Carle).

1276. Mukherji, K.K., Loyola College:
Stratigraphy and petrology of Black River rocks in southwestern Ontario with application of thermoluminescence study for surface correlation, 1964-70.
The thermoluminescence study will be initiated shortly to provide further support to various facies and stratigraphic interpretations, regional correlation and trace element geochemistry. See Regional petrology of Black River limestones in the Ordovician of southwestern Ontario, Canada; (abstract) Internat. Meeting, Geol. Assoc. Can., Tech. Program, Kingston, 1968.

1277. Norford, B.S., Geol. Surv. Canada:
Ordovician and Silurian biostratigraphy of British Columbia, Alberta, Yukon, Mackenzie and Franklin, 1961-.
A regional project involving the description of the rocks and faunas of various areas, and compilations for the region as a whole. See Ordovician and Silurian stratigraphy of the southern Rocky Mountains; Geol. Surv. Can., Bull. 176 (in press), and Geol. Soc. Amer., Spec. Paper 87, p. 118.
Silurian of the Hudson Bay Lowlands, 1966-70.
Mapping and description of the Silurian rocks and faunas of the Hudson Bay and James Bay lowlands of Manitoba, Ontario, Quebec and the District of Keewatin.
Type sections of Silurian formation of northwest Greenland, 1966-75.
Description of the rocks and fossils from type section studied in 1966 in Greenland with the cooperation of the Grønlands Geologiske Undersøgelse.

1278. Paterson, D.F., Saskatchewan Dept. of Mineral Resources:
Cambro-Ordovician clastics of Saskatchewan, 1968-70.
Concerns the relations of the Deadwood Formation (Cambrian), the Winnipeg Formation (Middle Ordovician) and the overlying Red River Formation (essentially Upper Ordovician). The first two formations are a series of clastic sediments whose exact ages and stratigraphic relations are in doubt.

1279. Peterson, N.N., Queen's Univ.:
Detailed lithostratigraphy of Ordovician rocks in the Kingston area, Ontario, 1965-68; Ph.D. thesis.

1280. Pugh, D.C., Geol. Surv. Canada:
Subsurface Cambrian stratigraphy in southern and central Alberta, 1967-69.

1281. Sargent, W., Queen's Univ.:
Biostratigraphy of a Middle Ordovician Algal Bioherm, 1968-69; M.Sc. thesis.

1282. Thusu, B., Univ. of Ottawa:
Microfossils and paleoecology of the Silurian Rochester shale, Niagara escarpment, Ontario, 1968-70; Ph.D. thesis.

Includes establishment of a zonal scheme using microfossils (primarily ostracods) and study of various aspects, including paleoecology, of a change of facies within the Rochester shale.

1283. Usher, J.L., Queen's Univ.:
Silurian stratigraphy of eastern Canada, 1968-71.

1284. Uyeno, T.T., Geol. Surv. Canada:
Conodont biostratigraphy of the Hull Member, Ottawa Formation, Ottawa-Hull district, 1961-68.

1285. Uyeno, T.T., Geol. Surv. Canada, Barnes, C.R., Univ. of Waterloo:
Conodont biostratigraphy of the Levis Formation, Quebec, 1967-68.
Conodonts obtained from the Shumardia limestone (Raymond's zone D1) of the Levis Formation, in Levis, Quebec.

1286. Williams, S.R., Univ. of Ottawa:
Biostratigraphy of the Silurian Read Bay Formation, Somerset Island, Northwest Territories, 1968-70; Ph.D. thesis.
Involves the detailed study of invertebrate faunas of the Read Bay Formation, with the object of establishing a sound correlation between Somerset Island and standard sections elsewhere in the region.

1287. Young, F.G., McGill Univ.:
Stratigraphic analysis of the Lower Cambrian Gog and Cariboo Groups, British Columbia, 1967-69; Ph.D. thesis.
Deals with largely original stratigraphic data about the Upper Proterozoic - Lower Cambrian between and including the Barkerville-Wells area and the Mt. Robson-Jasper area in the eastern Cordillera.

Devonian to Permian

1288. Bamber, E.W., Procter, R.M., Geol. Surv. Canada, Mamet, B.L., Univ. of Montréal:
Stratigraphy and paleontology of Mississippian of northeastern British Columbia and southeastern Yukon, 1968-69.
See Upper Paleozoic rocks of northeastern British Columbia; Geol. Surv. Can., Paper 68-15 (in press).

1289. Bamber, E.W., Geol. Surv. Canada, Waterhouse, J.B., Univ. of Toronto:
Stratigraphy of the Carboniferous and Permian of northern Yukon, 1968-69.
See Stratigraphy and palynology of a Permian section, Tatonduk River, Yukon Territory; Geol. Surv. Can., Paper 68-18 (in press).

1290. Belyea, H.R. (Miss), Geol. Surv. Canada:
Facies distribution and reactivation of a pre-Devonian uplift, southern District of Mackenzie, 1966-68.
Chinchaga and older Devonian, southern District of Mackenzie, northern Alberta and northeastern British Columbia, 1967-69.

1291. Campbell, F.A., Univ. of Calgary:
Chemical and mineralogic composition of the Rainbow Formation, 1967-69.
X-ray diffraction and fluorescence analysis have been used to give a detailed analysis of the distribution of anhydrite, dolomite and calcite in the basin.

1292. Campbell, F.A., Oliver, T.A., Univ. of Calgary:
Study of Ireton and Duvernay Formations, Alberta Basin, 1966-67.
A continuing study of these units throughout Alberta which will attempt to present a detailed picture of the formation and variations within the Alberta Basin. See Mineralogic and chemical composition of Ireton and Duvernay Formations, central Alberta; Bull. Can. Petrol. Geol., vol. 16, No. 1, pp. 40-63, 1968.

1293. Corneil, B., Univ. of Alberta:
Ante Creek Reef in the Upper Devonian of Western Canada, 1967-69; M.Sc. thesis.

1294. Ferguson, L., Mount Allison Univ.:
Studies of a Lower Carboniferous marine transgression, 1959-70.
See The Paleoecology of Lingula squamiformis Phillips (PS) during a Scottish Mississippian marine transgression; Jour. of Paleontolcgy, vol. 37, pp. 669-681, 1963.
Stratigraphic and faunal study of the Permo-Pennsylvanian of north-central Ellesmere Island, Northwest Territories, 1961-70.

1295. Geldsetzer, H., Queen's Univ.:
Inter-regional Devonian relationships, eastern North America, 1967-70; Ph.D. thesis.
A field study of critical Devonian localities to ascertain the depositional and erosional inter-relations within the eastern North American Devonian.

1296. Gretener, P.E., Labute, G., Univ. of Calgary:
Differential compaction around a Leduc Reef, central Alberta, 1968; M.Sc. thesis (Labute).
Quantitative study of differential compaction around the Wizard Lake reef including computation of the compaction of the Ireton in time, growth of the compaction structure in the Nisku in time, and estimation of the maximum eroded thickness at the Pre-Cretaceous unconformity.

1297. Kent, D.M., Saskatchewan Dept. of Mineral Resources:
Stratigraphy and sedimentation of the Mississippian Madison Group in western Saskatchewan, 1968-70.
See Geology of the Upper Devonian Saskatchewan Group and equivalent rocks in western Saskatchewan and adjacent areas; Sask. Dept. Min. Res., Rept. No. 99, 1968.

1298. King, A.F., Memorial Univ. of Newfoundland:
Stratigraphy and structure of Upper Carboniferous Bude Formation, North Cornwall, England, 1963-68.

1299. Mackenzie, W.S., Geol. Surv. Canada:
Devonian stratigraphy, Lower Mackenzie River area (Operation Norman), 1968-71.
Stratigraphy, sedimentology, and correlation of Lower Paleozoic rocks of the area. See Devonian stratigraphy, Operation Norman, 1968; Geol. Surv. Can., Paper 69-1A, 1969.

1300. Macqueen, R.W., Bamber, E.W., Geol. Surv. Canada:
Mississippian stratigraphy, sedimentology, and correlation, Rocky Mountains and Foothills, 1963-.
A continuing study from the Crowsnest Pass area of southern Alberta to the Jasper area of west-central Alberta. See Stratigraphy and facies relationships of the Upper Mississippian Mount Head

Formation, Rocky Mountains and Foothills, south-western Alberta; Bull., Can. Petrol. Geol., vol. 16, No. 3, 1968.

1301. Macqueen, R.W., Price, L.L., Geol. Surv. Canada:
Carbonate-evaporite cycles in the Souris River Formation, Saskatchewan, 1967-69.
The purpose is to compare the Devonian carbonate-evaporite cycles with modern supratidal carbonate-evaporite cycles from the Persian Gulf and Caribbean area. Data have been obtained from cores, and from observations made on anhydrite-dolomite relationships as seen on the walls of a potash mine shaft. See Carbonate-evaporite cycles, Souris River Formation, Saskatchewan; Geol. Surv. Can., Paper 68-1A, pp. 202-203, 1968.

1302. Martin, H.L., Geol. Surv. Canada:
Subsurface Upper Paleozoic stratigraphy, Yukon Territory, 1968-.
Mississippian subsurface geology in west-central Alberta, 1966-.
See Mississippian subsurface geology in the Pembina area, Alberta; Geol. Surv. Can., Paper 66-22, 1966.

1303. Mason, D., Chevron Standard Ltd.:
Lower and Middle Devonian conodont biostratigraphy of Western Canada, 1966-.
See Conodont faunas from the Emsian and Eifelian stages of the Devonian in the Yukon Territory, Canada and their relationship to the Monograptus Yukonensis zone; (abstract) Proc. Int. Symposium on the Devonian System, Calgary, Sept. 1967, A.S.P.G.

1304. Mason, G.D., Quebec Dept. of Natural Resources:
Stratigraphic study in the east Gaspé Basin, 1967-68; Ph.D. thesis, Carleton Univ.
A study of the petroleum possibilities in the Lower Devonian formations of eastern Gaspé Peninsula, with special emphasis on the Gaspé limestone - Gaspé sandstone transition. Diamond drilling of the limestone-sandstone transition was carried out at widely separated localities and a total of 1,120 feet of core was obtained.

1305. McGugan, A., Baxter, S., Univ. of Calgary:
Mississippian conodont zonation; M.Sc. thesis (Baxter).

1306. McGugan, A., Naqvi, I., Clarke, G., Univ. of Calgary:
Permian biostratigraphy, surface and subsurface; M.Sc. thesis (Naqvi), Ph.D. thesis (Clarke).
See Permian and Pennsylvanian biostratigraphy, and Permian depositional environments, petrography, and diagenesis, southern Canadian Rocky Mountains; Bull. Can. Petrol. Geol., Spec. Guidebook issue, September 1968.

1307. Miall, A.D., Univ. of Ottawa:
Sedimentary history of the Devonian Peel Sound Formation, Prince of Wales Island, Northwest Territories, 1966-69; Ph.D. thesis.
Includes detailed analysis of ancient alluvial fan deposits and broad relationships of continental and marine facies in relation to tectonic setting. See The Peel Sound Formation (Devonian) of Prince of Wales and adjacent islands; a Prelim. Rept., Arctic, vol. 21, pp. 84-91.

1308. Monger, J.W.H., Geol. Surv. Canada:
Atlin Horst project, British Columbia, 1966-69.
A detailed investigation of the stratigraphy and structure of Mississippian to Permian cherts, limestones, greenstones and ultramafic rocks which form the Atlin Horst, a structurally high block that is the largest single area of late Paleozoic eugeosynclinal rocks in the Western Canadian Cordillera. See Geol. Surv. Can., Paper 68-1A, pp. 34-36, 1968.

1309. Morrow, D., British Columbia Dept. of Mines and Petroleum Resources:
Elk Point Group in northeast British Columbia, 1968-.
Stratigraphic and petrological study of the evaporite facies of the Elk Point Group.

1310. Mountjoy, E.W., McGill Univ.:
Carboniferous stratigraphy and petrology of northern Jasper Park, 1959-.
See Geol. Surv. Can., Paper 61-31, 1962.

1311. Mountjoy, E.W., McGill Univ., Mackenzie, W.S., Geol. Surv. Canada:
Stratigraphy of the southern part of the Devonian Ancient Wall Reef complex, Jasper National Park, Alberta, 1964-68.
A study, based on mountain outcrops in the region northwest of Jasper, of the stratigraphy of an Upper Devonian carbonate complex and its relationship to surrounding argillaceous strata. A petrographic analysis of the Cairn and Southesk Formation carbonates is included.

1312. Nautiyal, A.C., Univ. of Saskatchewan:
Microfauna and biostratigraphy of the Upper Devonian Woodbend and Saskatchewan Groups of Alberta and Saskatchewan, 1967-69; Ph.D. thesis.

1313. Nichols, R.A.H., Saskatchewan Dept. of Mineral Resources:
New studies of the geology of the Birdbear Formation, Devonian, southeast Saskatchewan, 1967-68.
See Report of same title, Sask. Dept. Mineral Res. (in press).

1314. Norris, A.W., Geol. Surv. Canada:
Paleobiogeography of the Devonian period in the Western Hemisphere, 1968.
A paper is being prepared as a contribution to the introductory volume of the Treatise on Invertebrate Paleontology. It will include a succinct yet comprehensive discussion of the fossil invertebrate faunas of the period with emphasis on the marine realm, along with comment on the terrestrial and fresh water invertebrates. Dr. H.K. Erben, University of Bonn is preparing a similar paper on the Devonian in the Eastern Hemisphere.

1315. Norris, A.W., Belyea, H.R. (Miss), Geol. Surv. Canada:
Late Middle and early Upper Devonian formations from Manitoba, central Saskatchewan to Great Slave Lake, 1965-69.

1316. Pedder, A.E.H., Geol. Surv. Canada:
Devonian biostratigraphy, Western and Northern Canada, 1968-.
In initial stages, coral faunas of the Lower Devonian of the Yukon and Upper Devonian of the Rocky Mountains and Northwest Territories will be studied.

1317. Ross, J.D., Amerada Petroleum Corp.:
Reef/off-reef relationships in the Devonian of the Kananaskis Lakes area, Alberta, 1968-69; M.Sc. thesis, Univ. of North Dakota.
Includes reconnaissance geologic mapping of the Kananaskis and Spray Mountain ranges and measured sections of the Upper Devonian, Fairholme Group which illustrate reef and off-reef environments.

1318. Schenk, P.E., Murray, D.A., Dalhousie Univ.:
Study of the depositional environment, fauna, and flora of the Windsor Group (Mississippian) of Nova Scotia, 1967-69; M.Sc. thesis (Murray).
This study is concerned with field relations, carbonate petrology, identification of fauna and flora, paleoecology, insoluble-residue analysis, and elemental analysis to interpret the paleoenvironment and chrono-stratigraphy of the Windsorian Stage (Mississippian). See Significance of algal stromatolites to paleoenvironmental and chronostratigraphic interpretations of the Windsorian Stage (Mississippian) of the Maritime Provinces; Spec. Pub. on Maritime Geology; Geol. Assoc. Can., 1968.

1319. Smith, L., Queen's Univ.:
Erosional aspects of Devonian correlations, Western Canada, 1967-.
A study of the effects of erosion on the Devonian rocks of Western Canada, leading to a space-time reconstruction of the Devonian in that area. Work has been focused, so far, on the depositional aspects of rocks of this time and a better balance between the two is sought.

1320. Take, W.F., Nova Scotia Research Foundation:
Structural and stratigraphic studies of the Windsor Group (Mississippian) of Cape Breton Island, 1967-.
A study of numerous structural and stratigraphic problems in an attempt to reconstruct the original spatial relationships of the various sections, and to determine the sedimentary facies and depositional basins involved. The ultimate objective is a better understanding of the carbonate and evaporite rocks of the Windsor Group.

1321. Toomey, D.F., Pan American Petroleum Corp., Mountjoy, E.W., McGill Univ., Mackenzie, W.S., Geol. Surv. Canada:
Upper Devonian (Frasnian) algae and foraminifera from the Ancient Wall carbonate complex, Jasper National Park, Alberta.
A study of the distribution of foraminifera and algae within the Ancient Wall carbonate complex of northern Jasper National Park with a discussion of other known Devonian foraminiferal horizons of North America, and an evaluation of the possible future role of foraminifera in stratigraphic and ecologic studies.

1322. Trettin, H.P., Geol. Surv. Canada:
The Marble Canyon Formation (Permian) in the Marble Range, Cariboo district, British Columbia, 1964-69.
See Stratigraphy and structure of the Marble Canyon Formation in the Marble Range, Clinton area, British Columbia; Geol. Surv. Can., Paper 68-1, p. 220, 1968.

1328. Uyeno, T.T., Geol. Surv. Canada:
Conodont biostratigraphy of the Waterways Formation, northeastern

and central Alberta, 1964-69.
See Conodont zonation, Waterways Formation (Upper Devonian) northeastern and central Alberta; Geol. Surv. Can., Paper 67-30, 1967.
Conodont biostratigraphy of Middle and Upper Devonian strata of southern and central Manitoba, 1967-70.

1324. Williams, H., Memorial Univ. of Newfoundland:
Carboniferous rocks of the Red Indian Lake basin, Newfoundland, 1968-70.
Carboniferous strata of Red Indian Lake basin form the easternmost Carboniferous exposures in Newfoundland. Spore analysis indicates that the rocks are of Early Mississippian age, although virtually undeformed and poorly indurated. It is proposed to study the stratigraphy, age, and provenance of these rocks and to compare these strata with thicker, deformed sequences of the same age in the Cape Anguille-White Bay basin to the west.

1325. Yole, R.W., Carleton Univ.:
Stratigraphy, sedimentology and paleontology of Sicker Group, Vancouver Island, 1960-69.
See Upper Paleozoic stratigraphy of Vancouver Island, British Columbia; Proc. Geol. Assoc. Can. (in press).

1326. Young, H., Queen's Univ.:
Lithostratigraphy of Mississippian Lodgepole Formation, Manitoba, 1966-69; Ph.D. thesis.

Mesozoic

1327. Bayliss, P., Deere, R., Univ. of Calgary:
The mineralogy of Lower Jurassic in west-central Alberta, 1967-68; thesis project (Deere).

1328. Brooke, M.M. (Miss), Univ. of Saskatchewan:
Jurassic microfauna and biostratigraphy of southwest Saskatchewan and north-central Montana, 1966-68; M.Sc. thesis.

1329. Burk, C.F.Jr., Geol. Surv. Canada:
Structural analysis of Cretaceous fish scales marker horizon, west-central Alberta, 1967-68.
Trend-surface analysis of a widespread marker horizon, the results of which may aid in locating deeper structures such as Devonian reefs.

1330. Caldwell, W.G.E., North, B.R., McLean, J.R., Huffman, D.P., Rask, D.H., Univ. of Saskatchewan:
Stratigraphic studies in Cretaceous rocks, Saskatchewan, 1960-; Ph.D. thesis (McLean), M.Sc. theses (Huffman and Rask).
Caldwell and North are studying the foraminiferal faunas of the entire Cretaceous sequence in Saskatchewan with a view to producing a biostratigraphical zonal scheme. McLean is studying the stratigraphy of the "Belly River" Formation with special emphasis on mineralogy and petrology. Huffman is studying the foraminiferal faunas of the White-Speckled Shales in western Saskatchewan to complement the work of Park (1965) and Caldwell and North (1966).

Rask is studying the biostratigraphy of the Bearpaw Formation in the Frenchman River valley. See The Late Cretaceous Bearpaw Formation in the south Saskatchewan River valley; Sask. Res. Coun. (Geology Div), Rept. 8, ca. 200 p., 1968.

1331. Carrigy, M.A., Research Council of Alberta:
Petrology of nonmarine Upper Cretaceous-Tertiary sandstones, 1961-.
A report describing the results of the study will be published as a Research Council Bulletin in 1969.

1332. Christopher, J.E., Saskatchewan Dept. of Mineral Resources:
Upper Jurassic basal Cretaceous formations of southern Saskatchewan, 1967-71.

1333. Dodson, P., Univ. of Alberta:
Stratigraphy of the dinosaur-bearing beds of the Oldman Formation, in Dinosaur Provincial Park, Alberta, 1968-69; M.Sc. thesis.

1334. Edmund, A.G., Royal Ontario Museum:
Biostratigraphic study of Upper Cretaceous faunas, Milk River, Alberta, 1967-69.
Contrary to conditions elsewhere, fossils are more common in the Foremost than in the Oldman, and indicate a shallow, fresh water environment, often with long periods of coal deposition. Mammal remains are almost non-existant.

1335. Foscolos, A.E., Procter, R.M., Stott, D.F., Geol. Surv. Canada:
Clay mineralogy of Lower Cretaceous shales of northeastern British Columbia, 1968-70.
Includes identification of, and examination of the distribution of clay mineral facies geographically and stratigraphically and investigation of relations between clay distribution and other stratigraphic parameters.

1336. Gibson, D.W., Geol. Surv. Canada:
Triassic stratigraphy and petrology in the Foothills and Front Ranges of Western Canada, 1962-.
A detailed study of the Triassic rocks in the Foothills and eastern Rocky Mountains of Alberta and British Columbia, to provide data on the character, structure, distribution, age, stratigraphic relationships, origin of the bedrock, and other geological data required to evaluate the oil, gas, and mineral potentialities of the region. See Triassic stratigraphy between Athabasca and Brazeau Rivers of Alberta; Geol. Surv. Can., Paper 68-11, 1968.

1337. Havard, C.J., Geol. Surv. Canada:
Stratigraphy and structure of Lower Cretaceous sedimentary rocks of the Waterton-Castle River area, Alberta, 1967-69.

1338. Hopkins, W.S.Jr., Geol. Surv. Canada:
Mesozoic palynology and biostratigraphy, Western and Northern Canada, 1968-.
Although largely concerned with Mesozoic palynology of Arctic Canada, will include other parts of Canada. This project may be extended to include the palynology of the Cretaceous-Tertiary boundary. See Subsurface Miocene rocks, British Columbia - Washington; Geol. Soc. Amer., Bull., vol. 79, pp. 763-768, 1968.

1339. Jeletzky, J.A., Geol. Surv. Canada:
Jurassic-Cretaceous transition beds, Pacific slope of North America, 1966-69.
To evaluate the stratigraphic position and age of richly fossiliferous marine upper Tithonian and lower Berriasian rocks recently discovered in western British Columbia. See Proceedures vol., Geol. Soc. Amer., San Francisco Meeting, pp. 102-103, 1966.
History of marine cretaceous biotic provinces of Western and Arctic Canada, 1967-70.
To summarize the available data and to organize them into a concise paper illustrated by several paleogeographical maps.
Cretaceous and uppermost Jurassic biostratigraphy of western Cordillera, 1967-.
A detailed stratigraphical-paleontological study to assemble information on paleontological zoning. See Upper Jurassic and Cretaceous rocks of Taseko Lakes map-area and their bearing on the Geological history of southwestern British Columbia; Geol. Surv. Can., Paper 67-54, 1968.

1340. Lerbekmo, J.F., Univ. of Alberta:
Chemical correlation of bentonites in the Edmonton Formation, central Alberta, 1966-70.

1341. Muller, J.E., Jeletzky, J.A., Geol. Surv. Canada:
Geology of the Nanaimo Group, western British Columbia, 1965-68.
The Upper Cretaceous, Santonian to Maestrichtian Nanaimo Group contains at least four major transgressive, non-marine to marine sedimentary sequences. The project involves mapping, description of stratigraphic sections and stratigraphic paleontology and aims at understanding the paleogeography, history of sedimentation and of tectonic events in the "Georgia Seaway". See Geol. Surv. Can., Paper 67-1, Pt. B, pp. 38-47, 1967.

1342. Ollerenshaw, N.C., Geol. Surv. Canada:
Stratigraphy of the Blairmore Group and Kootenay Formation, southern Foothills of Alberta, Bow River to Clearwater River, 1966-70.
Emphasis is being placed on the conglomerate and sandstone facies in terms of their tectonic environment. See Mesozoic and Cenozoic rocks between Bow and Brazeau Rivers, Alberta; Alta. Soc. Petrol. Geol., Guidebook, 1968.

1343. Price, L.L., Geol. Surv. Canada:
Studies of Cretaceous stratigraphy of the plains of Saskatchewan, Manitoba, and eastern Alberta, 1964-69.
Current studies include the Favel and Vermilion River formations of eastern Saskatchewan and Manitoba and the Lower Cretaceous Swan River group.
Mesozoic stratigraphy of Hudson Bay Lowlands, 1967-70.
Includes study of coal deposits of the southern part of Hudson Bay Lowlands.

1344. Russell, L.S., Royal Ontario Museum:
Correlation of Upper Cretaceous formations in Montana and southern Alberta, 1963-69.
The transgressive nature of many formational boundaries in the Upper Cretaceous of Alberta and Montana has made time correlation difficult. In this study all available criteria are being

used to establish time boundaries and will permit a better reconstruction of physical history of this region in Late Cretaceous time. This project has the collaboration of William A. Cobban and James P. Gill, U.S. Geological Survey. See Cretaceous nonmarine faunas of northwestern North America; Royal Ontario Museum, Life Sci. Contri. 61, 24 pp., 1964.

1345. Salter, D.L., Univ. of Waterloo:
Clay mineralogy of Cretaceous sediments from northern Ontario, 1967-69.
The clay mineralogy of samples mainly from boreholes is being evaluated by X-ray diffraction methods. Apart from the fact that the mineralogy of these sediments is little known, an object of the investigation is to find mineralogical characteristics which may assist in correlation problems.

1346. Schau, M., Univ. of British Columbia:
The Triassic Nicola Group, 1964-68; Ph.D. thesis.
The group consists of intermingled volcanic and sedimentary rocks representing a Triassic island arc.

1347. Stelck, C.R., Warren, P.S., Univ. of Alberta:
Definition of the Lower Cretaceous-Upper Cretaceous boundary in Western Canada, 1956-69.
See Upper Cretaceous, Peace River area, British Columbia; Edmonton Geol. Soc., Fourth Annual Field Trip Guidebook, pp. 10-21, 1962.

1348. Stott, D.F., Geol. Surv. Canada:
Cretaceous stratigraphy, northeastern British Columbia, 1961-69.
Detailed stratigraphic investigation of mainly Lower Cretaceous rocks in Foothills and Plains of northeastern British Columbia. To establish the relations with equivalent successions between Peace and Smoky Rivers and in the region of Liard and Mackenzie Rivers. See Cretaceous stratigraphy between Tetsa and La Biche Rivers, northeastern British Columbia; Geol. Surv. Can., Paper 68-14.
Cretaceous subsurface studies in northeastern British Columbia, 1962-.
Studies of samples, cores, and logs of wells in conjunction with surface investigations. See Lower Cretaceous Bullhead and Fort St. John Groups, between Smoky and Peace Rivers, Rocky Mountain Foothills, Alberta and British Columbia; Geol. Surv. Can., Bull. 152.
Jurassic and Cretaceous stratigraphy, Sikanni Chief River to lat. 53°30', British Columbia and Alberta, 1968-71.
Detailed stratigraphic studies of the Jurassic Fernie Formation and Lower Cretaceous Minnes Groups and equivalent strata of the Foothills. See Fernie and Minnes strata north of Peace River, Foothills of northeastern British Columbia; Geol. Surv. Can., Paper 67-19 (Parts A and B).

1349. Tozer, E.T., Geol. Surv. Canada:
Triassic biostratigraphy and biochronology, 1953-70.
Study of morphology and distribution of Canadian Triassic Ammonoidea and Bivalvia. See A standard for Triassic time; Geol. Surv. Can., Bull. 156, 1967.

1350. Velasco, F., Saskatchewan Dept. of Mineral Resources:
Viking and related Cretaceous rocks in southwestern Saskatchewan, 1967-.

1351. Wyman, J.M., Saskatchewan Dept. of Mineral Resources:
Investigations of the geology and economic potential of the Medicine Hat sand, western Saskatchewan, 1968-69.

Cenozoic

1352. Russell, L.S., Storer, J.E., Royal Ontario Museum:
Fauna and correlation of the Wood Mountain gravel, Miocene of Saskatchewan, 1967-69; Ph.D. thesis (Storer).
All available collections of the Wood Mountain fauna are being studied and new material is being collected. This study should not only provide adequate knowledge of an important vertebrate fauna, but should contribute to the working out of the physical history of the northern plains in Tertiary time. See Tertiary plains of Alberta and Saskatchewan; Proc. Geol. Assoc. Can., vol. 9, pp. 17-19, 1957.

1353. Tiffin, D.L., Murray, H.W., Univ. of British Columbia:
Continuous seismic profiling in the Strait of Georgia, British Columbia, 1966-68; Ph.D. thesis (Tiffin).
An attempt to outline the distribution of the Recent and Pleistocene sediments in the Strait of Georgia and to show the structure of the underlying bedrock. See Mapping the off-shore shelf with continuous seismic; Oilweek, vol. 7, No. 38, pp. 48-51, 1966.

General Problems

1354. Barnes, W., Univ. of British Columbia:
Precambrian stratigraphic studies, southeastern British Columbia, 1962-.
Combined stratigraphic/sedimentologic study; present investigations concentrated in the southern Purcell Range and the adjacent parts of the Rocky Mountain Trench. See Correlation of and facies changes in the carbonaceous, calcareous, and dolomitic formations of the Precambrian Belt-Purcell Supergroup; Geol. Soc. Amer., Bull., vol. 77, pp. 1399-1426, 1966.

1355. Bartlett, G.A., Bedford Institute, Nova Scotia:
Geology of the Atlantic Continental margins, 1966-.
A detailed paleontologic interpretation of the Mesozoic and Cenozoic sediments from the Continental Shelf and Slope of both the Western and Eastern Atlantic. Thick sequences in eastern Canadian waters suggest both Tethyan and West Indian affinity. Paleontological, sedimentological and structural evidence implies that the Canadian Continental Shelf is a continuation of the Gulf Coast and Atlantic Coastal Plain physiographic province. See Tertiary stratigraphy on the Continental Slope off Nova Scotia; Maritime Sediments, vol. 4, No. 3, pp. 22-37, 1968.

1356. Braun, W.K., Univ. of Saskatchewan:
Devonian microfauna and biostratigraphy of the Northwest Territories and Alberta, 1964-74.
See Upper Devonian ostracod faunas of Great Slave Lake and northeastern Alberta, Canada; Internat. Symp. on Devonian System, Calgary, 1967, vol. II, pp. 617-652, 1968.

1357. Christie, R.L., Geol. Surv. Canada:
Regional geology and stratigraphy, Arctic Archipelago, a continuing study.
Particular attention is being paid to the Precambrian crystalline terraine; to the distribution and ages of the late Precambrian sedimentary rocks and their contained sills and dykes; and to the stratigraphy of the lower Paleozoic rocks exposed along the eastern margin of the Paleozoic sedimentary basin. See Bache Peninsula, Ellesmere Island, Arctic Archipelago; Geol. Surv. Can., Mem. 347.

1358. Clark, D.A., Chi, J., Solohub, J., Mobil Oil Canada Ltd.:
Discriminant function analysis of digital mechanical log data, 1968-69.
The purpose is to determine the feasibility and applicability of discriminant function analysis as an aid in (1) distinguishing hydrocarbon from non-hydrocarbon-bearing zones and (2) distinguishing lithology types.

1359. Clark, D.A., Pasenkopf, W., Mobil Oil Canada Ltd.:
Geological well data system, 1969-70.
A geological well data system is being developed using a method of coding stratigraphic data which will allow for the recording of any stratigraphic section encountered together with a system of correlating tops which provides for (1) re-interpretations and revisions of correlation without changing original data and (2) can be used to correlate with tops anywhere else in the world.

1360. Copper, P., Laurentian Univ.:
Paleozoic biostratigraphy, especially concerned with Ordovician, Silurian and Devonian brachiopod faunas of eastern North America, 1965-70.

1361. Danner, W.R., Sada, K., Nestell, M., Univ. of British Columbia:
Stratigraphy and paleontology of the Cache Creek Group and correlated sequences (Sicker, Chilliwack, etc.) in southern British Columbia and northern Washington State, 1960-.
Study includes sedimentary petrography of carbonate rocks and associated clastic sediments. Special emphasis is being placed on identification of the fusulinid fossils. See Permian Calcareous algae from northwestern Washington and southwestern British Columbia; Jour. Paleontology, vol. 40, No. 2, March 1966.

1362. Fahraeus, L.A., Univ. of Western Ontario:
Stratigraphic and taxonomic studies of conodonts from western Newfoundland and of Siluro-Devonian conodonts from Yukon Territory, 1967-.

1363. Gilmore, R., McGill Univ.:
Stratigraphy of Rosenburg and Philipsburg thrust sheets, southern Quebec, 1966-69; Ph.D. thesis.

1364. Gordon, A.J., Univ. of New Brunswick:
Lower Paleozoic rocks of central New Brunswick, 1966-.

1365. Hobson, G.D., Overton, A., Geol. Surv. Canada:
Marine seismic - Gulf of St. Lawrence, 1964-69.
Two-ship marine seismic refraction experiments to investigate the thickness, nature and attitude of the sedimentary rocks underlying the Gulf of St. Lawrence to the depth of the crystalline basement.

1366. Hood, P.J., Sawatzky, P., Bower, M.E., Geol. Surv. Canada, Godby, E.A., Baker, R.C., Davis, N., National Aeronautical Establishment:
Ocean aeromagnetics, 1962-.
The objectives are to conduct high resolution aeromagnetic surveys over the Canadian Continental Shelves for purposes of delineating sedimentary basins and to obtain and study magnetic data over the ocean basin in order to shed light on the theories of magnetic imprinting of oceanic rocks, ocean floor spreading and continental drift. See Aeromagnetic profiles across the Reykjanes Ridge, southwest of Iceland; Jour. Geophys. Res., vol. 73, No. 24, 1968.

1367. Hubert, C., Vallières, A., Caty, J.-L., Université de Montreal:
Stratigraphie des roches cambro-ordoviciennes de la région de St-Malachie, Québec, 1967-70; thèse de maîtrise (Vallières), thèse de doctorat (Caty).
Voir Tectonics of part of the Sillery in the Chaudière - Matapedia segment of the Quebec Appalachians; Roy. Soc. Can., Spec. Pub. 10, pp. 31-40, 1967.

1368. Jeletzky, J.A., Geol. Surv. Canada:
Mesozoic and Tertiary rocks on the west coast of Vancouver Island and in Quatsino Sound, British Columbia, 1949-72.
A detailed survey of the stratigraphy, facies and biochronology. See Tertiary rocks of the Hesquiat-Nootka area, west coast of Vancouver Island, British Columbia; Geol. Surv. Can., Paper 53-17, 1954.

1369. Kerr, J.Wm., Geol. Surv. Canada:
Stratigraphic studies, Arctic Canada, 1961-.
Studies on various problems of stratigraphy and correlation in the Arctic Islands. See New nomenclature for Ordovician rock units of the eastern and southern Queen Elizabeth Islands, Arctic Canada; Bull. Can. Petrol. Geol., vol. 15, No. 1, 1967.
Stratigraphy and structure, southwestern Ellesmere Island and northwestern Devon Island, Northwest Territories, 1967-72.
Stratigraphy and structure, central Ellesmere Island, Northwest Territories, 1961-69.
The investigation will produce a 1 inch to 4 miles map of those parts of central Ellesmere Island underlain by Lower and Middle Paleozoic rocks. Separate reports will be produced on the stratigraphy of these rocks. See Stratigraphy of central and eastern Ellesmere Island, Arctic Canada, Part I: Proterozoic and Cambrian; Geol. Surv. Can., Paper 67-27, 1967.

1370. Kerr, J.Wm., Temple, P.G., Geol. Surv. Canada:
Stratigraphy and structure Bathurst Island, Northwest Territories, 1963-69.

The objective is to produce a report and a 4 mile geological map. The area covers the region of intersection of two major fold belts and demonstrates the history of the western side of the Boothia uplift. See Tectonic history of the Boothia Uplift and Cornwallis Fold Belt, Arctic Canada; Bull. A.A.P.G., vol. 49, No. 7, pp. 905-926, 1965.

1371. Lajoie, J., Léonard, M.A., Mathey, B., Héroux, Y., Chagnon, A., Université de Montréal:
Paléogéographie de séquences siluro-ordoviciennes dans les Appalaches du Québec, 1964-; thèse de maîtrise (Mathey, Héroux, Chagnon), thèse de doctorat (Léonard).
Titres des travaux: 1. anatomie du flysch de St-Fabien, Cté de Rimouski, 2. sédimentologie des flysch de la région de Trois-Pistoles, 3. provenance de la fraction grossière du flysch de St-Simon, 4. sur la provenance du flysch de Berthier, 5. mise en place d'un horizon deconglomérat calcaire, région de Trois Pistoles, 6. formation des boulets de canon, 7. remplacement du lutum dans les wackes.

1372. Lenz, A.C., Univ. of Western Ontario:
Upper Silurian and Lower Devonian brachiopods of northern Yukon and adjacent Northwest Territories, 1965-70.
Involves the study of the paleogeography, biostratigraphy and taxonomy of Late Silurian and Early Devonian brachiopods of the Canadian northwest. See Upper Silurian and Lower Devonian biostratigraphy, Royal Creek, Yukon Territory, Canada; Int. Sympos. on Devonian System, vol. 2, pp. 587-599, 1967.

1373. Lenz, A.C., Jackson, D.E., Univ. of Western Ontario:
Upper Silurian and Lower Devonian graptolites and graptolite biostratigraphy of the northwestern Canadian mainland, 1966-69.
See Late Silurian graptolites from Porcupine River, Yukon Territory; Geol. Surv. Can., Bull. (in press).

1374. Lespérance, P.J., Université de Montréal:
Trilobites et stratigraphie de l'Ordovicien Supérieur-Silurien-Dévonien inférieur, 1962-.
Surtout des Appalaches du Québec. Voir Ordovicien and Silurian trilobite faunas of the White Head Formation, Percé region, Quebec; Jour. Paleont., vol. 42, pp. 811-826, 1968.

1375. Lespérance, P.J., Bourque, P.A., Université de Montréal:
Stratigraphie des strates siluro-dévoniennes du NW de la Gaspésie, Québec, 1967-69.
Les strates étudiées sont celles plus vieilles que la Fn. Cap-Bon-Ami, de la Forillon à Murdochville. Voir Silurian stratigraphy and paleogeography of Matapedia-Temiscouata region, Quebec; Bull. Amer. Assoc. Petrol. Geol., vol. 52, pp. 615-640, 1968.

1376. Liberty, B.A., Univ. of Guelph:
Detailed geological mapping of Paleozoic rocks of southern Ontario, 1969.

1377. McCabe, H.R., Manitoba Mines Branch:
Structural and stratigraphic features of Paleozoic Formations - southwestern Manitoba, 1964-67.
See Tectonic framework of Paleozoic Formations in Manitoba; Trans. Can. Inst. Min. Met., vol. LXX, pp. 180-189, 1967.

1378. McGregor, D.C., Geol. Surv. Canada:
Biostratigraphic study of Paleozoic palynomorphs of the Arctic Islands, 1968-72.
The objectives are to set up zonal standards for Paleozoic palynomorphs for the Arctic Islands, to correlate palynomorph zones with conodont zones in measured sections (in joint study with T.T. Uyeno), and to obtain fossil data of use to those engaged in geologic exploration of the Arctic. Collections were obtained from four Silurian-Devonian sections in the summer of 1968.

1379. Mountjoy, E.W., McGill Univ.:
Mesozoic stratigraphy of northern Yukon, 1961-.
A regional study of the Mesozoic stratigraphy of northern Yukon as a part of Operation Porcupine of the Geological Survey. Includes determination of gross stratigraphic relationships, petrography and depositional history of these rocks. See New occurrences of Jurassic rocks and fossils in central and northern Yukon Territory, Geol. Surv. Can., Paper 67-12, 1967.
Cambrian stratigraphy and petrology of northern Jasper Park, Alberta, 1960-.
Regional study of Cambrian stratigraphy to determine distribution thickness and petrography of various units. A study of Ordovician strata and the pre-Devonian unconformity is also included. See Geol. Surv. Can., Paper 61-31, 1962.

1380. Osborne, F.F., Université Laval:
Stratigraphic index for Quebec, 1968-71.

1381. Price, L.L., Geol. Surv. Canada:
Geological observations at shafts of potash mines, Saskatchewan, 1964-70.
Summaries of biostratigraphy are in preparation for five of the shafts now completed.

1382. Stanton, M.S., Chevron Standard Ltd.:
Arctic stratigraphy, 1967-.

1383. Stott, D.F., Geol. Surv. Canada:
Stratigraphic and structural investigations, King Christian, Ellef and Amund Ringnes Islands, 1967-73.
The islands, lying within Sverdrup Basin and Arctic Coastal Plain, are underlain by formations ranging in age from Early Carboniferous to Tertiary and consisting of carbonate and clastic rocks. Several diapiric structures with cores of anhydrite and secondary gypsum were emplaced through intermittent growth. See Ellef Ringnes Island, Canadian Arctic Archipelago; Geol. Surv. Can., Paper 68-16.

1384. Uyeno, T.T., Geol. Surv. Canada:
Conodont biostratigraphy of Paleozoic rocks of the Arctic Islands, 1968-.
Upper Silurian and Devonian sections have been sampled in four localities on Melville, Bathurst, and Cornwallis Islands. D.C. McGregor is studying palynomorphs from the same samples.

1385. White, W.I., Saskatchewan Dept. of Mineral Resources:
Geology and petroleum deposits of the North Hoosier area, west-central Saskatchewan, 1968-.

A study of the stratigraphic interval from the base of the Bakken Formation to the top of the Viking Formation in an area comprising about 7 townships which includes two oil pools, part of one gas pool and several other petroleum bearing horizons. The study is based upon the investigation of all cores, cuttings and logs in the area. Its purpose is to elucidate the geology, which is complicated by an enormously large hiatus, and thereby facilitate the selection of future drilling locations.

1386. Winder, C.G., Univ. of Western Ontario:
Paleozoic stratigraphy of southern Ontario, 1951-.
See Micropaleontology of the Devonian in Ontario; Inter. Devonian Symp., Calgary, 1967, vol. II, pp. 711-719, 1968.
Stratigraphic nomenclature of the Paleozoic in southern Ontario, 1965-.
The Ontario Stratigraphic Committee of which Dr. Winder is Chairman has defined formations in the subsurface in 33 wells spread across southern Ontario using both lithologic and geophysical criteria. Proposed formation names are suggested primarily to establish consistent usage and definition. The study developed as an outgrowth of the Ontario Well Data-Computer Project. A systematic collection of outcrop samples will provide reference with the subsurface sections.

1387. Yorath, C.J., Chamney, T.P., Geol. Surv. Canada:
Mesozoic stratigraphy and biostratigraphy - Operation Norman, 1968-71.
Stratigraphy, sedimentology, biostratigraphy and correlation of Mesozoic and Tertiary rocks, Arctic Coastal Plains, Northwest Territories. See Operation Norman, District of Mackenzie, Northwest Territories; Geol. Surv. Can., Paper 69-1A, 1969.

STRUCTURAL GEOLOGY AND TECTONICS

Alberta

1388. Burk, C.F.Jr., Geol. Surv. Canada:
Structural analysis of Cretaceous fish scales marker horizon, west-central Alberta, 1967-68.
Trend-surface analysis of a widespread marker horizon, the results of which may aid in locating deeper structures such as Devonian reefs.

1389. Geiger, K.W., Research Council of Alberta:
Bedrock topography of National Topographic System map-area 82I, Alberta, 1964-68.
See Bedrock topography of the Gleichen map-area, Alberta; Res. Coun. Alberta, Rept. 67-2, 14 pp., 1968.

1390. Mountjoy, E.W., McGill Univ.:
Structure of Front and Main Ranges, northern Jasper Park, Alberta, 1967-.
Extent, geometry and development of fold and thrust structures, relationships of folds with abrupt termination of thrusts, interrelations of hanging-wall and foot-wall structures. See Geol. Surv. Can., Maps 49-1959, 47-1963, Paper 61-31.

1391. Robinson, J.E., Charlesworth, H.A.K., Univ. of Alberta:
The structure of the sedimentary rocks of the Interior Plains of Western Canada, 1965-.

British Columbia

1392. Balkwill, H.R., Geol. Surv. Canada:
Structural analysis of Western Ranges, Rocky Mountains, Golden, British Columbia, 1966-68.

1393. Burk, C.F.Jr., Geol. Surv. Canada:
Structural analysis of Cretaceous fish scales marker horizon, west-central Alberta, 1967-68.
Trend-surface analysis of a widespread marker horizon, the results of which may aid in locating deeper structures such as Devonian reefs.

1394. Campbell, R.B., Geol. Surv. Canada:
Geology of Cariboo Mountains, British Columbia, 1959-72.
This continuing investigation stresses the solution of structural and stratigraphic problems of significance to an understanding of the tectonic history of the eastern Cordillera. See Geol. Surv. Can., Paper 68-1, 1968 and Map 15-1967.

1395. Chase, R.L., Bremner, M.N., Univ. of British Columbia:
Geology of features ascribed to sea-floor spreading off the west coast of Canada, 1969-; Ph.D. thesis (Bremner).
In 1969 a cruise of 2 to 4 weeks is planned in cooperation with Dr. Roger Stacey, Gravity Division, Observatories Branch. Features to be examined are the southern part of Queen Charlotte Islands fault zone, the Explorer Trench, and the Juan de Fuca Ridge. Techniques will include continuous seismic profiling, dredging and coring and a gravity meter and magnetometer survey.

1396. Fyson, W.K., Univ. of Ottawa:
Structural and stratigraphic relations of Paleozoic and Mesozoic rocks in the Shuswap Lake area, British Columbia, 1965-69.
See Structural relations in metamorphic rocks, Shuswap Lake area, British Columbia; (abstract) Annual Meeting, Can. Ins. Min. Metal., Vancouver, 1968.

1397. Monger, J.W.H., Geol. Surv. Canada:
Atlin Horst project, British Columbia, 1966-69.
A detailed investigation of the stratigraphy and structure of Mississippian to Permian cherts, limestones, greenstones and ultramafic rocks which form the Atlin Horst, a structurally high block that is the largest single area of late Paleozoic eugeosynclinal rocks in the western Canadian Cordillera. See Geol. Surv. Can., Paper 68-1A, pp. 34-36, 1968.

1398. Murray, J.W., Univ. of British Columbia:
Structure of continental margin west of Vancouver Island, British Columbia, 1967-.
A continuous seismic profile project on the continental shelf and slope off Vancouver Island. To date approximately 950 miles of seismic profiles have been obtained using a 5,000 joule sparker.

1399. Richards, T.A., Univ. of British Columbia:
The Chilliwack batholithic complex, 1966-69; Ph.D. thesis.
A study of mid- to late-Tertiary plutons near the International Border - part of the Cordilleran Structural Project.

Manitoba

1400. Burk, C.F.Jr., Geol. Surv. Canada:
Structural analysis of Cretaceous fish scales marker horizon, west-central Alberta, 1967-68.
Trend-surface analysis of a widespread marker horizon, the results of which may aid in locating deeper structures such as Devonian reefs.

1401. Haugh, I., Elphick, S.C., Manitoba Mines Branch:
Structural and petrologic studies in the Kettle Rapids - Moose Lake area, northern Manitoba, 1968-69.

1402. McCabe, H.R., Manitoba Mines Branch:
Structural and stratigraphic features of Paleozoic formations - southwestern Manitoba, 1964-67.
See Tectonic framework of Paleozoic formations in Manitoba; Trans. Can. Inst. Min. Metal., vol. LXX, pp. 180-189, 1967.

Newfoundland and Labrador

1403. Currie, K.L., Geol. Surv. Canada:
Geology of the Mistastin Lake structure, Labrador, 1968-69.
Mistastin Lake is an elliptical crater containing a shock metamorphosed central uplift of Precambrian rocks, and a marginal belt of Jurassic andesitic rocks, fed by a well exposed ring dike.

1404. Kennedy, M.J., Memorial Univ. of Newfoundland:
Structural studies of the metamorphic rocks between Ming's Bight and Pacquet Harbour, Newfoundland, 1967-68.
This study of rocks which belong to the same metamorphic complex as the Fleur de Lys Group is providing information on the geometry and orientation of the D_1 deformation ellipsoid as well as leading to the recognition of large scale D_2 nappes similar to those found in the Fleur de Lys Group.

1405. Neale, E.R.W., Williams, H., Kennedy, M.J., King, A., Smitheringale, W.G., Hughes, C.J., and graduate students, Memorial Univ. of Newfoundland:
Phase 1 of Anatomy of the Appalachian Mobile Belt in the Notre Dame Bay region of Newfoundland, 1969-75.
This will be a team study in which faculty members and graduate students will integrate their individual research projects to contribute towards the major structural, petrologic and economic problems in this complex. Phase 1 will concentrate on the western part of the study area, i.e. the Burlington and Springdale Peninsulas.

1406. Stevens, R.K., Univ. of Western Ontario:
Structural and stratigraphic study of the Taconic klippen of western

Newfoundland, and their relationship with the autochthone and central Newfoundland, 1963-69; Ph.D. thesis.

See The crustal evaluation of the western margin of the Newfoundland Appalachians; (abstract) Geol. Soc. Amer., Annual Meeting, Mexico City, 1968.

Nova Scotia

1407. Bidgood, D.E.T., Take, W.F., Nova Scotia Research Foundation:
Gravity study of a Horton graben in central Nova Scotia, 1967-.

Three gravity profiles across an area of Horton rocks bounded by major faults gave positive anomalies. Geophysical and geological interpretation indicates presence of dense rocks below the Horton.

1408. Take, W.F., Nova Scotia Research Foundation:
Structural and stratigraphic studies of the Windsor Group (Mississippian) of Cape Breton Island, 1967-.

A study of numerous structural and stratigraphic problems in an attempt to reconstruct the original spatial relationships of the various sections, and to determine the sedimentary facies and depositional basins involved. The ultimate objective is a better understanding of the carbonate and evaporite rocks of the Windsor Group.

Photolinear patterns associated with instrusive salt bodies in Nova Scotia, 1967-.

Strong photolinear patterns, apparently caused by continued movement of intrusive salt bodies, assist in the interpretation of gravity data and the location of near surface extensions of salt.

Northwest Territories

1409. Cook, D.G., Aitken, J.D., Balkwill, H.R., Ayling, M.E., Geol. Surv. Canada:
Structural aspects of Operation Norman - a helicopter supported reconnaissance geological study of 125,000 square miles of the lower Mackenzie River area, Northwest Territories, 1968-71.

Asymmetric, commonly faulted, anticlines in the Franklin Mountains and Colleville Hills display diverse structural trends and abrupt reversals of asymmetry. These structures indicate horizontal shortening or compression of the stratigraphic sequence above the Cambrian Macdougal Group. This suggests a décollement zone, occurring in the Macdougal Group, and extending more than 100 miles east and northeast of the Mackenzie Mountain Front. See Geol. Surv. Can., Paper 69-1, 1969.

1410. Norris, D.K., Larochelle, A., Geol. Surv. Canada:
The Mackenzie deflection, Northwest Territories, 1966-70.

Structural geology, stratigraphy and geophysics (especially paleomagnetism) are being used to assess the nature, origin and significance of the great change in structural trend of the Mackenzie Mountains, known as the Mackenzie deflection. The deflection is being compared with similar features around the world

to establish the relation between basin geometry and structural style in orogenic belts.

1411. Reinhardt, E.W., Geol. Surv. Canada:
Petrological and structural study of the McDonald fault system, Great Slave Lake, Northwest Territories, 1965-68.
A study of the paragenetic and structural history of metamorphic, migmatitic, and mylonitic gneisses occurring along the boundary of the Slave and Churchill Structural Provinces. See Geol. Surv. Can., Paper 67-1A, 1967 and Paper 69-1A, 1969.

Ontario

1412. Ambrose, J.W., Queen's Univ.:
A detailed study of folds in the Buck Lake-Devil's Lake area north of Kingston, Ontario, 1968-.
Some attempt is being made to apply statistical studies by computer to determine the configuration of the fold, but in any case the research is directed towards a better understanding of the development of these so-called "re-folded" folds.

1413. Brigham, R.J., Univ. of Western Ontario:
The structural geology of Paleozoic sediments in southwestern Ontario, 1964-69; Ph.D. thesis.
Structure and isopachous maps for the principal formations and surfaces within the Paleozoic subsurface are being generated by computer using the data of the Ontario well-data file. Principal structural features, for example the Algonquin Arch, are being reconstructed by trend surface analysis. See Trend surface analysis - a new look at old data; Ont. Petrol. Institute Proc., London Meeting, 1967.

1414. Divi, R., Univ. of Ottawa:
Structural analysis of Grenville rocks, Bancroft area, Ontario, 1967-69; Ph.D. thesis.

1415. Fabbri, A., Univ. of Ottawa:
Study of the Sparrow Lake gneiss structure, Muskoka District, Ontario, 1968-70; Ph.D. thesis.
Detailed macroscopic and microscopic study of a basin-like structure in layered gneisses.

1416. Kretz, R., Univ. of Ottawa:
Structure and petrology of the Bala mixed-gneiss syncline, Muskoka district, Ontario, 1968-70.

1417. Naldrett, A.J., Peredery, W., Univ. of Toronto:
Study of rocks between the Sudbury Nickel Irruptive and the overlying Onaping Formation, 1968-71; Ph.D. thesis (Peredery).
The purpose is to determine whether or not the unusual rocks at the top of the Nickel Irruptive are related to the impact of a meteorite.

1418. Newson, R., Queen's Univ.:
A structural study of the Perth Road syncline, Ontario, 1967-68; M.Sc. thesis.

A detailed study of a structure in Grenville gneisses about twenty miles north of Kingston.

1419. Oldershaw, M.A., Schwerdtner, W.M., Univ. of Toronto:
Orientation of elongate and platy minerals in Glamorgan gabbro, county of Haliburton, Ontario, 1967-70.
Objectives are (1) analysis of fluidal texture in Glamorgan gabbro; (2) determination of fundamental differences between igneous and metamorphic mineral lineations; and (3) relationship between gneissosity, schistosity and fluidal texture in metagabbros.

1420. Robin, P.-Y., Univ. of Toronto:
Mechanical significance of a fracture pattern in Precambrian metavolcanics, Tudor township, Ontario, 1966-68; M.Sc. thesis.
Detailed study of joints, fractures, shear zones, slickensides, extension cracks and schistosity on a group of greenstone outcrops indicated several ways of utilizing indicators of stress direction. The analysis suggested that the mesoscopic fracture pattern resulted from two separate processes. The earlier process created five or six fracture directions; the later process utilized selected fracture directions and resulted in slip along pre-existing joint surfaces belonging to three of the earlier fracture sets.

1421. Rousell, D.H., Laurentian Univ.:
A structural sedimentary study of the Chelmsford and Onwatin Formations of the Sudbury Basin, 1968-70.

1422. Venkitasubramanyan, C.S., Queen's Univ.:
A structural study of the Northbrook anticline, Ontario, 1967-68; Ph.D. thesis.
An intensive study of a structurally complicated area east of Madoc, Ontario. The study is developing, at least in part, into a study of methods of statistical investigation of structural data.

1423. Watkinson, D.H., Univ. of Toronto:
Partial melting of marbles of the Haliburton-Bancroft area, Ontario, 1968-70.
A field and laboratory (experimental) study of structures, textures and mineralogy of marbles that are suggestive of partial fusion during high-grade metamorphism.

1424. Wynne-Edwards, H.R., Fong, D., Queen's Univ.:
Structure of the Potspoon Lake syncline, Frontenac Axis, 1965-69; M.Sc. thesis (Fong)
A detailed study of a syncline, including petrofabrics. See Geology of Tichborne (east half) map-area, Ontario; Geol. Surv. Can., Paper 64-56, 1965.

1425. Wynne-Edwards, H.R., Shaw, C.M.E., Queen's Univ.:
Structure and petrology of a gabbro body at Leo Lake, 1963-70; M.Sc. thesis (Shaw).
Detailed mapping and petrological investigation of an anular gabbro body in the Frontenac Axis. See Gananoque map-area, Ontario; Geol. Surv. Can., Map 27-1962.

1426. Wynne-Edwards, H.R., Wallach, J., Queen's Univ.:
Structures in grey gneiss at Parham, Ontario, 1967-69; Ph.D. thesis (Wallach).

The structure and petrology of a grey gneiss complex near Parham is to be compared to those of surrounding rocks of the Grenville Group to assess the relative ages of the two categories of rocks, and test the hypothesis that the grey gneiss represents basement. See Geology of Tichborne (east half) map-area, Ontario; Geol. Surv. Can., Paper 64-56, 5 pp., 1965.

Quebec

1427. Béland, J., Roy, D., Université de Montréal:
Diaclases dans les gneiss de la structure de Manicouagan, 1966-68; thèse de maîtrise (Roy).
La forme externe de la structure de Manicouagan (51°25'N, 68°45'W) est reliée à des diaclases dépendant d'orientations structurales régionales. Le centre de la structure montre une série de fractures disposées en cône; ces dernières seraient les seules attribuables à une évènement du type explosion.

1428. Brown, A., Queen's Univ.:
A structural investigation of the Opemiska Mine, 1961-68; Ph.D. thesis.
An exhaustive structural study involving all observable structural elements.

1429. Carrara, A., Univ. of Ottawa:
Structural analysis of Lower Paleozoic rocks, Mt. Albert area, Gaspé Peninsula, Quebec, 1968-70; Ph.D. thesis.

1430. Currie, K.L., Geol. Surv. Canada:
Geology of the Manicouagan structure, Quebec, 1963-69.
See A preliminary report on the Manicouagan structure; Geol. Surv. Can., Paper 67-70, 1969.

1431. Fyson, W.K., Univ. of Ottawa:
Relation of minor to major structures in the Maritime Provinces, 1962-.
See Gravity sliding and cross folding in Carboniferous rocks, Nova Scotia; Amer. Jour. Sci., vol. 265, pp. 1-11, 1967.

1432. Rondot, J., Ministère des Richesses naturelles du Québec:
Structure de Charlevoix, Québec, 1964-.
Etude des dykes de brèche, des roches allochtones et de l'orientation des shatter cones et cartographie de la partie ouest de la structure de Charlevoix. Voir Nouvel impact météoritique fossile? La structure semi-circulaire de Charlevoix; Can. Jour. Earth Sci., vol. 5, No. 5, pp. 1305-1312 et aussi guide pour l'excursion.

1433. Wynne-Edwards, H.R., Kehlenbeck, M.M., Queen's Univ.:
Boundary relationships between the Pipmuacan anorthosite body and the Lac Rouvray gneiss complex, Quebec, 1966-69; Ph.D. thesis
A study of the tectonic history and crystallization of part of the Lac St. Jean anorthosite complex, with special emphasis on the textures, deformation, and recrystallization of the anorthosite.

Saskatchewan

1434. Beecham, A.W., Queen's Univ.:
Structural geology of an area along the ABC fault, Beaverlodge area, northern Saskatchewan, 1966-68; M.Sc. thesis.

1435. Burk, C.F.Jr., Geol. Surv. Canada:
Structural analysis of Cretaceous fish scales marker horizon, west-central Alberta, 1967-68.
Trend-surface analysis of a widespread marker horizon, the results of which may aid in locating deeper structures such as Devonian reefs.

1436. Cargill, D.G., Queen's Univ.:
Fracture control of mineralization adjacent to St. Louis fault, Beaverlodge area, northern Saskatchewan, 1967-69; M.Sc. thesis (Cargill).

General Problems

1437. Ambrose, J.W., Queen's Univ.:
Investigation of photoelastic techniques to establish orientations of principal stress axes in tectonites, 1968-.
Apparatus is now on hand which will enable investigation of the creep recovery of specimens of tectonites.

1438. Aumento, F., Geol. Surv. Canada:
Geology of the mid-Atlantic Ridge near 45°N, 1966-70.
See Potassium-argon ages and spreading rates on the mid-Atlantic Ridge at 45°N; Science, vol. 161, No. 3848, pp. 1338-1339, 1968.

1439. Barr, K.G., Tyrlik, W.T., Berry, M.J., Forsyth, D.A., Bone, M.N., Observatories Branch, Dept. of Energy, Mines and Resources:
Seismic crustal studies throughout Canada, 1964-.
Studies of the crust and upper mantle throughout Canada including the Arctic by seismic means, including theoretical studies: a project near Yellowknife is nearing publication, recent Cordilleran and Polar Continental Shelf Projects are under active analysis, and a major field operation along the Grenville Front has just been successfully completed.

1440. Barron, K., Mines Branch, Dept. of Energy, Mines and Resources:
Fracture initiation and ultimate failure of rock specimens, 1966-.
To predict the strength of rock masses it will probably be necessary to take into account systematic discontinuities such as joints, bedding planes etc. that commonly occur. An attempt is being made to simulate these effects of such anisotropic properties by laboratory testing samples with predetermined failure planes. To date testing has confirmed theoretical postulates for the brittle failure of isotropic rocks. Theory and tests are being extended to cover the case of anisotropic rocks. It is hoped that these theoretical postulates will then also apply to rock masses.

1441. Bartlett, G.A., Queen's Univ. and Bedford Institute, Nova Scotia:
The mid-Atlantic Ridge, 1966-.

Various aspects of deep sea oozes in ponded basins and seamounts on the mid-Atlantic Ridge are being investigated. These studies concern age of sediments associated with the ridge; significance of deep-sea carbonate lithification; rates of seafloor spreading based on relative and absolute ages of microfauna.

1442. Brown, R.L., Garnett, J., Donohoe, H., Univ. of New Brunswick:
Analysis of rock fabrics in the northern Appalachians and Caledonides, 1965-; Ph.D. theses (Garnett and Donohoe).

1443. Clark, D.A., Solohub, J., Mobil Oil Canada Ltd.:
Multiple regression analysis of structural data, 1968-69.
An investigation of the possibility of using multiple regression to predict the occurrence of deep horizons from shallower horizons, and to investigate the significance (geologically) of anomalies encountered.

1444. Clifford, P.M., McMaster Univ.:
Mechanical behaviour of Precambrian crust, 1967-.
Nature and status of the Grenville Front in the vicinity of Sudbury, Ontario, 1963-.

1445. Clifford, P.M., Hsu, M.-Y., McMaster Univ.:
Structural development of 'Keewatin' volcanic-sedimentary belts, 1963-; Ph.D. thesis (Hsu).

1446. Clifford, P.M., Rector, R.J., Underhill, D.H., McMaster Univ.:
Mechanical properties of multicomponent agregates, 1965-; Ph.D. theses (Rector and Underhill).

1447. Coates, D.F., Zahary, G., Herger, G., Mines Branch, Dept. of Energy, Mines and Resources:
Classification of rocks, 1962-70.
Progress to date consists of widespread agreement on the classification of the rock substance and some agreement on that for the rock mass, with new ideas being developed to improve the latter. See A recommended rock classification for rock mechanics purposes; Bull. Can. Inst. Min. Metal., Oct. 1968.

1448. Currie, J.B., Univ. of Toronto:
Experimental study of fracture development in sandstone and limestone under variable confining pressure and strain rate, 1968-.
A study of the range of conditions under which intergranular and intragranular fracturing contribute significantly to deformation modes in sedimentary rocks.

1449. Currie, K.L., Geol. Surv. Canada:
Geochemistry of Canadian craters, 1966-68.
The project compares the composition of igneous rocks to those of crater country rocks to evaluate the hypothesis that the igneous rocks result from wholesale melting of the country rocks. See On the geochemistry of some large Canadian craters; Nature, vol. 218, p. 457, 1968.

1450. Dence, M.R., Robertson, P.B., Observatories Branch, Dept. of Energy, Mines and Resources:
Shock metamorphism in Canadian craters, 1962-.

Deformation attributed to high-pressure shock waves has been identified at sixteen Canadian craters. A scheme of progressive shock deformation or metamorphism has been worked out from the material available from these craters and is in substantial agreement with recent experimental studies of similar minerals. This work is progressing in collaboration with American workers and with Canadian investigators at D.R.B. Suffield Research Station where rock materials have been shocked by large TNT explosions. See Shock zoning at Canadian craters: petrography and structural implications; Contr. Dom. Obs., vol. 8, No. 26, 1968.

1451. Dence, M.R., Robertson, P.B., Innes, M.J.S., Halliday, I., Griffin, A.A., Popelar, J., Observatories Branch, Dept. of Energy, Mines and Resources:
Geological and geophysical studies of Canadian craters, 1953-.
The recognition of the Charlevoix (La Malbaie) Quebec and Mistastin Lake, Labrador craters raises the number of ancient meteorite craters in Canada to 16. Gravity data are available for 14 of these craters, notably for the Manicouagan and Sudbury structures and are currently being interpreted by J. Popelar and M.R. Dence. Further drilling at the Brent crater in 1967 was successful in yielding two holes which, with previous drilling results, give a detailed profile of the entire crater. These cores are being studied by M.R. Dence. Sedimentary sections of the core are being studied by Prof. F.W. Beals. Univ. of Toronto and heat-flow measurements have been taken by Prof. A. Beck, Univ. of Western Ontario. See On the possibility of a catastrophic origin for the Great Arc of eastern Hudson Bay; Contr. Dom. Obs., vol. 4, No. 29, 1968.

1452. Gees, R.A., Grant, A.C., Dalhousie Univ.:
Structural geology of the Labrador Continental Shelf and Slope, 1970; Ph.D. thesis (Grant).

1453. Gibb, R.A., van Boeckel, J.J.G.M., Hornal, R.W., Observatories Branch, Dept. of Energy, Mines and Resources:
Interpretation of gravity surveys, Ontario-Quebec mining belt, 1964-68.
The results of the gravity surveys made during the 1946 to 1963 period are presented as a Bougner anomaly map (scale: 1:500,000). The area is studded with many granitic batholiths of variable composition which are outlined by intense negative gravity anomalies. The whole region is regarded as one great roof pendant and on the assumption that the volcanic and sedimentary rocks of the area are everywhere floored by granite, it is possible to estimate the thicknesses of the volcanic belts using the gravity results but the depths to which the granite extends cannot be determined by the gravity method along. A preliminary interpretation using two- and three-dimensional models to simulate major geological bodies indicates that many of the dense volcanic belts in the area extend to depths ranging from 3 to 5 km. See A preliminary analysis of the gravity anomaly field in the Timmins-Senneterre mining areas; Gravity Map Series, Dom. Obs., No. 58 (in press).

1454. Hastie, L.M., Univ. of Toronto:
Study of dislocation effects by holography, 1966-69; Ph.D. thesis.
The intention is to use the holographic imaging technique to study the displacements at the free-surface of a large elastic body containing a buried dislocation with application to tectonics.

1455. Hood, P.J., Sawatzky, P., Bower, M.E., Geol. Surv. Canada, Godby, E.A., Baker, R.C., Davis, N., National Aeronautical Establishment: Ocean aeromagnetics, 1962-.

The objectives are to conduct high resolution aeromagnetic surveys over the Canadian Continental Shelves for purposes of delineating sedimentary basins and to obtain and study magnetic data over the ocean basin in order to shed light on the theories of magnetic imprinting of oceanic rocks, ocean floor spreading and continental drift. See Aeromagnetic profiles across the Reykjanes Ridge southwest of Iceland; Jour. Geophys. Res., vol. 73, No. 14, 1968.

1456. Hornal, R.W., Observatories Branch, Dept. of Energy, Mines and Resources: Interpretation of the gravity anomalies in the Bear and Slave geological provinces, Northwest Territories, 1966-69.

A study of the regional gravity survey from Great Slave Lake to Victoria Island and from Dubawnt Lake to Great Bear Lake is in progress. The anomalies correlate well with structural trends and geological formations. A large positive gravity anomaly north of Coppermine is due to late Proterozoic flood basalts which underlie Paleozoic rocks except in the areas of the Minto Arch and the Coppermine River where up to four kilometres of basalt are exposed. A belt of positive anomaly parallels the rocks of the Snare Group from Great Slave Lake to Great Bear Lake and may represent basic intrusions along the geosyncline. A gravity high over the east arm of Great Slave Lake may be related to basic sills and dykes intruding the rocks of the Great Slave and Et-then Groups. A steep gravity gradient between massive granite of Archaean age and gneisses of Proterozoic age marks the boundary of the Churchill and Slave geological provinces between Artillery Lake and the Back River. See The gravity anomaly field in the Coppermine area, Northwest Territories; Gravity Map Series, Dom. Obs. Map No. 45 (in press) and Gravity anomalies over the northwestern Canadian Shield (in preparation.

1457. Kerr, J.Wm., Geol. Surv. Canada:
Studies of continental drift, 1966-.

See Nares submarine rift valley and the relative rotation of North Greenland; Bull. Can. Petrol. Geol., vol. 15, No. 4, 1967.

1458. King, M.S., Univ. of Saskatchewan:
Mechanical state of rock approaching failure, 1967-72.

The initial aim of this research is to determine the static stress-strain relationships and acoustic wave velocities on rock samples approaching failure under triaxial loading conditions. The rock samples will be tested in a hydraulic compression machine which has been stiffened to eliminate machine "bounce" at failure of the rock sample. It is then proposed to perform harmonic analyses on microseismic "noise" produced when a rock approaches failure, both in the laboratory and underground in a mine. This research will lead to a better understanding of the mechanism of rock failure, with applications in the prediction of earthquakes.

1459. King, M.S., Acar, K.Z., Univ. of Saskatchewan:
Rheological properties of Prairie Evaporites at elevated temperatures, 1967-71; M.Sc. thesis (Acar).

The long-term mechanical properties of the Prairie Evaporites are being studied at elevated temperatures in order to obtain their

equations of state. Knowledge of the equations of state of halite and sylvinite is basic to studies of the feasibility of mining evaporites at depths greater than 3,500 feet by conventional means, and increasing the recovery of potash mines already producing.

1460. King, M.S., Garg, O.P., Univ. of Saskatchewan:
Static and dynamic elastic properties of rocks, 1967-71; M.Sc. thesis (Garg).
The elastic properties of sedimentary rocks are being measured by static and dynamic techniques. The static elastic moduli and ultrasonic compressional and shear-wave velocities are measured simultaneously on each rock sample as it is subjected to changes in triaxial loading conditions. This research will lead to a better understanding of the reasons for the elastic moduli of rocks measured under static conditions differing from those determined by dynamic techniques. See Ultrasonic compressional and shear-wave velocities in confined rock samples; Fifth Canadian Symposium on Rock Mechanics, 1968.

1461. Lajtai, E.Z., Jain, S.K., Univ. of New Brunswick:
Strength of discontinuous rocks, 1965-; M.Sc. thesis (Jain).
A continuing project investigating the strength of simulated discontinuous rocks (models) under direct shear and triaxial loading. Several subprojects investigating the direct shear strength of partially separated rock joints have been completed. Investigations of same in a triaxial stress field are underway. See Shear strength of weakness planes in rock; Internat. Jour. Rock Mech. and Min. Sci. (in press).

1462. Manchee, E.B., Weichert, D.H., Anglin, F., Basham, P.W., Whitham, K., Observatories Branch, Dept. of Energy, Mines and Resources:
Array seismology, 1962-.
This project embraces research into detection and identification methods for explosions as well as general research into the characteristics of earthquakes and earth structure as they may be delineated by a medium aperture array. The outputs of U,K.A.E.A.-type arrays are analyzed by analogue-digital means in Ottawa. See Upper Mantle structure under the Churchill Province of the Canadian Shield, east of the Yellowknife seismic array; Jour. Phys. Earth March, 1969.

1463. Manconi, J.W., Loyola College:
Relations between thermal activation energy and fault zones, 1968-.

1464. Martignole, J., Université de Montréal:
Evolution pétrographique et structurale des formations catazonales dans le sud de la Province de Grenville, 1965-72.
Etude pétrographique et structurale des formations catazonales au NE de Montréal afin de déterminer l'évolution de la stratigraphie, du métamorphiste et du magnétisme dans le sud de la Province de Grenville. Voir Découverte du disthène dans le sud de la Province tectonique de Grenville, et signification pétrogénétique de ce minéral dans le facier granulite; C.R. Acad. Sc. Paris, Q. série, D. 23 septembre 1968.

1465. Naus, A.W., Diatomic Research Ltd., Calgary:
Effect of pressure changes caused by erosion and sedimentation on the nature and distribution of tectonic activity.

1466. North, F.K., Carleton Univ.:
Gravitational tectonics, 1963-69.
Further refinement of the genetic classification of gravitational tectonic phenomena proposed in the following paper. See Bull. Can. Petrol. Geol., vol. 12, pp. 185-225, 1964.

1467. Norton, G.W., Lajtai, E.Z., Univ. of New Brunswick:
Mechanics of single crystals of selenite, 1968-69.
The objective is to define conditions of plastic deformation by translation gliding and twinning of selenite under direct shear loading.

1468. Price, R.A., Queen's Univ.:
The significance of fabrics imposed on indurated rocks under non-metamorphic conditions, 1964-.
An investigation of the character and kinematic and dynamic significance of small-scale (mesoscopic and microscopic) fabric elements imposed upon indurated rocks deformed under non-metamorphic conditions. See The tectonic significance of mesoscopic subfabrics in the southern Rocky Mountains of Alberta and British Columbia; Can. Jour. Earth Sci., vol. 4, pp. 39-70, 1967.
Geometry and mechanics of folds in the southern Canadian Rockies, 1961-69.
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Operation Bow-Athabasca, Alberta and British Columbia, 1965-.
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1470. Reik, G.A., Univ. of Toronto:
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Caledonia gypsum consists of a matrix of fine-grained gypsum surrounding scattered angular fragments of claystone. An important change in the deformation mode of this material occurs at approximately 600 bars confining pressure. At higher pressures, deformation is uniformly distributed over the entire sample while at lower pressures deformation is accentuated in zones. At constant strain rates development of these zones is expressed in the stress-strain curves by a decrease in differential stress after the yield point.

1471. Savage, J.C., Hastie, L.M., Univ. of Toronto:
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Fitting of dislocation models to observed geodetic fault displacements. See Steketee's paradox; Bull. Seism. Soc. Amer., vol. 59, No. 1, 1969.

1472. Schwerdtner, W.M., Sirdevan, P., Univ. of Toronto:
Kinematic significance of hornblende lineations in metamorphic rocks, 1966-.
Correlation of hornblende lineations in simple structures with inferred directions and magnitudes of megascopic strain; application of the natural strain gauge thus obtained to regional strain analysis.

1473. Sharma, K., Queen's Univ.:
A structural study of the Lac Piscatosin Syncline, 1966-68; Ph.D. thesis.
This project has developed into a study of the fabric patterns developed in quartzites as contrasted with those developed in carbonate rocks. The study indicates that essentially hydrostatic pressures developed in a carbonate body during the deformation period.

1474. Siragusa, G., Schwerdtner, W.M., Univ. of Toronto:
Reconstruction of strain directions in mylonites, 1968-69; M.Sc. thesis (Siragusa).
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1475. Stauffer, M.R., Univ. of Saskatchewan:
Geometry of deformed rocks, a continuing project.
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Ground control (field studies relating to stress measurement), 1966-.
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Isostatic studies, 1968-69.
This study involves a statistical study of elevation and gravity in the region of the interior plains of Canada. The deformation of the underlying rocks in response to variations in topographic load is also being examined. The project is intended to be extended into Western and Eastern Canada as gravity and elevation data become available. The research is two fold: 1. To obtain residual (isostatic) anomaly maps for subsequent geological analysis. 2. An investigation of isostatic processes and fundamental problems of large scale gravity interpretation.

1478. Wheeler, J.O., Geol. Surv. Canada:
Southern Cordilleran structure project, 1963-69.
Structural studies across the southern Canadian Cordillera to obtain an integrated picture of the form of the structures and the relationships in space and time between the individual structures and between structural belts, thus leading to an understanding of the structural development of the southern Cordillera. See A structural section across the southern Canadian Cordillera; Geol. Assoc. Can., Spec. Paper No. 6 (in preparation).

1479. Wilson, J.T., Crawford, A.R., Morrison, R.P., Univ. of Toronto:
The current scientific revolution in the earth sciences.
Precise evidence of motions of plates of the lithosphere provided by magnetic imprinting of the ocean floors has meant a profound change in the earth sciences. The problem of the opening and closing in Phanerozoic time of the Atlantic and Pacific Oceans and of the Gulf of Mexico and the Arctic Sea is being studied and information about the world's great faults with lateral movement is being compiled.

1480. Wynne-Edwards, H.R., Queen's Univ.:
The tectonics of the Grenville Province, 1960-.
A continuing examination of the Grenville Province and the tectonic and age relations of the rocks within it. See The Grenville Province and its tectonic significance: a reply to discussion; Proc. Geol. Assoc. Can., vol. 16, pp. 59-62, 1965.

1481. Wynne-Edwards, H.R., Bourne, J.H., Queen's Univ.:
Tectonic reconstruction along the Grenville Front, 1967-69; M.Sc. thesis (Bourne).
A detailed comparison of the Grenville Front within the limit of a modern orogenic belt, combined with a compilation of the known data on the Grenville Front. See The Grenville Province and its tectonic significance; Proc. Geol. Assoc. Can., vol. 15, Pt. 2, pp. 53-67, 1964.

1482. Wynne-Edwards, H.R., Hasan, Z.U., Queen's Univ.:
Intersecting orogenic belts across the northern Atlantic, 1968-69.
The theory of continental growth by acretion has depended heavily on the interpretation that most of the granitic rocks of the Shield are new rocks produced by the latest orogenic event, and on a supposedly parallel distribution of successively younger belts of deformation outwards from a continental nucleus. Both these interpretations are no longer reasonable. The quartzofeldspathic rocks in the Grenville Province and elsewhere are largely reworked crystalline basement representing recycled parts of older structural provinces, and the arrangement of the orogenic belt around and across the north Atlantic show that discordance and transgression, rather than parallelism, are the general rules.