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NATIONAL ADVISORY COMMITTEE ON RESEARCH IN THE GEOLOGICAL SCIENCES

CURRENT RESEARCH IN THE GEOLOGICAL SCIENCES IN CANADA, 1970-71

Compiled by Thomas E. Bolton

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Thomas E. Bolton

GEOLOGICAL SURVEY OF CANADA PAPER 71-5

DEPARTMENT OF ENERGY, MINES AND RESOURCES

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CURRENT RESEARCH IN THE GEOLOGICAL SCIENCES IN CANADA, JUNE, 1970 - MAY, 1971

The research projects listed in this compilation have been obtained mainly from the universities, federal and provincial department of mines, and other non-industrial institutions carrying on research in the geological sciences; with the exception of a few projects by some of the larger oil companies, the compilation does not include research by mining and oil company geologists. Some projects in geophysics and other fields concerned with geology and geological problems were reported and are herein included; comprehensive reports on geophysical research in Canada are published annually in the Canadian Geophysical Bulletin.

The survey was made between November, 1970 and January, 1971 and records research in progress from about June, 1970 to May, 1971.

The compilation is useful in enabling research workers to see who are working in similar fields and on similar problems. It indicates lines of 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 in manuscript form in university libraries.

Success in assembling project titles and other information for such a compilation depends on the response of institutions and research worker. Acknowledgement is made in particular to those who assembled and forwarded the data on research projects in the organizations 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 and in allied fields of interest to geologists and 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 contributors have provided, in addition to the title, a short statement on the subject under investigation and references to their most recent publication on the project.

Many projects that seem to fall equally well under more than one heading are repeated under these headings. An author index (p.194) lists after each author the numbers of projects, as listed in the compilation, 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. Charlesworth, H.A.K., Akehurst, A.J., Pinsent, R.H., Univ. of Alberta:
Precambrian geology of Tete Jaune Cache and Lake Louise areas, Alberta, 1960-71.
See Geology of the region between Prince George and Jasper; Edmonton Geol. Soc., Guidebook, pp. 84-93, 1970.

2. Godfrey, J.D., Klewchuk, P., Research Council of Alberta:
Reconnaissance bedrock mapping, 1 inch to ½ mile, northeastern Alberta, 1969-; graduate project (Klewchuk).
Reconnaissance mapping on 300 square miles of Precambrian Shield in the Fort Chipewyan district.

3. Green, R., Research Council of Alberta:
Geologic map of Alberta, 1962-.
Resolution of two rock unit boundary problems will complete this map, intended to replace the 1948 map (Geol. Surv. Can., Map 1002A, 1951). See Bedrock Geology of Northern Alberta; Alberta Res. Council, 1970.

4. Mellon, G.B., and others, Research Council of Alberta:
Bedrock mapping western plains, Alberta, 1969-72.
To classify and map the Late Cretaceous-Paleocene clastic strata of west-central Alberta on the basis of lithology, petrographic and engineering properties.

5. Mountjoy, E.W., McGill Univ. and Geol. Surv. of Can.:
Mount Robson southeast map-area 83E SE., 1959-.
Regional study and mapping of structure and stratigraphy of Rocky Mountains in Alberta and British Columbia.

6. Ollerenshaw, N.C., Geol. Surv. of Can.:
Geology of the southern Alberta Foothills, Bow River to Clearwater River, 1962-75.
Structure and stratigraphy of this region to be published as a series of papers and geological maps on a scale of 1:50,000.
Rocky Mountain Foothills map and cross-section compilation, 1969-72.

7. Price, R.A., Queen's Univ.; Mountjoy, E.W., McGill Univ.; Aitken, J.D., Univ. of Calgary:
Operation Bow Athabasca, Alberta and British Columbia, 1965-.
A reconnaissance study of 12,000 square miles of the Rocky Mountains south from Jasper, Alberta to Banff, Alberta leading to the publication of a series of geological maps of scales of 1:50,000 and 1:250,000 and an analysis of the structural evolution of this part of the southern Canadian Rockies. See Geologic structure of the Canadian Rocky Mountains between Bow and Athabasca Rivers - a progress report; Geol. Assoc. Can., Sp. Paper 6, pp. 7-25, 1970.

British Columbia

8. Campbell, R.B., Geol. Surv. of Can.:
Geology of the Cariboo Mountains, British Columbia, 1959-72.
A continuing study on structural and stratigraphic problems bearing on an understanding of the tectonic history of eastern Cordillera. See Geology of the Region between Prince George and Jasper; Edmonton Geol. Soc., Field Conference Guide Book, pp. 84-93, 1970.

9. Carter, N.C., British Columbia Dept. of Mines and Petroleum Resources:
Geology and mineral deposits of the Alice Arm area, British Columbia, 1968-71.
See Geology, exploration and mining in British Columbia, 1969; B.C. Dept. of Mines Pet. Resources, pp. 60-68, 1970.

10. Church, B.N., British Columbia Dept. of Mines and Petroleum Resources:
Geology in the region between Owen Lake and Goosly Lake, British Columbia, 1969-71.
A study of vein type and massive replacement sulphide type mineralization based on regional mapping between Owen Lake and Goosly Lake and detailed mapping at Nadina Mine and the Sam Goosly prospect, covering a total area of about 300 square miles. See The geology of the Owen Lake area, in Geology, exploration and mining in British Columbia; B.C. Dept. of Mines Pet. Resources, pp. 122-141, 1969. The Sam Goosly copper-silver prospect; ibid., pp. 142-145, 1969.
Geology of the White Lake basin, British Columbia, 1969-.
A continuing study of the stratigraphy, structure and mineralization of the early Tertiary volcanic sequence near Penticton, British Columbia. See The Dusty Mac silver prospect, in Geology, exploration and mining in British Columbia; B.C. Dept. of Mines Pet. Resources, pp. 294-296, 1969.
Geology of the South Boundary area, British Columbia, 1970-72.
Mapping and research bearing on copper mineralization near the U.S. boundary southeast of Greenwood, British Columbia.

11. Gabrielse, H., Mansy, J.L., Geol. Surv. of Can.:
Operation Finlay, 1970-73; Ph.D. thesis (Mansy).
A detailed study of character, distribution, provenance and structure of the Upper Proterozoic Ingenika Group in conjunction with regional mapping of Lower Paleozoic strata.

12. McTaggart, K.C., Univ. of British Columbia:
Geology of the Coquihalla serpentine belt, 1971-74.

13. Monger, J.W.H., Geol. Surv. of Can.:
Upper Paleozoic rocks of Stikine Arch and Atlin Horst, 1966-72.
Parts of a continuing study of Upper Paleozoic sedimentation, volcanism and stratigraphy in the Western Cordillera. Available data indicate that these Upper Paleozoic strata are the most important rocks in any plate tectonic interpretation of Cordilleran history.

14. Muller, J.E., Geol. Surv. of Can.:
Geology and mineral deposits of northern Vancouver Island (N.T.S. 1021, 92L, 92E, 92K), 1968-72.

Upper Triassic sediments of northern Vancouver Island; Geol. Surv. of Can., Paper 70-1B, pp. 11-18, 1970. Northern Vancouver Island (92E, K, L, 1021); Geol. Surv. Can., Paper 70-1A, pp. 44-49, 1970.

15. Northcote, K.E., British Columbia Dept. of Mines and Petroleum Resources:
Geology and Mineral deposits of Rupert Inlet - Cape Scott area, Northern Vancouver Island, British Columbia, 1968-71.

16. Roddick, J.R., Hutchison, W.W., Geol. Surv. of Can.:
Coast Mountains Project, British Columbia, 1962-74.
A continuing investigation of the Coast Mountain between Vancouver and southeast Alaska with special emphasis on the evolution of the plutonic rocks. See Metamorphic framework and plutonic styles of the Central Coast Mountains, B.C.; Can. J. of Earth Sci., vol. 7, pp. 376-405, 1970. Bute Inlet and Pemberton map-areas; Geol. Surv. of Can., Paper 71-1A, 1971.

17. Stott, D.F., Geol. Surv. of Can.:
Cretaceous stratigraphy, Peace River to 60°, British Columbia, 1961-71.
Detailed stratigraphic investigation of mainly Lower Cretaceous rocks in Foothills and Plains of northeastern British Columbia to establish the relationships with equivalent successions studied between Peace and Smoky Rivers and in the region of Liard and Mackenzie Rivers, including Trutch (94G), Fort Nelson (94J), Maxhamish Lake (94), Toad River (94N), and Tuchodi Lake (94K) areas.

18. Tipper, H.W., Geol. Surv. of Can.:
Smithers map-area, British Columbia, 1969-72.
A re-study of the area with emphasis on the stratigraphy and paleontology of the Mesozoic rocks. As such it is part of the continuing study of Jurassic stratigraphy, history, paleontology, sedimentation, volcanology, etc., of the western Cordillera.

Manitoba

19. Bailes, A.H., Manitoba Dept. of Mines:
Preliminary compilation of the geology of the Snow Lake-Flin Flon-Sherridon area, 1969-70.
Geological mapping of the Guay Lake (63N-1E) and Wimapedi Lake (630-4) map-areas, 1969-71.
See Manitoba Mines Branch, Prel. maps 1969B-1, 1969B-2, 1970B-1.

20. Campbell, F.H.A., Manitoba Dept. of Mines:
Geology of Turnbull-Granville Lakes area; contact relationships between the Sickle and Wasekwan Groups; stratigraphy and sedimentation of the Rice Lake Group, 1969-71.
See Turnbull-Granville Lakes area; Manitoba Mines Branch, Geol. Paper 4/70, 1970.

21. Cranstone, D.A., Manitoba Dept. of Mines:
Geological mapping of the Pakwa Lake (63J15) and Pistol Lake (630E) map-areas, 1968-70.
See Manitoba Mines Branch, Prel. maps 1969D-1, and 1969D-2.

22. Cranstone, J.R., Manitoba Dept. of Mines:
Geology of Southern Indian Lake: north and east areas, 1969-71.
See Southern Indian Lake: north and east areas; Manitoba Mines Branch, Geol. Paper 4/70, 1970.
Metamorphism of the northeastern portion of Southern Indian Lake, 1970-71.

23. Elphick, S.C., Manitoba Dept. of Mines:
Southern Indian Lake, 1969-71.
See Southern Indian Lake area: Mynarski Lakes; Manitoba Mines Branch, Geol. Paper 4/70, 1970.

24. Ermanovics, I.F., Geol. Surv. of Can.:
Geological remapping of the Berens River-Dear Lake map-area, Manitoba and Ontario, 1969-70.
A three-fold division of Archean granitoid terrain between latitudes 50 to 53 degrees N. in southeastern Manitoba is used to find relict greenstone belts in uplifted granitic blocks in the Superior Structural province. Through regional mapping, this work is expected to be extended north to latitude 54. See Geology of Berens River-Deer Lake map-area, Manitoba and Ontario - A preliminary analysis of tectonic variation in the area; Geol. Surv. Can., Paper 70-29, 1971.

25. Frohlinger, T.G., Manitoba Dept. of Mines:
Southern Indian Lake, 1969-71.
See Southern Indian Lake area: Central area; Manitoba Mines Branch, Geol. Paper 4/70, 1970.

26. Hinds, R.W., Manitoba Dept. of Mines:
Southern Indian Lake, 1969-71.
See Southern Indian Lake area: Opachuanau Lake; Manitoba Mines Branch, Geol. Paper 4/70, 1970.

27. Manitoba Mines Branch, Manitoba Dept. of Mines:
Greenstone belts in the Superior province of Manitoba, 1971-.

28. McRitchie, W.D., Manitoba Dept. of Mines:
Project Pioneer, 1966-71.
Detailed and regional structural and petrological studies of metamorphic and acidic plutonic rocks in the Wanipigow-Winnipeg River region, southeast Manitoba.

29. Schledewitz, D.C.P., Manitoba Dept. of Mines:
Southern Indian Lake area, 1969-71.
See Southern Indian Lake area: Rat Lake; Manitoba Mines Branch, Geol. Paper 4/70, 1970.

30. Steeves, M.A., Lamb, C.F., Manitoba Dept. of Mines:
Southern Indian Lake, 1969-71.
See Southern Indian Lake area: Geology of the Opachuanau Lake-Issett Lake-Pemichigamau Lake-Earp Lake area, 1970.

31. Thomas, K.A., Manitoba Dept. of Mines:
Southern Indian Lake, 1969-71.
See Southern Indian Lake area: southwest portion; Manitoba Mines Branch, Geol. Paper 4/70, 1970.

32. Weber, W., et al., Manitoba Dept. of Mines:
Kasmere Lake project, 1971-73.
Mapping project, northwestern corner of Manitoba, 58°45' - 60°00'/101°00' - 102°00'.

New Brunswick

33. Fyffe, L., Irrinki, R., New Brunswick Dept. of Natural Resources:
Mapping of N-7, M-7, M-8 quarter-mile map sheets, New Brunswick, 1970-71.
Detailed stratigraphic and structural studies are emphasized.

34. Grant, R., Univ. of New Brunswick:
Preliminary geological map, Loch Alva area, New Brunswick, 1969-71.

35. Greiner, H.R., Univ. of New Brunswick:
Geologic mapping in the Dalhousie-Campbellton area, New Brunswick, 1970-72.

36. Skinner, R., Geol. Surv. of Can.:
Plaster Rock map-area, New Brunswick, 1970-72.
See Plaster Rock map-area, New Brunswick; Geol. Surv. Can., Paper 71-1, Part A, 1971.

Newfoundland and Labrador

37. Brueckner, W.D., Memorial Univ. of Newfoundland:
Problems of Avalon Peninsula geology, 1959-.
This project deals with a variety of bedrock problems, emphasis being laid on the sedimentary formations and their diastrophic deformation without excluding the interrelationships with volcanic and intrusive rocks. See Geology of eastern part of Avalon Peninsula - a summary; Am. Assoc. Petrol. Geol., Mem. 12, pp. 130-138, 1970.

38. Butler, J., Bartlett, G., Newfoundland and Labrador Dept. of Mines, Agriculture and Resources:
Bibliography of the geology of Newfoundland and Labrador, 1814 through 1968, 1967-70.
See Bibliography of the geology of Newfoundland and Labrador, 1814 through 1968; Mineral Res. Div., Bulletin 38, 1970.

39. Cumming, L.M., Bostock, H.H., Geol. Surv. of Can.:
Operation Strait of Belle Isle, 1968-72.
To determine the structure and origin of the Strait of Belle Isle for possible future engineering construction, and to assess petroleum and mineral potential of the operation-area.

See Operation Strait of Belle Isle, Quebec and Newfoundland-Labrador (Parts of 2M, 3D, 12I, 12P, 13A); Geol. Surv. Can., Paper 70-1, Pt. A, pp. 3-8, 1970 (Cumming). Precambrian Rocks, Long Range Mountains, Northwest Labrador (12I); ibid., pp. 125-129, 1970 (Bostock).

40. Greene, B.A., Newfoundland and Labrador Dept. of Mines, Agriculture and Resources:
Geological map of Labrador 1:1,250,000, 1970-72.

41. Hughes, C.J., Memorial Univ. of Newfoundland:
Geology of eastern Avalon, Newfoundland, 1966-72.
Petrography of lavas, marine tuffs and sediments and "volcanic" granites.

42. Mullins, J., Newfoundland and Labrador Dept. of Mines, Agriculture and Resources:
Geology, St. Catherines (east half) map-area (1N/3 E/2), 1968-70.
See Geology, St. Catherines (east half) map-area (1N/3 E/2); Mineral Res. Div., Geol. Rep. No. 15, 1970).

43. Mullins, J., Fogwill, W.D., Greene, B.A., Newfoundland and Labrador Dept. of Mines, Agriculture and Resources:
Map Index of Geological, Geophysical and Related Maps, Newfoundland and Labrador, 1968-70.
See Map index, geological, geophysical and related maps; Mineral Res. Div., Information circular No. 13, 1970.

44. Sutton, J.S., Brown, P., Memorial Univ. of Newfoundland:
The Geology of the area from Cape Ray to La Poile, southwestern Newfoundland, 1970-72; M.Sc. thesis (Brown).

45. Williams, H., Calcutt, M.J., Memorial Univ. of Newfoundland:
Geology of Fortune Bay, Newfoundland, 1969-71; M.Sc. thesis (Calcutt).
Regional study is concerned mainly with Precambrian stratigraphy and relationships between Precambrian and Palaeozoic rocks and a detailed study with the stratigraphy and sedimentation of the Devonian (?) Cinq Isle Formation.

Northwest Territories

46. Bostock, H.H., Geol. Surv. of Can.:
Itchen Lake map-area, District of Mackenzie, 1964-71.
A study of the structural and age relations of the Yellowknife Group within the map-area with emphasis on determination of extent and origin of the gold-bearing rocks, and mapping and structural interpretation of the Proterozoic outlier at Rockinghorse Lake. The area includes rocks of Abukuma-type facies series that vary in metamorphic grade from greenschist to upper amphibolite facies. See Geol. Surv. of Can., Paper 68-1B, pp. 72-76.

47. Cook, D.G., Aitken, J.D., Balkwill, H.R., Yorath, C.J., Geol. Surv. of Can:
Operation Norman, District of Mackenzie, 1968-71.

Reconnaissance mapping program, lower Mackenzie and Anderson River, Northwest Territories. See Simpson Lake map-area, District of Mackenzie (97B); Geol. Surv. of Can., Paper 69-10, 1970.

48. Cook, D.G., Aitken, J.D., Balkwill, H.R., Chamney, T.P., MacKenzie, W.S., Macqueen, R.W., Usher, J.L., Yorath, C.J., Geol. Surv. of Can., Univ. of Calgary (Aitken), Queen's Univ. (Usher):
Operation Norman - geology of the Mackenzie Plains, Franklin Mountains, and northern Mackenzie Mountains, District of Mackenzie, 1967-72.
See Operation Norman, District of Mackenzie, N.W.T.; Geol. Surv. Can., Paper 71-1, Part A, 1970.

49. Henderson, J.B., Geol. Surv. of Can:
Yellowknife and Hearne Lake map-areas, District of Mackenzie, 1970-74.
To revise and interpret the geology and economic potential of the Precambrian terrain of the project area known only through earlier gross reconnaissance. See Yellowknife and Hearne Lake map-areas, District of Mackenzie; Geol. Surv. of Can., Paper 71-1, Part A, 1971.

50. Jackson, G.D., Benson, D.G., Davison, W.L., Ermanovics, I.F., Crawford, W.J.:
Operation Penny Highlands, 1969-.
Helicopter reconnaissance of 55,000 sq. miles in south-central Baffin Island.

51. Kerr, J.W., Geol. Surv. of Can.:
Stratigraphy and structure, central Ellesmere Island, Northwest Territories, 1961-70.
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.
Stratigraphy and structure, S.W. Ellesmere Island and N.W. Devon Island, Northwest Territories, 1967-72.
The investigation will produce further 1 inch to 2 mile maps of the region.

52. Kerr, J.W., Temple, P.G., Geol. Surv. of Can.:
Stratigraphy and structure, Bathurst Island, Northwest Territories, 1963-70.
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.

Nova Scotia

53. Bingley, J.M., Isenor, G.C., Wambolt, R., Nova Scotia Dept. of Mines:
St. Mary's River basin project, 1970.
An assessment of the Horton sedimentary basin (lower Carboniferous) of Colchester, Pictou and Guysborough Counties, including its stratigraphy, structure and potential mineral occurrences.

54. Potter, W.G., Milligan, G.C., Nova Scotia Dept. of Mines:
Windsor Basins project - Cape Breton Island, 1970.
An assession of the economic geology of the Windsor marine sedimentary basins, including geological mapping, geochemistry and geophysical surveys.

Ontario

55. Ayres, L.D., Ontario Dept. of Mines and Northern Affairs:
Favourable Lake-Poplar Hill compilation sheet, 1968-71.
See Favourable Lake-Poplar Hill area; Ontario Dept. of Mines, Misc. Paper 43, 1970.
Northwind Lake area, Ontario, 1970-72.
See Northwind Lake area; Ontario Dept. of Mines, Misc. Paper 43, 1970.

56. Baer, A.J., Geol. Surv. of Can.:
Geology of the Precambrian Shield in the Rivière Gatineau map-area, Québec and Ontario, 1968-.
Large-scale reconnaissance preparatory to a compilation map at 1:1 million. See Geol. Surv. Can., Paper 70-1A, 1970; Paper 71-1A, 1971.

57. Bennett, G., Ontario Dept. of Mines and Northern Affairs:
The geology of Strathcona, Briggs, Strathy and Chambers Townships, Ontario, 1969-72.
Geological mapping at a scale of 1 inch to ¼ mile for final publication at 1 inch to ½ mile. Final report to include a study of the stratigraphy and mineral deposits of the four townships. See The geology of Strathcona Township; Ontario Dept. of Mines, Prel. Map P. 596; The geology of Briggs Township; Ibid., Prel. Map P. 595.

58. Bennett, G., Thurston, P.C., Giguere, J.F., Ontario Dept. of Mines and Northern Affairs:
Operation Pukaskwa, 1968-71.
Geological mapping at 1 inch to 1 mile with final report to include study of petrography, stratigraphy and mineral deposits of area.

59. Blackburn, C.E., Ontario Dept. of Mines and Northern Affairs:
Geology of the Otukamamoan Lake area, Ontario, 1970-71.

60. Bright, E.G., Ontario Dept. of Mines and Northern Affairs:
Geology of Beemer, English and Zavitz Townships, District of Sudbury, Ontario, 1967-71.
See Ontario Dept. of Mines, Prel. Maps P. 453-455.
Geology of Moher, Semple and Hutt Townships, District of Sudbury, Ontario, 1968-71.
See Ontario Dept. of Mines Prel. Maps P. 489-91.
Operation Pamour - Timmins data series, 1970-71.
Helicopter supported field mapping and drill core collection survey of 45 townships lying immediately north of Timmins centered around the Texas Gulf-Kidd Creek Mine. Outcrop, geology, drill hole geology and ground and airborne geophysical data will be published at a scale of 1 inch to ¼ mile. Aeromagnetic anomalies and interpreted geology will be

shown on inset maps at a scale of 1 inch to 1 mile. Final publication of interpreted regional geology of entire area will be at 1 inch to 2 and 4 miles.

61. Bright, E.G., Lovell, H.L., Petruk, W., Ontario Dept. of Mines and Northern Affairs:
Geology and mineral deposits of the Cobalt-Kirkland Lake-Timmins region of Ontario; 1972-I.G.C. Field trip A39, 1970-71.

62. Card, K.D., Palonen, P., Ontario Dept. of Mines and Northern Affairs:
Louise-Eden area, District of Sudbury, Ontario (Project 68-3), 1968-71; M.Sc. thesis (Palonen), Univ. of Calgary.
The map-area is located in the Southern Province immediately northwest of the Grenville Front and is underlain by metasedimentary rocks of the Huronian Supergroup and mafic and granitic intrusions of various ages.
Shakespeare-Dunlop area, District of Sudbury, Ontario, 1970-71 (Project 70-1).
The map-area is located at the boundary between the Southern and Superior provinces and is underlain by granitic and mafic intrusive rocks of the Superior Province, by metasediments and metavolcanics of the Huronian Supergroup, and by mafic intrusions of several ages.

63. Carter, M.W., Ontario Dept. of Mines and Northern Affairs:
Operation Rossport, 1969-71.
Areal reconnaissance mapping at a field scale of 1" to ¼ mile of a primarily migmatite belt, to outline the principal rock formations and provide information on the character of known mineral deposits and their distribution relative to rock units and/or structures. See Operation Rossport; Ontario Dept. Mines, Misc. Paper 43, 1970.

64. Carter, M.W., McIlwaine, W.H., Robeson, D., Ontario Dept. of Mines and Northern Affairs:
Geology of Nipigon Schreiber area, District of Thunder Bay, Ontario, 1970-71.
This is a revision of the Nipigon Schreiber geological compilation map.

65. Chandler, F.W., Teal, P.R., Ontario Dept. of Mines and Northern Affairs:
McMahon and Morin Townships, Ontario, 1970.
Refinement of Lower Huronian Stratigraphy in terms of current nomenclature.

66. Davies, J.C., Ontario Dept. of Mines and Northern Affairs:
Geology of the Atikwa Lake area, Ontario, 1966-70.
See Ontario Dept. Mines, Prel. Maps P. 387, 388.
Geology of the north part of Shoal Lake, Ontario, 1966-71.
See Ontario Dept. Mines, Prel. Maps P. 527,568.
Geology of Western Peninsula, Lake of the Woods, Ontario, 1969-71.
See Ontario Dept. Mines, Prel. Maps P. 594, 604.

67. Dreimanis, A., Geol. Surv. of Canada:
Surficial geology, Port Stanley map-area, Ontario (40 I/II, west-half), 1968-71.

68. Fenwick, K.G., Ontario Dept. of Mines and Northern Affairs:
Geology of the Finlayson Lake area, Ontario, 1967-71.
Geology of the Lang-Cannon Lakes area, Ontario, 1969-71.

69. Frarey, M.J., Geol. Surv. of Can.:
Lake Panache-Collins Inlet map-areas, Ontario, 1969-72.
A revision of earlier work with emphasis on Huronian stratigraphy, and relationship of Southern Province to Grenville Province in this area and nature of the boundary.

70. Jensen, L.S., Ontario Dept. of Mines and Northern Affairs:
Geological report of Melba and Bisley Townships, District of Timiskaming, Ontario, 1968-70.
See Preliminary Maps; Melba Township P. 519; Bisley Township P. 520; Ontario Dept. Mines.
Geological report of Clifford and Ben Nevis Townships, District of Timiskaming, Ontario, 1969-71.
Geological report of Ossian and Pontiac Townships, District of Timiskaming, Ontario, 1970-71.

71. King, H.L., Ontario Dept. of Mines and Northern Affairs:
Keewatin-Kenora area, 1969-72.
Geological mapping at 1 inch to ½ inch of a metasedimentary-metavolcanic sequence bounded on the north by gneissic and granitic rocks.

72. Kustra, C.R., Thurston, P.C., Ontario Dept. of Mines and Northern Affairs:
Obonga-Leigh Lakes area, Ontario, 1965-71.

73. Liberty, B.A., Geol. Surv. of Can., Brock Univ.:
Palaeozoic mapping in southwestern Ontario, 1969-.

74. Lovell, H., Ontario Dept. of Mines and Northern Affairs:
Geology and scenery in and near the Lake Timiskaming rift valley, 1968-71.
Lebel Township, Ontario, 1969-71.

75. Lovell, H., Frey, E., Ontario Dept. of Mines and Northern Affairs:
New Liskeard-Englehart area, Ontario, 1970-72.

76. Lumbers, S.B., Ontario Dept. of Mines and Northern Affairs:
Geology of the Burwash area, Ontario, 1967-70.
Geology of the Tomiko area, Ontario, 1969-71.
Parts of a reconnaissance mapping program initiated in 1964 to study the geology of the northwestern part of the Grenville Province in Ontario. See Ontario Dept. Mines, Misc. Paper 43, 1970.

77. Mackasey, W.O., Ontario. Dept. of Mines and Northern Affairs:
Geology of Dorothea, Sandra and Irwin Townships, District of Thunder Bay, Ontario, 1967-70.
See Guide to Sturgeon River metavolcanic-metasedimentary formations in the Beardmore-Geraldton area; Proc. Sixteenth Annual Institute on Lake Superior Geology, pp. 69-84, 1970.
Geology of Walters and Leduc Townships, District of Thunder Bay, Ontario, 1968-71.

Geology of Eva and Summers Townships, District of Thunder Bay, Ontario, 1969.
See Ontario Dept. Mines, Prel. Maps P. 601, 602, 1970.
Geology of Barbara, Meader and Pifher Townships, District of Thunder Bay, Ontario, 1970-72.
One inch to ¼ mile mapping of the geology and mineral deposits in part of the Sturgeon River Gold Belt.

78. McIlwaine, W.H., Ontario Dept. of Mines and Northern Affairs:
Geology of the Gowganda area, District of Timiskaming, Ontario, 1966-71.
See Ontario Dept. Mines, Prel Maps P. 374, 475, 517, 518.
Geology of Dorion and McTavish Townships, District of Thunder Bay, Ontario, 1970-73.

79. McIlwaine, W.H., Wallace, H., Ontario Dept. of Mines and Northern Affairs:
Geology of Black Bay peninsula and vicinity, District of Thunder Bay, Ontario, 1970-71.

80. Meyn, H.D., Ontario Dept. of Mines and Northern Affairs:
Sweeny, Beaumont, Beresford Townships, Ontario, 1 inch to ½ mile, 1970-71.

81. Milne, V.G., Ayres, L.D., Lumbers, S.B., Ontario Dept. of Mines and Northern Affairs:
Geological Map of Ontario, 1 inch to 16 miles, 1969-71.

82. Pryslak, A.P., Ontario Dept. of Mines and Northern Affairs:
Tustin Bridges area, District of Kenora, Ontario, 1967-71; M.Sc. thesis.
Geology of Corless, Dent, Knott and Mitchell Townships, District of Kenora, Ontario, 1969-71.
See Knott and Corless Townships, District of Kenora (Patricia Portion); Ontario Dept. Mines, Misc. Paper 43, 1970.

83. Pyke, D.R., Ontario Dept. of Mines and Northern Affairs:
Fallon and Fasken Townships, District of Timiskaming, Ontario, 1968-71.
See Ontario Dept. Mines, Prel. Maps P. 496, 497.
Adams and Eldorado Townships, District of Timiskaming, Ontario, 1969-71.
See Ontario Dept. Mines, Prel. Maps P. 571, 572.
McArthur-Geikie area, District of Cochrane, Ontario, 1970-72.
Grassy River- Whitefish River area, Districts of Cochrane and Timiskaming, Ontario, 1970-73.

84. Riley, R.A., Ontario Dept. of Mines and Northern Affairs:
Muleahy Township (north half), Ontario, 1968-71.
Ball, Todd, Fairlie, and Byshe Townships, Ontario, 1970-.
Remapping of the west end of the Red Lake metavolcanic-metasedimentary belt and selected areas of the east end of the belt. Special emphasis on volcanology and economic geology.

85. Robertson, J.A., Ontario Dept. of Mines and Northern Affairs:
Geology of Flack Lake-Moune Lake area, Ontario, 1969-72.
See Ontario Dept. Mines, Prel. Maps P. 609 Twp. 1B; P. 610 Twp. 1A.

Geology of the Algoma-Massey area, Ontario, 1969-75.
Stratigraphy, structure and economic geology of Victoria and Salter Townships and Indian Reserve No. 5.

86. Robertson, J.A., Card, K.D., Ontario Dept. of Mines and Northern Affairs:
Geology and scenery of the north shore of Lake Huron, 1970-72.

87. Rupert, R.J., Ontario Dept. of Mines and Northern Affairs:
Geological map Twp. 29, R. 23, Ontario, 1 inch to $\frac{1}{4}$ mile, 1970-71.

88. Rupert, R.J., Leahey, E.J., Giblin, P.E., Ontario Dept. of Mines and Northern Affairs:
Southeast $\frac{1}{4}$ of Manitouwadge-Wawa Compilation, Ontario, 1964-71.

89. Rupert, R.J., Mirza, S., Ontario Dept. of Mines and Northern Affairs:
Subsurface compilation, Elliot Lake area, 1970-72.

90. Thurston, P., Carter, M.W., Riley, R., Ontario Dept. of Mines and Northern Affairs:
Fort Hope-Landsdowne House compilation map, Ontario, 1968-71.

91. Thurston, P., Sage, R., Siragasa, G., Ontario Dept. of Mines and Northern Affairs:
Operation Winisk Lake, 1970-72.
Helicopter supported reconnaissance geological mapping of area bounded by 52°30'-54° N. Lat. 86°-90° W. Long. and 90°-92° W. Long. 52°30'-53° N. Lat.

92. Thurston, P., Siragusa, G., Sage, R., Watkinson, D., Ontario Dept. of Mines and Northern Affairs:
Operation Chapleau, 1969-71.
Helicopter supported reconnaissance geological mapping of area bounded by 49°-46°45' N. Lat 82°-84° W. Long.

93. Trowell, N., Ont. Dept. of Mines and Northern Affairs:
Glitter Lake area, Ontario, 1970-71.
Geological mapping of the Sturgeon Lake greenstone belt, Districts of Kenora and Thunder Bay.

Quebec

94. Allard, G.O., Quebec Dept. of Natural Resources:
Revision of the geology and structure of the Dore Lake Complex, Chibougamau district, Quebec, 1966-71.
Continuation of a detailed study of the Dore Lake Complex and a detailed survey of structures which might be worth exploring for ore deposits. See Geology of the northwest quarter of Lemoine township; Quebec Dept. Natural Res., Prel. Rept. 589, 1970.

95. Bassaget, J.P., Ministère des Richesses Naturelles du Québec:
Geology of the North coast of the St. Lawrence River between Natashquen and Musquaro, Quebec, 1968-72.

96. Bourque, P.A., Quebec Dept. of Natural Resources:
Western half of the Saint-John river anticline, Gaspé Peninsula, Quebec, 1969-71.
To establish a stratigraphic sequence for the Silurian in the eastern part of the Gaspé Peninsula.

97. Chown, E.H., Ministère des Richesses Naturelles du Québec:
Geology of the Otish Mountains, Quebec, 1963-71.
Includes studies of the sedimentary history of the Otish Group, differentiation and alteration of the Conflans gabbro sill complex, and structure of the Otish Mountains.

98. Cimon, J., Quebec Dept. of Natural Resources:
Northeast quarter of Hauy township and northwest quarter of Queylus township, Chibougamau district, Quebec, 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.

99. de Römer, H.S., Quebec Dept. of Natural Resources:
McGerrigle Mountains area, Gaspé North County, Quebec, 1 inch to 1,000 feet, 1966-.

100. Eakins, P.R., McGill Univ. and Quebec Dept. of Natural Resources:
Geology of LaReine and LaSarre townships, Quebec, 1970-72.
General and structural studies in a region of amphibolitized volcanic rocks; delimitation of major structures in the vicinity of an important mixing camp.

101. Feuerbach, M., Quebec Dept. of Natural Resources:
Southeast quarter of Scott township, Chibougamau district, Quebec, 1 inch to 1,000 feet, 1966-.
Continuation of a detailed study of the Dore Lake Complex and of the Chibougamau greenstone belt.

102. Franconi, A., Sharama, K., Ministère des Richesses Naturelles du Québec:
Grenville Project, 1965-73.
An interim report on the same area is also on open file. See Dept. of Natural Resources, Quebec Preliminary Report "Geology of the Toulmoustouc, Sainte Marguerite and Moise Rivers area, Saguenay County.

103. Germain, M., Quebec Dept. of Natural Resources:
Northwest quarter of Vauquelin township, Val d'Or district, Quebec, 1 inch to 1,000 feet, 1969-.

104. Globensky, Y., Ministère des Richesses Naturelles du Québec:
Revision of the Three Rivers map-area, Quebec, 1970-71.

105. Héroux, Y., Quebec Dept. of Natural Resources:
Sayabec, Val Brillant and La Redemption area, Matapedia County, Quebec, 1 inch to 500 feet, 1969-71; Ph.D. thesis.

106. Imreh, L., Quebec Dept. of Natural Resources:
Northern part of Baby township, Temiscaming county, Quebec, 1 inch to 1,000 feet, 1968-.

Third 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.

107. Kretz, R., Ministère des Richesses Naturelles du Québec and Univ. d'Ottawa:
Géologie de la région Kazabazua-Fort Coulonge, Québec, 1955-72.
Metamorphic geology of Fort Coulonge-Otter Lake area, Quebec, 1955-.

108. MacIntosh, J.A., Quebec Dept. of Natural Resources:
Clericy township mapping, district of Rouyn-Noranda, Quebec, 1 inch to 1,000 feet, 1967-70.
Area underlain by mafic to felsic flows, pyroclastic rocks, and acid intrusions. There are indications of gold, zinc and copper mineralizations.

109. Mills, J.P., Quebec Dept. of Natural Resources:
Regional geology of the Sakami Lake and Long Lake areas, Quebec, 1965-71; Ph.D. thesis.
Regional stratigraphy in the Bachelor Lake - Lake Puskitamica region, Abitibi-East, Quebec, 1968-71.

110. Mukherji, H.H., Ministère des Richesses Naturelles du Québec:
Geology around St. Blandine, P.Q., 1970-72.
Detailed mapping of various stratigraphic units and structural features and tracing of various carbonate facies in the St. Leon Formation that might provide clues as to the future gas and oil possibilities.

111. Otton, J.K., Ministère des Richesses Naturelles du Québec:
Lake Loudron area, Montcalm and Joliette Counties, Quebec, 1970; Ph.D. thesis.

112. Pouliot, G., Hocq, M., Ecole Polytechnique:
Pétrologie et tectonique des roches Grenville de la région de Pipmuacan (Est), 1968-72; thèse de doctorat (Hocq).
L'analyse pétrographique de quelque 600 lames minces est quasi complétée et l'analyse de quelque 190 olivines par diffraction-X a permis d'individualiser plusieurs bandes de troctolites. Quelque 100 plagioclases des séries rubanées anorthositiques ont permis de définir les variations dans ces assemblages. Nos travaux portent présentement sur le massif syenite-granite qui recoupe les séries anorthositiques. Les travaux minéralogiques (optique et diffraction-X) effectués jusqu'a présent sur ces granites suggèrent en zonation; cette zonation est déjà suggérée par les levés de terrains. Quelque 50 analyses chimiques totales réparties sur les roches du massif granitique, sur les pyroxènes des anorthosites et sur les amphibolites contenues dans les gneiss de couverture permettront d'étudier les affinités pétrochimiques de ces différentes unités.

113. Pourret, G., Ministère des Richesses Naturelles du Québec:
Revision of the geology of the Kipawa Lake area, Québec, 1970-73.

114. Remick, J.H., Ministère des Richesses Naturelles du Québec:
Geology of the Evans Lake area, Quebec, 1 inch to ½ mile, 1969-72.
Regional mapping and study of the metamorphosed volcanic and sedimentary rocks in the area, especially the large zone of rhyolite and pyroclastic rocks.

115. Rive, M., Ministère des Richesses Naturelles du Québec:
Geology of the Dumoine Lake area, Quebec, 1970.

116. van de Walle, M., Quebec Dept. of Natural Resources:
Southern half of Montbeillard township, district of Rouyn-Noranda, Quebec, 1 inch to 1,000 feet, 1969-71.
Second phase of a program leading to a complete mapping of an area (Montbeillard township) underlain by Precambrian rocks.

117. Vogel, D.E., Quebec Dept. of Natural Resources:
Northwest quarter of Villebon township, Val d'Or district, Quebec, 1 inch to 1,000 feet, 1969-72.

Saskatchewan

118. Beck, L.S., Saskatchewan Dept. of Mineral Resources:
Geology of the Pasquia Hills area, 1967-.
An area from the Manitoba border to Longitude 104°W. and from Latitude 52°30'N. to 53°30'N.

119. de Zoysa, T.H., Saskatchewan Dept. of Mineral Resources:
Ena Lake (west half): 74-N-16-W, 1970-71.

120. Forsythe, L.H., Saskatchewan Dept. of Mineral Resources:
Morning Lake area (east half): 73-P-5-E, 1 inch to 1 mile, 1970-71.

121. Johnston, W.G.Q., Saskatchewan Dept. of Mineral Resources:
Southend area (west half): 64-D-6-W, 1 inch to 1 mile, 1970-71.
Examination of the contact zone between Kisseynew type gneisses and lower grade metasediments and metavolcanics.

122. Kays, M.A., Saskatchewan Dept. of Mineral Resources:
Hara Lake area (east half): 64-M-1-E, 1 inch to 1 mile, 1970-71.
Mapping of a portion of the Wollaston fold belt.

123. Kupsch, W.O., Univ. of Saskatchewan:
Annotated bibliography of Saskatchewan geology, supplement to cover 1966-1970 (incl.), 1970-71.
See Annotated bibliography of Saskatchewan geology (1923-1965 incl.); Saskatchewan Dept. Min. Resources, 1967.

124. Langford, F.F., Univ. of Saskatchewan:
Geology of the Wapawekka area, 1969-70.
Pleistocene and Mesozoic geology; economic geology of silica and kaolin.

An area bounded by latitude 54°N. to 55°N. and longitude 104°W. to 106°W.

125. Lewry, J.F., Saskatchewan Dept. of Mineral Resources:
Glennie Lake area (east half): 63-M-12-E, 1970-71.

126. Scott, B.P., Saskatchewan Dept. of Mineral Resources:
Charcoal Lake area: 64-L-16, 1970-71.
Mapping of a portion of the Wollaston fold belt.

Yukon Territory

127. Blusson, S.L., Tempelman-Kluit, D.J., Geol. Surv. of Can.
Operation Stewart, 1969-71.
Solution of stratigraphic problems relating to the tectonic history of the eastern Yukon, Mackenzie Mountains region.

128. Tempelman-Kluit, D.J., Geol. Surv. of Can.:
Operation Snag-Aishihik Lake, Yukon Territory, 1970-72.
A regional geological reconnaissance of Aishihik Lake (115H), Snag (115J and 115K,E½) and Stewart River (115N,E½) map-areas in the Yukon.

General Problems

129. Hesse,R., Stephan W., McGill Univ. and Geol. Surv. of Bavaria:
Geological Map of Bavaria, 1:25,000; sheet no. 8234 Penzberg incl. table of sections. Explanations for the above 1959-70.
Stratigraphic and structural survey of a portion of the central part of the eastern Alpine Flysch Belt (Hesse).

130. Norford, B.S., Geol. Surv. of Can.:
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.

131. Robertson, J.A., Ontario Dept. of Mines and Northern Affairs:
Miscellaneous projects Elliot Lake area.

132. Tanguay, M.G., Bensoussan, M.A., Ecole Polytechnique:
Etude de la réflectance spectrale des matériaux terrestres, 1969-73.

133. Tanguay, M.G., Do Lam Sinh, M., Ecole Polytechnique:
Optical processing of aerial photo patterns by coherent light, 1969-73.

DATA STORAGE AND RETRIEVAL

134. Agterberg, F.P., Geol. Surv. of Can.:
Computer oriented research on mineral deposits, 1967-.
See Interpolation of areally distributed data; Quart. Colorado School Mines, vol. 64, pp. 217-237, 1969.
Statistical models for geologic processes, 1967-.
Autocorrelation functions in geology: Colloquium on Geostatistics; Plenum Publ. Corp., New York, pp. 113-141, 1970.

135. Agterberg, F.P., Fabbri, A.G., Geol. Surv. of Can.:
Probability models for estimating mineral potential.
A detailed study is being made for a volcanic belt in the Superior Province (Timmins-Kirkland Lake area, Ontario, and Noranda-Val d'Or area, Quebec). Results are being extrapolated to less well-explored areas on the Canadian shield. See Multivariate prediction equations in geology; Math. Geol., vol. 2, pp. 319-324, 1970.

136. Alvey, G.C., Robertson, W.A., Chevron Standard Ltd.:
Application of computer science to exploration geology, 1964-.

137. Barton, E., Eakins, P.R., McGill Univ.:
Computer application to tectonic data, 1970-71; M.Sc. thesis (Barton).
A detailed analysis of structural elements of the Granby area, Quebec.

138. Brown, P., Carleton Univ.; Cruden, D.M., Univ. of Ottawa:
Fabric of Ottawa Region, 1970-.
An attempt to compile a data bank of fabric elements on all scales for the region around Ottawa.

139. Charlesworth, H.A.K., Univ. of Alberta:
Processing data relating to structural geology by means of the computer, 1963-.

140. Coakley, J.P., Inland Waters Branch, Canada Centre for Inland Waters:
Development of computer and statistical techniques for reduction of Great Lakes sediment data, 1968-.
See Natural and artificial sediment tracer experiments in Lake Ontario; Proc. 13th Conf. for Great Lakes Res., 1970.

141. David, M., Ecole Polytechnique:
Application of the theory of regionalized variable to ore Reserve Estimation, 1968-70.
See The geostatistical estimation of porphyry type deposit and scale factor problem; Proc. Intern. Mining Pribram Symp., 1970.

142. David, M., Ecole Polytechnique; Lacourse, J., Univ. de Montréal:
Application of Universal Kriging to mapping problems of aeromagnetic data, 1969-.
Several numerical interpolation techniques have been used to draw contour maps of aeromagnetic data. So far no studies have been done to try and take into account as much as possible the spatial correlations which are encountered in the field of variation. Universal kriging is a technique which has been suggested in 1969 by G. Matheron.

143. David, M., Ecole Polytechnique; Turgeon, R., Univ. de Montréal:
Preparation of programs for multivariate statistical analysis, 1968-.

144. Donaldson, J.A., Cecile, M., Carleton Univ.:
Initiation of a computer-processable file of geological data for Precambrian strata of the western Canadian Shield, 1970-72; M.Sc. thesis (Cecile).
Field data collected during regional studies of three Helikian sequences (Dubawnt Group, Hornby Bay Group, upper Coppermine River Group) are to be coded for storage and retrieval (including provision for retrieval of maps of specific parameters). The data file will be augmented with information accumulated during laboratory study of station samples.

145. Edgar, A.D., Univ. of Western Ontario:
Data processing file of undersaturated alkaline rocks, 1968-73.

146. Ferguson, S.A., Groen, H.A., Haynes, R., Wallace, K.R. (Mrs.), Ontario Dept. of Mines and Northern Affairs:
Computer processing of Ontario deposits of uranium and thorium, 1970-71.
The input document consists of four pages which gives location by various means, the name and address of the present owner and three previous owners, types of development, ore minerals, stratigraphic location, rock types orientation, dimension and grade of the mineralized zones, amount of reserves, references, etc.

147. Fuzesy, A. (Mrs.), Saskatchewan Dept. of Mineral Resources:
Canadian index to geoscience data: Saskatchewan section, 1969-72.
Part of Saskatchewan's contribution to the Canadian Index to Geoscience Data. Intially it is to contain data from unpublished files.

148. Gilliland, J.A., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Computer research on groundwater hydrographs, 1967-70.
To determine the applicability of techniques from communication theory to hydrograph analysis; to utilize large quantities of computer-compatible hydrograph data to detect small periodic fluctuations in groundwater hydrograph; and to study the phenomenon of water table fluctuations in response to changes in barometric pressure. See A rigid plate model of the barometric effect; J. Hydrology, vol. 7, pp. 233-245, 1969.

149. Govett, G.J., Chapman, R.P., Univ. of New Brunswick:
Evaluation and comparison of different statistical methods of interpreting multi-element geochemical drainage data, 1969-71; M.Sc. thesis (Chapman).
To evaluate various statistical methods such as 'R'-mode Factor Analysis, 'Q'-mode Factor Analysis, Trend Surface Analysis, Multigroup discriminant function analysis, rolling mean analysis in terms of (i) local, (ii) regional geochemical drainage exploration. Determine satisfactory method(s) to process a large quantity of regional geochemical information.

Determine optimum sample densities (data from Saint John-St. George area and Bathurst-Jacquet River area, New Brunswick).

150. Gower, J., Murphy, L., Godwin, C.I., Univ. of British Columbia:
Techniques and applications of digitizing drill-core information, 1970-71.

151. Grice, R.H., McGill Univ.:
Computer-based storage and selective retrieval of Geotechnical exploration data, 1965-.

152. Grove, G., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Aquifer analysis, 1970-71.
To develop GOWN-oriented computer programs for the automated analysis of the effect of artificially induced aquifer stresses.

153. Grove, G., French, J., Inland Waters Branch, Dept. of Energy, Mines and Resources:
GOWN - operation and maintenance, 1968-.
To operate and maintain a general purpose hydrogeologic data storage and retrieval system for all types of hydrogeologic data for the use of the Inland Waters Branch and other agencies and to produce automatically, maps and sections displaying hydrogeologic information.

154. Larsson, J.O., Nichol, I., Queen's Univ.:
The application of computerized techniques in the interpretation of reconnaissance data from New Brunswick, 1970-71.
To assess the usefulness of multivariate statistical procedures as methods for increasing the reliability of the interpretation of geochemical reconnaissance data.

155. Russell, R.D., Blenkinsop, J., Loveless, A.J., Meldrum, R.D., Mitchell, D.L., Ozard, J.M., Univ. of British Columbia:
Isotope geophysics - instrumentation; Ph.D. (Blenkinsop and Meldrum) and M.Sc. thesis (Mitchell).
In the past year, the laboratory has acquired an Interdata Model 4 digital computer. The computer has been interfaced with three mass spectrometers and a synchronous tape drive. Partially completed programming allows for on-line reduction of certain mass spectra.

156. Shiau, S.Y., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Flow pattern analysis, 1970-72.
To develop GOWN-oriented computer program for the automated analysis of groundwater flow patterns to obtain: (a) basin recharge-discharge profiles; (b) natural basin yields; (c) basin wide water balance evaluations based on (a) and (b).

157. Smith, F.G., Univ. of Toronto:
Computation and plotting of liquidus data in multicomponent systems, 1963-75.
The number of significant papers, books, reports, etc. on liquidus data of possible interest to a physical geochemist was found to be very large. The major effort in this project

is obtaining all the data and converting it to computer-accessible form. The computer programs to use the data have been tested, but the data must be obtained.

158. Smith, F.G., Le, V., Univ. of Toronto:
Information storage, retrieval and manipulation of all information in a selected field of physical geochemistry, 1963-74.
This system uses free text of author(s), title, source, and descriptors of the subject matter. The information is stored on a disk pack and is accessed by a 360/65 computer. Optimal procedures and cost of gathering and processing relevant information are being assessed for publication.
Grain growth in metamorphic rocks, 1965-73.
The extensive literature on grain growth is still being searched. Items of interest are being processed for storage, retrieval and manipulation by computer.

159. West, G.F., Clee, T., Univ. of Toronto:
A computer program for interpretating refraction-wide angle reflection seismic data.
A computer program package for interpreting refraction-wide angle reflection seismic data in terms of a layered medium with arbitrary gently curved interfaces (three-dimensions). Travel times and amplitudes of specified types of rays are calculated, for specified points of emergence. The reflection part is fully operating and the refraction parts is under construction.

160. Wynne-Edwards, H.R., Sharma, K.N.M., Queen's Univ.:
Application of electronic data processing to geological mapping in Quebec, 1968-72.
A cooperative project with the Quebec Dept. of Natural Resources, using field date coordinated by Dr. A. Laurin.

161. Zodrow, E.L., Univ. of Western Ontario:
Contribution to the theory of mineral samples (in 2 parts), 1968-71.
See Factor analysis and magnetite formation and distribution in the Smallwood Mine; Min. Eng. Trans. AIME, vol. 247, pp. 61-69, 1970.

ENGINEERING GEOLOGY

162. Anderson, E.G., Neilson, J.M., Queen's Univ.:
Engineering geology of a portion of Beverly Township, 1969-70.

163. Barron, K., Bielenstein, H.U., Eisbacher, G.H., Herget, G., Mines Branch, Dept. of Energy, Mines and Resources:
Geomechanics, 1966-.
To determine the effect of geologic structure on both the stresses within and the strength of rock masses surrounding mine excavations. This requires measurements of in-situ stresses and strengths, and the development of methods for interpreting geologic structure together with correlation of these factors. See Tectonic interpretation of elastic-strain-recovery measurements at Elliot Lake, Ontario; Mines Branch

Res. Rept. R210, 1969. Brittle fracture initiation in, and ultimate failure of rocks; 2nd International Congress, Intern. Soc. Rock Mechanics, Belgrade, 1970.

164. Barron, K., Coates, D.F., Gyenge, M., Hedley, D., Yu, Y., Mines Branch, Dept. of Energy, Mines and Resources:
Stability of slopes in rocks, 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 use of artificial support as a means of stabilizing slopes or as a means of increasing slope angle.

165. Benham, W.R., Neilson, J.M., Queen's Univ.:
Preliminary engineering geology investigation of northern Pittsburg Township, 1969-70.

166. Blunden, R., Mathews, W.H., Univ. of British Columbia.
Urban geology, Vancouver, British Columbia, 1969-71.

167. Bozozuk, M., Burn, K.N., Eden, W.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 The mechanics of landslides in Leda Clay; Can. Geotechnical J., vol. 7, No. 3, pp. 285-297, 1970. On the yielding and mechanical strength of Leda clays; Can. Geotechnical J., vol. 7, No. 3, pp. 297-312, 1970. Groundwater flow in Eastern Ottawa; Can. Geotechnical J., vol. 7, No. 3, pp. 326-332, 1970.

168. 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 boundary of the discontinuous and continuous permafrost zones, Arctic Archipelago and Western Cordillera, are being collected continuously by direct field observations, review of the technical literature, and reports form 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 Occurrence of permafrost in canadian peatlands; Proc. Third Intern. Peat Congress, pp. 174-181, 1970. Permafrost as an ecological factor in the subarctic; Proc.

Symp. on Ecology of Subarctic Regions, UNESCO, pp. 129-140, 1970. Permafrost in Canada: its influence on northern development; Univ. Toronto Press, 1970.

169. Chagnon, J.Y., Quebec Dept. of Natural Resources:
Landslides and quick clays in the Province of Quebec, 1967-.
Dam site investigations (20 sites in 1970), 1967-.

170. Cruden, D.M., Mines Branch, Dept. of Energy, Mines and Resources:
Effects of fluids on mechanical properties of brittle rocks, 1970-.
See A theory of brittle creep in rocks under uniaxial compression; J. Geophys. Res., vol. 75, p. 3431-3442, 1970.

171. Eivemark, M.M., McGill Univ.:
Relationship between engineering geology investigations in urban areas and foundation design requirements, 1970-71; M.Sc. thesis.

172. Green, R., and others, Research Council of Alberta:
Environmental geology of the Foothills and contiguous areas.
To map and integrate those aspects of the bedrock and surficial geology of selected portions of the Foothills relevant to land classification and utilization.

173. Hunt, G., Neilson, J.M., Queen's Univ.:
Geotechnical survey of southwest Pittsburg Township, 1969-70.

174. Johnston, G.H., Division of Building Research, National Research Council:
Structures in permafrost, 1950-.
To develop the design criteria for foundations in permafrost and for construction of engineering facilities and structures on permafrost. Inuvik, Northwest Territories - Observations of ground temperatures, pile movements, etc., being made to assess the ground thermal regime and the performance of engineering structures and facilities on permafrost, e.g., roads, airstrip, wharf, building foundations and utilidors. Thompson, Manitoba - Observations being made to assess the ground thermal regime in soil and rock and the performance of thermo-syphon devices and building foundations. Kelsey and Kettle Gen. Stations, Manitoba - Observations to assess the performance of dykes on permafrost. Churchill, Manitoba - Observations to assess the performance of a water supply main in permafrost. Oil and Gas pipelines - assessment of geotechnical problems associated with pipelines in permafrost. See Dykes on permafrost: predicting thaw and settlement; Can. Geotechnical J., vol. VII, No. 4, 1970.
Anchorage in permafrost, 1965-71.
Evaluation of the time-deformation (creep) characteristics and long term strengths of various types of anchors in permafrost. Field testing program of anchors in permafrost at Thompson completed in 1970.

175. Kennedy, T.S., Neilson, J.M., Queen's Univ.:
A comparative design study for tile drainage, 1969-70.

176. King, M.S., Univ. of Saskatchewan:
Rheological properties of Prairie Evaporites, 1968-72.

The long-term mechanical properties of the Prairie Evaporites are being studied at temperatures and pressures typical of those found in Saskatchewan at subsurface depths to 5000 feet. Knowledge of the rheological equations of state of sylvinite is basic to studies of the feasibility of (a) mining potash at depths greater than 3500 feet by conventional means, and (b) increasing the recovery of potash from mines already producing.

Underground acoustic measurements, 1970-74.

The objectives of this reasearch are to develop an acoustic system, initially for use in Saskatchewan potash mines (a) to determine the evaporite cover by a reflection technique, (b) to locate and delineate other geologic discontinuities underground, and (c) to determine the stability of mine pillars and backs.

177. King, M.S., Kurfurst, P.J., Univ. of Saskatchewan:
Static and dynamic elastic properties of rocks, 1967-72.

The elastic properties of rocks are being measured experimentally by static and dynamic techniques. The static stress-strain relations and ultrasonic-wave velocities are measured simultaneously on each rock sample as it is subjected to changes in triaxial loading conditions and with different pore saturants. These tests are performed in a controlled-environment chamber at temperatures in the range $-6^{o}F$ to $+75^{o}F$. This research will lead to a better understanding of the reason for the elastic properties of rocks measured under static conditions differing form those determined by dynamic methods. The prediction of the behaviour of foundations of large structures and underground installation subjected to earthquakes or blast effects will be facilitated, for both temperature and permafrost regions.

178. King, M.S., Leuschen, A.A., Univ. of Saskatchewan:
Mechanical state of rock approaching failure, 1967-75.

The objectives are to determine methods for predicting the onset of rock failure from analyses of the following laboratory measurements, made at temperatures in the range $-6^{o}F$ to $75^{o}F$: (a) microseismic noise emitted by the rock, (b) velocities of compressional and shear waves in the rock, (c) relationship between the static and dynamic mechanical properties as the rock approaches failure under triaxial loading conditions. This reasearch has potential applications in the design of foundations for large structures to resist earthquakes in both temperate and permafrost regions, in the drilling and excavation of rock and in the prediction of pillar failure in underground mining.

179. King, R.D., Neilson, J.M., Queen's Univ.:
Changes in physical properties of rocks with depth of burial and their significance if site investigation, 1969-70.

180. Lajtai, E.Z., Univ. of New Brunswick:
Brittle fracture of rocks, 1965-.

To examine and quantify: conditions of tensile fracture initiation, conditions of shear fracture initiation, the process of interaction between flows, the influence of flow size, and eventually the mechanism involved in the evolution of shear fractures and faults.

181. Laroque, G.E., Coates, D.F., Darling, J.A., Mines Branch, Dept. of Energy, Mines and Resources:
Explosives and blasting research, 1963-72.

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

183. Martin, M.J., Neilson, J.M., Queen's Univ.:
Preliminary site investigation of the proposed Fairmont Subdivision, 1969-70.

184. Owen, E.B., Geological Surv. of Canada:
Engineering geology and mapping, Welland Canal, 1962-71.
See Geol. Surv. Can., Paper 71-1, Pt. A, 1971.

185. McPherson, R.A., Research Council of Alberta:
Urban geology of the greater Edmonton area.
A project has been initiated to provide guidelines for the future development of the City of Edmonton which are based upon the natural resources and environmental characteristics of an area encompassing 36 townships, within which Edmonton is centrally located. A series of maps will be prepared in which areas will be graded for specific land uses pertaining to waste disposal, mineral exploitation, general construction, recreation, agriculture, and aesthetic purposes.

186. 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 Frost heaving forces in Leda Clay; Can. Geotechnical J., vol. VII, No. 1, pp. 8-16, 1970. Thermal conductivity of frozen soils; Can. J. Earth Sciences, vol. VII, No. 3, pp. 982-987, 1970.

187. Penner, E., Eden, W.J., Division of Building Research, National Research Council:
Expansion of pyritic shale in Ottawa area, 1969-71.
Examples of shale expansion have been found, which have led to damages to buildings. The expansion has been traced to a complex weathering process which takes place in the presence of autotrophic bacteria and results in a volume increase of the shale.

188. Pouliot, G., Etudiants gradués (à venir), Ecole Polytechnique:
La mesure de la structure des argiles glaciaires par méthodes de diffraction-X, 1969-72.
Ce travail vise à développer et à utiliser un appareil de type goniomètre universel pour la mesure de l'orientation des minéraux argileux au sein des argiles. Le travail effectué jusqu'à présent comprend: (1) rapport de fin d'études (thèse d'ingénieur); (2) quelques essais d'imprégnation au carbowax 6000 ainsi que des mesures d'intensité des pics (001) de l'illite dans diverses coupes sur un même échantillon.

189. Pouliot, G., Loiselle, A., Ballivy, G., Ecole Polytechnique:
Minéralogie et propriétés géotechniques des argiles de la Baie James, 1968-70; thèse de maîtrise (Ballivy).

Voir Quelques caractéristiques minéralogiques et géotechniques des dépôts d'argile du Nord-Ouest du Québec (Région de Matagami-Fort Rupert), (résumé); 38e Congrès de l'ACFAS, Supplément aux Annales, vol. 37, p. 50, 1970.

190. Rousell, D.H., Laurentian Univ.:
Strain determination of experimentally deformed oolitic limestone, 1969-71.
To determine the strain from several cylinders of oolitic limestone experimentally shortened in a triaxial test apparatus. Parameters of strain are changes in shape and orientation of the ooids and mechanically formed twins in calcite.

191. Smith, G.F., Neilson, J.M., Queen's Univ.:
Geotechnical study of foundation and construction materials in southeast Pittsburg Township, 1969-70.

192. Soles, J.A., Mines Branch, Dept. of Energy, Mines and Resources:
Mineralogy and petrography of construction materials and their utilization in different climatic conditions, 1959-.

193. Suprun, A.J., Neilson, J.M., Queen's Univ.:
Slope stability of open-face rock cuts, Highways 401 and 2, Kingston-Gananoque, Ontario, 1969-70.

GEOCHEMISTRY

Analytical Methods and Analysis

194. Abbey, S., Champ, W.H., Courville, S., Sen Gupta, J.G., Geol. Surv. of Canada:
Development of methods for the analysis of geological materials, 1952-.
Development work continues on refinement and extension of optical emission spectrographic and atomic absorption methods; improvement of precision and accuracy of x-ray fluorescence analysis for major components of rocks and of the chemical determination of sulfur and carbon. New work under way includes development of methods for traces of precious metals and of the rarer alkali metals. See Rapid combustion methods for determining sulfur; Anal. Chim. Acta, vol. 49, pp. 519-525, 1970. Determination of carbon by non-aqueous titration; ibid., vol. 51, pp. 437-447, 1970. Analysis of rocks and minerals by atomic absorption, Pt. 3, a lithium-fluoborate scheme; Geol. Surv. Can., Paper 70-23, 1970.

195. Abbey, S., Champ, W.H., Courville, S., Sen Gupta, J.G., and supporting staff, Geol. Surv. of Canada:
Analysis of rocks and minerals, a continuing project.
The group continues to provide compositional data on geological materials for the benefit of the scientific programs of the Geological Survey of Canada. Contributions have also been made in the analysis of lunar rocks. See Chemical composition of lunar material; Science, vol. 167, pp. 530-531, 1970.
Analysis of international reference samples, 1953-.

The group continues to participate in collaborative analysis of proposed standard samples of rocks and minerals. Samples already done or now under study have originated in Canada, the U.S.A., the U.K., France, Switzerland, the U.S.S.R., Czechoslovakia, Tanzania, South Africa and Japan. Studies have also been undertaken on the assignment of acceptable concentration values for major, minor and trace components of the various proposed standards, on the basis of published data from many sources. See U.S.G.S. Standards - a critical study of published analytical data; Can. Spectroscopy, vol. 15, pp. 10-16, 1970.

196. Lapointe, C.M., Dibbs, H.P., Mines Branch, Dept. of Energy, Mines and Resources:
The effect of nuclear radiation on adsorption at the mineral-solution interface, 1969-.
Initial measurements have been made of the flotation recovery of quartz following exposure to a high-intensity cobalt-60 source. An increase in flotation yield over that from non-irrodiated quartz was found.

197. 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 rocks and minerals.

198. Nebesar, B., Mines Branch, Dept. of Energy, Mines and Resources:
Combustion method for the determination of sulphur in iron ores, 1966-71.
A major portion of the project, comprising the development and testing of a new gas-permeable combustion boat cover has been already completed. Such covers are now being used in designed experiments to evaluate the influence of various experimental variables. See Techniques for mounting and measuring gas permeability of soft, sheet-form refractories; Materials research standards, vol. 10, p. 76, 1970.
High-precision chemical analysis of sulphidic materials, differential spectrophotometric determination of sulphur, 1965-71.

199. Perrault, G., Hébert, P., Ecole Polytechnique:
Recherche sur les méthodes analytiques pour les oligo-éléments des roches et des minérais, 1965-.
Nous continuons nos recherches sur les méthodes de mesure des oligo-éléments des roches: (1) par fluorescence X; (2) par spectrophotométrie d'absorption atomique.

200. van Loon, J.C., Lichwa, J., Univ. of Toronto:
Determination of trace inorganic cations natural waters, 1969-.

201. van Loon, J.C., Sermer, T., Wright, G., Univ. of Toronto:
Development and evaluation, ion selective electrodes, 1968-; M.Sc. thesis (Sermer,and Wright).

202. Volborth, A., Dalhousie Univ.:
Analysis of rocks by fast-neutron activation, 1968-73.
Nonstoichiometry studies of oxides and sulfides, 1968-74.
Geochemistry of Halifax County granites, 1969-75.

Ionic constituents in lunar glasses and mineralogy of lunar dust, 1970-71.

203. Webber, G.R., McGill Univ.:
Application of instrumental methods of analysis to geological materials, 1959-.
See Mercury and sulpnur in two intrusive complexes, Rougemont and Lake Dufault, Quebec; Geol. Assoc. Can., Proc. vol. 22, pp. 11-18, 1970.

Chemical Oceanography and Limnology

204. Conroy, N., Kramer, J.R., McMaster Univ.:
Limnological aspects of shield lakes, 1969-71; M.Sc. thesis (Conroy).
Primary production, nutrients, biomass are related to rock and soil type in soft water shield lakes. Limiting nutrients to biological production are defined.

205. Cronan, D.S., Univ. of Ottawa:
Geochemistry of ferromanganese deposits from the world ocean, 1964-.
Regional geochemistry of Pacific pelagic sediments; 1968-71.
See Average abundances of Mn, Fe, Ni, Co, Cu, Pb, Mo, V, Cr, Ti and P in Pacific pelagic clays; Geochim. et Cosmochim. Acta, vol. 33, pp. 1562-1565, 1969.

206. Cronan, D.S., Murty, P.S.N., Univ. of Ottawa:
Geochemistry of sediments from the North Atlantic Ocean, 1969-72; M.Sc. thesis (Murty).

207. Cronan, D.S., Sozanski, A., Univ. of Ottawa:
Ferromanganese deposits in Canadian lakes, 1969-72; M.Sc. thesis thesis (Sozanski).

208. Cronan, D.S., Thomas, R.L., Univ. of Ottawa and Canada Centre Inland Waters:
Geochemistry of ferromanganese deposits in the Great Lakes, 1969-.
See Ferromanganese oxide concretions in Lake Ontario; Can. J. Earth Sci., vol. 7, pp. 1346-1349, 1970.

209. Fritz, D.W., Queen's Univ.:
Trace elements in carbonates, 1970.
A study is aimed at determining suites of trace elements in carbonates and studying the effects of (1) diagenetic processes, and (2) lithification and burial on the suites.

210. Hitchon, B., Research Council of Alberta:
Geochemistry of formation waters, oils and gases in western Canada, and surface waters of Mackenzie River drainage basin.
Regional variations of river water composition resulting from halite solution, Mackenzie, River drainage basin, Canada; Water Resources Research, vol. 5, pp. 1395-1403, 1969. See Geochemistry and origin of formation waters in the western

Canada sedimentary basin. 1. Stable isotopes of hydrogen and oxygen; Geochim.et Cosmochim. Acta, vol. 33, pp. 1321-1349, 1969.

211. Kramer, J.R., McMaster Univ.:
Short-lived cyclical chemical phenomena in lakes, 1966-.
Stoichiometry of biological uptake and release and cyclicity of data are related to biological processes for a eutrophic (Erie) and oligotrophic (Huron) lake.

212. Thomas, R.L., Cronan, D.S., Inland Waters Branch, Canada Centre for Inland Waters and Univ. of Ottawa:
Inorganic geochemistry of the Great Lake sediments, 1968-.
Analytical work comprises total major element analysis and selected minor element analysis using X.R.F., A.A.S., and standard wet chemical methods. Acoustic surveys of the lakes are run in association with geochemical sampling to prepare detailed regional sediment distribution plans. Sedimentological parameters are also investigated on samples collected during this program. See Ferro-manganese concretions in Lake Ontario; Can. J. Earth Sci., vol. 7, p. 1346, 1970.

213. Warry, N.D., Kramer, J.R., McMaster Univ.:
Iron sulfide-iron phosphate minerals in fresh water eutrophic lakes, 1970-72; M.Sc. thesis (Warry).
Redefinition of mineralogy of iron sulfides (mackinavite, greigite, melmkorite, etc.) and iron phosphates (dufrenite, strengites, vivianite) is achieved by X-ray diffraction. A survey of Lake Erie sediments reveals the interplay of S-PO_4 as (a) function of a bacterial action and (b) oxidation potential.

Exploration Geochemistry

214. Arnold, R.G., Saskatchewan Research Council:
Trace metal geochemistry in rocks, large sediments and waters in Saskatchewan, 1969-73.
Trace metal dispersions in lake waters and sediments near oxidizing mineral showing is being investigated. See The concentrations of metals in lake waters and sediments of some Precambrian lakes in the Flin Flon and La Ronge areas, Saskatchewan; Geol. Div. Circular 4.

215. 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 informations on the mobility of elements in the surficial environment. See The Cu, Pb, Zn, Mo, and Mn content of stream and spring sediments, southwestern New Brunswick: N.T.S. 21-G/6, 7, 8W, 10, 11; Rept. Investigation No. 11, 1970.

Primary and secondary dispersion of molybdenum and tungsten and associated metals near molybdenum-tungsten mineralization in granite, 1968-71.

Four granitic facies have been recognized in the area of known Mo and W occurrences, three of which are known to contain Mo and W minerals. The research work is an attempt to determine the most favorable facies that will lead to the mineralized zone based on the distribution of trace elements: Mo, W, Sn, Cu, Pb, Zn, Co and Ni. The behavior of Mo and W in the secondary environment is also being investigated with special reference on the effect of the Fe and Mn content of the stream sediments and soil.

216. Azzaria, L.M., Université Laval:
Mercury in soil and air from the vicinity of ore deposits; forms of mercury in soil from the vicinity of ore deposits; trace mercury analysis in soils, rocks, sediments, water, air, and organic matter, 1965-.

See Mercury analysis in geochemical exploration; Bull. Can. Mining Met., vol. 62, pp. 521-530, 1969.

217. Blain, C.F., Nichol, I., Queen's Univ.:
Regional geochemical reconnaissance in northwest Ontario, 1969-72; Ph.D. thesis (Blain).

To evaluate the viability of low density sampling as a procedure for identifying large scale areas of increased mineral potential in the Canadian Shield area of northwest Ontario.

218. Closs, L.G., Nichol, I., Queen's Univ.:
Interpretation of geochemical reconnaissance data from the Springdale Peninsula, Newfoundland, 1970-73; Ph.D. thesis (Closs).

To evaluate various computerized procedures in elucidating subtle though significant information from multi-element geochemical drainage reconnaissance data from the Springdale Peninsula, Newfoundland.

219. Coleman, L.C., Univ. of Saskatchewan:
Geology and geochemistry of the Hanson Lake area, Saskatchewan, 1962-.

Work is continuing on studies of the occurrence of trace metals (Cu, Zn and Ni) in bedrock samples from the Hanson Lake area. New work may be started on the geology, geochemistry and geochronology of Precambrian rocks in the area immediately east of Hanson Lake. See Geology and geochemistry of the Hanson Lake area, Saskatchewan; Saskatchewan Res. Council, Geol. Div., Rept. No. 10, 1970.

220. Crosby, R., New Brunswick Dept. of Natural Resources:
Geochemistry of antimony in the secondary environment, 1970-72; M.Sc. thesis.

The role of organic matter, clay minerals, Fe and Mn hydroxides in the fixation of antimony in stream sediments and soil is being investigated. The nature of the dispersion patterns of antimony in a mineralized and nonmineralized zones is being studied based on the behavior of the element in order to formulate rules regarding the use of antimony as a path

finder element in the search for antimony deposits in routine geochemical prospecting.

221. Darling, R., Ambrosii, G., Ecole Polytechnique:
Exploration géochimique dans la région de Preissac-LaCorne, Québec, 1968-72; thèse de doctorat (Ambrosii).
Une étude de la distribution des oligo éléments choisis entre les minéraux majeurs des batholithes de Preissac et LaMotte. Le but de cette étude est de lier le comportement de ces éléments et leur redistribution pendant la période post-magmatique du refroidissement des granites à la formation des gisements post-magmatiques de Li et Mo qui se trouvent associés avec ces granites.

222. Darling, R., Gélinas, L., Campiglio, C., Guha, J., Ecole Polytechnique:
La pétrologie et la géochimie du batholithe Bourlamaque: développement d'une méthode de prospection, 1969-72; thèse de doctorate (Campiglio).
Le batholithe de Bourlamaque est composé d'un gabbro quartzique en partie altéré par des processus post-magmatiques. Il contient, dans quelques endroits, des sulfures (Cu, Mo) disséminés. Il y a aussi plusieurs mines d'or dans les bordures du batholithe. Le but principal de ce projet sera d'étudier la pétrographie et la géochimie du batholithe, de préciser l'histoire de sa cristallisation magmatique et de son altération post-magmatique, de relier à cette histoire la formation des gisements d'or et des concentrations de Cu, Mo. On espère que ce travail pourra donner des indications pétrographiques, minéralogiques ou géochimiques utiles à la prospection de ces métaux. Le projet est divisé en deux parties: a) et b). M. Campiglio (partie a) étudie la géochimie des roches totales et la distribution des éléments choisis entre les silicates dans ces roches. M. Guha (partie b) étudie la distribution et la composition des sulfures dans le batholithe.

223. Darling, R., Gélinas, L., Hardy, R., Ecole Polytechnique:
La pétrologie et la géochimie des roches ultramafiques et des gisements de nickel associés de la région de Cape Smith, Québec, 1969-72; thèse de doctorat (Hardy). L'étude de la pétrographie et de la distribution des éléments majeurs et oligo éléments choisis dans les roches ultramafiques et des gisements associés. Le but de cetter recherche est: (a) d'expliquer l'histoire de la cristallisation magmatique et métamorphique de ces minérais et de ces roches et le comportement des oligo éléments lors de ces processus et (b) de trouver des indices chimiques qui seront utiles en prospection pour des gisements de Ni dans un milieu géologique semblable.

224. Darling, R., Spitz, G., Ecole Polytechnique:
La géochimie des roches autour du gisement de cuivre de SOQUEM, Canton de Louvicourt, Québec, 1969-71; thèse de maîtrise (Spitz).
Echantillonnage des roches autour du gisement et leur analyse pour des éléments majeurs et des oligo éléments choisis.

225. Davenport, P.H., Nichol, I., Queen's Univ.:
Geochemical dispersion associated with the Cu-Zn-Ag deposit at Uchi Lake, northwest Ontario, 1969-72; Ph.D. thesis (Davenport).

The investigation is aimed at recognizing diagnostic geochemical criteria which would serve to identify mineralization of the Uchi Lake type from non-economic mineralization characterized with similar geophysical anomalies.

226. Dyck, W., Geol. Surv. of Canada:
Development of radiochemical exploration methods using radon, 1968-72.
Radon and uranium tests in surface waters and sediments carried out during the 1969 field season in a 500-square mile area in the Beaverlodge, Saskatchewan region showed that both methods are applicable for regional prospecting for uranium.

227. Fortescue, J.A.C., Winn, R., Brock Univ.:
The experimental application of geochemical prospecting methods to the delineation of areas of pollution in the vicinity of St. Catharines, Ontario, 1970-71.

228. Foster, J.R., Nichol, I., Queen's Univ.:
The application of partial extraction techniques in geochemical exploration, 1969-72.
To assess the application of selected partial extraction techniques to specific problems of geochemical exploration.

229. Govett, G.J., Austria, V., Univ. of New Brunswick:
Primary and secondary dispersion of Mo and W and associated metals near Mo-W mineralization in granite, New Brunswick, 1968-71; M.Sc. thesis (Austria).
To determine the relation between trace element assemblages in bedrock, soils and stream sediments characteristic of Mo-W mineralization in New Brunswick.

230. Govett, G.J., Felder, F., Univ. of New Brunswick:
The use of trace element analysis in soils and stream sediments as a means of differentiating different types of Pb-Zn deposits in the Devonian carbonates in Northwestern Spain, 1970-71; M.Sc. thesis (Felder).
To study the distribution of trace elements (Cu, Zn, Pb, Cd, Ag, Hg) in the mineralized zone, adjacent country rock, soils and stream sediments, in order to determine trends and patterns associated with various types of mineralization. One major deposit and a half dozen showings and anomalous areas have been selected, and samples of the soils, stream sediments and mineralized rock have been taken.

231. Govett, G.J., Lahti, H.R., Univ. of New Brunswick:
Some factors contributing to secondary dispersion of trace elements in glacial soils of the St. Stephen area, New Brunswick, 1969-71; M.Sc. thesis (Lahti).
Evaluation of controlling factors in the dispersion of some trace elements from bedrock through primarily glacial soils; fundamental soil tests such as pH, cation exchange capacity, free iron, organic carbon and X-ray analysis of the clay size portion of the soil were conducted on profile soil samples from 21 pits. The use of soil data in conjunction with the trace element distribution in the soil profiles and bedrock has provided some conclusions as to which of the factors significantly affect the dispersion of trace elements in glacial soils.

232. Govett, G.J., Villard, D.J., Univ. of New Brunswick:
Factors affecting the geochemical dispersion of uranium in stream sediments in a river in central New Brunswick, 1970-71; M.Sc. thesis (Villard).
To explain the anomalous dispersion of stream sediments in a river detected by a Cominco exploration program in 1969. The interference effects of Mn and Fe on the fluorometric analysis of uranium will be determined. This information will be put to use in further geochemical exploration for uranium.

233. Govett, G.J., Whitehead, R.E., Univ. of New Brunswick:
A study of the trace element distribution in the host rocks and massive sulphides at Heath Steele Mines Ltd., New Brunswick, 1970-72; M.Sc. thesis (Whitehead).
To provide a useful tool for locating blind ore zones by means of rock geochemistry.

234. Gunton, J.E., Nichol, I., Queen's Univ.:
The relationship between primary and secondary dispersion associated with Copper mineralization at Princeton, British Columbia, 1970-73; M.Sc. thesis (Gunton).
To establish the relationship between primary and secondary dispersion patterns associated with the Copper Mountain mineralization near Princeton, British Columbia, in order to evaluate their use in mineral exploration.

235. Hornbrook, E.H.W., Geol. Surv. of Canada:
Development of biogeochemical exploration methods for metallic mineral deposits for winter use, 1967-69.
Feasibility pilot study of geochemical reconnaissance methods in the Ennadai-Rankin belt, 1970-72.

236. Jonasson, I.R., Geol. Surv. of Canada:
Mercury in soil gas applied to exploration for sulphide ores, 1969-71.
To establish environmental relationships and physio-chemical mechanisms which control the migration of mercury from base-metal deposits to the surficial environment i.e., to establish the chemical routes by which mercury may move between ore, bedrock, soils, streams, plants, and atmosphere. Particular emphasis is being placed on a study of the forms in which mercury occurs in the various media and especially in soil gases. Work to date indicates a broad division of mercury compounds into elemental, inorganic and organo-metallic classes in soil and soil gas materials. See Mercury in the natural environment; A review of recent work; Geol. Surv. Can., Paper 70-57, 1970.

237. Kelly, R., Winter, H., Quebec Dept. of Natural Resources:
Geochemical study of the Mt-Laurier area, Quebec, 1970-.

238. Larsson, J.O., Nichol, I., Queen's Univ.:
The application of computerized techniques in the interpretation of reconnaissance data from New Brunswick, 1970-71.
To assess the usefulness of multivariate statistical procedures as methods for increasing the reliability of the interpretation of geochemical reconnaissance data.

239. Trueman, E.A., Clark, A.H., Queen's Univ.:
Minor element studies on sulphides, oxides and silicates from the Copper Mountain area, British Columbia; 1968-70; M.Sc. thesis (Trueman).
This geochemical study forms part of a more comprehensive metallogenetic project in south-central British Columbia.

240. Truscott, M.G., Coleman, L.C., Univ. of Saskatchewan:
Geochemistry and petrology of Tertiary igneous rocks of the Sweet Grass Hills, Montana; Ph.D. thesis (Truscott).
Investigation of the petrology and geochemistry of Tertiary alkaline volcanics and near surface intrusives in the area of East Butte in the Sweet Grass Hills, Montana are being carried out. Geological mapping and sampling was carried out during the summer of 1970 by Truscott.

241. Wolfe, W.J., Ontario Dept. of Mines and Northern Affairs:
Application of biogeochemistry in mineral exploration in glaciated terrain, 1969-71.
Studies of biogeochemical responses to various types of mineralization in glaciated environments of the Precambrian Shield. See Biogeochemical distribution of cobalt in second year aspen and birch twigs; Ontario Dept. Mines, Prel. Geochem. Map No. P.600, 1970.
Primary dispersion of ore elements in Precambrian igneous intrusive rocks, 1969-72.
Current studies involve examination of the distributions of Cu, Pb, Zn, Mo, Li and Ba in Precambrian felsic intrusions in Ontario. See Geochemistry of syenitic stocks in Cairo and Otto Townships, District of Timiskaming; Ontario Dept. Mines, Misc. Paper 43, 1970.

Isotope Geochemistry

242. Brooks, C., Univ. of Montreal:
The development of Shield areas (with special reference to Canada) by means of geochemical and isotope/geochronologic analysis, 1968-74.

243. Burnie, S.W., Schwarcz, H.P., Crocket, J.H., McMaster Univ.:
Sulphur isotopes in sandstone copper deposits in Michigan, 1968-71; M.Sc. thesis (Burnie).
An investigation of sulfur isotope variation in the Nonesuch Formation from Michigan with a view to substantiation of a possible sedimentary origin of these ores.

244. Clarke, D.B., O'Nions, R.K., Dalhousie Univ.:
K/Rb and strontium isotope ratios in a suite of basalts from Baffin Island, Northwest Territories, 1969-70.
There are petrological reasons to believe that these low-K tholeutes are representative of primary magnas. New data on K and Rb concentrations as well as $Sr^{87}/86$ ratios (0.7028) tend to confirm the earlier findings. See Tertiary basalts of Baffin Bay: Possible primary magna from the mantle; Contrib. Mineral. Petrol. vol. 25, pp. 203-224, 1970.

245. Draper, R.G., Montgomery, D.S., Wanless, R.K., Mines Branch, Dept. of Energy, Mines and Resources and Geol. Surv. of Canada:
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, 1967-71.

246. Folinsbee, R.E., Univ. of Alberta:
Stable isotope studies, 1955-.
Stable isotope studies of objects of geological interest; primarily the study of isotopes in ores in an attempt to unravel the source or sources of the ore forming solutions. See Carbon-13 and Oxygen-18 in dinosaur, crocodile, and bird egg-shells incicate environmental conditions; Science, vol. 168, pp. 1353-1356, 1970. Lead and sulphur isotopes of the Irish base metal mines in Carboniferous carbonate host rocks (abstract); Internat. Assoc. on the genesis of ore deposits, Tokyo meeting, 1970.

247. Fritz, P., Univ. of Alberta:
Isotopic characteristics of dolomites, 1968-71.
Investigations into the waterbalance etc. of evaporitic lakes with low salinities in the Edmonton area.

248. Jordan, F.W., Schwarcz, H.P., McMaster Univ.:
Boron isotopic fractionation during adsorption by clay minerals, 1968-71; Ph.D. thesis (Jordan).
See Boron isotopic fractionation during clay adsorption from sea-water; Earth Plan. Sci. Lett., vol. 6, pp. 1-5, 1969.

249. Marchand, M., Crocket, J., McMaster Univ.:
Strontium isotope studies of igneous rocks, 1969-74; Ph.D. thesis (Marchand).
Studies of alkaline complexes and diamantiferous kimberite by strontium isotope mass spectrometry have been carried out. Currently under study is the Sr isotopic composition of melt rocks from the Onaping formation, Sudbury and rocks from crater in Quebec.

250. Schwarcz, H.P., McMaster Univ.:
Sulfur isotope fractionation in sulfide ore minerals, 1967-71.
Experimental calibration of pyrite-galena-sphalerite fractionations; temperature determinations in metamorphosed ore deposits. See Experimentally determined sulfur isotope fractionations between sulfide minerals; Earth Plan. Sci. Lett., vol. 7, pp. 162-166, 1969.
Oxygen isotope ratios of evaporitic sulfates, 1968-.

251. Schwarcz, H.P., Clarke, W.B., McMaster Univ.:
Mg-Isotopic composition of lunar and meteoritic plagioclase, 1967-71.
Search for evidence of extinct 0.7×10^6 y. Al^{26} in plagioclase from lunar basalt and meteorites. See Al26-Mg26 dating of feldspar in meteorites; J. Geophys. Res., vol. 75, pp. 448-462, 1970.

252. Shieh, Y.N., Schwarcz, H.P., McMaster Univ.:
Oxygen isotope ratios in granitic and associated rocks of the Grenville Province, 1968-71.

Paragneiss, migmatite, and granite from high-grade Grenville terranes are anomalously O^{18}-deficient. The granites do not appear to have formed by anatexis. In a lower grade area, the granites are lighter than intruded metasediments but heavier than "typical" plutonic granites.

253. Thompson, P., Schwarcz, H.P., Ford, D., McMaster Univ.:
U, Th, O and C isotope studies of caves, 1967-71; Ph.D. thesis (Thompson).
Dating of calcite deposits in limestone caves by radioactive disequilibrium; dating of Pleistocene glaciations by measurement of O^{18}/O^{16} ratios in carbonate and detection of climatic shifts.

Mineralogical Phase Chemistry

254. Ansell, H.G., Boorman, R.S., New Brunswick Research and Productivity Council:
Phase relationships in the In-S system, 1969.

255. Arnold, R.G., Malik, O., Univ. of Saskatchewan:
Phase equilibrium studies in the Fe-Ni-S system, 1966-71; 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 the natural assemblages.

256. Arnold, R.G., Shimazaki, H., Saskatchewan Research Council:
Trace metal distributions between co-existing sulfides, 1965-71.
Investigation of the partitioning of trace elements between co-existing sulfide phases as a function of temperature to study the value of this type of scheme as a geothermometer.

257. Barnett, D.E., Boorman, R.S., Sutherland, J.K., New Brunswick Research and Productivity Council:
New data on ternary phases in the system Zn-In-S, 1970.
See Subsolidus phase relations in the ZnS-In_2S_3 system; J. Materials Sci., vol. 4, pp. 658-671.

258. Barnett, D.E., Trembath, L.T., New Brunswick Research and Productivity Council:
Crystallography of ZnS-In_2S_3 phases, 1969-71.

259. Beswick, A.E., Laurentian Univ.:
1. Alkali metal distributions in granitic melts and vapours.
2. Experimental determination of trace metal partition coefficients, 1970-73.
The first project is aimed at determining partition coefficients for K and Rb between micas, feldspars and the melts from which they crystallize, over the range 800°C-500°C. The second project is a general outgrowth of the above project. Initially the aim is to determine experimentally the partitioning behaviour of Co and Ni between such phases as olivine, pyroxene biotite spinel and eventually sulphides over a range of temperatures, pressures and phase compositions. The ultimate aim is to obtain quantitative data on the distribution

of elements in order to better understand their geochemical behaviour in igneous and metamorphic process (e.g. why do some peridotites contain nickeliferous deposits and other not?).

260. Bird, G.W., Fawcett, J.J., Univ. of Toronto:
Stability of chlorite bearing assemblages in the system K_2O-MgO-Al_2O_3-SiO_2-H_2O, 1968-71; Ph.D. thesis (Bird).

261. Bonardi, M., Hogarth, D.D., Univ. of Ottawa:
Pegmatites in the Wakefield Lake-Dodds Lake region, Quebec, 1969-72; Ph.D. thesis (Bonardi).
Mineralogy, geochemistry and genesis of three types of pegmatites (Li-Be, Ce, Y) found in the Park region. See Wakefieldite, natural YVO_4; Can. Mineralogist, vol. 10, pp. 136-137 (abstract), 1969.

262. Boorman, R.S., Ansell, H.G., Sutherland, J.K., New Brunswick Research and Productivity Council, N.B.:
Phase relationships in the Pb-Bi-Te system, 1970-71.
Phase relations in the Pb-Sn-S system, 1970-71.

263. Boorman, R.S., Sutherland, J.K., New Brunswick Research and Productivity Council:
Synthetic Phases in the Cu-Pb-Bi-S system, 1969-.

264. Boorman, R.S., Sutherland, J.K., Ansell, H.G., Barnett, D., New Brunswick Research and Productivity Council, N.B.:
Phase relationships in the Cd-In-S system, 1969-71.
Phase relationships in the Pb-In-S system, 1969-71.

265. Brown, J.B., MacLean, W.H., McGill Univ.:
High temperature experimental studies on the nickel sulfide-silicate system, 1970-73; Ph.D. thesis (Brown).

266. Cabri, L.J., Mines Branch, Dept. of Energy, Mines and Resources:
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. The synthesis and stability relations of CoSbS, $NiSb_2$ and S-bearing berzelianite were studied. See Paracostibite (CoSbS) and nisbite ($NiSb_2$), new minerals from the Red Lake area, Ontario, Canada; Can. Mineral., vol. 10, pp. 232-246, 1970. Costibite (CoSbS), a new mineral from Broken Hill, N.S.W., Australia; Am. Mineral., vol. 55, pp. 10-17, 1970.

267. Cabri, L.J., Harris, D.C., Goodman, R.H., Mines Branch, Dept. of Energy, Mines and Resources:
Compositions and stability relations of copper-iron sulphides, 1965-.
The iron analogue of valleriite has been discovered and characterized. Mössbauer spectra of synthetic high-temperature disordered cubic chalcopyrite is similar to that of synthetic high-temperature disordered cubic cubanite. The six-line spectra for talnakhite indicates a stronger internal magnetic field than tetragonal chalcopyrite which may be explained by

a greater degree of magnetic ordering. See A new "valleriite-type mineral"; Am. Mineral., vol. 55, 1970. Mössbauer spectra of some copper-rion sulfides; Geokhimiya, vol. 5, pp. 636-639, 1970.

268. Cermignani, C., Univ. of Toronto:
Solid state electrolytes applied to fluorine bearing minerals; Ph.D. thesis.

269. Clark, A.H., Armstrong, R.C., Queen's Univ.:
Phase equilibria in ore mineral system, 1969-; M.Sc. thesis (Armstrong).
A preliminary study of the system Cu-Hg-S has been made.

270. Edgar, A.D., Kubo, M., Univ. of Western Ontario:
The system Fo-Ab-Lc, 1969-71.

271. Edgar, A.D., Sood, M.K., Univ. of Western Ontario:
The system Fo-Di-Lc, 1967-71.
See Phase relations in portions of the system diopside-nepheline-kalsilite-silica and their importance in the genesis of alkaline rocks; Can. Min., vol. 10, p. 380, 1970.

272. Fawcett, J.J., James, R.S., Grieve, R.A.F., Univ. of Toronto:
Phase relations in the system $FeO-Al_2O_3-SiO_2-H_2O$, 1967-71; Ph.D. thesis (Grieve).
See Synthesis of chloritoid at low pressures; Am. Mineral., vol. 55, pp. 517-521, 1970.

273. Fawcett, J.J., James, R.S., McOnie, A.W., Univ. of Toronto:
Stability of the intermediate Mg-Fe chlorites, 1967-72; M.Sc. thesis (McOnie).

274. Greenwood, H.J., Lecheminant, A.N., Duffy, C.J., Misener, J., Fletcher, C., Reamsbottom, S., Francis, D.M., Univ. of British Columbia:
Geological phase equilibrium and related field studies, 1967-73, Ph.D. and M.Sc. programmes.
Greenwood: Stability of anthophyllite relative to talc + enstatite; reactions involving phlogopite, orthoclase, dolomite, calcite, quartz, talc, diopside, in H_2O and CO_2 mixtures at 2 kilobars. Lecheminant: Distribution of Ni between coexisting olivine and pyrrhotite. Duffy: Distribution of Fe and Mg between coexisting chlorite and biotite. Misener: Diffusion of Fe and Mg in olivine at high pressures. Greenwood: Metamorphism and structure in the northern Shuswap near Blue River. Fletcher: Metamorphism and structure of high-grade rocks near Quesnel Lake, B.C. Reamsbottom: Metamorphism and structure of high grade rocks near Harrison Lake, B.C. See The reaction: dolomite + quartz + water = talc + calcite + carbon dioxide; Am. J. Sci., vol. 258, pp. 225-242, 1970.

275. Hamann, R., Univ. of Toronto:
Solubility of galena in alkaline solutions, 1970-71; M.Sc. thesis.

276. Iwasaki, H., Bright, N.F.H., Rowland, J.F., Mines Branch, Dept. of Energy, Mines and Resources:
Studies in the titanium-oxygen system, 1965-70.

This study was aimed at elucidating certain outstanding problems in the very complex binary system Ti-O. These are: (1) the behaviour of compositions close to the stoichiometric TiO composition which exhibit somewhat unusual stability relationships with varying temperature; (2) 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, and the other of which has a notably different structure. See The polymorphism of the oxide Ti_3O_5; J. Less-Common Metals, vol. 17, No. 1, pp. 99-110, 1969. The stability of the polymorphs of titanium monoxide; J. Less Common Metals, vol. 21, No. 4, pp. 353-363, 1970.

277. James, R.S., Laurentian Univ.:
Stability and phase equilibria of iron-bearing chlorites, 1969-71.
Geochemistry of the cordierite-anthoplyllite rocks at Manitouwadge, Ontario, 1970-.

278. Jolliffe, A.W., Rojkovic, I., Queen's Univ.:
A study of the mineralogy and geochemistry of the uranium-silver-cobalt-nickel-bismuth vein deposits at Great Bear Lake, Northwest Territories, 1970.

279. 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 relevant sub-systems, 1962-71.
Study of the range of temperature and compositional stability leading to the formation of niobium-bearing perovskite titanium-bearing pyrochlores, etc. The binary systems CaO-Nb_2O_5 is known from other work at the Mines Branch. The binary systems CaO-TiO_2 and Nb_2O_5-TiO_2 are partly known from outside work, although we have extended the knowledge of both systems. The existence of at least two ternary compounds in the CaO-Nb_2O_5-TiO_2 system has been confirmed. 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. The phase-volume occupied by the mineral niocalite [$3(3CaO.2SiO_2).CaO.Nb_2O_5$] in the quaternary system is being defined. See A re-examination of the system CaO-TiO_2 at liquidus temperatures; J. Less-Common Metals, vol. 20, No. 4., pp. 273-279, 1970. Phase equilibirum studies in the system CaO-Nb_2O_5-TiO_2; J. Less-Common Metals, vol. 21, No. 3, pp. 225-253; vol. 21, No. 4, pp. 479-480, 1970.

280. Kim, K., Burley, B.J., McMaster Univ.:
The sequence of P.T. curves around a quaternary invariant point in the system $NaAlSiO_4$-$KAlSiO_4$-SiO_2-H_2O, 1967-70; Ph.D. thesis (Kim).
A theoretical study of probable phase equilibrium in the system, using information obtained from various sources. See Can. J. Earth Sci., 1971.
The crustal chemistry of scapolites, 1967-; Ph.D. thesis (Kim).
Four structures of isomorphous scapolites have been determined; using these structures the crystal chemistry of other scapolites may be predicted.

Phase equilibria in the system $NaAlSi_3O_8$-$NaAlSiO_4$-H_2O with special emphasis on the stability of analcite, 1967-. See Can. J. Earth Sci., 1970.

Phase equilibria in the system NaAlSi O -$NaAlSiO_4$-H_2O up to 15 kb, 1967-.

A theoretical study of probable phase equilibria in the system up to 15 kb using as the basis of extrapolation data collected experimentally up to 10kb. The experimental data is reported in another paper. See Can. J. Earth Sci., 1971.

281. Kissin, S.A., Scott, S.D., Univ. of Toronto:

Defect chemistry and stability of iron sulfide minerals, 1969-72; Ph.D. thesis (Kissin).

Detailed study of the relationships among sulfur fugacity, temperature, composition, and structure of minerals in the Fe-S system using hydrothermal and electro-chemical methods.

282. Kretschmar, U., Scott, S.D., Univ. of Toronto:

Phase studies and geobarometry of the Fe-As-S system, 1968-72; Ph.D. thesis (Kretschmar).

Clark's (1960) data on the Fe-As-S system is being refined and extended to lower temperatures. Phase studies will be applied to arsenopyrite occurrences in a variety of geological environments.

283. Lake, R.H., Bright, N.F.H., Mines Branch, Dept. of Energy, Mines and Resources:

Studies in the tin-oxygen system, 1967-71.

The oxide SnO_2 (cassiterite) is well-established. The oxide SnO has been the subject of some earlier work, but the range of its temperature stability and its exact stoichiometry (or otherwise) have not been definitively fixed. The literature on the existence of intermediate oxide(s) is unsatisfactory and inconsistent: a definitive study of the system is therefore desirable and is underway. The use of Mössbauer studies in determining the state of valency of the tin in any intermediate oxide(s) is under consideration. There is some evidence of the existence of an intermediate oxide whose composition may <u>not</u> be Sn_3O_4, that assigned to this compound in the published literature, but may be Sn_3O_5. The existence of <u>both</u> is possible.

284. MacLean, W.H., McGill Univ.:

Phase relations in the system FeS-FeO-TiO_2-SiO_2, 1970-72.

Fe-Ti oxides are frequently found with sulfides in many rocks in the earth's crust. The presence of Ti changes the melting and crystallization relations such as those surveyed in the FeS-FeO-Fe_3O_4-SiO_2 system. This research is designed to evaluate these changes. See Liquidus phase relations in the FeS-FeO-Fe_3O_4-SiO_2 system, and their application in geology; Econ. Geol., vol. 64, pp. 865-884, 1969.

285. Myers, D., Univ. of Toronto:

Solubility of galena and sphalerite in brines, 1970-71; M.Sc. thesis.

286. Naldrett, A.J., Brown, G.M., Univ. of Toronto:

Study of chemical equilibria between Fe-My pyroxenes and Fe sulfides, 1967-71.

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.

287. Naldrett, A.J., Shima, H., Univ. of Toronto:
Saturation solubility of sulfur in ultramafic liquids as a function of fO_2 and temperature, 1970-72.

288. Naldrett, A.J., Simpson, P., Univ. of Toronto:
Determination of the relationship between reflectivity and composition of the $Fe_{1-x}S$-$Ni_{1-x}S$ solid solution in the Fe-Ni-S system, 1969-71.
The purpose is to determine how well compositions in the $Fe_{1-x}S$-$Ni_{1-x}S$ solid solution can be determined by making measurements of reflectivity.

289. Platt, R.G., Edgar, A.D., Univ. of Western Ontario:
The system Ne-Fo-Di, 1970-71.
The system Ne-Fo-Ak, 1970-71.

290. Roeder, P., Queen's Univ.:
Activity of iron in basaltic liquids, 1969-.
The solubility of iron in silicate liquids is being determined in equilibrium with metallic iron and gas of a known oxygen fugacity. The activity of a hypothetical Fe.O. species in the silicate liquid can be calculated from the experimental data.

291. Schneeberg, E.P., Univ. of Toronto:
Solid state electrolytes in geochemistry; Ph.D. thesis.

292. Scott, S.D., Univ. of Toronto:
Stoichiometry and phase changes in sulfides, 1964-.
The stoichiometry and polytypism of CdS and MoS_2 are currently being investigated.
Geobarometry and geothermometry of the Zn-Fe-S system, 1967-71.
Results are presently applied to massive Cu-Zn ores in Canada to determine environments of emplacement and metamorphism.

293. Singh, S.K., Univ. of Ottawa:
Agpaites near Seal Lake, Labrador; 1969-71; Ph.D. thesis.
Mineralogy, geochemistry and genesis of the Joan Lake and Redwine Plutons.

294. Skippen, G.B., Reinhardt, E.W., Carleton Univ. and Geol. Surv. of Canada:
A study of the distribution of Fe^{+2} and Mg^{+2} between biotite and orthopyroxene, 1969-72.
Involved is a field study of granulites from the Grenville Province and a complimentary laboratory study with the object of improving the understanding of conditions obtained during high-grade, regional metamorphism of granulites. See Petrochemical study of Grenville granulites; Geol. Surv. Canada, Paper 70-1, Pt. B, pp. 48-54, 1970.

295. Springer, G., Mines Branch, Dept. of Energy, Mines and Resources:
Phase relations of bismuthinite, stibnite and aikinite, 1969-71.
Compounds in the pseudobinary systems Sb_2S_3-Bi_2S_3 and $CuPbSi_3$-Bi_2S_3 have been synthesized, and the phase relations studied, with the objective of increasing the understanding of mineral assemblages containing these minerals.
Phase relations in the pseudo-binary system Cu_2FeSnS_4-Cu_2ZnSnS_4, 1969-70.
To explain the stannite-kesterite intergrowth found in certain ore deposits.

296. Sutherland, J.K., Boorman, R.S., New Brunswick Research and Productivity Council:
The chemistry of natural cosalites, 1969-71.

297. Venkateswaran, G.P., Edgar, A.D., Univ. of Western Ontario:
The system Lc-AR, 1970-71; M.Sc. thesis (Venkateswaran).

General Problems

298. Ahmed, S.M., Mines Branch, Dept. of Energy, Mines and Resources:
Studies of the double layer at oxide and sulphide surfaces by potentiometric methods, 1966-.
To study the zero point of change, surface charge densities and differential capacities of oxide and sulphide surfaces with particular reference to the surface chemistry of flotation. See Studies of the double layer at oxide-solution interfaces; J. Physical Chem., vol. 73, p. 3546, 1969.
Bacterial leaching, 1967-71.

299. Alcock, F.G., Shaw, D.M., McMaster Univ.:
Alkali geochemistry in Precambrian iron formations, 1970-; M.Sc. thesis (Alcock).
Abundances of Li, K. Rb, Cs in Precambrian iron formations are being studied from the standpoint that their distribution may give information concerning sedimentation processes.

300. Baker, A.K., Farrar, E., Queen's Univ.:
A study to determine the amounts of inert gas incorporated into cooling lavas, 1970-.

301. Baragar, W.R.A., Geol. Surv. of Canada:
Volcanic studies of Coppermine River basalts, Northwest Territories, 1966-72.
The object is to study the petrology, geochemistry, and stratigraphy of the Coppermine River flows with a view to (1) determining the relationship of the copper deposits contained within the flows to the volcanism, and (2) clarifying the distinctions in the style of volcanism between the stable platforms (the Coppermine type) and the mobile belts (greenstone belts).

302. Barker, J., McNutt, R.H., McMaster Univ.:
Rare earth partition and fractionation in anorthosite minerals, 1967-71; M.Sc. thesis (Barker).

303. Barker, J., McNutt, R., Crocket, J., McMaster Univ.:
Activation determination of rare earth elements in anorthosite and accessory rock forming minerals; 1969-72.

304. Corlett, M.I., Queen's Univ.:
Minor element contents of sulfides - an aid in geological interpretation, 1961-72.

305. Coy-Yll, R., Ecole Polytechnique:
Geochemistry of altered rock-forming minerals, 1970-71.
The electron microprobe is being used for the study of local geochemical trends in altered minerals, in order to gain a better understanding of the geochemical behavior of transition elements in chlorite and serpentine minerals resulting from alteration processes. The interpreting of a such behavior is considered in terms of crystal field theory.

306. Crocket, J.H., McMaster Univ.:
Platinum group metals in iron meteorites and carbonaceous chondrites, 1967-72.
Continuing with the platinum group metals studies in carbonaceous chondrites, a suite of fifty iron meteorites has been analyzed for Ru, Os, Ir, Pt and Au by neutron activation analysis. Data for ten other trace constituents are available on the suite allowed for extensive comparison of geochemistry of platinum group metals with other elements.

307. Darnley, A.G., Grasty, R.L., Geol. Surv. of Canada:
Airborne geochemistry, 1970-.
To develop methods of obtaining from the air information about the chemical composition of the ground. To select the methods most pertinent to the objectives of the Geological Survey on the basis of long term cost-effectiveness.

308. Davies, J.L., New Brunswick Dept. of Natural Resources:
Geology and geochemistry of the Ordovician volcanic rocks, Bathurst-Newcastle area, New Brunswick, 1963-72.

309. Dostal, J., Shaw, D.M., McMaster Univ.:
Geochemistry of the Loon Lake pluton, southeastern Ontario, 1968-72.
Field and petrographic study of the evolution of this pluton to be followed by detailed study of Re, U and Th distribution.

310. Fortescue, J.A.C., Brock Univ.:
Fundamental and applied landscape geochemistry, 1970-.

311. Fortescue, J.A.C., McNeely, R., Brock Univ.:
Forest biogeochemical studies, 1970-71.

312. Fratta, M., Univ. of Ottawa:
Radioactive mineral deposits near Otter Lake, Quebec, 1969-71; Ph.D. thesis.

313. Govett, G.J., Punwasee, J.D.N., Univ. of New Brunswick:
Secondary dispersion on soil and drainage systems under tropical rain forest conditions, Guyana, 1970-72; M.Sc. thesis (Punwasee).

To determine the influence of physico-chemical factors on the secondary migration and fixation of elements in a rain-forest environment.

314. Grove, E.W., British Columbia Dept. of Mines and Petroleum Resources: Study of whole rock geochemistry of the Guichon batholith and wall rocks, 1970-.

315. Guenther, C., Kramer, J.R., McMaster Univ.:
Surface chemistry of clays with reference to PO_4 adsorption, 1969-71; M.Sc. thesis (Guenther).
Isoelectric points of clays are followed with chemical aging. Shift in zeta potential with adsorbed PO_4 are measured.

316. Helson, J., Shaw, D.M., McMaster Univ.:
Geochemistry of tungsten, 1968-72; Ph.D. thesis (Helson).
Distribution of W in basaltic rocks is being studied using neutron activation.

317. Houston, W.N., Kramer, J.R., McMaster Univ.:
Surface chemistry and feldspar weathering, 1969-71; M.Sc. thesis (Houston).
Isoelectric point is determined from zeta potential for fresh and chemically aged feldspars of varying composition. This shows the surface chemistry changes with weathering.

318. Larson, L.R., Webber, G.R., McGill Univ.:
Geochemical subdivision, stratigraphic correlation, and genesis of rhyolitic volcanic rocks, northwestern Quebec, 1969-71; M.Sc. thesis (Larson).

319. Levinson, A.A., Dewis, F.J., Univ. of Calgary:
Hydrogeochemistry and clay mineralogy of the Mackenzie drainage basin, 1968-72.

320. Liberty, B.A., Brock Univ.:
Detailed carbonate study, paleozoics of southern Ontario (trace elements), 1967-.
See Trace elements in bedrock formations of Ontario; Dept. of Soil Science, Univ. of Guelph, Prog. Rept., pp. 51-54, 1967.

321. Maxwell, J.A., Abbey, S., Champ, W.H., Geol. Surv. of Canada:
Lunar crust investigation, 1967-70.
Two specimens of lunar igneous crystalline rocks, and one of the fine-grained unconsolidated surficial material, were analyzed for major, minor and trace elements using conventional rock and mineral analysis, atomic adsorption and optical emission spectroscopic methods. The samples were characterized by unusually high titanium and very low alkali contents, a conspicuous lack of volatile constituents such as water, fluorine and carbon dioxide and a concentration of some so-called "refractory elements" such as barium, zirconium, yttrium and scandium. See Chemical composition of Apollo 11 lunar samples 10017, 10020 and 10084; Proc. Appollo 11 Lunar Sci. Conf., vol. 2, pp. 1369-1374, 1970.

322. Mercer, W., Crocket, J., McMaster Univ.:
Trace element content of pyrite from uraniferous conglomerates at Elliot Lake, Ontario, 1968-74; Ph.D. thesis (Mercer).

Co, Mn, Ni, As, and Ag are being determined in Elliot Lake pyrites. Through use of factor analysis and other statistical means, these pyrites will be compared with others from known uranium ores of hydrothermal or other character to evaluate the origin of pyrite and hopefully uranium from the Elliot Lake ores.

323. Potter, W.G., Milligan, G.C., Nova Scotia Dept. of Mines:
Windsor basins project - Cape Breton Island, 1970.
An assessment of the economic geology of the Windsor marine sedimentary basins involving geological mapping, geochemistry and geophysical surveys.

324. Quebec geological parties, Geological Services, Quebec Dept. of Natural Resources:
Routine stream sediment sampling in the course of geological mapping, 1965-.
Samples collected are being analyzed for Cu, Zn, Pb, Mo, U, Au, Ag, V, Cr, Ni, Pt, Sn, W.

325. Quebec mapping parties, Mineral Deposits Service, Quebec Dept. of Natural Resources:
Rock geochemistry, 1968-.
In view of obtaining chemical information on the lithological units encountered in the course of mapping, the field parties are requested to collect fresh rock samples which are analyzed for oxides (Si, Al, Ca, Mg, K, Na, Ti, Fe) and trace elements (Cu, Pb, Zn, Ni, Sb, Mn, U, Au, V, Cr, Pt, Sn, W).

326. Reed, D.J., Gillieson, A.H., Mines Branch, Dept. of Energy, Mines and Resources:
Calibration of X-ray fluorescence determination of copper, iron and zinc in sulphide-ore slurry-streams for on-stream analysis at Hudson's Bay Mining and Smelting Co., Flin-Flon, Manitoba, 1970.
A fifteen-year old, discarded X-ray goniometer was modified to take a slurry irradiation cell and a chronium target X-ray tube. A slurry circuit was designed and built by the Hydrometallurgy Section, Extraction Metallurgy Division (W. Gow and A. Poulin). Fifteen different ore factions were chemically analyzed by the Analytical Chemistry Section, and together with six mixtures of fractions were investigated by X-ray fluorescence analysis.

327. Reeve, E.J., Univ. of Toronto:
Geochemistry of York River pegmatite and gneisses; Ph.D. thesis.

328. Robertson, R.C.R., Shaw, D.M., McMaster Univ.:
Origin of quartz-feldspar gneisses, 1970-; Ph.D. thesis (Robertson).
Major and trace element geochemistry of silicic volcanic rocks and sandstones will be compared using multivariate statistical methods to look for indications of origin. Attention will be focussed on the Ridge gneiss, Wollaston Township, Ontario, whose origin is controversial.

329. Signorelli, G., Kramer, J.R., McMaster Univ.:
Biological-chemical surveying of lakes using multi-spectral photography, 1970-73; Ph.D. thesis (Signorelli).

Multi-spectral photography is examined along with station measurements to define a procedure to estimate chlorophyll, dissolved carbon and turbidity. Data are examined for Lake Ontario.

330. Skippen, G.B., Moore, R.M., Ewert, E.W., Carleton Univ.:
The metamorphism of siliceous carbonates, 1969-72; M.Sc. thesis (R.M. Moore, E.W. Ewert).
Involved is a field study of marbles in eastern Ontario and western Quebec combined with experimental studies of carbonate-silicate equilibria. Experimental studies are presently concentrated on the parageneses of phlogopite and potash feldspar in siliceious carbonates.

331. Smith, T.E., Univ. of Windsor:
The geology and geochemistry of the granitic rocks of Nova Scotia, 1969-.
The granitic rocks of Halifax County are presently being mapped and their structural and petrological characteristics determined. Samples have been collected for X-ray fluorescence determination of major element variation and also the trace element distribution in the rocks with a view to determining their origin and geological history. See The structural characteristics of the Strathspey Complex; Geol. Mag., vol. 103, 1970.
The geochemistry of the Portage Lake lava series, 1970-72.
Major element and trace element geochemistry of this lava sequence to determine its original magma type and any functional crystallization trends shown.

332. Studier, M., Argonne National Laboratories; Zeller, E., Univ. of Kansas; Mills, J.P., Loyola College:
Origin and environmental significance of certain graphilic zones, 1969-.
Tests utilizing the Bendix mass spectrometer will indicate if carbon compounds have been involved in a biological cycle. Information concerning maximum temperature of the environment etc. have been obtained.

333. Sutherland, J.K., Boorman, R.S., Abbott, D., New Brunswick Research and Productivity Council:
Chemistry of ore minerals in New Brunswick, 1967-.
See Composition of some New Brunswick sphalerites; Research and Productivity Council, Research Note 21, 1969.

334. Terasmae, J., Fortescue, J.A.C., Losee, F.L., Fraser, D.M., Liberty, B.A., Lissey, A., Brock Univ.:
Geoepidemiology of the Niagara Peninsula, Ontario, 1971-72.
The objective of this study in medical geology is to relate the content and concentration patterns of trace elements found in rocks, soils, water and plants to the incidence of human and animal disease and other health problems. The study will help to determine the existing levels of both natural and introduced (through human activities) pollution.

335. Weber, W., McRitchie, W.D., Scoates, R.F.J., Manitoba Dept. of Mines:
Project Pioneer, 1966-70.

336. Wynne-Edwards, H.R., Fuh, Tsu-Min, Queen's Univ.:
Geochemical correlation of rocks on either side of the Grenville Front at Val d'Or, Quebec, 1967-70; 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.

GEOCHRONOLOGY

337. Baadsgaard, H., Univ. of Alberta:
Thermal migration of Rb and Sr-kinetics, 1966-71.
See Thermally-induced migration of Rb and Sr in an adamellite; Eclogae Geol. Helv., vol. 63, No. 1, pp. 31-44, 1970.

338. Baadsgaard, H., Godfrey, J.D., Koster, F., Hoffman, G., Lee, K.S., Sassano, G., Univ. of Alberta:
Geochronology, metamorphic and tectonic history of northeastern Alberta - northwestern Saskatchewan Precambrian shield area, 1960-; M.Sc. (Hoffman and Lee) and Ph.D. theses (Sassano).
Three partial theses studies are involved at present: Relative ages of host rock in Fay Mine, Uranium City, U-Th-Pb systematics in Archean remnants in N.E. Alberta and regional geochronology of the Tazin Lake area, N.W. Saskatchewan. In addition, aspects of the late Archean (Kenoran) polymetamorphism north of Tazin Lake are being looked into.

339. Baadsgaard, H., Lambert, R., Ramsay, C., Drury, S., Univ. of Alberta:
Geochronology, isotope geology, metamorphic and tectonic history of the Yellowknife area, Northwest Territories, 1961-; Ph.D. thesis (Ramsay).
A multiple-project involving a number of aspects of the metamorphic and igneous petrology of the rocks of the area.

340. Baadsgaard, H., Muller, P., Univ. of Alberta:
Rb-Sr and K-Ar dating of diabase dyke systems in Beartooth Range, Montana, U.S.A., 1967-71; Ph.D. thesis (Muller).
A critique of present dating methods used on diabase or dolerite dykes is intended. See Potassium-argon ages of Precambrian mafic dykes in Wyoming; Bull. Geol. Soc. Am., vol. 80, pp. 899-906, 1969.

341. Barton, E., Doig, R., McGill Univ.:
A structural and stratigraphic study of the rocks in the Grenville province north of Montreal emphasizing Rb/Sr and K/Ar geochronological and isotopic techniques, 1968-71; Ph.D. thesis (Barton).
The approximate boundaries of the area involved are defined by the Morin anorthosite pluton, the Lac Croche igneous complex, and the St. Didace adamellite pluton. Preliminary results indicate that three and possibly four distinct periods of igneous activity affected this area after the deposition of the Grenville series sediments and volcanics. These can be correlated with major periods of metamorphism.

342. Blenkinsop, J., Ryan, B.D., Slawson, W.F., Univ. of British Columbia:
Isotopic geophysics - Rb/Sr geochronology, 1967-; Ph.D. theses (Blenkinsop and Ryan).
Ryan is attempting Rb/Sr age determinations of Shuswap terrain material; Slawson has completed age determination by Rb/Sr method for the core granite of the Vredefort Ring Structure, South Africa.

343. Brooks, C., Univ. of Montreal:
The development of Shield areas (with special reference to Canada) by means of geochemical and isotope/geochronologic analysis, 1968-74.

344. Carter, N.C., British Columbia Dept. of Mines and Petroleum Resources, and Univ. of British Columbia:
Potassium-argon age determinations of porphyry-type copper and molybdenum deposits, west-central British Columbia, 1967-; Ph.D. thesis.
See Copper and molybdenum porphyry deposits in central British Columbia; Can. Mining J.; vol. 91, No. 4, pp. 74-76, 1970.

345. Clark, A.H., Farrar, E., Quirt, G.S., Queen's Univ.:
Geochronological studies of the Andean Mobile Belt of northern Chile (largely Lat. 26-29°S.), 1967-72; Ph.D. thesis (Quirt).
A critical part of an analysis of metallogenetic relationships in the Andean Mobile Belt is the establishment of a detailed chronology of intrusive and extrusive events, using K/Ar dating. See K/Ar evidence for the post-Paleozoic migration of granitic intrusion foci in the Andes of northern Chile; Earth and Plan. Sci. Letters, Oct. 1970.

346. Cormier, R.F., Saint Francis Xavier Univ.:
Rubidium-strontium dating of rocks, 1960-.
The age of the granitic intrusives of Cape Breton Island, is being investigated. See Radiometric dating of the Coldbrook Group of southern New Brunswick, Canada; Can. J. Earth Sci., vol. 3, 1969.

347. Cranstone, D.A., Turek, A., Manitoba Dept. of Mines and Natural Resources and Northern Illinois Univ.:
Rb-Sr geochronology of the Churchill-Superior boundary in Manitoba, and the Manitoba nickel belt, 1969-71.
See Rb-Sr contribution to the location of the Churchill-Superior boundary in Manitoba; Can. J. Earth Sci., vol. 7, pp. 1017-1020, 1970.

348. Dey-Sarkar, S.K., Farquhar, R.M., Goodwin, A.M., Univ. of Toronto:
Rb-Sr dating of Blake River Precambrian volcanics, 1970-71; M.Sc. thesis (Dey-Sarkar).
The initial phase of a study of the Precambrian geochronology of selected volcanic and granitic rocks of the Canadian Shield.

349. Doig, R., McGill Univ.:
Equilibrium in U-Th series; radiometric methods for determining Pb isotope ratios, 1969-72.

350. Doig, R., Brooks, C., McGill Univ. and Univ. of Montreal:
K-Ar and Rb-Sr geochronological study of ore deposits and host volcanic rocks, Chile, 1969-1970.

351. Farquhar, R.M., Goodwin, A.M., Univ. of Toronto:
Geochronology of the English River Gneiss belt, 1970-.

352. Farrar, E., McBride, S.L., Clark, A.H., Caelles, J.C., Queen's Univ.:
A geochronological investigation of the western Catamarca and La Rioja Province, Argentina, 1970-; M.Sc. thesis (McBride), Ph.D. thesis (Caelles).

353. Frith, A.R., Doig, R., McGill Univ.:
Rb-Sr geochronology study of a section across the Grenville province, Chibougamau to Tadoussac, Quebec, 1968-71; Ph.D. thesis (Frith).

354. Gibbins, W.W., McNutt, R.H., McMaster Univ.:
Rb-Sr isotopic studies on the Murray granite and Sudbury norite, 1968-71; Ph.D. thesis (Gibbins).

355. Lambert, R. St J., Drury, S.W., Coleman, M., Ramsay, C., Chary, N., Nnanedu, E., Univ. of Alberta:
Integrated petrochemical and isotopic studies in the Slave Province, Northwest Territories, 1970-; Ph.D. (Ramsay) and M.Sc. thesis (Chary and Nnanedu).
A continuation of investigations by Folinsbee and others in the area, utilizing stable isotope, geochronological, experimental petrological and rapid geochemical analysis methods to study the nature and origin of the Slave Province including both Archaean and Proterozoic igneous, metamorphic and sedimentary rocks, and the ore bodies contained therein.

356. Lambert, R. St J., Hogarth, D.D., Univ. of Alberta:
Age of the Wakefield syenite and related rocks, P.Q., 1969-71.

357. Lambert, R. St J., Martineau, M.P., Univ. of Alberta:
Petrochemistry and age of the Big Spruce Lake syenite/carbonatite complex, Northwest Territories, 1964-70.
A straightforward field mapping petrological, geochemical and geochronological study of a little-known complex containing mafic and ultramafic rocks, quartz-syenites, nepheline-syenites, fenites, calcite and dolomite carbonatites and a biotite-pyroxenite complex. Its age, >2100 m.y. defines the minimum age of major faults in the Slave Province. Supported by the Boreal Institute the Natural Environment Research Council of G.B., and the Giant Yellowknife Mining Company.

358. Lowdon, J.A., Geol. Surv. of Canada:
Radiocarbon laboratory development and operation, 1959-.
Investigation into the variation in radiocarbon content in the atmosphere due to thermonuclear weapons is continuing. Results show that, after reaching a maximum concentration of about 90% above pre-bomb days (1950) in 1964, the C^{14} concentration in the atmosphere has steadily dropped to a level of 53% above normal in 1970. See Carbon-isotope fractionation during dry combustion of oxalic acid; Radiocarbon, vol. 12, No. 2, pp. 347-349, 1970.

359. McCorkell, R.H., Dalhousie Univ.:
Fission track dating, 1969-71.

360. Ozard, J.M., Ulrych, T.J., Univ. of British Columbia:
Isotope geophysics - U/Pb geochronology, 1968-.
Analyses are being carried out on the so-called "1 billion year old anorthosites". See A comment on the concordia method of interpreting whole-rock U/Pb ratios; Earth Planet. Sci. Lett., vol. 7, pp. 116-118, 1969.

361. Reynolds, P., Kublick, J., Dalhousie Univ.:
K/Ar dating, 1970-; Ph.D. thesis (Kublick).

362. Ruddick, J.C., Farrar, E., Queen's Univ.:
A geochronological investigation of the Tulameen and Hedley intrusives, British Columbia, 1968-70; M.Sc. thesis (Ruddick).
Initial argon ratios of both intrusions have been

363. Steiner, J., Univ. of Alberta:
Environmental analysis of the Precambrian Wynd Formation near Jasper, Alberta, 1969-71.
Analysis will be based on detailed sedimentological and stratigraphic criteria. In addition estimates on paleosalinity on the basis of boron determinations will be made. Rubidium-strontium age determination will also be done.
Environmental analysis of the Jurassic to Lower Cretaceous Minnes Group of central and northern Alberta, 1970-73.
Analysis will be based on detailed sedimentological, stratigraphic and geochemical (boron) criteria. Age determination of potassium-argon and rubidium-strontium will be made to determine the age of provenance, deformation and possibly diagenesis and sedimentation.

364. Terasmae, J., Brock Univ.:
Quaternary geochronology and paleoecology in Ontario, 1969-.
This long-term study is aimed at the establishment of the geochronology of Quaternary deposits and events in Ontario. Stratigraphic palynology, paleobotany, radiocarbon dating, geolimnology, dendrochronology, Quaternary geology and paleoclimatology are used to achieve the objective of the investigation. The study focuses attention on environmental changes and the influence of these changes on the terrestrial and aquatic ecosystems. The reconstruction of past environments is an important aspect of the study. See Pollen-bearing sediments of the St. Davids buried valley fill at the Whirpool, Niagara River gorge, Ontario; Can. J. Earth Sci., vol. 7, No. 2, pp. 539-542, 1970. Hypsithermal range extension of white pine (Pinus strobus L.) in Quebec, Canada; Can. J. Earth Sci., vol. 7, No. 2, pp. 406-413, 1970.
Late-Wisconsin geochronology in southern Ontario, 1971-72.
The study is aimed at the establishment of the ages of endmoraines (the process of deglaciation) and glacial lake stages in the Hamilton-Niagara-Woodstock area where the geochronology of these events is insufficiently known. Palynological studies and radiocarbon dating will be used to obtain the results which will contribute to the knowledge of the Great Lakes history in the area studied.

Postglacial geochronology and paleoecology of the Kamloops area, British Columbia, 1971-73.
To establish the chronology of late- and postglacial events (deglaciation, climatic change, geological features, and history of vegetation) by a study of lake sediments and peat deposits, involving palynological investigations, radiocarbon dating and sediment characteristics (chemical and physical).

365. Touray, M., Doig, R., de Béthune, P., McGill Univ.:
Initial Sr^{87}/Sr^{86} ratios, Massif du Champ du Feux, Vosges, France, 1969-70.

GEOMORPHOLOGY AND GLACIOLOGY

366. Barnett, D.M., Geol. Surv. of Canada:
Proglacial geomorphology, Generator Lake, Baffin Island, 1965-71; Ph.D. thesis.
Model study of the proglacial lacustrine environment relating modern glacio-fluvial processes to former glacial, lacustrine and related landforms and deposits associated with former and present levels of Generator Lake. See Geol. Surv. Can., Paper 70-1, Pt. A, 1970.

367. Bik, M.J.J., Geol. Surv. of Canada:
Geomorphology of Cypress Hills and adjoining parts of southern Alberta, 1965-71.
Reconstruction of meltwater channel terrace gradients indicates that crustal movements other than isostatic rebound occurred in southern Alberta since deglaciation. Comparison of the surface topography and structural data from oil and gas wells indicates that the broad topographical characteristics of the plains of Southern Alberta appear to be related to deformations of Upper Cretaceous horizons.
Surficial deposits and geomorphology, Central Research Forest, Ontario, 1968-70.
Joint studies by the Geological Survey of Canada, the Inland Waters Branch, and the Forest Management Institute, Department of Fisheries and Forestry, of groundwater conductivity and flow patterns revealed that certain hazards to trees exist in the valley environments of the Central Resourch Forest; evidence of slow upward flow of rather saline groundwater was found.

368. Blake, Jr., W., Geol. Surv. of Canada:
Quaternary reconnaissance, southern Ellesmere Island and Devon Island, Northwest Territories, 1967-.
Reconnaissance of glacial geology and geomorphology with special emphasis on chronology of Pleistocene events and determination of regional pattern of postglacial uplift.

369. Brueckner, W.D., Anderson, M.M., Memorial Univ. of Newfoundland:
Geomorphic problems of Newfoundland, 1959-.
This project is not restricted to any particular geomorphic aspects; in the near future however, emphasis will be given to studies of shoreline features related to changes of sea level, and of glacial drift and its post-glacial fate.

See Post-glacial geomorphic features in Newfoundland, eastern Canada; Eclogae geol. Helvetiae, vol. 62, No. 2, pp. 417-441, 1969.

370. Carson, M.A., McGill Univ.:
The long term stability of natural hillslopes, 1967-72.
Study of hillslope development in relation to mass-movements in areas of different lithologic and climatic settings. Work completed in Exmoor and Pennines (U.K.) and Laramie Mts. (U.S.A.). Work in progress in Ontario, California and Colorado.

371. David, P.P., Univ. de Montréal:
Study of lime occurrences in Canada, 1965-.

372. Elson, J.A., McGill Univ.:
Effects of freeze-thaw porcesses in a temperate climate, 1964-.
Soil and snow temperature and soil moisture are correlated with vertical movements of the soil; rock fall from a cliff is related to freeze-thaw cycles and other factors. The role of needle ice in moving material on the ground surface is under study. Four years records for some processes are in hand; at least five are needed, and preferably more.

373. Grant, D.R., Geol. Surv. of Canada:
Quaternary geology St. Anthony-Blanc Sablon, Newfoundland, 1969-70.
Although basically a survey of landforms and materials for resource development, the study produced evidence of several regionally significant Quaternary events and processes, notably that glaciers from Labrador impinged on Newfoundland leaving a till of marine derivation, and that, as in the Maritime Provinces, glaciers both retreated to and readvanced from upland areas.

374. Greiner, H.R., Univ. of New Brunswick:
Geomorphology of the headquarters area, Fundy National Park, New Brunswick, 1970-71.

375. Hattersley-Smith, G., Dept. of National Defence:
Geophysical research in the Arctic, 1963-70.
This project was concerned with glaciological, meteorological and oceanographic studies in northwestern Ellesmere Island. See Mass balance of the Ward Hunt ice rise and ice shelf: a 10 year record; J. Glaciology, vol. 9, No. 56, pp. 247-52, 1970.

376. Klassen, R.W., Geol. Surv. of Canada:
Quaternary geology and geomorphology of the Assiniboine River valley and its tributaries, 1966-71.
Project with geomorphology, sedimentation and history of mapped segments of valley in preparation.
Bedrock topography and Quaternary stratigraphy, Virden, Manitoba, 1967-70.

377. Klassen, R.W., Wyder, J.E., Bannatyne, B.B., Geol. Surv. of Canada and Manitoba Mines Br.
Bedrock topography southern Manitoba, 1970.

378. Mackay, J.R., Geol. Surv. Canada and 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 and geophysical determination of permafrost depths.

379. Mathews, W.H., Mackay, J.R., Univ. of British Columbia:
Snow creep, Mount Seymour, southern British Columbia, 1957-.

380. Mayr, F., Université de Montréal:
Wuerm stratigraphy of the type area, eastern Alps; counting and contouring. A critical evaluation of current use in geology; a guide-book to geomorphology, 1968-72.
See Wuerm stratigraphy of the type area; AMQUA, 1st Meeting, Abstracts, p. 90, 1970.

381. McDonald, B.C., Geol. Surv. of Canada:
Sedimentology and morphology of eskers, 1968-72.
Investigation of eskers and associated features involving their classification form, sedimentology, and origin. By documenting the sedimentation history of eskers, an attempt will be made to inter-relate morphology, sedimentary transport, and sediment types, and to contribute to an understanding of esker origin.

382. Parry, J.T., Boesch, M., Dredge, L., McGill Univ:
Terrain analysis project, 1964-.
Colour densitometric studies on Aerial Ektachrome films and prints; in comparison of the case and effectiveness of different methods of slope measurement from air photos; the derivation of military operational maps from terrain data; the examination of infrared imagery in terrain evaluation.

383. Pearce, A.J., Elson, J.A., McGill Univ.:
Erosion and denudation in the desert regions of Sadberg, 1970-73; Ph.D. thesis (Pearce).
Modern rates of erosion and denudation are measured and related to meteorological events. The average denudation for the 50 years since the desert formed is estimated and the modification of the original glacial deposits studied.

384. St-Onge, D.A., Lengellé, J., Geol. Surv. of Canada:
Erosion studies in an area of intense petroleum exploration and development (Swan Hills, Alberta), 1970-72; Ph.D. thesis (Lengellé).
Gully development related to deforestation, methods of control.

385. Shearer, J.M., Geol. Surv. of Canada:
Surficial geology and geomorphology, Mackenzie Bay-Continental Shelf, 1970-.
Some shallow reflection seismic lines were run on the west side of Mackenzie Bay during the summer of 1970 in an attempt to delineate the various geological units offshore.

Future work will consist of the eastward continuation of this kind of survey, with accompanied sediment core sampling in the delta mouth. Eventually, it is hoped that the offshore geological history can be pieced together.

GEOPHYSICS

Electrical

386. Becker, A., Geol. Surv. of Canada, Ecole Polytechnique:
Airborne resistivity electromagnetic system (ARES), 1969-75.
The current work on the project of designing a variable frequency airborne electromagnetic system was restricted to the construction of a scale model for this new, recently patented airborne electromagnetic method. As outlined in the 1968 patent, the frequency of operation varies in concert with the apparent resistivity of the ground beneath the instrument. The most important feature of the new system however is its ability to maintain a constant depth of penetration irrespective of ground conductivity. The initial trials were directed towards the verification of theoretical principles. The experiments were carried out using horizontal layers of aluminum foil for the ground model. The results of this work indicate that the theoretical foundations are valid.

387. Becker, A., King, W.F., Geol. Surv. of Canada:
VLF mapping, 1968-71; M.Sc. thesis (King).
The experimental work performed during the summer of 1970 concludes the preliminary series of measurements of the distortion of VLF electromagnetic waves by faults and shear zones. The recent data obtained in the Ottawa basin and across two major features in the Noranda area (Smoky Creek fault, Lois Lake shear) confirms the earlier results which indicated the suitability of VLF methods for the mapping of near surface geological features.

388. Becker, A., Roy, J., Ecole Polytechnique:
Electromagnetic method for geophysical prospecting, 1970-71.
This applied research project is dedicated to the improvement of existing ground EM prospecting methods through the incorporation of a radio telemetry system in commercial equipment. It is expected that this modification will undoubtedly increase the depth of penetration of the equipment chosen.

389. Caner, B., Auld, D.R., Victoria Magnetic Observatory:
Electrical conductivity of the lower crust and upper mantle, western Canada, 1963-.
Geomagnetic induction methods are being used to determine the electrical conductivity structure in western Canada, particularly for the lower crust and upper mantle. A long-term cooperative project with the Department of Geophysics at the University of British Columbia.

390. Collett, L.S., Geol. Surv. of Canada:
AFMAG surveys, 1968-75.

During 1970, no AFMAG flying was conducted during the summer. The results of the 1968 flying in the Upper Nelson River area, Manitoba, and Uranium City area, Saskatchewan and of the 1969 flying in the St. Mary's River area, Nova Scotia, have been prepared for publication. Profiles of the two frequency (140 and 510 Hz) profiles were digitized. With the aid of the computer and plotter, the profiles of the two frequencies have been plotted to the scale of 1:50,000 and will be overprinted on photo-map bases, where available, and otherwise on half-tone topographic map bases. Now in publication stage are 26 map sheets for Manitoba, 4 for Saskatchewan and 4 for Nova Scotia. See AFMAG survey, St. Mary's River area, Nova Scotia (11 E/6, 7, 8 and 11 F/5); Geol. Surv. Can., Paper 70-1, Pt. A, pp. 70-71, 1970.

391. Collett, L.S., Katsube, T.J., Geol. Surv. of Canada:
Electrical rock properties, 1969-.
Techniques have been established for measuring the conductivity, relative permittivity and loss tangent of rocks from 10^3 to 10^7 Hz. Measurements have also been made on six lunar specimens from Apollo 11 and 12 flights. Induced polarization studies on rocks and disseminated sulphides are being made in the frequency range for 10^{-2} to 10^3 Hz to determine if iron rich sulphides and graphite conductors can be separated from copper rich sulphides. See Electrical rock properties; Geol. Surv. Can., Paper 70-1B, pp. 39-41, 1970.

392. Dyck, A.V., Becker, A., Geol. Surv. of Canada:
Secondary fields of a vertical magnetic dipole above a thin thin horizontal layer of conductive overburden, 1969-71.
The present work describes a numerical calculation of the secondary fields produced by an oscillating vertical magnetic dipole located above a thin, horizontal, conducting sheet.

393. Faessler, C.W., Ecole Polytechnique:
Accurate calculation of resistivity curves for large electrode separations and resistivity contrasts, 1969-70.
The apparent resistivity function is an infinite series which is convergent very slowly for large resistivity contrasts and large electrode separations. In all the published material on this subject, these cases have been neglected or only approximated in a very rough way.
Etude préliminaire des paramètres contrôlant la chargeabilité des minéralisations disséminées en polarisation induite, 1969-.
Obtention, de façon empirique et sous conditions contrôlées, de quelques relations entre ces différents paramètres (teneur, grosseur des grains, porosité, salinité, etc.) et vérification au moyen d'échantillons naturels.

394. Koulomzine, T., Lavoie, C., Ecole Polytechnique:
Comparative study of electrical and electromagnetic methods as applied to the search for sulphide deposits, 1966-71; 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.

395. Lazreg, H., Inland Waters Branch, Dept. of Energy, Mines and Resources:
Geophysical methods applied to the study of seawater intrusion, 1969-71.
Zones of lateral saline groundwater intrusion have been delineated at Shippegan, N.B., and in the Eliot River area, Prince Edward Island by surface electrical resistivity profiling. The vertical variation in conductivity of the strata has been investigated by resistivity soundings on these areas. Induced polarization has been applied in an attempt to differentiate between sandstone aquifers with saline groundwater and clayey layers. Preliminary measurements reveal an apparent geo-electrical anisotropy in the Shippegan, N.B. area.

396. Middleton, R., Ontario Dept. of Mines and Northern Affairs:
Airborne geophysical surveys in northern and southern Ontario, 1970.
A magnetic, gamma-ray spectrometer and VLF electromagnetic geophysical system was flown with a helicopter in the Matheson area in order to develop an airborne geological mapping system. VLF electromagnetic tests were flown in the Oxbridge Township area north of Toronto in an attempt to map Pleistocene geology.

397. Scott, W.J., Geol. Surv. of Canada:
Low frequency, phase-sensitive resistivity measurements, 1967-70; Ph.D. thesis.
A very low-frequency power signal generator has been constructed to provide a nearly sinusoidal output at a power level of approximately 300 watts and frequency range from .01 to 200 Hz. The instrument was tested over several sulphide bodies in Quebec, New Brunswick and Ontario. Phase shifts have been observed.

398. Slankis, J.A., Geol. Surv. of Canada:
Telluric and magnetotelluric surveys at 8 Hz., 1966-70.
The use of natural electromagnetic field at 8 Hz for mineral exploration and geological mapping has been investigated and optimum measurement techniques have been developed.

399. Speirs, D., Queen's Univ.:
A resistivity survey of an area north of Kingston, Ontario, 1969-70; M.Sc. thesis.

Geothermal

400. Hyndman, R.D., Pye, G., Rankin, D., Dalhousie Univ.:
Study of the heat flow in the Atlantic Provinces and in Labrador Sea and Baffin Bay, 1967-; M.Sc. (Pye) and Ph.D. thesis (Rankin).

401. Mathews, W.H. with cooperation of Granduc Operating Co. and Earth Physics Section, Dept. Energy, Mines and Resources:
Geothermal studies, Granduc, British Columbia, 1966-71.

402. Saull, V., Telford, M., Phipps, D., Clay, D., Ng. K., Longe, R., Gray, N., McGill Univ.:
Thermal and tectonic geophysical studies, 1952-.
Saull - an hypothesis of global tectonics; Saull, Telford and Clay - earthquake prediction in the St. Lawrence Lowland; Saull and Ng - mathematical study of convection processes; Saull and Phipps - thermochemistry of clays; Longe - an explanation of sulphide accumulation in nature; Gray - determination of thermal histories of small intrusions from petrologic information.

Gravity

403. Bower, D.R., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Earth tides, 1968-.
Earth tide amplidute coefficients were determined for both tilt and gravity from observations made at the underground site near Poltimore, Quebec during 1968 and 1969. The coefficients for the M_2 constituent are: $\gamma_{south}=0.775$ (6.5° lead); $\gamma_{east}=0.894$ (0.6° lag); $\delta_{gravity}=1.196$ (1.5° lag). The coefficients are the ratio of observed amplitude to theoretical amplitude on a rigid earth.

404. Burke, W.E.F., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Gravity survey of eastern Ontario - southern Quebec, 1970.
Two thousand nine hundred and sixty gravity stations were established at 6 to 8 mile intervals (1,100 stations) and 1-4 mile intervals (1,860 stations).

405. Dence, M.R., Robertson, P.B., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Crater investigations in Canada, 1970-.
Analysis of gravity data at Lake Wanapitei, water depths of more than 100 meters, and similarities to other craters such as Deep Bay suggest a probable impact origin for the Wanapitei structure. This was supported in 1970 by the discovery of boulders of impact breccia containing fresh, highly siliceous glass and other evidence of shock deformation in glacial deposits south of the lake. Other crater studies in 1970 have been concerned with mapping the distribution of shock effects around the Sudbury Basin and with laboratory investigations of shock effects in samples from Lake St. Martin, Manitoba; Brent, Ontario; Charlevoix and Clearwater Lake, Quebec; Mistastin, Labrador; and Mare Tranquillitatis, Moon. See Petrology, mineralogy and deformation of Apollo 11 samples; Geochim. et Cosmochim, Acta Suppl. 1, Proc. Apollo 11 Lunar Sci. Conf., vol. 1, pp. 315-340, 1970.

406. Gendzwill, D.J., Univ. of Saskatchewan:
Analysis of vertical gradients of gravity, 1970-.
A theoretical investigation of the measurement and use of the vertical gradient of gravity. See The Gradational density contrast as a gravity interpretation model; Geophysics, vol. 35, No. 2, p, 270, 1970.

407. Gibb, R.A., Walcott, R.I., McConnell, R.K., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Gravity study of northern Ontario, 1969-71.
Studies of the geology and geophysical results in northern Ontario have led to the hypothesis that the boundary between the Churchill and Superior structural provinces may be an ancient suture or join line between collided continental fragments. See Gravity measurements in northern Ontario; Grav. Map Ser. Earth Physics Br. Nos. 25, 28-36, 1970.

408. Goodacre, A.K., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Correlation of gravity and seismic data, 1968-.
In Canada variations of compressional wave velocity in the upper mantle may be due to regional variations in deep heat flow in some areas and in other areas to anisotropic propagation of seismic waves. Lateral variations of density and compressional wave velocity in the upper mantle appear to extend to at least 100 km.

409. Goodacre, A.K., Cooper, R.V., Stephens, L.E., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Underwater gravity survey of the Nova Scotia continental shelf, 1970-71.
Six hundred and ninety-two gravity stations were established in the Laurentian Channel, Cabot Strait, St. Pierre Bank and on the Scotian Shelf. Profiles were run across the Orpheus Anomaly and a diapiric structure northeast of Sable Island. See Results of underwater gravity surveys in the Gulf of St. Lawrence; Grav. Map Ser. Dom. Obs. No. 86, 1969.

410. Halliday, D., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Gravity survey of District of Keewatin, Northwest Territories, 1970-71.
Three thousand five hundred and thirty-four stations were established in the area bounded by latitudes 60°N and 66°N and west from Hudson Bay to longitude 102°W. Some 171,000 square miles were surveyed with stations at intervals of 8 miles.

411. Jacoby, W.R., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Correlation of gravity and seismic data, 1970-.
The density distribution in the crust and upper mantle is being studied by fitting the computed gravity effects of seismically determined models to the observed gravity field. These studies have led to the idea of the 'convection' of the lithosphere-asthenosphere system as a possible driving mechanism for plate movements. See Instability in the upper mantle and global plate movements; J. Geophys. Res., vol. 75, No. 29, 1970.

412. Koulomzine, T., Sylla, N., Lamontagne, Y., Nadeau, A., Ecole Polytechnique:
Study of methods of interpretation of magnetic and gravity anomalies, 1968-71.
Using GE-235 and CDC-6400 computers, more than 5,000 curves of magnetic anomalies caused by prisms, lenses and

combined prisms have been calculated and secondary master curves constructed leading to simple interpretation of any given field magnetic profile. See New methods for the direct interpretation of magnetic anomalies caused by dykes of infinite length; Geophysics, vol. 35, No. 5, 1970.

413. Maxant, J., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Gravity investigation in the southern interior plains, 1969-71.
Prior to interpreting the gravity anomalies an intensive study of the densities of sedimentary rocks of the basin is nearing completion. The main sources of the density data are Gamma-gamma logs from 450 wells distributed throughout Alberta, Saskatchewan and Manitoba.

414. Middleton, R.S., Ontario Dept. of Mines and Northern Affairs:
Gravity survey in northeastern Ontario, 1970-71.
A gravity control network was established in the Timmins, Cobalt and Matheson areas in northeastern Ontario and geological structures (i.e., the Porcupine-Destor Fault and Kamiskotia gabbro complex) were profiled. See Gravity survey in northeastern Ontario; Ontario Dept. of Mines, Misc. Paper 43, Summ. field work, 1970.

415. Personnel, Mapping and Charting Establishment, Dept. of National Defence; Earth Physics Branch, Dept. of Energy, Mines and Resources:
Gravity survey of British Columbia, 1966-.
During the course of a topographic survey north of Vancouver (NTS maps 92G, H, I, J) about 250 gravity stations were observed.

416. Popelar, J., Dence, M.R., Earth Physics Branch, Dept. of Energy, Mines and Resources:
A gravity study of the Sudbury basin, 1968-71.
Bouguer anomaly maps have been compiled (from 2,302 gravity observations) at scales of 1:250,000 and 1:50,000 for regional and detailed studies of the Sudbury structure. Several interpretation programs and statistical routines have been written and applied to the data which include 1,800 rock density determinations and all available geological information.

417. Sobczak, L.W., Stephens, L.E., Earth Physics Branch, Dept. of Energy, Mines and Resources:
A gravity study of North Ellesmere Island and the Lincoln Sea, 1970-71.
A Bouguer anomaly map 1:500,000 of the region has been compiled from 700 gravity stations. Local anomalies are related to known geologic structure and regional anomalies reflect changes in the thickness of the crust. See The gravity field of northeastern Ellesmere Island, northern Greenland and Lincoln Sea; Grav. Map Ser. Earth Phys. Br. No. 114 (in press).

418. Sobczak, L.W., Stephens, L.E., Winter, P.J., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Gravity survey of Beaufort sea, 1969-71.
Approximately 1,550 gravity stations were observed on the sea ice. Stations on a four mile grid cover an area of 50,000 square miles. See Preliminary results of gravity surveys over

the Mackenzie Basin and Beaufort Sea with maps; Grav. Map Ser. Dom. Obs. Nos. 117-119, 1970.

419. Sobczak, L.W., Weber, J.R., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Gravity maps of the Arctic Islands, 1960-.
Two Bouguer anomaly maps (1:1,000,000) covering the area bounded by latitudes 74°N and 82°N and longitudes 60°W and 141°W have been compiled from about 8,800 gravity stations observed during the period 1960-68. The main features of the gravity field have been studied. See Gravity measurements over the Queen Elizabeth Islands and Polar Continental Margin; Grav. Map Ser. Dom. Obs. Nos. 115, 116 (in press).

420. Stacey, R.A., Paul, M.K., Earth Physics Branch, Dept. of Energy, Mines and Resources:
A study of the Darnley Bay gravity anomaly, Northwest Territories, 1970-71.
A further study of the 130 mgal positive Bouguer anomaly at Darnley Bay on the Arctic coast 400 km east of the Mackenzie Delta tends to confirm Hornal's et al (1970) conclusion that it is related to an unexposed basic body with radial symmetry. Several possible models fit the anomaly.

421. Walcott, R.I., Boyd, J.B., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Gravity study of northern Alberta, 1968-70.
See The gravity field of northern Alberta and parts of Northwest Territories and Saskatchewan; Grav. Map Ser. Earth Phys. Br. Nos. 103-111, 1970.

Geomagnetic and Paleomagnetic

422. Beales, F.W., Strangway, D.W., Univ. of Toronto:
Paleomagnetics of Mississippi Valley type ore deposits, 1970-.
Previous studies by Beales and Onasick (1970) have indicated that stable remanence can be measured. We are now proceeding with oriented sample studies from a variety of ore fields.

423. Dunlop, D.J., Dubey, A.C., Univ. of Toronto:
Remanent magnetic properties of igneous and sedimentary rocks and of synthetic equivalents of their constituent minerals; Ph.D. thesis (Dubey).
Ultimately, all projects are aimed at developing reliability criteria and suitable "cleaning" techniques for rocks used in paleomagnetic investigations. See Hematite: intrinsic and defect ferromagnetism; Science, vol. 169, pp. 858-860, 1970. Coercive force and remanence of monodomain grains with mixed crystalline and shape anisotropy; Phil. Mag., vol. 21, pp. 385-397, 1970. An experimental evaluation of single domain theories; Rev. Geophys., vol. 7, pp. 709-757, 1969.

424. Faessler, C.W., Ecole Polytechnique:
Instrument analogique pour calculer les anomalies magnétiques et les démontrer sur grand écran, 1970-71.

Les calculatrices analogiquss ne sont pas toujours disponibles et sont en général composées de circuits redondants. Certains circuits spécials permettront un appareil relativement petit et beaucoup moins coûteux. Cet appareil servira tant à la démonstration en classe, des différentes formes d'anomalies, des formes des différentes composantes et de l'effet des différents paramètres, de même qu'à l'interprétation des anomalies observées en pratique.

425. Gendzwill, D.J., Univ. of Saskatchewan:
Studies of rock magnetism in Saskatchewan, 1970-.
It is intended to collect magnetic information from a large suite of rock samples collected for geochemical research from the Amisk Lake and Hanson Lake areas of Saskatchewan.

426. Goh, R., Steele, J.P., Ulrych, T.J., Univ. of British Columbia:
Marine geophysics - magnetic survey, 1970-72; Ph.D. (Steele) and M.Sc. thesis (Goh).
Participation in Hudson 70 survey off west coast Queen Charlotte Islands; Beaufort sea continental shelf magnetic survey. See Geophysical measurements in British Columbia; Gravity Map Ser. Earth Physics Br., Dept. Energy, Mines and Resources, 1970.

427. Hood, P.J., Bower, M.E., Geol. Surv. of Canada:
Ocean aeromagnetics, 1962-.
To conduct high resolution aeromagnetic surveys over the Canadian Continental Shelves for purposes of delineating sedimentary basins; 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 profile from Cape Cargenholm, Baffin Island to Red Head, Greenland; Geol. Surv. Can., Paper 70-1, Part B, pp. 37-39, 1970.

428. Hood, P.J., Sawatzky, P., Geol. Surv. of Canada:
Queen Air high resolution aeromagnetics, 1968-.
To design, fabricate, install and test a high resolution rubidium vapour aeromagnetic survey system in a Queen Air aircraft; to conduct high-resolution aeromagnetic test surveys with this system to evaluate its use as an aid to geological mapping. See Geophysical applications of high resolution magnetometers, Springer-Verlag, Heidelberg; Encyclopedia of Physics, vol. 49, No. 3, pp. 422-460, 1971.

429. Hyndman, R.D., Cochrane, N., Dalhousie Univ.:
Geomagnetic studies on the continental margin, 1967-; Ph.D. thesis (Cochrane).

430. Kornik, L.J., Geol. Surv. of Canada:
Regional aeromagnetic-geologic correlation, 1966-.
A regional study to correlate geology with aeromagnetic data. A regional in situ magnetic susceptibility and remanent magnetism survey is conducted as a field component of the project.

431. Larochelle, A., Symons, D.T.A., Schwarz, E.J., Christie, K.W., Geol. Surv. of Canada:
Research in paleomagnetism and rock magnetism, 1958-.

Papers in advanced stages of preparation include a paper on the distribution of phases of $Fe_{1-x}S$ in the Strathcona Mine (Sudbury) and a fundamental study on synthetic $Fe_{1-x}S$. Other forthcoming papers are on the paleointensity of the Sudbury norite and paleomagnetism of dykes on the coast of Labrador and Baffin Island and Tertiary Cape Dyer volcanics (with W.F. Fahrig) and on samples of lunar rocks and oil (Apollo 12). See A discussion of thermal and alternating field demagnetization methods in the estimation of paleomagnetic field intensities; J. Geomag. Geoelec., vol. 21, No. 3, pp. 669-677, 1970. The Mid-Atlantic Ridge near 45°N. thermomagnetics of dredged samples of igneous rocks; Can. J. Earth Sci., vol. 7, No. 2, pp. 268-273, 1970. Paleointensity study of late Miocene igneous rocks from British Columbia; Can. J. Earth Sci., vol. 7, No. 1, pp. 176-181, 1970. Thermomagnetics of lunar dust sample 84/88; Geochim. Cosmochim. Acta., suppl. I, vol. 3, pp. 2389-2397, 1970. Magnetic properties of lunar sample 10048-22; Geochim. Cosmochim. Acta, suppl. I, vol. 3, pp. 2305-2308, 1970.

432. MacLaren, A.S., Geol. Surv. of Canada:
Magnetic anomaly map of Canada, 1965-71.

433. McGrath, P.H., Hood, P.J., Geol. Surv. of Canada:
Aeromagnetic interpretation - Appalachia, 1967-.
A study of interpretation techniques and of all available geophysical data in the Appalachian region. Particular emphasis is given to areas where the sediments might be oil-bearing. See The dipping dyke case: a computer curve-matching method of magnetic interpretation; Geophysics, vol. 35, No. 5, pp. 831-848, 1970.

434. Mercier, A., Seguin, M.K., Université Laval:
Interprétation des relevés aéromagnétiques dans la région située entre les latitudes 47° et 51° et longitudes 68° et 72°, Province de Québec, 1970-72; these de maîtrise (Mercier).

435. Middleton, R.S., Ontario Dept. of Mines and Northern Affairs:
Magnetic survey of Loveland and MacDiarmid Townships, Ontario, 1970.
Ground magnetic coverage was completed using 3 fluxgate magnetometers. See Magnetic survey of Loveland and MacDiarmid Townships; Ontario Dept. Mines, Misc. Paper 43, Summ. field work, 1970.
Airborne geophysical surveys in northern and southern Ontario, 1970.
A magnetic, gamma-ray spectrometer and VLF electromagnetic geophysical system was flown with a helicopter in the Matheson area in order to develop an airborne geological mapping system. VLF electromagnetic tests were flown in the Oxbridge Twp. area north of Toronto in an attempt to map Pleistocene geology.

436. Sangster, D.F., Hood, P.J., Gross, G.A., Geol. Surv. of Canada:
Nakina geologic-magnetic study, 1963-71.
A detailed geological and magnetic study of a well-exposed iron-formation in the Nakina area of northern Ontario was undertaken in order to better assess the relationships between geology and magnetic parameters of rich rocks.

437. Symons, D.T.A., Univ. of Windsor:
Paleomagnetic studies of radiometrically dated igneous rocks in the Cordillera, 1969-.
Paleomagnetic measurements have been completed on the following rock units in British Columbia: (a) Tertiary intrusives including Sooke Gabbro of Vancouver Island, (b) Karnubea volcanics, (c) Squamish batholith near Vancouver, (d) Chilliwack batholith near Hope, (e) Copper Mountain batholith and Tulameen ultramafics near Princeton, (f) Guichon batholith, (g) Topley intrusions near Fraser Lake, (h) Coast Range batholith near Prince Rupert, and (i) the Nass River flow. The work is supported by the Geological Survey of Canada. See Paleomagnetism of the Jurassic Island Intrusions of Vancouver Island, British Columbia; Geol. Surv. Can., Paper 70-63, 1971.
Paleomagnetism of carbonatite complexes in Ontario, 1970-.
Paleomagnetic evidence will be sought to examine the genesis of the carbonatite complexes in terms of age, mode of intrusion and tectonic evolution.

Seismic

438. Bertrand, W.G., Univ. of British Columbia:
Seismic reflection profiling and reconnaissance geology of the Dellwood Seamount area, 1970-71; M.Sc. thesis.
To determine whether the Dellwood knolls is a zone of sea floor spreading connecting the Revere-Dellwood fracture zone to the Queen Charlotte Fault.

439. Burke, K.B.S., Univ. of New Brunswick:
Study of physical properties of surficial deposits, 1970-71.
See Problems of seismic prospecting for groundwater in surficial deposits; in Geol. Surv. Can., Econ. Geol. Rept. No. 26, pp. 569-579, 1970.

440. Dainty, A.M., Univ. of Toronto:
Synthetic seismograms in multilayered media, 1967-.
The object is to explain features observed on real seismograms by computing theoretical (synthetic) seismograms by various methods in cases where the earth is approximated by a stack of horizontal, perfectly elastic layers. So far, leaking modes have been used, and the investigation is now moving into generalized ray theory. Also, research on the most efficient way to calculate theoretical seismograms is being carried out.

441. Ellis, R.M., Forsyth, D.A., Univ. of British Columbia:
Crustal seismology, 1969-71; M.Sc. thesis (Forsyth).
Interpretation of data from Project Edzoe and its reversal. Particular interest is attached to area between Hazelton and Kitimat Mountain ranges and also the Fraser River Valley at Quesnel, British Columbia.

442. Gendzwill, D.J., Hajnal, Z., Univ. of Saskatchewan:
Seismic investigation of collapse structure near Crater Lake, Saskatchewan, 1970-71.

A circular lake about 20 miles south of Yorkton, Saskatchewan has been shown by shallow drilling to be due to subsidence. It is thought that the subsidence is due to dissolution and removal of the underlying Prairie Evaporite Salt formation. A seismic reflection program was carried out to verify this and determine the extent of salt solution.

443. Goodacre, A.K., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Correlation of gravity and seismic data, 1968-.
In Canada variations of compressional wave velocity in the upper mantle may be due to regional variations in deep heat flow in some areas and in other areas to anisotropic propagation of seismic waves. Lateral variations of density and compressional wave velocity in the upper mantle appear to extend to at least 100 km.

444. Hajnal, Z., Univ. of Saskatchewan:
Seismic study of deep crustal features in southwestern Saskatchewan, 1970-71.
Preliminary study of several major gravity and magnetic anomalies seem to reveal deep seated crustal structures in the southwestern part of Saskatchewan.

445. Henry, B., Queen's Univ.:
The feasibility of shallow seismic reflection work in the Kingston area, 1970-71; M.Sc. thesis (Henry).

446. Hobson, G.D., Geol. Surv. of Canada:
Marine seismic - 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 or pneumatic, is used to initiate seismic energy. 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 complimentary to the sedimentary and limnogeological studies carried out concurrently. See High resolution reflection seismic survey in western Lake Erie; Proc. 12th Conf. Great Lakes Res., pp. 210-224, 1969.

447. Hobson, G.D., Hunter, J.A.M., Geol. Surv. of Canada:
Hammer seismic surveys, 1962-.
Shallow seismic methods, both refraction and reflection techniques, can be applied to problems in mining, engineering and groundwater. Particular attention is being given to recording and recognizing reflected P- and S-waves. A shallow seismic survey, elastic constants studies and surficial geology of part of Defence Research Establishment Suffield (D.R.E.S.), Suffield, Alberta; Geol. Surv. Can., Paper 69-13, 1970.

448. Jacoby, W.R., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Correlation of gravity and seismic data, 1970-.
The density distribution in the crust and upper mantle is being studied by fitting the computed gravity effects

of seismically determined models to the observed gravity field. These studies have led to the idea of the 'convection' of the lithosphere - asthenosphere system as a possible driving mechanism for plate movements. See Instability in the upper mantle and global plate movements; J. Geophys. Res., vol. 75, No. 29, 1970.

449. Kemp, A.L.W., Lewis, C.F.M., McAndrews, J.H., Inland Waters Branch, Canada Centre for Inland Waters:
Modern sedimentation rates in Lakes Ontario and Erie, 1970-73.
To estimate present day sedimentation rates in Lakes Ontario and Erie by two methods. (1)Analysis of echo sounding, seismic and piston core data of the two lakes to estimate post-glacial mud thickness. By measurement of bulk density and porosity of the sediment, together with sediment thickness to estimate sedimentation rates assuming constant sedimentation since post-glacial times. (2)To check on constancy of sedimentation and estimates in (1) by measuring the Ambrosia horizon in the sediment (circa 150 yrs. B.P.).

450. Leblanc, G., DuBerger, R., Université Laval:
Etude de la propagation des ondes séismiques près de Québec, 1970-72; these de maîtrise (DuBerger).
Utilisant les explosions de carrières et le réseau tripartite, on espère déterminer la courbe des ondes longitudinales et suggérer un modèle de structure de croûte.

451. Leblanc, G., Leroux, J., DuBerger, R., Université Laval:
Etude de la microséismicité de la région de Québec, 1968-72; thèse de maîtrise (Leroux, DuBerger).
Utilisant un réseau tripartite de séismomètres à haute magnification (4×10^6), divers sites, près de Québec et aussi de la Malbaie, ont été occupés durant 1969 et 1970. La courbe de fréquence des microtremblements de terre en fonction de leur magnitude sera calculée.

452. Overton, A., Geol. Surv. of Canada:
Seismic - Precambrian Shield, 1970-.
Seismic refraction and reflection 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 ore bodies will be investigated using frequency and amplitude parameters as well as velocity variation.

453. Stacey, R.A., Stephens, L.E., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Geophysical studies in British Columbia, 1966-.
A crustal model for the southern part of the Canadian Cordillera has been constructed based on the assumption that isostatic compensation is local and complete. The thickness of the crust in the model below the Plains, the mountains of B.C., and the ocean west of Vancouver Island appears to be in good agreement with the depth to the M-discontinuity derived from seismic data.

454. West, G.F., Aldon, T., Univ. of Toronto:
A pack-portable, three-channel seismic recorder.
A prototype of a pack-portable, three channel seismic recorder for unattended operation of up to a week has been

constructed. This unit designed for seismic crustal sounding under Canadian Shield conditions is now under test. A total of 60 minutes of data is recorded digitally, starting at a number of preprogrammed times. A crystal chronometer and WWVB receiver are included to establish timing on the records. Construction of 12 units is scheduled for spring and summer 1971.

455. West, G.F., Dampney, C., Univ. of Toronto:
A study of two-dimensional wave propagation in a medium of a few layers with dipping interfaces.
Synthetic refraction and wide angle reflection seismograms were calculated by modifications of the Sherwood-Cagniard technique and compared with laboratory model data, with good results. Curved interface problems were also attempted, but with only moderate success.

456. West, G.F., Halls, H.C., Univ. of Toronto:
Lake Superior seismic refraction surveys.
The most important findings are (1) confirmation of faults on the NW side of Isle Royale and north side of Michipicoten Island; (2) no confirmation of the postulated North Shore faults along the Minnesota coast; (3) support for the general lakeward continuity of volcanic rocks as projected from the exposed geology, (4) discovery of the widespread existence of relatively flat-lying Bayfield-Jacobsville rocks almost everywhere beneath the lake.

457. West, G.F., Kunar, L., Univ. of Toronto:
Sonobuoy design for refraction surveys.
A satisfactory sonobuoy design for refraction surveys with ranges up to 50 km has been achieved. Studies of the system's performance during the 1969 field season indicate that future work should be concentrated on the source rather than the detection system. Performance of the system with safety fuse fired explosives was excellent for first-arrival refraction, but left something to be desired for late-arrival reflection studies. The problem is chiefly due to bubble pulse oscillations of the shot and may be partly curable by record processing. A cleaner source pulse would also be desirable.

458. Wiggins, R.A., Univ. of Toronto:
Interpretation technique for seismological observations.
The objective is to develop and apply computational techniques for interpreting seismological observations in terms of the structure of the earth. Such interpretations must include methods for exhibiting the uncertainty in the structure due to both uncertainties in the observations and non-uniqueness. To date methods have been developed for Monte Carlo inversion of body-wave travel-time and phase-velocity data and for perturbation inversion of surface wave observations. See Monte Carlo inversion of body-wave observations; J. Geophys. Res., vol. 74, no. 12, pp. 3171-3181, 1969.

General

459. Ade-Hall, J.M., Ryall, P., Dalhousie Univ.:

Changes in the magnetic properties and opaque minerals of the basaltic lavas of the continents and oceans in response to widespread metamorphism in the zeolite facies, 1970-73; Ph.D. thesis (Ryall).
See Burial metamorphism and the magnetic properties of basalt lavas (abstract); Trans. Am. Geoph. Union, vol. 51, 1970.

460. Babcock, E.A., Univ. of Alberta:
Structural geology and geophysics of Durmid area, Imperial Valley, California, 1966-70.
Surface and subsurface geology along the San Andreas Fault zone.
Low angle colour infrared aerial photography for fault studies, 1970-71.
Infrared photography to locate active faults in an alluvial filled valley.
Terrain analysis of Lake Wabamum area, Alberta, using remote sensing methods, 1970-.
Land use, geology, terrain for purposes of planning and development near Lake Wabamum, Alberta.

461. Barr, S.M., Univ. of British Columbia:
Marine geology of the northern end of Juan de Fuca Ridge and the adjacent continental slope, 1968-71; Ph.D. thesis.
Field work compiled includes continuous seismic profiling, magnetic profiling, and echo sounding, extensive dredging for bedrock samples on the Ridge, related seamounts, the transform fault cone forming the northern boundary of the area, and the continental slope. Petrology, chemical analyses, and fission track age dating will be undertaken on the basalts obtained.
See Structure of the continental slope west of Vancouver Island between 48°N and 49°10'N; Geol. Surv. Can., Paper 71-1, Pt. A, 1971.

462. Burke, K.B.S., Univ. of New Brunswick:
Geopnysical investigation of the tectonic framework of north-eastern New Brunswick, 1970-74.

463. Charbonneau, B.W., Geol. Surv. of Canada:
Gamma-ray support, 1967-72.
To undertake detailed geological and radiometric investigations on the ground in areas selected for experimental airborne gamma-ray spectrometer survey. To correlate air data with ground data in order to accumulate criteria for assessing airborne data on its own merits. To undertake systematic ground radiometric measurements to ensure the proper calibration of airborne measurements. See Radioactive precipitation and its significance to high-sensitivity gamma-ray spectrometer surveys; Geol. Surv. Can., Paper 70-1, Pt. B, pp. 32-33, 1970.

464. Chase, R.L., Univ. of British Columbia:
Geology of northeastern Pacific Ocean west of British Columbia, 1969-74.
See Deformation revealed by C.S.P. on margins of the northern sector of Juan de Fuca lithospheric plate, northeast Pacific Ocean; Geol. Soc. Amer. Abstracts with programs, vol. 2, No. 7, p. 518, 1970.

465. Clarke, G.K., Crossley, D.J., Classen, D.F., Univ. of British Columbia:
Geophysical glaciology - Fox Glacier, 1968-; Ph.D. (Crossley) and M.Sc. thesis (Classen).
Thermal drillings and conductivity measurements were made in 1970.

466. Clarke, G.K.C., Ulrych, T.J., Univ. of British Columbia:
Communication theory:
See Wavenumber domain analysis and design of potential field filters; Proc. Symp. on decision making in Mineral Exploration II, pp. 121-140, 1969. Applications of optimum filters in mining geophysics; ibid., pp. 141-162, 1969.

467. Darnley, A.G., Grasty, R.L., Geol. Surv. of Canada:
Airborne gamma spectrometry, 1967-72.
Development of airborne gamma-ray spectrometry, ancilliary navigational tract and data recording systems, and the necessary data processing methods to produce radiometric maps which will facilitate and accelerate geological mapping from the air. The choice of scale for publication to be determined from study of experimental results obtained in 1969-70.

468. Dorff, N.J., Cameron, R.A., Laurentian Univ.:
Use of radiation logging for the correlation of Precambrian rocks, 1970-71; M.Sc. thesis (Dorff).
See Cryptic variation and the petrology of the Sudbury Nickel Irruptive; Econ. Geol., vol. 65, No. 2, 1970.

469. Duckworth, K., Univ. of Calgary:
Development of equipment and techniques in mining geophysics, 1968-.

470. Dyck, J.H., Saskatchewan Research Council:
Geophysical prospecting for groundwater in southern Saskatchewan, 1963-70.
See Some recent borehole logging applications in groundwater studies: a review; Saskathcewan Research Council, Report P70-2, 1970.

471. Grasty, R.L., Ostrihansky, L., Geol. Surv. of Canada:
Radioisotope methods, 1967-72.
To develop application of lightweight portable radioisotope instrumentation for geological field use, especially for in situ analysis of rock composition; to provide laboratory analyses by radioisotope methods of control samples collected in support of airborne gamma spectry and airborne geochemistry.

472. Hattersley-Smith, G., Dept. of National Defence:
Geophysical research in the Arctic, 1963-70.
This project was concerned with glaciological, meteorological and oceanographic studies in northwestern Ellesmere Island. See Mass balance of the Ward Hunt ice rise and ice shelf: a 10 year record; J. Glaciology, vol. 9, No. 56, pp. 247-52, 1970.

473. Hayles, J., LeCouteur, P., Lee, L., Ozard, J.M., Russell, R.D., Slawson, W.F., Ulrych, T.J., Univ. of British Columbia:

Isotope geophysics - common lead models and interpretation, 1958-. Ph.D. (LeCouteur and Lee) and M.Sc. thesis (Hayles). R.D. Russell is working on a model to explain the difference in character between oceanic basalt lead and continental lead. Analyses are being made: oceanic basalt lead, Manitouwadge ore lead, southern Greenland "ore" lead, East Kootenay ore lead, and Anvil ore lead. See Lead isotopes, lunar capture and mantle evolution; Nature, vol. 224, pp. 766-768, 1969.

474. Keen, M.J., graduate students, Dalhousie Univ.:
Geophysical and geological studies in Baffin Bay and Labrador Sea, 1970-71.
See The continental margin of Eastern Canada; The Sea IV, 1970.

475. King, M.S., Kurfurst, P.J., Univ. of Saskatchewan:
Static and dynamic elastic properties of rocks, 1967-72.
The elastic properties of rocks are being measured experimentally by static and dynamic techniques. The static stress-strain relations and ultrasonic-wave velocities are measured simultaneously on each rock sample as it is subjected to changes in triaxial loading conditions and with different pore saturants. These tests are performed in a controlled-environment chamber at temperatures in the range -6°F to +75°F. This research will lead to a better understanding of the reasons for the elastic properties of rocks measured under static conditions differing from those determined by dynamic methods. The prediction of the behaviour of foundations of large structures and underground installation subjected to earthquakes or blast effects will be facilitated, for both temperate and permafrost regions. Proc. 11th Symp. Rock Mech., (in press).

476. Koulomzine, T., Becker, A., Ecole Polytechnique:
Geophysical prospecting methods applicable to the search for deep seated metallic ore bodies, 1969-72.
Intention; to build modern detecting equipment to be lowered into sparsely distributed deep drill holes which in some mining camps are fairly numerous, but have not been used for adequate geophysical studies. The design of such equipment is well underway and expected to be ready for testing in the field in 1971; to critically restudy and modify known techniques and devise new techniques with the aim of obtaining greater penetration.

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

478. Laroche, P., Seguin, M.K., Université Laval:
Propriétés physiques des gisements sulfurés de la province de Québec, 1970-71; thèse de maîtrise (Laroche).

479. Loveless, A.J., Russell, R.D., Univ. of British Columbia:
Isotope geophysics - analyses of gadolinium, samarium, and europium in the Abee meteorite, 1969-70; Ph.D. thesis (Loveless).

480. Morin F., McGill Univ.:
Down-the-hole geophysical logging in close (20') centres of a limestone rock mass, 1970-71; M.Sc. thesis.

481. Ozard, J.M., Ulrych, T.J., Univ. of British Columbia:
Isotope geophysics - U/Pb geochronology, 1968-.
Analyses are being carried out on the so-called "1 billion year old anorthosites".

482. Potter, W.G., Milligan, G.C., Nova Scotia Dept. of Mines - Geological Division:
Windsor basins project - Cape Breton Island, 1970.
An assessment of the economic geology of the Windsor marine sedimentary basins involving geological mapping, geochemistry and geophysical surveys.

483. Ranalli, G., Carleton Univ.:
Relations between geophysical and structural patterns in the Ottawa Valley, 1970-73.
To study the correlations between available geophysical information (gravity, aeromagnetics, seismicity) and the geologic and structural evolution of the Ottawa Valley from approximately 74°W to 76°W.

484. Russell, R.D., Blenkinsop, J., Loveless, A.J., Meldrum, R.D., Mitchell, D.L., Ozard, J.M., Univ. of British Columbia:
Isotope geophysics - instrumentation; Ph.D. (Bleninsop and and Meldrum) and M.Sc. thesis (Mitchell).
A newly acquired Interdata Model 4 digital computer has been interfaced with three mass spectrometers and a synchronous tape drive. Partially completed programming allows for on-line reduction of certain mass spectra.

485. Slaney, V.R., Geol. Geol. Surv. of Canada:
Infrared scanning, 1967-72.
To recognize the surface distribution of rocks, soils, drainage and fracture patterns using I.R. scanning techniques. To determine the optimum conditions for I.R. surveys by studying the effects of day and night changes, seasonal changes and the effect of weather on the response of the ground. See Infrared scanning; Geol. Surv. Can., Paper 70-1, Part A, p. 84, 1970.
Multispectral photography, 1967-72.
Development of multispectral aerial photography, including high altitude and satellite photography, and methods of interpretation as a means of providing geological information. See Multispectral Photography; Geol. Surv. Can., Paper 70-1, Part A, p. 84, 1970.

486. Thomlinson, A.G., Univ. of British Columbia:
Geology of Explorer Ridge, off Vancouver Island, British Columbia, 1969-72; Ph.D. thesis.
Explorer Ridge, topographically a series of narrow, elongate valleys and hills trending northeast appears to be an active site of sea-floor spreading. Evidence to this effect includes "striping" of magnetic anomalies; high heat flow; fresh, young-looking basalts; thickening of unconsolidated sediments laterally away from line of active spreading. Work includes seismic profiling, dredging for basalts, remanent magnetism

measurements, thin-section petrographic study, x-ray diffraction, chemical analysis and fission track dating.

487. Walcott, R.I., Earth Physics Branch, Dept. of Energy, Mines and Resources:
Flexural rigidity, thickness, and viscosity of the lithosphere, 1968.
The flexural rigidity of the lithosphere is deduced from observations of the wavelength and amplitude of bending in the vicinity of supercrustal loads. From these values, the thickness of the continental lithosphere is inferred to be about 100 km and that of the oceanic lithosphere about 75 km or more.

488. Wyder, J.E., Geol. Surv. of Canada:
Borehole and related geophysical techniques, 1968-.
Evaluation of potential use of borehole geophysical techniques as tools for studying Quaternary deposits and low grade metamorphosed Precambrian sediments near Kimberley, British Columbia.
Sidewall sampling and geophysical service, 1968-.
Borehole geophysical measurements were made as part of co-operative projects with personnel of the Inland Waters Branch in parts of Prince Edward Island, New Brunswick and British Columbia. The sidewall sampler was used on a joint Federal-Provincial project in the Okanagan Valley of British Columbia. It was also used in the lower Fraser Valley in co-operation with personnel of the Inland Waters Branch. See Geol. Surv. Can., Paper 71-1, Part A, 1971.

MINERAL DEPOSITS

Base Metals

489. Allen, D.G., Clark, A.H., Queen's Univ.:
Mineralogy and geochemistry of the Galore Creek copper deposit, British Columbia, 1967-70; Ph.D. thesis (Allen).
A study of sulphide, oxide, and silicate minerals in an unusual, quartz-free, syenitic prophyry copper deposit, stressing phase relations involving biotite, K-feldspar, sphalerite, pyrite, and magnetite. Chemical and microprobe analyses of these minerals are defining a narrow fugacity-temperature region for ore deposition and alteration.

490. Assad, R., Université Laval:
A study of nickel occurrences in the Grenville with special reference to the Renzy Lake deposit, Province of Quebec, 1969-72.
An attempt to establish the particular nature of these occurrences in the Grenville zone in order to evaluate possible mineralization controls that may be of use in exploration.
Nickel mineralization at the Matagami Lake Mine, Quebec, 1970-72.
An attempt to relate the occurrence of nickel sulfides in an ultrabasic intrusive to the presence of massive pyritic and Zn-Cu sulfides in the adjacent intruded formations.

491. Bachinski, D.J., Univ. of New Brunswick:
Sulphur isotopic composition of cupriferous iron sulphide deposits associated with volcanic rocks, Notre Dame Bay, Newfoundland, 1965-70.
Compositional variations in naturally occurring ferromagnesian silicate minerals in metamorphosed sulphide ore deposits, 1967-71.

492. Bachinski, D.J., Ansell, V., Univ. of New Brunswick:
Chromite in the Tilt Cove sulphide ores, Notre Dame Bay, Newfoundland, 1970-71.

493. Bachinski, D.J., McAllister, A.L., McBride, D., Univ. of New Brunswick:
Structure and stratigraphy of the Heath Steele Mine, Bathurst area, New Brunswick, 1970-75; Ph.D. thesis (McBride).
Part of a comprehensive program on the massive sulphide ores in the Bathurst area directed towards unravelling of the stratigraphy, reconstructing environments of deposition and evaluating changes in the ores due to metamorphism.

494. Bachinski, D.J., Proudfoot, D., Univ. of New Brunswick:
Fabric changes in sulphide aggregates, 1970-72; M.Sc. thesis (Proudfoot).
Part of a larger program on metamorphism in sulphide ores. Textural changes in sulphide aggregates will be studied both in the field and through heating experiments.

495. Beales, F.W., Univ. of Toronto:
Sulphide ore deposits in limestone host rocks, 1965-.
Emphasis on stratigraphic aspects of ore body emplacement in limestones. See Stratigraphic habitat of Mississippi Valley type ore deposits; Inst. Min. Met. London, Trans., pp. B145-154, 1970.

496. Blais, R.A., Gentile, F., Ecole Polytechnique:
Geology and base metals deposits of the Stratford and Disraeli areas of Quebec, with special reference to the Cupra Mine, 1969-71; Ph.D. thesis (Gentile).

497. Brown, A.C., Ecole Polytechnique:
Mineralogy of the Chibuluma Cu-Co deposit, Zambia, 1969-71.
Textural and chemical analysis of sulfides and associated gangue minerals with the intent to define the primary and recrystaylization history of mineralization in the Zambian copperbelt.

498. Chyi, L., Crocket, J., McMaster Univ.:
Noble metals in the Strathcona mine, Sudbury, determined by activation analysis, 1969-74; Ph.D. thesis (Chyi).
Pt, Pd, Au and Ir are being determined in ore minerals from the Strathcona mine, Sudbury. Analyses of co-existing pyrrhotite, pentlandite, chalcopyrite from the deep ore zone of this mine constitute the major emphasis of the project. See A study of precious metals in the Sudbury nickel irruptive ores; Econ. Geol., G5, p. 438, 1970.

499. Clark, A.H., Queen's Univ.:
Mineralogy and geochemistry of the Ylojarvi copper-tungsten deposit, southwest Finland, 1960-.

Microprobe studies have confirmed the occurrence in this unmetamorphosed Precambrian deposit of several rare ore minerals, which permit the more precise estimation of the conditions of ore formation. Particular attention is being paid to the unusual copper-iron sulphides in the ores, which include cuprian pyrrhotite, cubic cubanite, three compositionally distinct forms of chalcopyrite, and a probable very copper-rich mackinawite-type mineral. See An unusual copper-iron sulfide, $Cu_{0.12}Fe_{0.94}S_{1.00}$, from the Ylojarvi copper-tungsten deposit, Finland; Econ. Geol., vol. 65, pp. 590-591, 1970.

Compositional relations of sphalerite in natural, low-temperature environments, 1966-70.

Phase relations at low temperatures in the Fe-Zn-S system may probably be predicted from the iron contents of sphalerites in well-defined natural assemblages. Sphalerite coexisting with primary monoclinic pyrrhotite and pyrite in the Panasqueira deposit contains 11.6-12.4 mole % FeS, while sphalerite associated with greigite and pyrite in the Mina Alacran deposit of Chile contains 7.5 mole % FeS. These data are considered to define equilibrium curves of geothermometric interest.

500. Clark, A.H., Farrar, E., Haynes, S.J., Lortie, R.B., Zentilli, M., Quirt, G.S., McNutt, R.H., Conn, H., Mortimer, C., Sillitoe, R.H., Queen's Univ. in cooperation with McMaster Univ. and Instituto de Investigaciones Geologica de Chile:

Metallogenetic relationships in the Andean copper province of northern Chile, 1967-73; Ph.D. theses (Haynes, Quirt).

A comprehensive investigation of the temporal and spatial relationships of diverse ore deposits in the Andes of northern Chile is underway, directed towards an assessment of the sources and modes of concentration of the economically valuable metals. It is hoped that this work in an unusually well-exposed terrane will permit the better definition of the parameters characteristic of metallogenetic provinces or metallotects. See K-Ar chronology of granite emplacement and associated mineralization, Copiapo mining district, Atacama, Chile (abstr.); Econ. Geol., vol. 65, p. 736, 1970.

501. Clark, A.H., Lortie, R.B., Zentilli, M., Queen's Univ.:

Genesis of disseminated, strata-bound copper deposits in felsic pyroclastic flows, Copiapo region, northern Chile, 1967-72; Ph.D. theses (Lortie, Zentilli).

Detailed studies of the petrology and chemistry of mineralized and barren ignimbrite flows are yielding information on the mode of formation of these unusual and important continental strata-bound ore deposits. Field relations and sulphur isotope fractionation indicate that a simple, magmatic origin is unlikely.

502. Clark, A.H., McNutt, R.H., Queen's Univ., and McMaster Univ.:

Mineralogy, chemistry, and stable isotope distribution of Jurassic-Pleistocene andesitic and rhyolitic volcanics, Copiapo region, northern Chile, 1969-72.

Representative, radiometrically-dated specimens of andesitic and rhyolitic lavas and pyroclastics are under study, in an attempt to clarify the evolution of these dominant magma types during the orogenic and post-orogenic stages of the

Andean mobile belt. In part, this work is directed towards the distinction of mineralized and barren extrusive units.

503. Clark, A.H., Zentilli, M., Queen's Univ.:
The localization and genesis of sulphide mineralization in the Hornitos Formation of northern Chile, Lat. 26-29°S, 1968-72.
Ore deposits formed during the development of the Upper Cretaceous or Lower Tertiary continental sediments and volcanics of the Hornitos Formation are under study, with emphasis on regional and local controls; this work is part of a comprehensive analysis of metallogenetic relationships in this region.

504. Carter, N.C., British Columbia Dept. of Mines and Petroleum Resources and Univ. of British Columbia:
Potassium-argon age determinations of porphyry-type copper and molybdenum deposits, west-central British Columbia, 1967-; Ph.D. thesis.
See Copper and molybdenum porphyry deposits in central British Columbia; Can. Mining J., vol. 91, No. 4, pp. 74-76, 1970.

505. Cranstone, D.A., Manitoba Dept. of Mines:
Geological study of the Manitoba nickel belt, 1968-72.
A comprehensive study of the regional geology, structure, metamorphism and mineral deposits of the Manitoba nickel belt, in the area between Assean and Split Lakes in the northeast and Kiski and Gormley Lakes in the southwest.

506. Eckstrand, O.R., Geol. Surv. of Canada:
Geology of Canadian nickel and Platinum group deposits, 1963-.
Field studies and general synthesis continues, directed toward the characterization and classification of nickel deposits in Canada. See Serpentinites as potential sources of nickel; Geol. Surv. Can., Paper 70-1B, Rept. Activities Pt. B, pp. 55-56, 1970.

507. Fenwick, K.G., Michigan Technological Univ.:
Origin of a stratabound pyrite deposit in predominantly volcanic derived strata, in the Finlayson Lake area, District of Rainy River, Ontario, 1967-71; M.Sc. thesis.
Thin and polished sections, sulfur isotope analyses, trace element analyses, complete chemical analyses and the chemical analyses of the alteration envelope of the pyrite were studied and compared with some of the major deposits in Ontario.

508. Gerard, M.P., McGill Univ.:
The copper deposit of Madeleine Mines Ltd., Gaspé Nord, Quebec, 1967-71.

509. Govett, G.J., Constantinou, G., Pantazis, T.M., Univ. of New Brunswick, Geol. Surv. Cyprus:
The sulphide deposits of Cyprus, 1967-71.
To determine the origin and genesis of the Cyprus stratiform sulphide deposits; to determine and explain the distribution of trace elements in the ore and host rock; and to devise an exploration technique using bedrock geochemistry.

510. Govett, G.J., Felder, F., Univ. of New Brunswick:
The use of trace element analysis in soils and stream sediments as a means of differentiating different types of Pb-Zn deposits in the Devonian carbonates in Northwestern Spain, 1970-71; M.Sc. thesis (Felder).
To study the distribution of trace elements (Cu, Zn, Pb, Cd, Ag, Hg) in the mineralized zone, adjacent country rock, soils and stream sediments, in order to determine trends and patterns associated with various types of mineralization. One major deposit and a half dozen showings and anomalous areas have been selected and samples of the soils, stream sediments and mineralized rock have been taken.

511. Govett, G.J., Whitehead, R.E., Univ. of New Brunswick:
A study of the trace element distribution in the host rocks and massive sulphides at Heath Steele Mines Ltd., New Brunswick, 1970-72; M.Sc. thesis (Whitehead).
To provide a useful tool for locating blind ore zones by means of rock geochemistry.

512. Guilloux, L., Brown, A.C., Ecole Polytechnique:
Metallogenic studies on the Icon Syndicate copper deposit, Chibougamau, Québec, 1970-72.
Mineralogic analysis of a stratiform copper deposit in a dolomitic host rock. Regional base metal zoning is also being investigated.

513. Harris, D.C., Mines Branch, Dept. of Energy, Mines and Resources:
Mineralogical examination of the base-metal deposits of the Red Lake area, Ontario, 1969-.
Mineralogical examination of samples collected from the South Bay Mines, Trout Lake Deposit (Cochenour Willans Gold Mines Ltd.) and Rexdale property is underway. See Paracostibite (CoSbS) and nisbite (NiSb), new minerals from the Red Lake area, Ontario; Can. Mineral., vol. 10, pp. 232-246, 1970.

514. Hartlein, A.J., Scott, S.D., Univ. of Toronto:
Origin of sulpides in the Huronian sediments at Silverfields Mines, Cobalt, Ontario, 1970-71; M.Sc. thesis (Hartlein).
Conformable sulfides in Huronian argillites (?) may have been derived from the underlying Archean mineralized interflow bands.

515. Jambor, J.L., Geol. Surv. of Canada:
Mineralogy of porphyry deposits of copper and molybdenum in Canada, 1970-.
The study will focus on alteration zoning around individual deposits, commencing with those in the Babine Lake area, British Columbia.

516. Jonasson, I.R., Geol. Surv. of Canada:
Mercury in soil gas applied to exploration for sulphide ores, 1969-71.
To establish environmental relationships and physiochemical mechanisms which control the migration of mercury from base-metal deposits to the surficial environment, i.e., to establish the chemical routes by which mercury may move between ore, bedrock, soils, streams, plants, and atmosphere. Particular

emphasis is being placed on a study of the forms in which mercury occurs in the various media and especially in soil gases. Work to date indicates a broad division of mercury compounds into elemental, inorganic and organo metallic classes in soil and soil gas materials. See Mercury in the natural environment; A review of recent work; Geol. Surv. Can., Paper 70-57, 1970.

517. Kindle, E.D., Kirkham, R.V., Geol. Surv. of Canada:
Geology of copper deposits in Canada, 1960-.
See Preliminary report on the copper deposits, Coppermine River area, District of MacKenzie; Geol. Surv. Can., Paper 70-49, 1970. Copper deposits of Coppermine River area, District of Mackenzie; Geol. Surv. Can., Bulletin 150 (in press).

518. Lydon, J.W., Clark, A.H., Queen's Univ.:
Sedimentary and geochemical controls of strata-bound lead-zinc-silver-copper-iron mineralization in the Aracena-Portal belt of southern Iberia, 1968-72.
The unravelling of metallogenetic relationships in this complex area is at present focussed on the study of the known orebodies and their carbonate and volcanic environments.

519. MacLean, W.H., Webber, G.R., McGill Univ.:
Inter-relationship of base-metal and gold ore deposition in the Porcupine district, northwestern Ontario, 1971-74.

520. McAllister, A.L., Bhatia, D.M.S., Univ. of New Brunswick:
Facies changes in iron formation, Brunswick No. 12 Mine, Bathurst, New Brunswick, 1967-; M.Sc. thesis (Bhatia).

521. McBride, D.E., Clark, A.H., Queen's Univ.:
Geology and chemistry of the Macex copper prospect, Terrace, British Columbia, 1969-71; M.Sc. thesis (McBride).
Involves an investigation of minor element dispersion in a porphyry copper environment.

522. McBride, D., McAllister, A.L., Univ. of New Brunswick:
Geology of the Heath Steele ore zones, New Brunswick, 1970-73; Ph.D. thesis (McBride).
To establish the detailed stratigraphy of the ore zones, which have been subjected to multiple folding, and to interpret the stratigraphy in terms of paleoecology.

523. McMillan, W.J., British Columbia Dept. of Mines and Petroleum Resources:
Geology and mineral deposits of the Guichon Creek batholith, 1970-72.
Geologic mapping at scale 1 inch to 1320 feet is being conducted, with emphasis on the structural setting of the deposits.

524. Milne, V.G., Ont. Dept. of Mines and Northern Affairs:
Manitouwadge area, Ontario, 1 inch to 1,000 feet, 1968-71.
Surface mapping, mine examination, and detailed stratigraphic, structural and metamorphic relationships of the Cu-Zn-Ph orebodies in the Manitouwadge mining camp. See Ontario Dept. Mines, Prel. Map, P. 548.

525. Moore, J.C.G., Mount Allison Univ.:
Mercury haloes around sulphide bodies of northern New Brunswick, 1963-72.

526. Morton, R.D., Robinson, B.W., Badham, N., Sassano, G P., Goble, R., Goble, E., Univ. of Alberta:
Studies on the nature and origins of U- and U-Ag-Cu-Bi-Ni-Co-mineralization at Echo Bay, Camsell River and Great Slave Lake, Northwest Territories, Eldorado, Saskatchewan and of Cu-Pb-Zn deposits near Waterton Lake, southwest Alberta, 1967-73; Ph.D. (B.W. Robinson, G.P. Sassano) and M.Sc. theses (R. Goble, E. Goble).
To investigate the role of sedimentary and metamorphic processes in the development of the listed ore deposits. A broad mineralogical, petrological and geochemical approach is being taken and field data are augmented by geochronological studies and by analyses of stable isotopes such as S, O and C. Geothermometric techniques and microprobe analyses of the constituent mineral phases are being employed to elucidate the fluid geochemistry during ore transport and deposition.

527. Naldrett, A.J., 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, 1967-71; Ph.D. thesis (Hewins).

528. Naldrett, A.J., Muir, J.E., Univ. of Toronto:
Study of the Giant Mascot nickel-sulfide deposit, Hope, British Columbia, 1969-71; M.Sc. thesis (Muir).
To determine the relationship between mineralization and the different ultramafic rocks present at the deposit.

529. Naldrett, A.J., Rae, D., Univ. of Toronto:
Study of inclusions at Little Stobie Mine, 1970-72; M.Sc. thesis (Rae).

530. Pertold, Z., McAllister, A.L., Univ. of New Brunswick:
Structural geology of the Brunswick No. 6 Mine area, Bathurst, New Brunswick, 1969-70.
A detailed field examination of the sulphides which have been subjected to polyphase deformation. Laboratory follow-up includes fabric studies on pyrite, pyrrhotite and quartz using a Phillips textural goniometer.

531. Petruk, W., Mines Branch, Dept. of Energy, Mines and Resources:
Mineralogy and geochemistry of the porphyry copper-molybdenite deposits in British Columbia, 1969-.
To determine the mineral assemblages present in each deposit, and to correlate the compositions and physical properties of the individual minerals to each assemblage. In addition the assemblages will be correlated to the host rock and wall rock alteration products to assess the affect of each factor on mineral beneficiation.

532. Preto, O.A., British Columbia Dept. of Mines and Petroleum Resources:
Geology and mineral deposits of Copper Mountain, British Columbia, 1968-71.

533. Roberts, R.G., Morris, J.H., Univ. of Waterloo:
Fabric of pyrrhotite in deformed sulphide ores of Mattagami Lake Mine, Quebec, 1964-70; M.Sc. thesis (Morris).
Structural geology and sulphide mineralization of the Upper Beaver Mine, Ontario, 1970-72.

534. Sangster, D.F., Geol. Surv. of Canada:
Geology of Canadian lead and zinc deposits, 1965-.
Long-term comprehensive research on the geology of lead and zinc deposits to provide a geological basis for exploration and an assessment of lead and zinc potential in Canada. Currently, research and data synthesis are being directed toward the volcanogenic or massive sulphide type of lead- and zinc-bearing deposits. Data gathering mainly involves geological descriptions of mining properties in order to obtain a clear understanding of the types and geological environments of these deposits. Research is being conducted on the S- and Pb-isotopic compositions of these ores as well as their major element geochemistry. In addition, a study of lead-zinc deposits in relation to Lower Cambrian strata of the western Canadian Cordillera in order to better assess the lead-zinc mineral potential of these strata is underway. See Metallogenesis of some Canadian lead-zinc deposits in carbonate rocks; Proc. Geol. Assoc. Can., vol. 22, pp. 27-36, 1970. Geological exploration guides for Canadian lead-zinc deposits in carbonate rocks; Can. Mining J., pp. 49-51, April, 1970.

535. Sims, W., McGill Univ.:
Heavy minerals as potential indicators of sulfide deposits, Gaspé area, Quebec, 1964-71; Ph.D. thesis.

536. Smith, E., McGill Univ.:
The nature of mercury anomalies in rocks in and near the New Calumet Sulphide deposits, Quebec, 1969-71; M.Sc. thesis.

537. Smith, T.E., Univ. of Windsor:
An investigation of secondary dolomites and sedimentary Pb/Zn sulphide ore bodies in the Bruce Peninsula, 1970-.
A field and laboratory investigation designed to indicate the role played by bacteria and algae in the production of dolomites and Pb/Zn sulphides. Experiments are being designed to use algae and bacteria collected at sites of recent dolomitization (e.g., Bonaire, Florida, and the Bahamas) to convert calcite into dolomite at low temperatures and pressures.

538. Strong, D.F., Memorial Univ. of Newfoundland:
Sulphide mineralization in the Betts Cove-Tilt Cove region of Newfoundland, 1970-.

539. Suffel, G.C., Hutchinson, R.W., Ridler, R., Univ. of Western Ontario:
Genesis and metamorphism of massive sulphide ores, 1969-.
It is believed that metamorphic features in Archaean sulphide ores are commonly unrecognized and mostly are undescribed in Canadian ores. See Metamorphism of massive sulphides at Manitouwadge, Ontario, Canada; Proc. Internat. Assoc. on the Genesis of Ore Deposits, Tokyo, 1970.

540. Touborg, J., Scott, S.D., Univ. of Toronto:
Metamorphism of the Geco orebody, Manitouwadge, Ontario, 1969-72; Ph.D. thesis (Toubourg).
Application of laboratory-derived geothermometers and geobarometers to a metamorphosed massive Cu-Zn orebody.

541. Tupper, W.M., Dass, A.J., Davies, J.L., Heslop, J., Nash W., Rath, U., Casselman, M., Carleton Univ.:
Geology and geochemistry of mineral deposits, in particular sulphide deposits in volcanic-sedimentary environments, 1966-; Ph.D. theses (A.J. Dass, J.L. Davies, J. Heslop, W. Nash, U. Rath), M.Sc. thesis (M. Casselman).
Work is in progress on the base metal deposits at Rio Tinto, Spain; Bathurst, New Brunswick; Amisk Lake-Rusty Lake area, Manitoba; Mamainse Point (Coppercorp deposit), Ontario; and Bathurst Inlet, Northwest Territories, on the silver deposits at Cobalt, Ontario, and on the Mount Allen tungsten deposit in the Northwest Territories.

Coal and Peat

542. Hacquebard, P.A., Geol. Surv. of Canada
Petrographic correlation of coal seams at Carmacks, Yukon, 1969-71.
To determine the extent of mineable coals in the Carmacks area presently under exploitation, by correlating the major seams that are separated by faulting. See The correlation of the main seam in the Tantalus Butte Coal Mine at Carmack, Yukon Territory; Geol. Surv. Can., Topical Rept. 140, 1970.

543. Simard, A., Quebec Dept. of Natural Resources:
Inventory of peat-bogs, surveying drainage networks, and planning, 1970-.

Ferrous Metals

544. Gross, G.A., McLeod, C.R., Geol. Surv. of Canada:
Geology of iron and manganese deposits in Canada, 1957-.
Investigation continues on the variety and environment of sedimentary facies of various types of cherty iron formation. An active program is underway to obtain analytical data on major and minor elements in the various sedimentary facies of iron-formation to further evaluate their depositional environment and the iron ore potential of these chemical sediments. See Survey and world iron ore resources: Nature and occurrence of of iron ore deposits of Canada and the West Indies; United Nations, 1970. Geological concepts leading to mineral discovery; Can. Mining J., April, 1970. Some Canadian occurrences of maghemite; Geol. Surv. Canada, Paper 70-7, 1970.

545. Ridler, R.H., Geol. Surv. of Canada:
Iron formation facies in the southern part of the Abitibi Basin, Ontario and Quebec, 1969-71.
Precious and base metal sub-facies of the standard facies of iron formation (exhalite) conform to regional patterns of facies distribution. Much of the shelf edge carbonate, sulfide, silicate facies has been traditionally interpreted as replacement along a major fault, rather than poly-deformed

sediment. See Metallogeny and iron formation Kirkland Lake-Noranda-Cadillac; Geol. Assoc. Can. Prog. Abstracts, p. 44, 1970.

Industrial Minerals

546. Bannatyne, B.B., Manitoba Dept. of Mines and Natural Resources:
High-calcium limestone deposits of Manitoba, 1970-.

547. Bartlett, G., Fong, C., Greene, B.A., Newfoundland and Labrador Dept. of Mines, Agriculture and Resources:
Silica assessment project, 1965-71.
Investigation and assessment involves goelogical mapping, diamond drilling and quantitative analysis for SiO_2, Fe_2O_3, Al_2O_3, MgO, CaO, Na_2O, K_2O.

548. Bishop, D.G., Nova Scotia Dept. of Mines:
Barite and manganese project, Nova Scotia, 1970-.
An assessment of the occurrences of barite and manganese within the various geologic environments of Nova Scotia including detailed chemical analyses and drilling programs.

549. Burwasser, G.J., Ontario Dept. of Mines and Northern Affairs:
Pleistocene geology and industrial mineral resources of the Sudbury area, Ontario, 1970-71.
Summary of field work, 1970.
Industrial mineral resources of Nottawasaga Township, Ontario, 1970.
Summary of field work, 1970.

550. Feenstra, B.H., Ontario Dept. of Mines and Northern Affairs:
Pleistocene geology and industrial mineral resources of the Niagara and Welland areas, southern Ontario, 1969-73.
To prepare surficial geology, bedrock topography - drift thickness and mineral resource maps at 1:50,000.

551. Fong, C., Newfoundland and Labrador Dept. of Mines, Agriculture and Resources:
Dolostone investigation, 1970-71.
A detailed study of the chemical composition and physical properties of the complete Ordovician St. George Group underlying the east end of the Port au Port Peninsula.

552. Fowler, J.H., Nova Scotia Dept. of Mines:
Clay and shale project, 1970.
A continuing project to provide an overall assessment of clays and shales in Nova Scotia.
Sands and gravel project, Cape Breton Island, Nova Scotia, 1970-.
To determine the location, extent and quality of sands and gravels to provide information for construction companies, etc.

553. Hamilton, J.B., New Brunswick Dept. of Natural Resources:
Sand and gravel in New Brunswick, 1969-71.
Primarily an inventory study to obtain data on the

quality, quantity of material available; estimates of present and future needs will be obtained.

554. Hamilton, W.N., Research Council of Alberta:
Salt deposits, Alberta, 1966-.
Quartzite, Alberta, 1970.
An appraisal of quartzites of the Rocky Mountain Formation in the vicinity of the Bow Valley as a source of high-purity silica.

555. Hitchon, B., Holter, M.E., Research Council of Alberta:
Calcium-magnesium brines, 1969-70.
The commercial potential of calcium and magnesium in Alberta brines has been studied by means of iso concentration maps and Na-Ca-Mg ternary composition diagrams. Reserves of calcium chlorite and magnesium have been calculated for brines in three stratigraphic units where contents of more than 60,000 mg/l calcium and more than 9000 mg/l magnesium are found.

556. Holter, M.E., Research Council of Alberta:
Silica sand deposits of southern Alberta, 1969-71.
Limestone of Alberta, 1970-72.

557. Levinson, A.A., Hitchon, B., Univ. of Calgary and Research Council of Alberta:
Selected trace elements in Alberta brines, 1970-72.

558. Maurice, O.D., 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.

559. McCabe, H.R., Bannatyne, B.B., Manitoba Dept. of Mines and Natural Resources:
Stratigraphic and industrial minerals core hole programme, 1969-.
Core is obtained in various Paleozoic and Mesozoic formations in southwestern Manitoba in order to supplement limited outcrop information, to answer specific stratigraphic and structural problems, and to evaluate industrial mineral deposits. See Stratigraphic and industrial minerals core hole programme; Manitoba Mines Branch, Geol. Paper 4/70, 1970.

560. McLaws, I.J., Research Council of Alberta:
Uses and specifications of sand and gravel, 1968-70.
Detailed information on the uses and specifications of silica sand has been compiled as a general reference manual for Alberta.

561. Murray, D.A., Fowler, J.H., Nova Scotia Dept. of Mines:
Limestone and dolomite project, mainland of Nova Scotia, 1970-.
Investigations and inventory of limestones and dolomites involving mapping, surface sampling, diamond drilling and detailed analyses of all occurrences examined. See Limestone and dolomites of Nova Scotia, Part I - Cape Breton Island, 1967.

562. Papezik, V.S., Memorial Univ.:
Mineralogy of a pyrophyllite deposit near Foxtrap, Newfoundland, 1969-72.
The pyrophyllite deposit is located in an altered rhyolite belt near the contact with a granitoid pluton. The rock is very fine-grained, and consists of pyrophyllite, sericite and quartz in varying proportions, with sparse nodules of diaspore. A method of quantitative modal analysis of the fine grained assemblages by X-ray diffractometer is being developed.

563. Paré, C., Quebec Dept. of Natural Resources:
Limestones of the Province of Quebec, 1970-.
Chemical study of most of the limestone occurrences in the Province of Quebec.

564. Scafe, D.W., Research Council of Alberta:
Alberta bentonite studies, 1968-.
Laboratory investigations have yielded the expected igneous minerals in the silt-size fraction: glass shards and feldspars partly altered to montmorillonite. Analysis of exchangeable cations indicates a progressive increase in Na and decrease in Ca from coarse to fine clay fractions. Mg and K are relatively constant but the high K content of some samples may be preventing the desirable expansion of montmorillonite for use as drilling mud or as a pelletizing agent. X-ray data suggest that Na is being forced between the montmorillonite layers, yielding incorrect d-spacings when Ca is removed as secondary calcite or gypsum.

565. Tiphane, M., Quebec Dept. of Natural Resources:
Fluorite and baryte occurrences in the province of Quebec, 1970.

566. Vos, M.A., Ontario Dept. of Mines and Northern Affairs:
Asbestos in Ontario, 1969-71.
To revise "Asbestos in Ontario", by D.F. Hewitt and J. Satterly, Minerals Circular No. 1, 1953. Preparation of a report on fieldwork and on information collected from files in the resident geologist offices in the province is in progress.
Ordovician limestone resources of southern Ontario, 1969-71.
A survey of Ordovician limestone resources of southern Ontario was undertaken in view of an increasing demand on these limestones for production of aggregate and cement. Important factors in the evaluation of limestone resources are chemical purity and the physical characteristics of the rock. Overburden thicknesses have been compiled also.
Salt in Ontario, 1970-71.
To update information contained in Industrial Mineral Report No. 6: "Salt in Ontario", by D.F. Hewitt. Two mines and five brining operations by four different companies in Ontario produce a total of about 4 million tons of salt annually at a value of approximately $20,000,000.
Devonian limestone resources of southwestern Ontario, 1970-72.
Devonian limestones of southwestern Ontario are a source of aggregate, cement and chemical lime. Data on overburden thickness in appropriate areas will be compiled also.

567. Worth, J., New Brunswick Dept. of Natural Resources:
Geology of rock salt deposits in the Windsor Group of New Brunswick, 1970-71.
Investigation of rock salt structures and their economic potential as well as controls over deposition of halite and associated minerals in the southeastern New Brunswick area.

Other Metals

568. Austria, Jr., V., New Brunswick Dept. of Natural Resources:
Primary and secondary dispersion of molybdenum and tungsten and associated metals near molybdenum-tungsten mineralization in granite, 1968-71; M.Sc. thesis.
Four granitic facies have been recognized in the area of known Mo and W occurrences, three of which are known to contain Mo and W minerals. The research work is an attempt to determine the most favorable facies that will lead to the mineralized zone based on the distribution of trace elements: Mo, W, Sn, Cu, Pb, Zn, Co and Ni. The behavior of Mo and W in the secondary environment is also being investigated with special reference on the effect of the Fe and Mn content of the stream sediments and soil.

569. Clark, A.H., Queen's Univ.:
Mineralogy and geochemistry of the Pansqueira tungsten-tin deposit, northern Portugal, 1959-.
Work recently completed includes analytical studies of cubic cubanite and rhombohedral and hexagonal molybdenite. See Compositional differences between hexagonal and rhombohedral molybdenite; Neues Jrb. Miner, Monats., pp. 33-38, 1970.
Ore mineralogy of the Alacran Ar-As-Sb deposit, Pampa Larga, northern Chile, 1967-71.
The complex ore mineral assemblages in this unusual low-temperature deposit are yielding information on the phase relationships in several sulphide-type systems. Among those minerals which have been recognized are greigite, smithite, arsenolamprite, high realgar, and arsenian sphalerite. See Arsenolamprite confirmed from the Copiapo area, northern Chile; Min. Mag., vol. 37, pp. 732-733, 1970. Alpha-arsenic sulfide, from Mina Alacran, Pampa Larga, Chile; Amer. Mineral., vol. 55, pp. 1338-1334, 1970.

570. Clark, A.H., Queen's Univ., in cooperation with C. Mortimer and and R.H. Sillitoe, Instituto de Investigaciones Geologicas de Chile:
Mineralogy and tectonic/geomorphic controls of supergene alteration in the Copiapo region, northern Chile, 1965-71.
Attention is presently focused on the reconstruction of the former distribution of hypogene and supergene silver minerals, with emphasis on Ag-sulphosalts and phases in the Ag-Hg-haloid systems. See Cuproscheelite from the Copiapo mining district, northern Chile; Amer. Mineral., vol. 55, pp. 1345-1352, 1970.

571. Dawson, K.R., Geol. Surv. of Canada:
Comprehensive Economic Geology Series report on the geology of niobium and tantalum in Canada, 1970-72.
To prepare a comprehensive reference on current knowledge of the geology of niobium and tantalum in Canada which will provide a geological basis for exploration and for assessment of niobium and tantalum potential in Canada. The report is to include a review of the mineralogy and geochemistry of niobium and tantalum, a review of all major types of deposits in Canada, a classification of these deposits and criteria for recognizing each type, a review of concepts of their geological environment, genesis and provenance, and should indicate regions and geological units in Canada that are most favourable for the occurrence of each type of deposit.

572. Ferguson, S.A., Groen, H.A., Haynes, R., Ontario Dept. of Mines and Northern Affairs:
Gold deposits of Algoma, Cochrane, Fort Frances, Kenora, Kenora (Patricia Portion) and Thunder Bay Districts, 1968-71.

573. Joliffe, A.W., Rojkovic, I., Queen's Univ.:
A study of the mineralogy and geochemistry of the uranium-silver-cobalt-nickel-bismuth vein deposits at Great Bear Lake, Northwest Territories, 1970.

574. Kish, L., Quebec Dept. of Natural Resources:
Vanadium project, Chibougamau district, Quebec, 1970-.
Delimitation of a Fe, Ti, V, orebody in Reinfret township, Chibougamau district using bore holes, geophysical and geological surveys.

575. Mahajan, S.K., McGill Univ.:
Molybdenite deposits in Preissac township, Quebec, 1967-71; Ph.D. thesis.

576. Nickel, E.H., Owens, D.R., Mines Branch, Dept. of Energy, Mines and Resources:
The distribution of nickel in Canadian low-grade nickel deposits, 1970-71.

577. Nicol, C., Queen's Univ.:
A mercury-silver deposit near Flowers, Ontario, 1966-71; M.Sc. thesis.

578. Petruk, W., Mines Branch, Dept. of Energy, Mines and Resources:
Mineralogy of the tin-bismuth-molybdenum-tungsten deposit in the Mount Pleasant mine in New Brunswick, 1970-71.
To determine the minerals and mineral assemblages present in the deposit, and to correlate the compositions and physical properties of the individual minerals to each assemblage. In addition, the assemblages will be correlated to the host rock and wall rock alteration products to assess the affect of each factor on mineral beneficiation.

579. Petruk, W., Harris, D.C., Mines Branch, Dept. Energy, Mines and Resources:
Mineralogy and geochemistry of the silver deposits in the Cobalt and Gowganda area, 1964-70.

A study of the characteristics of the silver deposits in the Cobalt-Gowganda area and of the arsenides, silver, sulph-arsenides, sulph-antimonides, and sulphides in the deposits in order to determine the varieties of minerals present, to establish the compositions and physical properties of those that have variable compositions, and to correlate them with the mineralogical and geological characteristics of the deposits. See Allargentum redefined; Can. Mineral., vol. 10, pp. 163-172, 1970.

580. Ridler, R.H., Geol. Surv. of Canada:
The interrelation of the Archean volcanic stratigraphy and mineral deposits of the Kirkland Lake area, Ontario, 1966-70.
The ultra-alkaline volcanics of the Kirkland Lake complex are a congruent part of the overall Archean volcanic evolution in the Kirkland Lake area. Precious metal mineralization is associated either with iron formation (exhalite) or felsic volcanic intervals. See Relationship of mineralization to volcanic stratigraphy in the Kirkland-Larder Lakes area, Ontario; Geol. Assoc. Can. Proc., vol. 21, pp. 33-42, 1970.

581. Rose, E.R., Geol. Surv. of Canada:
Geology of rare earth deposits of Canada, 1967-.
The long range objective is to determine the nature of occurrence and distribution of rare-earth elements in Canada, and to indicate their potential economic importance.
Geology of vanadium deposits in Canada, 1963-.
Vanadium has not yet been produced from any of its few known Canadian deposits. This work attempts to show that vanadium is of more widespread distribution in Canada than has generally been realized, and to indicate the possibilities of finding commercially important vanadium deposits in Canada. See The Ferride element content of titaniferous magnetite in Canada; Geol. Surv. Can., Paper 69-54, 1970.

582. Scott, S.D., Univ. of Toronto:
Studies on arsenical silver deposits, 1970-.
Mineralogical relationships, fluid inclusion studies, zoning, wall rock alteration, comparison of Great Bear Lake and Cobalt, Ontario deposits.

583. Tupper, W.M., Dass, A.J., Davies, J.L., Heslop, J., Nash, W., Rath, U., Casselman, M., Carleton Univ.:
Geology and geochemistry of mineral deposits, in particular sulphide deposits in volcanic-sedimentary environments, 1966-; Ph.D. theses (A.J. Dass, J.L. Davies, J. Heslop, W. Nash, U. Rath), M.Sc. thesis (M. Casselman).
Work is in progress on the base metal deposits at Rio Tinto, Spain; Bathurst, New Brunswick; Amisk Lake-Rusty Lake area, Manitoba; Mamainse Point (Coppercorp deposit), Ontario; and Bathurst Inlet, Northwest Territories; on the silver deposits at Cobalt, Ontario; and on the Mount Allen tungsten deposit in the Northwest Territories.

584. Whitmore, D.R.E., Geol. Surv. of Canada:
A report on the geology of chronium deposits in Canada, 1970-72.
Deposits of chromite, the only important ore mineral of chromium, occur as gravity accumulations in the ultrabasic

portions of some layered intrusions or as more or less modified xenoliths in ultrabasic intrusions. Such xenoliths, the principal current source of high-grade metallurgical ore, derive presumably from gravity accumulations formed at greater depths in the crust or in the upper mantle.

Petroleum

585. 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, 1964-70.
This Directory will contain detailed analyses of numerous Canadian oil samples, which were analyzed in our Fuels Research Laboratories and geological, reservoir and secondary recovery data on selected oil pools from which these samples were taken. See Analyses and characteristics of oil samples from Alberta (Mine Branch Inf. Circular IC232), Ontario (IC228), and Saskatchewan (IC231).

586. Draper, R.G., Montgomery, D.S., Wanless, R.K., Mines Branch, Dept. of Energy, Mines and Resources, and Geol. Surv. of Canada:
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, 1967-71.

587. Fleming, J.M., Newfoundland and Labrador Dept. of Mines, Agriculture and Resources:
Petroleum exploration in Newfoundland and Labrador, 1968-70.
See Petroleum exploration in Newfoundland and Labrador; Mineral Res. Rept. No. 3, 1970.

588. Fuzesy, L.M., Dept. of Mineral Resources:
Geology of the Ratcliffe beds in south-central Saskatchewan, 1969-71..

589. Gibson, D.W., Geol. Surv. of Canada:
Triassic stratigraphy and petrology in the Foothills and Front Ranges of Western Canada, 1962-.
To provide data on the character, structure, distribution, age, stratigraphic relationships, origin of the bedrock, and other geological data that are required to evaluate the oil, gas, and mineral potentialities of the region within the Triassic rocks of the Foothills and eastern Rocky Mountains of Alberta and British Columbia.

590. Hitchon, B., Research Council of Alberta:
Geochemistry of formation waters, oils and gases in Western Canada, and surface waters of Mackenzie River drainage basin.
Regional variations of river water composition resulting from halite solution, Mackenzie River drainage basin, Canada; Water Resources Research, vol. 5, pp. 1395-1403, 1969. See Geochemistry and origin of formation waters in the Western Canada sedimentary basin. I. Stable isotopes of hydrogen and oxygen; Geochim et Cosmochim. Acta, vol. 33, pp. 1321-1349, 1969.

591. Stanton, M.S., Chevron Standard Ltd., Calgary:
Petroleum chemistry, 1967-.
Marine geology, 1967-.
Arctic stratigraphy, 1967.

592. von Osinski, W.P., Saskatchewan Dept. of Mineral Resources:
Geology and production history of the Rosebank area, southeastern Saskatchewan, 1970-71.
See Geology and production history of the Bakken Formation in the Rocanville area - southeastern Saskatchewan, 1970.

Radioactive Deposits

593. Allen, J.M., Wynne-Edwards, H.R., Queen's Univ.:
The nature and occurrence of uranium mineralization at the Mekoos prospect, Mount Laurier, 1969-70; M.Sc. thesis (Allen).

594. Cameron, A.R., Hacquebard, P.A., Birmingham, T.F., Donaldson, J.R., Geol. Surv. of Canada:
Uranium possibilities in lignite, 1966-71.
Field work on this project has been completed and radioactivity data have been reported (in press) for 19 areas in Saskatchewan, Alberta, British Columbia and the Yukon Territory. The best results were obtained in the Cypress Hills area of southwestern Saskatchewan with a top value of 800 ppm 0_30_8 on the total coal basis. See Radioactivity in Western Canadian coals; Geol. Surv. Can., Paper 70-52, 1970.

595. Fratta, M., Univ. of Ottawa:
Radioactive mineral deposits near Otter Lake, Quebec, 1969-71; Ph.D. thesis.
Mineralogy, geochemistry and genesis of radioactive minerals.

596. Govett, G.J., Villard, D.J., Univ. of New Brunswick:
Factors affecting the geochemical dispersion of uranium in stream sediments in a river in central New Brunswick, 1970-71; M.Sc. thesis (Villard).
To explain the anomalous dispersion of stream sediments in a river detected by a Cominco exploration program in 1969. The interference effects of Mn and Fe on the fluorometric analysis of uranium will be determined. This information will be put to use in further geochemical exploration for uranium.

597. Little, H.W., Geol. Surv. of Canada:
Geology of uranium and thorium deposits of Canada, 1967-.
The project comprises coordination of research within the Branch on uranium and thorium deposits, direct supervision of certain research projects, keeping abreast of exploration and development of uranium and thorium deposits in Canada, assessment of the potential for various regions for uranium and thorium, and direct research on specific deposits of uranium and thorium. See Distribution of types of uranium deposits and favourable environments for uranium exploration; Internat. Atom. En. Agency, Proc., Vienna, 1970.

598. Macdonald, J.A., McGill Univ.:
Processes of surficial dispersion of uranium in the vicinity of some pitchblende deposits, Beaverlodge, Saskatchewan, 1964-71; Ph.D. thesis.

599. Theis, N., Queen's Univ.:
Mineralogical study of two orebodies on different reefs of the Quirke mine, 1970-71; M.Sc. thesis.

600. Wolf, K.H., Laurentian Univ.:
Comparative sedimentological and petrologic study of uranium and other metal-bearing Precambrian sediments in Ontario., 1970-74.

General Problems

601. Alvey, G.C., Robertson, W.A., Chevron Standard Ltd., Calgary:
Application of computer science to exploration geology, 1964-.

602. 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.

603. Bingley, J.M., Isenor, G.C., Wambolt, R., Nova Scotia Dept. of Mines:
St. Mary's River basin project, 1970.
An assessment of the Horton sedimentary basin (lower Carboniferous) of Colchester, Pictou and Guysborough Counties, and its stratigraphy, structure and potential mineral occurrences.

604. Bright, E.G., Lovell, H.L., Petruk, W., Ontario Dept. of Mines and Northern Affairs; Mines Br., E.M.R.
Geology and mineral deposits of the Cobalt-Kirkland Lake-Timmins region of Ontario; 1972-I.G.C. Field trip A39, 1970-71.

605. Clark, A.H., Queen's Univ.:
Iron sulphide relationships in selected ore deposits and rocks, 1963-.
Attention is being focused on the rare, very iron-deficient hexagonal pyrrhotites, and on "abnormal monoclinic pyrrhotites" showing asymmetrical peak splitting; on the chemistry of mackinawite in diverse assemblages; and on occurrences of smythite (Wedge, N.B.) and greigite (Mina Alacran, Chile).

606. Clark, A.H., Haynes, S.J., Queen's Univ.:
Chemistry of highly - and poorly-mineralized intrusions in the Andes of northern Chile, 1969-72; Ph.D. thesis (Haynes).
Involves the study of the rock and mineral chemistry of dated granitic bodies, ranging in age from Lower Jurassic to mid-Tertiary, in an attempt to relate chemical factors to the distribution, type, and volume of associated hydrothermal mineralization. The inter-relationships of porphyry copper

mineralization with other types of ore deposits throughout northern Chile are receiving attention. Chlorine concentrations and partitioning show promise in ore target definition.

607. Collins, J.A., Queen's Univ.:
Lithofacies and diagenesis of the upper St. George Formation: (Lower Ordovician carbonates) near Daniel's Harbour, Newfoundland, 1969-71; M.Sc. thesis.
Cominco Ltd. currently holds a concession (mineral) covering some 470 square miles of platform carbonates. Proved reserves include 5½ million tons of 7½% zinc. The current study is designed to evaluate stratigraphic, sedimentological and diagenetic controls of this stratabound type mineralization.

608. Cormier, R.F., Keating, B., Shaw, W.S., Saint Francis Xavier Univ.:
Economic mineral potential of Cape Breton Island, Nova Scotia, 1969-.

609. Dugas, J., Quebec Dept. of Natural Resources:
Compilation of a metallogenic map of the nickel belt, Ungava Bay, Quebec, 1969-70.
Area covered by this map is located between Cap Smith and Wakeham Bay, in the northern part of Quebec (Ungava Bay).

610. Eastwood, G.E.P., Jackson, E.V., British Columbia Dept. of Mines and Petroleum Resources:
British Columbia mineral inventory, 1967-.
To complement seven sheets already published, a set of preliminary mineral inventory maps will be issued early in 1971 covering the rest of the well-mineralized areas of the province. Mineral inventory cards will not be available for some preliminary maps.

611. Fogwill, D., Williams, H., Newfoundland and Labrador Dept. of Mines, Agriculture and Resources:
A study of mineral deposits and prospecting environments in Newfoundland, 1969-71.
Involves the application of modern concepts of metallogenesis to the island of Newfoundland.

612. Folinsbee, R.E., Univ. of Alberta:
Stable isotope studies, 1955-.
Stable isotope studies of objects of geological interest; primarily the study of isotopes in ores in an attempt to unravel the source or sources of the ore forming solutions. See Carbon-13 and Oxygen-18 in dinosaur, crocodile and bird eggshells indicate environmental conditions; Science, vol. 168, pp. 1353-1356, 1970. Lead and sulphur isotopes of the Irish base metal mines in Carboniferous carbonate host rocks, (abstract); Internat. Assoc. on the genesis of ore deposits, Tokyo meeting, 1970.

613. Fuzesy, Mrs. A., Saskatchewan Dept. of Mineral Resources:
Index to assessment work in the La Ronge Mining district of Saskatchewan, 1970.
A manually compiled index of the assessment work carried out by industry on the Precambrian of the La Ronge area. File titles are arranged according to the National Topographic System and a brief description of the contents of the files is given.

614. Gower, J., Westerman, C., Murphy, L., Univ. of British Columbia:
Primary zoning in ore deposits, 1970-71; M.Sc. thesis (Westerman).

615. Hacquebard, P.A., Donaldson, J.R., Geol. Surv. of Canada:
Rank studies of coal and carbonaceous matter, 1968-72.
Since 1969 the rank studies have been devoted entirely to Western Canada, notably to the coals in the Rocky Mountains Foothills Belt (for evaluation of coking properties) and central Alberta (for determination of the degree of organic metamorphism). All rank determinations are carried out by means of reflectance measurements on polished surfaces of coal and carbonaceous matter. See Coal metamorphism and hydrocarbon potential in the Upper Paleozoic of the Atlantic Provinces, Canada; Can. J. Earth Sci., vol. 7, No. 4, pp. 1139-1162, 1970.

616. Hale, W.E., Univ. of New Brunswick:
Carboniferous mineral occurrences in northern Appalachia, 1967-71.
A compilation of data on occurrences in the Carboniferous starting with New Brunswick and some interpretation of the palaeogeographic and geological conditions that gave rise to these somewhat unusual occurrences including: manganese, copper, uranium, tin, evaporites, oil, etc.

617. Jolliffe, A.W., Jolliffe, H.R., Queen's Univ.:
Preparation of the first English translation of Georgium Agricola's Bermannus sive de re Metallica published in 1530. This first scientific work of Agricola's may be regarded as marking the birth of the sciences of Mineralogy and Economic Geology.

618. Jones, B.E., Venugopal, D.V., Ruitenberg, A.A., New Brunswick Dept. of Natural Resources:
Caledonian project, 1970-73.
A stratigraphic, structural and metallogenic investigation complemented by ground and airborne geophysical data. Mineralized structures in parts of the Johnson Croft, Annidale, Jordan Mountain and Black River areas; Mineral Res. Br., New Brunswick Dept. Natural Res. (in press).

619. Leech, G.B., Geol. Surv. of Canada:
General metallogeny of Canada, 1966-.
See Metallogenic maps of North America and Canada; Geol. Surv. Can., Paper 69-18, pp. 53, 54, 1969.

620. McLaws, I.J., and others, Research Council of Alberta:
Economic minerals map of Alberta, 1970-.

621. O'Donnell, N.D., Univ. of Western Ontario:
Investigation of an indicator train of sulphide ore at Gull Pond, Newfoundland, 1967-71; M.Sc. thesis.

622. Ruitenberg, A.A., Buttimer, S.M., New Brunswick Dept. of Natural Resources:
Detailed stratigraphic and structural investigations of mineralized belts in southern New Brunswick, 1967-75.
Nickel-copper occurrences in the St. Stephen area and base metal occurrences in southeastern New Brunswick are being investigated.

623. Shilts, W.W., Geol. Surv. of Canada:
Mineral indicator tracing, southern Keewatin, 1970-73.
See Geol. Surv. Can., Paper 71-1, Pt. A, 1971.

624. Sutherland-Brown, A., British Columbia Dept. Mines and Petroleum Resources:
Copper and molybdenum deposits of British Columbia, 1967-71.
A study of the form, distribution, classification and hopefully, genesis of the copper and molybdenum deposits of British Columbia. See Mineralization in British Columbia and the copper and molybdenum deposits; Trans. Can. Inst. Mining Met., vol. 72, pp. 1-15, 1969.

625. Sutherland-Brown, A., Cáthro, R.J., Panteleyev, A., Ney, C.S., British Columbia Dept. Mines and Petroleum Resources:
Metallogeny of the Cordilleran region, 1967-.

MINERALOGY

Specific Minerals

626. Bachinski, S.W., Univ. of New Brunswick:
Subsolidus phase relations of the alkali feldspars and the post-crystallization history of perthites, 1967-71.
Work based mainly upon a Ph.D. dissertation completed at Yale University dealing with the partitioning of alkalis between feldspar and other alkali-bearing phases and the mixing properties of microcline - low albite solutions.
Preliminary investigation of possible occurrence of zeolite and/or prehnite-pumpellyite facies rocks in New Brunswick, 1971-73.
Early in 1970, the fist discovery of prehnite-pumpellyite facies rocks in this portion of the continent was reported by Coombs, et al., (1970, Amer. Jour. Sci.). These rocks occur near Presque Isle, Maine, only several tens of miles from New Brunswick. As there is no reason to believe that such low-grade metamorphic rocks die out at the international border, reconnaissance work in western New Brunswick (portions of Carleton, Victoria, and Madawaska counties), along the assumed strike of the described occurrence, will be undertaken to see if zeolite and/or prehnite-pumpellyite facies rocks in fact occur in this area.

627. Bachinski, S.W., Bachinski, D.J., Univ. of New Brunswick:
Preliminary investigation of the feldspars in "porphyries" associated with sulphide deposits, northern New Brunswick, 1971-73.
This investigation could result in new constraints regarding temperature(s) of formation and/or equilibration and rock type. To date, no data exist on the exact composition of the K-rich alkali feldspars; estimations of structural state range from maximum microcline through orthoclase to sanidine. Good data on the plagioclases are similarly lacking. A particular rock type will be described in the literature as granite porphyry, augen schist (metamorphosed sedimentary rock), augen schist (metamorphosed tuff or rhyolite), or a combination of the

latter two. We would like to carry out detailed optical, X-ray, chemical and/or electron microprobe investigations on the feldspars - particularly the alkali feldspars. We will attempt to compare "phenocryst" feldspars and matrix feldspars to see if there is any difference between them in composition and/or structural state.

628. Bachinski, S.W., (Canada); Scott, R.B., Scott, M.R., (U.S.A.); Nesbitt, R.W., (Australia); Univ. of New Brunswick:
Rate of Al-Si ordering in sanidines from an ignimbrite cooling unit, 1968-71.
X-ray diffraction studies of monoclinic alkali feldspars, $Or_{73}(Ab+An)_{27}$, from a 300-meter thick ignimbrite indicate that those feldspars in the central portion of the unit are significantly more ordered than those near the margins. The variations in degree of order are indicative of structural states that cover most of the more disordered half of the range between high sanidine and orthoclase. Further Al-Si ordering is believed to have become ineffective at temperatures below approximately 500°C, based upon lack of significant K-Na unmixing. The length of time required for feldspars to order to their observed state can be estimated by calculation of time required for the ignimbrite to cool from 800°C, the approximate emplacement temperature, to 500°C; this period was found to be a few hundred to 650 years, depending upon the cooling influence of climatic and ground water environmental factors.

629. Bayliss, P., Univ. of Calgary:
Clay mineralogical studies in Northern Canada of pyrite group, crystal structure, 1968.
See Isomorphous substitution in cobaltite and ullmannite; Amer. Mineral, vol. 54, pp. 426-430, 1969. Mineralogy and boron determination of the shales from the Reindeer well, Mackenzie River Delta, N.W.T., Canada; Bull. Can. Petrol. Geol., vol. 18, pp. 80-83, 1970.

630. Berry, L.G., Queen's Univ.:
Mineralogical study of sulphosalt minerals from Binn valley, Switzerland.

631. Biggar, G.M., Clarke, D.B., Dalhousie Univ.:
Pyroxene Phase Relations in $CaO-MgO-Al_2O_3-Fe-O_2$, 1969-70.
A new approach has been taken to the problem of defining and representing the solid solution limits of pyroxenes. Synthetic pyroxenes produced at 1 - atmosphere were analyzed by electron probe. The compositional ranges of protoenstatile, orthopyroxene and "pigeonite" were shown to be dependent on temperature, ppO_2 and bulk composition of the system. Applications are made to the study of inversion and exsolution phenomena in natural pyroxenes, to the sequence of crystallization in a layered intrusion and to the mineralogy of meteorites, as well as lunar lavas, highly reduced and highly oxidized terrestrial lavas.
Pyroxene phase relations in synthetic and natural meteorites, 1970.
The large change in pyroxene composition effected by ppO_2 has led to the investigation of synthetic pyroxenes

crystallized under the highly reducing conditions appropriate to the formation of meteorites.

632. Bird, G.W., (Ph.D.), Fawcett, J.J., Univ. of Toronto:
Stability of chlorite bearing assemblages in the system K_2O-MgO-Al_2O_2-H_2O, 1968-71; Ph.D. thesis (Bird).

633. Bourne, J.H., Ministère des Richesse Naturelles du Québec:
An evaluation of the Humite Group as regional metamorphic minerals in the Gracefield area, Quebec, 1970-72; Ph.D. thesis.
The minerals of Humite Group (norbergite, chondrodite, humite, and clinohumite) are apparently developed as regional metamorphic minerals in the Grenville Group marbles, in the Gracefield area of southwestern Quebec.

634. Brown, Alexander C., Ecole Polytechnique:
Mineralogy of the Chibuluma Cu-Co deposit, Zambia, 1969-71.
Textural and chemical analysis of sulfides and associated gangue minerals with the intent to define the primary and recrystallization history of mineralization in the Zambian copperbelt.

635. Cabri, L.J., Dept. of Energy, Mines & Resources, Mines Branch:
The relationship between crystal structure and reactivity of pyrrhotite, 1970-71.
The hydrometallurgical treatment of pyrrhotite is currently being investigated by the Extraction Metallurgy Division of the Mines Branch as a possible alternative to current smelting practices. The study of the effect of crystal structure (and composition) on pyrrhotite reactivity comprises a part of this larger investigation.

636. Chen, S.M., Burley, B.J., McMaster Univ.:
Non-Bragg reflections in Cancrinite.
A number of cancrinites have been investigated to determine the nature and hopefully the origin of non-Brag reflections which all Cancrinites appear to show. These have been catalogued and described, and some guesses hazarded as to their origin.

637. Chorlton, L.B., Martin, R.F., McGill Univ.:
Effect of boron substitution on the stability of alkali feldspars, 1970-71; M.Sc. thesis (Chorlton).
See Disordered authigenic feldspars of the series KalSi$_3O_8$ - KBSi$_3O_8$ from Southern California; Am. Mineral., vol. 55, No.11, p.12, 1970.

638. Donnay, G., McGill Univ.:
Crystallographic investigation of sulfide minerals, 1969-71.

639. Douglas, J.A.V., Dence, M.R., Plant, A.G., Traill, R.J., Univ.of Ottawa, Geol. Surv. of Canada:
Petrology and mineralogy of lumar samples, 1969.
Investigation of Apollo 11 samples completed, Apollo 12 samples current, Apollo 14 samples proposal submitted. See Garnet: first occurrence in Lunar Samples; Science, July 1970.

640. Edgar, A.D., Blackburn, C.E., Univ. of Western Ontario:
Eudialyte from Kipawa L.P.Q., 1969-70.

641. Edgar, A.D., Nolan, J. (Imperial College), Wilkinson, J.F.G. (Univ. of New South Wales).
X-ray investigation of pyroxenes from the Shonkin Sag, Montana, 1970-72

642. Farrell, D.M., Mines Branch, Dept. of Energy, Mines & Resources:
Determination of the course of structural changes and of the kinetics of conversion of magnetite through maghemite to α-hematite by infrared spectroscopy, 1968-70; M.Sc. thesis.
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. Since the last report, extensive work has been carried out on the preparation and obtaining of pure magnetite and maghemite as starting materials. Quality has been assessed by X-ray diffraction analysis, infrared spectroscopy, thermogravimetric and chemical analysis. The reaction cell has been designed and constructed. Kinetic experiments will begin shortly.

643. Fawcett, J.J., James, R.S., Grieve, R.A.F., Univ. of Toronto:
Phase relations in the system $FeO-Al_2O_3-SiO_2-H_2O$, 1967-71; Ph.D. thesis (Grieve).
See Synthesis of chloritoid at low pressures; Am. Mineral., vol. 55, pp. 517-521, 1970.

644. Fawcett, J.J., James, R.S., McOnie, A.W., Univ. of Toronto:
Stability of the intermediate Mg-Fe chlorites, 1967-72; M.Sc. thesis (McOnie).

645. Fraser, J.R., Univ. of British Columbia:
A nephrite occurrence on O'Ne-ell Creek, British Columbia; 1967-71; M.Sc. thesis.

646. Fratta, M., Univ. of Ottawa, Dept. of Geol.:
Radioactive mineral deposits near Otter Lake, Quebec, 1969-71; Ph.D. thesis.
Mineralogy, geochemistry and genesis of radioactive minerals.

647. Frisch, T., Univ. of Alberta:
Mineralogy of: A. Peralkaline ignimbrites, and B. Alkali basalts and associated inclusions, Gran Canaria, Canary Islands, 1968-71.
An electron microprobe study in cooperation with H.U. Schmincke (Bochum University, Germany). See Petrology of clinopyroxene - amphibole inclusions from the Roque Nublo volcanics, Gran Canaria, Canary Islands; Bull. Volc., vol. 33, pp. 1073-1088, 1970.
Petrology of megacrysts and inclusions in trachyte, Bokkos, northern Nigeria, 1970-71.
An electron microprobe study in cooperation with J.B. Wright (The Open University, England).
Petrology of some ultrabasic bodies in basement gneiss, Southeastern Greenland, 1971.
An electron microprobe study in cooperation with D. Bridgwater (Geol. Surv. Greenland).

648. Gill, J.E., MacLean, W.H., McGill Univ.:
Studies of Chalcopyrite, 1965-70.

649. Gillieson, H.C.P., McMahon, C., Mines Branch, Dept. of Energy, Mines & 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. In rocks and minerals it has been customary to determine the oxygen content by difference or by making as good a guess as possible as to the nature of the oxides present. The present work is directed towards improving the precision of the neutron activation analysis, particularly for high contents of oxygen, such as occur for example in silicates. A dual bi-axial rotating sample irradiator is under construction. This device, already in use elsewhere, significantly improves precision by ensuring that sample and reference specimens undergo identical irradiation, and variations in the neutron flux no longer adversely affect precision.

650. Harris, D.C., Dept. of Energy, Mines & Resources, Mines Branch:
Characterization of copper selenides, 1968.
See New data on Tyrrellite; Can. Mineral., vol.10, pp. 731-736, 1970. An occurrence of sulphur-bearing berzelianite; Can. Mineral. vol. 10, pp. 737-740, 1970.

651. Hawthorne, F.C., Grundy, H.D., McMaster Univ.:
Cation partitioning in the amphiboles and micas, 1968-73; Ph.D. thesis (Hawthorne).
The material under investigation consists of an intimate intergrowth of hastingsitic amphibole and biotite separated from a quartz diorite which was collected in the Sudbury area experimentally. The work involves 3-D crystal structure refinement and collection of Mossbauer spectra.

652. Hogarth, D.D., Univ. of Ottawa:
Structure, geology and mineralogy of the southern Gatineau Park, Quebec, 1965.
Origin of eulvsite and carbonatite in the Park region. See Geology of the southern part of the Gatineau Park, National Capital region; Geol. Surv. Can., Paper 70-20.
Lapis lazuli in Baffin Island, Northwest Territories,1968-72.
Petrogenesis of two lapis lazuli deposits on Baffin Island and petrogenesis of lapis lazuli in general.

653. Jambor, J.L., Geol. Surv. of Canada:
Mineralogy of porphyry deposits of copper and molybdenum in Canada, 1970-.
The study will focus on alteration zoning around individual deposits, commencing with those in the Babine Lake area, British Columbia.

654. Kamineni, D.Ch., Univ. of Ottawa:
Petrochemical Study of metamorphic rocks and Coexisting minerals of the Yellowknife Group, district of Mackenzie, 1968-71; Ph.D. thesis.
Metasedimentary rocks of the Yellowknife Group exposed lying between Sparrow and Ross Lakes (about 50 miles NE of

Yellowknife town) are chosen for a detailed petrochemical investigation. The areas of the present investigations are: 1. origin of anthophyllite-cordierite rocks, 2. distribution of elements between coexisting minerals, and 3. compositional zoning in garnets.

655. Ledoux, R.L., Université Laval:
Etude de la décomposition de la muscovite, de la phlogopite et de la biotite, 1968-71.
Les phases de décomposition des micas sont étudiées par spectroscopie infrarouge. La transformation de cristaux de biotite (Château-Richer) en macrocristaux de kaolinite est révélée par des clichés de rayons-X (suivant la méthode de précession de Buerger).

656. Martin, R.F., McGill Univ.:
Synthesis and stability relationships of alkali feldspars in peralkaline environments, 1969-72.
In view of the major influence of peralkaline fluids on the kinetics of reactions in silicate systems, a considerable effort is being directed at a determination of the alkali feldspar solvus in the presence of such fluids at pressures of up to 10 kilobars.

657. Nickel, E.H., Owens, D.R., Dept. of Energy, Mines & Resources, Mines Branch:
The distribution of nickel in Canadian low-grade nickel deposits, 1970-71:

658. Pearce, T.M., Edgar, A.D., Univ. of Western Ontario:
Iron-bearing analcites in igneous rocks, 1969-72.

659. Perrault, G., Rigaud, M., Richard, P., Vicat, J., Ecole Polytechnique:
Cristallochimie du niobium, 1968-75; étudiant au D.Sc.A. (Richard).
A ce jour, nous avons établi l'identité cristallographique des oxydes de niobium et leurs principaux paramètres thermodynamiques (publication prochaine). Les travaux de continuation porte: 1. sur la définition de la structure atomique de certains silicates de niobium; 2. sur l'étude bibliographique de d'autres familles de composés du niobium.

660. Perrault, G., Vincent, H., Ecole Polytechnique:
Structure des oxychlorures de plomb, 1971-72.
Nous avons redéfini la structure cristalline de la mendipite ($Pb_3O_2Cl_2$) et établi le groupe d'espace de quelques autres espèces. Nous comptons faire la structure de Pb_2OCl_2 au cours des six mois qui suivront.

661. Petruk, W., Dept. of Energy, Mines & Resources, Mines Branch:
Mineralogy and geochemistry of the porphyry copper-molybdenite deposits in British Columbia, 1969.
Mineralogy of the tin-bismuth-molybdenum-tungsten deposit in the Mount Pleasant mine in New Brunswick, 1970-71.
To determine the minerals and mineral assemblages present in the deposit, and to correlate the compositions and physical properties of the individual minerals to each assemblage. In addition, the assemblages will be correlated to the host rock and wall rock alteration products to assess the affect of each

factor on mineral beneficiation.

662. Petruk, W., Harris, D.C., Dept. of Energy, Mines & Resources, Mines Branch:
Mineralogy and geochemistry of the silver deposits in the Cobalt and Gowganda area, 1964-70.
A study of the characteristics of the silver deposits in the Cobalt-Gowganda area and of the arsenides, silver, sulph-arsenides, sulph-antimonides, and sulphides in the deposits in order to determine the varieties of minerals present, to establish the compositions and physical properties of those that have variable compositions, and to correlate them with the mineralogical and geological characteristics of the deposits. See Allargentium redefined; Can. Mineral., vol. 10, pp. 163-172 1970.

663. Rimsaite J.H.Y., Geol. Surv. of Canada:
Study of mica group minerals and associated host rocks, 1959-.
Studies continue on retentivity of adsorbed atmospheric argon in micas, and on anionic and cationic variations in mica crystals. "Contributions to Mineralogy and Petrology" vol. 29, No. 2. See Structural formulae of oxidized and hydroxyl-deficient micas and decomposition of the hydroxyl group; Contr. Mineral. Petrolog., vol. 25, pp. 225-240, 1970. Adsorption and retentivity of adsorbed and radiogenic argon in heated micas; GAC/MAC annual meeting, Winnipge, Man. 1970 Prog. and abstracts, p. 45, 1970. Effect of oxidation and dehydration on optical and X-ray properties of micas; in 19th Annual Clay Minerals Conference, Prog. and abstracts, p. 32, 1970.
Mica group minerals and related silicates in canadian mineral deposits, 1970-.
Analytical research on the distribution of major and minor constituents between the ore and silicate minerals.

664. Scott, J.D., Queen's Univ.:
Crystal structure of franckeite and fizelyite, 1968-71.
Crystal structure and redefinition of schirmerite from Cobalt, Ontario, 1970-71.

665. Scott, S.D., Univ. of Toronto:
Studies on arsenical silver deposits, 1970-.
Mineralogical relationships, fluid inclusion studies, zoning, wall rock alteration, comparison of Great Bear Lake and Coblat, Ontario deposits.

666. Singh, S.K., Univ. of Ottawa:
Agpaites near Seal Lake, Labrador, 1969-71; Ph.D. thesis.
Mineralogy, geochemistry and genesis of the Joan Lake and Redwine Plutons.

667. Springer, G., Dept. of Energy, Mines & Resources, Mines Branch:
Phase relations of bismuthinite, stibnite and aikinite, 1969-70.
Compounds in the pseudobinary systems Sb_2S_3 - Bi_2S_3 and $CuPbBiS_3$ - Bi_2S_3 have been synthesized, and the phase relations studied, with the objective of increasing the understanding of mineral assemblages containing these minerals. See Naturally occurring compositions on the solid-solution series Bi_2S_3-Sb_2S_3, Min. Mag., vol. 37, pp. 295-296, 1969.

Phase relations in pseudo-binary system Cu_2FeSnS_4 - Cu_2ZnSnS_4, 1969-70.
To explain the stannite-kesterite intergrowths found in certain ore deposits.

668. Steacy, H.R., Geol. Surv. of Canada:
Testing field and office collections for radioactive and fluorescent minerals, 1966-.
Radioactive and fluorescent minerals are often too fine-grained to be recognized visually in hand specimen. Therefore, routine laboratory testing with a Geiger counter and ultra violet lamp is carried out on field officers' collections to uncover specimens containing radioactive and fluorescent minerals or to assure officers that they are not unknowingly harbouring such specimens.

669. Sutherland, J.K., Boorman, R.S., New Brunswick Research and Productivity Council, N.B.:
The Chemistry of natural cosalites, 1969-71.

670. Townsend, M.G., Dept. of Energy, Mines & Resources, Mines Branch:
Pleochroism in silicates, 1969-70.
See On the dichroism of Tourmaline; J. Physics and Chem. of Solids, vol. 31, pp. 2481-2488, 1970.

General

671. Abbott, D., New Brunswick Research and Productivity Council:
Heavy minerals in glacial gravels from New Brunswick, 1970-71.

672. Barnett, D.E., New Brunswick Research and Productivity Council:
Determination of indium in Sphalerites by atomic absorption, 1970-71.
Crystallography of a Cd-In-S Compound, 1970-71.

673. Berry, L.G., Scott, J.D., Hsi-che-Lin, Queen's Univ.:
Description and crystal structure of new mineral from Kipawa, Quebec, 1966-71.

674. Bonardi, M., Hogarth, D.D., Univ. of Ottawa:
Pegmatites in the Wakefield Lake-Dodds Lake region, Quebec, 1969-72; Ph.D. thesis (Bonardi).
Mineralogy, geochemistry and genesis of three types of pegmatites (Li-Be, Ce, Y), found in the Park region. See Wakefieldite, natural YVO_4; Canadian Mineralogist, vol. 10, p. 136-137 (abstract), 1969.

675. Clarke, D.B., Domsky, B., Dalhousie Univ.:
Electron microprobe investigation of concentration gradients in natural glasses, 1970-71.

676. Dean, R.S., Mines Branch, Dept. of Energy, Mines & Resources:
Mineralogy of argillaceous materials in Canada, 1958-.
See Mineralogical examination of two clay samples from Rosslyn Village, Paipoonge Township, Thunder Bay District,

Ontario; Mineral Proc. Div., Mines Branch, Test Report 70-10, 1970.

677. Donnay, G., McGill Univ.:
Quantitative application of the electroneutrality principle to mineral structures, 1968-.
The valence summation procedure proposed in the above paper is now being used on the feldspar system, For low albite it suggest slight ammounts of OH^- for $O^=$ substituting in the framework structure, implying that H_2O+, as commonly reported in albite analysis, may be structural water. Pumpellyite, a mineral of the epidote group, has been shown to be a hydroxy not a hydrated silicate. See "How to recognize O^{2-}, OH^- and H_2O in a crystal structures determined by X-rays"; Amer. Mineral., vol. 55, pp. 1003-1015, 1970.

678. Faye, G.H., Mines Branch, Dept. of Energy, Mines & Resources:
The correlation of absorption spectra with structure of minerals and inorganic complexes, 1965-.
See The Effect of Charge-Transfer Processes on the Colour and Pleochroism of Amphiboles; Can. Mineral., vol. 10, p. 616, 1970.

679. Foscolos, A.E., Geol. Surv. of Canada:
Clay mineral investigation, 1968-.
To improve and develop techniques for identifying clay minerals in sedimentary rocks by X-ray diffraction and diffractometry, differential thermal and thermogravimetric analysis and electron scanning microscopy; to improve and develop method for elemental analysis in layer lattice silicates, clay mineral s, and sedimentary rocks; to investigate equilibrium constants, reaction rates clay synthesis, clay diagenesis and clay mineral separation in layer lattice silicates, clay minerals and sedimentary rocks. See Factors affecting the rate of the interchange reaction of adsorbed protons on the 2:1 clay minerals; Soil Science, vol. 110, pp. 52-60.
Identification of unknown minerals by X-ray diffraction and chemical analyses, 1968-.
Qualitative and quantitative determination of clay minerals by X-ray diffraction, diffractometry, thermal and thermogravimetric analysis and electron scanning microscopy; Qualitative and quantitative determination of major and minor elements in sedimentary rocks by wet chemistry. See A rapid determination of total, organic and inorganic carbon in shales and carbonates; A rapid determination of total sulphur in rocks and minerals; Geol. Surv. Can., Paper 70-11.

680. Foscolos, A.E., Procter, R.M., Stott, D.F., Geol. Surv. of Canada:
Clay mineralogy of Lower Cretaceous shales of northeastern British Columbia, 1968-70.
To differentiate thick indivisible shale units, to use clay mineral assemblages in stratigraphy as a tool for correlation, and to establish direction of sediment transport.

681. Gabe, E.J., Hall, S.R., Rowland, J.F., Mines Branch, Dept. of Energy, Mines & Resources:
Crystal structure analysis of minerals, 1968-.

682. Gill, J.E., McGill Univ.:
Deformation of Sulphides, 1955-71.
See Further notes on the deformation sulphides;
Econ. Geol., vol. 65, pp. 570-582, 1970.

683. Gillieson, H.C.P., Farrell, D.M., Mines Branch, Dept. of Energy, Mines & Resources:
Infrared vibration spectra of sulphide minerals, 1966-70.
By use of the UNIVAC 1108 Computer and to a first approximation, the bond strengths of the atomic linkages in pyrite, marcasite, cattierite, vaesite, arsenopyrite, cobaltite, gersdorffite, loellingite, safflorite, rammelsbergite and chalcopyrite have been calculated. From these and the vibration frequencies, the specific heat and cohesive energy of the first three minerals have been derived.
Determination of quartz in dusts by infrared spectroscopy, 1967-71.
Alpha-quartz has been determined down to one tenth of a milligram when collected on a polyvinylidene chloride ("Saran") filter, by the absorption of its characteristic peak at a wavelength of 12.5 microns. It was estimated that the limit of detection under the conditions used, was one twentieth of a milligram. Possible interferences from feldspar, mica and pyrite have been examined, According to the spectra recorded in the literature, hornblende, kaolinite and montmorillonite might also interfere. By the use of a selective infrared detector and composite filters of polyvinylidene chloride and "Irtan 2" (zinc sulphide) it is suggested that a simple non-dispersion infrared analyser for the determination of a alpha-quartz in in dusts might be devised. Modification of the sensor head of a commercial linear quartz thermometer is under consideration by the instrument manufacturer.

684. Grundy, H.D., McMaster Univ.:
Crystallography of the cancrinite solid solution series, 1969-71.
A carbonate rich and a hydroxyl cancrinite are under investigation at present. The experimental work involves 3-D crystal structure refinements.

685. Guha, J., Darling, R., Ecole Polytechnique:
Etude préliminaire de la minéragraphie du gisement de cuivre Louvem, 1970.
Etude en section polie et par microsonde de minérais.

686. Harris, D.C., Mines Branch, Dept. Energy, Mines & Resources:
Electron microprobe analysis of ore minerals, 1968-.

687. Hughson, M.R., Mines Branch, Dept. of Energy, Mines & Resources:
High-temperature X-ray diffraction analysis, 1970-71.
Application of method to study of the recrystallization of metamict minerals.

688. Kaiman, S., Mines Branch, Dept. of Energy, Mines & Resources:
Development of a traversing accessory for the Vickers 55 microscope, 1970.
An electrically controlled drive fitted to the Vickers projection microscope traverses the stage laterally in either direction and facilitates detailed microscopical examination of mineral sections.

689. Kaiman, S., Hughson, M.R., Mines Branch, Dept. of Energy, Mines & Resources:
Mineralogical investigation of ore samples.
To provide mineralogical information in connection with ore-treatment studies.

690. Levinson, A.A., Dewis, F.J., Univ. of Calgary:
Hydrogeochemistry and clay mineralogy of the Mackenzie drainage basin, 1968-72.

691. Nickel, E.H., Mines Branch, Dept. of Energy, Mines & Resources:
The fundamental properties of sulphides and related minerals, 1964-.
To relate the physical, chemical and optical properties of sulphides to their structure, bonding, and stability. See The application of ligand-field concepts to an understanding of the structural stabilities and solid-solution limits of sulphides and related minerals; J. Chem. Geol., vol. 5, pp. 233-241, 1970.

692. Owens, D.R., Pinard, R.G., Mines Branch, Dept. of Energy, Mines & Resources:
Mineralogical investigation of Canadian ores in conjunction with mineral processing research, 1930-.
A wide range of ores is currently being studied mineralogically in connection with development and exploration of Canadian ore deposits by the mining industry. Much of the data obtained through studies are also useful in the field of economic geology.

693. Papezik, V.S., Memorial Univ. of Newfoundland:
Mineralogy of a pyrophyllite deposit near Foxtrap, Newfoundland, 1969-72.
The pyrophyllite deposit is located in an altered rhyolite belt near the contact with a granitoid pluton. The rock is very fine-grained, and consists of pyrophyllite, sericite and quartz in varying proportions, with sparse nodules of diaspore. A method of quantitative modal analysis of the fine grained assemblages by X-ray diffractometer is being developed.

694. Perrault, G., Aarden, D., Richard, P., Ecole Polytechnique:
Minéralogie du Mont St-Hilaire, 1964-75; thèse de doctorat (Richard).
Nos travaux actuels sur St-Hilaire portent sur les sujets suivants: 1) les association minérales des veines de pegmatites, Il semble que les principes de Korzhensky et de Thomson expliquent bien un grand nombre d'associations observées; 2) la définition d'un nouveau silicate de niobium voisin de la nenadkevichite (UK-19 de la publication 1967); 3) la structure cristalline de l'ékanite (= UK-4 de la publication 1967); 4) la cartographie des Carrières De-Mix et Poudrett; 5) la définition d'un nouveau silicate de manganèse. Voir Mineralogy at Mont St-Hilaire; Geol. Assoc. Can. -Mineral. Assoc. Can., Guidebook, pp. 103-115, 1969.

695. Perrault, G., Hébert, P., Ecole Polytechnique:
Préparation de standards minéraux pour l'analyse instrumentale, 1968-71.
A ce jour, nous avons réalisé un standard, MRG-1 gabbro àolivine du Mont Royal. Ce standard sera soumis prochainement

àla Société Canadienne de Spectroscopie, pour diffusion. Les analyses de contrôle devraient être complètes vers déecembre 1970.

Nous participons aussi à l'analyse des roches volcaniques pour le sous-comité de volcanologie du C.N.R.

696. Perrault, G., Le Page, Y., Sang, N., Ecole Polytechnique:
Programmation électronique pour les recherches en cristallographie, 1966-; étudiant D.Sc.A. (Le Page).

Nous continuons le développement de nouveaux programmes de calculs électroniques pour les recherches en cristallographie. En novembre 1970, notre programmathèque comprenait 25 programmes distincts; nous comptons l'augmenter beaucoup en 1970-71 (environ 40 programmes en novembre 1971). Les programmes sont centrés sur: 1) l'interprétation radiocristallographique; 2) la définition de la structure cristalline. Nos programmes sont écrits en Fortran IV pour la CDC-6400 de l'Université de Montréal.

697. Pouliot, G., Loiselle, A., Ballivy, G., Ecole Polytechnique:
Minéralogie et propriétés géotechniques des argiles de la Baie James, 1968-70; thèse de maîtrise (Ballivy).

Voir Quelques caractéristiques minéralogiques et géotechniques des dépôts d'argile du Nord-Ouest du Québec (Région de Matagami - Fort Rupert), (résumé); 38e Congrès de l'ACFAS, Sullpément aux Annales, vol. 37, p. 50, 1970.

698. Ripley, L.G., Webster, A.H., Fushimi, S., Mines Branch, Dept. of Energy, Mines & Resources:
Growth of single crystals of base metal sulphides of controlled composition, 1964-71.

This project involves the preparation of single crystals of various metal sulphides and related compounds, as required, for us in investigation of the physical properties of synthetic minerals. Work has been conducted on the following materials: FeS_2(pyrite), NiS_2 (vaesite), CoS_2 (cattierite) and arsenopyrite (FeAsS) grown by chemical vapour transport with iodine from $PbCl_2$ fluxes; $FeAs_2$ (loellingite), HgS and ZnSe grown by chemical vapour transport with iodine; Hydrothermal techniques are being employed to produce single crystals of marcasite (FeS_2) and related materials. See The growth of arsenopyrite single crystals by the closed-tube iodine vapour transport technique; Mines Res. Rep. R216, 1969.

699. Roscoe, W.E., McGill Univ.:
Experimental deformation of sulphides, 1969-72; Ph.D. thesis.

Chalcopyrite polycrystalline aggregates are being deformed plastically in a triaxial stress apparatus at elevated temperatures and 1000 bars confining pressure to investigate the dependence of strain rate on temperature and differential stress as well as textural effects, Other sulphides may be studied later.

700. Sabina, A.P., Geol. Surv. of Canada:
Study of mineral collecting areas of interest to collectors, mineralogists and tourists, 1964-.

Mineral occurrences in Precambrian between LaRonge, Saskatchewan and Thompson, Manitoba have been investigated and a guidebook covering them is being prepared for publication.

See Rocks and minerals for the collector: Hull-Maniwaki, Quebec; Ottawa-Peterborough, Ontario; Geol. Surv. Can., Paper 69-50, 1970.

701. Smith D.G.W., O'Nions, R.K., Univ. of Alberta:
Studies of bonding in minerals by means of their soft X-ray emission spectra, 1969-.

702. Steacy, H.R., Gauthier, C.H.R., Geol. Surv. of Canada:
Systematic reference series of the national mineral collection and G.S.C. collections of minerals and ore suites, 1955-.
The need for an active working collection of minerals at the federal level to support geological research in Canada was recognized by the establishment in 1961, and maintenance by the Geological Survy of Canada, of the Systematic Reference Series of the National Mineral Collection. This series currently contains examples of some 1600 different minerals, from Canada and abroad. The usefulness of the Series to the academic community has been demonstrated by its frequent consultation and by its compliance with requests from government agencies, universities and industry for samples of a select nature, which since 1965 have averaged 150 samples a year. The Series offers a continuing repository for Canadian minerals and specimen material accruing from mineralogical research. It also offers an expertise contributing to the evaluation and significance of collected specimens. See Occurrences of uranium and vanadium in Prince Edward Island; Geol. Surv. Can., Paper 68-74, 1968.

703. Stevenson, J.S., McGill Univ.:
Mineralogical studies of ashed lung tissue, 1951-.

704. Sutarno, Bowman, W.S., Alexander, G.E., Lake, R.H., Bright, N.F.H., Mines Branch, Dept. of Energy, Mines & Resources:
Recently, in the technology of "hard" or permanent-magnet-type ceramic magnets, strontium hexafferrite has been shown to exhibit properties superior to any other lead and/or barium compositions. There is a high-grade deposit of celestite in Cape Breton Island, Nova Scotia. Work was done in an attempt to develop an economic way of using this sulphate ore for the manufacture of strontium hexaferrite. Two possible routes for converting this sulphate mineral into the carbonate form needed for ferrite manufacture were worked out and the preferred method indicated. See The extraction of strontium from the mineral celestite; Mines Branch Res. Rept. R223, 1970.
Studies in the science and technology of "Soft" ferrites, 1969-71.
In as much as a considerable background of knowledge and experience in the science and technology of "hard" or permanent-magnet-type ferrites has been built up over the past five years, it was felt desirable to acquire a comparable level of "know-how" in the field of "soft" or spinel-type ferrites. These are widely used in computer applications and in magnetic tapes. A statistically-designed study of the various chemical and processing parameters than can affect the ceramic and magnetic properties of the products is underway, involving many of the same variables as were studied in the "hard" ferrite work. A special magnetic testing facility has been acquired and tested.

705. Sutarno, Bowman, W.S., Alexander, G.E., Lake, R.H., Horwood, J.L., Bright, N.F.H., Mines Branch, Dept. of Energy, Mines & Resources:

Studies in the science and technology of "hard" ferrites, 1966-71.

Methods, such as differential thermal analysis, thermogravimetric analysis, semi-quantitative X-ray diffraction, petrographic and electron microscopy, sintering and calcination studies, of assessing the efficacy of various grades of iron oxide (principally hematite), both natural and synthetic, in the formation of barium, strontium and lead hexaferrites to yield technologically-important magnetic ceramic materials, have been investigated. The project has been partly an "in-house" study and has been partly conducted in collaboration with an industrial research laboratory. The effects of various processing variables on the ceramic and magnetic properties of the resultant materials have been studied. Some statistical analysis of the relative importance of these parameters is being conducted. See The mechanism of the formation of lead hexaferrite ; Journ. Can. Ceram. Soc., vol. 38, 1969 . The effect of some operational variables on the properties of strontium hexaferrite ; Journ. Can. Ceram. Soc., vol. 38, pp. 9-13, 1969. Variations in the ceramic and magnetic properties of barium hexaferrite samples made from iron oxides prepared by different methods ; Journ. Can. Ceram. Soc.. vol. 38, pp. 171-175, 1969. The effect of forming pressure and of sintering time and temperature on the magnetic and ceramic properties of strontium ferrite ; Journ. Can. Ceram. Sco., vol. 39, 1970. The magnetic and ceramic properties of mixed barium-strontium ferrites ; vol. 39, 1970. Expanding ferrites know-how ; Can. Chem. Processing, vol. 54, No. 8 , p. 14,1970. (Letter to the Editor).

706. Sutherland, J.K., New Brunswick,Research and Productivity Council, N.B.:
Occurrence of Indium at Mount Pleasant, New Brunswick, 1968-.
See A second occurrence of dzhalindite; Can. Mineral.

707. Sutherland, J.K., Boorman, R.S., Abbott, D., Halls, C., New Brunswick Research and Productivity Council, N.B.:
Chemistry of Ore Minerals in New Brunswick, 1967-.
See Composition of some New Brunswick sphalerites; Research and Productivity Council, Research Note 21, 1969.

708. Theis, N., Queen's Univ.:
Mineralogical study of two orebodies on different reefs of the Quirke mine, 1970-71; M.Sc. thesis.

709. Townsend, M.G., Horwood, J.L., Mines Branch, Dept. of Energy, Mines & Resources:
Electrical and magnetic measurements on sulphides, 1969-.
Metal-to-semiconductor transitions in NiS and FeS are under investigation.

710. Traill, R.J., Geol. Surv. of Canada:
Catalogue of Canadian Minerals, 1958-.
Data are being compiled for preparation of the first supplement to "A Cataloge of Canadian Minerals". Minerals are listed in alphabetical order and localities of occurrence are given by Province or Territory in order of increasing NTS reference number. Data entries include details of the location and information concerning the mineral found at that location. Chemical analyses are reported. See A catalogue of Canadian minerals; Geol. Surv. Can., Paper 69-45, 1970.

711. Traill, R.J., Plant, A.G., Douglas, J.A.V., Dence, M.R., Geol. Surv. of Canada:
Mineralogy and petrology - lunar material, 1968-.
The research team has examined and reported on the mineralogy and petrology of lunar rocks and soil collected on the Apollo 11 and 12 missions, as invited participants in the NASA Apollo Manned Lunar Landing Programme. It is expected that studies will be made of materials collected on future manned Apollo flights. See Science, vol. 167, pp. 594-597, vol. 169, pp. 981-982; Geochim. Cosmochim. Acta, - Proc. Apollo 11 Lunar Sc. Conf., vol. 1, pp. 65-79, 81-86, 315-340, 1970.

PALEONTOLOGY

Invertebrate

712. Barnes, C.R., Univ. of Waterloo:
Conodonts from the Black River and lower Trenton Groups, Ontario, Quebec, New York, and Vermont, 1966-72.
See North American Middle and Upper Ordovician conodont faunas; Geol. Soc. Amer., Memoir (in press).
Paleozoology and provincialism of Ordovician conodonts, 1969-.
Collections being studied include those from Ontario, Quebec, Newfoundland, Hudson Bay, Arctic Islands, Manitoba, New York State, Vermont, Wales, Ireland, and Turkey.

713. Barnes, C.R., Poplawski, S., Univ. of Waterloo:
Conodonts from the Mystic Conglomerate (Ordovician), Quebec, 1970-71.
See Conodonts from the Levis Formation (Zone DI) (Middle Ordovician), Levis, Quebec; Geol. Surv. Can., Bull. 187, pp. 79-97, 1970.

714. Barnes, C.R., Sass, D.B., Monroe, E.A., Univ. of Waterloo, Alfred Univ., N.Y. State Univ.:
Ultrastructure of conodonts, 1968-.
See Preliminary studies of ultrastructure of selected Ordovician conodonts; Royal Ontario Museum, Life Sc. Contrib. 76, 1970.

715. Bertrand, R., Université de Montréal:
Biométrie et systématique des trilobites "Trenton" du Québec, 1968-73; thèse de doctorate.
Etude detaillée de Cryptolithus dans ces meines strates présenteé comme thése de M.Sc.

716. Braun, W.K., Univ. of Saskatchewan:
Devonian biostratigraphy and ostracod faunas of western Canada, 1965-75.
Emphasis is on zonation and regional correlations, and detailed documentation of the ostracod and other microfaunas. See Biostratigraphic determinations of fossils from the subsurface of the Yukon Territory and the Districts of MacKenzie and Franklin; Geol. Surv. Canada, Paper 70-15, 1970.

717. Chamberlain, J.A., Jr., Westermann, C.E.G., McMaster Univ.:
Some aspects of the fluid dynamics of fossil shelled cephalopods, 1966-72.

Drag coefficients for cephalopods have been measured using plastic scale models of cephalopod shells. These are used to compare the dynamic efficiencies of various cephalopod morphologies. Results so far indicate that ammonoids and nautiloids tend to occupy morphological regions of high efficiency, but that within a given region, morphological variation does not greatly alter efficiency.

In the future this work will be applied to a wider variety of cephalopod shells, and will be expanded to include the fluid dynamics of shell sculpture, orientation, and phylogenetic change. Attempts will be made to determine actual swimming velocities by applying the equations from thrust of jet propellers, and observing the swimming mechanisms in moder Nautilus.

718. Chamney, T.P., Geol. Surv. of Canada:
Foraminiferal zonation of the Mesozoic and lower Cenozoic rocks of the Mackenzie River Delta and adjacent Arctic Coastal Plain, 1969-72.

All classes of fossil organisms recognized in the laboratory prepared rock samples have been identified and recorded. The most amenable approach in subdividing this very thick (approx. 13,000 feet) stratigraphic sequence has been the application of paleoecological equivalents. These related depositional intervals are based on similar fossil organic content (assemblages) and in many cases their boundaries are coincident with recognizable physical changes in the sequence of strata. See Biostratigraphic subdivision of the first Mackenzie River Delta exploratory borehole; Geol. Surv. Can., Paper 70-1, pt. B, pp. 80-83, 1970.

719. Chatterton, B.D.E., Univ. of Alberta:
Study of the invertebrate palaeontology of the Taemas area, New South Wales, Australia, 1966-71.

720. Chiang, K.K., Univ. of Western Ontario:
Faunas and age of the Fossil Hill and Amabel Formations, southwestern Ontario, 1968-69; M.Sc. thesis.

See Brachiopods of the Amabel Formation of Bruce Peninsula, Ontario; J. Paleontology, vol. 45, 1971.

721. Collins, D.H., Royal Ontario Museum:
Buoyancy and balance in chambered cephalopods, 1967-72.

See The microstructure and function of the connecting ring of Nautilus, Spirula and fossil nautiloids; abstract, Geol. Soc. Amer. Ann. Meeting Milwaukee, 1970.

A more general statement of the siphuncular microstructure and buoyancy mechanisms in coleoid cephalopods is being prepared for inclusion in the Coleoid cephalopod volume of the Treatise on Invertebrate Paleontology.

722. Copper, P., Laurentian Univ.:
The morphology, evolution and ecology of the atrypoid brachiopods in western Europe and eastern North America, 1968-72.

The atrypoid brachiopods are one of the most dominant marine invertebrate elements during the Ordovician, Silurian and Devonian periods. Nothing is known about their origins in the Middle Ordovician and their world-wide extinction at the end of Frasnian time (Upper Devonian) is equally mysterious. Extremely little data is available on internal structures within this group of brachiopods, and there is equally sparse

information about their biostratigraphic distribution. Hence at the present time this very abundant brachiopod order has been of little value in dating lower and middle Paleozoic sediments. The object of this study is to bring together as much information on the group as possible. This involves not only sampling of prime fossil localities in the field, to determine accurately the time, space and environmental distributions of species, but also re-examination of all museum material.

723. Delorme, L.D., Inland Water Branch, Dept. of Energy, Mines & Resources:
Paleohydrogeology - Systematics of Pleistocene and Recent freshwater Ostracoda of Canada, 1965-70.
The systematics of Canadian freshwater ostracodes has until now been unknown and hence ecological and paleoecological studies has been held back. See Freshwater Ostracoda of Canada, Parts 1-IV; Can. J. Zoology, Vol. 48, Nos. 1,2,5,6, 1970; Part V; ibid., vol. 49, No. 1, 1970.
Paleohydrogeology - The use of freshwater Ostracoda as a paleolimnological tool, 1967-.
Ostracodes have become an important tool in paleolimnology in delineating environments, changes in environment brought about by changes in climate, vegetation and groundwater movement. Accurate interpretations can now be made on chemical and physical characteristics of pre-existing lake, ponds, and streams. See Ostracodes as Quaternary paleoecological indicators; Can. J. Earth Sci., vol. 6, No. 6, pp. 1471-1476, 1969.

724. Dixon, O.A., Univ. of Ottawa:
Ordovician-Silurian paleoecological studies, Anticosti Island, Quebec, 1968-.
Study of the Ordovician-Silurian transition sequence on Anticosti Island, its successive fossil populations and various sedimentary environment; Systematic studies of tabulate corals. See Nautiloids and current ripples as paleocurrent indicators in Upper Ordovician limestones, Anticosti Island, Canada; J. Sed. Petrology, vol. 40, pp. 682-687, 1970.

725. Fahraeus, L.E., Memorial Univ. of Newfoundland:
1) Studies of Lower Paleozoic conodonts from the Notre Dame Bay Area. 2) Studies of Lower Paleozoic conodonts from the west coast of Newfoundland.
Samples from the Clam Bank, Long Point and Table Head Formations and the Ordovician part of the Cow Head Group are being studied. See Conodont-based correlations of Lower and Middle Ordovician strata in western Newfoundland; Bull. Geol. Soc. Amer., vol. 81, pp. 2061-2076, 1970.

726. Ferguson, L., Mount Allison Univ.:
Compaction-distortion of fossil brachiopods and its bearing on taxonomy, 1959-73.
The distortion of productids is presently under investigation.
A study of the Scottish Carboniferous ostracod general Bairdia and Paraparchites, 1969-75.
Growth series of both Bairdia and Paraparchites from restricted vertical intervals are being compared with the type specimens of numerous "species" of these genera which have been previously recorded from the same locality. The

object of the study is to reduce the number of spurious species within each genus by "lumping" together those forms which are obvious instars of one species. Several thousand topotype specimens were collected during the 1969 field season and are currently under examination.

727. Globensky, Y., Ministère des Richesses Naturelles du Québec:
Conodont study of the Grondines and Trenton Sections, Quebec, 1970-71.
See Stratigraphic distribution of conodonts in the Middle Ordovician Neuville section of Quebec; Proc. Geol. Assoc. Can., vol. 23, pp. 43-68, 1971.
Conodont study of the Neuville Trenton Section, 1970-71.

728. Greiner, H.R., Univ. of New Brunswick:
Cyrtospirifer and related genera from the Upper Devonian-Lower Mississippian of western Canada, 1965-72.

729. Hall, R.L., Westermann, G.E.G., McMaster Univ.:
The "Stephanoceras" assemblage of western Canada (Jurassic Ammonoidea), 1970-73; Ph.D. thesis (Hall).
The study will involve a faunistic study of this worldwide assemblage, with taxonomic revision, based particularly on the outcrops of the Queen Charlotte Islands.

730. Harrington, J.W., Univ. of Calgary:
1) Correlation and comparison of the western Canadian and New York Frasnian (Upper Devonian), 1969-70.
2) Brachiopoda of the Melville Island Formation (Upper Devonian) of Banks Island, Northwest Territories, 1969-70.

731. Jull, R.K., Univ. of Windsor:
Visean rugose corals of Queensland, Australia, 1962-71.
See The Lower Carboniferous corals of Eastern Australia: A review; Essays in honour of Dorthy Hill, Aust. Nat. Univ. Press, pp. 120-139.
Colony development in Ordovician and Silurian tabulate corals, particularly representatives of the syringophyllid and heliolitid corals, 1969.
An attempt to explore evolutionary patterns within two groups of tabulate corals and to ascertain what their relationships with the rugose corals might be. Material being used originates from North American, Europe and Australia.
Ontogeny and hyster-ontogeny in the rugose coral Hexagonaria anna from the Traverse Group, Michigan, 1970.
Colonies of Hexagonaria anna from Michigan are amongst the few known colonial rugose corals with the tips of the initial corallite (protocorallite) intact. The study revolves around studyingthe ontogeny of the sexually produced protocorallite and comparing this to the hystero-ontogeny of a sexually budded corrallites within the colony.

732. Kapp, U., (Miss), Stearn, C.W., McGill Univ.:
Paleoecological studies in the Chazyan reefs of the Lake Champlain area, 1968-71; M.Sc. thesis (Kapp).
The role of stromatoporoids, corals and bryozoans in the formation of these first coelenterate reefs in the geological column is being investigated.

733. Lenz, A.C., Univ. of Western Ontario:
Late Silurian and early Devonian brachiopods of central northern Yukon, 1966-72.
See Lake Silurian brachiopods of Prongs Creek, northern Yukon; J. Paleontology, vol. 44, pp. 480-500, 1970.

734. Lenz, A.C., Jackson, D.E., Univ. of Western Ontario:
Lake Silurian and early Devonian graptolites of the northern Canadian Cordillera, 1968-71.

735. Lespérance, P.J., Ministère des Richesses Naturelles du Québec:
Trilobites of the Applachians in Quebec, 1962-.
Voir Trilobites and stratigraphy of the Middle Cambrian Corner-of-the-Beach Formation, Eastern Gaspe Peninsula; Geol. Surv. Can., Bull. 187, pp. 43-58, 1970.
Trilobites de l'Ordovicien Supérieur au Devonien Inférieur des Appalaches du Québec, 1962-.
Voir The Synphoriinae: An evolutionary pattern of Lower and Middle Devonian trilobites; J. Pal., vol. 45, No. 2, pp. 182-208, 1971.

736. Logan, A., Univ. of New Brunswick, Saint John:
Re-study of the type-species of Palaeozoic bivalve genera belonging to the orders Arcoida, Mytiloida and Pterioida, 1968-72.
To adequately describe and figure the type-species of poorly-known Palaeozoic genera, many of which have been stumbling blocks to our understanding of the phylogeny and systematics of the bivalve group as a whole; to develop a coded and standardised classification of both objective and subjective descriptive data suitable for computer storage and retrieval.

737. Mamet, B.L. Université de Montréal:
Zonation et microfacies du Carbonifère Inférieur, 1960-.
Voir Carbonate microfacies of the Windsor Group (Carboniferous), Nova Scotia and New Brunswick; Geol. Surv. of Canada, Paper 70-21, 1970.

738. McGugan, A., Univ. of Calgary:
Cretaceous Foraminifera; Permian stratigraphy and diagenesis.
See Vancouver Island, Cretaceous Foraminifera; (abstract). GSA Rocky Mountain Sec. Pt. 5, p. 44, 1969. Permian and Pennsylvanian biostratigraphy and Permian depositional environments, petrography and diagenesis, Southern Canadian Rocky Mountains; Can. Bull. Petrol. Geol., Spec. Guidebook, pp. 48-66, 1969.

739. Munro, I., Lynch, H.G., Univ. of Waterloo:
Ordovician conodonts and paleoenvironment of the Arctic Ordovician fauna, Lake Timiskaming, Ontario, 1970-71, M.Sc. thesis.

740. Nautiyal, A.C., Univ. of Saskatchewan:
Upper Devonian biostratigraphy and acritarch faunas of western Canada, 1966-71; Ph.D. thesis.
Emphasis is on zonation and regional correlations, and detailed documentation of the microplanktonic faunas and floras discovered.

741. Neville, R.S.W., Memorial Univ. of Newfoundland:

1) A qualitative and quanlitative study of Chitinoza from Ordovician rocks on the Port au Port Peninsula, West Newfoundland. 2) Reconnaissance study of HF-resistant microfossils in the sedimentary formations of Newfoundland, 1969-71.

742. Noble, J.P.A., Logan, A., Univ. of New Brunswick:
Recent brachiopod morphology and ecology - eastern Canada, 1971-73.
Morphology and function of recent articulates of Atlantic Canada; distribution of populations and individuals and environmental variation - a recent model; and shell structure and chemistry and relation to environmental parameters.

743. Norford, B.S., Geol. Surv. of Canada:
Monography 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 Articulata. The family is restricted to the interval Middle Ordovician to Upper Silurian and most of the known occurrences are in Canada. See The Ordovician trimerellid brachiopod Eodinobolus from south-east Ontario; Palaeontology, vol. 12, pp. 161-171, 1969.

744. Oxley, J., Waterhouse, J.B., Univ. of Toronto:
The upper Permian Brachiopod subfamily Spiriferellinae from Arctic Canada, and its signigicance for correlation, paleogeography, paleoclimate and continental drift, 1970-71.
Ecology and correlation studies of brachiopods.

745. Pauzé, R., Université de Montréal:
Paleoecologie des brachiopodes de la Formation Sayabec (Wenlockien-Ludlovien) dela région Sayabec-La Rédemption, 1970-72; etudiant gradué.

746. Pedder, A.E.H., Geol. Surv. of Canada:
Late Silurian and Devonian coral faunas of western and northern Canada, 1968-.
See Middle Devonian coelenterates from the Nahanni Formation of Hudson's Bay, Amerada Camsell A-37 well, District of Mackenzie; Geol. Surv. Can., Bull. 192, 1971.

747. Poplawski, S., Morgan, A., Streenivasa, B.A., Univ. of Waterloo:
Paleontology of the Toronto interglacial: ostracods, beetles and cladocera, 1963-72.

748. Riva, J., Université Laval:
Study of Lowlands and Appalachian graptolites, 1962-.
See Graptolite faunas of the St. Lawrence Lowlands and Anticosti; Am. Assoc. Petrol. Geol., Mem. 12, pp. 513-556, 1970.

749. Stearn, C.W., McGill Univ.:
Are the stromatoporoids alive and well and living in Jamaica?, 1970-71.
Hartmann and Goreau have claimed that the new class of calcareous sponges discovered in Jamaica are living stromatoporoids. The investigation is a comparison of the living material in co-operation with Dr. Willard Hartmann and J. Jackson with fossil stromatoporoids.

Paleocology of stromatoporoids on the Ancient Wall carbonate complex, Jasper National Park, Alberta, 1964-.

750. Stearn, C.W., Mehrotra, P., McGill Univ.:
Middle Devonian stromatoporoid faunas of the Yukon Territory, 1968-70.
Project will be completed by the publication of the report. See Lower and Middle Devonian stromatoporoids from northwestern Canada; Geol. Surv. Canada, Paper 70-13, 1971.

751. Thusu, B., Univ. of Bristol:
1) Acritarchs and ostracode from the Rochester Formation (Middle Silurian), southern Ontario and western New York. 2) Depositional environments of the Rochester Formation (Middle Silurian) in southern Ontario, 1967-71; Ph.D. Thesis.
A rich assemblage of Acritarchs from the Rochester Formation (Middle Silurian) in southern Ontario is remarkably similar to the one recorded in Buildwas Beds (Lower Wenlock) in the Welsh Borderland. Ostracode studies, now under completion, throw new light on correlation of the Rochester Formation.

752. Uyeno, T.T., Geol. Surv. of Canada:
Conodont biostratigraphy of Paleozoic rocks of the Arctic Islands, 1968-.
Six stratigraphic sections of Silurian and Devonian rocks on Prince Patrick, Bathurst, Cornwallis, Devon, and Ellesmere Islands were measured and sampled in 1969.

753. Verma, H.M., Westermann, G.E.G., McMaster Univ.:
Study of Upper Jurassic ammonites from La Caja Formation of Sierra Catorce, 1969-71; Ph.D. thesis (Verma).
The Upper Jurassic ammonite faunas of Mexico received considerable attention in the early part of the century. However, the fauna of the area under investigation was not studied as thoroughly as other areas to the North. The collection of the author, made systematically from several previously unknown localities, consists of several hundred well preserved ammonites principally belonging to the families Perisphinctidae and Berriasellidae. The objects of the investigation are to study the variation of the different forms present to revise the taxonomy of the fauna in the light of present-day knowledge and to draw inferences regarding the Upper Jurassic paleogeography.

754. Vicencio, R., G.E.G. Westermann, McMaster Univ.:
Models for the morphology of the ammonoid shell and their use in the study of evolution and taxonomy of ammonoids; 1967-71, Ph.D. thesis (Vicencio).
Morphogenetic models for the development of accretionary shells, and in particular the ammonoid shell, have been elaborated. Their use permits a strict treatment of the total morphology (including shape) of these structures in terms of their functional morphologies, evolutionary histories and phylogenetic relationships.

755. Wall, J.H., and others, Research Coucil of Alberta:
Bearpaw microfaunal studies, 1966-.
Microfaunal studies of subsurface sections of the Bearpaw Formation in the Calgary and Cypress Hills areas are in progress. See Marginal marine microfaunas from the Late Cretaceous Bearpaw

Formation of central southeastern Alberta; Geol. Assoc. Can., Prog. and Abstracts, Ann. meeting, p. 26, 1970.

756. Warwick, W.F., Inland Waters Branch, Canada Centre for Inland Waters:
Chironomidae of Lake Ontario, 1968-.
This study of the midge (chironomid) fauna of Lake Ontario involves taxonomic definition of Great Lakes fauna - particular reference to larval forms; geographic distribution of larval forms; definition of ecological relationships; utilization of the study of recent larval forms to provide for the identification of fossilized larval head -capsules; study of the palaeo-distribtuion of fossilized forms.

757. Westermann, G.E.G., Riccardi, A.C., McMaster Univ.:
Middle Jurassic ammonoid fauna and stratigraphy of the Andes, particularly of Argentine, 1965-72.
A revision of the taxonomy and distribution of the known species and assemblages, their relationships and world-wide correlation, based on field work in 1965 and 1970. The study of the Hildoceratoceae has almost been concluded.

Vertebrate

758. Beebe, B.B., (Miss), Royal Ontario Museum:
Osteological analysis of the field fox, Dusicyon sechurae, 1970-72; M.Sc. thesis.

759. Churcher, C.S., Royal Ontario Museum:
Osteological analysis of the sabre-toothed cat, Smilodon neogaeus; 1963-.
Faunal investigation of the Pleistocene deposits at Medicine Hat, Alberta, 1965-.
A continuing research project in cooperation with Dr.A. MacS. Stalker, of the Geological Survey of Canada.
Faunal investigation of the Lower Pleistocene deposits at Swift Current, Saskatchewan, 1966-71.
This site represents lowest Pleistocene or perhaps even uppermost Pliocene vertebrates and thus constitutes the first record of such a deposit for Canada.
Faunal investigation of the Late Pleistocene vertebrates from Kom Ombo, Egypt, 1968-71.
These materials are those collected by the Canadian Prehistoric Expedition to Nubia in 1962-1963. It represents the midden deposits of the dwellers along the Nile circa 15,000-10,000 BC.

760. Churcher, C.S., Karrow, P.F., Royal Ontario Museum, and Univ. of Waterloo:
The Hamilton Bay vertebrate fauna, 1961-71.
Faunal investigation of the Holocene deposits at Hamilton Bay, Ontario, 1938-71.
New material discovered throws light on the age and paleoclimate of the Lake Iroquois Bar.

761. Dineley, D.L., Broad, D.S., Lawrence, D., Stephen, D., Univ. of Bristol:
Siluro-Devonian vertebrates from northern Canada, 1965-75; Ph.D. thesis (Broad).

The principal faunas being investigated are from Somerset and Prince of Wales Islands, N.W.T., and an important collection of Early Devonian faunas from the Mackenzie Mountains, N.W.T. Several new genera of ostracoderms are being described. The arthrodires will be studied shortly and an examination of the large bony fishes is to begin later.

762. Edmund, A.G., Royal Ontario Museum:
Systematics and descriptions of Xenarthra, 1958-.

763. Fox, R.C., Univ. of Alberta:
Late Cretaceous microvertebrates from Alberta, 1965-.
See Eatherian mammal from the early Campanian (late Cretaceous) of Alberta, Canada; Nature, No. 5258, pp. 630-631, 1970.

764. Greiner, H.R., Univ. of New Brunswick:
Paleoecology of the Albert (Mississippian) palaeoniscids, New Brunswick, 1958-71.

765. Kisko, L.M., Royal Ontario Museum:
Osteological analysis of the dire wolf, Canis dirus, 1968-72; Ph.D. thesis.

766. McGowan, C., Mandarino, J., Royal Ontario Museum:
An investigation into the chemical nature of fossil bone apatite, 1969-71.

767. McGowan, C., McAndrews, J., Royal Ontario Museum:
The extinction of mastodons in the Great Lakes region, 1970-71.

768. Ramaekers, P.P.J., Royal Ontario Museum:
The vertebrate fauna of the Willwood Formation, Lower Eocene of Wyoming, 1967-71; Ph.D. thesis.
Study of vertebrate fossils from the Willwood Formation in the Royal Ontario Museum and the National Museum of Natural Sciences. Field work in 1970 further delimited the occurrence of the specimens and established what assemblages were from single stratigraphic levels, involving computerized statistics.

769. Russell, L.S., Royal Ontario Museum:
Tertiary mammals of Saskatchewan. Part II. The Oligocene fauna, 1954-72.
All known taxa of the Cypress Hills fauna are being described and illustrated. The first section of the report, dealing with the non-ungulate orders of mammals, should be completed early in 1971. The second part, on the ungulates, will be ready in 1972. See Tertiary mammals of Saskatchewan. Part I. The Eocene Fauna; Royal Ontario Mus., Life Sci. Contrib. vol. 67, 1965.
Additions to the fauna of the Wood Mountain Gravel, Miocene of Saskatchewan, 1970-72.
Study of fossil mammals collected from the Wood Mountain Gravel prior to 1970 has been completed by John E. Storer. Much additional material was obtained by Russell in 1970.

770. Wilson, M.V.H., Royal Ontario Museum:
Fossil fishes from the Tertiary of British Columbia, 1968-71; Ph.D. thesis.

Study of the fossil fishes from various Eocene formations in the interior of British Columbia, preserved in the National Museum of Natural Sciences, the Royal Ontario Museum, and the University of British Columbia. During 1970 much additional material was obtained from the Horsefly River and Princeton localities, and several new occurrences were discovered and worked.

Paleobotany

771. Barss, M.S., Geol. Surv. Canada:
Carboniferous and Permian palynology, 1955-.
To determine on the basis of miospores the biostratigraphic zonation of the Upper Paleozoic succession of Canada as an aid to stratigraphy and for worldwide correlation, and to study taxonomy of new forms and describe them.

772. Berti, A.A., Univ. of Western Ontario:
Paleobotanic investigation of mid-Wisconsin interstadial deposits in the Lake Erie and Ontario basins, 1966-70; Ph.D. thesis.
Palynologic and macrofossil studies have been done from the following sites: Port Talbot-Plum Point area and Scarborough Bluffs in Ontario, Garfield Heights in Ohio, Titusville, Pennsylvania.

773. Hills, L.V., Sweet, A.R., Gunther, Johnson, C., Smith, R., Klovan, E., Univ. of Calgary:
Stratigraphy, paleobotany and palynology of the Beaufort Formation, Arctic Canada; The fossil history of Azolla; Upper Cretaceous megaspores; Jurassic meospores from Arctic Canada; Upper Devonian megaspore from Arctic Canada; graduate studies (Sweet, Gunther, Smith), 1968-73.

774. Hopkins, W.S., Jr., Geol. Surv. Canada:
Mesozoic palynology of the Sverdrup Basin, Northwest Territories, Canada, 1968-.
To delimit the stratigraphic and geographic distribution of useful key palynomorphs, and the distribution, migration and evolution of plants in the Arctic through the Mesozoic and into the Tertiary.

775. Karrow, P.F., Anderson, T.W., Univ. of Waterloo:
Palynological study of late and post-glacial vegetational changes in southwestern Ontario and their relation to ice retreat and Lake Algonquin, 1967-71; Ph.D. thesis (Anderson).

776. Kuc, M., Geol. Surv. Canada:
Fossil mosses in the Arctic, 1969-.
Investigations of stratigraphy and paleobotanical characteristics of fossil floras (vascular plants, bryophytes, lichens, etc.) in interglacial and postglacial deposits, especially in the Canadian Arctic Archipelago. See Fossil mosses, Beaufort Formation (Tertiary), northwestern Banks Island, western Canadian Arctic; Can. J. Botany, vol. 49, 1971.

777. Mamet, B.L., Rudloff, B., Université de Montréal:
Algues du Paléozoique Supérieur, 1968-72.

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778. McAndrews, J.H., Royal Ontario Museum:
Source of pollen in Lake Ontario, 1971-72.
See Percentage trends of pollen in surface sediments of Lake Ontario; 13th Conf. Great Lakes Res. (abstracts), p. 84, 1970.

779. McGregor, D.C., Geol. Surv. Canada:
Biostratigraphic study of Paleozoic palynomorphs of the Arctic Islands, 1968-75.
Devonian plant microfossils of eastern Canada, 1962-75.
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Microfossils from the Ordovician Red River Formation, 1970.
See Palynomorphs of the Ordovician Cat Head Member, Lake Winnipeg, Manitoba; Geol. Surv. Can., Bull, 202, 1971.

781. Mott, R.J., Geol. Surv. Canada:
Palynological studies, central Saskatchewan, 1965-69.
See Palynological studies in central Saskatchewan. Contemporary pollen spectra from surface samples; Geol. Surv. Can., Paper 69-32, 13 pp., 1969. Geol. Surv. Can., Paper 71-1, Pt. A, pp. 182-183, 1971.

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Quaternary palynology, 1969-.
See Palynological studies in the Ottawa area; Geol. Surv. Can., Paper 69-38, 1970. The pollen stratigraphy of a dated section of lake sediment from Central Alberta; Can. J. Earth Sci., vol. 7, No. 3, pp. 938-945, 1970.

783. McIntyre, D.J., Chevron Standard Ltd., Calgary:
Mesozoic and Tertiary palynology, 1966-.

784. Parker, M.L., Geol. Surv. Canada and Univ. British Columbia:
Dendrochronological investigations, 1968-.
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 Dendrochronological techniques used by the Geological Survey of Canada; in Tree-ring analysis with special reference to North America; Univ. British Columbia, Faculty of Forestry, Bull. No. 7, pp. 55-66, 1970.

785. Riding, R., McGill Univ.:
Calcareous algae from the Upper Devonian Ancient Wall complex, Alberta, 1970-71.
The distribution, taxonomy, and roles of the calcareous algae are being investigated at the southern margin of the carbonate complex at Mount Haultain. The principal genera involved are Girvanella, Keega, Renalcis, and Sphaerocodium. Less common forms are Litanaia, Paraepiphyton, Solenoporaceae,

and Vermiporella.
The taxonomy and affinities of Renalcis and related genera, 1970-71.
The genera Chabakovia, Izhella, Nephelostroma, Nubecularites, Ptychocladia, Renalcis, and Shuguria comprise a group of morphologically similar small calcareous chambered Palaeozoic organisms. Some have been assigned to the Foraminiferida and others to various divisions of the algae. Several of them are probably synonymous. The study is based mainly on material from the Upper Devonian Ancient Wall complex of Alberta, and on published descriptions.

786. Singh, Ch., Research Council of Alberta:
Lower Cretaceous microfloras of the Peace River district, Alberta 1965-70.
See Lower Cretaceous microfloras of Peace River area, northwestern Alberta; Alberta Res. Council, Bull. 28, (3 volumes in press).
Cenomanian-Turonian microfloras of the Peace River district, Alberta, 1969-.
About 165 samples collected from outcrops of the upper Shaftesbury Formation, St. John Shale, Dunvegan Formation, and lower Kaskapau Formaion along Peace River, Pouce Coupe River, and Howard Creek have been processed.
The upper Shaftesbury microfloral assemblage is essentially similar to that of the lower Shaftesbury beds. The Dunvegan Formation is characterized by the presence of typical Cenomanian megaspore genera e.g. Ariadnaesporites, Molaspora, Balmeisporites, etc. Numerous tricolporate angiosperm pollen, not found in the strata of pre-Cenomanian age, also have been recovered from the Dunvegan Formation.

787. Walton, H.S., Chevron Standard Ltd., Calgary:
Paleozoic palynology, 1960-.

General

788. Bartlett, G.A., Queen's Univ.:
Ecostratigraphy and biostratigraphy of waters and sediments adjoining the Mid-Atlantic ridge; 1966-.
Microfaunal analyses, test microstructure, coiling directions, and faunawatermass relationships are being investigated to interpret the paleoclimatology and paleooceanography of the North Atlantic.

789. Bartlett, G.A., Slessor, D.R., Smith, R., Stevenson, S., Queen's Univ.:
Ultramicrostructure and elemental content of microorganisms, 1967-.
The interpretation of the detailed ultramicrostructure and elemental content of microorganisms utilizing scanning electron microscopes and microprobe analyzers. The relationship of morphology to environment.

790. Greiner, H.R., Univ. of New Brunswick:
Recent tracks and boring in littoral zones near St. Andrews, New Brunswick, including Spio setosa and Glycera

dibranchiata, 1969-74.
Trace fossils from northern New Brunswick strata, including presumed petallichthyid trails and Zoophycus sp., 1969-74.

791. Hofmann, H.J., Université de Montréal:
Phanerozoic organic sedimentary structures and 1969-.
Precambrian Paleontology, 1966-.
See Attributes of Stromatolites; Geol. Surv. of Canada, Paper 69-39, 1969.

792. Karrow, P.F., Clarke, A.H., Herrington, H.B., Delorme, L.D., Univ. of Waterloo:
Paleontology of sediments of glacial lakes Iroquois and Algonquin, 1957-72.

793. Waterhouse, J.B., Univ. of Toronto:
Correlation of world marine Permian on basis of brachiopods, 1968-71.
Recorrelation of world marine Permian, including Canadian Arctic and West, by brachiopods, into a nine-fold scheme, much more exhaustive and extensive and finer than previous clarifications. See Trans. N.Z. Roy. Soc. Geol., vol. 7, No. 7, pp. 97-109, 1970.

PETROLOGY AND PETROGRAPHY

Alberta

794. Ghent, E.D., Oliver. T.A., Miller, B., Univ. of Calgary:
Petrology of Blairmore sands, southern foothills, 1970-72; M.Sc. thesis (Miller).

795. McCormack, M., Oliver, T.A., Univ. of Calgary:
Petrology of the Cardium Formation, Bow River to Jumping Pound River, 1970-72: M.Sc. thesis (McCormack).

British Columbia

796. Barr, Sandra, M., Univ. of British Columbia:
Marine geology of the northern end of Juan de Fuca Ridge and the adjacent continental slope, 1968-71; Ph.D. thesis
Field work completed includes continuous seismic profiling, magnetic profiling, and echo sounding, extensive dredging for bedrock samples on the Ridge, related seamounts, the transform fault zone forming the northern boundary of the area, and the continental slope. Petrology, chemical analyses, and fission track age dating will be undertaken and the basalts obtained. See Structure of the Continental slope west of Vancouver Island 48°N and 49° 10'N; Geol. Surv. Can., Paper 71-1, Pt. A, 1971.

797. Nicholls, J., Johnson, E., Univ. of Calgary:
Petrology of the quaternary volcanics, British Columbia, 1970-73; M.Sc. thesis (Johnson).

798. Lambert, M.B., Carleton Univ.:
The Bennett Lake cauldron Subsidence complex, British Columbia and Yukon Territory, 1967-71; Ph.D. thesis.
A Tertiary cauldron subsidence, ring dyke complex with a history of explosive volcanism, rapid sedimentation and subsidence followed by central resurgence. At least two nested cauldrons are filled with great thicknesses of acidic tuffs, breccias, ignimbrites, conglomerates, and lavas of the Skukum Group.
Field investigations are being followed by petrographic and petrochemical studies of the volcanic rocks and the surrounding granitic rocks, with the aim of elucidating the history of volcanic eruption and of related tectonic movements. See Tertiary cauldron subsidence complex, Bennett Lake, British Columbia and Yukon Territory (104 M); Geol. Surv. Can., Paper 69-1, Pt. A, pp. 21-23, 1969.

799. Lavoie, S., Fawcett, J.J., Univ. of Toronto:
Petrology of flood basalts of the Kamloops Group, British Columbia, 1968-71; M.Sc. thesis (Lavoie).
See Rapid rock analysis by electron probe; Geochimica et Cosmochimica Acta, vol. 34, pp. 243-247, 1970.

Manitoba

800. Bailes, A.H., Manitoba Dept. of Mines & Natural Resources:
Geological study of the Files-Morton Lakes area, 1970-72.

801. Ermanovics, I.F., Plant, A.G., Geol. Surv. Canada:
Flinty crush-rock in granitoid terrain of southeastern Manitoba, 1970-71.
Veins of this cataclastic rock within a regionally sheared zone, comprise chemically and texturally zoned rock-paste.

802. Froese, E., Moore, J.M., Geol. Surv. Canada and Carleton Univ.:
Petrological studies in the vicinity of the Kisseynew Front, Manitoba, 1970-73.
During 1970 detailed mapping was begun in the Snow Lake area, Manitoba, with the primary object of establishing the pattern of metamorphic isograds. Combined with mineralogical studies, this will permit an evaluation of metamorphic conditions. Particular attention will be paid to sulphide-silicate reactions and their bearing on the behavior of sulphides during metamorphism.

803. Kendrick, G., Manitoba Dept. of Mines & Natural Resources:
Southern Indian Lake project, 1970-71.
See Turnbull-Pemichigamau Lakes area in summary of Geol. Fieldwork, 1970, Manitoba Mines Branch, Geol. Paper 4/70, 1970.

804. Marshall, P., Edgar, A.D., Univ. of Western Ontario:
K/Rb ratios in micas and feldspars of the Montgary, Manitoba, pegmatite, 1969-71; M.Sc. thesis (Marshall).

805. McRitchie et al, W.D., Manitoba Dept. of Mines & Natural Resources:
Burntwood Project, 1970-74.
Detailed and regional structural, petrologic and economic studies of the acidic plutonic and metamorphic rocks of the

Nelson House-Pukatawagan region, northern Manitoba. See Burntwood project; Manitoba Mines Branch, Geol. Paper 4/70, 1970.

806. Scoates, R.F.J., Manitoba Dept. of Mines & Natural Resources: Ultramafic rocks of Manitoba, 1969-73.

New Brunswick

807. Martin, R.F., McGill Univ.:
Petrology of gabbro-granophyre-syenite-granite rock associations in New Brunswick, 1970-72.
In New Brunswick, Devonian rocks of granitic composition occur in two kinds of rock associations, one usually described as orogenic, the other, anorogenic. Current detailed studies are directed at the anorogenic suites, specifically those in the southern portion of the province, to clarify petrogenetic questions related to the tectonic setting at the time of emplacement. See Petrogenetic and tectonic implications of two contrasting Devonian batholithic associations in New Brunswick, Canada; Am. J. Sci., vol. 268, pp. 309-321, 1970.

808. Pertold, Z., McAllister, A.L., Univ. of New Brunswick:
Structural geology of the Brunswick No. 6 Mine area, Bathurst, New Brunswick, 1969-70.
A detailed field examination of the sulphides which have been subjected to polyphase deformation. Laboratory follow-up includes fabric studies on pyrite, pyrrhotite and quartz using a Phillips textural goniometer.

Newfoundland and Labrador

809. Hughes, C.J., Memorial Univ. of Newfoundland:
Geology of eastern Avalon, Newfoundland, 1966-72.
Petrography of lavas, marine tuffs and sediments and "volcanic" granites.
Igneous rocks of Fogo Island, Newfoundland, 1970-72.
Petrography, structure, cognate inclusions, isotope studies.

810. Hughes, C.J., Malpas, J., Memorial Univ. of Newfoundland:
Metasomatism in acid rocks of Bull Arm Formation, Avalon, Newfoundland, 1970-72; M.Sc. thesis (Malpas).
Chemical studies upon, and implications of metasomatism of volcanic rocks during low grade regional metamorphism.

811. Papezik, V.S., Memorial Univ. of Newfoundland:
Petrology of volcanic rocks of the Late Precambrian Harbour Main Group, Avalon Peninsula, Newfoundland, 1967-.
Volcanic rocks of the Harbour Main Group are dominantly sodic and weakly alkalic. Although some pillow lavas are present, most of the rocks were formed by subaerial eruptions; several belts of well-preserved ignimbrites are present. The rocks may have formed in a tectonic belt of the Basin and Range type during a period of post-orogenic block-faulting. See Petrochemistry of

volcanic rocks of the Harbour Main Group, Avalon Peninsula, Newfoundland; Can. Jour. Earth Sci., vol. 7, pp. 1485-1498, 1970.

Northwest Territories

812. Baadsgaard, H., Lambert, R., Ramsay, C., Drury, S., Univ. of Alberta:
Geochronology, isotape geology, metamorphic and tectonic history of the Yellowknife Are, Northwest Territores, 1961-; Ph. D. thesis (Ramsay).
A multiple-project involving a number of aspects of the metamorphic and igneous petrology of the rocks of the area.

813. Baragar, W.R.A., Donaldson, J.A., Robertson, W.A., Geol. Surv. Canada:
Volcanic studies of Coppermine River Basalts, Northwest Territories, 1966-72.
The object is to study the petrology, geochemistry, and stratigraphy of the Coppermine River flows with a view to 1) determining the relationship of the copper deposits contained within the flows to the volcanism and 2) clarifying the distinctions in the style of volcanism between the stable platforms (the Coppermine type) and the mobile belts (greenstone belts). See Geochemistry of Coppermine River Basalts; Geol. Surv. Can., Paper 69-44, 1969.

814. Biron, S., Béland, R., Université Laval:
Pétrologie des basaltes de l'Ile Bill de Portland, Baie d'Hudson, T.N.W., 1969-71.
Basaltic sequence includes trachytic rocks in the form of thin flows and breccia, and discontinuous contorted carbonate rocks which may be evidence of the inflowing of basaltic lavas in non-consolidated calcaro-dolomitic oozes. Slight evidence of thermal spring activity accompanied by pyritic mineralization.

815. Clarke, D.B., O'Nions, R.K., Dalhousie Univ.:
K/Rb and strontium isotope ratios in a suite of basalts from Baffin Island, Northwest Territories, 1969-70.
There are petrological reasons to believe that these low-K tholeutes are representative of primary magnas. New data on K and Rb concentrations as well as Sr $^{87}/_{86}$ ratios (0.7028) tend to confirm the earlier findings. See Tertiary basalts of Baffin Bay: Possible primary magna from the mantle, Contrib. Mineral. Petrol., vol. 25, pp. 203-224, 1970.

816. Davidson, A., Geol. Surv. Canada:
Granite studies in the Ennadai-Rankin Inlet region, Northwest Territories, 1966-71.
See Nepheline -K-feldspar investigation from Kaminak Lake N.W.T., Can. Mineralogist, vol. 10, Pt. 2, pp. 191-206, 1970.

817. Kretz, R., Univ. of Ottawa:
Study of crystalline rocks of the Yellowknife area, 1960-.
See Can. J. Earth Sci., vol. 7, p. 1219-35.

818. Lambert, R. St J., Martineau, M.P., Univ. of Alberta:
Petrochemistry and age of the Big Spruce Lake syenite/carbonatite complex, Northwest Territories, 1964-70.

A straightforward field mapping petrological, geochemical and geochronological study of a little-known complex containing mafic and ultramafic rocks, quartz-syenites, nepheline-syenites, fenites, calcite and dolomite carbonatites and a biotite-pyroxenite complex. Its age, > 2100 m.y. defines the minimum age of major faults in the Slave Province. The project was supported by the Boreal Institute, the Natural Environment Research Council of G.B., and the Giant Yellowknife Mining Company.

819. Reinhardt, E.W., Geol. Surv. Canada:
Petrological and structural study of the McDonald fault system, Great Slave Lake, Northwest Territories, 1965-71.
See Geology of the Precambrian rocks of Thubun Lakes map-area in relationship to the McDonald fault system, District of Mackenzie; Geol. Surv. Can., Paper 69-21, 1969.

820. Ridler, R.H., Geol. Surv. Canada:
Volcanic study in Ennadai Belt, District of Keewatin , 1970-73.
The Archean stratigraphy and exhalite facies appear remarkably similar to that at the Superior Province. Hudsonian effects are superimposed to varying degrees. Three mafic to felsic volcanic cycles are recognized. A complex carbonate-sulfide exhalite zone overlies the youngest and thickest recognized felsic volcanic formation and is overlain by mafic pillow lava.

Nova Scotia

821. Amos, J., Acadia Univ.:
Fabric and crystallization of a thick sheet of Triassic basalt, near Port Lorne, Nova Scotia, 1967-72; M.Sc. thesis.

822. Colwell, J.A., Acadia Univ.:
Petrology and geochemistry of Triassic basalt, Nova Scotia, 1969-71.
Determination of the mineral and chemical variation within and between the flows of the North Mountain basalt in Nova Scotia with particular attention to copper occurrences in particular flows.

823. Rao, I.R., Acadia Univ.:
Petrography and origin of volcanics in the White Rock Formation of Torbrook, Nictaux area, Nova Scotia, 1968-71; M.Sc. thesis.

824. Smith, T.E., Univ. of Windsor:
The geology and geochemistry of the granitic rocks of Nova Scotia, 1969-.
The granitic rocks of Halifax County are presently being mapped and their structural and petrological characteristics determined. Samples have been collected for X-ray fluorescence determination of major element variation and also the trace element distribution in the rocks with a view to determining their origin and geological history. See The structural characteristics of the Strathspey Complex: Geol. Mag., vol.103, 1970.

825. Tsai, Ching-Lang, Acadia Univ.:
Petrography and structure of vent structures in Triassic basalt, Digby Neck and Long Island, Fundy Coast, Nova Scotia, 1969-71; M.Sc. thesis.

Ontario

826. Annells, R.N., Geol. Surv. Canada:
Keweenawan volcanics of Eastern Lake Superior, Ontario, 1969-71.
A stratigraphic subdivision of basic, intermediate and acid Keweenawan lavas of Michipicoten Island and Mamainse Point has been made using petrographic controls. Electron microprobe work shows flows have broadly tholeiitic mineralogy; 85 new chemical analyses in process of interpretation. See Keweenawan volcanics of eastern Lake Superior; Geol. Surv. Can., Paper 71-1, Pt. A, pp. 116-119, 1971.

827. Ayres, L.D., Ontario Dept. of Mines & Northern Affairs:
Early Precambrian volcanism and sedimentation, Lake Superior Provincial Park, Ontario, 1961-71.
A stratigraphic, sedimentologic, and geochemical study. See Synthesis of early Precambrian stratigraphy north of Lake Superior (abstract); Institute on Lake Superior Geology, 16th meeting, p. 8, 1970.
Gamitagama Lake Complex, Ontario, 1961-72.
See Townships 31 and 30, Ranges 20 and 19; Ontario Dept. Mines, Geol. Rept., pp. 26-35, 1969.

828. Bateman, P., Univ. of Saskatchewan:
Petrology of the volcanics of Ben Nevis and Clifford townships, Ontario, 1970-72; M.A. thesis.

829. Bull, D., Laurentian Univ.:
Petrology and conditions of deposition of the Espanola Limestone of the Huronian, 1970-71.
To determine the conditions of deposition, palaeogeography, and diagenesis of the Espanola Limestone in northern Ontario.

830. Cantin, Ruth, McMaster Univ.- Ontario Dept. of Mines & Northern Affairs:
Petrography and paleocurrents of the Chelmsford Formation of the Sudbury Basin, Ontario, 1970-71.

831. Card, K.D., Pattison, E., Ontario Dept. of Mines & Northern Affairs and International Nickel Co.:
Nipissing diabase of the southern province, Ontario, 1970-71.

832. Fabbri, A., Univ. of Ottawa:
Structural and textural studies of gneisses near Sparrow Lake Muskoka area, Ontario, 1968-71; Ph.D. thesis.

833. Kretz, R., Univ. of Ottawa:
Geology of the Bala mixed-gneiss syncline, Muskoka area, Ontario, 1968-.

834. Moore, J.M. Jr., Thompson, P.H., Hutcheon, I.E., Carleton Univ:

Petrology and structure of metamorphic rocks in the Grenville Province, eastern Ontario, 1962-72; Ph.D. thesis (PHT), M.Sc. thesis (IEH).

Moore and Thompson are studying the structure, stratigraphy and metamorphic zoning in a metamorphosed clastic sequence, between Madoc and Bishop Corners, in Hastings, Lennox and Addington, and Frontenac Counties.

Hutcheon is studying the remolite isograd in siliceous carbonate rocks in a small area around Myer's Cave, Frontenac County.

835. Morin, J., Univ. of Saskatchewan:
Petrology of granitic rocks in northwestern Ontario , 1970-72; M.A. thesis.

836. Naldrett, A.J., 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, 1967-71; Ph.D. thesis (Hewins).

837. Naldrett, A.J., Gasparrini, E.L., Univ. of Toronto:
Petrology of the Sudbury nickel irruptive, 1967-72.

Detailed petrographic and electron microprobe studies are being made of traverses across the irruptive to assist in the interpretation of the geological history of the intrusion. See Cryptic variation and the petrology of the Sudbury nickel irruptive; Econ. Geol., vol. 65, pp. 122-155, 1970.

838. 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).

To determine whether or not the unusual rocks at the top of the nickel irruptive are related to the impact of a meteorite.

839. Sampson, G.A., Fawcett, J.J., Univ. of Toronto:
Metamorphic studies in the Madoc region of southeastern Ontario, 1968-71; Ph.D. thesis (Sampson).

840. 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.

841. Siemiatkowska, K.M., McGill Univ. and Ontario Dept. of Mines & Northern Affairs:
A study of alkaline fenite breccias, Louise-Eden area, District of Sudbury, Ontario, 1970-71.

Two alkaline fenite breccia bodies intrude quartzites of the Mississagi Formation southwest of Sudbury, Ontario. Quartzite breccia fragments are replaced by aegerine, riebeckite, and feldspars and small rutile-bearing carbonate veins are present.

842. Siemiatkowska, K.M., Martin, R.F., McGill Univ.:
Mineralogical and petrological study of the Nemag Lake and Kusk Lake intrusion-like bodies, 1970-71; M.Sc. thesis (Siemiatkowska).

The Nemag Lake and Kusk Lake intrusion - like bodies are situated approximately 12 miles southwest of Sudbury on the Whitefish Lake Indian Reserve No. 6. These bodies consist of aegerine-riebeckite fenites which have been intensively brecciated. The fenites are developed in a feldspathic sandstones of the Huronian sequence. The breccia fragments which show pronounced reaction rims consist of quartzite that has been either partially or totally digested.

843. Stevenson, J.S., McGill Univ.:
Comprehensive petrological and mineralogical study of the nickel irruptive and overlying Onaping tuff, Sudbury, Ontario, 1951-.

844. Wynne-Edwards, H.R., Hasan, Zia-ul, Krause, J.B., Queen's Univ.:
Metamorphic zones in the Frontenac Axis, Ontario, 1968-70.
A compilation of work to date on metamorphic assemblages in the Frontenac Axis.

845. Wynne-Edwards, H.R., Krause, J.B., Queen's Univ.:
The assemblage di-plag-iron oxide in the Frontenac Axis - a study of co-existing metamorphic minerals, 1967-71; Ph. D. thesis (Krause).
A study of a particular but common mineral assemblage at different metamorphic grades.

846. Wynne-Edwards, H.R., Wallach, J.L., Queen's Univ.:
Structures in grey gneiss at Parham, Ontario, 1967-70; 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 agres of the two categories of rocks, and test the hypothesis that the grey gneiss represents basement.

Quebec

847. Béland, R., Université Laval:
Geochemical and petrographic examination of rhyolitic flows at the top of the Blake River sequence, Malartic Township, Quebec, 1970-71.
A continuous and complete section of rhyolite obtained in an 800' drill hole, is being examined and analyzed.

848. Campiglio, C., Quebec Dept. of Natural Resources:
Petrography and geochemistry of the Bourlamaque batholith, Val d'Or district, Quebec, 1969-71; Ph. D. thesis, Ecole Polytechnique.
The main purpose is to define the possibilities of mineral concentrations associated with this pluton.

849. Darling, R., Gélinas, L., Campiglio, C., Guha, J., Ecole Polytechnique:
La pétrologie et la géochimie du batholithe Bourlamaque: développement d'une méthode de prospection, 1969-72.
Le batholithe de Bourlamaque est composé d'un gabbro quartzique en partie altéré par des processus post-magmatiques.

Il contient, dans quelques endroits, des sulfures (Cu, Mo) disséminés. Il y a aussi plusieurs mines d'or dans les bordures du batholithe. Le but principal de ce projet sera d'etudier la pétrographie et la géochimie du batholithe, de préciser l'histoire de sa cristallisation magmatique et de son altération post-magmatique, de relier à cette histoire la formation des gisements d'or et des concentrations de Cu, Mo. On espère que ce travail pourra donner des indications pétrographiques, minéralogiques ou géochmimques utiles à la prospection de ces métaux. Le projet est divisé en deux parties: M. Campiglio étudie la géochimie des roches totales et la distribution des éléments choisis entre les silicates dans ces roches; M.Guha étudie la distribution et la composition des sulfures dans le batholithe.

850. Darling R., Gélinas, L., Hardy, R., Ecole Polytechnique:
La pétrologie et la géochimie des roches ultramafiques et des gisements de nickel associés de la région de Cape Smith, Québec, 1969-72; thèse de doctrat (Hardy).
L'étude de la pétrographie et de la distribution des éléments majeurs et oligo éléments choisis dans les roches ultramafiques et des gisements associés.

851. Eakins, P.R., McGill Univ.:
Olivine-bearing and other basalts in northwestern Quebec, 1970-72.
A detailed study of all aspects of pillowed formations on a regional basis in northwestern Quebec with the aim of determining whether or not there are satisfactory parameters for stratigraphic mapping of these units, and whether there is a genetic connection between the olivine-bearing basalts and intrusive peridotite bodies in the region.

852. Gélinas, L., Ecole Polytechnique:
Etude des caractères magmatiques des ceintures volcaniques des Cantons de l'Est., 1971-73.
Nous chercherons a définir le chimisme des métarhyolites qui possèdent des amas minéralisés stratiformes afin de les comparer aux métarhyolites stériles. Ces métarhyolites ont-elles un lien génétique avec les lavas méta-andésites et méta-basaltes associées? Quelles influences peuvent avoir les sédiments associés aux rhyolites sur la localisation des gîtes stratiformes?

853. Gittins, J., Univ. of Toronto:
Petrology of the Obedjiwan alkaline ring complex, Quebec, 1968-.
Chemical petrology and intensive geochronological study of a late Grenville ring complex.
Mineralogy and petrology of the Sheffield Lake alkaline complex, Kipawa River, Quebec, 1967-.

854. Goldie, R.J., McGill, Univ.:
A detailed petrologic and geochemical study of an 18-foot thick sill near Montreal, 1970-71; M.Sc. thesis.

855. Nixon, C., Univ. of Ottawa:
Chemical and textural variation in a diabase dike, Gatineau Park, Quebec, 1967-71; M.Sc. thesis.

856. Pouliot, G., Hocq, M., Ecole Polytechnique:

Pétrologie et tectonique des roches Grenville de la région de Pipmuacan (Est), 1968-72; thèse de doctorat (Hocq).

L'analyse pétrographique de quelque 600 lames minces est quasi complétée et l'analyse de quelque 190 olivines par diffraction-X a permis d'individualiser plusieurs bandes de troctolites. Quelque 100 plagioclases des séries rubanées anorthositiques ont permis de définir les variations dans ces assemblages. Nos travaux portent présentement sur le massif syenite-granite qui recoupe les séries anorthositiques. Les travaux minéralogiques (optique et diffraction-X), effectués jusqu'à présent sur ces granites suggèrent en zonation; cette zonation est déjà suggérée par les levés de terrains. Quelque 50 analyses chimiques totales réparties sur les roches du massif granitique, sur les pyroxènes des anorthosites et sur les amphibolites contenues dans les gneis de couverture permettront d'étudier les affinités pétrochimiques de ces différentes unités.

857. Pouliot, G., Woussen, G., Ecole Polytechnique:
Pétrologie et pétrochimie de l'intrusion de la Montagne de Brome, Québec, 1968-71; thèse de doctorat (Woussen).

L'accent du travail pétrographique a surtout été mis sur les gabbros où quatre unités pétrographiques ont été mises en évidence. Nous avons complété la préparation de 40 échantillons pour l'analyse chimique globale. De plus, les feldspaths plagioclases et alcalins ont été séparés sur 45 échantillons et l'analyse de ces minéraux par absorption atomique (Ca, Na, K, Ba, Sr, Rb) va bon train. Les travaux minéralogiques ont porté sur les feldspaths, les pyroxènes et les amphiboles.

858. Valiquette, G., Pouliot, G., Ecole Polytechnique:
Pétrologie des granites d'importance économique: Les granites à Molybdène, 1969-72.

Ce travail vise à appliquer les connaissances acquises ces dernières années sur les feldspaths et sur la paragenèse des roches granitiques à des problèmes de géologie économique. En vue d'établir le cadre pétrogénétique dans lequel les granites de l'épizone ont évolué et de les comparer aux granites de la mesozone des Cantons de l'Est, nous faisons sur chaque phase granitique l'analyse modale et chimique, nous séparons les minéraux des roches équigranulaires, les phénocristaux et la pâte des porphyres, nous déterminons la composition et l'état structural des feldspaths, la composition de la pâte, et enfin nous tentons de retracer la pétrogénèse des ensembles quartz-plagioclase-feldspath alcalin. Cette étude constitue une partie d'un projet d'ensemble qui comprend entre autres la distribution et la localisation des oligo-éléments dans les feldspaths et les porphyres par G. Pouliot.

859. Wakjira, A., Eakins, P.R., McGill Univ.:
Amphibolization of pillowed basalts of LaSarre and LaReine townships, Quebec, 1970-71; M.Sc. (Wakjira).

A detailed petrographical and chemical study of the changes undergone during amphibolization and deformation of pillowed basalts.

860. Wong, A.S., Univ. of Ottawa:
Mineralogy of marble, Gatineau Park, Quebec, 1969-71; M.Sc. thesis.

Dolomite-calcite-Ca, Mg silicate assemblages, their stability and environmental conditions in their development.

861. Wynne-Edwards, H.R., Bourne, J.H., Queen's Univ.:
Migmatites in the Gatineau valley, Quebec, along the infracrustal-supracrustal boundary, 1969-71; Ph.D. thesis (Bourne).

862. Wynne-Edwards, H.R., Kehlenbeck, M.M., Queen's Univ.:
Textures in the Pipmuacan anorthosite, Quebec-study of recrystallization and deformation, 1966-70; Ph. D. thesis (Kehlenbeck).
A study of the igneous and tectonic history of part of the Lac St. Jean anorthosite complex, to trace the sequence of post-crystalline deformation.

Saskatchewan

863. Laplante, B., Univ. of Saskatchewan:
Calc-silicate rocks near Wollaston Lake, Saskatchewan, 1970-72; M.A. thesis.

864. Sturman, B.D., Queen's Univ.:
Mineralogy and petrology of Hab mine, Saskatchewan, 1970-71; M.Sc. thesis.

General

865. Abbott, D., Research and Productivity Council, New Brunswick:
Petrology of an ilmenite-rich gabbro, 1970-71.

866. Ade-Hall, J.M., Ryall, P., Dalhousie Univ.:
Changes in the magnetic properties and opaque minerals of the basaltic lavas of the continents and oceans in response to widespread metamorphism in the zeolite facies, 1970-73; Ph.D. thesis (Ryall).
See Burial metamorphism and the magnetic properties of basalt lavas, (Abstract); Trans. Am. Geoph. Union, vol. 51, 1970.

867. Allen, C.R., Gittins, J., Univ. of Toronto:
Petrology of the ultramafic suite associated with carbonatite complexes, 1970-72; M.Sc. thesis (Allen).
Chemical, petrographic and hydrothermal study of pyroxenites, amphibolites and amphibole pyroxenites, associated with carbonatite intrusives, that are feldspathoidal normative but which do not have feldspathoids in the mode.

868. Caner, B., Victoria Magnetic Observatory, Dept. of Energy, Mines & Resources:
Petrological interpretation of electrical conductivity structure in western Canada, 1967-70.
See Electrical conductivity structure in western Canada and petrological interpretation; J. Geomag. Geoelectr. Japan, vol. 22, pp. 113-129, 1970.

869. Clarke, D.B., Dalhousie Univ.:
Petrology and geochemistry of the submarine basalts dredged from Davis Strait, 1970-71.
The terrestrail basalts from the margins of Baffin Bay belong to the initial phases of sea-floor spreading in that part of the world. The basalts from offshore may show a continuation of certain compositional trends observed in the terrestrial rocks. If so, they may be regarded as a younger phase of the onshore volcanics.

870. Douglas, J.A.V., Dence, M.R., Plant, A.G., Traill, R.J., Univ. of Ottawa and Geol. Surv. Canada:
Petrology and mineralogy of lunar samples, 1969-.
Investigation of Apollo 11 samples completed; Apollo 12 samples current; Apollo 14 samples proposal submitted. See Garnet: first occurrence in lunar samples; Science, July 1970.

871. Edgar, A.D., Sood, M.K., Piotrowski, J.M., Univ. of Western Ontario:
Melting relations in rocks of the Ilimaussaq Complex, Southwest Greenland, 1965-72.
See Melting relations of undersaturated alkaline rocks; Medd øm Gronland, Bd. 181, Nrs. 9 and 12, 1970.

872. Fawcett, J.J., Gasparrini, E., Rucklidge, J.C., Univ. of Toronto:
Chemical petrology of tertiary flood basalts from the Scoresby Sund area of East Greenland, 1965-71.

873. Ghent, E.D., Univ. of Calgary:
Petrological and geochemical studies in the Cordillera and electron microprobe study of minerals, 1967-73.
See Electron microprobe study of magnesium distribution in some Mississippian echinoderm limestones from Western Canada; Can. J. Earth Sci., vol. 7, pp. 1308-1316, 1970.

874. Jen, Lo-Sun, Univ. of Ottawa:
Spatial distribution of crystals and phase equilibria in charnockitic granulites from Adirondack, N.Y., 1969-72; Ph.D. thesis.

875. Lyttle, N., Clarke, D.B., Dalhousie Univ.:
Petrological and geochemical investigation of spilitic rocks from the Olympic Peninsula, Washington, 1970-71; M.Sc. thesis (Lyttle).
Part of a long-term project initiated at the University of Alberta (D.G.W. Smith) dealing with the mineralogy, petrology, geochemistry, isotope geochemistry and economic geology of spilitic lava.

876. Martingnole, J., Goulet, N., Schimann, K., Hébert, Y., Bouillon, J.J., Barondeau, B., Ministère des Richesses Naturelles du Quebec et Université de Montréal:
Recherches Pétrologiques et Structurales dans le Sud de la Province de Grenville, 1965-72.
Voir Tectonic setting and evolution of the Morin Anorthosite, Grenville Province, Québec; Bull. Géol. Soc. Finland, vol. 42, pp. 165-209, 1970.

877. McNutt, R.H., McMaster Univ.:
Petrology and Rb-Sr geochemistry of some volcanic rock suites, 1970-.

878. Mummery, R., McNutt, R.H., McMaster Univ.:
Development of corona-garnet amphibolites in high grade metamorphism, 1968-71; Ph.D. thesis (Mummery).

879. Naldrett, A.J., Univ. of Toronto:
Study of Archean ultramafic rocks, 1969-75.

880. 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).

881. Parker, L.M., Edgar, A.D., Univ. of Western Ontario:
Melting relations of alkaline lavas from Teneriffe Canary Islands, and Kola, U.S.S.R., 1968-71; M.Sc. thesis (Parker).

882. Pouliot, G., Coulomb, J.J., Ecole Polytechnique:
Minéralogie et paragenèse des feldspaths dans certains granites d'importance économique, 1968-71; thèse de maîtrise (Coulomb).
Nous avons pu amasser une importante collection de roches granitiques Tertiaires porteuses de minéralisation en molybdène. Ce projet principal comprend plusieurs sous-projets et porte sur une analyse minéralogique et pétrochimique détaillée, dans le but de déterminer les similarités et les différences entre ces différentes occurrences. Voir La cristallisation des porphyres de Big Ben, Montana, (Résumé); 38e Congrès de l'ACFAS, Supplément aux annales, vol. 37, p. 50, 1970.

883. Reinhardt, E.W., Skippen, G.B., Geol. Surv. Canada:
Petrochemical study of selected Grenville granulites, 1969-71.
A detailed assessment of conditions obtained during high-grade regional metamorphism of granulites from selected localities of the western Grenville province. See Petrochemical study of Grenville granulites. See Geol. Surv. Can., Paper 70-1B, 1970.

884. Shaw, E., (Miss), Queen's Univ.:
Leo Lake gabbro, 1964-71; M.Sc. thesis.

885. Skippen, G.B., Moore, R.M., Ewert, E.W., Carleton Univ.:
The metamorphism of siliceous carbonates, 1969-72; M.Sc. thesis (R.M.M., E.W.E.)
Involved is field studies of marbles in Eastern Ontario and Western Quebec combined with experimental studies of carbonate-silicate equilibria. Experimental studies are presently concentrated on the parageneses of phlogopite and potash feldspar in siliceous carbonates.

886. Skippen, G.B., Reinhardt, E.W., Carleton Univ.:
A study of the distribution of Fe^{+2} and Mg^{+2} between biotite and orthopyroxene, 1969-72.
Involved is a field study of granulites from the Grenville Province and a complimentory laboratory study with the object of improving the understanding of conditions obtained during high-grade, regional metamorphism of granulites.

See Petrochemical study of Grenville granulites; Geol. Surv. Canada, Paper 70-1, Pt. B, pp. 48-54, 1970.

887. Smith, D.G.W., Clarke, D.B., Morton, R.D., Fritz, P., Univ. of Alberta:
Petrological, mineralogical and geochemical investigations of rocks of the spilite-keratophyre suite, 1969-.

888. Truscott, M.G., Coleman, L.C., Univ. of Saskatchewan:
Geochemistry and petrology of tertiary igneous rocks of the Sweet Grass Hills, Montana; Ph.D. thesis (Truscott).
Investigations of the petrology and geochemistry of Tertiary alkaline volcanics and near surface intrusives in the area of East Butte in the Sweet Grass Hills, Montana are being carried out. Geological mapping and sampling was carried out during the summer of 1970 by Truscott.

889. Watkinson, D.H., Carleton Univ.:
Petrology and mineralization of alkalic rock complexes, 1967-72.
Experimental, and electron microprobe studies of metallic minerals and rock-forming minerals; field work on Northern Ontario occurrences of alkalic rocks. See Experimental studies bearing on the origin of the alkalic rock - carbonatite complex and niobium mineralization at Oka, Quebec; Can. Mineral., vol.10, pp. 350-361, 1970.

890. Winkler, H.G., Wynne-Edwards, H.R., Pirie, J., Queen's Univ.:
Anatexis in a grey gneiss, 1967-71; Ph.D. thesis (Pirie).
A detailed study of a single outcrop to determine the nature of the granitic (mobilisate) fraction in a quartzofeldspathic gneiss, using mineralogical and chemical analyses, electron probe studies, and experimental work.

891. Wolf, K.H., Laurentian Univ.:
Stratigraphy, sedimentation, petrology and diagenesis of the zeolitic volcanic lacustrine Pliocene Rome beds, Eastern Oregon, 1966-71.
See Textural and compositional transitional stages between various lithic grain types (with a comment on 'Interpreting Detrital Modes of Graywacke and Arkose'). J. of Sed. Petrology 1971.

QUATERNARY GEOLOGY AND GROUNDWATER

Alberta

892. Bayrock, L.A., Research Council of Alberta:
Surficial geology of the Edmonton area, N.T.S. Sheet 83H, Alberta, 1958-71.
Expected the map will be published by the end of 1971.
Surficial geology of northeastern Alberta, 1969-.
To map and sample the surficial deposits of approximately 20,000 square miles in northeastern Alberta, including the Athabasca-Peace Rivers delta.

893. Bayrock, L.A., Boydell, A.N., Research Council of Alberta and Univ. of Calgary:
Surficial geology of the Rocky Mountain House area, N.T.S. Sheet 83B, Alberta, 1969-.
The northeast quadrant of this area was mapped in 1969 by T. Reimchen; the remaining portions of the area were mapped by Bayrock and Boydell with helicopter support in the Foothills region.

894. Berg, T.E. (deceased), McPherson, R.A., Research Council of Alberta:
Surficial geology of the Medicine Hat area, N.T.S. Sheet 72L, Alberta, 1965-71.
Compilation of a map on a scale of 1:250,000 is underway.

895. Bik, M.J.J., Geol. Surv. Canada:
Geomorphology of Cypress Hills and adjoining parts of southern Alberta, 1965-71.
Reconstruction of meltwater channel terrace gradients indicates that crustal movements other than isostatic rebound occurred in southern Alberta since deglaciation. Comparison of the surface topography and structural data from oil and gas wells indicates that the broad topographical characteristics of the plains of southern Alberta appear to be related to deformations of Upper Cretaceous horizons.

896. Borneuf, D., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series (AHRMS), M=1:250,000; NTS 82P, Drumheller, 1966-70.
Alberta hydrogeological reconnaissance map series (AHRMS), M=1:250,000; NTS 83I, Tawatinaw, 1970-71.
Alberta hydrogeological reconnaissance map series (AHRMS), M=1:250,000; NTS 72E, Foremost, 1971-72.

897. Carlson, V.A., Research Council of Alberta:
Bedrock topography maps, M=1:250,000.
See Bedrock topography of the Oyen map-area, NTS 72M, Alberta; V.A. Carlson. Research Council of Alberta Map, 1970.

898. Currie, D.V., Research Council of Alberta:
An evaluation of the groundwater budget for the Tri-Creek watershed, Alberta, 1967-70.
The project was extended beyond the scope and term of the original thesis by drilling and pump testing of three selected sites in the Tri-Creek Basin during 1969. Preliminary indications are that bedrock units in the area of study have transmissibilities ranging from 100 to 3000 igpd/ft.
Alberta hydrogeological reconnaissance map series (AHRMS), M=1:250,000; NTS 73E, Vermilion, 1971-72.

899. Gabert, G.M., Research Council of Alberta:
Provincial observation-well network, 1956-.
Hydrogeology of Red Deer and vicinity, Alberta, 1965-70.

900. Gabert, G.M., Steinhauer, R.A., Stein, R., Research Council of Alberta:
Hydrogeological advisory service, 1956-.

901. Green, R., and others, Research Council of Alberta:
Environmental geology of the Foothills and contiguous areas.
To map and integrate those aspects of the bedrock and

surficial geology of selected portions of the Foothills relevant to land classification and utilization.

902. Kahil, A., Toth, J., Research Council of Alberta:
Investigation of the dewatering possibilities of the tar sand's overburden near Fort McMurray, Alberta, 1968-69.

903. LeBreton, E.G., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series (AHRMS), M=1:250,000; NTS 83A, Red Deer, 1966-70.

904. Leskiw, L., Toth, J., Research Council of Alberta:
Relations between types and genesis of soils and regional groundwater movement, Vegreville district, 1969-71.

905. McPherson, R.A., Research Council of Alberta:
Urban geology of the greater Edmonton area.
A project has been initiated to provide guidelines for the future development of the City of Edmonton which are based upon the natural resources and environmental characteristics of an area encompassing 36 townships, within which Edmonton is centrally located.
A series of maps will be prepared in which areas will be graded for specific land uses pertaining to waste disposal mineral exploitation, general construction, recreation, agriculture, and aesthetic purposes.

906. Ozoray, G.F., Research Council of Alberta :
Alberta hydrogeological reconnaissance map series (AHRMS), M=1:250,000; NTS 83G, Wabamun Lake, 1969-70.
Alberta hydrogeological reconnaissance map series (AHRMS), M=1:250,000;NTS821, Gleichen, 1970-71.
Alberta hydrogeological reconnaissance map series (AHRMS), M=1:250,000; NTS 73M and 74D, Winefred Lakes and Waterways, 1971-72.

907. Quist, L., Gabert, G.M., Research Council of Alberta:
Hydrogeological investigations at Red Deer, Alberta, 1968-69; M.Sc. thesis (Quist).

908. Rutter, N.W., Geol. Surv. Canada:
Quaternary geology of Peace River reservoir area, 1966-69.
See Summary of preliminary work on the Quaternary geology of the Lake Williston area, B.C.; Edmonton Geol. Soc., Guidebook, 1969.
Quaternary geology, Bow River Valley, Alberta, 1967-69.
See Successful application of borehole stratigraphic techniques in an area of Mountain glacial drift; Geol. Surv. Can., Paper 69-35, 1970.
Quaternary geology, Pine Pass-Jasper area, British Columbia and Alberta, 1969-73.
See Geol. Surv. Can., Paper 71-1, Pt. A., pp. 178-179, 1971.

909. Staff, Research Council of Alberta:
Alberta hydrogeological information map series, (AHIMS), M=1:50,000, 1968-.
A form of data storage. All available hydrogeological information is plotted on maps of 1:50,000 scale as observations.

The three major purposes of the system are as follows: 1) To establish a system of continuously updated and readily accessible storage of integrated hydrogeological information. 2) To summarize all available information in a directly usable manner for consulting purposes. 3) To collect and store hydrogeological information in preparation for the 1:250,000 scale Hydrogeological Reconnaissance Maps.

910. Stalker, A.M., Geol. Surv. Canada:
Quaternary of southern Alberta, 1965-.
Project comprises stratigraphic and chronologic studies of Quaternary deposits including vertebrate paleontology work by C.S. Churcher, Univ. of Toronto, archeology studies by members of Dept. of Archaeology, Univ. of Calgary, and geophysical studies by J.E. Wyder, G.S.C. See Deposits near Medicine Hat, Alberta; Geol. Surv. Can., Display chart, 1970. Geol. Surv. Can., Paper 71-1, Pt. A. pp. 180-181, 1971.

911. St-Onge, D.A., Geol. Surv. Canada:
Quaternary geology and geomorphology of Whitecourt area, Alberta, 1966-70.
Sequence of glacial lakes in north-central Alberta.
Quaternary geology and geomorphology of Tawatinaw area, Alberta, 1968-72.
Geological mapping of Quaternary deposits, Quaternary stratigraphy and bedrock topography. Rate of erosion in post-glacial time.

912. St-Onge, D.A., Lengellé, J., Geol. Surv. Canada:
Erosion studies in an area of intensive petroleum exploration and development (Swan Hills, Alberta), 1970-72; Ph.D. thesis (Lengellé).
Gully development related to deforestation, methods of control.

913. 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, 1964-70.
An evaluation of the groundwater budget and its significance within the hydrologic balance for the Streeter basin, 1964-70.
An evaluation of the groundwater budget of the Cache Percotte and Whiskeyjack basins near Hinton, Alberta, 1965-70.
An evaluation of the groundwater budget and its significance within the hydrologic balance for the Deer Creek basin, 1966-70.
Alberta hydrogeological reconnaissance map series (AHRMS), M=1:250,000; NTS 72L, Medicine Hat, 1970-71.

914. Tokarsky, O., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series (AHRMS), M=1:250,000; Grimshaw-Chinook Valley, NTS 84C/4 and 84C/5, 1965-70.
Alberta hydrogeological reconnaissance map series (AHRMS), M=1:250,000; NTS 84F, Bison Lake, 1967-70.
Alberta hydrogeological reconnaissance map series (AHRMS), M=1:250,000; NTS 84K; Mount Watt; 1967-70.

Alberta hydrogeological reconnaissance map series (AHRMS), M=1:250,000; NTS 83B, Rocky Mountain House, 1967-70.
Alberta hydrogeological reconnaissance map series (AHRMS), M=1:250,000; NTS 82H & G, Lethbridge, Fernie, 1970-71.
Alberta hydrogeological reconnaissance map series (AHRMS), M=1:250,000; NTS 83K & J, Iosegun Lake, Whitecourt, 1971-72. See Hydrogeology of the Grimshaw-Chinook valley map-areas, NTS 84C/4 and 84C/5, Alberta; Research Council of Alberta Map, 1970.

915. Toth, J., Stein, R., Research Council of Alberta:
Effect of municipal water withdrawal on the goundwater regime near Olds, Alberta, 1970-71.

916. Vanden Berg, A., Research Council of Alberta:
Chemistry and hydrology of groundwater in the vicinity of Waterton Dam, Alberta, 1970.

917. Westgate, J.A., Aario, R., Fritz, P., Matthews, J., Jr., Univ. of Alberta:
Stratigraphy and palaeoecology of Quaternary deposits along the Smoky River, Peace River area, Alberta.

918. Westgate, J., Dormear, J.F., Schweger, C., Univ. of Alberta:
Quaternary palaeosols in southeastern Alberta, 1970-72.

919. Westgate, J., Kerr, H.A., Univ. of Alberta:
Hydrogeology of the Edmonton area, Alberta, 1968-72; Ph.D. thesis (Kerr).

920. Westgate, J.A., Ramsden, J., Univ. of Alberta:
Quaternary geology of the Edmonton area, Alberta, 1965-.
Characterisation and delineation of glacial drift sheets in southern and central Alberta, 1966-.
Post-glacial alluvial stratigraphy of the North Saskatchewan River Valley, Alberta, 1970-74.

British Columbia

921. Clague, J., Univ. of British Columbia:
Surficial geology of the Rocky Mountain Trench, southeastern British Columbia, 1970-71; Ph.D. thesis.
Stratigraphy and geologic history of unconsolidated and semi-consolidated deposits from Miocene to Holocene in age. Provenance of Miocene strata and late Wisconsinan glacial deposits are emphasized.

922. Danner, W.R., Univ. of British Columbia:
Stratigraphy and sedimentary structures of Pleistocene sequences of Point Grey, British Columbia, and Point Roberts, Washington, 1969-71.

923. Halstead, E.C., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Hydrogeology of Fraser lowland, British Columbia, 1970-74.
To define the position and extent of aquifers and in particular the distribution of fluvial sands and gravels

sandwiched between marine clays deposited during the late stages of Fraser glaciation. The geological evidence is required to prove or disprove postulates regarding oscillatory behaviour of the land emergence following deglaciation in Fraser Valley, British Columbia.

924. 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 71-1, Pt. A. pp. 164-167, 1971.

925. Reimchen, T.H.F., Univ. of Western Ontario:
Quaternary geology of the Peace River area, British Columbia, 1970-73; Ph.D. thesis.
Differentiation of the Laurentide drift from the mountain drift, and deciphering of their stratigraphic interrelationship are the main tasks of this investigation.

926. Rutter, N.W., Geol. Surv. Canada:
Quaternary geology, Pine Pass-Jasper area, British Columbia and Alberta, 1969-73.
See Geol. Surv. Can., Paper 71-1, Pt. A, pp. 178-179, 1971.

Manitoba

927. Elson, J.A., McGill Univ.:
Problems of glacial Lake Agassiz, 1964-72.
Strandlines, end moraines, and outlets of Lake Agassiz are being mapped and the chronology of the lake worked out from these and other evidence. Present effort is concentrated on identifying beaches across gaps, and determining their temporal significance. See Pebble shape criteria and the chronology of Lake Agassiz beaches; Prog. Abstracts, Ann. Meeting, Geol. Assoc. Can., Winnipeg, pp. 20-21, 1970.

928. Fenton, M.M., Geol. Surv. Canada and Univ. Western Ontario:
Quaternary geology, Winnipeg (East half), 1970-72; Ph.D. thesis.
To map the surficial geology and determine the Quaternary stratigraphy of the area; a program of surface mapping combined with limited power augering (< 100 feet x 33 m) was conducted during the summer of 1970.
Quaternary geology of a portion of south-eastern Manitoba, 1970-73.

929. Klassen, R.W., Geol. Surv. Can.:
Quaternary geology and geomorphology of the Assiniboine River Valley its tributaries, Manitoba, 1966-71.
See Geol. Surv. Can., Paper 71-1, Pt. A, p. 170, 1971.
Bedrock topography and Quaternary stratigraphy, Virden, Manitoba, 1967-70.
Quaternary geology, Duck Mountain, Manitoba-Saskatchewan, 1968-71.

930. van Everdingen, R.O., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Discharge of saline subsurface water and surface-water quality in Manitoba, 1969-70.

See Surface water composition in southern Manitoba reflecting discharge of saline subsurface water and subsurface solution of evaporites; G.A.C. Symposium Geoscience in Manitoba, 1970.

931. Wyder, J.E., Geol. Surv. Canada:
Buried Missouri and Red River Valleys in Manitoba, 1969-71.
The project consists of using a combination of geophysical, geological, and drilling techniques to delineate and determine the drift stratigraphy of the buried Missouri and Red River valleys in southern Manitoba. See Bedrock topography and geology of southern Manitoba; Geol. Surv. Can., Map 25-1970, 1970.

New Brunswick

932. Brown, D.D., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Seawater intrusion at Shippegan, Taylor Island, New Brunswick, 1967-70; Ph.D. thesis.
An investigation of intrusion due to overpumping and of the effects of geology and production rates on the subsurface distribution of fresh, brackish and salt groundwaters.

933. Gadd, N.R., Geol. Surv. Canada:
Quaternary geology, southwest New Brunswick, 1967-70.
The study has provided 1/50,000 maps St. George (21 G/2) and St. Stephen (21 G/3) map-areas and field work has been completed for a 1/250,000 map of Fredericton (21 G, Canadian part). In addition to providing background information for groundwater investigations by the New Brunswick Dept. of Natural Resources, the project is a source of information for studies in glacial dispersion, availability of construction materials, and in the fields of agriculture and forestry.

Newfoundland and Labrador

934. Fulton, R.J., Hodgson, D., Minning, V. G., Geol. Surv. Canada:
Quaternary geology inventory, southern Labrador, 1969-72.
A helicopter supported, ARDA sparked, surficial geology mapping project aimed at covering Labrador south of 56° Lat. in three field seasons. See Geol. Surv. Can., Paper 71-1, Pt. A, pp. 160-161, 1971.

935. Grant, D.R., Geol. Surv. Canada:
Quaternary geology St. Anthony-Blanc Sablon, Newfoundland, 1969-70.
Although basically a survey of landforms and materials for resource development, the study produced evidence of several regionally significant Quaternary events and processes, notably that glaciers from Labrador impinged on Newfoundland leaving a till of marine derivation, and that, as in the Maritime Provinces, glaciers both retreated to and readvanced from upland areas. See Surficial deposits, geomorphic features, and late Quaternary history of the terminus of the Northern Peninsula of Newfoundland, and adjacent Quebec-Labrador; Maritime Sediments, vol. 5, No. 3, pp. 123-125, 1969.

Northwest Territories

936. Barnett, D.M., Geol. Surv. Canada:
Proglacial geomorphology, Generator Lake, Baffin Island, 1965-71; Ph.D. thesis (Univ. of Western Ontario).
Model study of the proglacial lacustrine environment relating modern glacio-fluvial processes to former glacial, lacustrine and related landforms and deposits associated with former and present levels of Generator Lake.

937. Blake, W., Jr., Geol. Surv. Canada:
Quaternary reconnaissance, southern Ellesmere Island and Devon Island, Northwest Territories, 1969-.
Reconnaissance of glacial geology and geomorphology with special emphasis on chronology of Pleistocene events and determination of regional pattern of postglacial uplift. See Geol. Surv. Can., Paper 71-1, Pt. A., pp. 157-158, 1971.
Pumice on raised beaches, eastern Arctic Canada, 1968-.
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 Arctic Canada and elsewhere around North Atlantic Ocean, See Studies of glacial history in Arctic Canada, I: Pumice, radiocarbon dates and differential postglacial uplift in the eastern Queen Elizabeth Islands; Can. J. Earth Sci., vol. 7, pp. 634-664, 1970.

938. Church, M., Univ. of British Columbia:
Baffin Island sandar - a study of Arctic fluvial environments, 1965-70; Ph.D. thesis.
Study of the environment of alluvial deposits in part of the Eastern Canadian Arctic including hydrology, hydraulics, sediment transport, sedimentation and morphology of the deposits.

939. Hodgson, D.A., Geol. Surv. Canada:
Submarine morphology off the northeast Baffin Island coast, 1967-70.
A project designed to extend knowledge or erosional and depositional landforms to areas below present sea level by continuous profiling with an echo sounder; in conjunction with Dr. O.H. Løken, Glaciology Subdivision, Inland Waters Branch.
Quaternary reconnaissance, northeastern Baffin Island, 1968-70.

940. Hughes, O.L., Geol. Surv. Canada:
Quaternary reconnaissance, Northwest District of Mackenzie, Stage II, 1969-71.
See Five surficial geologic maps (96 C.D.E. & 106 G.H.) have been placed on open file; 96 B has been completed and is ready for placement on open file.

941. Kuc, M., Geol. Surv. Canada:
Fossil mosses in the Arctic, 1969-.
Investigations of stratigraphy and paleobotanical characteristics of fossil floras (vascular plants, bryophytes, lichens, etc.) in interglacial and postglacial deposits, especially in the Canadian Arctic Archipelago. See Fossil mosses, Beaufort Formation (Tertiary), northwestern Banks Island, western Canadian Arctic; Can. J. Bot., vol. 49, 1971 (in press).

942. Rampton, V., Geol. Surv. Canada:
Quaternary geology, Beaufort-Mackenzie, Northwest Territories, 1969-72.
See Herschel Island-Aklavik, parts of 107 B, 117 A, 117 C, 117 D; Geol. Surv. Can., Open File report 21, 1970. Geol. Surv. Can., Paper 71-1, Pt. A, pp. 173-177, 1971.

943. Shilts, W.W., Geol. Surv. Canada:
Mineral indicator tracing, southern Keewatin, 1970-73.
See Geol. Surv. Can., Paper 71-1, Pt. A, pp. 191-192, 1971.

944. Westgate, J.A., Tang, P., Univ. of Alberta:
The glacial stratigraphy and boulder train (indicator fan) of the Pine Point area, Northwest Territories, 1970-74; Ph.D. thesis (Tang).

Nova Scotia and Prince Edward Island

945. Carr, P.A., van der Kamp, G., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Sea-water intrusion study in the Pennsylvanian and Permian rocks of New Brunswick and Prince Edward Island, 1967-71.
Sixteen days of water level records were collected from a tidal gauge and four wells situated in a line perpendicular to the shore at Borden, Prince Edward Island. These two sets of records are separated by harmonic analysis into the O_1, K_1 and M_2 tidal components. In a confined aquifer groundwater flow is linear, so each component represents a distinct test on the aquifer - each component is analyzed for hydraulic conductivity and specific storage by the tidal method.

946. Gale, J.E., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Hydrogeology of fractured media in the Halifax area, 1969-73; Ph.D. thesis (Colorado School of Mines).
A study of hydrology of fractured metamorphic and igneous rocks in the area of Halifax, Nova Scotia.

947. Grant, D.R., Geol. Surv. Canada:
Surficial geology, southern Cape Breton Island, Nova Scotia, 1970-72.
Although basically a survey of landforms and materials for resource development, the study produced evidence of several regionally significant Quaternary events, notably that during the last glacial maximum ice moved northward apparently formthe south on the continental shelf. Subsequently, ice flow was reversed by rising sea level. Earlier, ice had entered the region from the west. Laurentide glaciation remains unsubstantiated. See Geol. Surv. Can., Paper 71-1, Pt. A, pp. 161-164, 1971.

948. MacNeill, R.H., and students:
Pleistocene geology of Nova Scotia (mainland area), 1951-72.

Ontario

949. Berti, A.A., Univ. of Western Ontario:
Paleobotanic investigation of Mid-Wisconsin interstadial deposits in the Lake Erie and Ontario basins, 1966-70; Ph.D. thesis.
Palynologic and macrofossil studies have been done from the following sites: Port Talbot-Plum Point area, and Scarborough Bluffs in Ontario, Garfield Heights in Ohio, Titusville, Pennsylvania.

950. Bik, M.J.J., Geol. Surv. Canada:
Surficial deposits and geomorphology, Central Research Forest, Ontario, 1968-70.
Joint studies by the Geol. Surv. of Canada, Inland Waters Branch, and Forest Management Institute, Dept. of Fisheries and Forestry, of groundwater conductivity and flow patterns revealed that certain hazards to trees exist in the valley environments of the Central Research Forest; evidence of slow upward flow of rather saline groundwater was found. See Geol. Surv. Can., Paper 71-1, Pt. A, pp. 149-154, 1971.

951. Burwasser, G.J., Ontario Dept. of Mines and Northern Affairs:
Pleistocene geology and industrial mineral resources of the Sudbury area, Ontario, 1970-71.
Summary of Field Work, 1970.

952. Charron, J.E., Inland Waters Branch, Dept. of Energy, Mines & Resources:
A hydrogeological study of Prescott County, Ontario, 1969-70.
To determine the direction of groundwater flow in the interstream area of the Ottawa and St. Lawrence rivers.

953. Dreimanis, A., Geol. Surv. Canada and Univ. of Western Ontario:
Wisconsin stratigraphy, north shore of Lake Erie, 1969-72.
Type section established for the Plum Point Interstade, and Late-to Mid- Wisconsin sections measured along Lake Erie cliffs for 45 kilometres.

954. Farvolden, R.N., Farquhar, G.J., Hill, H.M., Univ. of Waterloo.
Sanitary landfill study , 1968-73.
Several old and new landfill sites in the Grand River Basin are being instrumented to determine the properties and distribution of materials and the envelope of contamination. The objective is to develop criteria for the location and design of sanitary landfills in the basin. See Phase I Report Sanitary landfill study; Industrial Res. Inst.,Univ. of Waterloo, 1970.

955. Farvolden, R.N., Novakovic, B., Univ. of Waterloo:
Scale of groundwater flow systems, 1969-72; M.Sc. thesis (Novakovic).
Data from drill holes is being used to analyse the groundwater flow system in the Otter Creek - Big Creek Basins in southwestern Ontario.

956. Feenstra, B.H., Univ. of Western Ontario:
Late Wisconsin stratigraphy between the Milverton and Elmira moraines, southwestern Ontario, 1967-71; M.Sc. thesis.
Pleistocene geology and industrial mineral resources of the

Niagara and Welland areas, southern Ontario, 1969-73.
To prepare surficial geology, bedrock topography - drift thickness and industrial mineral resource maps at a scale of 1:50,000.

957. Fitzpatrick, M., Ambrose, J.W., Watt, W.E., Queen's Univ.:
Groundwater investigations in Prince Edward County, Ontario, 1968-71.

958. Gale, J., Farvolden, R.N., Univ. of Western Ontario and Univ. of Waterloo:
Analysis of the bedrock topography of southwestern Ontario 1967-71; M.Sc. thesis (Gale).
Data from drill holes in Southwestern Ontario is being analysed to produce a series of trend surfaces for the bedrock topography. Residuals are also contoured.

959. Haefeli, C.J., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Groundwater flow into Lake Ontario, 1968-70.
Investigations are carried out simultaneously on three different levels: 1) groundwater inlet - surface flow and its relation to soil, overburden and bedrock; 2) groundwater bearing media - hydrogeological investigations in overburden and bedrock; and 3) groundwater outlet - temperature survey along the shore to verify major groundwater outlets. See Regional groundwater flow between Lake Simcoe and Lake Ontario; Inland Waters Branch, Dept. of Energy, Mines & Resources, Tech. Bull. No. 23, 1970.

960. Hancock, J.S., Univ. of Western Ontario:
Late Wisconsin deposits of the western part of London, Ontario, 1970-71.
Several tens of excavations and gravel pits examined, and 250 samples collected for laboratory analyses.

961. Harrison, J.E., Geol. Surv. Canada and Univ. of Calgary:
Quaternary geology of the North Bay - Mattawa region, Ontario, 1968-70.

962. Henderson, E.P., Geol. Surv. Canada:
Quaternary geology, Kingston (North half), Ontario, 1968-71.
Includes study of position of ice-dam shoreline of Lake Iroquois in eastern Ontario at the time of its maximum extent and the relationship of meltwater drainage to later lake levels in the Ontario basin. See Geol. Surv. Can., Paper 71-1, Pt. A, pp. 167-168, 1971.

963. Hore, R.C., Fleischer, F.C., Barouch, M., Logan, L.A., Benjelloun, R., Fligg, E.K., Jaffray, R.B., Ontario Water Resources Commission and Univ. of Guelph:
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.

964. Hore, R.C., Fleischer, F.C., Barouch, M., Logan, L.A., Jaffray, R.B., Ontario Water Resources Commission:

Bowanville, 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. Research into all aspects of water-balance studies under these conditions.

965. Hore, R.C., Fleischer, F.C., Barouch, M., Logan, L.A., Benjelloun, R., Fligg, E.K., Jaffray, R.B., Ontario Water Resources Commission:
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.

966. Hore, R.C., Fleischer, F.C., Barouch, M., Logan, L.A., Jaffray, R.B.:
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.

967. Hore, R.C., Fleischer, F.C., Barouch, M., Logan, L.A., Jaffray, R.B., Ontario Water Resources Commission:
Wilton Creek IHD representative basin study, 1965-74.
To study the hydrologic characteriestics in a river basin representative of limestone plain conditions in southern Ontario.

968. Hore, R.C., Ostry, R.C., Wilkins, R.G., Ontario Water Resources Commission:
International field year on the Great Lakes, 1968-72.
To study the movement of groundwater in representative areas of the Lake Ontario drainage basin in order to assess the total ground-water contributions to the lake.
Representative basins presently under study are the Wilmot Creek basin, Forty Mile Creek basin, Oakville Creek basin, Moira River basin, Duffin-Rouge River basin and Wilton Creek basin.
Ground-truth information on soil moistures, ground temperatures and ground and surface water temperatures to assess ground-water discharge is being collected in conjunction with infra-red photographic flights being undertaken by other agencies.

969. Karrow, P.F., Anderson, T.W., Univ. of Waterloo:
Palynological study of late and post-glacial vegetational changes in southwestern Ontario and their relation to ice retreat and Lake Algonquin, 1967-71.

970. Karrow, P.F., Clarke, A.H., Herrington, H.B., Delorme, L.D., Univ. of Waterloo:
Paleontology of sediments of glacial lakes Iroquois and Algonquin, 1957-72.

971. Karrow, P.F., White, O.L., Univ. of Waterloo:
Urban geology, Kitchener-Waterloo, Ontario, 1958-.
The Laurentian buried valley, 1960-71.

972. Lewis, C.F.M., Geol. Surv. Canada and Canada Centre for Inland Waters:
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. The relative tilting is upwards in the north at 2.7 mm/year (Manitoulin Island relative to the outlet St. Clair River). This estimate is based on study of sediments in small, recently-emerged lake basins along the northern shore of Lake Huron. Geomorphological study of the Nipissing shoreline on Manitoulin Island is underway to detect local anomalies in the regional uplift and to isolate the responsible factors. See Recent uplift of Manitoulin Island, Ontario; Can. J. Earth Sci., vol. 7, No. 2, 665-675, 1970. Geol. Surv. Canada, Paper 71-1, Pt. A, p. 172, 1971.

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 are closely integrated with related projects of the Limnogeology group of the Canada Centre for Inland Waters. Stratigraphic and qualitative surface sediment information are extracted from echograms and seismic profiling records. Core and surface samples are analysed for particle size distribution, mineralogical composition, water and organic contents. Radiocarbon palynological, and microfossil analyses of selected materials will be attempted with particular reference to lithologic and chronologic sediment zonation, inferences regarding sediment dispersal processes, and rates of sedimentation.

973. Lissey, A., Brock Univ.:
Hydrogeology of the Niagara Peninsula, Southern Ontario, 1970-.

974. McAndrews, J.H., Royal Ontario Museum:
Paleo-plant ecology of Ontario in postglacial time, 1969-73.
See Fossil pollen and our changing landscape and climate; Rotunda, vol. 3, pp. 30-37, 1969.

975. Mellary, A.A., Ontario Water Resources Commission:
Aquifer characteristics of an overburden, artesian aquifer in the Duffin Creek drainage basin, 1970-71.
The determination of the hydraulic characteristics of the sands and gravels in the lower part of the overburden with special regard to water quality.

976. Minning, G., Geol. Surv. Canada:
Quaternary geology, Arnprior, Ontario, 1969-71.
Designed to provide basic information on Quaternary geology of the Arnprior area as requested by the Ontario Dept. of Mines & Northern Affairs. See Geol. Surv. Can., Paper 71-1, Pt. A, 1971.

977. Mirynech, E., Brock Univ.:
Particle analysis of surficial deposits of Trenton-Campbellford-Belleville area, Ontario, 1960-.
Mineralogical and sedimentological analysis of the surficial deposits of the Belleville-Picton-Kingston-Tweed area, Ontario, 1962-.

978. Parsons, M.L., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Groundwater flow in the clay belt of Northern Ontario, 1966-70; Ph.D. thesis.
Natural groundwater flow in an eskerine sand-lacustrine clay-till complex was measured by piezometer installations and simulated by a numerical digital model. Subsurface temperatures were measured in the piezometers and temperature variations were related to differences in surface cover, thermal conductivity of strata and groundwater flow systems.

979. Pikula, R.J., Wang, K.T., Roy, A.C., Reid, M., Ontario Water Resources Commission:
Northern Ontario water resources survey, 1966-73.
A reconnaissance inventory of water resources in the four major basins draining to Hudson's Bay in terms of quantity, quality, and use.

980. Scott, W.F., Neilson, J.M., Queen's Univ.:
Groundwater contamination in the Sydenham area, Frontenac County, Ontario, 1969-71; M.Sc. thesis (Scott).

981. Sibul, U., Choo-Ying, A., Ontario Water Resources Commission:
Water resources survey of the upper Nottawasaga River basin, 1968-71.
Inventories of the water resources in the drainage basin in terms of quantity, quality, and use.
Water resources of survey of the Moira River basin, 1969-72.

982. Sibul, U., Choo-Ying, A., Goff, A., Ontario Water Resources Commission:
Water resources survey of the Duffin-Rouge Creek basins, 1970-73.

983. Skinner, R.G., Geol. Surv. Canada:
Glacial-interglacial stratigraphy, James Bay Lowland, Ontario, 1969-71; Ph.D. thesis (Univ. of Washington).
See Geol. Surv. Can., Paper 71-1, Pt. A, pp. 179-180, 1971.

984. Terasmae, J., Brock Univ.:
Postglacial history and paleoecology in the Algonquin Park area, Ontario, 1969-71.
To establish the postglacial sequence of environmental changes in the Park area using palynological and radiocarbon dating methods. These natural changes of the environment will be compared with changes caused by recent human activities. Dendrochronological methods will be used to study recent climatic changes during the last 200 or 300 years.

985. Vagners, U.J., Ontario Dept. of Mines & Northern Affairs:
Pleistocene geology of the Windsor-Essex area, Ontario, 1970-72.
See Pleistocene geology of Windsor-Essex area; Ontario Dept. Mines, Misc. Paper 43, 1970.

986. Yakutchik, T.J., Lammers, W., Ontario Water Resources Commission:
Water resources survey of the Big Creek drainage basin, Ontario, 1964-71.
An inventory of the water resources in the drainage basin in terms of quantity, quality, and use.

Quebec

987. Croteau, D., Ministère des Richesses naturelles du Québec:
Etude hydrogéologique de la région des lacs Aylmer et Saint-Francois, 1966-70.
On a continué la campagne de sondages de reconnaissance, implanté des puits d'essai et des piézomètres dans une vallée préglaciaire. On est à mettre au point un programme d'imagerie à l'infra-rouge pour essayer de déceler les zones d'écoulement souterrain dans le lac Aylmer.

988. Denis, R., Houde, M., Ministère des Richesses naturelles du Québec:
Geology of the unconsolidated deposits of the St. Gabriel De Brandon area, 1970.
A study of the glacial and fluvio-glacial geomorpholigical features of the area in addition to mapping and studying the unconsolidated deposits.

989. Dessureault, R., Ministère Des Richesses naturelles du Québec:
Forages de reconnaissance dans la région du lac Saint-Jean, 1969-72.
Comme le roc de cette région présente peu d'intérêt au point de vue potentialité aquifè, les recherches se sont concentrées sur l'étude des dépôts meubles du Pléistocène. A ce jour on a complété un levé de résistivité, 20,000 pieds de forage et 4 puits d'essai.
Surveillance de fluctuation des nappes aux Iles-de-la-Madeleine, 1970-73.
C'est un projet financé par l'administration ODEQ. Il a consisté à terminer l'inventaire des puits en 1970 et comprendra un levé de résistivité, une étude hydrochimique et la préparation éventuelle d'un modèle mathématique. Voir Hydrogéologie des eaux souterraines aux Iles-de-la-Madeleine; HG-2.

990. Eggboro, M., McGill Univ.:
Groundwater geochemistry of Montreal Island, 1971-; M.Sc. thesis.

991. Grenier, C., Ministère des Richesses naturelles du Québec:
Etude hydrogéologique de l'Ile d'Orléans, 1968-71.
L'Ile d'Orléans compte 6 municipalités aux prises avec un problème aigu d'alimentation en eau. On a effectué 1140 pieds de forage, 40 déterminations sismiques, un inventaire de puits et des analyses chimiques des eaux.
Hydrogéologie de la région métropolitaine de Québec, 1968-72.
Informatique ou mise en mémoire de l'information hydrogéologique, 1968-72.
A ce jour, 5000 dossiers sont entrés en mémoire et validés; 3000 autres le seront sous peu. Il est prévu de compléter tout le territoire du Québec d'ici 1972 et de pouvoir utiliser la banque de données hydrogéologiques (BDH) dès 1971.

992. La Salle, P., Ministère des Richesses naturelles du Québec:
Surficial geology of the Lake St. John area, Quebec, 1968-72.
Surficial geology of the Quebec City area, Quebec 1968-72.

993. Pearce, A.J., McGill Univ.:
Post-glacial denudation rates, Mont St. Hilaire, Quebec, 1969-70; M.Sc. thesis.

Rates of movement of colluvium by soil creep and slope wash, free face retreat of scarps, and fluvial denudation were determined for 2 locations each as average values for the last 12,000 years.

994. Personnel professionnel du service de l'Hydrogéologie, Ministère des Richesses naturelles du Québec:
Il s'agit de travaux de reconnaissance dans une quarantaine de municipalités aux prises avec un problème d'alimentation en eau. Il s'est fait des levés sismiques, des forages et des pompages. Voir Reconnaissance hydrogéologique à Rougemont, comté municipal de Rouville; HGP-2. Programme ARDA 765, municipalités rurales; HGP-3.

995. Prévôt, J.M., Ministère des Richesses naturelles du Québec:
Inventaire des eaux souterraines dans les comtés de Saint-Hyacinthe et de Rouville, projet ARDA 1053, 1967-70.
Voir Reconnaissance hydrogéologique à Rougemont, comté municipal de Rouville; HGP-2.
Etude de synthèse des Basses-Terres du Saint-Laurent, 1969-72.
Compilation des données existantes et tracé d'une carte topographique du bedrock pour la rive sud du Saint-Laurent. Il reste à compléter les informations pour la rive nord.

996. Rochette, F., Farvolden, R.N., Univ. of Waterloo and Ministère des Richesse naturelles du Québec, Univ. of Western Ontario:
The groundwater regime of a small mountain watershed is being analysed using hydrometeorlogical records, and data from drill holes.

997. Simard, G., Ministère des Richesses naturelles du Québec:
Etude hydrogéologique du bassin de la rivière Eaton, 1965-70.
Il s'agit d'étude dans le cadre de la décennie hydrologique internationale. On a terminé l'étude cette année en concentrant les travaux sur les sables et graviers profonds dans les vallées préglaciaires et les matériaux d'alluvion. En outre, on a continué à faire des relevés piézométriques. Voir Hydrogéologie du bassin de la rivière Eaton; HG-2.

998. Tremblay, G.E., Ministère des Richesses naturelles du Québec:
Quaternary Geology and Geomorphology of the area east of Lake St. Jean, Quebec, 1966-70.

Saskatchewan

999. Karrow, P.F., Geol. Surv. Canada:
Quaternary stratigraphy, south Saskatchewan Valley in south-west Saskatchewan, 1970-72.
See Geol. Surv. Can., Paper 71-1, Pt. A, p. 169, 1971.

1000. 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.

1001. Mott, R.J., Geol. Surv. Canada:
Palynological studies, central Saskatchewan, 1965-69.
See Geol. Surv. Can., Paper 71-1, Pt. A, pp. 182-183, 1971.

1002. van Everdingen, R.O., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Influence of surface water levels in Diefenbaker Lake, Saskatchewan, on piezometric levels in underlying Upper Cretaceous bedrock aquifers, 1962-71.

Yukon Territory

1003. Bouchard, M., Universite de Montreal:
Etude de phenomènes glaciaires et periglacioires a l'ile Herschel, territoires du Yukon, 1970-72; thèse de maîtrise.

1004. Hughes, O.L., Geol. Surv. Canada:
Surficial geology, Aishihik Lake and southwestern Yukon, 1965-70.
Quaternary stratigraphy of Old Crow Basin and Porcupine River Valley, Yukon Territory, 1968-70.
The palynology of samples from Old Crow Basin and Porcupine River Valley is currently being studied by S. Lichti-Federovich, Geol. Surv. Can. Ostracodes in samples from Porcupine River Valley are being studied by D. Delorme, Inland Waters Branch; L.V. Hills, University of Calgary, is studying spruce cones from sections within the study area.

1005. Rampton, V., Geol. Surv. Canada:
Quaternary geology, Snag-Kluane Lake, 1965-.
Investigation included vegetational and climatic history of area from pollen analysis. See Neoglacial fluctuations of the Natazhat and Klutlan Glaciers, Yukon Territory, Canada; Can. J. Earth Sci., vol. 7, No. 5, pp. 1236-1263, 1970.

General

1006. Bartlett, G.A., Queen's Univ.:
A history of the Gulf of St. Lawrence, 1968-.
Paleoclimatology and paleogeography of the Gulf of St. Lawrence and reconstruction of the history of the area during, and immediately after Wisconsin glaciation. Relating formative processes to post environments is an integral part of this investigation.

1007. Bird, J.B., McGill Univ.:
Late Quaternary events in northern Canada, 1966-.
See Final phase of the Pleistocene ice sheet north of Hudson Bay; Acta Geographica Lodziensia, No. 24, 1970, pp. 75-90.

1008. Carson, M.A., Chyurlia, J.P., McGill Univ.:
Mechanisms of storm runoff production, 1969-73; Ph.D. thesis (Chyurlia).

Study of sources of storm runoff: accelerated goundwater flux, accelerated soil moisture discharge, rainfall interception by expanding drainage net. Interrelations between channel water chemistry and runoff sources.

1009. Clarke, G.K.C., Crossley, D.J., Classen, D.F., Univ. of British Columbia:
Geophysical glaciology - Fox Glacier, 1968-; Ph. D. (Crossley) and M.Sc. thesis (Classen).
Thermal drillings and conductivity measurements were made in 1970. See The Fox Glacier project; Can. Geog. J., vol. 81, pp. 26-29, 1970.

1010. Craft, J.L., Univ. of Western Ontario:
Late-Wisconsin glaciation in the Adirondact Mountains, New York, 1965-71; Ph.D. thesis.
See Late Pleistocene local glaciation and glacial climate in the High Peaks Region, Adirondact Park, New York; AMQUA 1st meeting, p. 23, 1970 (Abstracts).

1011. David, P.P., Université de Montréal:
Study of dune occurrences in Canada, 1965-.

1012. Delorme, L.D., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Paleohydrogeology - The use of freshwater Ostracoda as a paleolimnological tool, 1967-.
Ostracodes have become an important tool in paleolimnology in delineating environments, changes in environment brought about by changes in climate, vegetation and groundwater movement. Accurate interpretations can now be made on chemical and physical characteristics of pre-existing lakes, ponds, and streams. See Ostracodes as Quaternary paleoecological indicators; Can. J. Earth Sci., vol. 6, No. 6, pp. 1471-1476, 1969.

1013. Dreimanis, A., Mörner, N.-A., Morgan, A., Univ. of Western Ontario:
Stratigraphy of the last ice age in the Eastern Great Lakes region, 1958-.
See Effect of groundwater level on stress history of the St. Clair clay till deposit; Discussion; Can. Geotechn. J., vol. 7, pp. 188-189, 1970. Stratigraphy and correlation of the late Quaternary, Discussion; AMQUA Abstracts, 1st meeting, p. 38, 1970. Wisconsin glaciation in the Huron, Erie and Ontario lobal areas; GSA Abstracts with Progr., vol. 2, No. 7, pp. 541-542, 1970. The Erie Insterstadial: type section, lake level, ice recession and correlations; ibid., p. 631, 1970.

1014. Dreimanis, A., Vagners, U.J., Stankowski, W., Univ. of Western Ontario:
Lithologic, granulometric and fabric investigations of tills, aimed at establishing general rules on their formation, 1962-; Ph.D. thesis (Vagners).
See Discussion of rock breakage as related to some engineering and geologic processes; Proc. 22nd Soil Mech. Conf., C.E. Res. Rept. No. 67, pp, 88-93, 1970. Criteria for distinction of till from other diamictions. Discussion; AMQUA Abstracts, 1st Meeting, p. 36-37, 1970.

1015. Flint, Jean-Jacques, Brock Univ.:
Fluvial systems in glaciated terrains, 1970-73.
A number of drainage basins in Canada and Alaska have been selected to determine the influence of glaciation and low topographic relief on the hydrologic and geomorphic properties of channel network. For each basin the flow characteristic, the sediment yield, and the hydraulic geometry will be calculated. Geomorphic parameters including stream gradient, topologic arrangement of the channel network, density of lakes and swamps will be obtained from field and map measurements. Relation between hydrologic, geomorphic, and climatic parameters for different physiographic regions will be quantitatively examined.

1016. Foscolos, A.E., Rutter, N.W., Geol. Surv. Canada:
Soils in glaciated and unglaciated terrains, 1969-72.
To classify polygenetic Quaternary soils; to develop a method for differentiating soils developed in situ from transported soils; to date the aeoliay and loess deposits which lie on buried soils; to study the direction of aeliay sand and loess transport.

1017. Fulton, R.J., Halstead, E.C., Geol. Surv. Canada and Inland Waters Branch:
Quaternary geology of the southern Canadian Cordillera - IGC field excursion A02, 1970-72.
Information is being compiled for a Quaternary IGC field excursion which will follow the Transcanada Highway from Victoria to Calgary.

1018. Gilliland, J.A., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Network design, 1967-70.
To establish design criteria for networks of groundwater observation wells measuring natural water levels and monitoring changes in groundwater storage, with particular reference to optimum well spacing; to establish design criteria for observation wells and monitoring instruments; to develop a recorder working on the variable time interval principle.
Interaction of groundwater and its environment, 1970-72.
To study the interaction of groundwater and its environment and its function as a transport agent with particular reference to: a) its action in dissolving, transporting and precipitating inorganic and organic solutes at relatively low temperatures and pressures (0 ~ 150°C, 1 - 5 bars); b) its interaction with ice (and frozen ground) both in permafrost regions and during seasonal freezeup; c) the action of aqueous and non-aqueous, fluids in the solution, deposition and transport of mineral species at high temperatures and pressures (T > 150°C, P > 5,000 bars).

1019. Green, R., Currie, D.V., Research Council of Albera:
Criteria for selection of sites for solid waste disposal, 1970.

1020. Grice, R.H., McGill Univ.:
Multiaquifer analysis for ground water system, 1967-

1021. Grice, R.H., Semec, B., McGill Univ.:
Controlled weathering of shale, 1967-71.
See The effect of temperature-humidity on the disintegration

of non-expandible shales; Bull. Assoc. Eng. Geol., vol. V, No. 2, pp. 69-77.

1022. Grove, G., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Aquifer analysis, 1970-71.
To develop GOWN-oritented computer programs for the effect of artificially induced aquifer stresses.

1023. Gwyn, H.J., Univ. of Western Ontario:
Investigation of heavy minerals in tills along the south edge of the Canadian Shield, 1969-71; Ph.D. thesis.
To establish a standard for deciphering the regional directions of movement of glacial flows and lobes moving into the area south of the Shield, between Lake Superior and Montreal. Preliminary statistical analyses of Central Clustering and R-Mode factor analysis indicate two major regional assemblages of tills (132 samples analysed).

1024. Heginbottom, J.A., Geol. Surv. Canada:
Erosion in a permafrost environment, 1969-.
A study towards developing an understanding of the nature, extent and rate of erosion in permafrost areas disturbed by man. See Geol. Surv. Can., Paper 71-1, Pt. A, pp. 185-186, 1971.

1025. Henderson, E.P., Prest, V.K., Lewis, C.F.M., Geol. Surv. Canada, and Canada Centre for Inland Waters:
Pleistocene geology of Lake Ontario basin, the lake basin in Ontario and New York, 1970-72.
To prepare a map, at a scale of 1:500,000, of the surficial unvonsolidated deposits within the Lake Ontario drainage basin (US and Canadian portions). The map will display both glacial and post-glacial deposits and provide a framework for regional, environmental studies. In particular, considerations of ground water movements should benefit.

1026. Herr. R.L., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Groundwater regime in the central research forest, 1969-71.
To determine the direction of groundwater movement, and the magnitude of the annual water-table fluctuation throughout the Central Research Forest of the Federal Forest Management Institute.

1027. James, N.P., McGill Univ.:
Diagenesis and paleoecology of the uplifted Pleistocene reef tracts, northern Barbados, West Indies, 1968-71; Ph.D. thesis.
The younger Pleistocene limestones of northern Barbados were deposited about 127,000 years B.P. ago and subsequently uplifted as a complete unit. The processes of diagenesis and the use of specific textures to characterize varied diagenetic environments are being investigated.

1028. Klassen, R.W., Wyder, J.E., Bannatyne, B.B., Geol. Surv. Canada and Manitoba Mines Br.:
Bedrock topography southern Manitoba, 1970.
See Bedrock topography and geology of southern Manitoba; Geol. Surv. Can., Paper 70-51, 1970.

1029. Lawson, D.W., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Principles of groundwater pollution, 1967-.
To develop a mathematical model of physicochemical transport in porous media which will be useful in solving subsurface water quality problems.

1030. Lennox, D.H., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Doublet well experiments, 1969-71.
Project cancelled. Data collected have been transferred to a related study by H. Lazreg on geophysical methods applied to the study of seawater intrusion.

1031. Lewis, C.F.M., Geol. Surv. Canada and Canada Centre for Inland Waters:
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 are closely integrated with related projects of the Limnogeology group of the Canada Centre for Inland Waters.
Stratigraphic and qualitative surface sediment information are extracted from echograms and seismic profiling records. Core and surface samples are analysed for particle size distribution, mineralogical composition, water and organic contents. Radiocarbon, palynological, and microfossil analyses of selected materials will be attempted with particular reference to lithologic and chronologic sediment zonation, inferences regarding sediment dispersal processes, and rates of sedimentation. See Geol. Surv. Can., Paper 71-1, Pt. A, pp. 170-172, 1971.

1032. MacLeod, N., McGill Univ.:
Geological aspects of deep well waste disposal, 1971-72; M.Sc. thesis.

1033. May, R.W., Univ. of Western Ontario:
Chemical investigation of tills of southern Ontario, 1968-71; Ph.D. thesis.
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. Cu, Zn, Cr, Ni, CaO, MgO were determined in 155 samples, and multivariate statistical techniques used to analyze the data. Results suggest two distinct groups: the Ontario-Erie, and the Huron-Georgian Bay lobe tills. See Cu, Zn, Cr, Ni geochemistry of glacial tills in southern Ontario, Canada; Abstracts with progr., Geol. Soc. Amer., vol. 2, No. 7, p. 618, 1970.

1034. Mott, R.J., Lichti-Federovich, S., Geol. Surv. Canada:
Quaternary palynology, 1969-.
See Palynological studies in the Ottawa area; Geol. Surv. Can., Paper 69-38, pp. 16, 1970. See The pollen stratigraphy of a dated section of late Pleistocene lake sediment from central Alberta; Can. J. Earth Sci., vol. 7, No. 3, pp. 938-945, 1970. Geol. Surv. Can., Paper 71-1, Pt. A, p. 183, 1971.

1035. Parker, M.L., Geol. Surv. Canada and Univ. of British Columbia:
Dendrochronological investigations, 1968-.
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 Dendrochronological techniques used by the Geological Survey of Canada; Univ. British Columbia, Faculty of Forestry, Bull. No. 7, pp. 55-66, 1970.

1036. Parry, J.T., McGill Univ.:
Terrain evaluation for mobility, 1965-72.
This project is concerned with the possibilities of evaluating by remote sensing photography and other means, the quarternary geology and thus the surface conditions of specified area in Canada and similar analogous area. The whole to be incorporated into a study for off-road mobility. See "Terrain analysis for mobility" pointed in land evaluation; McMillans Co., Melborne, 1969.

1037. Parsons, M.L., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Regional groundwater flow and subsurface temperatures in a Maritime Province coastal environment, 1969-72.
An investigation of hydrogeologic significance of fractured rock of Carboniferous age along the Northumberland Strait coastal area of New Brunswick and Prince Edward Island is nearing completion as the first step in this study. Also preliminary borehole temperature logging and piezometric studis have been in progress since 1969.

1038. Rutter, N.W., Geol. Surv. Canada:
Soils in glaciated and unglaciated terrain, 1969-71.
See Pleistocene paleosol investigations in parts of Western Canada ; symposium vol. Pedology and Quaternary Research, National Research Council - Univ. of Alberta, Edmonton, Alberta, pp. 83-102, 1970.

1039. Shiau, S.Y., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Flow pattern analysis, 1970-72.
To develop GOWN-oriented computer program for the automated analysis of groundwater flow patters to obtain: a) basin recharge-discharge profiles; b) natuarl basin yields; c) basin wide water balance based on (a) and (b).

1040. Tanguay, M.G., Bensoussan, M.A, Do Lam Sinh, M., Ecole Polytechnique:
Etude de la réflectance spectrale des matériaux terrestres; Optical processing of aerial photo patterns by coherent light, 1969-73.

1041. Terasmae, J., Brock Univ.:
Hydrological implications of long term weather forecasting, 1970-72.
Information obtained from a study of tree-ring records (dendrochronology and dendroclimatology) is correlated with available weather records and the climatic changes pattern so established is related to the changes in the hydrological regime which is pertinent to the study of soil erosion, weathering and sedimentation in lakes and rivers. The tree-ring record provides a year by year chronology for such studies. The pattern of past events provides the means for forecasting future changes in the

hydrological regime. See Review of tree-ring studies in Canada - climatic changes geological applications and future prospects; Univ. of British Columbia, Faculty of Forestry, Bull. No. 7, pp. 82-85, 1970.

1042. Toth, J., Research Council of Alberta:
Development of principles and methods for the hydrogeological evaluation of extensive area, 1966-.
See A conceptual model of the groundwater regime and the hydrogeological environment; J.Hydr., vol. 10, No. 2, pp. 164-176, 1970. Groundwater movement and its possible effect on soils; Proc. Symp. Pedology and Quaternary Res., pp. 200-202, 1969.
Relation between groundwater movement and hydrocarbon accumulation, 1968-70.
See Relation between electric analogue patterns of groundwater flow and accumulation of hydrocarbons; Can. J. Earth Sci., vol. 7, No. 3, pp. 988-1007, 1970.

1043. Vanden Berg, A., Research Council of Alberta:
Automation of pump test data analysis.
Derivation of an algorithm to obtain a least squares fit to set of drawdown measurements taken in an observation well, and calculation of the parameters T (transmissibility), S (storage coefficient), and r_1 (distance to the one and only impermeable boundary).
The algorithm has been tried out successfully, using the University of Alberta computing facilities.

1044. van der Kamp, G., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Aquifer response to tidal fluctuations in a coastal environment, 1968-71; Ph.D. thesis (Univ. of Amsterdam).
See Determining aquifer characteristics by the tidal method; Water Resources Research, vol. 5, No. 5, 1969.

1045. van Everdingen, R.O., Inland Waters Branch, Dept. of Energy, Mines & Resources:
Thermal and mineral springs in the Rocky Mountains, 1967-70.
Investigations at thermal and mineral springs in the Rocky Mountains in Alberta and British Columbia, between Jasper and the Crowsnest Pass; included were measurements of physical and chemical parameters, chemical analyses, and investigation of stratigraphic and structural setting. See The Paint Pots, Kootenay National Park, British Columbia; acid spring water with extreme heavy-metal content; Can. J. Earth Sci., vol. 7, pp. 831-852, 1970.

1046. Vonhof, J.A., Inland Waters Branch, Dept. of Energy, Mines & Resources:
The effect of brine ponds on the groundwater regime, 1967-72.
To determine the rate and extent of groundwater pollution in the vicinity of waste disposal basins; to evaluate the long-term effects of brine ponds on the surface water regime in the area; to determine if and when remedial measures must be taken to limit the spread of subsurface pollution; to recommend possible alternative solutions to the waste disposal problem around potash mines based on the outcome of the above study.
Jointed tills in western Canada, 1969-73.
To determine the significance of the joints on the rate

of movement of groundwater and pollutants.

1047. Warren, B., Ministère des Richesses naturelles du Québec:
Development of a method for prospection in eskers, 1968-71.

1048. Westgate, J.A., Matthews, J., Jr., Univ. of Alberta:
Palaeoenvironmental analysis of Quaternary deposits at Dearing, Northwest Alaska, 1966-71; Ph.D. thesis (Matthews).

1049. Westgate, J.A., Schweger, C., Univ. of Alberta:
Stratigraphy and palaeoecology of Late Pleistocene deposits in the Onion Portage area, Northwest Alaska, 1967-72; Ph.D. thesis (Schweger).

1050. Westgate, J.A., Tomlinson, M., Univ. of Alberta:
Quaternary tephrochronology of western Canada, 1966-; M.Sc., thesis (Tomlinson).
See Late Quaternary tephra layers in southwestern Canada; Proc. 2nd ann. palaeoenvironmental workshop Univ. of Calgary Archaeol. Assoc., The Students' Press, Calgary, pp. 13-34, 1970.

1051. Williams, J.D.H., Sly, P.G., Inland Waters Branch, Canada Centre for Inland Waters:
Seasonal variation incomposition of the sediment-water interface in Lake Erie, 1971-72.
To measure changes in the composition of the uppermost 10cm of the sediment in nine selected locations in Lake Erie throughout the year and to determine whether changes in sediment composition are related to composition of the overlying lake waters.

SEDIMENTOLOGY AND SEDIMENTARY PETROLOGY

Recent and Unconsolidated Sediments

1052. Bartlett, G.A., Queen's Univ.:
Ecostratigraphy and biostratigraphy of waters and sediments adjoining the Mid-Atlantic ridge, 1966-.
Microfaunal analyses, test microstructure, coiling directions and faunawatermass relationships are being investigated to interpret the paleoclimatology and paleooceanography of the North Atlantic.

1053. Bartlett, G.A., Greggs, R.G., Queen's Univ.:
Oceanic ridges and seamounts in the North Atlantic, 1966-.
Various aspects of deep sea oozes from ocean basins and ridges are being investigated. These studies have a direct bearing on sea-floor spreading rates, complex fracture systems and deep sea carbonate diagenesis. See The Mid-Atlantic ridge near 45°00 ' N, pt. 8, carbonate sediments on oceanic ridges and seamounts; Can. J. Earth Sci., vol, 7, No. 2, pp. 257-267, 1970. A reintergretation of stylolite solution surfaces; Can. J. Earth Sci., vol. 7, No. 2, pp. 274-279,1970.

1054. Bartlett, G.A.,Hanidan, A., Slessor, D.K., Queen's Univ.:
Ecology, paleoecology, biostratigraphy and reconstruction of post Wisconsin sediments of the Atlantic Provinces, 1962-; Ph.D. thesis (Hanidan, M.Sc. thesis).
An environmental analyses of shallow-water environments in the tropic, subtropic, temperate and boreal area. Information provides a comprehensive assessment of both lateral and temporal microfauna distributions. Factorvector and analysis of variance computor programs are an intergral part of this program.

1055. Bartlett, G.A., Robertson, J., Molinsky, L., Queen's Univ.:
A geologic history of the Mackenzie River Delta, 1970-.
Biostratiography, sedimentology and tectonic history of the MacKenzie Delta area. Reconstruction of the Continental Margins from Cretaceous to present.

1056. Bartlett, G.A., Smith, L., Queen's Univ.:
Biostratigraphy and tectonic history of Canadian Atlantic continental margins, 1966-.
A detailed interpretation of the biotas, environments of deposition and tetonic history of continental margins. See Cretaceous strata on the Scotian Shelf; Can. J. Earth Sci., vol.7, No. 1, pp. 26-39, 1970. Mesozoic and Cenozoic history of the Grand Banks of Newfoundland; Can. J. Earth Sci., vol. 8, No. 1, pp. 70-116, 1971.

1057. Bartlet, G.A., Smith, R., Pratley, J., Queen's Univ.:
Ecostratigraphy and biostratigraphy of the North Atlantic, South Atlantic, Antarctic, South Pacific, North Pacific and Arctic Oceans, 1968-.
The interrelationship of the biomasses and watermasses in the various oceans and Caribbean Sea. The utilization of this information as a climatic and paleoclimatic index for the Mesozic and Cenozoic Periods. Scanning electron microscopes, microprobe analyzers, and computors are essential in this study. Many samples were collected on the "Hudson 70" cruise.

1058. Bird, J.B., Wong, Poh Poh, McGill Univ.:
Coastal geomorphic processes in tropical environments, 1968-; Ph.D. thesis (Wong).
A long term study of cliff and beach changes in Barbados and elsewhere.

1059. Carson, M.A., Taylor, C.H., Grey, B.J., McGill Univ.:
Sediment discharge of the Eaton River Basin, Quebec, 1968-72; Ph.D. thesis (Taylor), M.Sc. thesis (Grey).
Initial study restricted to determination of suspended sediment discharge during spring runoff and measurement of contribution from different sources. Detailed study, involving over 1,500 samples, completed during spring 1969. Possible extension to include bed load movement.

1060. Coakley, J.P., Inland Waters Branch, Canada Centre for Inland Waters:
Nearshore sediment transport in the Great Lakes, 1968-.
Sediment physical parameters are employed to determine source areas and dispersal patterns of nearshore sediment. Assuming that these latter features are expressed in the physical parameters studied, inferences are then possible as to the long-term nature of the various dynamic systems in the lake

regime acting to displace sediment material in the areas studied. See Investigations of bank erosion and nearshore sedimentation in Lake Diefenbaker; CCIW Technical Rept. Series, 1969.

1061. Coakley, J.P., Jonys, C., Inland Waters Branch, Canada Centre for Inland Waters:
Erosion and nearshore sediment movements in the vicinity of Point Pelee, western Lake Erie, Ontario, 1970-72.
In addition to the basic research involved in studing the phenomena of shore erosion and sediment movement, the work proposed will cast light on the serious erosion problem facing sections of the said shoreline, especially in the vicinity of Point Pelee.

1062. Costello, W.R., Walker, R.G., McMaster Univ.:
Braided stream deposits in Pleistocene outwash, Southern Ontario, 1967-70; M.Sc. thesis (Costello).

1063. David, P.P., Université de Montréal:
Study of dune occurrences in Canada, 1965-.

1064. Dreimanis, A., Dalrymple, R.W., Univ. of Western Ontario:
Late Wisconsin varved sands in the Port Stanley area, Ontario, 1970-71.
Field studies revealed the paleocurrents and the direct relationship of the ice sheet and the varves. About 170 samples from 22 meg-varves, collected along Lake Erie cliffs, will be analysed in the laboratory.

1065. Eynon, G., Walker, R.G., McMaster Univ.:
Sedimentology of Pleistocene sand/conglomerate facies relationships, 1970-72; M.Sc. thesis (Eynon).

1066. Gray, C.B.J., Inland Waters Branch, Canada Centre for Inland Waters:
Seasonal changes in chlorophylls and chlorophyll degradation products at the sediment-water interface, 1970-73.
To measure the seasonal changes in chlorophylls and chlorophyll degradation products at the sediment-water interface at a location in the central basin of Lake Erie. Short cores to be taken by diver at regular intervals for one year.

1067. Gray, C.B.J., Kemp, A.L.W., Inland Waters Branch, Canada Centre for Inland Waters:
Distribution of chlorophylls in the surface sediments of the Great Lakes, 1969-73.
To measure chlorophylls and chlorophyll degradation products in the main basins of Lakes Erie, Ontario and Huron. To relate the degree of decomposition of the precursor material to lake morphology, sediment type, Eh, pH, geochemistry, and degree of eutrophication of the lake water. See A quantitative method for the determination of chlorin pigments in Great Lakes sediment; Proc. 13th Conf. Great Lakes Res., 1970.

1068. Gwyn, H.J., Univ. of Western Ontario:
Investigation of heavy minerals in tills along the south edge of the Canadian Shield, 1969-71; Ph.D. thesis.
To establish a standard for deciphering the regional directions of movement of glacial flows and lobes moving into the area south of the Shield, between Lake Superior and Montreal.

Preliminary statistical analyses of Central Clustering and R-Mode factor analysis indicate two major regional assemblages of tills (132 samples analysed).

1069. Hesse, R., McGill Univ.:
Heavy minerals from site 113, leg. XII, Deep Sea drilling project (Labrador Sea), 1970-71.
The work is planned as an initial investigation followed by a more extensive marine geological program in the Labrador Sea (cooperation is sought with Bedford Oceanographic Institution).

1070. Hesse, R., Rad, U., Fabricius, F., McGill Univ.:
Holocene sedimentation, in the Strait of Otranto between the Adriatic and Ionian Seas (Mediterranean), 1968-70.

1071. James, N.P., McGill Univ.:
Diagenesis and paleoecology of the uplifted pleistocene reef tracts, northern Barbados, West Indies, 1968-71; Ph.D. thesis.
The younger Pleistocene limestones of northern Barbados were deposited about 127,000 years B.P. ago and subsequently uplifted as a complete unit. The processes of diagenesis and the use of specific textures to characterize varied diagenetic environment are being investigated.

1072. Johnston, L., Queen's Univ.:
Geochemistry of Dead Mans Bay, 1970; M.Sc. thesis.
Studies of modern sediments and the lake water are being carried out. It is hoped that studies of older sediments in the same bay will indicate the kind and rate of geochemical change that has occurred due to the advent of man in the district.

1073. Kemp, A.L.W., Gray, C.B.J., Mudrochova, A., Inland Waters Branch, Canada Centre for Inland Waters:
The nature and diagenisis of organic matter in modern Great Lake sediments, 1967-75.
To determine the types of organic compounds present in the recent sediments of the Great Lakes, and to measure the rates of change of these compounds since post-glacial times. Quantitative and qualitative determinations of pigments, fatty acids, amino acids, amino sugars, carbohydrates, humic acids, and fulvic acids, including isolation of individual compounds. Determination of types of enzyme present in the sediment and enzyme activity relationships with micro-organisms. See Organic matter in the sediments of Lakes Ontario and Erie; Proc. 12th Conf. Great Lakes Res., pp. 237-249, 1969.
Seasonal changes in organic matter at the sediment-water interface in South Bay, Manitoulin Island, Ontario, 1969-72.
To measure changes in Eh, pH, organic matter, and chlorophylls at a deep mud station in South Bay, Manitoulin Island during winter, spring, summer, and fall. Samples collected with a Benthos triple corer and analysed in Burlington laboratories.
The areal and vertical distribution of recent sediments in Lake Erie and Lake Huron, 1969-73.
To determine the areal distribtuion and vertical distribution of recent sediments in Lakes Erie and Huron by seismic and echo sounding surveys on a 10km grid coupled with sampling with grab and core samples on a 10km grid. Samples collected in summer months and the sediment particle size and texture as related

to the lake morphology, Eh, pH, organic carbon, carbonate carbon, quartz, and mineralogical clay.

Diffusion of nitrogen and phosphorus compounds at the sediment-water interface under controlled aerobic and anaerobic conditions, 1971-73.

To measure the rate of diffusion of nitrogen and phosphorus compounds at the sediment-water interface under controlled aerobic and anaerobic conditions over the course of one year, on fresh sediment from South Bay, Manitoulin Island. Sediment collected in March 1971 through the ice and kept in core tubes. Tubes sealed and stored under oxygen or argon and sub-sampled for chemical analysis at regular intervals throughout the year.

1074. Kemp, A.L.W., Mudrochova, A., Inland Waters Branch, Canada Centre for Inland Waters:

Physical and chemical properties of lake sediment, fulvic and humic acids, 1968-75.

Develop methods to isolate and fractionate humic and fulvic acids from the lake sediments. Measure cation-exchange capacity, molecular weight and adsorption properties of isolated humic and fulvic acids in particular with relation to pollution of the environment (Hg^2, DDT, $PO_4\equiv$ etc.). To determine the chemical nature of the humic acid and fulvic acid fractions by organic degradation procedures, measurement of protein and polysaccharide hydrolysates, and indirect procedures such as U.V. and I.R. spectra.

The feasibility of using lake muds as high grade agricultural soils, 1969-72.

Mud collected from various lakes in Ontario and analysed for N, P, K, humus, C-E-C, N-availability, P-availability, clay content, and trace metals. Plants grown in the different muds and compared with a control agricultural soil and with the addition of various fertilizers. Physical properties of muds assessed. Estimates made of dredging costs and feasibility and large scale experiment carried out where several large loads of mud are placed on barren land. Measurement of uptake of toxic materials such as mercury, from the mud to the plants. The effect of the retention of nutrients tested by growing plants for two consecutive years.

Nitrogenous compounds in recent Great Lake sediments, 1969-73.

To measure nitrate, nitrite, amonia, organic nitrogen, amino acid nitrogen, amino sugar nitrogen, urea, fixed ammonium, and undefined organic nitrogen compounds at close intervals down cores from the Great Lakes. To estimate rates of diffusion of nitrogen compounds and decomposition products of organic matter in the sediment. Triple Benthos cores taken at selected sites from the basins of Lakes Erie, Ontario, and Huron.

1075. Kemp, A.L.W., Lewis, C.F.M., McAndrews, J.H., Inland Waters Branch, Canada Centre for Inland Waters:

Modern sedimentation rates in Lakes Ontario and Erie, 1970-73.

To estimate present day sedimentation rates in Lakes Ontario and Erie by two methods. 1) Analysis of echo sounding, seismic and piston core data of the two lakes to estimate post-glacial mud thickness. By measurement of bulk density and porosity of the sediment, together with sediment thickness to estimate sedimentation rates assuming constant sedimentation since post-glacial times. 2) To check on constancy of sedimentation and estimates in (1)

by measuring the Ambrosia horizon in the sediment (circa 150 years B.P.).

1076. Knight, J., Middleton, G.V., McMaster Univ.:
Intertidal sand and bodies, Minas Basin, Nova Scotia 1970-72; M.Sc. thesis (Knight).

1077. Kuo, H., Crocket, J., McMaster Univ.:
Pd, Ir and Au in deep sea sediments, 1968-70; Ph.D. thesis (Kuo).
As an extention of the manganese nodule work we are examining a variety of deep sea cores (calcareous, siliceous, red clay) for Pd, Ir and Au by neutron activation analysis. The object is to determine the fraction of terrestrial and extra-terrestrial noble metal in the deep sea environment. See Palladium, indium and gold in deep sea manganese nodules; Geochim. et Cosmochim. Acta, vol. 32, p. 1049, 1968.

1078. Lawson, D.E., Baechler, F.E., Univ. of Waterloo:
The significance of small-scale sedimentary structures in the fluvial environment, 1970-73; M.Sc. thesis (Baechler).
Recent fluvial sedimentation of the Grand River and its tributaries.

1079. 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. By documenting the sedimentation history of eskers, an attemp will be made to inter-relate morphology, sedimentary transport, and sediment types, and to contribute to an understanding of esker origin. See Geol. Surv. Can., Paper 71-1, Pt. A, pp. 190-191, 1971.

1080. Morris, D.W., Univ. of New Brunswick:
Sedimentology (Pleistocene geology, sediment transport and budge problems), 1962-71.

1081. Mountjoy, E.W., Clack, W.J., Pendlebury, G.B., McGill Univ.:
Carbonate sedimentation Carriacou, Grenadines, West Indies; 1966-71; Ph.D. thesis (Clack), M.Sc. 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.

1082. Mountjoy, E.W., 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.

1083. Nooten, G., Queen's Univ.:
Dispersal patterns of terrigenous sediment, east coast, Grenada, West Indies, 1970-71.

1084. Peach, P.A., Brock Univ.:
Trace element study of lake-bottom sediments, 1970-71.
The use of trace element assemblages to distinguish sediments derived from the Palaeozoic rocks from those derived directly from the Precambrain terrane.

1085. Rukavina, N.A., St. Jacques, D.A., Inland Waters Branch, Canada Centre for Inland Waters:
Nearshore sedimentologic studies, Canadian Great Lakes, 1967-.
This is a program of sedimentological studies in the nearshore zone (depth 0-20 m) of the Canadian Great Lakes to identify and classify the materials, morphology, and processes of the zone and to develop a comprehensive model of the mechanics of nearshore sedimentation and provide the information fundamental to any nearshore study concerned with problems of erosion, deposition, dumping, structures, dredging, reclamation, etc.
Progress to date includes coverage of the Lake Ontario shoreline from Niagara to Wellington and of Lake Erie shoreline from Fort Erie to Port Maitland. In 1971, the Lake Ontario survey will be extended to Kingston and the Lake Erie survey to Long Point. See Nearshore sediment survy of western Lake Ontario, methods and preliminary results; Proc. 12th Conf. Great Lakes Res., pp. 317-324, 1969.
Project MOSES (Monitor Sediment Surveys), western Lake Ontario, 1971-72.
MOSES is a one-year program of monitor surveys of bottom sediment properties in the nearshore zone of western Lake Ontario. The function of MOSES is to determine the seasonal variations and net annual change in the sediment distribution of a representative portion of the nearshore zone.
The study area is in the westernmost portion of Lake Ontario in the quadrilateral defined by Bronte-Burlington-Hamilton-Grimsby.

1086. Slatt, R.M., Memorial Univ. of Newfoundland:
Textual and mineralogical variations within a Newfoundland till, 1970-71.
An attempt to answer 1) what is the degree of textural and mineralogical homogeneity or heterogeneity within a till deposit derived solely from one type bedrock, 2) are common sedimentological parameters such as grain roundness, grain-size frequency distribution analysis, and quantitative mineralogical analysis useful indicators of distance of glacial sediment transport?

1087. Sly, P.G., Sandilands, R., Inland Waters Branch, Canada Centre for Inland Waters:
Lake bottom studies, 1968-73.
Sampling on grid patters, designed to indicate the variance of numerous bed material parameters. Equipment used includes: double grab samplers, gravity and piston corers, vibro and water-jet corers, side scan sonar, echo sounding, continuous seismic profiling, U.W.T.V., and U.W. photography. Fields of study relate to: sedimentology, mineralogy, organic and inorganic geochemistry, ecology, stratigraphy, and geophysics.
Study areas include Lake Ontario and Georgian Bay(Tobermory). See Underwater photography in the Great Lakes - a report; Proc. 13th Conf. Great Lakes Res., 1970; A vibro-corer and portable tripod-winch assembly for through-ice sampling; ibid., 1970.

1088. Smith, B., Queen's Univ.:
Mineralogy, size distribution and biologic origin of sediments in carbonate sand islands, Grenadines, West Indies, 1970-71.

1089. Smith, L., Queen's Univ.:
Interrelations of carbonate and terrigenous sediments, east coast of Grenada, West Indies, 1968-71.
Adjacent areas on the east coast of Grenada have completely different sedimentary environments. Grenville Harbour is enclosed by organic reefs and Conference Beach is of terrigenous sediment. The geologic aspects of this area, with reference to ancient island arcs, is being studied along with the size, mineralogy and depositional environments of the sediments.

1090. Sonnenfeld, P., Univ. of Windsor:
Recent dolomites, 1970-74.
Recent primary and penecontemporaneous secondary dolomites are being investigated with concurrent attempts to duplicate conditions experimentally in the laboratory.

1091. Szabo, N.L., Univ. of New Brunswick:
Surficial geology and dispersion of trace elements by glacial transportation, 1967-71; Ph.D. thesis.
Examination of the dispersion of trace elements in ground moraine from a known source at Mount Pleasant, New Brunswick.

1092. Thomas, R.L., Cronan, D.S., Inland Waters Branch, Canada Centre for Inland Waters:
Inorganic geochemistry of the Great Lake sediments, 1968-.
Analytical work comprises total major element analysis and selected minor element analysis using X.R.F., A.A.S., and standard wet chemical methods. Acoustic surveys of the lakes are run in association with geochemical sampling to prepare detailed regional sediment distribution plans. Sedimentological parameters are also investigated on samples collected during this program. See Ferro-manganese concretions in Lake Ontario; Can. J. Earth Sci., vol. 7, p. 1346, 1970.

1093. Thomas, R.L., Sly, P.G., Inland Waters Branch, Canada Centre for Inland Waters:
Suspended solids of the Great Lakes, 1970-.
Development is proceeding with methods for in situ determination of solids content in the water column. Trials are in progress on a pumping and continuous flow centrifuging system for recovery of suspended solids for analytical purposes. Analysis to determine grain size distribution and a major and selected minor element content will be carried out to observe seasonal variations and to calculate sediment budgets.

1094. Wiese, W., Univ. of British Columbia:
Sediment distribution and general geology of Fatty Basin, a restricted Marine basin in a glaciated area on the west coast of Vancouver Island, 1969-71; M.Sc. thesis.
Initiated by the Fisheries Research Board of Canada as part of detailed studies of a possible lobster habitat on the Pacific coast of Canada.

1095. Williams, J.D.H., Kemp, A.L.W., Inland Waters Branch, Canada Centre for Inland Waters:
Amount and forms of phosphorus and kinetics of phosphorus movement in sediments of Lakes Erie and Ontario, 1970-72.
In order to understand the behaviour of phosphate in sediments from Lakes Erie and Ontario and its possible influence on eutrophication in these lakes, total organic phosphate and the major forms of inorganic phosphate in the sediments will be determined using a variety of chemical and mineralogical techniques developed for this purpose in investigations of sediments from Wisconsin lakes. This information will be related to information on the uptake and release of phosphate as established by kinetic studies. Sediment samples from these lakes will be taken periodically by a variety of techniques including Shipek buckets and Benthos and Alpine gravity corers from the "CSS Limnos" or from launches stationed at the Canada Centre for Inland Waters.

1096. Williams, J.D.H., Thomas, R.L., Inland Waters Branch, Canada Centre for Inland Waters:
Amounts of heavy metals at the sediment-water interface in the Great Lakes, 1971-72.
The project will measure the total and extractable amounts of heavy metals such as Co, Ni, Cu, Zn, Pb, and Cd in surficial sediments from Lakes Ontario, Erie, and St. Clair, and comparisons will be made with samples from greater depths.
Role of the fine components of lake sediments in the retention of anions and heavy metal cations, 1971-72.
The role of the fine particles of lake sediments, particularly clay fraction, in the retention of various anions and heavy metal cations will be investigated. Emphasis will be place on establishing the mineralogical and chemical nature of the component most involved in the retention of phosphate, silicate, arsenate, and molybdate ions, and heavy metal cations including Cu, Co, Ni, Zn, Pb, Cd,etc.

Sedimentary Rocks

1097. Beales, F.W., Oldershaw, A.E., Univ. of Toronto:
Diagenesis of micritic limestones-a continuing study.
The scanning electron microscope is being used to probe problems that could not be resolved using transmitted light petrography.

1098. Bee, K., Usher, R.L., Queen's Univ.:
Detailed lithostratigraphic correlation of lowest Ordovican sediments, Kingston area, 1970-71.

1099. Bell, R.T., Brock Univ.:
Stratigraphy and sedimentology of early Proterozoic sedimentary rocks, with particular emphasis on the Hurwitz Group, 1969-73.
Field investigation completed (essentially), studies for 1971 and 1972 proposed for comparative stratigraphy of other Aphebian suites. See Preliminary notes on the Hurwitz Group, Padlei map-area, Northwest Territories; Paper 69-52, 1970, Geol. Surv. Canada.

1100. Campbell, F.H.A., Manitoba Dept. of Mines & Natural Resources:
Geology of Turnbull-Granville Lakes area; contact relationships between the Sickle and Wasekwan Groups; stratigraphy and sedimentation of the Rice Lake Group.
See Turnbull-Granville Lakes area; Manitoba Mines Branch, Geol. Paper 4/70, 1970.

1101. Carrigy, M.A., Research Council of Alberta:
Petrology of nonmarine Upper Cretaceous-Tertiary sandstones, 1961-.
See Proposed revision of the boundaries of the Paskapoo Formation in the Alberta Plains; Bull. Can. Petrol. Geol., vol. 18, No. 2, pp. 156-165, 1970.

1102. Caty, J.L., Hubert, C., Ministère des Richesses naturelles du Québec:
Stratigraphy and petrography of the sedimentary rocks of the Papaskwasati Basin and Otish Mountains, Quebec, 1970-72.
To study the origin of the sedimentary rocks; to establish correlations between the Papaskwasati Formation and the Mistassini and Otish Mountains Groups and to study the possibilities of uranium mineralization in the sandstones and conglomerates of these formations.

1103. Collins, J.A., Queen's Univ.:
Lithofacies and diagenesis of the upper St. George Formation (Lower Ordovician carbonates) near Daniel's Harbour, Newfoundland, 1969-71; M.Sc. thesis.
Comincie Ltd. currently holds a concession (mineral) covering some 470 square miles of platform carbonates. Proved reserves include 5½ million tons of 7 ½% zinc. The current study is designed to evaluate stratigraphic, sedimentological and diagenetic controls of this stratabound type mineralization.
Considerable (4 months) field work was done by the writer on the property near Daniel's Harbour, Newfoundland, and laboratory work continues at Queen's University.

1104. Corneil B., Univ. of Western Ontario:
Petrology and paleoecology of the upper Middle Ordovician in southern Ontario, 1970-72; Ph.D. thesis.

1105. Danner, W.R., Univ. of British Columbia:
Origin of primary cherts and jasper, 1968-.

1106. Davies, I.C., Walker, R.G., McMaster Univ.:
Resedimented geosynclinal conglomerates; transport and environment of deposition, Upper Cambrian of Gaspé, Québec, 1970-72; M.Sc. thesis (Davies).

1107. Dimroth, E., Chauvle, J.J., Ministere des Richesses naturelles du Quebec:
Textural facies analysis of cherty ironstones, 1970-71
Study of the sedimentary and diagenetic textures of the Sokoman ironstone in the Central Labrador Trough, with the purpose: a) To gain a better understanding of the process during precipitation, deposition and epigenesis of cherty ironstones and b) outline the paleography of the Sokoman Formation in the Central Labrador Trough.

1108. Donaldson, J.A., Macey, G., Carleton Univ.:
Comparative studies of Proterozoic sedimentary rocks of Canada, 1963-; M.Sc. thesis (Macey).
A comparative petrological study of redbed basins in the northwestern part of the Canadian Shield.

1109. Donaldson, J.A., Worth, J., Carleton Univ.:
Sedimentologic and stratigraphic study of the Coppermine River Group, Northwest Territories, 1969-73; Ph.D. thesis (Worth).
See Geol. Surv. Can., Paper 70-1, Pt. A., pp. 120-124, 1970.

1110 Giles, P., Univ. of Western Ontario:
Petrology of the Lower Ordovician carbonates, Ottawa-Cornwall area, 1968-71; Ph.D. thesis.
Detailed analysis of the sedimentary petrology and calcite/dolomite distribution to establish the stratigraphic variability and depositional history. Evaporties occur in the sequence.

1111. Gordon, A., Patel, I.M., Univ. of New Brunswick, Saint John:
Provenance of basal Cambrian and Carboniferous conglomerates of the Saint John, New Brunswick, 1969-72.
The basal conglomerates are of continental origin and were deposited in a number of basins whose average trend seems to have been northeast. Both of the polymict conglomerates appear to be derived from local source, remanence of these assumed source rocks are exposed as structurally bounded inliers.

1112. Havard, C.J., Geol. Surv. Canada:
Lithostratigraphic studies of Upper Cretaceous formations encountered in C.P.O.G. Strathmore well, 1970.
To provide a lithostratigraphic record of the formations encountered in the Strathmore well as a basis for future palynological, geochemical, micropaleontological and sedimentary petrological studies.

1113. Hesse R., McGill Univ.:
Pelagic and non-pelagic (turbidite) mudstones within flysch sections, 1968-71.
A study of detailed measured sections of the Cretaceous Bavarian Flysch to establish criteria for the distinction between the pelagic and the (turbidity) current transported portions of the mudstone interlayers of flysch sequences. Comparative studies have been carried out in the Archean flysch of the Yellowknife Group, Northwest Territories and the Ordovician flysch of the Cloridorme Formation, Gaspé Peninsula, Quebec.
Sedimentology of Ordovician flysch deposits, Cloridorme Formation Gaspé Peninsula, Quebec, 1970-72.
Bed-by-bed stratigraphy of selected members ($\beta 2,3$) of the Cloridorme Formation. Lateral lithologic variations along individual beds. Probably the γ-members of the formation will later be included in this investigation.
The Gault Formation of the Eastern Alpine Flysch zone and of the Falkois Tasma Nappes: Step by step transition from disal to proximal environments on a 300 km long basin

plain in the Penninic facies realm of the Alps 1964-60. Sedimentological contribution to lithology, paleogeography, and tectonics of Alpine Flysch sediments.

1114. Hofmann, H.J., Université de Montréal:
Phanerozoic organosedimentary structures and problematica, 1969-.

1115. Hoffman, P.F., Geol. Surv. Canada:
Startigraphy, sedimentology, paleocurrents, paleontology and structure of the Epworth Group (Aphebian), Coronation Gulf area, District of Mackenzie, N.W.T., 1969-.
See Stratigraphy and structure of the Epworth fold belt, District of Mackenzie; Geol. Surv. Can., Paper 71-1A, Pt. A, pp. 135-138, 1971.

1116. Hopkins, J.C., McGill Univ.:
Petrography, distribution and diagenesis of carbonate complex marginal slope carbonates and basinal sediments, Devonian, Miette and Ancient Wall carbonate complexes, Alberta, 1968-71; Ph.D. thesis.
Investigation is aimed at establishing the nature and distribution of the reef margin and basinal sediments as exposed in the Colin thrust sheet at the Ancient Wall complex and in the carbonates near the reef complex, particularly with respect to cementation and neomorphism is emphasized. Also included are dolomitization and silicification and vertical and lateral mineralogical variations in the off-reef shales.

1117. Hughes, Marie, Univ. of Western Ontario:
Petrology of the Gasport formation of the Amabel (Middle Silurian), Queenston, Ontario, 1969-71; M.Sc. thesis.
Variations in calcite/dolomite, iron, permeability and other parameters are being determined.

1118. Kent, D.M., Saskatchewan Dept. of Mineral Resources:
Stratigraphic and sedimentologic analysis of Mississippian rocks in southwestern Saskatchewan, 1969-71.

1119. Kliske, A.E., Chevron Standard Ltd., Calgary:
Reef biostratigraphy and petrography - Devonian, 1969-.

1120. Lajoie, J., Université de Montréal:
Diagensis of some flysch sandstone deposits, St. Fabien, Quebec, 1969-71.

1121. Lajoie, J., Chagnon, A., Université de Montréal:
Clay mineralogy and sedimentology of the red beds in the flysch facies of St. Fabien - Trois Pistoles, Québec, 1969-71.
See Deep - Sea sediments in the Lower Paleozoic Quebec Supergroup; Geol. Assoc. Can., Sp. Paper 7, pp. 103-125,1970.

1122. Lajoie, J., Rocheleau, M., Université de Montréal:
Internal geometry and sedimentology of the lithic conglomerates of L'Islet, Quebec, 1970-72.

1123. Lerbekmo, J.F., Day, M., Univ. of Alberta:
Petrology of the Notikewin Member, Spirit River Formation, Alberta,

1969-71; M.Sc. thesis (Day).

1124. Lerbekmo, J.F., Rahmani, R., Univ. of Alberta:
Correlation, source and conditions of deposition of Upper Cretaceous - Paleocene sediments in Alberta, 1960-; Ph. D. thesis (Rahmani).

1125. Lerbekmo, J.F., Smith, D.G.W., Univ. of Alberta:
Correlation, composition and sedimentation of the White River ash, Yukon Territory, 1963-71.
See Distribution, composition, and source of the White River ash, Yukon Territory; Can. J. Earth Sci., vol. 6, No. 1, pp. 109-116, 1969.

1126. Long, G.F., Young, G.M., Univ. of Western Ontario:
Stratigraphy and sedimentology of the Chibougamau Group, northern Quebec, 1968-70; M.Sc. thesis (Long).
To discover the mode of deposition (glacial, mudflow, fluvial?).

1127. MacKenzie, W.S., Geol. Surv. Canada:
Allochthonous reef debris - limestone turbidites, Powell Creek, Northwest Territories, 1970.
See Devonian stratigraphy, District of Mackenzie; in Geol. Surv. Can., Paper 70-1, Pt. A, p. 224, 1970.

1128. Macqueen, R.W., Bamber, E.W., and others, Geol. Surv. Canada:
Mississippian stratigraphy, sedimentology, and correlation, Rocky Mountains and Foothills, 1965-.
A continuing study of the stratigraphy, sedimentology, and correlation of Mississippian strata from the Crowsnest Pass area of southern Alberta to the Jasper area of west central Alberta. See Stratigraphy, age, and interregional correlation of the Exshaw Formation, Alberta Rocky Mountains; Bull. Can. Petrol. Geol., vol. 18, No. 1, pp. 32-66, 1970. Electron microprobe study of magnesium distribution in some Mississippian echinoderm limestones from Western Canada; Can. J. Earth Sci., vol. 7, No. 5, pp. 1308-1316, 1970.

1129. Macqueen, R.W., Price, L.L., Geol. Surv. Canada:
Carbonate-evaporite cycles in the Souris River Formation, Saskatchewan, 1967-70.
To compare the Devonian carbonate-evaporite cycles with modern supratidal carbonate-evaporite cycles from the Persian Gulf and Caribbean area. Data has been obtained from cores, and from observations made on anhydrite-dolomite relationships as seen on the walls of a potash mine shaft.

1130. Mamet, B.L., Université de Montréal:
Zonation et microfacies du Carbonifère Inférieur, 1960-.
Voir Carbonate microfacies of the Windsor Group (Carboniferous), Nova Scotia and New Brunswick; Geol. Surv. Canada, Paper 70-21, 1970.

1131. Morrison, G., Usher, J.L., Queen's Univ.:
Detailed lithostratigraphic correlation based on well data, Kingston, Area, Ontario, 1970-71.

1132. Mountjoy, E.W., McGill Univ.:
Upper Devonian Miette and Ancient Wall reef complexes, 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 C.W. Stearn's paleoecology studies on stromatoporoids of the Ancient Wall complex and two graduate students - P. Strivastava who is investigation one coarse debris bed in detail at Ancient Wall and J. Hopkins who is studying sedimentation immediately adjacent to reef margins in both complexes. See Upper Devonian (Frasnian) alge and Foraminifera from the Ancient Wall carbonate complex, Jasper National Park, Alberta, Canada; Can. J. Earth Sci., vol. 7, No. 3, pp. 946-981, 1970.

1133. Munro, I., Lynch, H.G., Univ. of Waterloo:
Ordovician conodonts and paleoenvironment of the Arctic Ordovician fauna, Lake Timiskaming, Ontario, 1970-71; M.Sc. thesis.

1134. Oldershaw, A.E., Univ. of Toronto:
Carbonate cementation fabrics, 1967-.
See The significance at ferroan and non-ferroan calcite cements; Spec. Pub. No. 3, Bermuda Biological Station for Research, 1970.
Origin and diagenesis of bedded cherts, 1967-.
Scanning electron microscopy - diagenesis of carbonate sediments. and sedimentary rocks, 1969-72.
A detailed investigation of the spatial and temporal relationship of microtextures to porosity development, recrystallisation and replacement processes in predominantly carbonate rocks.

1135. Oles, K.F., Oregon State Univ.:
Paleocurrent and paleoslope analyses and the lithostratigraphy of the upper part of the late Cretaceous Nanaimo Group, Northern Gulf Islands, British Columbian, 1970-.
To develop a valid and coherent picture of provenance area, transport media, and depositional environments for the multifacied rocks forming the upper part of this late Cretaceous group through detailed stratigraphic studies extending from Gulf Islands to Vancouver Island.

1136. Oles, K.F., Packard, J. A., Oregon State Univ.:
Paleoenvironments of the Cretaceous rocks, Gabriola Island, British Columbia, 1971-; M.Sc. thesis (Packard).
To produce a detailed map of the structure and stratigraphy of Gabriola Island, and analyze and interpret sedimentary structures of the late Cretaceous rock units with respect to paleocurrents, transport agents, and depositional paleoenvironments.

1137. Ollerenshaw, N.C., Geol. Surv. Canada:
Cretaceous and Tertiary conglomerates and sandstones of the eastern Cordillera, 1969-72.
A study of the fabric, lithology and petrology of the coarse clastic facies of the Cretaceous-Tertiary interval in terms of its distribution, source and tectonic environment.

1138. Parviainen, E.A.U., Univ. of Western Ontario:
Regional stratigraphical and sedimentological investigation of Ramsay Lake and Bruce Formation (Huronian) of the north shore of Lake Huron, Ontario, 1967-70; Ph.D. thesis (Parviainen).
Detailed investigation of two polymicrite paraconglomerates and associated sedimentary rocks in an attempt to discover the significance of glacial deposition in the Huronian succession.

1139. Paterson, D.F., Dept. of Mineral Resources, Saskatchewan:
The Winnipeg Formation (Ordovician) of Saskatchewan, 1969-70.

1140. Pounder, D.A., Chevron Standard Ltd., Calgary:
Sedimentology, diagenesis and stratigraphy of carbonate rocks, 1959-.

1141. Schenk, P.E., Aoyagi, K., MacKenzie, C., Dalhousie Univ.:
Cyclic sedimentology and paleogeography of the Windsorian Stage (Middle Carboniferous), Nova Scotia, 1963-.
Carbonate-sulphate depositional and diagenetic environments are compared with field observations made in the Persian Gulf, Morocco, and Western Australia.

1142. Schenk, P.E., Jensen, L., Dalhousie Univ.:
Depositional environment of the Lower Devonian Torbrook Formation, northern Nova Scotia, 1970-72; M.Sc. thesis (Jensen).
Very detailed description of sedimentary textures, structures, and composition, and fauna to reveal changing environments from deep to shallow water immediately preceding the Acadian orogeny and the collision of the North American and African continents.

1143. Schenk, P.E., Rogers, D., Dalhousie Univ.:
Depositional environment and chert formation in the lacustrine Scots Bay Formation, Triassic, Nova Scotia, 1970-72; M. Sc. thesis (Rogers).
Stratigraphy and sedimentology of a Triassic lake and the diagenetic formation of chert nodules.

1144. Schenk, P.E., Smith, D., Rogers, D., MacKenzie, C., Harris, I., Dalhousie Univ.:
Sedimentology of the Meguma Group (Early Paleozoic), Novia Scotia, 1966-; M.Sc. thesis (D.S., D.R., C.H.) and Ph. D. thesis (Harris).
1) Continental rise off Nova Scotia, sediments and geophysics, with C. Keen, Inst. of Oceanography, spring, 1971; 2) Aberystwyth Grit of the Welsh basin - variation of detailed sections, with G. Kelling, Univ. of Swansea, 1969; and 3) Anti-Atlas Mountains of Morocco, dispersal and lateral variation of the interpreted "Meguma contintal shelf", with Smith, Rogers, and MacKenzie, summer, 1971. See Regional variation of the flysch-like Meguma Group (Lower Paleozoic) of Nova Scotia compared to recent sedimentation off the Scotian Shelf; Geol. Assoc. Can., Spec. Paper 7, pp. 127-153, 1970.

1145. Simpson, F., Saskatchewan Dept. of Mineral Resources:
Lower Colorado Group (Cretaceous), west-central Saskatchewan, 1969-71.
Sedimentology, palaeoecology and economic geology of

Lower Colorado Group.

1146. Smith, T.E., Univ. of Windsor:
An investigation of secondary dolomites and sedimentary Pb/Zn sulphide ore bodies in the Bruce Peninsula, 1970-.
A field and laboratory investigation designed to indicate the role played by bacteria and algae in the production of dolomites and Pb/Zn sulphides. Experiments are being designed to use algae and bacteria collected at sites of recent dolomitisation (e.g. Bonaire, Florida, and the Bahamas) to convert calcite into dolomite at low temperatures and pressures.

1147. Sonnenfeld, P., Univ. of Windsor:
Dolomites of Bruce Peninsula, Ontario, 1970-74.
Mode of secondary dolomitization and associate metallization of exposed carbonates in Bruce Peninsula.

1148. Steiner, J., Univ. of Alberta:
Environmental analysis of the Precambrian Wynd Formation near Jasper, Alberta, 1969-71.
Analysis will be based on detailed sedimentological and stratigraphic criteria. In addition estimates on paleosalinity on the basis of boron determinations will be made. Rubidium-Strontium age determination will also be done.
Environmental analysis of the Jurassic to Lower Cretaceous Minnes Group of central and northern Alberta, 1970-73.
Analysis will be based on detailed sedimentological, stratigraphic and geochemical (boron) criteria. Age determination of potassium-argon and Rubidium-Strontium will be made to determine the age of provenance, deformation and possibly diagenesis and sedimentation.

1149. Trettin, H.P., Geol. Surv. Canada:
Stratigraphy and sedimentology of clastic formation in the Arctic Islands.
See Stratigraphy and sedimentology of lower Paleozoic clastic units, Tanquary and Canon fiord regions, Ellsemere Island; Geol. Surv. Can., Paper 71-1, Pt. A, pp. 236-241, 1971.

1150. van de Poll, H.W., New Brunswick Dept. of Natural Resources:
Carboniferous stratigraphy, sedimentology and structure in New Brunswick, 1965-.
This study stresses the interrelationship between lateral and vertical lithological variations and patterns of sedimentation within the sedimentary fill of the (Carboniferous) Basin on one hand and the evolution of basin morphology, geometry, and tectonics on the other. It provides environmental parameters for an overall evaluation of the economic potential of the Carboniferous succession with respect to base-metals, energy resources and industrial minerals.

1151. Walker, R.G., Pettijohn, F.J., McMaster Univ. and John Hopkins Univ.:
Sedimentology of Archaean sedimentary-volcanic beds-The Minnitaki bed, northwestern Ontario, 1969-.
See Archaean turbidite basin, northwestern Ontario; Bull. Am. Assoc. Petrol. Geol., vol. 54, p. 874, 1970.

1152. Watson, R.I., Univ. of Toronto:
Micro-topography of sand grains as environmental indices, 1968-71; M.Sc. thesis.
Use of Scanning Electron Microscope to detect specific micro-topographic features.

1153. Williams, B.P., Peter, B., Univ. of Bristol:
Sedimentology of certain ancient fluvial deposits in eastern Canada, 1965-.
Studies of the sedimentology and palaeoecology of the Escuminac Formation were begun with D.L. Dineley in 1965 and will be completed shortly. Other Devonian continental deposits (Malbaie, etc.) have been briefly examined and will be further studied in the next few years.

1154. Wolf, K.H., Laurentian Univ.:
Stratigraphy, sedimentation, petrology and diagenesis of the zeolitic volcanic lacustrine Pliocene Rome beds, Eastern Oregon, 1966-71.
See Textural and compositional transitional stages between various lithic grain types (with a comment on 'Interpreting Detrital Modes of Graywacke and Arkose') J. Sed. Petrology, 1971.
2) Comparative sedimentological and petrologic study of uranium and other metal-bearing Precambrian sediments in Ontario, 1970-74.
Comparative sedimentological and petrologic study of uranium and other metal-bearing Precambrian sediments in Ontario, 1971-.

1155. Yorath, C.J., Havard, C.J., Geol. Surv. Canada:
Mesozoic and Tertiary stratigraphy and sedimentation, Beaufort-Mackenzie area, 1970-.

1156. Young, G.M., Univ. of Western Ontario:
Stratigraphy, sedimentology, petrochemistry and paleoclimatology of early Proterozoic rocks, 1964-.
Documentation of stratigraphic and sedimentological relationships in Early Proterozoic rocks in order to establish regional paleogeography and paleoclimatology of these times.
See An extensive early Proterozoic glaciation in North America?; Palaeogeography, Palaeoclimatology, Palaeoecology, vol. 7, pp. 85-101, 1970.

1157. Young, H., Brandon Univ.:
Sedimentology of the Virden member, Lodgepole Formation, Manitoba, 1967-; Ph.D. thesis (Queen's Univ.).

General

1158. Bhattacharjee, S.B., Walker, R.G., McMaster Univ.:
Ripple-drift cross-lamination in turbidites, Cloridorme Formation, Gaspé, Québec, 1968-70; M.Sc. thesis (Bhattacharjee).
See Geometrical analysis of ripple-drift cross-lamination; Can. J. Earth Sci., vol. 6, pp. 383-391, 1969.

1159. Middleton, G.V., McMaster Univ.:
Experimental study of bed thickness in turbidites, 1968-71.
See Bed thickness in experimental turbidites (abstract); Bull. Amer. Assoc. Petrol. Geol., vol. 54, p. 860, 1970.

1160. Pett, J.W., Walker, R.G., McMaster Univ.:
Flute casts and associated sole marks in turbidites, Gaspé, Québec, 1968-70; M.Sc. thesis, (Pett).

1161. Stanton, M.S., Chevron Standard Ltd.:
1) Petroleum Chemistry, 1967-; 2) Marine Geology, 1967-; 3) Arctic Stratigraphy, 1967.

1162. Stevens, G.R., Acadia Univ.:
Flow directions, microstructures, and fabric of Triassic basalts, Bay of Fundy, Nova Scotia, 1967-71.

1163. Walker, R.G., McMaster Univ.:
Turbidity current deposits in the Cloridorme Formation, Gaspé, Quebec., 1966-.
See Review of the geometry and facies organisation of turbidites and turbidite-bearing basins; Geol. Assoc. Can., Spec. Paper 7- pp. 219-251, 1970.

STRATIGRAPHY AND PALEONTOLOGY

Precambrian

1164. Ayres, L.D., Ontario Dept. of Mines & Northern Affairs:
Early Precambrian volcanism and sedimentation, Lake Superior Provincial Park, 1961-71.
A stratigraphic, sedimentologic, and geochemical study. See Synthesis of Early Precambrian stratigraphy north of Lake Superior (abstract); Institute on Lake Superior Geology, 16th meeting, p. 8, 1970.

1165. Bell, R.T., Brock Univ.:
Stratigraphy and sedimentology of early Proterozoic sedimentary rocks, with particular emphasis on the Hurwitz Group, 1969-73.
Field investigation completed (essentially), studies for 1971 and 1972 proposed for comparative stratigraphy of other Aphebian suites. See Preliminary notes on the Hurwitz Goup, Padlei map-area, Northwest Territories; Geol. Surv. Can., Paper 69-52, 1970.

1166. Donaldson, J.A., Jones, B.G., Carleton Univ.:
Proterozoic stromatolites, 1970-72.
Stromatolites and other sedimentary structures from the Hornby Bay Group are being investigated by serial sectioning, peel techniques, and staining. Evaluation of the biostratigraphic utility of conical stromatolites ("Conophton") is a major part of the investigation. Black cherts will be checked for possible microfossils.

1167. Donaldson, J.A., Worth, J., Carleton Univ.:
Sedimentologic and stratigraphic study of the Coppermine River Group, Northwest Territories, 1969-73; Ph.D. thesis (Worth).
See Geol. Surv. Canada, Paper 70-1, Pt. A., pp. 120-124, 1970.

1168. Frarey, M.J., Geol. Surv. Canada:
Huronian rocks north of Lake Huron, Ontario, 1956-71.
Stratigraphy and structure between Sault Ste. Marie and Blind River, Ontario.

1169. Hoffman, P.F., Geol. Surv. Canada:
Stratigraphy, sedimentology, paleoccurrents, paleontology and structure of the Epworth Group (Aphebian), Coronation Gulf area, District of Mackenzie, Northwest Territories, 1969-.
See Stratigraphy and structure of the Epworth fold belt, District of Mackenzie; Geol. Surv. Can., Paper 71-1A, Pt. A, pp. 135-138, 1971.

1170. Maher, J.B., Memorial Univ. of Newfoundland:
Stratigraphy and petrology of the sedimentary and volcanic sequence in the Pouch Cove area, northeastern Avalon Peninsula, Newfoundland, 1970-71; M.Sc. thesis.
The late Precambrian sequence in the Pouch Cove area consists of arkoses, greywackes, cherts, and tuffs, interbedded with volcanic flows of basaltic to rhyolitic composition. These rocks are cut by various types of dyke and are folded, faulted, and in part sheared. Petrologic studies are expected to shed light on the petrogenesis of the rocks present.

1171. McIlwaine, W.H., Ontario Dept. of Mines & Northern Affairs:
Stratigraphy, sedimentology and economic geology of the Sibley Group sedimentary rocks, District of Thunder Bay, Ontario, 1970-74.

1172. Parviainen, E.A.U., Young, G.M., Univ. of Western Ontario:
Regional stratigraphical and sedimentological investigation of Ramsay Lake and Bruce Formations (Huronian) of the north Shore of Lake Huron, Ontario, 1967-70; Ph.D. thesis (Pariviainen).
Detailed investigation of two polymicrite paraconglomerates and associated sedimentary rocks in an attempt to discover the significance of glacial deposition in the Huronian succession.

1173. Peach, P.A., Brock Univ.:
Compilation of data on fossil plants from the Gunflint Formation of Ontario (from material assembled by the late Dr. Moorhouse), 1970-71.

1174. Ridler, R.H., Geol. Surv. Canada:
The interrelation of the ARchean volcanic stratigraphy and mineral deposits of the Kirkland Lake Area, Ontario, 1966-70.
The ultra-alkaline volcanics of the Kirkland Lake complex are a congruent part of the overall Archean Volcanic evolution in the Kirkland Lake area. Precious, metal mineralization is associated either with iron formation (exhalite) or felsic volcanic interals.

See Relationship of mineralization to volcanic stratigraphy in the Kirkland -Larder Lakes area, Ontario; Geol. Assoc. Can., Proc., vol. 21, pp. 33-42, 1970.

1175. Robertson, J.A., Frarey, M.J., Card, K.D., Ontario Dept. of Mines & Northern Affairs:
Huronian stratigraphy.
Compilation maps showing distribution of formations (revised Huronian nomenclature) under preparation. See The Federal - Provincial Committe on Huronian stratigraphy - progress report; Ontario Dept. Mines, Misc. Rept. 31, 1969.

1176. Rousell, D.H., Laurentian Univ.:
The Chelmsford Formation of the Sudbury Basin, 1968-71.

1177. Young, G.M., Univ. of Western Ontario:
Stratigraphy, sedimentology, petrochemistry and paleoclimatology of Early Proterozoic rocks, 1964-.
The main objective is documentation of stratigraphic and sedimentological relationships in Early Proterozoic rocks in order to establish regional paleogeography and paleoclimatology of these times. See An extensive early Proterozoic glaciation in North American?; Palaeogeography, paleoclimatology, palaeoecology, vol. 7, pp. 85-101, 1970.

Cambrian to Silurian

1178. Beales, F.W., Lotej, G.P., Univ. of Toronto:
Ordovician stratigraphy of Brent meteorite crater, Ontario, 1970-71.
A joint research project with the Dominion Observatory, Ottawa.

1179. Bond, I., Queen's Univ.:
Biostratigraphy of the Upper Cambrian and Lower Ordovician of southeastern Ontario, 1970-71; M.Sc. thesis.
Revision of the stratigraphy involving the Potsdam, March, and Oxford Formations; conodonts have been found in strata previously mapped as Potsdam Formation.

1180. Bolton, T.E., Geol. Surv. Canada:
Silurian and Ordovician macro-biostratigraphy of Anticosti Island, Quebec, 1957-75.
Systematic investigation of the total fauna commencing with tabulate corals and echinoderms. See Subsurface Ordovician fauna, Anticosti Island, Quebec; Geol. Surv. Can., Bull. 187, pp. 31-41, 1970.

1181. Bolton, T.E., Copeland, M.J., Geol. Surv. Canada:
Silurian and Ordovician macro - and micro-biostratigraphy, Lake Timiskaming and Lake Nipissing, Ontario, 1968-71.
Description of important faunal elements and correlation with similar eastern Canada assemblages. See Echinodermata from the Ordovician (Pleurocystites, Cremacrinus) and Silurian (Hemicystites, Protaxocrinus, Macnamaratylus) of Lake Timiskaming region, Ontario and Quebec; Geol. Surv. Can., Bull. 187, pp.59-66, 1970.

1182. Bourque, P.A., Université de Montréal:
Stratigraphie et paléogeographie du Silurien et Dévonien basal du NE. de la Gaspésie, 1967-71.
See Silurian and basal Devonian stratigraphy of northeastern Gaspé Peninsula, Québec; Bull. Amer. Assoc. Petrol. Geol., vol. 54, No. 10, pp. 1868-1886, 1970.
Western half of the Saint-John river anticline, Gaspé Peninsula, Quebec, 1968-71.
To establish a stratigraphic sequence for the Silurian in the eastern part of the Gaspé Peninsula.

1183. Dean, W.T., Geol. Surv. Canada:
Ordovician rocks and faunas of Canada, 1968-.
Ordovician biostratigraphy and trilobites of Canada, particularly the eastern region, and their relationships to successions and faunas elsewhere. See Lower Ordovician trilobites from the vicinity of South Catcher Pond, northeastern Newfoundland; Geol. Surv. Can., Paper 70-44, 1970.
Cambro-Ordovician biostratigraphy and trilobites in the Appalachian region of eastern Canada, 1969-.
The sequence of shelly faunas in, especially, the Ordovician rocks of the Appalachian region and Newfoundland is under investigation, with particular reference to the trilobites and their stratigraphic value. More refined correlations with other areas of North America, as well as parts of western Europe, are expected to result from these researches. See A new Lower Ordovician trilobite faunule from Random Island, eastern Newfoundland; Geol. Surv. Can., Paper 70-19, 1970.

1184. Dixon, J., Univ. of Ottawa:
Ordovician-Silurian carbonates of Somerset and Prince of Wales Islands, District of Franklin, 1969-72; Ph. D. thesis.
A detailed study of carbonates and invertebrate fossils ascribed to the Allen Bay Formation in the Boothia Arch region, with the aim of defining its age limits and equivalence in the region, and of explaining its depositional history.

1185. Dixon, O.A., Univ. of Ottawa:
Ordovician-Silurian paleoecological studies, Anticosti Island, Quebec, 1968-.
Study of the Ordovician-Silurian transition sequence on Anticosti Island, its successive fossil populations and various sedimentary environment; systematic studies of tabulate corals. See Nautiloids and current ripples as paleocurrent indicators in Upper Ordovician limestones, Anticosti Island, Canada; J. Sed. Petrology, vol. 40, pp. 682-687, 1970.

1186. Greggs, R., Queens's Univ.:
Upper Cambrian biostratigraphy of North American, 1965-.
Lower Paleozoic biostratigraphy of southeastern Ontario, 1970-.

1187. Greiner, H.R., Porter, R.A., Howells, K., Univ. of New Brunswick:
Silurian-Devonian contact relationships and faunas of northern New Brunswick, 1959-71; M.Sc. thesis (Porter and Howells).

1188. Hamilton-Smith, T., New Brunswick Dept. of Natural Resources:
Silurian stratigraphy of western New Brunswick, 1967-73.
Current investigation (1969-1970): the Silurian stratigraphy

of the Woodstock area, western New Brunswick. See Stratigraphy and structure of Ordovician and Silurian rocks of the Siegas area, New Brunswick; New Brunswick Dept. Natural Resources, Mineral Res. Br., Rept. Invest. No. 12, 1970.

1189. Héroux, Y., Quebec Dept. of Natural Resources:
Sayabec, Val Brillant and La Redemption area, Matapedia County, Quebec, 1 inch to 500 feet, 1969-71; Ph.D. thesis.

1190. Lenz, A.C., Univ. of Western Ontario:
Ordovician to Devonian history of northern Yukon and adjacent Northwest Territories, 1970-71.

1191. Lespérance, P.J., Université de Montréal:
Stratigraphie du Silurien et Dévonien Inférieur des Appalaches du Québec, 1957-.
Voir Silurian and basal Devonian stratigraphy of northeastern Gaspé Peninsula, Québec; Bull. Amer. Assoc. Petrol. Geol., vol. 54, No. 10, pp. 1868-1886, 1970.
Stratigraphy of the Silurian Siluro-Devonian of the Lower St. Lawrence and Gaspé, Québec, 1962-.

1192. Macqueen, R.W., Geol. Surv. Canada:
Lower Paleozoic stratigraphy, Lower Mackenzie River area, (Operation Norman), 1968-71.
Includes stratigraphy, sedimentology, and correlation of Lower Paleozoic rocks of the area. See Lower Paleozoic stratigraphy and sedimentology, eastern Mackenzie Mountains, northern Franklin Mountains (96C,D,E,F; 106 G, H); Geol. Surv. Can., Paper 70-1A, Pt. A, pp. 225-230, 1970.

1193. Mountjoy, E.W., McGill Univ. and Geol. Surv. Canada:
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.

1194. Noble, J.P.A., Univ. of New Brunswick:
Silurian-Devonian stratigraphy and paleoenvironments - New Brunswick, 1970-74.

1195. 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.
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.
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.

1196. Paterson, D.F., Dept. of Mineral Resources, Saskatchewan:
The Winnipeg Formation (Ordovician) of Saskatchewan, 1969-70.

1197. Pugh, D.C., Geol. Surv. Canada:
Subsurface Cambrian stratigraphy in North Central Alberta, 1970-71.

1198. Williams, S.R., Univ. of Ottawa:
Faunal studies in the Silurian rocks of the Boothia Arch region, 1967-71; Ph.D. thesis.
A stratigraphic, faunal and paleoecological investigation of the highest Silurian strata (Read Bay Formation) in the Boothia Arch region, as a means of establishing the local and regional correlates, and the paleogeographic development of the region.

1199. Winder, C.G., Univ. of Western Ontario:
Stratigraphy of the Middle Ordovician, southwestern Ontario-carbonate petrology, micropaleontology, and macropaleontology, 1951-.
See Regional microfabric analysis and insoluble residues of Black River Group, (Middle Ordovician) in southern Ontario; Can. J. Earth Sci., vol. 7, No. 6, pp. 1437-1448, 1970.

1200. Young, F.G., Geol. Surv. Canada:
Stratigraphy of Gog and Cariboo Groups near the Rocky Mountain Trench, McBride area, British Columbia, 1967-72.

Devonian to Permian

1201. Bamber, E.W., Waterhouse, J.B., Geol. Surv. Canada and Univ. of Toronto:
Carboniferous and Permian stratigraphy and paleontology, northern Yukon Territory, 1962-71.

1202. Belyea, Helen, R., Geol. Surv. Canada:
Lower Elk Point, southern District of Mackenzie, northeastern British Columbia, northern and central Alberta, 1979-71.

1203. Bingley, J.M., Isenor, G.C., Wambolt, R., Nova Scotia Dept. of Mines:
St. Mary's River basin project, 1970.
Project designed for assessment of the Horton sedimentary basin (lower Carboniferous) of Colchester, Pictou and Guysborough Counties, N.S., with a view to interpreting stratigraphy, structure and potential mineral occurrences.

1204. Coppold, M., McGill Univ.:
Stratigraphy and lithofacies of the margin of the Ancient Wall carbonate complex, Chetamon thrust sheet, Jasper National Park, Alberta, 1970-72; M.Sc. thesis.
Reef-off reef relationships as exposed alon the Chetamon thrust sheet between Mounts Simla and Henday, Jasper National Park.

1205. Danner, W.R., Univ. of British Columbia:
Paleontology and stratigraphy of Cache Creek Group in southern and central British Columbia, 1963-.
See Carboniferous system of the western Cordillera of

south-western British Columbia and north-western Washington; Compte.Rendu. 6e Congres. Intern. Strat. Geol. Carbonif., vol. II, pp. 599-608, 1970.

1206. Ferguson, L., Mount Allison Univ.:
A stratigraphic and faunal study of the Permo-Pennsylvanian of north-central Ellesmere Island, Northwest Territories, 1961-75.
See Possible brood pouches and sexual dimorphism in the productid brachiopod Megousia Muir-Wood and Cooper 1960; Inter. Union Geol. Sci., Ser. A, No. 1, pp. 37-51, 1969.

1207. Harrington, J.W., Univ. of Calgary:
Correlation and comparison of the western Canadian and New York Frasnian (Upper Devonian), 1969-70.

1208. Kent, D.M., Saskatchewan Dept. of Mineral Resources:
Stratigraphic and sedimentologic analysis of Mississippian rocks in southwestern Saskatchewan, 1969-71.

1209. Kliske, A.E., Chevron Standard Ltd., Calgary:
Reef biostratigraphy and petrography - Devonian, 1969-.

1210. Ludvigsen R., Univ. of Western Ontario:
Age and fauna of the Michelle Formation, northern Yukon Territory, 1968-69; M.Sc. thesis.
See Age and Correlation of the Michelle Formation, northern Yukon Territory; Bull. Can. Petrol. Geol., vol. 18, No. 3, pp. 407-429, 1970.

1211. MacKenzie, W.S., Geol. Surv. Canada:
Devonian stratigraphy, Lower Mackenzie River area (Operation Norman), 1968-71.
See Devonian stratigraphy, District of Mackenzie; Geol. Surv. Can., Paper 70-1, Pt. A, p. 224, 1970.

1212. Macqueen, R.W., Bamber, E.W., and others, Geol. Surv. Canada:
Mississippian stratigraphy, sedimentology, and correlation, Rocky Mountains and Foothills, 1965-.
A continuing study of the stratigraphy, sedimentology, and correlation of Mississippian strata from the Crownest Pass area of southern Alberta to the Jasper area of west central Alberta. See Stratigraphy, age, and interregional correlation of the Exshaw Formation, Alberta Rocky Mountains; Bull. Can. Petrol. Geol. vol. 18, No. 1, pp. 32-66, 1970. Electron microprobe study of magnesium distribution in some Mississippian echinoderm limestones from Western Canada; Can. J. Earth Sci., vol. 7, No. 5, pp. 1308-1316, 1970.

1213. Mason, D., Chevron Standard Ltd., Calgary:
Lower and Middle Devonian conodont biostratigraphy, western and northern Canada, 1966-.

1214. McGugan, A., Univ. of Calgary:
Cretaceous Foraminifera; Permian stratigraphy and diagenesis.

1215. Monger, J.W.H., Geol. Surv. Canada:
Upper Paleozoic rocks of Stikine Arch and Atlin Horst, 1966-72.
Parts of a continuing study of Upper Paleozoic sedimentation, volcanism and stratigraphy in the Western Cordillera. Available Data indicate that these upper Paleozoic strata are the most important rocks in any plate tectonic interpretation of Cordilleran history.

1216. Moore, R.G., Acadian Univ.:
Biostratigraphy of the Windsor Group, 1962-72.

1217. Mountjoy, E.W., McGill Univ. and Geol. Surv. Canada:
Carboniferous stratigraphy and petrology of northern Jasper Park, 1959-.
Regional study of carboniferous stratigraphy to determine extent, thickness and petrography of various units.
Upper Devonian Miette and Ancient Wall reef complexes, 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 C.W. Stearn's paleoecology studies on stromatoporoids of theAncient Wall complex and two graduate students,P. Strivastava who is investigation one coarse debris bed in detail at Ancient Wall and J. Hopkins who is studying sedimentation immediately adjacent to reef margins in both complexes.

1218. Mountjoy, E.W., MacKenzie, W.S., Geol. Surv. Canada:
Stratigraphy of the southern part of the Devonian Ancient Wall Reef Complex, Jasper National Park, Alberta, 1964-70.
A study of the stratigraphy of an Upper Devonian carbonate complex and its relationship to surrounding argillaceous strata. A petrographic analysis of the Cairn and Southest Formation carbonates is included. See Upper Devonian (Frasnian) algae and foraminifera from the Ancient Wall carbonate complex, Jasper National Park, Alberta, Canada; Can. Jour. Earth Sci., vol. 7, No. 3, pp. 946-981, 1970.

1219. Noble, J.P.A., Univ. of New Brunswick:
Lower and Middle Devonian faunas: controlling factors in their evolution and distribution, 1967-72.
To construct a dynamic model showing the controlling factors in the space-time distribution of population, communities and other ecologic units and the relationship between these units and their taxonomic components.

1220. Norris, A.W., Geol. Surv. Canada:
Devonian biostratigraphy of northern Yukon Territory and adjacent District of Mackenzie, 1970-73.
During the summer of 1970 twelve new Devonian sections were measured as well as a number of helicopter traverses made to area not previously visited during Operation Porcupine (1962).

1221. Norris, A.W., Sanford, B.V., Geol. Surv. Canada:
Devonian stratigraphy of the Hudson Bay Lowlands, 1967-71.
See Palynology and correlation of Devonian formations in the Moose River Basin, northern Ontario; Proc. Geol. Assoc. Can., vol. 22, pp. 45-54, 1970.

1222. Stabbins, R., Dept. of Mienral Resources, Saskatchewan:
The Dawson Bay Formation (Middle Devonian) of south-east Saskatchewan, 1969-71.

1223. Trettin, H.P., Geol. Surv. Canada:
Stratigraphy, structure, and carbonate petrography of Marble Canyon Formation (Permian) in the Marble Range, Cariboo District, British Columbia, 1965-71.

1224. Waterhouse, J.B., Univ. of Toronto:
Paleolatitude of North Yukon in the Permian, 1970-71.
See The Paleoclimatic significance of Permian Productacea from Queensland; Stratigraphy and Paleontology essays in honour of Dr. D. Hill, ANU Press, pp. 226-235, 1969.

1225. Waterhouse, J.B., Bamber, E.W., Univ. of Toronto and Geol. Surv. Canada:
Upper Paleozoic stratigraphy and biostratigraphy of the Northern Yukon Territory, 1969-70.
A major work on upper Paleozoic stratigraphy of the Yukon, with detailed zoning on the basis of brachiopods, discussion of world correlation, paleoclimatic, continental drift, and new systematic descriptions.

1226. Wiley, W.E., Univ. of Saskatchewan:
The Middle Devonian Watt Mountain Formation of the Pine Point area, Northwest Territories, 1968-70; M.Sc. thesis.
Sedimentological-paleontological-stratigraphical analysis of a transgressive sequence, based on densely spaced drill-hole cores.

Mesozoic

1227. Brooke, M.M., Univ. of Saskatchewan:
Pre-Cretaceous biostratigraphy and microfaunas of Saskatchewan, 1966-71; M.Sc. thesis.
To date only the Jurassic microfaunas have been studied in detail.

1228. Caldwell, W.G.E., North, B.R., Lomenda, M.G., McNeil, D.H., Wright, E., Univ. of Saskatchewan:
Stratigraphic studies in Cretaceous rocks, 1959-; M.Sc. thesis (M.G.L., D.H.M., E.W.).
Biostratigraphy of the entire Cretaceous section in Saskatchewan is to be determined using mainly assemblages of Foraminifera obtained from potash company mine shafts and long cored sections. See Foraminifera from the Late Cretaceous Bearpaw Formation in the South Saskatchewan River Valley; Sask. Research Council, Rept. 9, 1970.

1229. Chamney, T.P., Geol. Surv. Canada:
Foraminiferal zonation of the Mesozoic and lower Cenozoic rocks of the Mackenzie River Delta and adjacent Arctic Coastal Plain, 1969-72.
All classes of fossil organisms recognized in the laboratory prepared rock samples have been identified and recorded. The most amenable approach in subdividing this very thick

(approx. 13,000 feet) stratigraphic sequence has been the application of paleoecological equivalents. These related depositional intervals are based on similar fossil organic content (assemblages) and in many cases their boundaries are coincident with recognizable physical changes in the sequence of strata. See Biostratigraphic subdivision of the first Mackenzie River Delta exploratory borehole; Geol. Surv. Canada, Paper 70-1, Pt. B, pp. 80-83, 1970.

1230. Christopher, J.E., Saskatchewan Dept. of Mineral Resources:
Basal Cretaceous - Upper Jurassic formations of Southwestern Saskatchewan, 1968-71.
See Notes on the Roseray and Cantuar Formations; Mesozoic core seminar, Sask. Geol. Soc.-Sask. Dept. Mineral Resources, 1970.

1231. Gibson, D.W., Geol. Surv. Canada:
Triassic stratigraphy and petrology in the Foothills and Front Ranges of Western Canada, 1962-.
To provide data on the character, structure, distribution, age, stratigraphic relationships, origin of the bedrock, and other geological data that are required to evaluate the oil, gas, and mineral potentialities of the region, within the Triassic rocks of the Foothills and eastern Rocky Mountains of Alberta and British Columbia.

1232. Havard, C.J., Geol. Surv. Canada:
Stratigraphy and structure of Lower Cretaceous sedimentary rocks of the Waterton-Castle River area, Alberta, 1967-70.
To establish the stratigraphic succession of the Lower Cretaceous in the subsurface and to effect a correlation of units with recognized surface formations in the southeastern Canadian Cordillera.
Lithostratigraphic studies of Upper Cretaceous formations encountered in C.P.O.G. Strathmore well, 1970.
To provide a lithostratigraphic record of the formations encountered in the Strathmore well as a basis for future palynological, geochemical, micropaleontological and sedimentary petrological studies.

1233. Mountjoy, E.W., McGill Univ. and Geol. Surv. Canada:
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.

1234. Ollerenshaw, N.C., Geol. Surv. Canada:
Stratigraphy of the Blairmore Group and Kootenay Formation, southern Foothills of Alberta, Bow River to Clearwater River, 1966-72.

1235. Park, R., Usher, J.L., Queen's Univ.:
Jurassic stratigraphy and paleontology, central British Columbia, 1970-71.

1236. Souther, J.G., Geol. Surv. Canada:
Mesozoic stratigraphy of Telegraph Creek map-area, 1969-70.
See Cordilleran volcanic study, 1969, Telegraph Creek,

British Columbia; Geol. Surv. Can., Paper 70-1, Pt. A, pp. 50-53, 1970.

1237. Stott, D.F., Geol. Surv. Canada:
Cretaceous stratigraphy, Peace River to 60°, British Columbia.
Detailed stratigraphic investigation mainly Lower Cretaceous rocks in Foothills and Plains of northeastern British Columbia, to establish the relationships with equivalent successions studied between Peace and Smoky Rivers and in the region of Liard and Mackenzie Rivers, including Trutch (94G), Fort Nelson (94J), Maxhamish Lake (94), Toad River (94N), and Tuchodi Lake (94K) areas.
Cretaceous subsurface studies in northeastern British Columbia, 1962-.
Jurassic and Cretaceous stratigraphy, Sikanni Chief River to 53°30', British Columbia and Alberta, 1968-72.
Detailed stratigraphic studies of the Jurassic Fernie Formation and Lower Cretaceous Minnes Groups and equivalent strata of the Foothills, and of the Cretaceous and Jurassic rocks in Dawson Creek (93P), Monkman (931), Wapiti (83L), and Mount Robson (83D) areas.

1238. Tipper, H.W., Geol. Surv. Canada:
Smither map-area, British Columbia, 1969-72.
A re-study of the area with emphasis on the stratigraphy and paleontology of the Mesozoic rocks. As such it is part of the continuing study of Jurassic stratigraphy, history, paleontolgy, sedimentation, volcanology, etc., of the western Cordillera.

1239. Yorath, C.J., Havard, C.J., Geol. Surv. Canada:
Mesozoic and Tertiary stratigraphy and sedimentation, Beaufort-Mackenzie area, 1970-.

1240. Young, F.G., Geol. Surv. Canada:
Basin analysis of exposed Mesozoic and Tertiary strata in northern Yukon Territory in relation to the subsurface stratigraphy of Mackenzie Delta-Beaufort Sea areas, 1970-76.
To elucidate and interpret the economic, tectonic, and historical significance of Mesozoic and Tertiary stratigraphy (most emphasis on Cretaceous rocks) and sedimentology of northern Yukon and northwestern District of Mackenzie. See Mesozoic stratigraphic studies, northern Yukon Territory and northwestern District of Mackenzie; Geol. Surv. Can., Paper 71-1A, Pt. A, pp. 245-247, 1971.

Cenozoic

1241. Cameron, B.E.B., Geol. Surv. Canada:
Tertiary biostratigraphy and depositional history of the Canadian Pacific margin, 1969-.
This project, in collaboration with members of the Dept. of Geology, Univ. of British Columbia and Marine Sciences Branch of the Dept. of Energy, Mines and Resources, involves studies of the west coast Tertiary outcrop belt, continental shelf, slope and deep sea deposits. The final goal is to understand the tectonic and depositional interaction between these different segments of the Pacific margin and to date their tectonic development.

See Tertiary foraminiferal succession of the Western Cordillera and Pacific Margin; Geol. Surv. Can., Paper 70-1, Pt. A, 1970

1242. Russell, L.S. The Royal Ontario Museum:
Faunas and correlation of the early Tertiary formations of Saskatchewan and Montana, 1967-71.
Involves a stratigraphic and faunistic comparison of the Ravenscrag Formation of Saskatchewan with the typical Fort Union Group of eastern Montana, in an effort to determine what parts of the Fort Union are equivalent to the Ravenscrag, what parts of Paleocene time are represented by the Ravenscrag and the Fort Union Formations, and to what extent the Cretaceous-Tertiary transition is comparable in the two areas.

General

1243. Bachinski, D.J., McAllister, A.L., McBride, D., Univ. of New Brunswick:
Structure and stratigraphy of the Heath Steele Mine, Bathurst area, New Brunswick, 1970-75.
Part of a comprehensive program on the massive sulphide ores in the Bathurst area directed towards unravelling of the stratigraphy, reconstructing environments of deposition and evaluating changes in the ores due to metamorphism.

1244. Bartlett, G.A., Smith, L., Queen's Univ.:
Biostratigraphy and tectonic history of Canadian Atlantic continental margins, 1966-.
A detailed interpretation of the biotas, environments of deposition and tetonic history of continental margins. See Cretaceous strata on the Scotian Shelf; Can. J. Earth Sci., vol. 7, No. 1, pp. 26-39, 1970.

1245. Caldwell, W.G.E., Univ. of Saskatchewan:
Stratigraphic studies in post-Precambrian rocks (with special emphasis on the Northwest Territories), 1959-.

1246. McBride, D., McAllister, A.L., Univ. of New Brunswick:
Geology of the Heath Steele ore zones, New Brunswick , 1970-73; Ph.D. thesis (McBride).
To establish the detailed stratigraphy of the ore zones, which have been subjected to multiple folding, and to interpret the stratigraphy in terms ofpaleoecology.

1247. Pounder, D.A., Chevron Standard Ltd., Calgary:
Sedimentology, diagenesis and stratigraphy of carbonate rocks, 1959-.

1248. Saull, V., Telford, M., Phipps, D., Clay, D., Ng, K., Longe, R., Gray, N., McGill Univ.:
Thermal and tectonic geophysical studies, 1952-.
Saull- anhypothesis of global tectonics; Saull, Telford and Caly- earthquake predicition in the St. Lawrence Lowlands; Saull and Ng- Mathematic study of convection processes; Saull and Phipps- thermochemistry of clays; Longe- an explanation of sulphide accumulation in nature; Gray- determination of thermal histories of small instrusions from petrologic information.

1249. Smith, L., Queen's Univ.:
Mesozoic and Tertiary sequences in the eastern canadian continental shelf and their relation to continental drift, 1968-71.
Lithic data combined with micropalentologic data, from deep wells, is being used to produce a stratigraphic synthesis for the area. The succession of sequences preserved in the shelf are thus delineated, their depositional environments are realized and the regional and saltdome tectonic history of the continental margin is perceived. See Mesozic and Cenozoic history of the Grand Banks of Newfoundland; Can. J. Earth Sci., vol. 8, No. 1, pp. 65-84, 1971.

1250. Stanton, M.S., Chevron Standard Ltd., Calgary:
1) Petroleum chemistry, 1967-;2) Marine geology, 1967-; 3) Arctic stratigraphy, 1967.

1251. Trettin, H.P., Geol. Surv. Canada:
Stratigraphy and regional structure of lower Paleozoic formations, Foxe Basin, northeastern Melville Peninsula, and parts of northern and central Baffin Island, 1968-71.

1252. Uyeno, T.T., Geol. Surv. Canada:
Conodont biostratigraphy of Paleozoic rocks of the Arctic Islands, 1968-.
Six stratigraphic sections of Silurian and Devonian rocks on Prince Patrick, Bathurst, Cornwallis, Devon, and Ellesmere islands were measured and sampled in 1969.

STRUCTURAL GEOLOGY AND TECTONICS

Alberta

1253. Charlesworth, H.A.K., Univ. of Alberta:
Preparation and filtering of contour maps from Interior Plains of Western Canada, 1965-71.
See Structural analysis using spatial filtering in Interior Plains of South-Central Alberta; Bull Am. Assoc. Petrol. Geol., vol. 53, No. 11, 1969.

1254. Havard, C.J., Geol. Surv. Canada:
Stratigraphy and structure of Lower Cretaceous sedimentary rocks of the Waterton-Castle River area, Alberta; 1967-70.
To establish the stratigraphic succession of the Lower Cretaceous in the subsurface and to effect a correlation of units with recognized surface formations in the southeastern Canadian Cordillera.

1255. Mountjoy, E.W., McGill Univ. and Geol. Surv. Canada:
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. Additional field work was undertaken with the GSC on Operation Bow-Athabasca. See Geologic structure of the Canadian Rockies between Bow and Athabasca Rivers;

Geol. Assoc. Can., Sp. Paper 6, 1970. Geology of the Main Ranges between Tete Jaune Cache and Jasper; Guidebook Edmonton Geol. Soc., pp. 94-107, 1970.

1256. Spang, J.H., Univ. of Calgary:
Natural and structural significance of small scale kink bands in the Front Ranges of the Rocky Mountains west of Calgary, Alberta, 1970-71.

British Columbia

1257. Bertrand, W.G., Univ. of British Columbia:
Seismic reflection profiling and reconnaissance geology of the Dellwood Seamount Area, 1970-71; M.Sc. thesis.
To determine whether the Dellwood Knolls is a zone of sea floor spreading connecting the Revere-Dellwood Fracture zone to the Queen Charlotte fault.

1258. Cameron, B.E.B., Geol. Surv. Canada:
Tertiray biostratigraphy and depositional history of the Canadian Pacific margin, 1969-.
This project, in collaboration with members of the Dept. of Geology, Univ. of British Columbia and Marine Sciences Branch of the Dept. of Energy, Mines and Resources, involves studies of the west coast Tertiary outcrop belt, continental shelf, slope and deep sea deposits. The final goal is to understand the tectonic and depositional interaction between these different segments of the Pacific margin and to date their tectonic development. See Tertiary foraminiferal succession of the Western Cordillera and Pacific Margin; Geol. Surv. Can., Paper 70-1, Pt. A, 1970.

1259. Campbell, R.B., Geol. Surv. Canada:
Geology of the Cariboo Mountains, British Columbian, 1959-72.
A continuing study, now nearing completion, on structural and stratigraphic problems bearing on an understanding of the tectonic history of the eastern Cordillera. See Geology of the Region between Prince George and Jasper; Edmonton Geol. Soc., Field Conference Guidebook, pp. 84-93, 1970.

1260. Eisbacher, G.H., Geol. Surv. Canada:
Tectonic framework of the Sustut and Sifton Basin, British Columbia 1969-73.
See Tectonic framework of Sustut and Sifton Basins, B.C.; Geol. Surv. Can., Paper 70-1A, pp. 36-37, 1970.

1261. Fyles, J.T., British Columbia Dept. of Mines & Petroleum Resources:
Structural setting of the Ross Land mining camp, British Columbia, 1968-71.

1262. Lajoie, J.J., Clarke, G.K.C., Caner, B., Univ. of British Columbia:
Geomagnetic induction and structural geology in southeastern British Columbia, 1968-70.
See Geomagnetic induction anomaly near Kootenay Lake - a strike-slip feature in the lower crust?; Can. J. Earth Sci., vol. 7, pp. 1568-1579, 1970.

1263. Thomlinson, A.G., Univ. of British Columbia:
Geology of Explorer Ridge, off Vancouver Island, British Columbia, 1969-72; Ph.D. thesis.
Explorer Ridge, topographically a series of narrow,elongate valleys and hills trending northeast, appears to be an active site of sea-floor spreading. Evidence to this effect includes "striping" of magnetic anomalies; high heat flow; fresh, young looking basalts; thickening of unconsolidated sediments laterally away from line of active spreading. Work includes seismic profiling, dredging for basalts, remanent magnetism measurements, thin-section petrographic study, X-ray diffraction, chemical analysis and fission-track dating.

1264. Thompson, R.I., Price, R.A., Queen's Univ.:
Structural, stratigraphic and petrologic studies on eastern margin of the Shuswap metamorphic complex, Revelstoke, British Columbia, 1969; Ph. D. thesis (Thompson).
An investigation of the interrelations between deformation and metamorphism in tectonic evolution along the eastern margin of the Shuswap metamorphic complex, at the north end of the Kootenay arc, southeast of Revelstoke, British Columbia.

1265. Simony, P.S., Helfenbein, Y., De Vries, C., Baer, H., Univ. of Calgary:
Geology ofthe Rocky Mountain Trench, 1969-74; Graduate studies (Helfenbein, De Vries, Baer).
See Structure of the Dogtooth Range and adjacent protions of the Rocky Mountain Trench; Geol. Assoc. Can., Spec. Paper 6, 1970.

1266. Zwanzig, H.V., Price, R.A., Queen's Univ.:
The Illecillewaet synform, 1970-72.
An investigation of structural geometry and of the nature and significance of changes in fabric and metamorphic grade in the transition zone along the eastern margin of the Shuswap metamorphic complex, Roger Pass area, British Columbia.

Manitoba

1267. Bailes, A.H., Manitoba Dept. of Mines & Natural Resources:
Geological study of the Files-Morton Lakes area, 1970-72.

1268. McCabe, H.R., Bannatyne, B.B., Manitoba Dept. of Mines & Natural Resources:
Lake St. Martin crypto-explosion structure, 1968-70.
See Lake St. Martin crpto-explosion structure and geology of the surrounding area; Manitoba Mines Branch, Geol. Paper 3/70, 1970.

1269. Stauffer, M.R., Mukherjee, A.C., Univ. of Saskatchewan:
Structural evolution of part of the Churchill Province of the Canadian Shield, 1965-; Ph.D. thesis (Mukherjee).
This project, although primarily structural in nature, is also involving a study of stratigraphy, depositional environments, and radiometric ages, See Superposed deformation in the Missi meta-sedimentary rocks near Flin Flon, Manitoba; Can. J. Earth Sci., vol. 8, No. 2, pp. 217-242, 1971.

1270. Weber, W., Manitoba Dept. of Mines & Natural Resources:
Project Pioneer.

New Brunswick

1271. Brown, R.L., Carleton Univ.:
Fabric studies in Northern Appalachian, 1965-.
See Deformation history in part of the Lubec-Belleisle zone of southern New Brunswick; Can. J. Earth Sci., vol. 7, pp. 748-767, 1970.

1272. Burke, K.B.S., Univ. of New Brunswick:
Geophysical investigation of the tectonic framework of northeastern New Brunswick, 1970-74.

1273. Garnett, J.A., British Columbia Dept. of Mines & Petroleum Resources:
Structural analysis of part of the Lubec-Belleisle fault zone, Southwestern New Brunswick, 1968-71.
See The Lubec-Belleisle zone of southern New Brunswick; G.A.C./ M.A.C. Ann. meeting, Prog. and abstract, pp. 6-7, 1970.

1274. Helmstaedt, H., Geol. Surv. Canada:
Structural analysis of Bathurst-Newcastle district, New Brunswick, 1969-71.
In addition to the regional structural analysis, I am engaged in a study of quartz fabrics in low-grade metamorphic rocks and their possible use for Kenimatic and dynamic interpretation is underway. See Geology of Map-area O-G, Head of Middle River and Wildcat Brook (Northern New Brunswick); N.B. Dept. Nat. Resources, Map Series 70-1, 1970.

1275. Stringer, P., Univ. of New Brunswick:
Structural geology of selected areas in New Brunswick, and geological investigation of the Caledonian Mountains, New Brunswick, 1970-74.
1) Polyphase deformation and ductile strain established in a few areas in the Lower Paleozoic rocks of southwestern and northern New Brunswick is to be extended into other areas. 2) Preliminary investigation of broad folding in the Pennsylvanian strata of central and eastern New Brunswick is intended to determine the distribution and development of brittle fractures. 3) Regional correlation is to be attempted of the structural belts in New Brunswick with the tectonic framework of the northern Appalachians established in New England and Newfoundland. 4) Geological investigation of the Caledonian Mountains will involve mapping of major lithological units and structures in the predominantly Precambrian metasediments and volcanics.

Newfoundland and Labrador

1276. Kennedy, M.J., Colman-Sadd, S.P., DeGrace, J.R., McGonigal, M., MacNeil, D.J., Douglas, C., Memorial Univ. of Newfoundland:
Structural studies of the metamorphic rocks of the Newfoundland Appalachians, 1970-71; thesis subjects.

Work has begun on the eastern marginal metamorphic belt of the Newfoundland Appalachians extending from north of Gander to Baie D'Espoir, 1970. Work will begin upon the metamorphic rocks of the Grand Lake-Deer Lake region of western Newfoundland in 1971. See The Hermitage flexure, the Cabot Fault and the disappearance of the Newfoundland Central Mobile Belt, 1970.

1277. Kennedy, M.J., DeGrace, J.R., Memorial Univ. of Newfoundland:
Structural studies of the Lush's Bight Group of the Springdale area, Newfoundland and the possible control of structure on base-metal mineralisation, 1969-71; M.Sc. thesis (DeGrace).

1278. Kennedy, M.J., Smyth, W.R., Memorial Univ. of Newfoundland:
Structural studies within the Appalachians of northwestern Newfoundland, 1969-72; Ph.D. thesis (Smyth).
A structural study of transported rocks of the Hare Bay klippe from Hare Bay to south of Canada Bay. Rocks correlatable with the other Fleur de Lys Supergroup were emplaced in the upper slice of the klippe after polyphase deformation and metamorphism. The lower slice was undeformed at emplacement but is now tightly folded by post-emplacement tectonism.

1279. Sutton, J.S., Marten, B.E., Clark, A.M.S., Memorial Univ. of Newfoundland:
The structural and metamorphic history of part of the southern section of the Nain Province and its Proterozoic cover, Labrador, 1970-72; Ph.D. thesis (Marten and Clark).
The interaction and inter-relationships of the Proterozoic Aillik Series and Hopedale Gneisses in the area from Makkovik to Ugjuktok Bay, Labrador, concentrating on a) the pre-Aillik Series history of the Hopedate Gneisses and b) the interaction and inter-relationships of the gneisses and metasediments during superimposed Hudsonian deformation and metamorphism.

1280. Williams, H., Comeau, R., Memorial Univ. of Newfoundland:
Transported ophiolitic complexes in western Newfoundland, 1970-72; M.Sc. thesis (Comeau).
Peridotites and gabbros of the Bay of Islands Igneous Complex comprise most of the higher structural slices of the Taconic allochthon in western Newfoundland. Amphibolites, granodiorites, and relatively unmetamorphosed mafic volcanic rocks are also present and form an integral part of the same transported structural sheets. Extensive melange zones of various aspect characterize the base of the slices in most places where contacts are exposed. These are generally several tens to more than 100 feet thick and separate the igneous and meta-igneous rocks from underlying unmetamorphosed sedimentary rocks of the Humber Arm Group. The basal contacts of the ophiolitic slices dip gently westward and are in places roughly coincident with present sea level.
The structural history of the ophiolites, the timing of deformational events, and the site of initial emplacement of the Bay of Islands Complex are paramount in analysing the geologic history of western Newfoundland.

Northwest Territories

1281. Dineley, D.L., Univ. of Bristol:
Arches and basins of the southern Arctic Islands of Canada, 1965-71.
A broad survey of stratigraphy and sedimentology, Palaeozoic and later deposits, especially in the vicinity of the Boothia Arch. Reference is made to the scale and distribution of crustal movements, especially during mid-Palaeozoic time, and also to the possibility of the area constituting a centre of early vertebrate radiation.

1282. Geldsetzer, H., Geowest Services Ltd., Alberta, and Queen's Univ.:
Tectonic, environmental , and diagenetic history of the Helikian time interval in northern Baffin Island, Northwest Territories, 1970.

1283. Kerr, J.W., Geol. Surv. Canada:
Stratigraphy and structure, central Ellesmere Island, Northwest Territories, 1961-70.
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.
Stratigraphy and structure, S.W. Ellesmere Island and N.W. Devon Island, Northwest Territories, 1967-72.
The investigation will produce further 1 inch to 2 mile maps of the region.

1284. Kerr, J.W., Temple, P.G., Geol. Surv. Canada:
Stratigraphy and structure, Bathurst Island, Northwest Territories, 1963-72.
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.

1285. Trettin, H.P., Geol. Surv. Canada:
Stratigraphy and regional structure of lower Paleozoic formations Foxs Basin, northeastern Melville Peninsula, and parts of northern and central Baffin, Island, 1968-71.

Nova Scotia

1286. Fyson, W.K., Carrara, A., Attoh, K., Univ. of Ottawa:
Relationship of small-scale to large-scale structures in Paleozoic rocks, Nova Scotia, Gaspé Peninsula, and Eastern Townships, Quebec, 1962-; Ph. D. thesis (Carrara and Attoh).
See Structural development of the Paleozoic rocks of western Gaspé, Quebec; Can. J. Earth Sci., vol. 6, pp. 1113-1127, 1969. See Joint patterns in Lower Paleozoic rocks of western Gaspé, Quebec; Bull. Geol. Soc. Am., vol. 80, pp. 2321-2326, 1969.

1287. Keating, B.J., Saint Francis Xavier Univ.:
Structural, stratigraphic and age relationships that prevail between various units of the George River Group, 1967-71.
Since 1961 abundant field data has accumulated from various George River areas in Cape Breton and Saint John district, N.B. Only within last couple of years has complexity of structure been partly resolved. Some of the field data has been suitable for integration into a radiometric dating study of Cape Breton intrusives by R.F. Cormier, An alaskite, intrusive into George River crystalline limestone and dolomite, has been dated at about 500 x 10^6 years. Inference from field evidence suggests that other intrusives associated with George River metasediments may be earlier in age. Laboratory work to date has not served to support this inference beyond the suggestion of older ages in intrusives of distinctly different petrographic aspect from the alaskite.

1288. Keen, M.J., Beaumont, C., Dalhousie Univ.:
Study of the earth's crust by tidal loading, 1967-73; Ph.D. thesis (Beaumont).
See A new technique for installation of tiltmeters; Earth and Planetray Sci. Letters, 1970.

Ontario

1289. Ambrose, J.W., Queen's Univ.:
Clear Lake folds and associated mylonite zones, 1969-.
A study of the geometry and kinematics of a series of folds in Grenville rocks north of Kingston.

1290. Brigham, R.J., Univ. of Western Ontario:
Structural geology of Paleozoic sediments in southwestern Ontario, 1964-71; Ph.D. thesis.
The flat lying sediments are crossed by the Algonquin arch and the Chatham sag. A regional study utilizing the Ontario Well Data file will provide insight to the tectonic history.

1291. Brown, R., Cruden, D.M., Carleton Univ. and Univ. of Ottawa:
Fabric of Ottawa region, 1970-.
An attempt to compile a data bank of fabric elements on all scales for the region round Ottawa.

1292. Currie, A., Schwerdtner, W.M., Currie, J.B., Univ. of Toronto:
Structural analysis of Clare River synform, Ontario, 1969-71; M.Sc. thesis (A. Currie).

1293. Fabbri, A., Univ. of Ottawa:
Structural and textural studies of gneisses near Sparrow Lake, Muskoka area, Ontario, 1968-71; Ph.D. thesis.

1294. Fyson, W.K., Divi, R., Univ. of Ottawa:
Structural analysis of Grenville rocks, Madoc-Bancroft area, Ontario, 1967-71; Ph.D. thesis (Divi).

1295. McIlreath, I., Queen's Univ.:
A study of the primary dip concept in the Middle Ordovician strata adjacent to the Frontenac axis, 1969-71; M.Sc. thesis.
Studies of petrofabrics of inclined carbonate strata suggest Frontenac Axis has been uplifted in post-Ordovician time, and inclination presently observed in the limestones of areas near Axis may not be entirely due to 'supertenuous folding'.

1296. Pyke, D.R., Ontario Dept. of Mines & Northern Affairs:
Structural geology of the Timmins Gold Area, District of Cochrane, Ontario, 1969-73.

1297. Ranalli, G., Carleton Univ.:
Relations between geophysical and structural patterns in the Ottawa Valley, 1970-73.
To study thecorrelations between available geophysical information (gravity, aeromagnetics, seismicity) and the geologic and structural evolution of the Ottawa Valley from approximately 74°W to 76°W.

Quebec

1298. Barton, E., Eakins, P.R., McGill Univ.:
Computer application to tectonic data, 1970-71; M.Sc. thesis (Barton).
A detailed analysis of structural elements of the Granby area.

1299. Charre, R., Ministére des Richesses naturelles du Québec:
Study along the Grenville Front northwest of the Gouin Reservoîr, Abitibi County, 1969-73.
Structural and petrographic study of the rocks along the Grenville Front in the area northwest of the Gouin Reservoir.

1300. Dimroth, E., Ministére des Richesses du Québec:
Central Labrador Trough, Quebec 1963-72.
Investigation of the stratigraphy and facies distribution of the Denault, Fleming, Ruth and Sokoman Formations, and Tectonics of the central Labrador Trough, in particular in the segment between 56°00' N and 56°30'. Voir Evolution of the Labrador Geosyncline; Bull. Geol. Soc. Amer., vol. 81, pp. 2717-2747, 1970.

1301. Fyson, W.K., Carrara, A., Attoh, K., Univ. of Ottawa:
Relationship of small-scale to large-scale structures in Palaeozoic rocks, Nova Scotia, Gaspé Peninsula, and Eastern Townships, Quebec, 1962-; Ph.D. thesis (Carrara and Attoh).
See Structural development of the Paleozoic rocks of western Gaspé, Quebec; Can. J. Earth Sci., vol. 6, pp. 1113-1127, 1969. See Joint patterns in Lower Paleozoic rocks of western Gaspé, Quebec; Bull. Geol. Soc. Am., vol. 80, pp. 2321-2326, 1969.

1302. Hogarth, D.D., Univ. of Ottawa:
Structure, geology and mineralogy of the southern Gatineau Park, Quebec, 1956-.

Origin of eulvsite and carbonatite in the Park region. See Geology of the southern part of the Gatineau Park, National Capital region; Geol. Surv. Can., Paper 70-20.

1303. LeCorre, B., Eakins, P.R., McGill Univ.:
Structural geology of the LaSarre-LaReine region, northwestern Quebec, 1970-71; M.Sc. thesis (LeCorre).
A detailed analysis of local and regional structural geology in part of northwestern Quebec.

1304. Muller, J., Certon, Jean Marie, Ministére des Richesses Naturelles du Québec:
Geological and structural study of the St. Sylvestre area in the Appalachians of Quebec (Eastern Township). 1969-71.

1305. Rondot, J., Ministére des Richesses Naturelles du Québec:
A study of the Charlevoise semi-circular structure, 1969-72.
Voir La structure de Charlevoise comparée à d'autres impacts météoritiques; Can. J. Earth Sci., vol. 7, No. 5, 1970.

1306. Hubert, C., Granger, B., Beriault, A., Ministére des Richesses Naturelles, du Québec:
Structure of the Rosaire Group and the Bennett Schists of the St. Malachie area, Dorchester County, Quebec, 1970-71.

1307. St-Julien, Pierre, Université Laval:
Etudes structurales et stratigraphiques des roches allochtones de la région de Québec, 1969-71.
Etudes structurales des Schistes de Bennett, 1969-71.

1308. Williams, M., Eakins, P.R., McGill Univ.:
Study of a fold belt in the Snegamook Lake map area, Labrador.
A detailed study of the structure and stratigraphy of a key area in the eastern Precambrian Shield of Canada.

1309. Wynne-Edwards, H.R., Bourne, J.H., Queen's Univ.:
Regional 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 Intersecting orogenic belts across the North Atlantic; Am. J. Sci., vol. 268, pp. 289-308, 1970.

1310. Wynne-Edwards, H.R., Fuh, Tsu-Min, Queen's Univ.:
Geochemical correlation of rocks on either side of the Grenville Front at Val d'Or, Quebec, 1967-70; Ph.D. thesis (Fuh).
A test by geochemical correlation using five sample area of the hypothesis that the Archaean rocks near Val d'Or including the Abitibi greenstone belt, continue eastward in the Grenville Province.

General

1311. Bell, J.S., Univ. of Alberta:

Structural evolution of northern Venezuela, 1964-.

1312. Brown, A., Queen's Univ.:
Structural geology of Opemiska ore deposit, 1962-70; Ph.D. thesis.

1313. Burwash, R.A., Krupicka, J., Univ. of Alberta:
Cratonic dynamics of interior basins, 1970-73.
See Cratonic reactivation in the Precambrian basement of Western Canada. Part II. Metasomatism and isostasy; Can. J. Earth. Sci., vol. 7, pp. 1275-1294, 1970.

1314. Fyson, W.K., Univ. of Ottawa:
Structural patterns in metamorphic rocks, 1970-.

1315. Geldsetzer, H., Smith, D.L., Queen's Univ.:
Tectonically controlled sedimentation in the Middle Paleozoic of northeastern North America, 1967-70; Ph.D. thesis (Geldsetzer).
The Late Silurian to Early Mississippian time interval is subdivided into depositional and hiatal episodes. The tetonic control of such unconformity-bounded depositional sequences is discussed in terms of plate tectonics. Physical discontinuities are contrasted with biostratigraphic boundaries. The epicontinental setting of a sequence is analysed in terms of its physical parameters such as the geometrical configuration and the nature and distribution of depositional environments and is compared with the eustatically controlled depositional environments of the Quaternary. The temporal and spatial development of epeiric depositional environments is shown to be controlled primarily by differential subsidence and secondarily by differential aggradation.

1316. Gretener, P.E., O'Connor M., Davis, T., Aylesworth, A., Siegenthaler, C., Univ. of Calgary:
Compaction around reefs; overthrust faulting; shallow geothermics, 1969-72; graduate studies (O'Connor, Davies, Aylesworth).

1317. Hood, P.J., Bower, M.E., Geol. Surv. Canada:
Ocean aeromagnetics, 1962-.
To conduct high resolution aeromagnetic surveys over the Canadian Continental Shelves for purposes of delineating sedimentary basins; 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 profile from Cape Cargenholm, Baffin Island to Red Head, Greenland; Geol. Surv. Can., Paper 70-1, Pt. B, pp. 37-39, 1970.

1318. Kerr, J.W., Geol. Surv. Canada:
Studies of continental drift, 1966-.

1319. Kluyver, H.M., Queen's Univ.:
Lower Paleozoic tectono-stratigraphy of the northern Appalachians and the Caledonides, 1969-71; Ph.D. thesis.

1320. Martingnole, J., Goulet, N., Schimann, K., Hébert, Y., Bouillon, J.J., Barondeau, B., Ministére des Richesses Naturelles du Québec et Université de Montréal:
Recherches Pétrologiques et Structurales dans le Sud de la Province de Grenville, 1965-72.
See Tectonic setting and evolution of the Morin Anorthosite, Grenville Province, Québec; Bull. Géol. Soc. Finl., vol. 42, pp. 165-209, 1970.

1321. Nelson, S.J., Univ. of Calgary:
Geological history of western Canada, 1966-75.
Palaeogeographic and structural reconstructions of Western Canada, including the Arctic Islands from Precambrian to Recent by means of coloured block diagrams. See The Face of Time; Alberta Soc. Petrol. Geol. Atlas, 1970.

1322. Oriel, S.S., Price, R.A., U.S. Geol. Surv. and Queen's Univ.:
The tectonic record in the foreland margin of the Cordillera and the evolution of the interface along the western margin of the North America lithospheric plate, 1970-71.
An evaluation of the nature and timing of the deformation along the foreland margin of the Cordillera and southern Canada and the northern United States, and its implications for the evolution of the interface along the western margin of the North America lithosphere plate.

1323. Picklyk, D.D., Price, R.A., Queen's Univ.:
Mathematical modelling of geologic structures, 1969-72; Ph.D. thesis (Picklyk).
To simulate the evolution of geologic structures encountered in the southeastern Canadian Cordillera by mathematical modelling of progressive deformation in inhomogeneous materials using finite element methods.

1324. Poole, W.H., Rogers, J., Geol. Surv. Canada and Yale Univ.:
International Geological Congress 1972, Field Trip A63, C63, "Appalachian Geotectonic Elements, 1970-72".
Purpose is to demonstrate the Paleozoic geotectonic elements which were active during the evolution of the Appalachian geosynclinal belt in Canada. Two traverses will be followed, one across Newfoundland and the other across Nova Scotia, New Brunswick and Gaspé Peninsula, Quebec.

1325. Price, R.A., Queen's Univ.:
The significance of fabrics imposed on rocks under conditions of brittle deformation, 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, brittle conditions.
Tectonic evolution of the southeastern Canadian Cordillera and the nature and significance of variations in tectonic style, 1968-.

1326. Ranalli, G., Carleton Univ.:
Global tectonics and the rheology of the earth, 1971-.
Investigation of the possible rheological and thermal processes which can bring about the observed geotectonic features.

1327. Riva, J., Université Laval:
Thrusts in northeastern Nevada, U.S.A., 1959-70.
See Thrusted Paleozoic rocks in the northern and central HD Range, northeastern Nevada; Bull. Geol. Soc. Amer., vol. 81, pp. 2689-2716, 1970.

1328. Rousell, D.H., Laurentian Univ.:
Strain determination of experimentally deformed oolitic limestone, 1969-71.
To determine the strain from several cylinders of oolitic limestone experimentally shortened in a triaxial test apparatus. Parameters of strain are changes in shape and orientation of the ooids and mechanically formed twins in calcite.

1329. Rychener, L.M., Price, R.A., Queen's Univ.:
Structure and paleotectonic significance of roof pendants in the south-central part of the Idaho batholith, 1966-72; Ph. D. thesis (Rychener).
To establish the sedimentary facies, structural geometry, and deformational and metamorphic history of a series of roof pendants in the south-central Idaho batholith and their implications for regional tectonic evolution.

1330. Schwerdtner, W.M., and students, Univ. of Toronto:
Prophyroclast (ovoid) fabrics in mylonite zones, 1968-.
The project examins the possibility of reconstructing fault-displacement directions or movement directions from the prophyroblast fabric. This method might be applied to fault zones that are parallel to the regional gneissosity.

1331. Schwerdtner, W.M., Waddington, D., Univ. of Toronto:
Kinematic significance of mineral lineation (elongation) and schistosity, 1966-; M.Sc. thesis (Waddington).
This long-range project examins the relationships between mineral elongation, schistosity and directions of paleo-strain, in order to provide the field geologist who maps these structures with a better tool for regional structural interpretation. See Hornblende lineations in Trout Lake Area, Lac La Ronge Map Sheet, Saskatchewan; Can. J. Earth Sci., vol. 7, p. 884., 1970.

1332. Smith, L., Queen's Univ.:
Mesozoic and Tertiray sequences in the eastern canadian continental shelf and their relation to continental drift, 1968-71.
Lithic data combined with micropalentologic data, from deep wells, is being used to produce a stratigraphic synthesis for the area. The succession of sequences preserved in the shelf are thus delineated, their depositional environments are realized and the regional and saltdome tectonic history of the continental margin is perceived. See Mesozoic and Cenozoic history of the Grand Banks of Newfoundland; Can. J. Earth Sci., in press, vol. 8, No. 1, pp. 65-84, 1971.

1333. Stauffer, M.R., Univ. of Saskatchewan:
The geometry and textures of deformed rocks, 1965-.
See Deformation textures in tectonics; Can. J. Earth Sci., vol. 7, No. 2, pp. 498-511, 1970.

1334. Steiner, J., Univ. of Alberta:
Continenal drift and an expanding earth, 1969-72.
Computer fit of Africa and South America on a globe of a smaller radius than the present one.

1335. Stevens, R.K., Univ. of Toronto:
Plate tectonics, 1969-.
An analysis of the anatomy of mountain systems and their interpretation in terms of plate tectonics, with concentration on the identification and description of ancient oceanic lithosphere stranded on the continents. See Cambro-Ordovican flysch sedimentation and tectonics in West Newfoundland and their possible bearing on a Proto-Atlantic Ocean; Geol. Assoc. Can., Spec. Paper No. 7, pp. 176-177, 1970.

1336. Tanguay, M.G., Bensoussan, Aimé, M., Do Lam Sinh, M., Ecole Polytechnique:
Etude de la réflectance spectrale des matériaux terrestres (NRC); Optical processing of aerial photo patterns by coherent light (GSC), 1969-73.

1337. Wilson, J.T., Stevens, R.K., Univ. of Toronto:
Plate tectonics.
Compilation of data on plate tectonics and its interpretation especially in terms of determining effect on continents of overriding mid-ocean ridges (e.g., the south-western U.S.A. overriding the East Pacific Rise in Neogene time) and in terms of defining parts of other continents now incorporated in North America.

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