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NATIONAL ADVISORY COMMITTEE ON RESEARCH IN THE GEOLOGICAL SCIENCES

CURRENT RESEARCH IN THE GEOLOGICAL SCIENCES IN CANADA, 1971-72

Compiled by Thomas E. Bolton

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GEOLOGICAL SURVEY OF CANADA PAPER 72-5

DEPARTMENT OF ENERGY, MINES AND RESOURCES

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CURRENT RESEARCH IN THE GEOLOGICAL SCIENCES IN CANADA, JUNE, 1971 - MAY, 1972

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 on Seismology and Physics of the Earth's Interior. Details of geomorphological and glaciological research in Canada are included in the Inland Waters Branch, Energy, Mines and Resources, Report Series No. 15, 1971.

The survey was made between November, 1971 and January, 1972 and records research in progress from about June, 1971 to May, 1972.

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. 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 voluntarily 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 provided, in addition to the title, a short statement on the subject under investigation and references to their most recent publication on the projects. Those recorded in detail in the report of Current Research in the Geological Sciences in Canada, 1970-71, Geological Survey of Canada, Paper 71-5, 1972, are included in this year's survey by title only, unless new information was provided.

Many projects that seem to fall equally well under more than one heading are repeated under these headings. An author index (p. 170) 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. Bayrock, L.A., Boydell, A.N., Research Council of Alberta:
Surficial geology of the Rocky Mountain House area, Alberta, 1969-.
During Late Pleistocene (Wisconsin) time, the continental and mountain glaciers fused near the present townsite of Rocky Mountain House, producing a single ice sheet which flowed southeastward along the Foothills margin. Subsequent recession produced a separation of ice sheets with consequent development of a series of recessional moraines. A pre-Wisconsin till deposited by an older mountain ice sheet has been discovered on some of the high plateaus marginal to the Foothills.

2. Godfrey, J.D., Research Council of Alberta:
Precambrian bedrock mapping, northeastern Alberta, 1969-.
Reconnaissance mapping on a scale of 2 inches to 1 mile has been carried out on 510 square miles of Precambrian Shield in the Wylie Lake district.

3. Green, R., Research Council of Alberta:
Geologic map of Alberta, 1969-71.
Publication of the map, scale 1 inch = 20 miles, is anticipated early in 1972.

4. McPherson, R.A., Research Council of Alberta:
Surficial geology of the northern Foothills, 1972-.
Reconnaissance surficial geology mapping (1 inch = 4 miles) of the northern Foothills of Alberta will be conducted in the summer of 1972, utilizing helicopter mapping techniques developed in northeastern Alberta for forested terrain. The area to be mapped initially encompasses the Wapiti and north half of the Mount Robson sheets (N.T.S. Sheets 83L and 83E), and includes the portion of the Rocky Mountains and Foothills from the British Columbia border to the northern boundary of Jasper National Park.

5. Mellon, G.B., Kramers, J.W., Research Council of Alberta:
Bedrock mapping western Plains, Alberta, 1969-72.
Coal deposits of the northern part of the area have been described.

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

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-.

AREAL GEOLOGY

British Columbia

8. Carter, N.C., British Columbia Dept. of Mines and Petroleum Resources:
Geology and Mineral Deposits of the Alice Arm Area, British Columbia, 1968-72.
Mesozoic volcanic and sedimentary rocks on the east flank of the Coast Plutonic Complex.

9. Church, B.N., British Columbia Dept. of Mines and Petroleum Resources:
Geology of southwestern part of the Boundary District, British Columbia, 1970-71.

10. Fyles, J.T., British Columbia Dept. of Mines and Petroleum Resources:
Geology of the Rossland mining camp, British Columbia, 1968-72.

11. Garnett, J.A., British Columbia Dept. of Mines and Petroleum Resources:
Preliminary map, Hogem Batholith, Duckling Creek area, north-central British Columbia, 1971-.
Investigation of areas of copper mineralization within a syenitic complex affecting a diorite-monzonite phase of the Hogem batholith, part of the Omineca Intrusions.

12. Grove, E.W., British Columbia Dept. of Mines and Petroleum Resources:
Geology and Mineral Deposits, Unuk-Salmon River - Anyox areas, British Columbia, 1964-74.

13. McMillan, W.J., Grove, E.W., Agar, C., British Columbia Dept. of Mines and Petroleum Resources:
Geology and Mineral Deposits of the Guichon Creek Batholith, British Columbia, 1969-73.
Special emphasis is being placed on the structural development of the batholith with gravity and magnetic anomalies.

14. Monger, J.W.H., Geological Survey of Canada:
Upper Paleozoic rocks of the western Canadian Cordillera, 1966-.
Upper Paleozoic rocks in the western Canadian Cordillera contain elements of island arcs and oceanic crusts and are the oldest known rocks in the intermontane belt and coast mountains. Their distribution has an important bearing on the development of the Cordillera, according to current plate-tectonic hypotheses.

15. Northcote, K.E., British Columbia Dept. of Mines and Petroleum Resources:
Geology and mineral deposits of Rupert Inlet - Cape Scott map-area, Vancouver Island, British Columbia, 1968-72.

16. Preto, V.H., Church, B.N., British Columbia Dept. of Mines and Petroleum Resources:
Structure, stratigraphy and mineral deposits of the Upper Triassic Nicola Group, British Columbia, 1972-75.
The stratigraphy and structure and the relationship of the distribution of volcanic centres and comagmatic intrusions to the distribution of mineral deposits, will be investigated.

Manitoba

17. Bailes, A.H., Manitoba Dept. of Mines, Resources and Environmental Management:
Guay - Wimapedi Lakes area, Manitoba, 1968-72.

18. Bailes, A.H., Manitoba Dept. of Mines, Resources and Environmental Management:
The relationship of the Kisseynew Sedimentary Gneiss belt to the Flin Flon - Snow Lake greenstone belt, 1969-.
See Preliminary compilation of the geology of the Snow Lake - Flin Flon - Sherridon area; Manitoba Mines Br., Geol. Paper 1/71, 1971.

19. Bell, C.K., Geol. Surv. of Can.:
Upper Nelson River area, Manitoba, 1966-.
See Boundary geology, upper Nelson River area, Manitoba and northwestern Ontario; Geol. Assoc. Can., Sp. Paper No. 9, pp. 11-40, 1971.

20. Ermanovics, I.F., Geol. Surv. of Can.:
Precambrian Geology of Norway House and Grand Rapids map-areas, Manitoba, (63H and 63G), 1971-72.
'To relate intervolcanic belt' areas to a tectonic framework consistent with that which is known for the volcanic-sedimentary rock belts. See "Granites", "granite gneiss" and tectonic variation of the Superior Province in southeastern Manitoba; Geol. Assoc. Can., Sp. Paper 9, pp. 77-82, 1971.

21. McRitchie, W.D., Baldwin, D.A., Frohlinger, T.G., Manitoba Dept. of Mines, Resources and Environmental Management:
Burntwood Project, 1971-74; Ph.D. theses.
Regional geological mapping of the upper amphibolite facies metasedimentary gneiss associations in the Nelson House-Pukatawagan region is being conducted as a preliminary to more intensive studies on sedimentation structure and metamorphism that will eventually lead to a correlation between the geology in the Lynn Lake, Flin Flon and Thompson regions, northern Manitoba. See Burntwood project; Manitoba Mines Br., Geol. Paper 6/71, pp. 20-45, 1971.

22. Scoates, R.F.J., Campbell, F.H.A., Elbers, F.J., Gilbert, P.E., Manitoba Dept. of Mines, Resources and Environmental Management:
Greenstone project, 1971-73.

23. Weber, W., Lamb, C., Thomas, K.A., Schledewitz, D.C.P., Manitoba Dept. of Mines, REsources and Environmental Management:
Kasmere Lake project, 1971-73.
Lithology, structure, metamorphism and economic geology of the Wollaston Lake fold belt in northwestern Manitoba.

AREAL GEOLOGY

New Brunswick

24. Davies, J.L., Carleton Univ.:
Geology and geochemistry of the Austin Brook area, with special emphasis on the Austin Brook iron formation; 1972; Ph.D.

25. Greiner, H.R., Univ. of New Brunswick:
Geology of the Campbellton, Oak Ray (east half) and Escuminac (west half) areas, New Brunswick, 1970-71.

26. Grrinki, R.R., Fyffe, L.R., Davies, J.L., New Brunswick Dept. of Natural Resources:
Bathurst-Newcastle area, New Brunswick, 1970-73.
Detailed mapping of the Ordovician fold-belt that hosts a number of large economically important stratabound Zn, Pb, Cu sulphide deposits.

27. Skinner, R., Geol. Surv. of Can.:
Juniper (east half) map-area, New Brunswick, 1971-73.
The map-area lies on the west flank of the Miramichi Highlands of New Brunswick, about 30 miles northeast of Woodstock. The central and eastern parts of the area are underlain by mainly granitic rocks of Devonian and older age that enclose large masses of paragneiss. The granitic rocks are bordered on the west by tightly folded Silurian and/or Devonian volcanic and sedimentary rocks. See Juniper (east half) map-area, New Brunswick (21 J/11, E½); Geol. Surv. Can., Paper 72-1A, 1972.

Newfoundland and Labrador

28. Cumming, L.M., Bostock, H.H., Geol. Surv. of Can.:
Operation Strait of Belle Isle, 1969-72.
See Operation Strait of Belle Isle, Newfoundland and Labrador; Geol. Surv. Can., Paper 71-1, Pt. A, pp. 2-6, 1971. Precambrian geology, Strait of Belle Isle; Geol. Surv. Can., Paper 71-1, Pt. A, pp. 122-123, 1971.

29. Greene, B.A., Newfoundland and Labrador Dept. of Mines, Agriculture and Resources:
Geological map of Labrador, 1970-72.

30. Stevens, R.K., Memorial Univ.:
Geology of the Bonne Bay area, west Newfoundland, 1971-73.

31. Sutton, J.S., Brown, P., Memorial Univ.:
Geology of the area from Cape Ray to Rose Blanche, southwestern Newfoundland, 1970-72; M.Sc. thesis (Brown).
Status and history of the metamorphic rocks of the area and their relationship to a series of older gneisses and younger volcanic and sedimentary rocks occurring in the Cape Ray area.

32. Sutton, J.S., Marten, B.E., Clark, A.M.S., Memorial Univ.:
Geology of the Kaipokok Bay area, Labrador, 1969-72; Ph.D. theses (Marten, Clark).
Primarily concerned with the internal constitution and history of the two major rock units of the area, the Hopedale Gneiss Complex and the Aillik Group. The interaction between these two units during Hudsonian deformation and metamorphism is being paid special attention as an example of basement-cover interaction during orogenesis. See Structural history of the Kaipokok Bay area, Labrador, Newfoundland; Proc. Geol. Assoc. Can., vol. 24, pp. 103-106, 1971.

33. Taylor, F.C., Geol. Surv. of Can.:
Operation Tarngat, 1966-73.

Northwest Territories

34. Aitken, J.D., Univ. of Calgary, Balkwill, H.R., Cook, D.G., Yorath, C.J., Geol. Surv. of Can.:
Operation Norman, 1967-74.
To conduct stratigraphic and structural studies, and to evaluate the economic potential of the bedrock in the Great Bear, Horton, Anderson, and Mackenzie Plains, and in the Colville Hills, the Franklin Mountains, and part of the northern Mackenzie Mountains. See Operation Norman; Geol. Surv. Can., Paper 71-1, Pt. A, pp. 197-201, 1971.

35. Henderson, J.B., Geol. Surv. of Can.:
Yellowknife and Hearne Lake map-areas, District of Mackenzie, 1970-74.
To revise existing maps of the area where necessary and to investigate the relationship between Archean Yellowknife Supergroup sediments and volcanics, the origin of the sediments, their provenance and environment of deposition. See Yellowknife and Hearne Lake map-areas, District of Mackenzie with emphasis on the Yellowknife Supergroup (Archean); Geol. Surv. Can., Paper 72-1A, Pt. A, pp. 117-119, 1972.

36. Kerr, J.W., Geol. Surv. of Can.:
Stratigraphy and structure of central and eastern Ellesmere Island, Northwest Territories, 1961-72.

37. Kerr, J.W., Geol. Surv. of Can.:
Southwest Ellesmere Island and western Devon Island, Northwest Territories, 1967-72.

38. Lerand, M.M., Gulf Oil Canada Limited:
Petroleum potential of the Beaufort Sea.
A regional stratigraphic-structural analysis of mainland regions bordering the Arctic Ocean combined with offshore geophysical data to aid in determining the origin, presence, kind of structural traps, reservoirs and source beds underlying the continental shelves and adjacent coastal plains of the Beaufort Sea.

AREAL GEOLOGY

39. Ridler, R.H., Geol. Surv. of Can.:
Volcanic study in Ennadai Belt, District of Keewatin, 1970-72.
Preliminary examination of chemical data confirms that the Kaminak Group volcanics are calc-alkaline. See Relationship of mineralization to stratigraphy in the Archean Rankin Inlet - Ennadai Belt; Can. Mining J., vol. 92, No. 11, pp. 50-53, 1971.

40. Roy, K.J., Geol. Surv. of Can.:
Northern basin analysis program: Belcher Channel, Viscount Melville, Lancaster Sound, and Ballantyne Strait map-areas, Northwest Territories, 1971-.
See Bjorne Formation (Lower Triassic), western Ellesmere Island; Geol. Surv. of Can., Paper 72-1, Pt. A, pp. 224-226, 1972.

Nova Scotia

41. Keating, B.J., St. Francis Xavier Univ.:
Structural, stratigraphic and age relationships that prevail between various units of the George River Group, Cape Breton Island, Nova Scotia, 1961-.

Ontario

42. Ayres, L.D., Ontario Dept. of Mines and Northern Affairs:
Favourable Lake - Poplar Hill compilation sheet, 1968-72.

43. Ayres, L.D., Ontario Dept. of Mines and Northern Affairs:
Setting Net Lake - Northwind Lake areas, 1968-72.

44. Bennett, G., Ontario Dept. of Mines and Northern Affairs:
The geology of the northeast Timagami area, Ontario, 1969-73.
The general geology of Briggs, Strathcona, Strathy and Chambers townships with special attention to the metavolcanics and enclosed mineral deposits.

45. Bennett, G., Ontario Dept. of Mines and Northern Affairs:
The geology of the Lang-Stover area, Ontario, 1971-74.

46. Blackburn, C.E., Ontario Dept. of Mines and Northern Affairs:
Lower Manitou - Uphill Lakes area, District of Kenora, Ontario, 1971-73.

47. Blackburn, C.E., Ontario Dept. of Mines and Northern Affairs:
Off Lake - Burditt Lake area, District of Rainy River, Ontario, 1970-72.

48. Bond, W.D., Ontario Dept. of Mines and Northern Affairs:
Savant Lake area (McCubbin, Poisson and McGillis Townships), District of Thunder Bay, Ontario, 1971-72.

49. Bright, E.G., Ontario Dept. of Mines and Northern Affairs:
Geology and economic mineral deposits of the Timmins area, Ontario, 1970-72.

50. Bright, E.G., Ontario Dept. of Mines and Northern Affairs:
Geology of Beemer-English-Zavitz Townships; Geology of Moher-Semple-Hutt Townships, Ontario, 1968-.

51. Bright, E.G., Hunt, D.S., Ontario Dept. of Mines and Northern Affairs:
Timmins data series maps, 1970-.
The TIMMINS DATA SERIES program is designed to gather all available geological data (bedrock and drill core information) heretofore not available to the public at large. This data together with all public geological and geophysical information is reproduced at 1 inch to ¼ mile with adjoining 1 inch to 1 mile inset maps depicting (a) regional interpretive geology, (b) regional aeromagnetics, (c) regional surficial geology, and (d) index of exploration work carried out.

52. Card, K.D., Ontario Dept. of Mines and Northern Affairs:
Panache Lake area, District of Sudbury, Ontario, 1959-73.
Geology of that part of the eastern Southern Province bounded by latitudes 45°52' -46°30' and longitudes 81°00' - 82°00'.

53. Card, K.D., Palonen, P.A., Ontario Dept. of Mines and Northern Affairs:
Shakespeare-Dunlop area, Ontario, 1970-71.
Part of a broad study of the eastern part of the Southern Province with emphasis here on the Southern Province-Superior Province boundary and on layered gabbro-anorthosite plutons.

54. Carter, M.W., Ontario Dept. of Mines and Northern Affairs:
MacMurchy and Tyrrell Townships, Ontario, 1971-72.
To outline the mappable lithological units and study the nature and distribution of known mineral deposits with respect to the lighological units and/or structures. The area is underlain by Archean volcanics and sedimentary rocks which are intruded by igneous rocks. Proterozoic rocks comprise mafic igneous, and sedimentary rocks which overlie unconformably the Archean sequence.

55. Carter, M.W., Ontario Dept. of Mines and Northern Affairs:
Operation Rossport: Dickison Lake area, Ontario, 1969-71.
See Prel. Map P.690, Ontario Dept. of Mines and Northern Affairs, 1971.

56. Carter, M.W., McIlwaine, W.H., Robeson, D., Ontario Dept. of Mines and Northern Affairs:
Nipigon-Schreiber sheet (1 inch to 4 miles), District of Thunder Bay, Ontario, 1970-71.

57. Chandler, F.W., Ontario Dept. of Mines and Northern Affairs:
Wakomata Lake area, Ontario, 1971-73.
Part of continuing project aiming at resolving Huronian stratigraphy west of (approximately) longitude 83°. See

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Wakomata Lake area (west half). District of Algoma; Ontario Dept. of Mines and Northern Affairs, Misc. Paper 49, pp. 76-81, 1971.

58. Davies, J.C., Ontario Dept. of Mines and Northern Affairs:
Geology of the northern part of Shoal Lake and western peninsula, Ontario, 1968-72.
Two groups of volcanic rocks, each of which consists in general of a lower mafic flow unit and an upper unit of felsic pyroclastic rocks and derived sedimentary rocks are exposed in this part of the type-Keewatin section. The volcanic rocks have been intruded by sill-like mafic and ultramafic masses and by a number of distinct granitic plutons. The area contains several past-producing gold mines and some small base metal occurrences.

59. Davies, J.C., Morin, J.A., Ontario Dept. of Mines and Northern Affairs:
Geology of the Cedartree lake area, Ontario, 1971-72.
A 40,000-foot section of Archean volcanic rocks consists mainly of 15,000 feet of mafic flows overlain by intermediate to felsic pyroclastic rocks and derived sediments. The base as exposed is in contact with a granitic batholith; the metamorphism decreases upward in the section. Three differentiated (ultramafic to mafic) sills occur in the central part of the section. Numerous gold occurrences are associated with fractures and porphyry dikes.

60. Fenwick, K.G., Ontario Dept. of Mines and Northern Affairs:
Geology of the Lang-Cannon Lakes area, Ontario, 1969-73.

61. Frey, E.D., Lovell, H.L., Ontario Dept. of Mines and Northern Affairs:
Geology of Gauthier Township, Ontario, 1971-.
A re-survey, utilizing improved access and aerial photography.

62. Frey, E.D., Lovell, H.L., Ontario Dept. of Mines and Northern Affairs:
Geology of Dymond, Hudson, Kerns, Harley, Brethour, Hillard, Armstrong, Evanturel, Ingram, and Pense Townships, Ontario, 1970-.
The project was initiated to contribute to land-use planning around all communitites of the Little Clay Belt, including New Liskeard, Earlton, and Englehart.

63. Jensen, L.S., Ontario Dept. of Mines and Northern Affairs:
Elliot, Tannahill and Dokis Townships, District of Cochrane, Ontario, 1971-72.

64. Jensen, L.S., Ontario Dept. of Mines and Northern Affairs:
Pontiac and Ossian Townships, District of Timiskaming, Ontario, 1970-72.
See Prel. Map, P.629; Ontario Dept. of Mines and Northern Affairs, 1971.

65. King, H.L., Ontario Dept. of Mines and Northern Affairs:
Guide book: Geology and scenery of the Lake of the Woods - Rainy River area, Ontario, 1970-72.

66. King, H.L., Ontario Dept. of Mines and Northern Affairs:
Keewatin-Kenora area, Ontario, 1969-73.

67. Kustra, C.R., King, H.L., Ontario Dept. of Mines and Northern Affairs:
Atikokan - Lakehead sheet, 1970-72.
Revision of the 1 inch to 4 mile Atikokan-Lakehead compilation map.

68. Liberty, B.A., Brock Univ.:
Palaeozoic mapping of Southern Ontario, 1969-.
Middle and Upper Submembers of the Gull River Formation's Member A have been recognized as far north as Arnprior and Pembroke in the Ottawa Valley. Similarly Bobcaygeon and Verulam Formations have been recognized in outliers as an extension from the Arnprior area.

69. Lumbers, S.B., Ontario Dept. of Mines and Northern Affairs:
Geology of the Tomiko area, Ontario, 1969-72.
In addition to outlining the major geological features and mineral potential of the Grenville Province and of the immediately adjacent Southern and Superior Provinces, the study attempts to define the Grenville Front and to determine relationships of the southern and Superior Provinces to the Grenville Province. See Some aspects of the northwestern margin of the Grenville Province between Sudbury and Lake Timiskaming, Ontario; Geol. Assoc. Can. - Mineral. Assoc. Can., Annual Meeting Abstract, 1971.

70. Lumbers, S.B., Ontario Dept. of Mines and Northern Affairs:
Geology of the River Valley area, Ontario, 1971-73.

71. Mackasey, W.O., Ontario Dept. of Mines and Northern Affairs:
Geology of Walters and Leduc Townships, District of Thunder Bay, Ontario, 1968-72.

72. Mackasey, W.O., Ontario Dept. of Mines and Northern Affairs:
Geology of Eva and Summers Townships, District of Thunder Bay, Ontario, 1969-72.

73. Mackasey, W.O., Ontario Dept. of Mines and Northern Affairs:
Geology of Barbara, Meader and Pifher Townships, District of Thunder Bay, Ontario, 1970-72.

74. McIlwaine, W.H., Ontario Dept. of Mines and Northern Affairs:
Geology of Dorion Township and vicinity, District of Thunder Bay, Ontario, 1971-74.

75. McIlwaine, W.H., Ontario Dept. of Mines and Northern Affairs:
The geology of McTavish Township, District of Thunder Bay, Ontario, 1971-73.

76. Meyn, H.D., Ontario Dept. of Mines and Northern Affairs:
Frechette, McNamara, Cotton Townships, Ontario, 1971-72.

AREAL GEOLOGY

77. Milne, V.G., Breaks, F.W., Ontario Dept. of Mines and Northern Affairs:
Geology of Horwood and part of Keith Townships, Sudbury District, Ontario, 1971-72
Detailed mapping of the geology, structure, and mineral showings from this metavolcanic-metasedimentary belt.

78. Morgan, A.V., Univ. of Waterloo:
Quaternary stratigraphy and palaeontology in southwestern Ontario, 1971-72.
Areal examination of the Pleistocene deposits of the Lucan-Parkhill-Thedford area with the view of determining the limits and stratigraphic range of the respective till sheets and interstadial deposits in this region.

79. Pryslak, A.P., Ontario Dept. of Mines and Northern Affairs:
Geology of the Tustin-Bridges area, District of Kenora, Ontario, 1967-72.

80. Pryslak, A.P., Ontario Dept. of Mines and Northern Affairs:
Geology of the Townships of Dent, Mitchell, Corless, and Knott, District of Kenora, Ontario, 1969-72.

81. Pyke, D.R., Ontario Dept. of Mines and Northern Affairs:
Geology of Adams and Eldorado Townships, District of Timiskaming, Ontario, 1969-72.
See Ontario Dept. of Mines, Prel. Geol. Maps P.571, P.572.

82. Pyke, D.R., Ontario Dept. of Mines and Northern Affairs:
Geology of the Redstone River area, District of Timiskaming, Ontario, 1970-73.
See Ontario Dept. of Mines, Prel. Maps, P.631, P.632.

83. Riley, R.A., Ontario Dept. of Mines and Northern Affairs:
Muleah Township (north half), Ontario, 1968-71. Ball, Todd, Fairlie and Byshe Townships, Ontario, 1970-.
Emphasis is on volcanic stratigraphy and mineral deposits.

84. Robertson, J.A., Ontario Dept. of Mines and Northern Affairs:
Flack Lake - Mount Lake area, Ontario, 1969-74.
See A review of recently acquired geological data Blind River - Elliot Lake area; Ontario Dept. of Mines and Northern Affairs, Misc. Paper 45, 1971.

85. Robertson, J.A., Ontario Dept. of Mines and Northern Affairs:
Regional geology - Elliot Lake area, Ontario.
See Contemporaneous faulting and clastic intrusion in the Quirke Lake Group, Elliot Lake, Ontario: Discussion; Can. J. Earth Sci., vol. 8, pp. 307, 1971; Prel. Map 304, Ontario Dept. of Mines and Northern Affairs, 1971.

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

87. Robertson, J.A., Siemiatkowska, K.M., Ontario Dept. of Mines and Northern Affairs:
Massey - Webbwood area, Ontario, 1971-74.

88. Sage, R.P., Breaks, F.W., Troup, W.T., Ontario Dept. of Mines and Northern Affairs:
Operation Pickle Lake, 1971-73.
Mapping and compilation of the geology between latitudes 51°00' and 52°30' and longitudes 89°00' west and 92°00' west.

89. Sanford, B.V., Geol. Surv. of Can.:
Paleozoic geology of the Hudson Bay region, 1966-.
Involves basin analysis of the Hudson Platform of northeastern Canada. In the summer of 1971 bedrock mapping was initiated offshore in an area of some 235,000 square miles of Hudson Bay. Subsurface investigations are being currently carried out in conjunction with surface and subsea mapping projects to reconstruct the tectonic and sedimentological history of the Moose River and Hudson Bay Basins for the purpose of evaluating the potential hydrocarbon resources of these regions.

90. Thurston, P.C., Sage, R.P., Siragusa, G.M., Ontario Dept. of Mines and Northern Affairs:
Operation Winisk Lake, Ontario, 1971-72.
Areal geology at a reconnaissance scale of an area bounded by 86° - 90°W. longitude and 54° - 52°30'N latitude with an additional area bounded by 90-92°W. longitude and 53° - 52°30'N. latitude. See Prel. Maps P. 711 - P. 716.

91. Thurston, P.C., Siragusa, G.M., Sage, R.P., Ontario Dept. of Mines and Northern Affairs:
Operation Chapleau, Ontario, 1970-71.
Reconnaissance survey of an area bounded by 49° and 46°N latitude and 82° - 84°W latitude includes the Swayze metavolcanic belt, several smaller belts and the southern end of the Kapuskasing structural zone.

92. Wood, J., Ontario Dept. of Mines and Northern Affairs:
Geology of the north Spirit Lake area, District of Kenora (Patricia Portion), Ontario, 1971-72.

Quebec

93. Denis, R., Ministère des Richesses Naturelles du Quebec:
Région de Saint-Gabriel-de-Brandon (Moitié Est), Comtés de Maskinongé, Berthier et Saint-Maurice, Québec, 1971-72.

94. Dressler, B., Ministère des Richesses Naturelles du Quebec:
Région du lac Patu, fosse de Labrador, Nouveau Québec, 1971-72.

95. Franconi, A., Ministère des Richesses Naturelles du Quebec:
Région du lac Keniapiscau, territoire d'Abitibi, Québec, 1971-72.

AREAL GEOLOGY

96. Hubert, C., Héroux, Y., Caty, J.L., Brisebois, D., Granger, B., Univ. Montréal:
1 - Stratigraphy of the Sayabec reef, Gaspé Peninsula, Québec. 2 - Stratigraphy and sedimentology of the Precambrian sedimentary rocks of the Pépeshquasiti embayment of the Indicator basin, Quebec. 3 - Stratigraphy and sedimentology of the Quebec Supergroup in the area east of Lévis, Quebec, 1969-.

97. Lebuis, J., Ministère des Richesses Naturelles du Québec:
Région de Courcelette-Tourelle, Comtés de Gaspé-Nord et de Matane, Québec, 1971-72.

98. Lee, S., Ministère des Richesses Naturelles du Québec:
Région de Casey (partie est), Compé de Laviolette, Québec, 1970-73.

99. Liard, P., Ministère des Richesses Naturelles du Québec:
Région de Mont-Joli, Comtés de Rimouski, Matane, Matapédia, Québec, 1971-73.

100. Mukherji, K.K., Ministère des Richesses Naturelles du Québec:
Région de Sainte-Blandine (partie est), Comté de Rimouski, Québec, 1970-72.

101. Otton, J., Ministère des Richesses Naturelles du Québec:
Région de lac Bouchette; Comtés de Pontiac et Montcalm, Québec, 1971-72.

102. Rive, M., Ministère des Richesses Naturelles du Québec:
Région des lacs Ogascanan et Sairs, Comté de Témiscamingue, Québec, 1971-72.

103. Rondot, J., Ministère des Richesses Naturelles du Québec:
Région de la Rivière du Gouffre, Comté Charlevoix, 1970-73.

104. Schimann, K., Ministère des Richesses Naturelles du Québec:
Région de Maricourt (Baie Wakeham), Québec, 1971-74.

105. Sharma, K.N.M., Ministère des Richesses Naturelles du Québec:
Région des lacs Victor et Durocher, Québec, 1971-72.

106. Wégria, H., Ministère des Richesses Naturelles du Québec:
Région du lac Maricourt, Comté d'Abitibi-est, 1971-72.

Saskatchewan

107. Forsythe, L.H., Saskatchewan Dept. of Mineral Resources:
The geology of the Nemeiben Lake (west half)-La Ronge (west half) areas, Saskatchewan, 73-P-6-W and 73-P-3-W, 1971-72.

108. Kupsch, W.O., Univ. of Saskatchewan:
Boundary of the Canadian Shield, 1971-72.

109. Kupsch, W.O., Univ. of Saskatchewan:
Annotated bibliography of Saskatchewan geology, supplement 1965-1970, 1970-72.

110. Lewry, J.F., Saskatchewan Dept. of Mineral Resources:
Geology of Glennie Lake area, 63-M-12, 1970-72.

111. Munday, R.J.C., Saskatchewan Dept. of Mineral Resources:
1 - Geology of the Dutton Lake area (east half) Saskatchewan, 64-M-9-E, 1971-72. 2 - Mineral deposits map of the Precambrian Shield area of Saskatchewan, 1970-72.
Summer 1971 was spent mapping a narrow linear belt of supracrustal metasediments in the northeastern corner of Saskatchewan. These metasediments are thought to be unconformably above the granitic basement and probably can be equated with the Hurwitz Group. An interesting fluorite bearing, anhydrous hypersolvus granite is intrusive into the crystalline basement to the southeast of the metasedimentary belt.

112. Pearson, D.E., Saskatchewan Dept. of Mineral Resources:
Geology of Scimitar Lake area (east half) 63-M-15-E, 1971.
The stratigraphy and structure of the area correlate broadly across the area between Reindeer Lake and Sherridon in Manitoba, and rocks possibly equivalent to the Amisk Series of Flin Flon appear to contain the best mineralization.

113. Scott, B., Saskatchewan Dept. of Mineral Resources:
Geology of Pendleton Lake area (west half) 74-A-15-W, 1971-72.
Reconnaissance mapping to define and correlate rocks of sedimentary, volcanic and igneous origin and investigate economic mineral occurrences.

114. Sibbald, T.I.I., Saskatchewan Dept. of Mineral Resources:
Geology of Milton Island area (west half) 64-D-10-W, 1971-72.

Yukon Territory

115. Templeman-Kluit, D.J., Geol. Surv. of Can.:
Operation Snag-Yukon, 1970-73.
See Operation Snag-Yukon; Geol. Surv. of Can., Paper 72-1A, pt. A, pp. 36-39, 1972.

General Problems

116. Darnley, A.G., Grasty, R.L., Richardson, K.A., Charbonneau, B.W., Geol. Surv. of Can.:
Airborne gamma-ray spectrometry, 1967-.
A high sensitivity airborne gamma ray spectrometry system has been developed under this project. The system is used for cross-country reconnaissance surveys over the Canadian Shield and for detailed experimental surveys in the Provinces and the Northwest Territories - to acquire data on the distribution of radioactive elements within the Canadian Shield, to locate

areas of potential mineral deposits and to develop this survey method as an aid to geologic mapping.

117. Parry, J.T., Morgeli, W., Beswick, J., Dredge, L., McGill Univ.:
Terrain evaluation project, 1964-.
Evaluation of remote sensing methods to all aspects of terrain. See Infrared air photos for drainage analysis; Photogrammetric Engineering, vol. 37, No. 10, pp. 1031-1038, 1971.

118. Slaney, V.R., Geol. Surv. of Can.:
Multispectral photography.
Use of high altitude photography and colour photography for geology.

119. Wynne-Edwards, H.R., Neilson, M.J., Hasan, Z.-ul, Oliver, R.L., Weir, M.Ann, LeAnderson, P.J., Tremblay, P. Karvinen, W.O., Allen, J., Bourne, J., Pirie, J., Queen's Univ.:
Geology of the Grenville Province, 1967-; graduate theses.
The Grenville province is the southeastern part of the Canadian Shield with K/Ar ages of approximately 950 m.y. Investigation is underway of its tectonics, structure, petrology, mineralogy, and stratigraphy at all scales. Broad patterns of tectonic significance are apparent, for the terrain is one in which pre-orogenic crystalline basement representing the reworked equivalents of older provinces to the northwest is widely exposed. This has far reaching implications for the evolution of the continental crust, and the process of deep-seated deformation. See Plutonites, gneisses and granulites of the granulite facies; Freiberger Forschungshefte, Leipzig, vol. c. 268, pp. 11-24, 1971.

DATA STORAGE AND RETRIEVAL

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

121. Badry, A., Carlson, V.A., Research Council of Alberta:
Central data file, 1956-.

122. Bright, E.G., Hunt, D.S., Ontario Dept. of Mines and Northern Affairs:
Timmins data series maps, 1970-.
The TIMMINS DATA SERIES program is designed to gather all available geological data (bedrock and drill core information) heretofore not available to the public at large. This data together with all public geological and geophysical information is reproduced at 1 inch to ¼ mile with adjoining 1 inch to 1 mile inset maps depicting (a) regional interpretive geology, (b) regional aeromagnetics, (c) regional surficial geology, and (d) index of exploration work carried out.

123. Clark, D.A., Chi, J.W.W., Solohub, J., Mobil Oil Canada:
Interactive graphics analysis of lithologic data, 1969-71.
To develop and initiate a system for using an interactive, online, graphics display terminal for analyzing digitized lithologic data.

124. Closs, L.G., Nichol, I., Queen's Univ.:
Interpretation of geochemical reconnaissance data from the Springdale peninsula, Newfoundland, 1970-73.

125. David, P.P., Lebuis, J., Univ. de Montréal:
Computer application to the storage and retrieval of Quaternary field data, 1971-74.

126. David, M., Sabourin, R., Yale, P.P., Daoust, G., Ecole Polytechnique:
Applications nouvelles de la théorie des variables régionalisées aux sciences de la terre, 1970-.

127. den Boer, J.C., Mobil Oil Canada:
Computer graphics in exploration, 1966-.

128. den Boer, J.C., Mobil Oil Canada:
Teleprocessing of exploration data, 1971-.

129. Donaldson, J.A., Carleton Univ.:
Initiation of a computer-processable file of geological data for Precambrian strata of the western Canadian Shield, 1970-72.
Field data collected during regional studies of three Helikian sequences (Dubawnt Group, Hornby Bay Group, upper Coppermine River Group) are being 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.

130. Drapeau, G., Bedford Institute:
Marine geological data file, 1972.
To provide a storage and retrieval system for geological data. File will enable a rapid search for data on the

DATA STORAGE AND RETRIEVAL

following categories: geography, year, cruise, bathymetry, investigator, broad sediment category, type of sample (core, grab, dredge, etc.).

131. Drapeau, G., Bedford Institute:
Factor analysis of geological data, 1968-72.

132. Edgar, A.D., Univ. of Western Ontario:
A compilation of geochemical data on feldspathoidal rocks, 1970-72.

133. Ford, D.C., Coward, J., McMaster Univ.:
Digital computer simulation of discharge from drainage basins which contain significant carbonate aquifers, 1969-72; Ph.D. thesis (Coward).
This project begins with the Stanford multi-parameter programme for prediction of the mean monthly/annual hydrograph of a standard drainage basin and investigates the additions and changes required to obtain reasonable correlation with real hydrographs of basins containing major, active cavern systems. Sample basins are in a sandstone/shale/limestone area of West Virginia (field support by U.S.G.S.).
A second investigation is concerned with the transmission of floodwater pulses through cavern systems containing both vadose and phreatic portions.

134. Fuh, Tsu-Min, Saskatchewan Dept. of Mineral Resources:
Computerized geological mapping in the Precambrian area of Saskatchewan.
A computer program for geological mapping in the Precambrian area of Saskatchewan has been written and tested. The program will be put into use by some field parties in the 1972 field season.

135. Haworth, R.T., Sparkes, R., Atlantic Geosciences Centre:
Classification, storage and retrieval of geophysical charts, 1968-.
Implementation and updating of a user-operated filing system, for geophysical charts with easy and efficient storage and retrieval.

136. Holroyd, M.T., Hood, P.J., McGrath, P.H., Sawatzky, P.S., Sinha, A.K., Geol. Surv. of Can.:
High resolution aeromagnetic surveys, 1968-.
Automatic methods for editing, storage, compilation, mapping, retrieval, etc.

137. Holroyd-Doveton, J.D., Mobil Oil Canada:
Interrelationships of formation water chemistry, hydrodynamic regimes and hydrocarbon accumulations in the Upper Devonian of southern Alberta, 1971-.
Computer implemented statistical methods.

138. Hsu, E., Fogwill, W.D., Newfoundland and Labrador Dept. of Mines, Agriculture and Resources:
Mineral inventory, 1971.

139. Kelly, A.M., Fabbri, A., McCartney, W.D., Fyles, J.T., Geol. Surv. of Can., and British Columbia Dept. of Mines and Petroleum Resources:
Appraisal of mineral potential, Skeena Arch (Bulkley-Nechako region), British Columbia, 1971-72.
At the British Columbia Department of Mines and Petroleum Resources, data on each significant mineral occurrence are to be gathered and geological data are to be measured and coded using cells of 100 square kilometres each as defined by the Universal Mercator Grid. At the Geological Survey of Canada, Ottawa, this information, augmented by aeromagnetic and gravimetric data, is to be stored, analyzed and retrieved using the SAFRAS system. The resulting estimates of mineral potential of cells may lead to improved decision making in balanced natural resources development and mineral exploration.

140. Smith, F.G., Univ. of Toronto:
Information storage, retrieval and manipulation of all information in a selected field of physical geochemistry, 1963-74.
See Smith, F.G., Size of items of primary information for research in physical geochemistry; Can. J. Earth Sci., vol. 8, pp. 1033-1037, 1971.

141. Smith, F.G., Univ. of Toronto:
Computation and plotting of liquidus data in multicomponent systems, 1963-75.

142. Smith, F.G., Univ. of Toronto:
Grain growth in metamorphic rocks, 1965-75.

143. Sutterlin, P.G., May, R.W., Zodrow, E.L., Univ. of Western Ontario:
Evaluation of the information potential of geological data files in computer-processible form. Characterization of rock bodies using distribution functions and set theory methods, 1971-.
Toward a definition of a mineral sample in geology (short note); J. Int. Assoc. Mathematical Geol., vol. 3, No. 3, 1971. See The design of computer-processible information systems; Proc. 9th annual symposium, techniques for decision-making in the mineral industry, CIM vol. 12, 1971.

ENGINEERING GEOLOGY

144. Barnett, D.M., Kuc, M., Geol. Surv. of Can.:
Terrain performance, Melville Island, District of Franklin, 1971-73.
Preparation of case histories of terrain performance encountered by airfields, roads and "overland" vehicles, in relation to geological materials, geomorphic setting and ground ice. See Geol. Surv. Can., Paper 72-1, pt. A, pp. 137-139, 1972.

145. Barron, K, Bielenstein, H.U., Grant, F., Mines Branch, Dept. of Energy, Mines and Resources:
Roof stability in coal mines, 1970-.
Investigations within this project include: structure and lithologic variation of roof strata; roof-bolt anchorage tests and bolting patterns; evaluation of support innovations (roof trusses, untensioned grouted bolts); monitoring of strata behaviour as it is influenced by mining.

146. Barron, K., Fisekci, M.Y., Mines Branch, Dept. of Energy, Mines and Resources:
Coal and gas outbursts, 1970-.
Permeability, strength, stress and gas pressure are prime variables influencing outburst mechanics. In-situ measurement capabilities for these parameters and a detailed understanding of the structural setting for each coal seam must be developed to determine the effectiveness of engineering control methods and to obtain a scientific understanding of outbursts.

147. Bérard, J., Ecole Polytechnique:
Le comportement des agrégats à béton, 1969-72.
Certains agrégats de la région de Montréal présentent des propriétés très délétères dans les bétons, même s'ils ne constituent que 3 à 6% du gros agrégat. Ces matériaux ont subi avec succés tous les essais standards et ne peuvent être détectés par les méthodes usuelles. Nous avons entrepris d'établir des normes d'identification pour ces matériaux.

148. Blunden, R.H., Univ. of British Columbia:
Urban geology of greater Vancouver, 1971-73.

149. Bozozuk, M., Burn, K.N., Eden, W.J., Division of Building Research, National Research Council:
Geotechnical properties of eastern marine clay, 1951-.
Landslide at Orleans, Ontario; Nat. Res. Council Tech. Paper No. 321, 1971. South Nation River landslide, May 16, 1971; Can. Geotechnical J., vol. 8, No. 3, pp. 446-451, 1971. See Effect of sampling, size and storage on test results for marine clay; ASTM Sp. Tech. Publ. No. 483, pp. 121-131, 1971. Sampler trials in overconsolidated sensitive clay; ASTM Sp. Tech. Publ. No. 465, pp. 132-142, 1971.

150. Coates, D.F., Gyenge, M., Hedley, D.G.F., Herget, G., Yu, Y., Mines Branch, Dept. of Energy, Mines and Resources:
Stability of slopes in rock, 1963-.
See Field instrumentation for rock slopes; Proc. 1st Int. Conf. on Stability in Open Pit Mining, Soc. Mining Eng., pp. 143-168, 1971.

151. Goodrich, L.E., Division of Building Research, National Research Council:
Ground thermal regime, 1970-.
To develop, evaluate and apply numerical models for the prediction of ground thermal regimes under natural and disturbed conditions; to devise and test apparatus for measuring thermal properties of soils in the laboratory and in the field; to establish the information required for design purposes concerning the thermal properties of soil and ground thermal regime.

152. Grice, R.H., McGill Univ.:
Engineering geology of Montreal, Quebec, 1965-.

153. Heginbottom, J.A., Kurfurst, P.J., Geol. Surv. of Can.:
Terrain sensitivity evaluation and mapping, Mackenzie Valley transportation corridor, 1971-.
To develop and test a mapping system for terrain to evaluate its response to man's engineering activities. See Geol. Surv. Can., Paper 72-1, pt. A, pp. 145-146, 1972.

154. Herget, G., Mines Branch, Dept. of Energy, Mines and Resources:
Mine pillar strength and deformation behaviour, 1970-72.
Detailed mapping of fracture distributions in pillars and triaxial tests on 10 inch-diameter core will be used to predict the strength of mine pillars.

155. Hudec, P.P., Univ. of Windsor:
Pore-water behaviour in sedimentary rocks during natural freezing and thawing, and its effects on weathering, 1971-73.
The break down of rock in climates experiencing freezing temperatures has long been attributed to "frost action". Experiments have shown that very little freezing of water takes place in most rocks that are susceptible. These same rocks are also highly sorptive, i.e., contain large proportion of their pore water in sorptive state, and a relationship exists between rock break-down and the type of pore water in sedimentary rocks.

156. Hudec, P.P., Univ. of Windsor:
Physio-chemical weathering of rocks under different climatic environments, 1972-73.
Recent research on the importance of pore-water in the weathering process has demonstrated that the division into physical and chemical weathering is largely artificial, and that the same basic process operates in both.

157. Hughes, O.L., Hodgson, D., Zoltai, S., Pettapiece, W., Geol. Surv. of Can.:
Surficial geology and land classification, Mackenzie Valley transportation corridor, 1971-73.
The project is directed primarily at terrain inventory, with maps the main product. Experience indicates that the map-units adopted, based on genesis, geologic material and landform divide the terrain into meaningful and distinctive units with respect to vegetation patterns, soil types, ground-

ice content and general engineering performance and behaviour. See Quaternary reconnaissance Northwest District of Mackenzie; Geol. Surv. Can., Paper 72-1, pt. A, pp. 165-166, 1972.

158. Isaacs, R.M., Code, J.A., Geol. Surv. of Can.:
Engineering geology, Mackenzie Valley transportation corridor, 1970-74.
The project involved an engineering geology investigation with the objective of delineating the engineering characteristics of terrain units (mapped by O.L. Hughes) in terms of standard soil properties as well as with respect to the thermal parameters of conductivity and diffusivity, evaluating their performance as foundation or construction materials and developing criteria for the measurement and prediction of the interrelationship between engineering construction and terrain performance. Techniques for the recovery of frozen soil samples from borehole and for instrumenting for evaluation of the thermal properties of the soil had to be developed. See Geol. Surv. Can., Paper 72-1, pt. A, pp. 143-145, 1972.

159. Johnston, G.H., Division of Building Research, National Research Council:
Anchorage in permafrost, 1965-72.
Evaluation of time-deformation characteristics and long term strengths of various types of anchors in permafrost; field testing completed.

160. Johnston, G.H., Division of Building Research, National Research Council:
Structures in permafrost, 1950-.
See Construction on permafrost; Can. Geotechnical J., vol. 8, No. 2, pp. 236-251, 1971.

161. Karrow, P.F., White, O.L., Univ. of Waterloo:
Urban geology, Kitchener-Waterloo, Ontario, 1958-.

162. King, M.S., Bamford, T.A., Univ. of Saskatchewan:
Static and dynamic elastic properties of rocks, 1967-75; M.Sc. thesis (Bamford).
See Static and dynamic elastic properties of a sandstone at permafrost temperatures; Proc. 5th Conference on Drilling and Rock Mechanics, pp. 83-92, 1971.

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

164. Locker, J.G., Research Council of Alberta:
Engineering properties of Upper Cretaceous-Tertiary shales in central Alberta, 1967-72.

165. Mackay, J.R., Mathews, W.H., Univ. of British Columbia:
Soil movement in an alpine environment, Garibaldi Park, British Columbia, 1957-72.

166. McPherson, R.A., Research Council of Alberta:
Urban geology of the greater Edmonton area, Alberta, 1971-72.

167. Neilson, J.M., Queen's Univ.:
Engineering geology of Pittsburgh Township, Frontenac County, Ontario, 1970-72.

168. Owen, E.B., Geol. Surv. of Can.:
Engineering geology, land use regulations (DIAND), 1971-.
Assessments of current practices in road, airport and transmission line construction and in oil and gas exploration operations in Yukon Territory and the Northwest Territories in light of the new Arctic Land Use Regulations introduced by the Northern Economic Development Branch of the Department of Indian Affairs and Northern Development. See Geol. Surv. Can., Paper 72-1, pt. A, p. 147, 1972.

169. Penner, E., Eden, W.J., Division of Building Research, National Research Council:
Expansion of pyritic shale in Ottawa area, 1969-72.
To define the precise conditions under which weathering takes place and to its possible control.

170. Root, J.D., Knapik, L., Research Council of Alberta:
Great Divide Trail study, 1971.
A survey of the soils along a section of the proposed Great Divide Trail in Banff National Park and contiguous areas has shown that gleyed soils or soils with high silt were most damaged by the existing trail and that well-drained soils with high coarse fragment content were least damaged. Flowing water (from snowmelt, streams, springs, and intense rainfall) and trampling by hoof and foot are the principle agents of trail damage. Trampled areas invariably are associated with wet ground caused by poor drainage, groundwater seepage, or proximity to lakes or streambanks.
A report is being compiled which suggests relocation of some sections of the trail, procedures for compensating for soils susceptible to erosion, and additional studies that may be required.

171. Scott, J.S., Bawden, W.F., Geol. Surv. of Can.:
Stability of natural slopes, 1971-75.
Investigations during 1971 were confined to the valleys of the Fraser and Thompson Rivers in British Columbia where examples of block sliding, wedge failures, "thin skin" slides and flow slides were examined. See Natural slope stability in the Fraser Canyon area, British Columbia; Geol. Surv. Can., Paper 72-1, pt. A, pp. 139-140, 1972.

172. Scott, J.S., Richard, S.H., Code, J.A., Belanger, J.R., Geol. Surv. of Can.:
Environmental geology prototype study; Ottawa-Hull area, 1970-72.
Include surficial geology mapping of the Ottawa-Carleton area and adjacent parts of Quebec north of the Ottawa River; the use of the SYMAP automated cartographic technique as a means of displaying geological data from a data bank, and the

production of derived maps to provide background information for land use planning. See Geol. Surv. Can., Paper 72-1, pt. A, pp. 147-149, 1972.

173. Slusarchuk, W.A., Division of Building Research, National Research Council:
Deformation and strength of frozen and thawing soil, 1971-.
To gain knowledge concerning deformation characteristics and strength properties of frozen and thawing soils with particular reference to thawing permafrost under structures such as pipelines, dykes, airstrips and roads; and to develop test methods for determining the properties.

174. St-Onge, D.A., Geol. Surv. of Can.:
Environmental geology of the New Montreal International Airport Region (NMIAP), 1971-72.
Geoscientific study for regional planning. Physical properties of overburden. Data bank, computer maps. Voir Etude geoscientfique, région nord de Montreal; Geol. Surv. Can., Paper 72-1, pt. A, pp. 149-151, 1972.

175. Xenophontas, C., Queen's Univ.:
Damsite investigations, Ashoupmouchuan River, Quebec, 1971-72; M.Sc. thesis.

GEOCHEMISTRY

Analytical Methods and Analysis

176. Abbey, S., Champ, W.H., Courville, S., Sen Gupta, J.G., and supporting staff, Geol. Surv. of Can.:
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.

177. Abbey, S., Sen Gupta, J.G., Courville, S., Champ, W.H., and supporting staff, Geol. Surv. of Can.:
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.

178. Abbey, S., Champ, W.H., Sen Gupta, J.G., Courville, S., and supporting staff, Geol. Surv. of Can.:
Development of methods for the analysis of geological materials, 1952-.

Development work continues on refinement and extension of optical emission spectrographic and flame spectroscopy methods; improvement of technique and equipment in X-ray fluorescence analysis for major components and in atomic absorption analysis for traces of precious metals. New work includes the adaptation of an automatic sulfur titrator to the determination of carbon and ferrous iron and the adaptation of an atomic absorption spectrophotometer to the high-precision determination of such elements as silicon by colorimetry. See Analysis of rocks and minerals by atomic absorption and flame emission spectroscopy. Pt. 4. A composite scheme for the less common alkali and alkaline earth metals; Geol. Surv. Can., Paper 71-50, 1971.

179. Cronan, D.S., Univ. of Ottawa:
Geochemistry of manganese nodules and other ferromanganese deposits from the world ocean, 1964-.
See Rates of accumulation of manganese nodules and associated sediments from the equatorial Pacific; Geochim. et Cosmochim. Acta, vol. 35, pp. 621-626, 1971.

180. Cronan, D.S., Univ. of Ottawa:
Geochemistry of deep-sea metalliferous sediments associated with centres of sea-floor spreading, 1971-.

181. Fletcher, K., Univ. of British Columbia:
Application of flameless atomic absorption to analysis of geochemical samples, 1971-72.

182. Gunn, B.M., Univ. de Montréal:
Analytical geochemistry and fractionation trends of igneous rocks, 1966-75.
Partition coefficients and fractionation trends are derived by statistical analysis of data from mainly oceanic island volcanic associations. Analysis of major and trace elements are made by X-ray spectrometer and all data storage, retrieval, plotting and statistical treatment by computer. See Trace element partition during olivine fractionation of Hawaiian Basalts; Chem. Geol., vol. 8, pp. 1-8, 1971.

183. Hoffman, S., Fletcher, K., Univ. of British Columbia:
Regional geochemical techniques on the Nechako Plateau, British Columbia, 1971-73.

184. Perrault, G., Hébert, P., Ecole Polytechnique:
Préparation de standards minéraux pour l'analyse instrumentale, 1968-72.

185. Perrault, G., Hébert, P., Ecole Polytechnique:
Recherche sur les méthodes analytiques pour les oligo-éléments des roches et des minerais, 1965-.

186. Sawatzky, H., George, E., Mines Branch, Dept. of Energy, Mines and Resources:
Study of the types of organic sulphur compounds and hydrocarbons in selected Cretaceous crude oils of western Canada, 1971-73.

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New techniques have been developed for the separation and identification of sulphur compounds in petroleum fractions that will be applied to the maturation of organic sulphur compounds in petroleum.

187. Volborth, A., Dalhousie Univ.:
Completion of computerized fast-neutron activation and X-ray laboratory for geochemical studies and nonstoichiometry studies in meteorites, oxides, rocks, minerals and lunar dust, 1966-.
In 1972-1973 the build-up of the neutron activation facility will be completed as an integrat part of the system proposed in 1968. Further, in 1972-1974 we will proceed with method development and standardization of the existing analytical facility. When completed, the total system will perform rapid non-destructive major and trace element analysis in geochemical research. A major feature of this laboratory is the use of fast-neutron and (later) thermalized neutron fluxes for elements.

188. Webber, G.R., McGill Univ.:
Application of instrumental methods of analysis to geological materials, 1959-.
The nature of mercury anomalies of two intrusive complexes, Rougemont and Lake Dufault, Quebec, by multielement analysis; Can. J. Earth Sci., vol. 8, No. 10, pp. 1197-1202, 1971. See X-ray fluorescence determination of minor and trace elements in silicate rocks; Canadian Spectroscopy, vol. 16, No. 4, pp. 90-93, 1971.

Chemical Oceanography and Limnology

189. Buckley, D.E., Cranston, R.E., Bedford Institute:
Analytical methods for multi-element analyses of small samples of Alumno silicates, 1969-72.
To develop a simple quantitative method for sensitive analyses of small samples of suspended particulate silicates and to have the method developed for as many elements as can be determined by atomic absorption spectroscopy; to investigate capabilities of energy dispersive X-ray spectroscopy. See Atomic absorption analyses of 18 elements from a single decomposition of aluminosilicate; Chemical Geology, vol. 7, pp. 273-284, 1971.

190. Buckley, D.E., Cranston, R.E., Bedford Institute:
Geochemical interactions of major cations with layered silicates in sea water, 1967-73.
To determine the chemical stability of layered silicates as they pass from freshly weathered environments into brackish estuaries, and eventually into normal marine environments; to determine the exchange of major silicate cations with sea water and to determine the silicate diagenesis before deposition.

191. Buckley, D.E., Cranston, R.E., Bedford Institute:
Pathways of mercury in a river and estuary system and sources of mercury pollution, 1970-72.
To measure the concentration of mercury in a rural river, small municipality and river estuary in order to determine the "background" levels of mercury from geologic sources from municipal waste and atmospheric fall out and to relate these sources to the chemical alteration of mercury forms in rivers and sea water.

192. Buckley, D.E., Cranston, R.E., Bedford Institute:
Geochemical partition of trace elements in sea water, suspended particulate matter and bottom sediments, 1970-72.
Measurement of the abundance of Cr, Mn, Fe, Co, Ni, Cu, Zn, Mo, Cd, Sb, Hg and Pb in solution with organic and inorganic suspended particulate matter, and in bottom sediments and to relate these quantitative values to the physical chemistry of the elements and the nature of adsorbing material.

193. Buckley, D.E., Winters, G., Cranston, R.E., Bedford Institute:
Combined chelation and solvent extraction of trace elements from natural waters and analyses by atomic absorption spectroscopy, 1971-72.
To establish methods which will allow trace elements to be extracted with a combination of several chemical chelates; to determine the optimum extraction and sensitivity conditions for each element and to obtain comparative data from other laboratories and other methods; to determine best storage conditions for water samples and design quality control criteria for sampling.

194. Cronan, D.S., Univ. of Ottawa:
Regional geochemistry of sediments in the world ocean, 1966-.

195. Cronan, D.S., Sozanski, A., Univ. of Ottawa:
Geochemistry of ferromanganese oxide concretions in North American lakes, 1969-73.
See Geochemistry of ferromanganese oxide concretions and associated deposits in Lake Ontario; Bull. Geol. Soc. Am., vol. 83, No. 5, pp. 1493-1502, 1972.

196. Mothersill, J.S., Frietag, R., Holah, D., Hughes, A., Lakehead Univ.:
Limnological studies of Lake Superior, 1969-.
The limnological studies include the distribution of the lake-bottom sedimentary facies and the Quaternary stratigraphy; the study of the lake-bottom morphology of the Lake Superior basin; the geochemistry of the lake-bottom sediments and waters; and the identification and distribution of the lake-bottom fauna. Atomic absorption methods are being utilized to determine the amounts of iron, manganese, nickel zinc, copper, chromium and mercury present in the sediments. The amount of organic carbon present in the sediments is being determined using a Perkin Elmer analyzer. The mineralogy of the sediments is determined by X-ray diffractometry methods and the grain-size analyses by sieve and pipette methods. See Limnogeological studies of the eastern part of the Lake Superior basin; Can. J. Earth Sci., vol. 8, No. 9, pp. 1043-1055, 1971.

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197. Murty, P.S.N., Cronan, D.S., Univ. of Ottawa:
Geochemistry of sediments from the north-eastern Atlantic Ocean, 1970-73.

198. Peach, P.A., Brock Univ.:
Trace element study of lake bottom sediments, 1970-73.

199. Rashid, M.A., Bedford Institute:
Role of humic compounds of sediments in the solubility of some trace metals, 1971-72.
Humic compounds are believed to form chelates with various metals rendering the ins-luble metals soluble. The purpose of this investigation is to determine the quantities of various metals solubilized from soluble metal carbonates and sulfides by humic compounds. See Role of humic acids of marine origin and their different molecular weight fractions in complexing ci- and tri-valent metals; Soil Sci., vol. 3, pp. 298-306, 1971.

200. Rashid, M.A., Bedford Institute:
Amino acids associated with marine sediments and their role in chelation and solubility of metals, 1970-72.

201. Rashid, M.A., Bedford Institute:
Quinone content of humic acid and its role in the solubility of metals, 1970-72.
See Chemical characteristics of fractionated humic acids associated with marine sediments; Chem. Geol., vol. 7, pp. 37-43, 1971.

202. Rashid, M.A., Buckley, D.E., Robertson, K.R., Bedford Institute:
Interaction of humic acid with various clay minerals and natural sediments in ionic waters similar to marine estuaries, 1971-72.
Interaction of colloidal clays with humic compounds in coastal waters of varying ionic strength is of special interest because these reactions extend the process of holmy-rolysis which ultimately lead to sediment diagenesis.

203. Rashid, M.A., Buckley, D.E., Robertson, K., Bedford Institute:
Organo-clay complexes: effect of pH and cations on adsorption of humic acids on clay minerals and the nature of their interaction, 1969-72.
To determine the mechanisms and effects of interaction of humic compounds and layered silicates in various conditions of ionic solutions. To evaluate the results of the interactions in terms of the processes taking place in natural marine estuaries. See Interaction of humic acid with various clay minerals and natural sediments in ionic waters similar to marine estuaries; Proc. Internat. Geochem. Symposium, Moscow, U.S.S.R., 1971.

204. Rashid, M.A., Leonard, J., Bedford Institute:
Mobiligy of trace metals in sediments under the influence of humic compounds, 1971-72.

205. Rashid, M.A., Prakash, A., Bedford Institute:
Nature of humic compounds produced from the decomposed seaweeds, 1970-72.

Exploration Geochemistry

206. Armstrong, R.C., Groome, A, Nichol, I., Queen's Univ.:
The geochemistry of mercury and its role in geochemical exploration (New Brunswick and British Columbia), 1971-74.

207. Arnold, R.G., Saskatchewan Research Council:
Trace metal geochemistry of lake sediments and lake waters in Saskatchewan, 1969-73.

208. Austria, V.B., New Brunswick Dept. of Natural Resources:
Cu, Pb, Zn, Mo, Mn, contents of stream and spring sediments, parts of Carleton and York counties, New Brunswick, 1971-72. Primary and secondary dispersion of trace elements near Mo and W mineralization in granite, 1968-72.
To determine the applicability of rock geochemistry in mineral exploration where sampling is based on petrologic variations in a granitic body and to determine the factors that tend to offset the normal relationship between primary (bedrock) anomalies and secondary anomalies in drainage sediments and soil.

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

210. Blain, C.F., Nichol, I., Queen's Univ.:
The feasibility of regional geochemical reconnaissance in northwest Ontario, 1969-72.
To assess the application of low density geochemical reconnaissance sampling in the Superior Province of the Canadian Shield.

211. Boyle, R.W., Geol. Surv. of Can.:
Geochemistry of gold and its deposits, 1965-72.
A review of the literature followed by field and experimental work to illustrate the mode of concentration and dispersion of gold.

212. Clark, A.H., Arancibia, O., Queen's Univ.:
Aspects of geochemistry of rhenium, 1971-73.
A detailed study of the distribution of rhenium in molybdenite in individual porphyry copper and porphyry molybdenum deposit in British Columbia and Chile.

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213. Clark, A.H., Way, D.C., Queen's Univ.:
Geochemistry of mineralized intrusions in southwest Yukon, 1971-73.

214. Closs, L.G., Nichol, I., Queen's Univ.:
Interpretation of geochemical reconnaissance data from the Springdale peninsula, Newfoundland, 1970-73.

215. Coker, W.B., Nichol, I., Queen's Univ.:
The application of lake bottom sampling in geochemical reconnaissance of the Canadian Shield, 1971-74.

216. Coleman, L.C., Univ. of Saskatchewan:
Distribution of trace metals in bedrock of the Hanson Lake area, Saskatcehwan, 1962-75.
Manner of occurrence of trace metals (Cu, Zn, Ni) in some 10,000 bedrock samples from the Hanson Lake area is being investigated.

217. Coleman, L.C., Truscott, M.G., Univ. of Saskatchewan:
Geochemistry and petrology of Tertiary igneous rocks of the Sweetgrass Hills, Montana, 1970-74; Ph.D. thesis (Truscott).
Petrological, geochemical and some geochronological studies of Tertiary alkaline igneous rocks in the Sweetgrass Hills, Montana will provide a better understanding of the history of this area and adjoining parts of Alberta and Saskatchewan.

218. Darling, R., Ambrosii, G., Ecole Polytechnique:
Exploration géochimique dans la région de Preissac-LaCorne, Québec, 1968-73; thèse de doctorat (Ambrosii).

219. Darling, R., Gélinas, L., Campiglio, C., Guha, J., Ecole Polytechnique:
La pétrologie et la géochimie du batholithe Bourlamaque: développement d'une méthode de prospection, 1969-73; P thèse de doctorate (Campiglio).

220. Darling, R., Spitz, G., Ecole Polytechnique:
La géochimie des roches autour du gisement de cuivre de Louvem, Val d'Or, Québec, 1969-72; thèse de maîtrise (Spitz).
Pétrographie des roches autour du gisement et leur analyse pour des éléments majeurs et des oligo éléments choisis.

221. Davenport, P.H., Nichol, I., Queen's Univ.:
Geochemical dispersion in the Uchi Lake area of northwest Ontario, 1969-72.

222. Doyle, P., Fletcher, K., Univ. of British Columbia:
Regional geochemistry of the Hess Mountains, Yukon Territory, 1970-71.
See Regional geochemistry of the Hess Mountains and eastern Yukon Plateau; CIM Bull., vol. 64, pp. 61-67, 1971.

223. Eakins, P.R., McGill Univ.:
Magnesia rich pillow basalts in northwestern Quebec, 1968-73.
Olivine bearing picrite basalts have been identified in northwestern Quebec and appear to be closely related to ultramafic sills which locally contain asbestos veinlets and /or nickel-bearing sulphides.

224. Foster, J.R., Nichol, I., Queen's Univ.:
The application of partial extraction techniques in geochemical exploration, 1969-72.

225. Govett, G.J.S., Austria, V.B., 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).

226. Govett, G.J., Chapman, R.P., Univ. of New Brunswick:
Evaluation and comparison of different statistical methods of interpreting multi-element geochemical drainage data, 1969-72; M.Sc. thesis (Chapman).

227. Govett, G.J.S., Constantinou, G., Pantazis, T.M., Univ. of New Brunswick:
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; to devise an exploration technique using bedrock geochemistry.

228. Govett, G.J.S., 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).
Computerization of the data has in part been completed and regional trends in metal ratio distributions, if present, will be studied.

229. Govett, G.J.S., Galanos, D.A., Univ. of New Brunswick:
Evaluation of rock, soil, and stream geochemical exploration techniques for sulphide deposits in northern Greece, 1971-73; M.Sc. thesis (Galanos).

230. Govett, G.J.S., 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).

231. Govett, G.J.S., 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; Ph.D. thesis (Whitehead).

232. Grant, D.R., Hornbrook, E.H.W., Geol. Surv. of Can.:
Newfoundland mineral development program - glacial geology and geochemistry, 1971-72.

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In order to stimulate more fruitful types of mineral exploration, surficial deposits and geomorphic features are being mapped by airphoto interpretation over most of the island of Newfoundland, primarily to deduce the direction and sequence of glacial transport. Field studies in selected pilot areas in 1972 are designed to develop techniques of regional geochemical analysis of tills, derived stream and lake sediment, and of covering vegetation, that are appropriate in terms of the indicated modes and distance of glacial transport.

233. Gunton, J.E., Nichol, I., Queen's Univ.:
Geochemical dispersion associated with the Copper Mountain mineralization, 1970-73.

234. Hoag, R.B., McGill Univ.:
A hydrogeochemical study of waters in areas near some mineral deposits, 1971-74; Ph.D. thesis.

235. Hornbrook, E.H., Geol. Surv. of Can., Grant, D.R., Geol. Surv. of Can., Fleming, J.M., Newfoundland and Labrador Dept. of Mines, Agriculture and Resources:
Glacial geological-geochemical pilot project, 1971-72.

236. Johnston, W.G., Saskatchewan Dept. of Mineral Resources:
Geochemical investigations in the Waddy Lake - Southend areas of Saskatchewan, 1971-72.
Investigation includes presence and character of geochemical anomalies for Cu, Zn, and Pb and other metals in soils and bedrock at base metal occurrences; relationship of trace base metals to metamorphism; and relationship between analytical values by atomic-absorption and X-ray fluorescence.

237. Jolly, W.T., Brock Univ.:
Metamorphic differentiation of mafic lavas of Flin Flon, Manitoba, and its economic significance, 1971-.
Certain mafic Precambrian lavas of the Flin Flon region are characterized by the metasomatic development of epidote pods and segregations along linear trends within lava flows. The chemistry of the process and its significance with regard to the mineral deposits in the area is being studied:
A. Both the epidotized rocks and their hosts will be systematically studied chemically to determine the magnitude and method of elemental redistribution. A few trace elements - Cu, Ni, Rb, Zn - will be determined.
B. The data will be treated with factor and discriminant analysis as an aid in determining what variables had important effects on the redistribution process.

238. LaSalle, P., Warren, M.B., Ministère des Richesses Naturelles du Québec:
Etude geochemique de la moraine de fond dans la région miniere de l'Abitibi, Québec, 1971-73.

239. Levinson, A.A., Univ. of Calgary:
Exploration geochemistry; hydrogeochemistry, 1968-.

240. Morton, P., Fletcher, K., Univ. of British Columbia:
Applied geochemistry at Anvil, Yukon Territory, 1971-72.

241. Sherwood, H.G., Nova Scotia Technical College:
Evaluation of mafic igneous rocks in Nova Scotia, 1972-.
It is proposed to extend the present petrological and rock geochemical study to include all accessible mafic intrusive rocks within the province to establish a regional base level for the interpretation of the geochemical data and the delineation of anomalous conditions. Known Triassic volcanic rocks should be sampled for control.

242. Sherwood, H.G., Davis, J.D., Nova Scotia Technical College:
Evaluation of mafic intrusive rocks in the Chedabucto Bay - St. Peters Bay area of Nova Scotia, 1971-72.
An aeromagnetic-geologic compilation investigation at 1 inch to 8 miles indicated some interesting trends and patterns for the mafic rocks in the Chedabucto Bay area of Nova Scotia. Follow-up petrological and rock geochemical studies on a number of exposures of mafic rocks of poorly-defined composition (gabbroic to diabasic) at the eastern end of the Minas Basin-Chedabucto Bay fault zone is underway to classify and evaluate these igneous rocks.

243. Shilts, W.W., Geol. Surv. of Can.:
Mineral indicator tracing, southern Keewatin, 1970-73.
See Drift prospecting in the Kaminak Lake area, District of Keewatin; Geol. Surv. Can., Paper 72-1, pt. A, pp. 182-189, 1972.

244. Skinner, R.G., Geol. Surv. of Can.:
Application of Quaternary geology to mineral exploration Timmins - Val d'Or mining district, Ontario - Quebec, 1971-73.
See Geol. Surv. Can., Paper 72-1, pt. A. p. 189, 1972.

245. Trueman, E.A., Clark, A.H., Queen's Univ.:
Minor element studies on sulphides, oxides and silicates from the Copper Mountain area, British Columbia, 1968-72; M.Sc. thesis (Trueman).

246. Warren, H.V., Delavault, E., Fletcher, K., Univ. of British Columbia:
"Trace elements in rocks, soils and vegetation as guides to Carlin type of mineralization", 1965-73.
Vegetation has been found with anomalous amounts of gold and arsenic and rocks with anomalous amounts of barium and strontium in association with one deposit which resembles, and probably is, a "Carlin" "Cortez" type of deposit.

247. Warren, H.V., Delavault, R.E., Fletcher, K., Lefevre, L., Wilks, E.F., Univ. of British Columbia:
Trace elements in vegetables and soils, 1971-74.

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The dust, soils, and vegetables growing in different localities provide evidence that the trace element concentrations of various foodstuffs varies more greatly than has heretofore been appreciated. Urban contamination may be as important epidemiologically as industrial contamination, but an assessment must rest with medical specialists. See Metal pollution - a growing problem in industrial and urban areas; CIM Bull., vol. 64, No. 711, pp. 34-45, 1971.

248. Warren, H.V., Wilks, E.F., Univ. of British Columbia:
Trace elements in water, 1969-73.
Water sampling probably has had serious defects in the past because it has consisted largely of "grab" samples. It is necessary to sample continuously. Various attempts to do this simply and inexpensively have been only partially successful.

249. Wolfe, W.J., Ontario Dept. of Mines and Northern Affairs:
Patterns of geochemical and biogeochemical dispersion in glaciated terrain of the Precambrian Shield, 1970-75.
The processes of geochemical and biogeochemical dispersion in rocks, soils, tills, waters, and vegetation are being examined near diverse types of ore deposits in Precambrian Shield environments of Ontario with special reference to the effects of Quaternary cover on the observed dispersion patterns. See Biogeochemical prospecting in glaciated terrain of the Canadian Precambrian Shield; Bull. Can. Inst. Mining Metal., vol. 64, No. 715, pp. 72-80, 1971.

Isotope Geochemistry

250. Barton, J.M., Univ. de Montréal:
A strontium isotopic dissection of the Nain anorthosite-adamellite complex and of the Kiglapait layered norite-troctolite body, Labrador, 1971.

251. Brooks, C., Univ. de Montréal:
Early continent development in the light of isotopic and geochemical studies on Archean volcanics and in modern equivalents, 1969-.

252. Fritz, P., Univ. of Waterloo:
Geochemistry of dolomites, 1969-72.

256. Fritz, P., Cherry, J.A., Univ. of Waterloo:
Geochemistry of groundwater, 1971-.
Stable isotope and geochemical analysis will be used in aquifer recharge and water balance studies, investigations in the regional and local distribution of groundwater, and research on leachates from solid waste disposal sites.

257. McNutt, R.H., Crocket, J.H., McMaster Univ.:
Sr^{87}/Sr^{86} initial ratio studies of Chilean volcanic and plutonic rocks, 1971-.

Involves the measurement of rocks varying in age from 200 m.y. to the present, determining the spread in initial Sr^{87}/Sr^{86} ratios and seeing if this spread varies systematically with age of the rock.

258. Muecke, G.K., Dalhousie Univ.:
Investigations of a detailed history of thermal events for the low pressure metamorphic complex of pre-Mesozoic, mainland Nova Scotia, 1970.
Petrochemical, isotopic and magnetic studies are in progress: delineation of metamorphic zones in the Meguma Group and White Rock Formation; detailed studies of metamorphic reactions at the isograds and their relation to Nova Scotia granites and ore deposits; magnetic properties of these rocks and the mineralogy of their magnetic phases in order to determine the manner in which they change in response to increases in metamorphic grade; studies on the suitability of whole-rock K/Ar slate ages in dating regional metamorphic events and the thermal stability of slate ages; systematic investigations of problems in the microprobe analysis of phyllosilicates.

259. Ozard, J.M., Croucher, C., Ulrych, T.J., Univ. of British Columbia:
Lead and strontium isotopic analysis of basalts and also anorthosites, 1971-.
Basalts are from the mid-Atlantic, and anorthosites are from Canada, Greenland, and northwestern Scotland.

260. Schwarcz, H.P., McMaster Univ.:
Sulfur isotope geochemistry at Sudbury, Ontario, 1970-72.
Detailed study of fractionation between sulfide minerals in ores and variation in isotopic composition through various deposits.

261. Schwarcz, H.P., Burnie, S., Crocket, J.H., McMaster Univ.:
Sulfur isotope variations in stratiform ore deposits, 1968-72.
Isotopic ratios vary due to fractionation during bacterial reduction of seawater sulfate. The variation pattern can be correlated with the model of depositional environment based on sedimentologic criteria.

262. Schwarcz, H.P., Olson, E., McMaster Univ.:
Oxygen isotope studies of evaporite sulfates, 1969-72; Ph.D. thesis (Olson).
O^{18}/O^{16} variations are being studied in Phanerozoic evaporites for which sulfur isotope data exist, to test models of evaporite formation and to evaluate SO^{18} of ancient seawater sulfate.

263. Schwarcz, H.P., Shieh, Y.N., McMaster Univ.:
Oxygen isotope studies of granites and migmatites, 1969-72.
Isotopic variations during progressive metamorphism and migmatization within the Grenville province of southern Ontario.

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264. Schwarcz, H.P., Thompson, P., Ford, D., McMaster Univ.:
Geochronology and paleotemperature studies of cave deposits, 1968-72; Ph.D. thesis (Thompson).
Uranium-series disequilibrium isotope ratios (Th^{230}/U^{234}, U^{234}/U^{238}) are measured in caye-deposited limestones; from these, the date of deposition can be inferred. See Dating cave calcite deposits by the uranium disequilibrium method: some preliminary results from Crowsnest Pass, Alberta; Proc. 2nd Guelph Symposium on Geomorphology, 1971.

265. Schwarcz, H.P., Weiler, R., McMaster Univ. and Canada Centre for Inland Waters:
Carbon isotope geochemistry of Lake Erie water, 1971-72.
C^{13}/C^{12} ratios in bicarbonate dissolved in water vary with season. Magnitude of change and areal variation can supply information on inputs of carbon to lake. Interstital (pore) water is influenced by organic content of sediment.

266. Seccombe, P., Clark, G.S., Univ. of Manitoba:
A sulphur isotope investigation of sulphide occurrences in the Birch-Uchi Lakes greenstone belt, northwestern Ontario, 1970-72.

267. Thode, H.G., Monster, J., McMaster Univ.:
Sulphur isotope ratios in petroleum and sediments, 1960-.

268. Thode, H.G., Rees, C.E., McMaster Univ.:
Sulphur isotope ratios in lunar materials, 1970-74.

Mineralogical Phase Chemistry

269. Arnold, R.G., Malik, O., Univ. of Saskatchewan:
Phase equilibrium studies in the Fe-Ni-S systems, 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. A new invariant reaction involving two immiscible liquids at 1005°C has been studied. The distribution of nickel and cobalt between co-existing pentlandite and pyrrhotite has been studied as a function of temperature below 500°C; the distribution ratios vary predictably with temperature.

270. Arnold, R.G., Shimazaki, H., Saskatchewan Research Council:
Trace metal distributions between co-existing sulfides, 1965-71.
The partitioning of Ni, Co, Se, Mn among pyrrhotite, pyrite and arsenopyrite are currently being investigated.

271. Brown, J.B., McGill Univ.:
An experimental study on some aspects of serpentinization, 1971-73; Ph.D. thesis.
Study involves first an addition of iron-containing olivine to the system, then Ni behaviour within that system during the formation of serpentine.

272. Clark, A.H., Armstrong, R.C., Queen's Univ.:
Phase equilibria in ore mineral systems, 1969-.; M.Sc. thesis (Armstrong).

273. Crocket, J.H., Chyi, L.L., McMaster Univ.:
Noble metal geochemistry in sulfides from Strathcona Mine, Sudbury, Ontario, 1968-72, Ph.D. thesis (Chyi).
The partition of Pd, Pt, Ir and Au between coexisting pyrrhotite, pentlandite, chalcopyrite and magnetite from Strathcona Mine (Falconbridge Nickel Company) Sudbury, Ontario, has been studied by neutron activation analysis, and the fractionation of these metals between the main types of ore found at Strathcona investigated. In general, Pt, Pd and Au, but not Ir, are concentrated in chalcopyrite and pentlandite rather than pyrrhotite. Pd shows marked enrichment in pentlandite relative to any other noble metal studied including platinum.

274. Crocket, J.H., Garth, J., McMaster Univ.:
Noble metal geochemistry of the Merensky reef horizon, Bushveld Complex, 1970-72; M.Sc. thesis (Garth).
Pd, Ir, Pt and Au are determined by neutron activation analysis on whole rock, sulfide and chromite mineral separates from the Merensky reef pegmatite, Bushveld Complex. A detailed study on individual sulfide grains and small (25 mg) chromite samples is possible for these ores.

275. Crocket, J.H., Kuo, H.Y., McMaster Univ.:
Rare earth geochemistry of Sudbury nickel irruptive rocks, 1970-73; Ph.D. thesis (Kuo).
The rare earth group elements (La-Lu) are determined by neutron activation analysis using a wet chemical rare earth group separation followed by gamma spectrometry analysis with Li(Ge) diode detector. Analyses will be carried out on micropegmatite, north and south range norites, ore-bearing sublayer gabbro, offset quartz diorite and ultramafic and gabbroic xenoliths. The rare earth abundance patterns will be used to test various current hypotheses on the relationships between these constituent facies of the Sudbury nickel irruptive.

276. Crocket, J.H., Mercer, W.M., McMaster Univ.:
Pd and Au geochemistry in stratiform, pyritic, base metal deposits from northern New Brunswick, 1968-73; Ph.D. thesis (Mercer).
Pd and Au have been determined in sulfide and footwall sediment samples from the Heath Steele and Caribou deposits from northern New Brunswick through neutron activation analysis. The very high Au/Pd ratios characteristic of these deposits places some linitations on possible sources and ore-forming processes applicable to these deposits.

277. Edgar, A.D., Duke, N., Univ. of Western Ontario:
Petrology and geochemistry of the Blue Mountain litchfieldite and associated rocks, Peterborough County, Ontario, 1971-73; M.Sc. thesis (Duke).

GEOCHEMISTRY

278. Edgar, A.D., Platt, R.G., Gupta, A.K., Venkateswaran, G.P., Univ. of Western Ontario:
Phase relations in portions of the system larnite-forsterite-nepheline-leucite-silica at pressures up to 1 kb P_{H_2O}, 1967-75.

279. Farrell, D.M., Mines Branch, Dept. of Energy, Mines and Resources:
Determination of the course of structural changes and of the kinetics of conversion of magnetite through maghemite to α-hematite by infrared spectroscopy, 1968-71; M.Sc. thesis.
Kinetic experiments have been completed, but the interpretation of the resulting infrared spectra has presented unforeseen difficulties and has not yet yielded satisfactory kinetic information.

280. Fratta, M., Shaw, D.M., McMaster Univ.:
Thallium geochemistry of "basaltic" rocks, 1971-73.
A detailed study of the geochemical behaviour of thallium in "basalts" of different ages, namely from Archean to present day, will contribute to understanding the chemical evolution of the early earth.

281. Gill, J.W., McGill Univ.:
Phase relations in part of the Cu-Fe-Ni-S system, 1971-73; M.Sc. thesis.

282. Hamann, R., Univ. of Toronto:
Solubility of galena in ore solutions at low temperatures, 1970-72; M.Sc. thesis.

283. Helsen, J.N.W., Shaw, D.M., McMaster Univ.:
Geochemistry of tungsten in basalts, 1970-73; Ph.D. thesis (Helsen).
Neutron activation analysis of basalts (sensitivity limit about 10 ppb) will provide basic data to appraise the budget of W in the earth. Measurement of phenocryst-matrix partition will lead to an understanding of the behaviour of W during differentiation processes.

284. Hinton, M.A., Shaw, D.M., McMaster Univ.:
Distribution of thallium in the minerals of a metamorphic rock in Chandos township, Ontario, 1971-72.
Partition of Tl among minerals in metamorphic rocks is entirely unknown. This exploratory project will concentrate on a multiphase scapolite amphibolite.

285. Jongejan, A., Wilkins, A.L., Mines Branch, Dept. of Energy, Mines and Resources:
High-temperature phase equilibrium studies in the system $CaO-Nb_2O_5-TiO_2-SiO_2$ and the relevant sub-systems, 1962-71.
This series of investigations relating to the ranges of temperature and compositional stability of possible compounds in the $CaO-Nb_2O_5-TiO_2-SiO_2$ system is being concluded. Various binary, pseudo-binary, ternary and pseudo-ternary sub-systems within the quaternary phase space have

been investigated with a view to explaining the formation of niobium-bearing perovskite, titanium-bearing pyrochlores, niocalite and the non-formation of sphene in the Oka, P.Q., deposits. No definite evidence for the formation of any stoichiometrically definable quaternary compound has been encountered; several ternary compounds have, however, been defined. See 1. Liquidus determinations along binary and pseudo-binary sub-systems within the quaternary system CaO-Nb_2O_5-TiO_2-SiO_2; J. Less-Common Metals, vol. 24, pp. 445-452, 1972. 2. Liquidus determinations in the pseudo-ternary sub-system $CaO.Nb_2O_5$-$CaO.TiO_2$-SiO_2 of the quaternary system CaO-Nb_2O_5-TiO_2-SiO_2; J. Less-Common Metals, vol. 25, pp. 109-114, 1971. 3. Liquidus determinations in the plane $CaO.Nb_2O_5$-$CaO.SiO_2$-TiO_2 within the quaternary system CaO-Nb_2O_5-TiO_2-SiO_2; J. Less-Common Metals, vol. 25, pp. 345-351, 1971. 4. Liquidus determinations in the 15%-SiO_2 plane of the quaternary system CaO-Nb_2O_5-TiO_2-SiO_2; J. Less-Common Metals, vol. 26, pp. 89-98, 1971.

286. MacLean, W.H., McGill Univ.:
The partition of elements between coexisting silicate and sulfide liquids, 1970-72.
See The partition of some transition elements between coexisting iron sulfide and iron silicate liquids; GAC-MAC Annual Meeting, Abstract, 1971.

287. MacLean, W.H., Cabri, L.J., Gill, J.E., McGill Univ., and Mines Branch, Dept. of Energy, Mines and Resources:
Exsolution products in heated chalcopyrite, 1970-72.
See Metastably coexisting chalcopyrite solid solutions; GAC-MAC Annual Meeting, Abstract, 1971.

288. MacRae, N.D., Univ. of Western Ontario:
Geochemical relations of skarn sulfide-silicate assemblages, 1969-74.
Experimental investigations are aimed at determining the sulfurization effects of common silicates under typical contact metamorphic P/T effects. Several natural skarn suites are also being examined. See Experimental investigations of some sulfide-silicate reactions in the hydrothermal temperature range; Carnegie Inst. Washington Yearbook 70, pp. 282-286, 1971.

289. McGowan, C., Mandarino, J., Royal Ontario Museum:
An investigation into the mineralogy and geochemistry of dinosaur bone from the Upper Cretaceous of Alberta, 1970-72.
To determine the changes that have taken place in the bone since the time of death. Results to date show that very little change has occurred.

290. McOnie, A.W., Fawcett, J.J., James, R.S., Univ. of Toronto and Laurentian Univ.:
Stability of intermediate Mg-Fe chlorites, 1968-72; M.Sc. thesis (McOnie).

GEOCHEMISTRY

291. Mercy, E., Lakehead Univ.:
Geochemistry of Lherzolite, 1968-.

292. Myers, D., Univ. of Toronto:
Aqueous zinc chloride complexes from 25°C to 90°C, 1970-72; M.Sc. thesis.

293. Naldrett, A.J., Brown, G.M., Univ. of Toronto:
Study of chemical equilibria between Fe-Mg pyroxenes and Fe sulfides, 1967-71.

294. 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.

295. 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, 1969-72.

296. Scott, S.D., Kissin, S.A., Kretschmar, U., Univ. of Toronto:
Crystal chemical and phase relations in sulfide systems, 1969-72; Ph.D. theses.
Determination of phase relations for sulfide systems (Fe-S, Zn-Fe-S, Fe-As-S, Zn-Fe-As-S) at geologically important temperatures and pressures by hydrothermal recrystallization. Synthesis of single crystals of sulfide minerals for X-ray diffraction analysis and optical, physical and electrical measurement. See Mossbauer spectra of synthetic iron-bearing sphalerite; Can. Mineralog., vol. 10, pt. 5, pp. 882-885, 1971.

General Problems

297. Anderson, G., Univ. of Toronto:
Geothermometry using solid electrolytes, 1971-73.

298. Appleyard, E.C., Univ. of Waterloo:
Geology of the Reid Lake - Rosenthal Nepheline - Corundum belt, Renfrew County, Ontario, 1969-72.
Study combines mineralogical, structural and geochemical approaches to the history of the alkaline gneisses, unravelling the phases of diastrophism, metamorphism and magmatism.

299. Arnold, R.G., Sangameshwar, S., Univ. of Saskatchewan:
A geochemical study of "economic" and "barren" sulfide bodies in the Flin Flon area, Saskatchewan and Snow Lake area, Manitoba, 1967-71; Ph.D. thesis (Sangameshwar).
The geochemical properties of mineable massive sulfide bodies and uneconomic massive sulfide bodies composed of iron sulfides are being studied to develop criteria to distinguish between the two types in exploration programs and to determine their modes of origin.

300. Buckley, D.E., Walker, D., Bedford Institute:
Mechanics and efficiency of filters as particulate matter separators, 1971-72.
To test the pass and retention characteristics of several types of filters including membrane, metalic, fiber and bombarded polycarbonate; to test drying characteristics, chemical stability and weighing properties. Several test results to be obtained by means of scanning electron microscopy.

301. Cermignani, C., Univ. of Toronto:
Measurement of sodium activity in minerals at high temperature using solid electrolytes, 1971-74; Ph.D. thesis.

302. Clarke, D.B., Dalhousie Univ.:
Petrology and geochemistry of Tertiary volcanics of the Davis Strait area and their relation to continental drift, 1970-.
Study is now expanded into the submarine rocks of Davis Strait in order to trace the petrochemical evolution of an aseismic ridge and into the rocks of Ubekendt Island, West Greenland in order to trace the history of magnetic evolution in a single locality. Other research projects include: Phase relations in pyroxenes; concentration gradients in natural glasses; melting experiments on picritic rocks; and petrogenesis of spilites.

303. Corlett, M.I., Queen's Univ.:
Minor element contents of sulfides and sulphosalts, 1961-72.

304. Dostal, J., Shaw, D.M., McMaster Univ.:
Origin of the Loon Lake pluton and rare earth element geochemistry, 1968-73; Ph.D. thesis (Dostal).
Field, petrographic and geochemical study of a high level pluton intrusive into the Grenville series rocks. Differentiation processes are being studied by neutron activation analysis of rare earth elements.

305. Edgar, A.D., The geochemistry and petrogenesis of peralkaline undersaturated rocks, 1965-73.

306. Ford, D.C., Drake, J.J., Miotke, F.D., McMaster Univ.:
Spatial and temporal patterns of carbonate and sulfate rock solution in the Canadian cordillera, 1966-73.
P_{CO_2} has been isolated as the most important factor governing the amount of carbonate rock solution. See Characteristics of limestone solution in the Southern Rocky Mountains and Selkirk Mountains, Alberta and British Columbia; Can. J. Earth Sci., vol. 8, No. 6, pp. 585-609, 1971.

307. Fortescue, J.A.C., Black, J.A., Gawron, E., Winn, R., Brock Univ.:
Studies in fundamental and applied landscape geochemistry, 1970-.
See Dept. Geol. Sci., Brock Univ., Research Rept., Ser., Nos. 1, 2, 4, 7, 1971.

GEOCHEMISTRY

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

309. Hitchon, B., Research Council of Alberta:
Geochemistry of formation waters, oils and gases in western Canada, and surface waters of MacKenzie River drainage basin.
Hydrodynamics and hydrocarbon occurrences, Surat Basin, Queensland, Australia; Water Resources Research, vol. 7, pp. 658-676, 1971.; Calcium and magnesium in Alberta brines; Research Council of Alberta, Econ. Geol. Rept. No. 1, 1971. See Geochemistry and origin of formation waters in the western Canada sedimentary basin - III. Factors controlling chemical composition; Geochim. et Cosmochim. Acta., vol. 35, pp. 567-598, 1971.

310. Holroyd-Doveton, J.D., Mobil Oil Canada:
Interrelationships of formation water chemistry, hydrodynamic regimes and hydrocarbon accumulations in the Upper Devonian of southern Alberta, 1971-.
Computer implemented statistical methods.

311. Jen, Lo-Sun, Univ. of Ottawa:
Spatial distribution of crystals and phase equilibria in charnockitic granulites from Adirondack Mountains, New York, 1969-73; Ph.D. thesis.

312. Kerba, M., Univ. of Montréal:
Geochemistry of the Chibougamau granites, 1970-73; M.Sc. thesis.
To demonstrate the relationship between the different batholiths; find new methods of analyses of elements expected to be in high concentration in granites using X-ray fluorescence, atomic absorption, colourimetry and wet chemical analyses; determine the potash feldspar content in the sodic granites using X-ray diffraction methods; and determine the geochronology of the different batholiths by mass spectrometry methods.

313. Larson, L.R., Webber, G.R., McGill Univ.:
Geochemical subdivision, stratigraphic correlation, and genesis of rhyolitic volcanic rocks, northwestern Quebec, 1969-72; M.Sc. thesis (Larson).

314. McNutt, R.H., Crocket, J.H., Barker, J., McMaster Univ.:
Rare earth studies in the Whitestone anorthosite, Ontario, 1969-71; M.Sc. thesis (Barker).
Involves the rare earth (RE) analysis of approximately fifteen samples of whole rock material and the minerals: plagioclase, hornblende, clinopyroxene and garnet. Emphasis placed on the RE distribution and fractionation pattern between coexisting minerals.

315. 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, 1970-71.

316. Reeve, E.J., Univ. of Toronto:
Geochemistry of the Golding-Keene pegmatite and adjacent rocks, 1969-72; Ph.D. thesis.

317. Schneeberg, E., Univ. of Toronto:
Measurement of sulfur fugacity at high temperatures using solid electrolytes, 1969-72; Ph.D. thesis.

318. Shaw, D.M., McMaster Univ.:
Origin of the earth's crust.
Following cold accretion, the earth experienced a high temperature stage when complete melting took place. Subsequently, cooling led to fractionation of lithophile elements to form the protocrust. Fractionation was produced by (a) partition, (b) zone melting and (c) gravitational differentiation. The implications of these processes for the geochemical and other characteristics of the early crust are being studied.

319. Smith, T.E., Univ. of Windsor:
Geochemistry of the Portage Lake lavas, Keweenawen, Michigan, U.S.A., 1972.

320. Smith, T.E., Univ. of Windsor:
Geology and geochemistry of the Newcastle porphyry, a Jamaican Tertiary volcanic sequence, 1972-75.

321. Smith, T.E., Univ. of Windsor:
Geology and geochemistry of the granitic rocks of southwestern Nova Scotia, 1970-.

322. Stanton, M.S., Chevron Standard Ltd., Calgary:
Organic and petroleum chemistry; geotectonics, 1967-.

323. Strong, D.F., Dickson, W.L., Chong, Teng Hau, Memorial Univ.:
Geochemistry of Newfoundland granites, 1971-.; M.Sc. thesis (Dickson, Chong).

324. Strong, D.F., Douglas, J.G., Memorial Univ.:
Geochemistry of Cambrian manganese deposits of Newfoundland, 1971-.; M.Sc. thesis (Douglas).

325. Sutherland, J.K., Abbott, D.W., Barnett, D.E., New Brunswick Research and Productivity Council:
Chemistry of some New Brunswick chalcopyrites and associated silver bearing minerals, 1970-71.

GEOCHEMISTRY

326. Wardlaw, N.C., Univ. of Calgary:
Petrology and geochemistry of paleozoic carbonates and shales, 1969-72.
See Carbonate and evaporite deposition and diagensis Middle Devonian Winnipegosis and Prairie Evaporite Formations of south-central Saskatchewan; Bull. Am. Assoc. Petrol. Geol., vol. 55, pp. 1759-1786, 1971.

327. Warren, H.V., Peterson, G.R., Delavault, R.E., Fletcher, K., Univ. of British Columbia:
"Trace element content of fish livers", 1968-.
The trace element content of fish livers has been found to be a useful guide, not only of contamination but also of anomalous conditions indicative of possible economic mineralization.

328. Weihmann, I., Gulf Oil Canada Limited:
Geothermal gradients.
Geothermal gradients in Northeastern British Columbia are being investigated to determine relationships of temperature variations to lithofacies, oil and gas occurrence, and tectonic patterns. Data from drillstem tests and bottom hole temperatures from log surveys are being used.

GEOCHRONOLOGY

329. Anderson, R., Univ. of Manitoba:
Rubidium-strontium geochronology of the Kasmere Lake area, northwestern Manitoba, 1971-72; M.Sc. thesis (Anderson).
See Canadian Geophysical Bull., 1971.

330. Aumento, F., Dalhousie Univ.:
Detailed geological investigation of the oceanic crust, 1969-.
1. Elucidation of the tectonic and igneous cycles on the axes of mid-oceanic ridges: layered intrusions, differentiation, ultramafic intrusions, and the subsequent metamorphism, metasomatism and weathering effects of these rocks. 2. Establishment of set of criteria for the identification of ancient oceanic crusts on the continents. 3. Measurement of the geometric shape and dimension of igneous material which produces magnetic anomalies on the ocean floor, and correlation of measured polarities with anomalies. 4. Use of fission tracks as an absolute dating method, and for the analytical in-situ determination of uranium and thorium in rocks and minerals.

331. Barton, E.S., McGill Univ.:
Geochronologic study of structural units in southern Quebec, 1970-72; M.Sc. thesis.

332. Blake, W., Lowdon, J.A., Geol. Surv. of Can.:
Radiocarbon dating, 1957-.
To establish an absolute chronology of events throughout Canada during the last 50,000 years, including rates of processes operative at present and in the past.

333. Brooks, C., Univ. de Montréal:
Early continent development in the light of isotopic and geochemical studies on Archean volcanics and modern equivalents, 1969-.

334. Carter, N.C., British Columbia Dept. of Mines and Petroleum Resources:
Geology and geochronology of porphyry copper and molybdenum deposits in central British Columbia, 1967-72; Ph.D. thesis.
A comparative geological study, coupled with potassium-argon dating of the age of mineralization of copper and molybdenum-bearing plutons in west-central British Columbia. These plutons, of Upper Cretaceous to early Tertiary age, intrude Mesozoic volcanic and sedimentary rocks within an area which is bounded on the west by the coast Plutonic Complex and on the east by the Omineca-Topley intrusions.

335. Clark, A.H., Farrar, E., Haynes, S.J., Lorite, R.B., Zentilli, M., Quirt, G.S., McNutt, R.H., Conn, H., Mortimer, C., Sillitoe, R.H., Queen's Univ.:
Metallogenetic relationships in the Andean copper province of northern Chile, 1967-.

GEOCHRONOLOGY

336. Clark, A.H., Farrar, E., Quirt, G.S., Queen's Univ.:
Geochronogical studies of the Andean Mobile Belt of northern Chile (largely 26°-29°S), 1967-72; Ph.D. thesis (Quirt).
Work has been extended to the dating of major porphyry copper deposits throughout Chile.

337. Clark, A.H., McNutt, R.H., Crockett, J., 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.

338. Cooke, H.B.S., Dalhousie Univ.:
Long term study on the stratigraphy, faunal succession and environment of deposits in central and southern Africa that have furnished remains of early man, 1938-.
It is planned to spend the whole of the summer of 1972 in Africa and part of the summer of 1973. The study has shown the need for comparisons with Indian material and a visit to India in 1973 may be necessary. Pleistocene studies within Nova Scotia are planned for 1972-1974.

339. Cormier, R.F., McNabb, B.E., St. Francis Xavier Univ.:
Rubidium-strontium dating of rocks and minerals, with particular emphasis on problems of northern Appalachian geology, 1961-.
Currently completing a study of the ages of granitic rocks on Cape Breton Island.

340. Dey-Sarkar, S.K., Farquhar, R.M., Univ. of Toronto:
Rb-Sr dating of Blake River Precambrian volcanics, Quebec, 1970-.
Rb-Sr whole rock isochron date of 2.5×10^9 yrs obtained ($\lambda = 1.39 \times 10^{-11}$ yr^{-1}) for acid volcanic samples from near Noranda. Plans are presently to check the Rb/Sr ratios in these samples using isotope dilution instead of X-ray fluorescence.

341. Doig, R., McGill Univ.:
K-Ar geochronology, alkaline rocks, 1965-.

342. Doig, R., McGill Univ.:
Rb-Sr geochronology, Grenville province rocks, Quebec, 1965-.

343. Doyle, R.J., Farquhar, R.M., Univ. of Toronto:
Rb-Sr dating of geotraverse granites and gneisses, 1971-.
Samples collected during summer of 1971 now being processed for selection of suitable Rb/Sr ratios. Results of whole rock dating will be guide to further course of project, both in regards to dating methods and scope.

344. Farrar, E., Baksi, A.K., Quirt, G.S., McBride, S.L., Archibald, D.A., Queen's Univ.:
Geochronological studies.
Geochronological investigations in northern Chile and Argentina to establish a comprehensive temporal framework for the interpretation of ore deposit localization in mobile

belts, with emphasis on the Andes of northern Chile and northeastern Argentina. K-Ar dating will be integrated with a petrochemical study of the intrusive and volcanic rocks associated with mineralization and with studies of stable isotope distribution and ultimately with the tectonic and petrologic evolution of the East Pacific Ocean floor.

Research on one of the fundamental assumptions of the K-Ar dating technique - the problem of initial argon-involves the use of isochron diagrams to determine both the amount of initial argon trapped in cooling minerals and its Ar^{40}/Ar^{36} ratio. The results show that in some cases this initial argon can radically affect the calculated age of a mineral. See High initial argon ratios in hornblendes; Earth and Plan. Sci. Letters, vol. 12, p. 208, 1971. Potassium-argon ages of porphyry copper deposits and associated rocks in the Farallon Negro-Capillitas District, Catamarca, Argentina; Econ. Geol., vol. 66, p. 961, 1971. Potassium-argon ages of porphyry copper deposits in northern and central Chile; Econ. Geol., vol. 66, p. 980, 1971.

345. Franklin, J.M., Wanless, R.K., Loveridge, W.D., Lakehead Univ. and Geol. Surv. of Can.:
Stratigraphy and age of the Sibley Group, a Paleohelikian red-bed sequence, 1967-72.

Rb-Sr whole rock isochron data has been used to determine the age of this sequence. The stratigraphy of the southern area of Sibley outcrop has been determined and detailed petrographic and clay mineralogy studies are under way. The Sibley Group is a thin (max. 700 ft.) laterally extensive (approx. 15,000 sq. miles) Paleohelikian red bed sequence formed of coarse to fine clastic sediments, carbonate beds, and chert-stromatolite zone.

346. Gertner, B., Farquhar, R.M., Univ. of Toronto:
Compilation of age data, 1960-.

Rb-Sr mineral and whole rock isochron ages for Canada are being compiled and will shortly be published as a project report.

347. Hayles, J.H., Slawson, W.F., Univ. of British Columbia:
Extended lead isotope analyses from Manitouwadge, Ontario, 1970-72.

348. Josse, G., Clark, G.S., Univ. of Manitoba:
Rubidium-Strontium geochronology of the File-Morton Lake area, west-central Manitoba, 1970-72; M.Sc. thesis (Josse).
See Canadian Geophysical Bull., 1971.

349. Keen, M.J., Dalhousie Univ.:
Study of the crust and upper mantle of the earth beneath the Maritimes, 1965-.

Earth Tides. The short term goal is to complete the study of the crust and upper mantle of the earth beneath the Maritimes by observing the elastic response of the solid earth to ocean tide loading. We plan in 1972-1973 to (1) complete observations of tilt and tidal gravity at Halifax,

Tatamagouche, Sable Island, St. John using the Melchior pendulum tiltmeters and the Geodynamics gravimeter (of Columbia University); (2) instal Stacey mercury tube tiltmeter at Halifax and Tatamagouche; (3) analyses the complete set of observations of tilt and gravity by comparing them with with results predicted from theoretical models using finite element method.

The long term goal is to try to determine the depth to and the properties of the low velocity layer of the upper mantle, using a profile of array of similar observations.

350. Laurent, R., Univ. de Laval:
Etude géochronométrique et géochimique des complexes ophiolitiques des Cantons de l'Est et de Gaspésie, Québec, 1971-75.

Utilisation de la méthode géochronométrique du potassium-argon combinée avec l'utilisation de la microsonde afin d'établir un modèle théorique de l'évolution thermique et géochimique des complexes ophiolitiques de la "Zone de la Serpentine".

351. McNutt, R.H., Gibbins, W.A., McMaster Univ.:
Rb-Sr geochronologic investigations of the Sudbury norite and Murray granite, Ontario, 1968-72; Ph.D. thesis (Gibbins).

See Rb-Sr isotopic studies on the Murray granite; Geol. Assoc. Can., Mineral Assoc. Can., Abstracts, 1971.

352. Neilson, J.M., Queen's Univ.:
Grenville Front in the Mistassini region, Quebec, 1970-73.

353. Ozard, J.M., Croucher, C., Ulrych, T.J., Univ. of British Columbia:
Lead and strontium isotopic analyses of basalts and also anorthosites, 1971-.

Basalts are from the mid-Atlantic, and the anorthosites are from Canada, Greenland, and northwestern Scotland.

354. Ozard, J.M., Russell, R.D., Slawson, W.F., Univ. of British Columbia:
Integrated study of anamalous lead data from the Canadian Shield, 1971-.

See Lead isotope studies of rock samples from the Superior Geological Province; Can. J. Earth Sci., vol. 8, No. 4, pp. 444-454, 1971.

355. Schindler, J.N., Schwarcz, H.P., Crocket, J.H., McNutt, R.H., McMaster Univ.:
Rhenium/osmium dating of ore deposits, 1968-72.

Neutron-activation analytical procedures for Re and Os are being devised. Survey is being made of concentrations in molybdenites and other sulfide minerals to determine feasibility.

356. Slawson, W.F., Univ. of British Columbia:
Age of granites in southern Botswana, Africa, 1970-72.

357. Slawson, W.F., Ozard, J.M., Univ. of British Columbia:
Common leads from Queen Maud Land, Antarctica, 1971-72.
Several galena from a vein at Jekelsen Nunatak have been obtained through the South African Geological Survey, and isotopically analyzed. The leads have an unusual composition, which may be interpreted as showing the source rock age to be $>2.5 \times 10^9$ yrs. old.

358. Terasmae, J., Brock Univ.:
Postglacial geochronology and paleoecology of the Kamloops area, British Columbia, 1971-.
The objective of the study is to establish the chronology of late- and postglacial events (deglaciation, climatic changes, geological features, and history of vegetation) by a study of lake sediments and peat deposits, involving palynological investigations, radiocarbon dating, tephrochronology, and sediment characteristics.
Some pollen diagrams have been completed, reconnaissance of additional potential sites for study has been made, and a survey of airborne pollen was completed in co-operation with scientists of the Canada Dept. of Agriculture. A series of surface sediment samples has been collected and studied for the purpose of providing a means of reference for the interpretation of fossil pollen and spore assemblages.

359. Terasmae, J., Brock Univ.:
Quaternary geochronology, paleoecology and dendroclimatology in Ontario, 1969-.
The primary objective of the proposed research is to establish a chronological framework for geological events (retreat of the continental ice-sheet, history of glacial lakes, and dating of the development of landscape features), climatic changes and history of vegetation since the last glaciation. This objective is achieved by making palynological, paleobotanical and sedimentological studies of selected peat and lake deposits which contain a biological and physical record that allows the reconstruction of past environmental changes. Results of these essentially paleoecological studies (supported by radiocarbon dating) are used for a regional correlation of stratigraphic units, geological events and landscape features (such as raised shorelines, moraines, and former outlets of lakes).

360. Turek, A., Cranstone, D., Univ. of Windsor:
Geochronology of the Churchill-Superior boundary region in Manitoba, 1970-72.

361. Van Niekerk, C.B., Clark, G.S., Univ. of Manitoba:
Rubidium-Strontium and Uranium, thorium-lead dating of Archean volcanic rocks, northwestern Ontario, 1971-72.

362. Van Schmus, W.R., Card, K.D., Ontario Dept. of Mines and Northern Affairs - Univ. of Kansas:
Radiometric age and petrology of granitic rocks beneath the Paleozoic cover of Manitoulin Island, 1970-72.
Samples of granitic rocks from beneath the Paleozoic cover of Manitoulin Island recovered by drilling are being analyzed petrographically, chemically, and by Rb-Sr radiometric methods.

GEOMORPHOLOGY AND GLACIOLOGY

(See Research Projects in Glaciology; Inland Waters Branch, Department of Energy, Mines and Resources, Rept. Ser. No. 15, 1971.

363. Barnett, D.M., Geol. Surv. of Can.:
Proglacial geomorphology, Generator Lake, Baffin Island, 1965-71; Ph.D. thesis.

364. Bik, M.J.J., Geol. Surv. of Can.:
Surficial deposits and geomorphology, Central Research Forest, Ontario, 1968-70.
Joint studies by the Geological Survey of Canada and the Inland Waters Branch and Forest Management Institute, Department of the Environment, of groundwater flow through the marine clay and the depth of oxidation of this clay revealed that higher permeabilities occur over greater depth intervals below the groundwater table under certain vegetation associations than found on the average. Sediment- and microstratigraphic analyses indicate the depth of oxidation of the marine clay to be a weathering phenomenon only; differences in colour-permeability of the brown mottled clay and the underlying blue-gray sensitive clay could not be related to stratigraphic boundaries or differences in grain size distribution.

365. Bik, M.J.J., Geol. Surv. of Can.:
Geomorphology of Cypress Hills and adjoining parts of southern Alberta, 1965-71.

366. Blake, W., Souchez, R.A., Geol. Surv. of Can., and Univ. of Brussels:
Quaternary reconnaissance, southern Ellesmere Island and Devon Island, Northwest Territories, 1967-.
Denudation rates in postglacial time. See Ice-cored moraines in south-western Ellesmere Island, N.W.T., Canada; J. Glaciology, vol. 10, No. 59, pp. 245-254, 1971.

367. 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 from other individuals and agencies. Accompanying this collection of information is the study of the climatic and terrain factors comprising the permafrost environment as a means of improving the understanding of and ability to predict the distribution and occurrence of permafrost. See "Permafrost in Canada: its influence on northern development"; Univ. of Toronto Press, 1970.

368. Church, M., Univ. of British Columbia:
Hydraulics of sediment transport and depositional morphology in high mountains, 1971-.
Sediment movement in gravel rivers is being studied in the context of detailed river channel hydraulics, and the alluvial deposits that result are being investigated by

sedimentological means. To develop an understanding of the hydraulics of gravel rivers and of the mechanics of formation of coarse, clastic alluvial deposits.

369. Dunne, T., McGill Univ.:
Survey of streamflow, sediment yields, and water chemistry of Kenya, in relation to geology, climate and land use, 1969-72.

370. Dunne, T., Price, A.G., McGill Univ.:
Snowmelt runoff production, 1971-73.
See Runoff processes during snowmelt; Water Resources Res., vol. 7, No. 5, pp. 1160-1172, 1971.

371. Flint, J.-J., Brock Univ.:
Fluvial systems in glaciated terrains, 1970-72.
The purpose of the research is to evaluate the regional characteristics in the channel geometry, geomorphology, and hydrologic response for channel networks in glaciated terrains. The hydrology of 400 regulated and unregulated drainage basins will be described by the mean annual discharge, flow variability, and flood discharge. This basic data will be used in conjunction with climatologic data to compare the water budget as calculated from stream runoff and climatologic informations. In addition, the regional variations in the average discharge and mean annual flood will be examined in relation to channel shape and dimensions to provide informations on the magnitude of the flow controlling the channel characteristics and responsible for the formation of a flood plain. Integration of the hydrology with the suspended sediment load carried by rivers will permit evaluation of transportation and erosion rates in selected areas across Canada.

372. Ford, D.C., McMaster Univ.:
The general problem of cavern genesis by groundwater solution in carbonate rocks and sulphate rocks, 1966-.
Three conflicting theories exist concerning the nature and the locus of the development of major solution caverns. Each is correct in specific circumstances of lithology, structure and geomorphic history, but no one is correct for a majority of cases. A new explanation which stresses the importance of the factors cited above has been developed. See Geologic structure and a new explanation of limestone cavern genesis; Trans. Cave Research Group, Gt. Britain, vol. 13, No. 2, pp. 81-94, 1971.

373. Ford, D.C., Brook, G.A., McMaster Univ.:
Genesis of caves and karst of the Nahanni Formation in the South Nahanni River region, Northwest Territories, and associated chronology of glaciation and river canyon formation, 1971-74.
A remarkable wealth of complex cave and karst land forms has developed in the limestone Nahanni Formation at 1st canyon, South Nahanni River, and in a belt extending 25 miles to the north. Part of this complexity is attributable to the fact that the region escaped the Wisconsin

glaciation and, from our preliminary data, probably the Illinoian glaciation as well.

By dating the caves (U-method of Thompson, Schwarcz and Ford, McMaster University), we hope to date the river canyon-cutting and glacial events in this region.

374. Gold, L.W., Division of Building Research, National Research Council:
Deformation and failure of ice, 1960-.

To establish the dependence of the deformation and failure of ice on stress, temperature and time. See The process of failure in ice; Can. Geotechnical J., vol. 7, No. 4, pp. 405-413, 1970. Investigation of the mechanical properties of St. Lawrence River ice; Can. Geotechnical J., vol. 8, No. 2, pp. 163-169, 1971.

375. Greiner, H.R., Univ. of New Brunswick:
Geomorphology of Fundy National Park, New Brunswick, 1970-71.

376. Henoch, W.E.S., Inland Waters Branch:
Fluctuations of glaciers in the Rocky Mountains, 1969-.

To study secular glacier fluctuations in selected areas of the Rocky Mountains and examine glacier fluctuations, correlation with climatic parameters, river discharge and dendrochronological records. See Estimate of glacier secular (1948-1966) volumetric change; J. Hydrology, vol. 1, No. 12, pp. 145-160, 1971. The use of Englemann Spruce latewood density for dendrochronological responses; Can. J. Forest Res., vol. 1, pp. 90-98, 1971.

377. Karrow, P.F., Univ. of Waterloo:
Bedrock topography, southwestern Ontario, 1958-73.

378. Kupsch, W.O., Univ. of Saskatchewan:
Permafrost glossary, 1971-72.

379. Mackay, J.R., Geol. Surv. of Can., and Univ. of British Columbia:
Geomorphic processes, Mackenzie Valley-Arctic Coast.

Multi-faceted study of geomorphic features and processes related to a permafrost environment; fluvial, lacustrine, coastal, eolian and mass wasting activity; origin and depth of permafrost and ground ice; resistivity and seismic surveys of permafrost and ground ice; relations between natural and artificial disturbances to the permafrost regime. Glacial and postglacial history. See Massive ice and icy sediments throughout the Tuktoyaktuk Peninsula, Richards Island, and nearby areas, District of Mackenzie; Geol. Surv. of Can., Paper 71-21, 1971.

380. Mackay, J.R., Mackay, D.K., Univ. of British Columbia, and Inland Waters Branch, Dept. of Environment:
To measure and assess the effects of a variety of snow cover conditions on ground temperature in different terrain types, 1969-.

Thermistors to measure snow cover and ground temperatures to depths of 1.5 m installed in several locations at Peter Lake, Garry Island, Paulatuk, N.W.T. Measurements

show significant temperature differences due to soil types, slope aspect, vegetation cover and location.

381. Mackay, J.R., Mathews, W.H., Univ. of British Columbia:
Snow creep, southern British Columbia, 1958-72.

382. McCann, S.B., Taylor, R.B., McMaster Univ.:
An investigation of beach characteristics and nearshore processes in the Canadian Arctic, 1968-73.
See The depth of the frost table on Arctic beaches, Cornwallis and Devon Islands, N.W.T., Canada; J. Glaciology, vol. 6, pp. 116-117, 1971.

383. Moore, T.R., Nicholson, H.M., McGill Univ.:
A study of the soils of the subarctic zone of interior Quebec/Labrador, 1971-73.
The study concentrates on the processes involved in the development of the soils, and the relationships between the soils and the vegetation, climate and geomorphology. Soils of the Regosolic, Podzolic, Brunisolic, Gleysolic and organic orders have been identified by general traverses and more detailed surveys of selected areas. Characterization of the soils' properties will be made by performing routine chemical and physical laboratory analyses, supplemented by differential extraction techniques to identfy the pedogenetic processes operating within the soil profiles.

384. Parry, J.T., Morgeli, W., Beswick, J., Dredge, L., McGill Univ.:
Terrain evaluation project, 1964-.
Evaluation of remote sensing methods to all aspects of terrain. See Infrared air photos for drainage analysis; Photogrammetric Engineering, vol. 37, No. 10, pp. 1031-1038, 1971.

385. Penner, E., Division of Building Research, National Research Council:
Frost action in soils, 1956-.
To establish mechanism of ice growth and propagation in freezing soils, to establish a simple method of determining frost susceptibility, to determine the heaving and adfreezing forces that can develop in freezing soils and to establish design practice in frost susceptible soils. See Transfer of heaving forces by adfreezing to columns and foundation walls in frost susceptible soils; Can. Geotechnical J., vol. 8, No. 4, pp. 514-527, 1971.

386. Ryder, J.M., Blair, J., Univ. of British Columbia:
Quaternary Geomorphology and stratigraphy of south-central British Columbia, 1971-.
To establish a chronology for glacier fluctuations and associated sedimentation through late-Quaternary time for the eastern side of the Coast Mountains and adjacent parts of the Interior Plateau; to relate stratigraphic and sedimentological characteristics of valley-fill sediments to depositional processes, and to identify environmentally conditioned changes in the sedimentation process; and to develop techniques of description, correlation and analysis

applicable to valley-fill deposits in regions of high relief. See Some aspects of the morphometry of paraglacial alluvial fans in south-central British Columbia; Can. J. Earth Sci., vol. 8, pp. 1252-1264, 1971.

387. Schaerer, P.A., Division of Building Research, National Research Council:
Snow and avalanches, 1960-.
To obtain information required for making decisions concerning avalanche control projects and for design of avalanche defence structures in deep snow areas. See Variation of ground snow loads in British Columbia; Proc. Western Snow Conference, pp. 44-48, 1970. Planning Defences Against Avalanches; Can. Geotechnical J., vol. 7, No. 4, pp. 397-404, 1970.

388. Schwarcz, H.P., Thompson, P., Ford, D., McMaster Univ.:
Geochronology and paleotemperature studies of cave deposits, 1968-72; Ph.D. thesis (Thompson).
Uranium-series disequilibrium isotope ratios (Th^{230}/U^{234}, U^{234}/U^{238}) are measured in cave-deposited limestones; from these, the date of deposition can be inferred. See Dating cave calcite deposits by the uranium disequilibrium method: some preliminary results from Crowsnest Pass, Alberta; Proc., 2nd Guelph Symposium on Geomorphology, 1971.

389. St-Onge, D.A., Lengellé, J., Geol. Surv. of Can.:
Erosion studies in an area of intensive petroleum exploration and development (Swan Hills, Alberta), 1970-72.

390. Thakur, T., Inland Waters Branch, Dept. of Environment:
Quantitative geomorphic analysis of selected Mackenzie tributary basins and its hydrologic interpretations, 1971-73.
To study the complete basin morphology including all factors of channelization and topography of the Mackenzie tributary basing; to quantify the importance of various geomorphic parameters affecting the hydrologic response of the drainage basins; and to develop means of predicting streamflow characteristics from landform characteristics. Important topographic factors which are expected to be influential in floods will be delineated.

GEOPHYSICS

Electrical

(See Canadian Geophysical Bulletin, vol. 23, (1970), 1971)

391. Anderson, C.D., Hanneson, J., Shemuluk, E., Univ. of Manitoba:
Model and field tests of an electromagnetic method, 1971-73.
The effect of geological conductors in the subsurface on the field from a large fixed source is being studied. The properties of the resultant elliptical field are measured.

392. Becker, A., Bolduc, P.M., Ecole Polytechnique:
Electromagnetic reflectometer, 1971-73.
To design an electromagnetic reflectometer for the detection and mapping of subsurface conductors.

393. Becker, A., Roy, J., Ecole Polytechnique:
Electromagnetic method for geophysical prospecting, 1970-71.

394. Becker, A., Sinha, A.K., Geol. Surv. of Can.:
ARES - Airborne resistivity electromagnetic system, 1966-73.
Design, construction and field evaluation of prototype, variable frequency airborne electromagnetic system for mapping electrical resistivity.

395. Collett, L.S., Ahrens, R.H., Koziar, A., Geol. Surv. of Can.:
AFMAG surveys, 1968-76.
The AFMAG data flown over the Thompson Belt in Manitoba and extending to the southern and northeastern regions beyond this region has been donated to the Geological Survey of Canada by AMAX Exploration Inc. This data has been digitized and machine plotted profiles will be published by the GSC.
Work is continuing on the instrumentation for measuring the 3-orthogonal magnetic components of the 8 Hz Schumann resonance natural EM field.
In cooperation with the University of Toronto, the GSC is studying the source fields of natural EM energy from 20 Hz to 10 KHz. Both the electric and magnetic components are being instrumented and measured. See AFMAG use in geological interpretation; CIM Bull., vol. 64, No. 706, pp. 39-47, 1971. ELF natural electromagnetic field investigations; Geol. Surv. Can., Paper 71-1B, pp. 17-19, 1971.

396. Collett, L.S., Katsube, T.J., Geol. Surv. of Can.:
Electrical rock properties, 1969-76.
To lay a basis for development and improvement of new and existing exploration and interpretation techniques for airborne and ground electromagnetic methods. Measuring systems for electrical parameters of rocks have been set up for the frequency range from 10^{-2} Hz to 10^{8} Hz. An improvement in measuring accuracy has been made, and a production line system for measurements of dry rocks has been completed for the frequency range from 10^{2} to 3×10^{7} Hz. Work on measuring systems for atmosphere controlled measurements (moist and moisture free conditions) is being carried.

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Measurement on a set of serpentinites has just been completed. At present, measurements are being made on a set of igneous rocks and measurements of sets of various types of rocks from across Canada are expected to follow.

Investigation on the electrical mechanism in rocks, the electrochemical polarization mechanism behind the IP pheonomena, and the electrical nonlinear phenomena in rocks are also being carried out. See Electrical rock properties; Geol. Surv. Can., Paper 71-1B, pp. 58-59, 1971. Electrical properties of Apollo 11 and 12 lunar samples; Second Lunar Science Conference, Geochim. et Cosmochim. Acta, pp. 2367-2379, 1971.

396. den Boer, J.C., Mobil Oil Canada:
Magneto-tellurics for petroleum exploration, 1970-.

397. Duckworth, K., Leask, D.S., Univ. of Calgary:
Scale model studies of electromagnetic prospecting systems, 1970-.

398. Duckworth, K., Leask, D.S., Univ. of Calgary:
Studies of altisation product and pore fluid composition effects on induced polarization effects in lead-zinc ores, 1970-.

399. Faessler, C.W., Ecole Polytechnique:
Etude préliminaire des paramètres contrôlant la chargeabilité des minéralisations disséminées en polarisation induite, 1969-.

400. Faessler, C.W., Plante, E., Ecole Polytechnique:
Accurate calculation of resistivity curves for large electrode separations and resistivity contrasts, 1969-72.

401. Favini, G., Univ. de Laval:
Méthods géophysiques de profondeur dans la recherche minière, 1970-75.

Recherche de gisements métallifères massifs à partir des forages d'exploration et des galeries des mines au moyen de méthodes géophysiques électriques et électromagnétiques. Collection et traitement de données digitalisées à variables multiples.

402. Lazreg, H., Inland Waters Branch, Dept. of Environment:
Geophysical methods applied to the study of salt water intrusion, 1969-73.

The study involves the application of geophysical methods in coastal hydrogeologic environment of the Maritime Provinces to locate the interface between fresh and saline groundwater in aquifers affected by salt water intrusion. Methods experimented with include electrical resistivity, induced polarization and electromagnetic techniques. In addition, a borehole geophysical logging unit has been put into operation to provide precise definition of stratigraphy and to detect water quality variations in aquifers. The principal field study areas are Shippegan and New Castle-Chatham in New Brunswick, Summerside, Prince Edward Island and Halifax, Nova Scotia.

403. Niblett, L.L.R., Chekryn, M., Hall, D.H., Univ. of Manitoba and Earth Physics Branch, EMR:
Magnetotelluric sounding over the English River crustal block, Ontario, 1971-72.

404. Scott, W.J., Collett, L.S., Becker, A., Geol. Surv. of Can.:
VLF mapping, 1967-75.
Preliminary field work was carried out in the Caledonia area of New Brunswick and in the Cobequid area of Nova Scotia, using magnetic, seismic, DC resistivity and two VLF radio wave techniques. Useful information about bedrock geology and structure can be obtained from such combinations of geophysical methods.

405. Scott, W.J., Collett, L.S., Telford, W.M., Geol. Surv. of Can.:
Geophysical investigations, 1966-71.
Phase-sensitive IP surveys were carried out over 10 sulphide deposits and two overburden conductivity anomalies, using frequencies from 0.01 to 10 Hz. where IP anomalies were observed.
Phase shifts between transmitter current and receiver voltages generally decreased with increasing frequency. Phase angles were approximately proportional to percent frequency effects.

406. Srivastava, S.P., Cochrane, N., Bedford Institute:
Influence of the lunar tides on the electric and magnetic field variations at the coastal station, 1970-72.
See Inland, coastal and offshore magnetotelluric measurements in eastern Canada; Can. J. Earth Sci., vol. 8, pp. 209-216, 1971.

Geomagnetic and Paleomagnetic

407. Aumento, F., Dalhousie Univ.:
Detailed geological investigation of the oceanic crust, 1969-.
1. Elucidation of the tectonic and igneous cycles on the axes of mid-oceanic ridges: layered intrusions, differentiation, ultramafic intrusions, and the subsequent metamorphism, metasomatism and weathering effects of these rocks. 2. Establishment of set of criteria for the identification of ancient oceanic crusts on the continents. 3. Measurement of the geometric shape and dimension of igneous material which produces magnetic anomalies on the ocean floor, and correlation of measured polarities with anomalies. 4. Use of fission tracks as an absolute dating method, and for the analytical in-situ determination of uranium and thorium in rocks and minerals.

408. Bachinski, D.J., Burke, K.B.S., Ball, D., Univ. of New Brunswick:
Magnetic transformations in thermally metamorphosed rocks, 1970-73.

GEOPHYSICS

409. Beales, F.W., Strangway, D.W., Johnson, B., Univ. of Toronto:
Paleomagnitics of Mississippi Valley type ore deposits.
Method has been applied to the Newfoundland Zinc Company property and results obtained have been consistent with the known geology.

410. Buchan, K.L., Dunlop, D.J., Univ. of Toronto:
Paleomagnetism of intrusive rocks in the Grenville Province, 1971-72; M.Sc. thesis (Buchan).
Preliminary paleomagnetic measurements on three relatively fresh intrusive rocks (one gabbro, two diorites) from Glamorgan Twp., Ontario, give paleopoles near 30°S, 155°E in general agreement with some early data of DuBois and Hood for rocks of Grenville age, but in complete disagreement with Robertson and Fahrig's recently published paleopoles for Keweenawan rocks of similar age (900-1000 m.y.). Stable directions of magnetization are very difficult to recover at most sites, because of large secondary components, but a very stable primary NRM (intensity after 800-oersted demagnetization about 20-30% of initial intensity, direction steady from 200 to 800 oersteds) has been recovered from one site in the gabbro.

411. Clarke, G.K.C., Univ. of British Columbia:
Glaciology, geomagnetism and exploration geophysics.
See Canadian Geophysical Bulletin, 1971.

412. Dunlop, D.J., Blackburn, C., Univ. of Toronto:
Thermoremanence of magnetite fine grains; magnetic properties and origin of stable remanence in selected igneous rocks; thermomagnetic behaviour of synthetic and natural hematites.
See Canadian Geophysical Bulletin, 1971.

413. Faessler, C.W., Ecole Polytechnique:
Instrument analogique pour calculer les anomalies magnétiques et les démontrer sur grand écran, 1970-72.

414. Foster, J.H., Geol. Surv. of Can.:
Paleomagnetism and rock magnetism instrumentation and development.
Geological purposes of the project are to provide (a) rock fabric data from the anisotropy of the induced magnetism of rocks for such uses as paleocurrent determinations; and (b) stratigraphic data from the direction of the remanent magnetism of rocks for such uses as correlation to assist in mapping. See Magnetism of the earth and climatic changes; in Earth Planet. Sci. Lett., vol. 12, No. 2, pp. 175-183, 1971.

415. Hall, D.H., Univ. of Manitoba:
Regional magnetic anomaly map of Manitoba.
See A computerized file of aeromagnetic data; Manitoba Mines Br. Publ. No. 71-1, Rept. 19, pp. 379-416, 1971.

416. Hall, D.H., Coles, R.L., Univ. of Manitoba:
Crustal magnetization in southeastern Manitoba, 1969-73.
See Canadian Geophysical Bulletins 1970, 1971.

417. Halls, H.C., Pesonen, L., Univ. of Toronto:
Paleomagnetism of Archean greenstones, 1971-72; M.Sc. thesis (Pesonen).
A principal source of uncertainty in early Precambrian geology is that almost nothing is known concerning the stratigraphic relationships between the various Archean greenstone belts that traverse much of the Canadian Shield. Geochemical, paleomagnetic and isotopic dating techniques may be useful in resolving these problems. Although the work is hampered by the severe folding and widespread metamorphism, an area north of Kirkland Lake has been chosen where these complexities are reduced to a minimum. To date 118 oriented samples have been obtained from both limbs of a syncline and paleomagnetic measurements on these specimens are in progress.

418. Hanes, J.A., Dunlop, D.J., Univ. of Toronto:
Petrology and magnetic properties of metamorphic rocks, 1971-72.
Includes petrological and thermomagnetic studies of Precambrian igneous rocks showing a gradation of metamorphism. To determine what changes occur in the magnetic mineralogy during metamorphism and to determine the feasibility of recovering reliable paleomagnetic data from metamorphosed Precambrian rocks.

419. Hanes, J.A., Dunlop, D.J., Univ. of Toronto:
Paleomagnetic and petrological studies of volcanic rocks in the Blake River syncline, 1971-72; M.Sc. thesis (Hanes).

420. Hodych, J.P., Memorial Univ.:
Why is it that some magnetite is lodestone?, 1971-.

421. Holroyd, M.T., Hood, P.J., McGrath, P.H., Sawatzky, P.S., Sinha, A.K., Geol. Surv. of Can.:
High resolution aeromagnetic surveys, 1968-.
Automatic methods for editing, storage, compilation, mapping, retrieval, etc.

422. Hood, P.J., Bower, M.E., Geol. Surv. of Can.:
Ocean aeromagnetics, 1962-.
See Low-level aeromagnetic surveys in the Labrador Sea; Geol. Surv. of Can., Paper 71-1, pt. B, pp. 37-39, 1971.

423. Hood, P.J., Sawatzky, P., McGrath, P., Kornik, L., Geol. Surv. of Can.:
Queen Air high resolution aeromagnetics, 1968-.
See Geophysical applications of high resolution magnetometers; Encyclopedia of Physica, vol. 49, No. 3, pp. 422-460, 1971.

GEOPHYSICS

424. Kornik, L.J., Geol. Surv. of Can.:
Regional aeromagnetic-geologic correlation, 1966-.

425. Koulomzine, T., Lamontagne, Y., N'Fanly, S., Nadeau, A., Ecole Polytechnique:
Study of methods of interpretation of magnetic and gravity anomalies, 1968-72.

426. Moon, W., Mark, P., Ontario Dept. of Mines and Northern Affairs:
Effect of overburden in the interpretation of ground magnetic and electromagnetic surveys, 1971-73.

427. Moon, W., Mark, P., Ontario Dept. of Mines and Northern Affairs:
Magnetic susceptibility of Precambrian rocks in Ontario, 1971-72.

428. Muecke, G.K., Dalhousie Univ.:
Investigations of a detailed history of thermal events for the low pressure metamorphic complex of pre-Mesozoic, mainland Nova Scotia, 1970.
Petrochemical, isotopic and magnetic studies are in progress: delineation of metamorphic zones in the Meguma Group and White Rock Formation; detailed studies of metamorphic reactions at the isograds and their relation to Nova Scotia granites and ore deposits; magnetic properties of these rocks and the mineralogy of their magnetic phases in order to determine the manner in which they change in response to increases in metamorphic grade; studies on the suitability of whole-rock K/Ar ages in dating regional metamorphic events and the thermal stability of slate ages; systematic investigations of problems in the microprobe analysis of phyllosilicates.

429. Nwachukwu, S.O., Currie, J.B., Univ. of Toronto:
Paleomagnetic and susceptibility anisotropy studies in the Wabigoon volcanics of Lac des Milles Lacs area, northwestern Ontario, 1971-73.
To determine the degree of magnetization stability in these Archean volcanics and to test the use of remanent vectors to delimit the altitude and extent of fold limbs.

430. Seguin, M.K., Univ. of Laval:
Paleomagnetism of the iron formation of the Labrador Trough, 1971-.

431. Seguin, M.K., Univ. of Laval:
Magnetic properties of materials magnetochemistry, 1971-.

432. Srivastava, S.P., MacIntyre, B., Bedford Institute:
Diurnal correction to sea magnetic surveys, 1969-.
To develop techniques for applying correction to sea magnetic data. See Diurnal variation of the total magnetic field along the east coast of Canada; Earth and Planetary Sci. Letters, vol. 10, pp. 423-429, 1971.

433. Symons, D.T.A., Univ. of Windsor:
Paleomagnetism of carbonatites in northern Ontario, 1971-75.
There are about twenty carbonatite complexes of varying age that intrude the Superior Province of the Precambrian Shield. They appear to be the last intrusive event in their respective areas, giving radio metric ages between 1600 m.y. and 500 m.y., and hence their stable remanence direction may reliably reflect the position of the Superior tectonic plate before geotectonic deformation. To date, the Seabrock Lake complex has been sampled and measurements are under way.

434. Symons, D.T.A., Univ. of Windsor:
Paleomagnetism of radiometrically dated igneous rocks in the Cordillera.
Several igneous bodies have been studied paleomagnetically to examine their stratigraphic, intrusive phase, geochronologic and geotectonic implications. Studies of the Recent Aiyansh Lava flow, Triassic Copper Mountain pluton, and other units are in progress. See Paleomagnetism of the Triassic Guichon Batholith and rotation in the Interior Plateau, British Columbia; Can. J. Earth Sci., vol. 8, No. 11, pp. 1388-1396, 1971.

Geothermal

435. Weihmann, I., Gulf Oil Canada Limited:
Geothermal gradients.
Geothermal gradients in Northeastern British Columbia are being investigated to determine relationships of temperature variations to lithofacies, oil and gas occurrence, and tectonic patterns. Data from drillstem tests and bottom hole temperatures from log surveys are being used.

Gravity

436. Burke, K.B.S., Tejirian, H.G., Gupta, V.K., Univ. of New Brunswick:
Geophysical investigation of tectonic framework of southeastern New Brunswick, 1970-74.
A regional gravity survey of about 500 stations has been completed near the Caledonia uplift in southern New Brunswick.

437. Haworth, R.T., von Arx, W.S., Dean, J.P., Atlantic Geosciences Centre and Woods Hole Oceanographic Instit:
Gravimetric determination of the geoid along meridian 150°W, 1970-72.
To determine the shape and absolute position of the geoid along this meridian for use as a ground reference for radar altimeter measurements from satellites.

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438. Haworth, R.T., Watts, A.B., Ruffman, A., Atlantic Geosciences Centre:
Geophysical studies in the Gulf of St. Lawrence, 1968-72.
To determine the crustal structure of the Gulf of St. Lawrence using the data collected by the 1968 and 1969 Bedford Institute hydrographic-geophysical surveys in conjunction with all previously collected data in the area.

439. Keen, M.J., Dalhousie Univ.:
Study of the crust and upper mantle of the earth beneath the Maritimes, 1965-.
Earth Tides. The short term goal is to complete the study of the crust and upper mantle of the earth beneath the Maritimes by observing the elastic response of the solid earth to ocean tide loading. We plan in 1972-1973 to (1) complete observations of tilt and tidal gravity at Halifax, Tatamagouche, Sable Island, St. John using the Melchior pendulum tiltmeters and the Geodynamics gravimeter (of Columbia University); (2) instal Stacey mercury tube tiltmeter at Halifax and Tatamagouche; (3) analyses the complete set of observations of tilt and gravity by comparing them with results predicted from theoretical models using finite element method.
The long term goal is to try to determine the depth to and the properties of the low velocity layer of the upper mantle, using a profile of array of similar observations.

440. Koulomzine, T., Lamontagne, Y., N'Fanly, S., Nadeau, A., Ecole Polytechnique:
Study of methods of interpretation of magnetic and gravity anomalies, 1968-72.

Seismic

441. Gendzwill, D.J., Hajnal, Z., Univ. of Saskatchewan:
Investigation of salt collapse features in south Saskatchewan, 1970-.
A number of small, round lakes of unusual depth occur in southeastern Saskatchewan, often a thousand feet in diameter and in excess of 100 feet in depth. Seismic reflection tests at Crater Lake, and more recently at Tuffnel Lake, show that the subsidence feature extends all the way to the Prairie Evaporite Formation, 3000 feet below surface. See Seismic investigation of the Crater Lake structure in southeastern Saskatchewan; Can. J. Earth Sci., vol. 8, No. 12, pp. 1514-1524, 1971.

442. Grant, A.C., Bedford Institute:
Seismic profiles and magnetic investigation of the continental margin off southern Baffin Island.
A cruise in August, 1971, extended reconnaissance seismic and magnetic coverage from Hudson Strait north to Davis Strait..

443. Grant, A.C., Harris, I.M., Bedford Institute:
Bedrock geology of the continental shelf northeast of Newfoundland and in the Gulf of St. Lawrence, 1972-.
A reconnaissance survey of continental shelf, bedrock geology as a follow-up to reconnaissance seismic profiler surveys north of Newfoundland, conducted by A.C. Grant since 1965. The proposed program of study involves shipborne, seismic profiler and sonar surveys in support of bedrock sampling by means of dredges and shallow-penetration, underwater drills, and direct observation and sampling by means of submersible vehicles.

444. Hajnal, Z., McClure, J.E., Univ. of Saskatchewan:
Seismic investigation of deep seated structures in Saskatchewan, 1970-75. Seismic investigation of Precambrian contact zones, 1971-74.
See Detailed Seismic study of the earth's crust in eastern Manitoba; Manitoba Mines Branch Publ. No. 71-1, 1971.

445. Hall, D.H., Bates, A., Homenuik, L., Baer, D., Univ. of Manitoba:
Deep seismic reflections in the Canadian Shield, 1970-72.
See Canadian Geophysical Bulletins 1971, 1972.

446. Hall, D.H., Desmarais, R., Univ. of Manitoba:
Upper mantle structure from deep seismic sounding, and teleseismic data, 1971-72.
See Geophysical determination of deep crustal structure in Manitoba; Geol. Assoc. Can., Sp. Paper 9, pp. 83-88, 1972.

447. King, M.S., Leuschen, A.A., Univ. of Saskatchewan:
Field studies of microseismic energy emission, 1970-75.
To relate the results of microseismic energy emission experiments on rocks approaching failure in the laboratory to the prediction of roof failure underground, particularly in the Saskatchewan potash mines.

448. Wiggins, R.A., McMechan, G.A., Madrid, J.A., Dey-Sarkar, K., Kalman, J.A., Silverstone, B., Univ. of Toronto:
Methods for interpreting seismic observations.
See Canadian Geophysical Bulletin, 1971.

General

449. Anderson, C.D., Le Bele, L., Univ. of Manitoba:
A study of the applications of low-power induced-polarization equipment, 1971-73.

450. Charbonneau, B.W., Geol. Surv. of Can.:
Gamma-ray support, 1967-.
To undertake detailed geological and radiometric investigations on the ground in areas selected for experimental airborne radiometric surveys. 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 equipment. To accumulate a large body of data pertaining to the radioelement composition of various rock and overburden types.

451. Chase, R.L., Barr, S.M., Thomlinson, A.G., Bertrand, W.G., Univ. of British Columbia:
Geology of northeastern Pacific west of British Columbia. 1969-.
The relation of the features of the Pacific continental margin of Canada (Continental Shelf, slope, and adjacent ridges, troughs, basins, and seamounts) to plate tectonic processes has been studied since 1969. Techniques include dredging, coring, photography, continuous seismic reflection profiling, magnetic profiling, atomic absorption analysis, fission track dating. The deformation of sedimentary strata and the petrology, age and magnetic properties of submarine eruptives are related to the tectonic history of the region. See Preliminary analysis of geophysical measurements north of Juande Fuca Ridge; Canadian J. Earth Sci., vol. 8, No. 10, pp. 1265-1281, 1971.

452. Darnley, A.G., Grasty, R.L., Richardson, K.A., Charbonneau, B.W., Geol. Surv. of Can.:
Airborne gamma-ray spectrometry, 1967-.
A high sensitivity airborne gamma-ray spectrometry system has been developed under this project. The system is used for cross-country reconnaissance surveys over the Canadian Shield and for detailed experimental surveys in the Provinces and the Northwest Territories - to acquire data on the distribution of radioactive elements within the Canadian Shield, to locate areas of potential mineral deposits and to develop this survey method as an aid to geologic mapping.

453. den Boer, J.C., Mobil Oil Canada:
Acoustic velocities of porous rocks, 1971-72.

454. Doig, R., McGill Univ.:
Ge-Li gamma-ray spectrometry, natural and induced radioactivity, 1965-.

455. Dorff, N.J., Cameron, R.A., Laurentian Univ.:
Correlation of Precambrian rocks using natural gamma radiation, 1970-72.
Analysis of rock samples for comparison with the field and laboratory measurements of gamma radiation. Radiation from powdered portions of these samples will be measured for comparison with the field data and to assess the effect of sample treatment on radiation emission.

456. Dyck, J.H., Saskatchewan Research Council:
Geophysical prospecting for groundwater in southern Saskatchewan, 1963-70.

457. Gravity Division, Earth Physics Branch, Dept. of Energy, Mines and Resources:
Gravity.
Research carried out by the Gravity Division during 1971 is reported in Volume 24 of the Canadian Geophysical Bulletin published by the Associate Committee on Geodesy and Geophysics of the National Research Council of Canada. A current bibliography is also included in that report.

458. Keen, C.E., Ross, D.I., Barrett, D.L., Bedford Institute:
Geophysical study of continental margin of eastern Canada, 1971-74.
To study: (a) transition from oceanic to continental crustal structure in some detail; (b) the nature of the quiet magnetic zone (involves in cooperation with Dalhousie university the selection of a suitable joides drilling site); and (c) if anisotrophy (seismic) exists in this part of the Atlantic.

459. King, M.S., Univ. of Saskatchewan:
Underground acoustic measurements, 1970-75.
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.

460. Koulomzine, T., Becker, A., Faessler, C.W., Ecole Polytechnique:
Geophysical prospecting methods applicable to the search of deep-seated metallic ore bodies, 1969-72.

461. McGrath, P.H., Hood, P.J., Geol. Surv. of Can.:
Aeromagnetic interpretation - Appalachia, 1967-.

462. Ross, D.I., Keen, C.E., Manchester, K.S., Barrett, D.L., Bedford Institute:
Geophysical studies of Baffin Bay and Davis Strait, 1970-73.
Study of magnetic, gravity and seismic data obtain obtained in Baffin Bay and the adjacent continental margins and its interpretation in terms of the history of the Eastern Arctic. See Geophysical studies in Baffin Bay and some tectonic implications; Can. J. Earth Sci., vol. 9, No. 3, pp. 239-256, 1972.

463. Ruitenberg, A.A., Venugopal, D.V., Giles, P., Buttimer, S., Chandra, J., New Brunswick Dept. of Natural Res.:
Caledonian Project, 1970-73.
A stratigraphic, structural and metallogenic investigation, augmented by airborne and ground geophysics, of the late Precambrian volcanic and sedimentary rocks in southeastern New Brunswick.

464. Slaney, V.R., Gross, H., Geol. Surv. of Can.:
Infrared imaging, 1966-72.
To examine the possible uses of thermal scanners for geology. To determine the optimum conditions for airborne IR surveys.

GEOPHYSICS

465. Srivastava, S.P., Keen, C.E., Bedford Institute:
Continental margin off the east coast of Canada, 1972-.
Systematic geophysical study of the continental margin off the east coast of Canada and its tectonic history.

466. Srivastava, S.P., Tiffin, D.L., Chase, R.L., Bedford Institute:
Continental margin off British Columbia, 1970-72.
Systematic study of the western continental margin and its tectonic history. See Preliminary analysis of geophysical measurements north of Juan de Fuca Ridge; Can. J. Earth Sci., vol. 8, No. 10, pp. 1265-1281, 1971.

467. Tanguay, M.G., Dufresne, R., and students, Ecole Polytechnique:
Etude de la réflectance spectrale des matériaux terrestres; optical processing of aerial photo patterns by coherent light; utilisation des images infrarouges dans les problèmes que les Forces Armées pouvent rencontrer dans les régions nordiques, 1969-75.

468. Tiffin, D.L., Cameron, B.E.B., Geol. Surv. of Can.:
Geophysical and geological studies of the Pacific margin, 1970-.
Two main areas of investigation are the Queen Charlotte Fault, an active transform fault west of the Queen Charlotte Islands, and the Tofino Basin, a one-sided sedimentary basin west of Vancouver Island. The Queen Charlotte fault separates two lithospheric plates at the continental margin, the America plate and the Pacific plate. Structures in the Tofino Basin may also be related to plate movements, in this case the Juan de Fuca Plate and the America plate. By detailed mapping of geophysical and geological parameters it is possible to achieve a more complete understanding of Pacific continental margins and their relation to plate movements as well as to better determine the economic possibilities of the area.

469. Wilson, J.T., Univ. of Toronto:
Study of a mechanism for continental drift, 1963-.
The author has been exploring the possibility that seven rising plumes lie under as many islands along the Mid-Atlantic Ridge and that the Ridge has formed by cracking from one dome to the next and by the plates on either side sliding off the domes. It has been shown that the lavas under the domes are more alkali than those in other parts of the sea floor which is compatible with their rising from greater depths.
R. Furon identified many domes in Africa and they appear to be of this nature, and others have been found in the Indian Ocean and in the Pacific. One of these is thought to have been overridden by North America and is now lying beneath the Colorado Plateau.

470. Wilson, J.T., Univ. of Toronto:
Editing symposium, 1967-72.
Sixty-three papers submitted to UNESCO Symposium held at Montevideo in October 1967 on the subject of

Continental Drift with special reference to the South Atlantic region, have been edited and dispatched to the American Geophysical Union which has promised to publish the Abstracts in EOS and make the text available on microfilm.

A Symposium entitled "Global Tectonics and Sea Floor Spreading" as part of the Ocean World Joint Oceanographic Assembly, was convened in Tokyo in October 1970. The ten papers submitted have been edited and sent to Tectonophysics for publication.

471. Wilson, J.T., Univ. of Toronto:
Tectonics and earthquakes in China, 1971-72.

In November 1971 I spent 3½ weeks in China visiting the Academia Sinica's Institutes of Geophysics, of Geology and of Paleontology and several observatories and universities.

During the course of these visits I discovered that the late Dr. J.S. Lee shortly before he died, proposed the framework for explaining the tectonic features of China in terms of horizontal movements of the crust. Although Dr. Lee did not relate this to other parts of the world, it may be compatible with plate tectonics. I also saw the latest maps of the distribution of earthquakes in time and space in China. The location and magnitude of 530 earthquakes which have occurred in China since 700 B.C. are recorded on these maps and some of the active faults can be related to patterns of tectonics according to J.S. Lee.

Since all scientific publication ceased in China in 1966 these ideas are not known to the west and I am endeavouring to write out the ideas I obtained from Chinese colleagues.

472. Yates, M.T., Univ. of Toronto:
Interpretation of lunar Mascons, 1971-72.

HYDROGEOLOGY

(See Canadian Geophysical Bulletin, vol. 23 (1970), pp. 100-201, 1971)

473. Badry, A., Research Council of Alberta:
Alberta hydrogeological information map series (AHIMS); M=1:50,000, 1968-75.
Seventeen atlasses containing information maps (M=1:50,000) are complete for virtually all settled parts of the province south of 55° parallel.

474. Badry, A., Carlson, V.A., Research Council of Alberta:
Central data file, 1956-.

475. Borneuf, D., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series, NTS 82P, Drumheller, 1968-70.

476. Borneuf, D., Brulotte, M., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series, NTS 72E, Foremost, 1971-72.

477. Borneuf, D., Zacharko, N., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series, NTS 83I, Tawatinaw, 1970.

478. Carson, M.A., Taylor, C.H., Grey, B.J., Chyurlia, J.P., Laronne, J., McGill Univ.:
Fluvial processes in Eaton River basin, Quebec, 1968-73; Ph.D. thesis (Taylor), M.Sc. thesis (Grey).
Measurement of amounts, fluctuations and sources of suspended, bed and dissolved loads in the Eaton basin during spring runoff. See The hydrologic response of the Eaton River basin, Quebec; Can. J. Earth Sci., vol. 8, No. 1, pp. 102-115, 1971.

479. Charron, J.E., Inland Waters Branch, Dept. of Environment:
Groundwater flow, southeastern Ontario, 1968-73.
To define the direction of groundwater flow in the area between the Ottawa and St. Lawrence river east of the city of Ottawa; to show the possibility of a groundwater flow originating from the St. Lawrence river and flowing to the Ottawa river by using topographic as well as bedrock control, computerized flow path sections and hydrogeochemistry.

480. Currie, D.V., Research Council of Alberta:
An evaluation of the groundwater budget for the Tri-Creek watershed, Alberta, 1967-72.

481. Currie, D.V., Zacharko, N., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series, NTS 73E, Vermilion, 1971-72.

482. Eggboro, M., McGill Univ.:
Groundwater geology of Montreal Island, Quebec, 1971-72; M.Sc. thesis.

483. Farvolden, R.N., Benoit, E., Phimister, J.D., Univ. of Waterloo:
Hydrogeology of solid waste disposal in the Grand River basin, Ontario, 1969-72.
An integral part of a major investigation that involves the pollution hazards of landfill disposal in this region.

484. Farvolden, R.N., Novakovic, B., Univ. of Waterloo:
Groundwater flow systems in the Big Creek-Big Otter Creek basins of southern Ontario, 1970-72.
Field evidence, particularly by the water levels in wells, is being collected and interpreted to find the scale of groundwater flow systems in the study area. The sensitivity to permeable horizons and topography is particularly interesting, and it is possible that digital solutions may eventually be derived to solve the inverse problem.

485. Fitzpatrick, M., Queen's Univ.:
Groundwater investigations in Prince Edward County, Ontario, 1969-72.
Substantial quantities of groundwater can only be expected in areas where the bedrock is well fractured or in permeable zones in surficial material. An infra-red line scanning survey is being run to aid in the location of these potential acquifers.

486. Frind, E.O., Verge, M.J., Univ. of Waterloo:
Digital modelling of groundwater flow systems, 1971-.
In the first phase of the project, a systematic method will be developed for obtaining the distribution of hydrogeologic properties of heterogeneous and anisotropic aquifers, and to determine the amount and type of data necessary for uniqueness and a desired level of confidence. The second phase will involve the modelling, with the help of the above method, of large-scale groundwater flow systems, such as the Grand River basin in southern Ontario. Suitable models will permit the systematic planning of groundwater resource development and the study of contaminant travel problems.

487. Fritz, P., Cherry, J.A., Univ. of Waterloo:
Geochemistry of groundwater, 1971-.
Stable isotope and geochemical analysis will be used in aquifer recharge and water balance studies, investigations in the regional and local distribution of groundwater and research on leachates from solid waste disposal sites.

488. Gabert, G.M., Research Council of Alberta:
Provincial observation-well network, 1956-.

489. Gabert, G.M., Research Council of Alberta:
Investigation for groundwater in the Red Deer area, central Alberta, 1965-72.

HYDROGEOLOGY

490. Gale, J.E., Inland Waters Branch, Dept. of Environment:
Hydrogeology of fissured media in the Halifax area, Nova Scotia, 1970-73.
To evaluate the geometric and hydrologic parameters of fissured rock in the Halifax area; the influence of major shear zones on the regional groundwater flow system, and the applicability of pump test theory to fissured flow media.

491. Grice, R.H., Morrow, G., McGill Univ.:
Multiaquifer flow analysis for reservoir areas, 1967-.

492. Hackbarth, D.A., Research Council of Alberta:
Investigation of the dewatering possibilities of the tar sand's overburden near Ft. McMurray, Alberta, 1971.
A series of alternative schemes for overburden dewatering is proposed which may be selected by the operator on the basis of his own cost analysis.

493. Lawson, D.W., Inland Waters Branch, Dept. of Environment:
Principles of groundwater pollution, 1967-.
The project is presently restricted to theoretical and numerical studies of transport phenomena in porous media. See Improvements in the Finite Difference Solution of Two-Dimensional Dispersion Problems; Water Resources Res., vol. 7, No. 3, pp. 721-725, 1971.

494. Lazreg, H., Inland Waters Branch, Dept. of Environment:
Geophysical methods applied to the study of salt water intrusion, 1969-73.
Application of geophysical methods on coastal hydrogeologic environment of the Maritime Provinces to locate the interface between fresh and saline groundwater in aquifers affected by salt water intrusion. Methods experimented with include electrical resistivity, induced polarization and electromagnetic techniques. In addition, a borehole geophysical logging unit has been put into operation to provide precise definition of stratigraphy and to detect water quality variations in aquifers. The principal field study areas are Shippegon, and New Castle-Chatham in New Brunswick, Summerside, Prince Edward Island, and Halifax, Nova Scotia.

495. Leskiw, L., Toth, J., Research Council of Alberta:
Relations between types and genesis of soils and regional groundwater movement, Vegreville district, Alberta, 1969-71; M.Sc. thesis (Leskiw).

496. Lissey, A., Brock Univ.:
Hydrogeology of the Niagara Peninsula, 1970-.

497. McCann, S.B., Cogley, J.G., McMaster Univ.:
Surface runoff of snowmelt and rainwater in the basin of the River Mecham, Cornwallis Island, Northwest Territories, 1970-75; Ph.D. thesis (Cogley).
See Observations on water hardness from southwestern Devon Island, N.W.T.; Canadian Geographer, vol. 15, pp. 173-180, 1971.

498. Ozoray, G.F., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series, NTS 83G, Wabamun Lake, 1969-70.

499. Ozoray, G.F., Lytviak, A., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series, NTS 82I, Gleichen, 1970-71.

500. Ozoray, G.F., Lytviak, A.T., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series, NTS 73M and 74D, Winefred Lake and Waterways, 1971-72.

501. Parsons, M.L., Inland Waters Branch, Dept. of Environment:
Regional groundwater flow and subsurface temperatures in a Maritime Province coastal environment, 1969-73.
Regional groundwater flow and heat transfer in fissured rocks of the coastal region of the Maritimes Carboniferous Basin are being investigated to assess the effect of groundwater withdrawal on the regional groundwater hydrodynamics and to explore the application of geothermal measurements to the evaluation of groundwater flow. Evaluation of rock fissure permeability is complete and extensive groundwater temperature observations have been made.

502. Stevenson, D.R., Research Council of Alberta:
An evaluation of the groundwater budget of the Cache Percotte and Whiskeyjack basins, Alberta, 1965-.

503. Stevenson, D.R., Research Council of Alberta:
An evaluation of the groundwater budget and its significance within the hydrologic balance for the Marmot Creek, Streeter, and Deer Creek basins, Alberta, 1964-.

504. Stevenson, D.R., Borneuf, D., Campbell, K., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series, NTS 72L, Medicine Hat, 1970-72.

505. Tokarsky, O., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series, NTS 84F, Bison Lake, 1967-70.

506. Tokarsky, O., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series, NTS 84K, Mount Watt, 1967-70.

507. Tokarsky, O., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series, NTS 83B, Rocky Mountain House, 1969-70.
See Hydrogeology of the Rocky Mountain House area, Alberta; Alberta Research Council, Rept. 71-3, 1971.

508. Tokarsky, O., Research Council of Alberta:
Hydrogeology of the Butte Springs, Alberta, 1971-72.

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509. Tokarsky, O., Beerwald, A., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series, NTS 82H & G, Lethbridge, Fernie, 1970-71.

510. Tokarsky, O., Beerwald, A., Research Council of Alberta:
Alberta hydrogeological reconnaissance map series, NTS 83K & J, Isogun Lake and Whitecourt, 1971-72.

511. Toth, J., Research Council of Alberta:
Development of principles and methods for the hydrogeological evaluation of extensive areas, 1966-70.

512. Toth, J., Stein, R., Research Council of Alberta:
Effect of municipal water withdrawal on the groundwater regime near Olds, Alberta, 1970-71.

513. Van den Berg, A., Inland Waters Branch, Dept. of Environment:
Groundwater well field design in coastal aquifers.
Maritime Provinces, 1971-74.
Salt water intrusion into coastal aquifers is being investigated theoretically by means of digital-mathematical simulation of the movement of the salt-fresh groundwater interface. The model will be tested using available hydrogeologic data as well as observations of groundwater heads and water quality being made in the Shippegon, New Brunswick area.

515. Van der Kamp, G., Inland Waters Branch, Dept. of Environment:
Groundwater motion in coastal aquifers, 1969-72.
To relate tidally-induced groundwater motion to the hydraulic characteristics of aquifers; to develop practical methods of correcting observed drawdowns for tidal fluctuations; and to study the variations of water salinity in coastal aquifers with position and time, with the aim of finding a relation between the observed tidal fluctuations and the position and width of the fresh-salt water transition zone.

516. Van Everdingen, R.O., Inland Waters Branch, Dept. of Environment:
Influence of surface-water levels in Diefenbaker Lake, Saskatchewan, on piezometric levels in underlying Upper Cretaceous aquifers, 1962-71.

517. Van Everdingen, R.O., Inland Waters Branch, Dept. of Environment:
Thermal and mineral springs in the Rocky Mountains, 1967-70.

518. Van Everdingen, R.O., Inland Waters Branch, Dept. of Environment:
Subsurface disposal of liquid wastes, 1971-.
Investigation of effects of subsurface injection of liquid wastes, waste-rock and waste-formation water interaction, and waste movement.

519. Vonhof, J.A., Inland Waters Branch, Dept. of Environment: The effect of brine ponds on the groundwater regime, 1967-72.

1) to determine the rate and extent of groundwater pollution in the vicinity of waste disposal basins; 2) to evaluate the long-term effects of brine ponds on the surface water regime in the area; 3) to determine if and when remedial measures must be taken to limit the spread of subsurface pollution; and 4) to recommend possible alternative solutions to the waste disposal problem of the potash industry.

520. Vonhof, J.A., Inland Waters Branch, Dept. of Environment: Jointed tills in Western Canada, 1969-73.

To determine the significance of the joints on the rate of movement of groundwater and pollutants.

MINERAL DEPOSITS

Base Metals

521. Allen, D.G., Clark, A.H., Queen's Univ.:
Mineralogy and geochemistry of the Galore Creek copper deposit, British Columbia, 1967-72; Ph.D. thesis (Allen).

522. Beales, F.W., Lozen, G.P., Univ. of Toronto:
Limestone research with special emphasis on the stratigraphic aspects of ore emplacement in carbonate rocks.
Investigation of ore controls at the Los Lamentos mine, Mexico where the lead, zinc, silver ore is implaced in lower Cretaceous limestones.

523. Blais, R.A., Gentile, F., Ecole Polytechnique:
Geology and base metal deposits of the Stratford and Disraeli areas of Quebec, with special reference to Cupra mine, 1969-72.
The area has been geologically mapped at 1" - 1000' for the Quebec Dept. Natural Res. Many stopes and drifts of the Cupra mine have been mapped in detail by Gentile, with special reference to deformational structures of massive and disseminated sulphides. Detailed textural analysis and trace element geochemistry of the sulphides is in progress.

524. Brown, A.C., Ecole Polytechnique:
Simulation of mineralization in black shales using chromatographic columns, 1970-.
Strictly conformable base metal concentrations may be in part explained by pulsations of mineralizing solution across suitable shale horizons.

525. Brown, A.C., Ecole Polytechnique:
Fluid inclusion study of gangue minerals associated with copper mineralization, Icon deposit, Chibougamau, Quebec, 1970-.

526. Carter, N.C., British Columbia Dept. of Mines and Petroleum Resources:
Geology and geochronology of porphyry copper and molybdenum deposits in central British Columbia, 1967-72; Ph.D. thesis.
A comparative geological study, coupled with potassium-argon dating of the age of mineralization of copper and molybdenum-bearing plutons in west central British Columbia. These plutons, of upper Cretaceous to early Tertiary age, intrude Mesozoic volcanic and sedimentary rocks within an area which is bounded on the west by the Coast Plutonic complex, and on the east by the Omineca Topley intrusions.

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

528. Clark, A.H., Farrar, E., Haynes, S.J., Lortie, R.B., Zentilli, M., Quirt, G.S. McNutt, R.H., McMaster Univ.; Conn, H., Mortimer, C., Sillitoe, R.H., Instituto de Investigaciones Geologicas de Chile; Queen's Univ.
Metallogenetic relationships in the Andean copper province of northern Chile, 1967-.

529. 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).

530. Clark, A.H., Lortie, R.B., Queen's Univ.:
Genesis of disseminated, strata-bound copper deposits in felsic pyroclastic flows, Copiapó region, northern Chile, 1967-72; Ph.D. thesis (Lortie).

531. Clark, A.H., Queen's Univ., McNutt, R.H., Crockett, J., McMaster Univ.:
Mineralogy, chemistry, and stable isotope distribution of Jurassic-Pleistocene andesite and rhyolitic volcanics, Copiapo region, northern Chile, 1969-72.

532. Collins, J.A., Queen's Univ.:
Copper mineralization in North American Proterozoic clastic sediments, 1971-73; Ph.D. thesis.
An analysis of the total geologic environment in which sedimentary copper, and associated cobalt, occurs; in order to uncover the basic model interrelationships common to all such deposits and, thereby, to act substantially in attracting and initiating needed mineral exploration for these metals.

533. Crocket, J.H., Chyi, L.L., McMaster Univ.:
Noble metal geochemistry in sulfides from Strathcona Mine, Sudbury, Ontario, 1968-72; Ph.D. thesis (Chyi).
The partition of Pd, Pt, Ir and Au between coexisting pyrrhotite, pentlandite, chalcopyrite and magnetite from Strathcona Mine (Falconbridge Nickel Company) Sudbury, Ontario, has been studied by neutron activation analysis and the fractionation of these metals between the main types of ore found at Strathcona investigated. In general, Pt, Pd and Au, but not Ir, are concentrated in chalcopyrite and pentlandite rather than pyrrhotite. Pd shows marked enrichment in pentlandite relative to any other noble metal studied including platinum.

534. Crocket, J.H., Mercer, W.M., McMaster Univ.:
Pd and Au geochemistry in stratiform, pyritic, base metal deposits from northern New Brunswick, 1968-73; Ph.D. thesis (Mercer).
Pd and Au have been determined in sulfide and footwall sediment samples from the Heath Steele and Caribou deposits from northern New Brunswick through neutron activation. The very high Au/Pd ratios

characteristic of these deposits places some limitations on possible sources and ore-forming processes applicable to these deposits.

535. Davies, J.F., Brown, D.S., Laurentian Univ.:
Petrology and geochemistry of rocks enclosing the McIntyre disseminated copper deposit, 1971-73; M.Sc. thesis (Brown).

The Pearl Lake "porphyry" is a quartz-sericite schist, in large part carbonatized and commonly pyritized. There is little or no evidence of primary texture or original mineralogy.

Graditional contacts, widespread alteration, lack of primary phenocrysts and, on the contrary, the presence of metacrysts cast doubt on the intrusive and porphyritic nature of the body. Rather, the Pearl Lake rocks represent a structurally controlled pipe of widespread metasomatism to which are genetically related both the contained disseminated copper deposit (with its own particular phases of alteration) and the peripheral gold-bearing quartz veins in the adjacent carbonatized volcanic rocks.

536. Davies, J.F., Luhta, L.E., Laurentian Univ.:
Mineralogy and wall-rock alteration of the McIntyre disseminated copper deposit, 1971-72; M.Sc. thesis (Luhta).

The McIntyre disseminated copper deposit has been regarded as a Precambrian example of typical porphyry copper deposits such as are common in the Mesozoic and Tertiary granodiorite intrusions of the Cordilleran. This implies a close genetic relationship with the Pearl Lake "porphyry", which in turn has been regarded as intrusive. The present study is concerned with the gangue-sulphide relationships and alteration haloes within the "porphyry".

Purpose of the present study of the copper ore zone within the Pearl Lake rocks and the related study of the entire Pearl Lake body is to investigate the possibility that the mineralization and the so-called "porphyry" originated by structurally controlled metasomatism of pre-existing rocks.

537. Davies, J.F., Taylor, R.W., Laurentian Univ.:
A study of sulphide fabrics, Chisel Lake Mine, Manitoba, 1970-72; M.Sc. thesis (Taylor).

A study of the grain size, grain shape, dimensional orientation, lattice orientation and textural relationships of sulphides from Chisel Lake, using optical and X-ray techniques in order to determine the effects of metamorphism on the fabric and composition of sulphide assemblages and to relate sulphide orientation to that of the host-rock schist.

538. Eckstrand, O.R., Geol. Surv. of Can.:
Geology of Canadian nickel and platinum group deposits, 1963-.

Continuing study of nickel deposits, directed toward characterization and classification of types of

nickel occurrences, and the development of geological guidelines in exploration and evaluation of potential.

539. Farquharson, R.B., Univ. of Calgary:
The characteristics and genesis of copper mineralization in south-central British Columbia, 1971-.

540. Franklin, J.M., Lakehead Univ.:
Metallogeny of the Sturgeon Lake volcanic belt, 1971-74.
Petrochemistry, ore mineralogy, and structure of the base metal massive sulphite deposits of the Sturgeon Lake area.

541. Fyles, J.T., Harakal, J.E., White, W.H., British Columbia Dept. of Mines and Petroleum Resources and Univ. of British Columbia:
Age of mineralization in the Rossland mining camp, British Columbia.
Potassium-argon dating of about fifteen different plutonic rocks and dykes and the geological relationships between these rocks and the sulphides indicates that the age of the molybdemite mineralization on Red Mountain is about 48 m.y. and that the copper-gold mineralization of the old Rossland camp is probably close to this age or somewhat younger.

542. Garnett, J.A., British Columbia Dept. of Mines and Petroleum Resources:
Preliminary map, Hogem Batholith, Duckling Creek area, north-central British Columbia, 1971.
Investigation of areas of copper mineralization within a syenitic complex affecting a diorite-monzonite phase of the Hogem batholith, part of the Omineca intrusions.

543. Govett, G.J.S., Constantinou, G., Pantazis, T.M., Univ. of New Brunswick:
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; to devise an exploration technique using bedrock geochemistry.

544. Grrinki, R.R., Fyffe, L.R., Davies, J.L., New Brunswick Dept. of Natural Resources:
Bathurst-Newcastle area, New Brunswick, 1970-73.
Detailed mapping of the Ordovician fold-belt that hosts a number of large economically important strata-bound Zn, Pb, Cn sulphide deposits.

545. 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-.

546. Hartlein, A.J., Scott, S.D., Univ. of Toronto:
Sulphides in Huronian sediments at Cobalt, Ontario, 1970-72; M.Sc. thesis (Hartlein).

MINERAL DEPOSITS

Characterization and genesis of galena, sphalerite and chalcopyrite in a basal unit of the Coleman Formation at the Silverfields mine, Cobalt, Ontario.

547. Hodder, R.W., Johnson, W.L., Kerswill, J.A., MacIntyre, D.G., Marchant, W.A., Univ. of Western Ontario:
Determination of economic potential of copper occurrences using volcanic-plutonic relationships in host rocks, 1970-74; M.Sc. theses.
Volcanic rocks are in many instances closely related in space and in age to plutonic rocks which may contain dispersed copper minerals in sufficient concentration to make large, low grade ore deposits of the porphyry copper type. There appears to be a direct relationship between the economic potential of these copper occurrences and 1) the nature of any copper, or other base metal occurrences in associated volcanic rocks, 2) the style of volcanism, plutonism, and tectonism in the local area of copper distribution, and 3) the absolute age of both the volcanic and the plutonic rocks. The objective of the project is to document the inferred metallogenic relationships and conclude as to its significance in determining economic potential of copper occurrences, particularly during the early stages of exploration.

548. Kirkham, R.V., Geol. Surv. of Can.:
Geology of copper and molybdenum deposits in Canada, 1970-.
To provide a geological basis for exploration and assessment of copper and molybdenum potential in Canada.

549. Koo, Ja Hak, Univ. of Saskatchewan:
Alteration and mineralization of the Flin Flon mine, Manitoba, 1970-74; Ph.D. thesis.

550. 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; Ph.D. thesis (Lydon).

551. McBride, D., McAllister, A.L., Univ. of New Brunswick:
Geology of the Heath Steele ore zones, 1970-73; Ph.D. thesis (McBride).

552. McBride, D.E., Clark, A.H., Queen's Univ.:
Geology and chemistry of the Macex copper prospect, Terrace, British Columbia, 1969-72; M.Sc. thesis (McBride).

553. Milligan, G.C., Dalhousie Univ.:
Investigations in the George River series, Cape Breton, Nova Scotia, 1962-.
Original objective was to find such features associated with sulphide occurrences as could be used

as guides in the search for ore. The halo of "retrogressive" minerals, associated with the sulphides, proves mineralization to be later than the regional metamorphism and is relevant to current dogmas about metamorphosed syngenetic sulphides. The processes and material transfers involved have been investigated also.

554. Naldrett, A.J., Rae, D., Univ. of Toronto:
Study of inclusions at Strathcona Mine, Sudbury, Ontario, 1970-72.

555. Preto, V.A., British Columbia Dept. of Mines and Petroleum Resources:
Copper deposits of the Racing River - Gataga River area, British Columbia, 1971.

556. Schwarcz, H.P., Burnie, S., Crocket, J.H., McMaster Univ.:
Sulfur isotope variations in stratiform ore deposits, 1968-72.
Isotopic ratios vary due to fractionation during bacterial reduction of seawater sulfate. The variation pattern can be correlated with the model of depositional environment based on sedimentologic criteria.

557. Stevenson, J.S., McGill Univ.:
Strontium isotope abundance, electron probe and chemical studies bearing on the petrogenesis of the granophyre (micropegmatite) and the Onaping Formation, Sudbury, Ontario, 1970-73.

558. Sutherland Brown, A., British Columbia Dept. of Mines and Petroleum Resources:
Copper and molybdenum deposits of British Columbia, 1968-73.
See Metallogeny of the Canadian Cordillera; CIM Trans., vol. LXXIV, pp. 121-145, 1971.

559. Tupper, W.M., Heslop, J., Carleton Univ.:
Characteristics and genesis of polymetallic base metal deposits associated with volcanic piles, 1964-.
Deposits currently under study include those at Bathurst, New Brunswick, Rio Tinto, Spain, and Faro, Yukon Territory.

560. Watkinson, D.H., Carleton Univ.:
Relation of ore deposits to intrusive igneous complexes, 1968-.
Two papers on the field and chemical aspects of this type of mineralization at Prairie Lake and Township 107/108, Ontario, are in preparation.

MINERAL DEPOSITS

Coal and Peat

561. Broughton, P.L., Whitaker, S.H., Saskatchewan Dept. of Mineral Resources:
Lignite stratigraphy of the Ravenscrag Formation, Saskatchewan, 1971-75.

Strippable coal seams are known to exist in the Ravenscrag Formation of Paleocene age. Production of lignite coal in the Ravenscrag is presently restricted to a few square miles in the Estevan area. The Formation, however, is known to cover about 10,000 square miles of the southern part of Saskatchewan.

A joint Federal-Provincial program will be undertaken in 1972 and 1973 to determine the extent of recoverable lignite reserves and to gain knowledge of the regional stratigraphy and structure of the Ravenscrag. Operational plans are to drill through the Formation in each township (six miles square), and to follow up with more closely spaced, shallower drilling in areas showing potentially economic lignite deposits.

562. Holter, M.E., Research Council of Alberta:
Lithology of the Luscar coal beds, central Alberta Foothills, 1971.

563. Kramers, J.W., Mellon, G.B., Research Council of Alberta:
Upper Cretaceous coal deposits, northwest-central Alberta, 1969-72.

Approximately 70 outcrop localities in the Smoky River-Fox Creek-Swan Hills region containing coal were examined, and the thicker coal beds sampled. The most widespread of the coal-bearing intervals apparently correlates with the Late Cretaceous Ardley coal zone of central Alberta, extending from the Fox Creek-Goose River area westward to the Simonette River where good exposures are found near the junction with Deep Valley Creek. The same coal-bearing strata are believed to correlate with thick coal seams exposed about the flanks of Nose Mountain to the west, near the eastern margin of the foothills.

Ferrous Metals

564. Beland, R., Univ. de Laval:
Minéralogie et genèse de gîtes uranifères dans les monts Québec, 1970-72.

L'hypothèse de travail pour expliquer les nodules uranifères dans les grès des Otish implique une réaction redox avec fer ferreux-ferrique, und première comparaison entre les teneurs en fer ferreux et ferriques des divers bancs de grès s'amorcera dès que notre laboratoire d'analyse sera libre, soit en janvier 1972.

565. Clark, A.H., Queen's Univ.:
Iron sulphide relationships in selected ore deposits and rocks, 1963-.

566. Davies, J.L., Carleton Univ.:
Geology and geochemistry of the Austin Brook area, with special emphasis on the Austin Brook iron formation, 1972; Ph.D. thesis.

567. Gross, G.A., McLeod, C.R., Geol. Surv. of Can.:
Geology of iron and manganese deposits: determination of major and minor elements in different facies and depositional environments of iron-formation, 1969-.
Major and minor element content in available specimens of cherty iron-formation are being determined by rapid analytical methods to obtain data on the compositional variations of these rocks deposited in different sedimentary environments. Elemental distribution patterns in the various lithological types and facies of the iron rich sediments will provide critical data on the provenance of the iron and silica, improve interpretive work on their manner of deposition and provide necessary basic data for evaluation and assessment of the grade and quality of iron ore deposits and potential resources.

568. Henriquez, F., McGill Univ.:
Relation of certain volcanogenic sulfide deposits to iron formation, 1971-73; M.Sc. thesis.

569. Kingston, P.W., New Brunswick Research and Productivity Council:
Mineralogy of New Brunswick hard rock and bog manganese ores, 1971-73.
Detailed examination of the mineralogy and compositions of manganese occurrences in New Brunswick with special emphasis placed on manganiferous shales (Tetagouche Fall) and on representative bog-type ores (Renous). The mineralogical examination involves ore microscopy, X-ray diffraction and electron microprobe analysis. Grade of the deposits is determined by wet chemical analysis of representative samples. Some experiments are being undertaken to assess the leaching potential of these ores with ferrous sulphate solutions, with respect to time, temperature, level of concentration of the leaching solution, and crushing size of the ore.

570. Neilson, J.M., Queen's Univ.:
Iron ore deposits, Chorkbuk Inlet, Baffin Island, Northwest Territories, 1971-72.

571. Ridler, R.H., Geol. Surv. of Can.:
Metallogeny of iron-formation (exhalite) at the southern margin of the Abitibi Basin, Ontario and Quebec, 1969-72.
See Analyses of Archean volcanic basins in the Canadian Shield using the exhalite concept; CIM Bull., vol. 64, No. 714, p. 20 (Abstract), 1971.

Industrial Minerals

572. Bannatyne, B.B., Manitoba Dept. of Mines, Resources and Environmental Management:
High-calcium limestone in Manitoba, 1969-72.
Deposits are primarily in rocks of Ordovician and Devonian ages.

573. Brown, J.B., McGill Univ.:
An experimental study on some aspects of serpentinization, 1971-73; Ph.D. thesis.
Study involves first an addition of iron-containing olivine to the system, then Ni behaviour within that system during the formation of serpentine.

574. Burwasser, G.J., Ontario Dept. of Mines and Northern Affairs:
Pleistocene geology and industrial minerals of Thunder Bay and vicinity, 1971-73.

575. Burwasser, G.J., Ontario Dept. of Mines and Northern Affairs:
Pleistocene geology and industrial minerals of the Sudbury Basin, 1970-72.

576. DeGrace, J.R., Newfoundland and Labrador Dept. of Mines, Agriculture and Resources:
Limestone evaluation project, 1971-72.
The limestones of the Port au Port Peninsula will be assessed by diamond drilling.

577. Feenstra, B.H., Ontario Dept. of Mines and Northern Affairs:
Pleistocene geology and industrial minerals of the Niagara area, 1969-72.

578. Hamilton, J., New Brunswick Dept. of Natural Resources:
Sand and gravel in New Brunswick, 1969-72.

579. Hamilton, W.N., Research Council of Alberta:
Salt, Alberta, 1966-71.

580. Hamilton, W.N., Research Council of Alberta:
Quartzite, Alberta, 1970-.

581. Hamilton, W.N., Research Council of Alberta:
Clay and shale resources of Alberta, 1970-.
A compendium of published and unpublished data on all ceramically tested clays and shales in Alberta.

582. Hitchon, B., Holter, M.E., Research Council of Alberta:
Calcium-magnesium brines, 1969-71.

583. Holter, M.E., Research Council of Alberta:
Silica sand deposits of the Medicine Hat area, Alberta, 1969-72.
See Silica (dune) sand from the Medicine Hat area, Alberta; Research Council of Alberta, Rept. 71-5, 1971.

584. Holter, M.E., Research Council of Alberta:
Silica sand deposits of the Red Deer area, Alberta, 1969-72.

585. Holter, M.E., Research Council of Alberta:
Limestones of Alberta, 1970-72.

586. King, M.S., Univ. of Saskatchewan:
Underground acoustic measurements, 1970-75.
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.

587. McLaws, I.J., Research Council of Alberta:
Uses and specifications of sand and gravel, 1968-71.

588. Papezik, V.S., Memorial Univ.:
Study of a pyrophyllite deposit near Foxtrap, Avalon Peninsula, Newfoundland, 1969-73.
Lenses of fine-grained pyrophyllite have been developed in major shear zones in rhyolitic rocks of the Late Precambrian Harbour Main Group, close to a granitic pluton. The altered rocks consist of very fine-grained pyrophyllite, sericite and quartz in varying proportion; several high-grade lenses are now being mined. Preliminary work (Keats, M.Sc. thesis, MUN, 1970) showed the feasibility of quantitative modal analysis of the rocks by X-ray diffractometer. Work is in progress on refining the method to the point of possible industrial application.

589. Scafe, D.W., Research Council of Alberta:
Alberta bentonite studies, 1968-.
Laboratory analysis of bentonite deposits mined by Magcobar Canada Ltd. at Rosalind in east-central Alberta has been completed and processing of samples from a 30-foot thick bentonite bed exposed on the Red Deer River near Dorothy has begun.

590. Vos, M.A., Ontario Dept. of Mines and Northern Affairs:
Ordovician limestone resources of southern Ontario, 1969-72.
Information gathered from existing quarry operations will be compiled in a report together with information on drift thickness in several areas.

591. Vos, M.A., Ontario Dept. of Mines and Northern Affairs:
Clay products industry of Ontario, 1971-.

592. Vos, M.A., Ontario Dept. of Mines and Northern Affairs:
Salt in Ontario, 1970-72.

MINERAL DEPOSITS

Other Metals

593. Austria, V.B., New Brunswick Dept. of Natural Resources:
Cu, Pb, Zn, Mo, Mu, contents of stream and spring sediments, parts of Carleton and York Counties, New Brunswick, 1971-72. Primary and secondary dispersion of trace elements near Mo and W mineralization in granite, 1968-72.
To determine the applicability of rock geochemistry in mineral exploration where sampling is based on petrologic variations in a granitic body and to determine the factors that tend to offset the normal relationship between primary (bedrock) anomalies and secondary anomalies in drainage sediments and soil.

594. Cabri, L.J., Mines Branch, Dept. of Energy, Mines and Resources:
The mineralogy of the Tulameen River sands, 1971-73.
Production of Pt and Au from the Tulameen River district, British Columbia, ceased in the early part of this century though large tonnages of alluvials still remain. The mineralogy and potential of these gravels and sands is still unknown.

595. Clark, A.H., Queen's Univ.:
Mineralogy and geochemistry of the Panasqueira tungsten-tin deposit, Northern Portugal, 1959-.
Selected aspects of this deposit are under study including supergene mineralogy (occurrence of Cu_6Pn_5 berndtite, and varlamoffite) and F:OH ratio variations in topaz.

596. Clark, A.H., Queen's Univ.:
Ore mineralogy of the Alacrán Ag-As-Sb deposit, Pampa Larga, northern Chile, 1967-71.

597. Clark, A.H., Queen's Univ., Mortimer, C., Sillitoe, R.H., Instituto de Investigaciones Geologicas de Chile:
Mineralogy and tectonic/geomorphic controls of supergene alteration in the Caoiapo region, northern Chile, 1965-71.

598. Dawson, K.R., Geol. Surv. of Can.:
Comprehensive economic geology report on the geology of niobium and tantalum in Canada, 1970-72.

599. Ferguson, S.A., Ontario Dept. of Mines and Northern Affairs:
Carbonatite-alkalic complexes of Ontario and their economic minerals, 1971-72.
See Columbium (Niobium) deposits of Ontario; Mineral Res. Circ. 14, 1971.

600. Gobeil, A., Univ. de Laval:
Etude géologique et pétrochimique des gîtes nickelifères du Québec. Lithologie et pétrochimie des horizons pyroclastiques volcano-sédimentaires associés aux gîtes de sulfures massifs (stérile et producteur), 1969-73.

601. Mahajan, S.K., McGill Univ.:
Molybdenite deposits in Preissac Township, Quebec, 1967-72; Ph.D. thesis.

602. Petruk, W., Mines Branch, Dept. of Energy, Mines and Resources:
Mineralogy of the bismuth-molybdenum-tungsten-tin deposit in southwestern part of New Brunswick, 1970-72.

603. Shegelski, R., Scott, S.D., Univ. of Toronto:
Silver deposits of the Great Bear Lake and Cobalt, Ontario regions, 1971-73.

604. Strong, D.F., Douglas, J.G., Memorial Univ.:
Geochemistry of Cambrian manganese deposits of Newfoundland, 1971-; M.Sc. thesis (Douglas).

605. Wilson, H.D.B., Bridge, D., Morrice, M., Seccombe, P., Univ. of Manitoba:
Tin distribution in Canadian massive sulphide deposits, 1970-72.

Petroleum

606. 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-.
This directory will contain detailed analysis of numerous Canadian oil samples, which were analysed in our Fuels Research Laboratories and geological, reservoir and secondary recovery data on selected oil pools from which these samples were taken.

607. den Boer, J.C., Mobil Oil Canada:
Magneto-tellurics for petroleum exploration, 1970-.

608. North, F.K., Carleton Univ.:
Petroliferous basins of the world, 1958-73.
See Characteristics of oil provinces: a study for students; Bull. Can. Petrol. Geol., vol. 19, No. 3, (1971), pp. 601-658, 1972.

609. Trollope, F.H., Mobil Oil Canada:
Hydrogen sulphide - hydrocarbon relationships of Upper Devonian of central Alberta, 1971-.

610. Velasco, F.B., Saskatchewan Dept. of Mineral Resources:
Notes on the Viking Formation southern-southwestern Saskatchewan, 1969-71.
Sedimentation and structure of the Viking sandy formation in the southern half of south-western Saskatchewan in relation to potential hydrocarbon accumulation.

Radioactive Deposits

611. Little, H.W., Boyer, A., Geol. Surv. of Can.:
Geology of uranium and thorium deposits in Canada, 1967-.
See Uranium in stream sediments in Carboniferous rocks of Nova Scotia; Geol. Surv. Can., Paper 70-54, 1971.

612. MacDonald, J.A., McGill Univ.:
Processes of surficial dispersion of uranium in the vicinity of some pitchblende deposits, Beaverlodge, Saskatchewan, 1964-72; Ph.D. thesis.

General

613. Cerny, P., Ferguson, R.B., Univ. of Manitoba:
Utilization of pegmatite ores of southeastern Manitoba, 1971-.
Mineralogical study of pegmatites and their economic minerals, as a part of a Province-sponsored project consisting of mineralogical, chemical-techniclogical, and economic studies.

614. Church, B.N., British Columbia Dept. of Mines and Petroleum Resources:
Tertiary volcanism and mineral deposits of Houston area, British Columbia, 1969-72.
Study of the volcanic stratigraphy and the relationship to centres of volcanism and comagmatic intrusions and mineral deposits, including the Silver Queen (Bradina) and Sam Goosly (Kennco).

615. Dalton, J.L., McMahon, C., Mines Branch, Dept. of Energy, Mines and Resources:
Direct determination of oxygen in rocks and minerals by activation analysis using a fast-neutron generator, 1967-72.

616. Guha, J., Darling, R., Ecole Polytechnique:
Etude préliminaire de la minéragraphie du gisement de cuivre Louvem, Québec, 1970-71.

617. Hale, W.E., Chrzanowski, N., Univ. of New Brunswick:
Carboniferous mineral occurrences in northern Appalachia, 1967-72.

618. Hamilton, W.N., McLaws, I.J., Research Council of Alberta:
Economic minerals map of Alberta, 1970-.
On a modified geologic map are displayed all significant deposits of economic minerals in Alberta other than petroleum and natural gas. The mineral resources are classified into categories based on industrial use, relative size of the deposit, and potential areas for future exploration and development.

619. Hoag, R.B., McGill Univ.:
A hydrogeochemical study of waters in areas near some mineral deposits, 1971-74; Ph.D. thesis.

620. Jackson, E.V., British Columbia Dept. of Mines and Petroleum Resources:
Mineral inventory of British Columbia, 1969-.
Compilation of the information on cards and maps and investigation of how best to store, retreive, and evaluate the information.

621. Kaiman, S., Hughson, M.R., Mines Branch, Dept. of Energy, Mines and Resources:
Mineralogical investigation of ores and process products - a continuing project.

622. Kelly, A.M., Fabbri, A., McCartney, W.D., Fyles, J.T., Geol. Surv. of Can., and British Columbia Dept. of Mines and Petroleum Resources:
Appraisal of mineral potential, Skeena arch (Bulkley-Nechako region), British Columbia, 1971-72.
At the British Columbia Department of Mines and Petroleum Resources, data on each significant mineral occurrence are to be gathered and geological data are to be measured and coded using cells of 100 square kilometres each as defined by the Universal Mercator Grid. At the Geological Survey of Canada, Ottawa, this information, augmented by aeromagnetic and gravimetric data, is to be stored, analyzed and retrieved using the SAFRAS system. The resulting estimates of mineral potential of cells may lead to improved decision making in balanced natural resources development and mineral exploration.

623. Kesler, S.E., Univ. of Toronto:
Distribution of ore metals in granodioritic rocks with emphasis on the distribution of related ore deposits and the origin of metallogenic provinces, 1971.

624. Leech, G.B., Geol. Surv. of Can.:
General metallogeny of Canada, 1966-72.

625. McCullough, R., Wilson, H.D.B., Univ. of Manitoba:
The change in grades of ore mined in Canada, 1971-72.
The gradual decrease in grade of ore mined in Canada is being determined to allow a forecast of grade of future ore supplies and probable types of sources for lower grade ores.

626. McMillan, W.J., Grove, E.W., Agar, C., British Columbia Dept. of Mines and Petroleum Resources:
Geology and mineral deposits of the Guichon Creek batholith, British Columbia, 1969-73.
Special emphasis is being placed on the structural development of the batholith with gravity and magnetic analysis.

627. Munday, R.J.C., Saskatchewan Dept. of Mineral Resources:
The geology of the Dutton Lake area (east half), Saskatchewan, 64-M-9-E, 1971-72. The mineral deposits map of the Precambrian shield area of Saskatchewan, 1970-72.

MINERAL DEPOSITS

Summer 1971 was spent mapping a narrow linear belt of supracrustal metasediments in the northeastern corner of Saskatchewan. These metasediments are thought to be unconformably above the granitic basement and probably can be equated with the Hurwitz Group. An interesting fluorite bearing, anhydrous hypersolvus granite is intrusive into the crystalline basement to the southeast of the metasedimentary belt.

628. Northcote, K.E., British Columbia Dept. of Mines and Petroleum Resources:
Mineral deposits of Vancouver Island, British Columbia, 1971-.

629. Randall, J.A., Univ. of Saskatchewan:
Petrology of ore deposits in the Precambrian Shield and environs, 1971-75; Ph.D. thesis.

630. Rimsaite, J.H.Y., Geol. Surv. of Can.:
Mica group minerals and related silicates in Canadian mineral deposits, 1970-75.
See Spinel-mica paragenesis in the Thompson nickel belt, Manitoba; Geol. Assoc. Can., Mineral Assoc. Can., Annual meeting, Abstract, p. 58, 1971.

631. Ruitenberg, A.A., Buttimer, S., New Brunswick Dept. of Natural Resources:
Structural, stratigraphic and metallogenic studies of the Silurian-Devonian rocks in southern New Brunswick, 1967-.
To assist in economic development of mineralized zones and to produce mineral forecast maps. See Mineralized structures in the Johnson Croft, Annidale, Jordan Mountain and Black River areas; New Brunswick Dept. of Natural Res., Rept. Investigation No. 13, 1971.

632. Ruitenberg, A.A., Venugopal, D.V., Giles, P., Buttimer, S., Chandra, J., New Brunswick Dept. of Natural Resources:
Caledonian project, 1970-73.
A stratigraphic, structural and metallogenic investigation, augmented by airborne and ground geophysics, of the late Precambrian volcanic and sedimentary rocks in southeastern New Brunswick.

633. Scoates, R.F.J., Campbell, F.H.A., Elbers, F.J., Gilbert, P.E., Manitoba Dept. of Mines and Environmental Management:
Greenstone project, 1971-73.

634. Scott, S.D., Univ. of Toronto:
Environments of ore deposition, 1969-.

635. Shaw, W.S., St. Francis Xavier Univ.:
Mineral deposits, Cape Breton Island, Nova Scotia, 1969-.

636. Smitheringale, W.G., Memorial Univ.:
Mineral deposits of the Springdale Peninsula and related areas.

637. Thode, H.G., Monster, J., McMaster Univ.:
Sulphur isotope studies of ores, 1956-.

638. Wilson, H.D.B., Laznicka, P., Univ. of Manitoba:
Distribution of ore bodies, 1965-.
The data source is a computer file of the composition and geology of approximately 7,000 ore deposits of the world. The data are being examined for significant distributions.

MINERALOGY

Specific Minerals

639. Ansell, H.G., Boorman, R.S., Sutherland, J.K., Kingston, P.W., New Brunswick Research and Productivity Council:
Phase relationships in the Pb-Bi-Te system,1971-72.

640. Bayliss, P., Univ. of Calgary:
Crystal chemistry of pyrite group, 1964-.

641. Berry, L.G., Scott, J.D., Queen's Univ.:
Redefinition and crystal structure of miserite, 1970-72.
Similar studies are also underway on other minerals - fizelyite, franckeite, and a probable new mineral from Cobalt, Ontario.

642. Billette, S., Donnay, G., McGill Univ.:
Refinement of the schorl tourmaline crystal structure, 1971-73.
See Magnetic susceptibility and triangular exchange coupling in the tourmaline mineral group; J. Physics Chemistry of Solids, vol. 32, pp. 1441-1448, 1971.

643. Bliss, N.W., McGill Univ.:
Some aspects of the mineralogy of ultramafics at the southwest end of the Manitoba Nickel Belt, 1970-72; Ph.D. thesis.
An examination of the opaque minerals, spinels and sulphides, and their interrelation.

644. Boorman, R.S., Ansell, H.G., Sutherland, J.K., New Brunswick Research and Productivity Council:
Copper doped Galena, natural and synthetic; effects on flotation properties, 1971-72.

645. Boorman, R.S., Kingston, P.W., Sutherland, J.K., New Brunswick Research and Productivity Council:
Mineralogy and chemistry of oxidized pyrite tailings, 1971-73.

646. Boorman, R.S., Sutherland, J.K., Ansell, H.G., New Brunswick Research Council and Productivity Council:
Subsolidus phase relationships in the Cd-In-S system, 1968-72.

647. Boorman, R.S., Sutherland, J.K., Ansell, H.G., New Brunswick Research and Productivity Council:
Low temperature phase relations in the Pb-Bi-S system, 1969-72.

648. Boorman, R.S., Sutherland, J.K., Ansell, H.G., New Brunswick Research Council and Productivity Council:
Low temperature phase relationships Pb-Sb-S system, 1971-73.

649. Cabri, L.J., Mines Branch, Dept. of Energy, Mines and Res.:
Mineralogical study of the platinum group elements, 1971-73.

650. Cabri, L.J., Mines Branch, Dept. of Energy, Mines and Resources:
The relationship between crystal structure and reactivity of pyrrhotite, 1970-71.
Leaching of pyrrhotite under non-oxidizing conditions with warm HCl solutions is dependent on the non-stoichiometry of the pyrrhotite. Leaching is faster and more efficient for troilite, less so for hexagonal pyrrhotite and the least for monoclinic pyrrhotite.

651. Cabri, L.J., Mines Branch, Dept. of Energy, Mines and Resources:
Compositions and stability relations of copper-iron sulphides, 1965-72.
See New compositional data for talnakhite, $Cu_{18}(Fe, Ni)_{16}S_{32}$; Econ. Geol., vol. 66, p. 673, 1971.

652. Cerny, P., Turnock, A.C., Ferguson, R.B., Univ. of Manitoba:
Mineralogy and petrology of pegmatites, 1971-.
Mineralogical, geochemical, and petrological study of pegmatites. Pegmatite types in southeastern Manitoba, their genetic linkage, crystallization conditions, and economic potential. General pegmatite petrology based on rock-forming minerals, and on the behaviour of rare elements. See Niobium-tantalum minerals from granitic pegmatites at Greer Lake, southeastern Manitoba; Can. Mineralogist, vol. 10, pt. 5, pp. 755-772, 1971. Graphic intergrowths of feldspars and quartz in some Czechoslovak pegmatites; Contr. Mineral. Petr., vol. 30, 1971.

653. Chao, G.Y., Carleton Univ.:
Crystal chemistry of apophyllite, 1970-72.
The refinement of the structure of apophyllite did not show two different environments for the H_2O molicules. The two-stage dehydration is interpreted, based on thermal studies, as a result of the transformation from $KCa_4\ Si_8O_{20}(F, OH)\cdot 8H_{20}$ to $KCa_4\ Si_8O_{20}(F, OH)\cdot 4H_{20}$ at 250°C, giving out 50% of the crystalline water and the new compound decomposes at 360°C, giving out the rest of the crystalline water and fluorine.
The structure of an unusual apophyllite from India with the composition $KCa_3\ Al\ Si_8O_{21}\cdot 8H_{20}$ is currently under investigation. The structure determination of apophyllite at 250°C is planned. See Refinement of the crystal structure of apophyllite II. Determination of the hydrogen positions by X-ray diffraction; Am. Mineralogist, vol. 59, pp. 1234-1242, 1971.

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

655. Donnay, G., McGill Univ.:
Crystal structure determination of low tridymite, 1971-72.

656. Donnay, G., McGill Univ.:
Structure refinement of iron-gallium garnet. Epitaxy of synthetic garnets, 1971-72.

MINERALOGY

657. Edgar, A.D., Univ. of Western Ontario and Imperial College:
Crystal chemistry of pyroxenes from Shonkin Sag, Montana, U.S.A., 1971-72.

658. Ferguson, R.B., Univ. of Manitoba:
Crystal-chemical interpretations of feldspar structures, 1958-.
Electrostatic charge distribution calculations are being carried out for the structures of the feldspars orthoclase, adularia and celsian for different large-cation cardinations and different Si-O and Al-O distances to see which combination gives the most satisfactory charge distribution to the oxygens. The results are interpreted in terms of Si-Al order-disorder, and of phase relations.

659. Fleet, M.E., Misra, D.C., Univ. of Western Canada:
Crystal chemistry and structure of ore minerals, 1967-.
Ph.D. thesis (Misra).
Most attention is being given to nickel sulphides and arsenides; the crystal structures of αNi_7S_6 and pararammelsbergite ($NiAs_2$) have been determined; βNi_7S_6 (godlevskite) and maucherite (Ni_8As_{11}) are being investigated; synthetic and natural pentlandite assemblages are being studied. See The crystal structure of a pyrrhotite (Fe_7S_8); Acta crystallographica, vol. B27, pp. 1864-1868, 1971.

660. Fraser, J., Univ. of British Columbia:
Origin of nephrite jade in British Columbia, 1970-72.

661. Gosselin, J., Tremblay, R.J., Townsend, M.G., Mines Branch, Dept. of Energy, Mines and Resources:
Mössbauer investigations of sulphide minerals, 1970-.

662. Grice, J.D., Ferguson, R.B., Cerny, P., Univ. of Manitoba:
Crystal-structure and crystal-chemical studies of tantalum oxide and nickel sulphide minerals, 1970-72.
This project involves crystal structure analyses and crystal-chemical interpretations in relation to the paragenesis of (1) the tantalum oxides wodginite, tantalite, pseudo-ixiolite and microlite from the Tanco pegmatite, Bernic Lake, Manitoba; and (2) the nickel sulphides millerite and hauchecornite.

663. Grundy, H.D., McMaster Univ.:
Crystallography and crystal chemistry of the cancrinite group of minerals, 1968-72.
Investigation of synthetic cancrinite of simple chemical composition and with almost no superstructure.

664. Grundy, H.D., Hawthorne, F.C., McMaster Univ.:
Crystal chemistry of the monoclinic amphiboles, 1969-72; Ph.D. thesis (Hawthorne).
The presence of many similar but nonequivalent cation sites in the amphiboles lends to complicated substitution patterns which have been considered by various

authors to reflect temperature of equilibration of the mineral assemblages in which the amphibole occurs. This work is aimed at providing information pertinent to this problem. The amphiboles Ferrotschermakite, Edenite, Arfvedosnite, Barkevikite and Kaersutite are presently under investigation.

665. Harris, D.C., Mines Branch, Dept. of Energy, Mines and Resources:
Characterization of copper selenides, 1968-.

666. Harris, D.C., Cabri, L.J., Mines Branch, Dept. of Energy, Mines and Resources:
Mineralogical examination of low-grade nickel deposits in Canada, 1970-.
Characterization of low-grade nickel-bearing serpentinites (0.2 - 0.6%) by determining the occurrence and textrual relationships of the nickel phases with the electron microprobe.

667. Hogarth, D.D., Univ. of Ottawa:
The nature and genesis of Lapis lazuli, 1968-73.
See Lapis lazuli near Lake Harbour, southern Baffin Island, Canada; Can. J. Earth Sci., vol. 8, pp. 1210-1217, 1971.

668. Kingston, P.W., New Brunswick Research and Productivity Council
Mineralogy of New Brunswick hard rock and bog manganese ores, 1971-73.
Detailed examination of the mineralogy and compositions of manganese occurrences in New Brunswick with special emphasis placed on manganiferous shales (Tetagouche Fall) and on representative bog-type ores (Renous). The mineralogical examination involves ore microscopy, X-ray diffraction and electron microprobe analysis. Grade of the deposits is determined by wet chemical analysis of representative samples. Some experiments are being undertaken to assess the leaching potential of these ores with ferrous sulphate solutions, with respect to time, temperature, level of concentration of the leaching solution, and crushing size of the ore.

669. Ledoux, R.L., Univ. de Laval:
Chemical decomposition of muscovite, phlogopite and biotite, 1970-72.
The K ion is extracted by Na T Ph B and the structural evolution of the micas is followed by infrared spectroscopy and X-ray diffraction.

670. Lin, S.B., Burley, B.J., McMaster Univ.:
Crystallography of silicates, 1971-73.
The crystal structures of a number of scapolites have been elucidated and the results prepared for publication.

MINERALOGY

671. Macek, J.J., Amback, H., Ferguson, R.B., Scoates, R.F.J., Univ. of Manitoba:
The evaluation of composition and structural state of twinned plagioclase utilizing optical technique, 1971-73.
The purpose of this project is to explain theoretically the various kinds of optical deviations of plagioclase twinned by albite law, known as "internal scatter" (Vogel, T.A., 1964, Amer. Min. 49, p. 614). The calculated deviations will be classified on the basis of chemical composition and structural state. Sets of charts relating composition and structural state utilizing measured optical properties will allow for a more critical evaluation of the conditions of origin of various plagioclase feldspars. Computer programmes have been designed for chart preparation. A modification of the method for determining optical properties utilizing a 5-aws universal stage is necessitated.

672. Martin, R.F., Chorlton, L.B., McGill Univ.:
The influence of boron on stability relationships of feldspars and on melting phenomena in granite, 1971-72; M.Sc. thesis (Chorlton).
See Disordered authigenic feldspars of the series $KAlSi_3O_8$-$KBSi_3O_8$ from southern California; Amer. Mineralogist, vol. 56, pp. 281-291, 1971.

673. Nebesar, B., Mines Branch, Dept. of Energy, Mines and Resources:
Combustion methods for the determination of sulphur in iron ores, 1966-72.

674. Nebesar, B., Mines Branch, Dept. of Energy, Mines and Resources:
High-precision chemical analysis of sulphidic materials - differential spectrophotometric determination of sulphur, 1965-72.

675. Papezik, V.S., Memorial Univ.:
Prehnite-pumpellyite facies metamorphism of Late Precambrian sediments on the Avalon Peninsula, Newfoundland, 1971-73.
Veins containing quartz, prehnite, calcite and albite and chlorite are common in the fine-grained sandstones of the lower part of the Late Precambrian Cabot Group near St. John's, Newfoundland. Prehnite formed by recrystallization of matrix forms numerous small patches in the rocks. The assemblage is characteristic of the quartz-prehnite zone of the "prehnite-pumpellyite metagreywacke facies" of metamorphism (Coombs, 1960). The mineralogy, areal extent of the zone, and possible gradation into other low-grade metamorphic facies are being investigated.

676. Perrault, G., Rigaud, M., Boucher, C., Ecole Polytechnique:
Cristallochimie du niobium, 1968-75.
Nous comptons faire beaucoup avancer ce projet en 1972-73 dans les directions suivantes:
(1) Travaux sur la définition des espèces cristallines

d'oxydes de niobium;

2) définition de la structure cristalline de (Na, Ca) (Nb, Ti) $Si_2O_7 \cdot 2H_2O$, la nenadkevichite;

3) définition minéralogique de la série nenadkevichite (Na, Ca) (Nb, Ti) $Si_2O_7 \cdot 2H_2O$ labuntsovite (K,Ba) (Ti, Nb) $Si_2O_7 \cdot 2H_2O$;

4) relevé bibliographiquesur la cristallochimie du niobium; and

5) synthèse et étude de la structure cristalline de nouveaux composés du niobium.

677. Perrault, G., Vincent, H., Ecole Polytechnique:
Structure des oxychlorures de plomb, 1971-72.
See Etude cristallographique de deux oxychlorures de plomb synthétiques. $Pb_3O_2Cl_2$ et Pb_2OCl_2; Bull. Soc. Fr. Mineral. Cristallogr., vol. 94, pp. 108-112, 1971.

678. Petruk, W., Mines Branch, Dept. of Energy, Mines and Resources:
Characteristics of the minerals in the $Cu_2(Fe, Zn)\ SnS_4$ (stannite) - $Cu_8(Fe, Zn)_3S_{12}$ (stannoidite) - $Cu_6\ Fe_2SnS_8$ (mawsonite) system from the bismuth-molybdenum-tunsten-tin deposit in southwestern New Brunswick, 1971-72.

679. Petruk, W., Mines Branch, Dept. of Energy, Mines and Reosurces:
Mineralogy and geochemistry of the prophyry copper-molybdenite deposits in British Columbia, 1969-.

680. Rimsaite, J.H.Y., Geol. Surv. of Can.:
Mica group minerals and related silicates in Canadian mineral deposits, 1970-75.
See Spinel-mica paragenesis in the Thompson nickel belt, Manitoba; GAC-MAC Annual meeting, Abstract, p. 58, 1971.

681. Schneider, M., McGill Univ.:
The crystal structure of bideauxite, 1970-72.

682. Springer, R.K., Brandon Univ.:
Exsolution in pyroxenes, 1971-72.
Electron microprobe and single crystal X-ray diffraction studies of coexisting Ca-rich and Ca-poor pyroxenes and their exsolved pyroxene lamellae from a layered mafic intrusion in the Sierra Nevada, California, U.S.A.

683. Stevenson, J.S., Stevenson, L.S., McGill Univ.:
Mineralogical study of urinary calculi, 1968-72.

684. Sutherland, J.K., Abbott, D.W., Barnett, D.E., New Brunswick Research and Productivity Council:
Chemistry of some New Brunswick chalcopyrites and associated silver bearing minerals, 1970-71.

685. Sutherland, J.K., Boorman, R.S., Kingston, P.W., New Brunswick Research and Productivity Council:
Chemistry of natural cosalite and cannizzarite, 1970-72.

General

686. Ahmed, S.M., Mines Branch, Dept. of Energy, Mines and Resources:
Bacterial leaching, 1967-71.
See The use of a 'cytopherometer' in electrophoretic studies of minerals and of mineral-leaching bacteria; Mines Branch Techn. Bull. TB 140, 1971.

687. 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-.

688. Allen, D.G., Clark, A.H., Queen's Univ.:
Mineralogy and geochemistry of the Galore Creed copper deposit, British Columbia, 1967-72; Ph.D. thesis (Allen).

689. Bayliss, P., Univ. of Calgary:
Clay mineralogy in northern Canada, 1967-.

690. Clark, A.H., Queen's Univ., Mortimer, C., Sillitoe, R.H., Instituto de Investigaciones Geologicas de Chile:
Mineralogy and tectonic/geomorphic controls of supergene alteration in the Copiapo region, northern Chile, 1965-71.

691. Coleman, L.C., Fillo, W., Univ. of Saskatchewan:
A comparison of the Kinley and Catherwood meteorites, 1971-73; M.Sc. thesis (Fillo).
Mineralogy and petrography of the Kinley meteorite -- an olivine-hypersthene chondrite found at Kinley, Saskatchewan during 1965-66 -- and the Catherwood meteorite -- another olivine-hypersthene chondrite found about 10 miles southwest of Kinley in 1966 -- indicate that these meteorites represent quite separate falls.

692. Dayal, R.R., Mines Branch, Dept. of Energy, Mines and Resources:
Phase equilibrium studies in the system $ZnO-Nb_2O_5-SiO_2$, 1969-71.
The ternary system $ZnO-Nb_2O_5-SiO_2$ has electronic ceramic significance and could also have mineralogical significance. The $ZnO-SiO_2$ and $Nb_2O_5-SiO_2$ binary systems are well known; the system $ZnO-Nb_2O_5$ has been studied earlier but incompletely. This work has been repeated and extended; the compounds $3ZnO \cdot Nb_2O_5$, α- and β-$ZnO \cdot Nb_2O_5$, and $2ZnO \cdot 17Nb_2O_5$ have been shown to exist. No ternary compound could be found in the three-component system so that the natural occurrence of a mineral analagous to niocalite in the $CaO-Nb_2O_5-SiO_2$ is very unlikely.

693. Dean, R.S., Mines Branch, Dept. of Energy, Mines and Resources:
Mineralogy of argillaceous materials in Canada, 1958-.
See Clay mineralogy of a sample of sylvite ore from the Duval Corporation Mine, Saskatoon, Saskatchewan; Mines Branch, Investigation Rept. IR 71-19, 1971.

694. Dibbs, H.P., Mineral Sciences Division, Mines Branch:
The effect of nuclear radiation on adsorption at the mineral-solution interface, 1969-.

695. Dibbs, H.P., Mines Branch, Dept. of Energy, Mines and Resources:
Determination of the zeta potentials of minerals, 1969-72.
A continuous-flow streaming potential apparatus has been developed and is being used for zeta potential determinations of some oxide and sulphide minerals.

696. Faye, G.H., Mines Branch, Dept. of Energy, Mines and Resources:
The correlation of absorption spectra with structure of minerals and inorganic complexes, 1965-.

697. Hall, S.R., Szymanski, J.T., Rowland, J.F., Childs, J.D., Mines Branch, Dept. of Energy, Mines and Resources:
Crystal structure of minerals, 1968-.
The crystal structure of mooihockite ($Cu_9Fe_9S_{16}$), haycockite ($Cu_{48}Fe_{60}S_{96}$), cubanite ($CuFe_2S_3$), high-temperature cubanite ($CuFe_2S_3$), and michenerite (PdTeBi) are currently under study using accurate X-ray diffraction techniques. In addition, the structures of talnakhite ($Cu_{18}Fe_{16}S_{32}$), movihockite, cubanite and pentlandite ($Fe_9Ni_9S_{16}$) are being examined using powder neutron diffraction methods.

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

699. Hughson, M.R., Mines Branch, Dept. of Energy, Mines and Resources:
High-temperature X-ray diffraction analysis, 1970-72.

700. Ledoux, R.L., Pichette, M., Univ. de Laval:
Quantitative mineralogical analysis of recent clay sediments in the St-Lawrence Lowlands, 1971-74;
M.Sc. thesis (Pichette).
The quantitative mineralogical analysis of the primary and secondary clay minerals is accomplished by the combination of a selective dissolution technique of minerals with X-ray diffraction, thermogravimetric analysis, and infrared spectroscopy.

701. McDougall, D.J., Douglas, G., Morency, M., Loyola College:
Thermoluminescence of minerals, 1962-.
Primary objective is to investigate variations in thermoluminescence in minerals in relationship to their geological environments. Specific areas of investigation currently being followed include:
a) strain effects (i.e. possibility of use of minerals as natural strain guage); b) thermal effects (i.e. possibility of use of TL to obtain temperature of formation); and c) radiation effects (i.e. possibility of use as natural radiation dosimeter).

702. Milligan, G.C., Dalhousie Univ.:
Investigations in the George River Series, Cape Breton, Nova Scotia, 1962-.
Original objective was to find such features associated with sulphide occurrences as could be used as guides in the search for ore. The halo of

"retrogressive" minerals, associated with the sulphides, proves mineralization to be later than the regional metamorphism and is relevant to current dogmas about metamorphosed syngenetic sulphides. The processes and material transfers involved have been investigated also.

703. Owens, D.R., Pinard, R.G., Harris, D.C., Petruk, W., Cabri, L.J., Mines Branch, Dept. of Energy, Mines and Resources:
Mineralogical investigation of canadian ores in conjunction with mineral processing research, 1930-.

704. Pajari, G.E., Trembath, L.T., Ghosh-Dastidar, P., Univ. of New Brunswick:
Element partitioning between co-existing phases, 1965-.
Involves the further testing of models proposed by Grover and Orville (1969, Geoch. Cosmochim. Acta.) and by Ghosh-Dastidar et al., (1970, Econ. Geol.). See Factors affecting the trace element co-efficient between co-existing sulphides; Econ. Geol., vol. 65, pp. 815-837, 1970.

705. Papezik, V.S., Memorial Univ.:
Study of a pyrophyllite deposit near Foxtrap, Avalon Peninsula, Newfoundland, 1969-73.

706. Perrault, G., Le Page, Y., Ecole Polytechnique:
Programmation électronique pour les recherches en cristallographie, 1966-.
Nous continuons le développement de nouveaux programmes de calculs électroniques pour les recherches en cristallographie. En novembre 1971, notre programmathèque comprenait 35 programmes distincts; nous comptons l'augmenter encore en 1972-73. Les programmes sont centrés sur: 1) l'interprétation radiocristallographique; and 2) la définition de la structure cristalline. Nos programmes sont écrits en Fortran IV pour la CDC-6600 de l'Université de Montréal.

707. Perrault, G., Le Page, Y., Currie, K.L., Ecole Polytechnique:
Minéralogie du Mont St-Hilaire, Quebec, 1964-75.
Nos travaux en cours sur St-Hilaire porte: 1) sur l'identification d'un nouveau silicate de Zn et de Mn; 2) sur la série nenadkevichite-Labuntsovite; and 3) la cartographie 1 po. = 200 pi. du Mont St-Hilaire au complet.

708. Ripley, L.G., Webster, A.H., Mines Branch, Dept. of Energy, Mines and Resources:
Growth of single crystals of base-metal sulphides and related compounds of controlled composition, 1964-72.
See Crystal growth, Part I: Background to crystal growth; Mines Branch Res., Rept. R235, 1971.
Crystal growth Part II: The growth of zinc sulphide crystals; Mines Branch Res., Rept. R236, 1971.

709. Roscoe, W.E., McGill Univ.:
Experimental deformation of sulphides, 1969-72; Ph.D. thesis.
The interdependence of stress difference, strain rate, and temperature is being investigated for natural and synthetic chalcopyrite at a confining pressure of 1000 bars.

710. Soles, J.A., Mines Branch, Dept. of Energy, Mines and Resources:
Construction materials: petrography, mineralogy, and utilization. Materials beneficiation: mineral relationships in rocks and ores and the effect on processing, 1959-.

711. Sutarno, Bowman, W.S., Alexander, G.E., Lake, R.H., Bright, N.F.H., Mines Branch, Dept. of Energy, Mines and Resources:
Studies in the science and technology of "soft ferrites, 1969-72.
See The thermal decomposition of freeze-dried metal sulphates to be used in the preparation of manganese-zinc ferrite; Mines Branch Inves. Rept. IR 71-41, 1971.

712. Sutarno, Bowman, W.S., Alexander, G.E., Lake, R.H., Bright, N.F.H., Mines Branch, Dept. of Energy, Mines and Resources:
Studies in the science and technology of "hard" ferrites, 1966-71.
See The effects of sintering atmosphere on the Properties of strontium ferrite permanent magnets, by Sutarno, W.S. Bowman, and G.E. Alexander. J. Can. Ceramics Soc., vol. 40, 1971.

713. Theis, N., Queen's Univ.:
Mineralogical study of two uraniferous reefs in the Elliot Lake district, Ontario, 1970-72; M.Sc. thesis.

714. Townsend, M.G., Horwood, J.L., Tremblay, R.J., Mines Branch, Dept. of Energy, Mines and Resources:
Electrical and magnetic studies of sulphide minerals, 1969-.
Mott transitions and related phenomena in antiferromagnetic sulphide minerals are being studied. See Metal-semiconductor transition in single crystal hexagonal nickel sulphide; Solid State Physics, vol. 4, p. 598, 1971.

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Invertebrate

715. Ashworth, A.C., Univ. of Waterloo:
A late Quaternary insect assemblage from southern Ontario, 1971.
Fossil insects are being extracted from some 10,000 year old sediments. The species which have been identified are identical to living forms and should provide information of both the habitat and climatic aspects of the environment in southern Ontario at this time.

716. Berdan, J.M., Copeland, M.J., U.S. Geol. Surv. and Geol. Surv. of Can.:
Ostracodes from lower Devonian formations in Alaska and Yukon Territory, 1970-72.
The limestone and shale member of the McCann Hill Chert of eastern Alaska and the Michelle and Prongs Creek Formations of Yukon Territory have yielded more than forty genera of ostracodes. Six new genera and thirty-two new species are included.

717. Chamney, T.P., Geol. Surv. of Can.:
Foraminiferal zonation of the Mesozoic and lower Cenozoic rocks of the MacKenzie River Delta and adjacent Arctic Coastal Plain, 1969-73.
See Biostratigraphic contributions from the Arctic Coastal Plain west of the MacKenzie River Delta; Geol. Surv. Can., Paper 72-1, pt. A, pp. 202-203, 1971.

718. Collins, D.H., Royal Ontario Museum:
Buoyancy mechanisms and shell ultrastructure of coleoid cephalopods, 1970-72.

719. Copper, P., Laurentian Univ.:
Paleoecology, morphology and evolution of components of benthic marine communities during Ordovician-Devonian time, 1962-75.

720. Dawes, C., Queen's Univ.:
Trilobite faunas of the Bison Creek Formation (Upper Cambrian), Alberta, 1971-73; M.Sc. thesis.

721. Dean, W.T., Geol. Surv. of Can.:
Distribution of Cambrian and Ordovician trilobites in eastern Canada.
Investigation of Cambrian trilobites of European type in eastern Canada and their relationships to similar faunas of the Mediterranean region and Turkey, and Ordovician trilobites in the Appalachian region and their relationship to faunas in Europe and other parts of North America.
See Ordovician trilobites from the central volcanic belt at New World Island, northeastern Newfoundland; Geol. Soc. Can., Bull. 210, 1971.

722. Dixon, O.A., Univ. of Ottawa:
Ordovician-Silurian faunal studies, Anticosti Island, 1968-.

Current studies involve systematics and distribution of tabulate coral faunas, and faunal succession in the Ordovician-Silurian transition.

723. Gishler, C.D., Univ. of Western Ontario:
Fauna and paleoecology of Queenston and Kagawong formations, Ordovician, southern Ontario, 1971-73; M.Sc. thesis.

724. Greiner, H.R., Univ. of New Brunswick:
Cyrtospirifer and related genera from the Upper Devonian-Lower Mississippian of western Canada, 1965-72.

725. Harrington, J.W., Univ. of Calgary:
Brachiopoda of the Melville Island Group (Upper Devonian), Banks Island, Northwest Territories, 1970-72.

726. Johnston, P.F., Chevron Standard Ltd., Calgary:
Micropaleontology, 1971-.

727. Jull, R.K., Univ. of Windsor:
Corallite development and microstructures in Tabulata and rugose corals, 1965-73.
Corallite development in Ordovician and Silurian tabulate corals, and selected rugose corals, is being studied by means of closely spaced acetate peel sections, with special reference to patterns of septal formation.

728. Kapp, U., McGill Univ.:
Paleoecology of Chazyan (Middle Ordovician) stromatoporoids on Isle Lamotte, Vermont, U.S.A., 1969-72; M.Sc. thesis.

729. Lenz, A.C., Univ. of Western Ontario:
Upper Silurian and Lower Devonian brachiopod biostratigraphy, taxonomy and paleoecology of the northern Canadian Cordillera, 1967-75.
See Werneckeella, a new Lower Devonian rhynchonellid brachiopod, Royal Creek, Yukon Territory; J. Pal., vol. 45, No. 5, pp. 844-848, 1971.

730. Lenz, A.C., Jackson, D.E., Univ. of Western Ontario:
Silurian and Devonian graptolite biostratigraphy and taxonomy of the northern Canadian Cordillera, and of Gaspé region, Québec, 1968-74.
See Late Silurian (Pridolian) and Early Devonian Monograptus of northwestern Canada; Geol. Surv. Can., Bull. 192, 1971.

731. Letendre, J., Univ. of Montreal:
Silurian Phacopsids (Trilobite), 1971-73; M.Sc. thesis.

732. Logan, A., Noble, J.P.A., Univ. of New Brunswick:
Ecology of Spondylus americanus on Bermuda Platform; recent brachiopod ecology, Bay of Fundy, 1970-.
The life habits of Spondylus americanus from the Bermuda Platform are being investigated, the main purpose being to aid paleoecological reconstructions in fossil

relatives. Ontogenetic development suggests definite growth tendencies in both fossil and recent "oysters", in spite of strong ecological control. Shell sculpture, mainly from the viewpoint of functional morphology, post-mortem hinge destruction and rate of breakdown of the rest of the shell into constituent particles, as well as local transportation, is also being studied.

The life habits and substrate preferences of the Recent brachiopod Terebratulina septentrionalis, spacial environmental, morphological and shell chemical relationships are being explored, as well as the population dynamics of the species.

733. McGugan, A., Scott, J.A.B., Univ. of Calgary:
Cretaceous and Tertiary micropaleontology (Foraminifera).

734. Medioli, F., Dalhousie Univ.:
Foraminifra ecology on the Scotian Shelf and other selected areas, 1966-.

Projects include: Sedimentology and stratigraphy of several basins of the Mid-Atlantic Ridge, mianly concerned with the composition of biotic oozes (Foraminifera and Nannoplankton). Subbottom structure of the Bermuda Rise. It is hoped that a continuous seismic survey will reveal the relations between the basaltic substratum and the capping aeolianites (Foramineferа, Nannoplankton, and Ostracode). Subbottom structure, sedimentology and micropaleontology of the Halifax Harbour basin.

735. Morgan, A., Univ. of Waterloo:
Quaternary palaeoecology of Pleistocene deposits in southern Ontario, 1970-.

Re-investigation of the fossil insects (Coleoptera) in the Scarborough Beds to determine: (a) if all the 70 species described by Scudder around 1890 are extinct; (b) palaeoclimate and palaeoecology as shown by the fossil beetles. Examination of the fossil beetles in the Port Talbot sequences on the shores of Lake Erie.

736. Morgan, A., Poplawski, S., Sreenivasa, B.A., Karrow, P.F., Univ. of Waterloo:
Paleontology of Toronto interglacial, 1957-.

Under investigation are the beetles of the Scarborough Formation, and the ostracods, midges and cladoceros of the Don and Scarborough Formations.

737. Noble, J.P.A., Logan, A., Univ. of New Brunswick:
Recent brachiopod morphology and ecology - eastern Canada, 1971-75.

738. Norford, B.S., Geol. Surv. of Can.:
Monograph of brachiopod family Trimerellidae, 1966-73.

739. Perry, D.G., Univ. of Western Ontario:
Age, correlation and faunas of the Delorme Formation, southern and central Mackenzie Mountains, 1971-73; Ph.D. thesis.

740. Petracca, A.N., Gulf Oil Canada Limited:
Tertiary microfauna, Mackenzie Delta area, Arctic Canada.
A microfossil assemblage from the Mackenzie Delta area, Arctic Canada, has been described. Twenty-one species are reported including two new species, Cyclammina arctica and Cyclammina borealis. The microfauna has similarities with Pacific faunas of early Tertiary age. The assemblage seems to indicate an open marine, cold water environment.
The assemblage was recovered from a core cut between 9573 and 9598 feet in a Mackenzie Delta well, and a similar assemblage has been observed in outcrops and subsurface the Arctic Coastal Plains region in Alaska and Northern Canada.

741. Poulton, T.P., Queen's Univ.:
Trigonid pelecypods and their application to solving stratigraphic problems in Jurassic rocks of central British Columbia, 1970-73; Ph.D. thesis.

742. Stearn, C.W., McGill Univ.:
Paleoecology of stromatoporoids of the Devonian System in western Canada.
See Lower and Middle Devonian stromatoporoids from northwest Canada; Geol. Surv. Can., Paper 70-13, 1971.

743. Stearn, C.W., McGill Univ.:
Affinity of the stromatoporoids to living organisms, 1969-72.
See The relationship of the stromatoporoids to the Coelenterata and the Porifera; Geol. Soc. Am., Programs with Abstracts, No. 7, vol. 3, p. 718, 1971.

744. Stearn, C.W., Riding, R.R., McGill Univ.:
Functional morphology of reef-forming organisms, particularly with respect to Millepora in Caribbean reefs, 1970-73.

745. Thusu, B., Univ. of Bristol:
Acritarchs of the Rochester formation in southern Ontario, 1968-72; Ph.D. thesis.
The Rochester Formation yielded an acritarch microflora containing 25 genera and 52 species and varieties. Comparison of the stratigraphically restricted Wenlockian acritarchs in the Rochester Formation in southern Ontario, Buildwas Beds in Shropshire, England, and the Hogklint Shale in Visby, Gotland, suggests that the Rochester microflora had more links with British than with the Baltic microflora. This interpretation supports Owen (1969, Paleontology) who on the basis of Bryozoa distribution believes the British Wenlockian Bryozoa to have some links with the Appalachian but none with the Baltic.

746. Wagner, F.J.E., Bedford Institute:
Pleistocene and Recent molluscs, Beaufort Sea through Lancaster Sound, 1970-72.

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747. Wagner, F.J.E., Bedford Institute:
Benthonic foraminiferida, Beaufort Sea through Lancaster Sound (Pleistocene and recent), 1970-73.

748. Westermann, G.E.G., McMaster Univ.:
Middle Jurassic ammonites of Chilean-Argentine Andes, 1965-73.
The Aalenian-Callovian ammonite assemblages are revised taxonomically and stratigraphically, based on 1964 and 1970 expeditions.

749. Westermann, G.E.G., Chamberlain, J.A., McMaster Univ.:
Flow dynamics of the ectocochliate cephalopod shell, 1970-72.
Flow visualization techniques are being used to evaluate the drag contributions of individual contributions of coiled cephalopod shells. Emphasis is placed upon the effect of shell form on boundary layer separation, umbilical turbulence, and turbulence in the wake. Analysis of the dynamic significance of common cephalopod sculptural features forms an integral part of this work.

750. Westermann, G.E.G., Hall, R.L., McMaster Univ.:
Classification and distribution of the Jurassic ammonites Stephanoceratidae, 1971-73; Ph.D. thesis (Hall).
A taxonomic revision of the worldwide family, based on collections mainly from the Queen Charlotte islands and Chile. While concentrating on East Pacific assemblages, worldwide distribution patterns will be considered. Detailed morphogenetic studies are expected to give evidence for several sexual-dimorphic pairs and result in simplification of the present classification.

751. Westermann, G.E.G., Verma, H.M., McMaster Univ.:
Upper Jurassic ammonites of Sierra Catorce, Mexico, 1968-72; Ph.D. thesis (Verma).
The Kimmeridigan-Tithonian ammonite assemblages of Sierra Catorce, San Luis Potosi Province, are revised taxonomically and stratigraphically, based on extensive new collections. The current classification is simplified and strong faunal affinities to the Argentine Andean area are indicated.

752. Westermann, G.E.G., Vicencio, R., McMaster Univ.:
Mathematical models for coiled molluscan shells, 1968-72; Ph.D. thesis (Vicencio).
Using a previously developed descriptive model for molluscan shells, based on the harmonic analysis of the cross-sectioned shape, a morphogenetic model is being developed. It consists essentially of solving the Laplace equation for diffusion with a linear sink along the growing edge of the shell, with different boundary conditions dictated by diffusion rates, growth intervals and length of the mantle. See Form, structure and function of shell and siphuncle in coiled Mesozoic ammonoids; Royal Ontario Mus., Life Sci. Cont., vol. 78, 1971.

Paleobotany

753. Barss, M.S., Geol. Surv. of Can.:
Palynological zonation of the Carboniferous and Permian rocks of Atlantic Provinces, Gulf of St. Lawrence and northern Canada, 1971-.
Seven miospore zones can be recognized, ranging in age from Mid-Devonian to possible early Visean within the Horton Group of the Atlantic Provinces.

754. Berti, A.A., Univ. of Western Ontario:
Paleobotanic investigation of Mid-Wisconsin interstadial deposits in the Lake Erie and Ontario basins, 1966-71; Ph.D. thesis.

755. Brideaux, W.W., McIntyre, D.J., Geol. Surv. of Can.:
Taxonomy, biostratigraphy and paleoecology of Mesozoic miospore and microplankton assemblages from western and northwestern Canada, 1971-.
See Recurrent species groupings in fossil microplankton assemblages; Palaeoclim. Palaeogeogr. Palaeoecol., vol. 9, pp. 101-122, 1971. Palynology of the Lower Colorado Group. I. Introductory remarks, geology, and microplankton studies; Palaeontographica, vol. 122, Abt. B, 1971.

756. Brideaux, W.W., Williams, G.L., Geol. Surv. of Can.:
Palynology of shallow core holes, Grand Banks, Newfoundland, 1970-71.

757. Hills, L.V., Sweet, A.R., Johnson, C., Anderson, B., Christiansen, O., McLaren, P., Univ. of Calgary:
Pleistocene and palynological research.
Projects include: palynology, paleobotany, and sedimentology of the Beaufort Formation, Arctic Canada, megaspores from the Upper Devonian, Banks Island, Arctic, Canada; Jurassic dinoflagellates from Arctic Canada; and the origin and evolution of Azolla. See Fossil mosses, Beaufort formation (Tertiary), northwestern Banks Island, western Canadian Arctic; Can. J. Botany, vol. 49, No. 7, pp. 1089-1094, 1971.

758. McGregor, D.C., Geol. Surv. of Can.:
Devonian plant microfossils of eastern Canada, 1962-77.

759. McIntyre, D.J., Chevron Standard Ltd., Calgary:
Mesozoic and Tertiary palynology, 1966-.

760. Mott, R.J., Geol. Surv. of Can.:
Palynological studies, central Saskatchewan, 1965-72.
See Radiocarbon dates from Saskatchewan; Geol. Surv. Can., Paper 71-1, pt. B, pp. 126-128, 1971.

761. Mott, R.J., Lichti-Federovich, S., Geol. Surv. of Can.:
Quaternary palynology, 1969-.
Palynological studies of late sediment cores from New Brunswick and of buried organic deposits in Cape Breton Island, Nova Scotia; palynological investigations of six Old Crow River sections in Yukon Territory and

megafossil analysis of the Watino section of mid-Wisconsin age in Alberta. See Palynology of a buried organic deposit, River Inhabitants, Cape Breton Island, Nova Scotia; Geol. Surv. Can., Paper 71-1, pt. B, pp. 123-125, 1971. Postglacial history and palynology of Sable Island, Nova Scotia; Geoscience and Man, vol. III, pp. 17-28, 1971.

762. Riding, R., McGill Univ.:
Calcareous algae from the Ancient Wall reef complex (Upper Devonian) at Mount Haultain, Alberta, 1970-72.
A variety of fossils generally referred to the calcareous algae occur at the southern margin of the Ancient Wall complex. Several of them are associated with stromatoporoid bioherms. They are long-ranging taxa and comparative material from the lower Paleozoic is also being examined.

763. Van Helden, B.G.T., Chevron Standard Ltd., Calgary:
Mesozoic palynology, 1971-.

764. Walton, H.S., Chevron Standard Ltd., Calgary:
Paleozoic palynology, 1966-.

Vertebrate

765. Brantley, A., Royal Ontario Museum:
Osteology and restoration of Eremotherium remains from the Pleistocene of Georgia, U.S.A., 1970-73.

766. Broad, D.S., Univ. of Bristol:
Siluro-Devonian Heterostraci from Somerset and Prince of Wales Islands, Northwest Territories, 1968-72; Ph.D. thesis.
A review of the family Traquairaspididae is in preparation.

767. Carroll, R.L., Reisz, R., Heaton, M., McGill Univ.:
Origin and early diversification of reptiles, 1963-75.
1. Preparation, illustration and description of Pennsylvanian and Permian members of the family Romeriidae, which includes the most primitive true reptiles and the ancestors of all higher reptiles, birds and mammals. Description of other Paleozoic reptiles, including the family Bolosauridae, of disputed taxonomic position. Specimens of these groups are currently under study. 2. Comparison of stem reptiles with early members of advanced reptilian lineages. This will require borrowing specimens from other institutions, as well as visits to collections in the United States, Great Britain, South Africa and Russia. 3. Collection and preparation of fossils of known Pennsylvanian and Mississippian localities, which might include early reptiles or their relatives among the Amphibia. Considerable material has already been collected, but awaits preparation. Prospecting in poorly known areas of Carboniferous strata which might

yield terrestrial vertebrates. See A Captorhinomorph reptile from the Lower Permian of Europe; J. Palaeontology, vol. 45, No. 3, pp. 450-463, 1971.

768. Dineley, D.L., Loeffler, E., Univ. of Bristol:
Siluro-Devonian Heterostraci from Somerset and Prince of Wales Islands and Mackenzie Mountains, Northwest Territories, 1968-.; Ph.D. thesis (Loeffler).
From Somerset and Prince of Wales Islands the material being studied includes Ctenaspis, Cephalaspids, Weigeltaspis and several new genera. The material from the Delorme Formation of the Mackenzie Mountains include Gathaspidids, Traquairaspidids, Pteraspidids and several new and problematic vertebrate taxa.

769. Edmund, A.G., Royal Ontario Museum:
Phylogeny, osteology and distribution of South American Pleistocene Xenarthra, 1959-.

770. Greiner, H.R., Univ. of New Brunswick:
Paleoecology of the Albert (Mississippian) palaeoniscids, New Brunswick, 1958-72.

771. Karrow, P.F., Univ. of Waterloo, Churcher, C.S., Univ. of Toronto:
Vertebrate paleontology of Hamilton Bay, Ontario, 1958-73.

772. Russell, L.S., Royal Ontario Museum:
Tertiary mammals of Saskatchewan. Part III. The Oligocene fauna: Perissodactyla and Artiodactyla, 1954-72.

General

773. Bartlett, G.A., Slessor, D.K., 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 shell morphology to environment and diagenetic processes is an important aspect of this investigation.

774. Clark, D.F., Bedford Institute:
Paraecological studies on living Foraminifera, 1969-71.
See Effects of aquaculture outfall in Benthonic Foraminifera in Clam Bay, Nova Scotia; Maritime Sediments, vol. 7, No. 2, (1971), pp. 76-84, 1972.

775. Clark, D.F. Bedford Institute:
Nannofossil study on Mid-Atlantic Ridge, 1971-72.

PALEONTOLOGY

776. Cooke, H.B.S., Dalhousie Univ.:
Long term study on the stratigraphy, faunal succession and environment of deposits in central and southern Africa that have furnished remains of early man, 1938-.
It is planned to spend the whole of the summer of 1972 in Africa and part of the summer of 1973. The study has shown the need for comparisons with Indian material and a visit to India in 1973 may be necessary. Pleistocene studies within Nova Scotia are planned for 1972-74.

777. Greiner, H.R., Univ. of New Brunswick:
Recent tracks and borings in littoral zones near St. Andrews, New Brunswick, including Spio setosa and Glycera dibranchiata, 1969-74.

778. Greiner, H.R., Univ. of New Brunswick:
Trace fossils from northern New Brunswick strata, including dalmanitid trails and Zoophycus sp., 1969-74.

779. Risk, M.J., McMaster Univ.:
Effect of substrate rugosity on development of colonizing marine communities, 1970-73.
Artificial settling plates will be made from a cold-cure acrylic plastic, allowing many duplicates to be cast from one master mold. These will be placed underwater for varying periods of time, and the settling communities evaluated.

780. Risk, M.J., McMaster Univ.:
Downslope transport of shells of intertidal organisms, 1971-72.
This study is an attempt to evaluate the relative contribution of the hard parts of the intertidal fauna to the sediment, in a limited area of predominantly carbonate composition. Samples of the intertidal fauna and the bottom sediment to a depth of 60 feet were taken at Bird Rock, Santa Catalina Island, California.

781. Schafer, C.T., Bedford Institute:
Ecology of nearshore benthonic Foraminifera, 1967-.
See Studies of benthonic Foraminifera in the Restigouche Estuary: 1. faunal distribution patterns near pollution sources; Maritime sediments, vol. 6, No. 3, (1970), pp. 121-134, 1971.

782. Vilks, G., Bedford Institute:
Ecology of planktonic Foraminifera in the Atlantic Ocean, latitude 50°N-55°S, longitude 10°W-69°W, 1967-72; Ph.D. thesis.
To associate foraminiferal faunas with water masses, recognized by physical methods. See Winter distribution of planktonic Foraminifera between the Grand Banks and the Caribbean; Micropaleontology, vol. 17, No. 1, pp. 31-42, 1971.

783. Vilks, G., Bedford Institute:
Ecology of planktonic Foraminifera in the Canadian Arctic Archipelago, 1968-72.
To determine the present oceanic influence and any changes in the environment during Holocene.

784. Walker, D.A., Bedford Institute:
Investigation of the biology and micro-ecology of benthonic foraminiferida indigenous to Nova Scotia and Bermuda, 1969-.
A continuous observation of growth and development of a population of several benthonic species to determine characteristic life cycles. Several cultures are being maintained in the laboratory for this investigation.

785. Walker, D.A., Vilks, G., Bedford Institute:
Investigation of test ultrastructure of the Foraminiferida by scanning electron microscopy.
Investigation of spine and pore structure and their function in selected species of planktonic Foraminifera and the ultrastructure of inigenous benthonic species of Foraminifera. See Etching of the test surface of benthonic foraminifers due to ingestion by the gastropod Littoria Linné; Can. J. Earth Sci., vol. 8, No. 11, pp. 1487-1491, 1971.

PETROLOGY AND PETROGRAPHY

British Columbia

786. Clark, T., Carmichael, D.M., Queen's Univ.:
Geology of the Turnagain River, British Columbia, ultramafic intrusion, 1970-74; Ph.D. thesis (Clark).
One of a number of ultramafic and mafic bodies located near the Nahlin fault of northern British Columbia.

787. Fawcett, J.J., Univ. of Toronto:
Petrological studies of Tertiary basalts from British Columbia, 1968-74.

788. Ghent, E., Jones, J.W., Miller, B., Univ. of Calgary:
Petrologic and geochemical studies in the Cordillera and electron microprobe study of minerals.
Petrology, mineralogy and geochemistry of metamorphic rocks in the Esplanade Range and Dogtooth Mountains, British Columbia, and metamorphism of siliceous carbonates in the Kootenay Arc; burial metamorphism in the Mesozoic of western Alberta; and techniques for the analysis of minerals by electron microprobe. See Zoned marganite from the Badshot Formation (Cambrian) near Kaslo, British Columbia; Can. J. Earth Sci., vol. 8, pp. 1145-1147, 1971.

789. Gilman, R.A., Price, R.A., Queen's Univ.:
The Clachnacuddain salient of the Shuswap metamorphic complex, 1971-72.
An investigation of the structural and petrologic relationships between the granitic gneisses and enveloping metasedimentary rocks in the area east of Revelstoke, British Columbia.

790. McTaggart, K.C., Greenwood, H.J., Read, P.B., and students, Univ. of British Columbia:
Ultramafic rocks of British Columbia and adjacent areas, 1971-.
Project will include field and laboratory studies of fresh, serpentinized, and metamorphosed bodies. Laboratory work will include high T-P synthesis of minerals found in ultramafic rocks. Attempts will be made to relate these rocks to the thermal and tectonic framework of Western North America and to plate tectonics and the development of the Cordillera.

791. Northcote, K.E., British Columbia Dept. of Mines and Petroleum Resources:
An investigation of intrusive and extrusive igneous processes, evolution of magmas and the relationship of intrusive and extrusive processes to mineralization on Vancouver Island, British Columbia, 1971-.

Manitoba

792. Bailes, A.H., Manitoba Dept. of Mines, Resources and Environmental Management:
Metamorphic and deformational history of the File - Morton - Woosey Lakes area, Manitoba, 1970-72.
A detailed geological study of a small area straddling the contact between two major Precambrian lithologic units, the Flin-Flon-Snow Lake greenstone belt and the Kisseynew sedimentary gneiss belt. To outline the metamorphic and deformational events which have affected this area, and to establish the relationship between these two major Precambrian lithologic and tectonic units.

793. Cerny, P., Turnock, A.C., Ferguson, R.B., Univ. of Manitoba:
Mineralogy and petrology of pegmatites, 1971-.
Mineralogical, geochemical, and petrological study of pegmatites. Pegmatite types in southeastern Manitoba, their genetic linkage, crystallization conditions, and economic potential. General pegmatite petrology based on rock-forming minerals, and on the behaviour of rare elements. See Niobium-tantalum minerals from granitic pegmatites at Greer Lake, southeastern Manitoba; Can. Mineralogist, vol. 10, pt. 5, pp. 755-772, 1971. Graphic intergrowths of feldspars and quartz in some Czechoslovak pegmatites; Contr. Mineral. Petr., vol. 30, 1971.

794. Edgar, A.D., Marshall, P.A., Univ. of Western Ontario:
K/Rb ratios in coexisting feldspars and micas from the Bernic Lake Li-bearing pegmatite, southeastern Manitoba, 1969-72; M.Sc. thesis (Marshall).

795. McRitchie, W.D., Baldwin, D.A., Frohlinger, T.G., Manitoba Dept. of Mines, Resources and Environmental Management:
Burntwood project, 1971-74; Ph.D. theses.
Regional geological mapping of the upper amphibolite facies metasedimentary gneiss associations in the Nelson House-Pukatawagan region is being conducted as a preliminary to more intensive studies on sedimentation, structure and metamorphism that will eventually lead to a correlation between the geology in the Lynn Lake, Flin-Flon and Thompson regions, northern Manitoba. See Burntwood project: Manitoba Mines Br., Geol. Paper 6/71, pp. 20-45, 1971.

796. Scoates, R.F.J., Trueman, D.L., Macek, J.J., Manitoba Dept. of Mines, Resources and Environmental Management:
Ultramafic rocks project, 1969-73.
See Ultramafic rocks of the Rice Lake greenstone belt; Manitoba Mines Br. Publ. 71-1, pp. 189-201, 1971. A description and classification of Manitoba ultramafic rocks; Geol. Assoc. Can., Sp. Publ. No. 9, pp. 89-96, 1971. Ultramafic rocks project; Manitoba Mines Br., Geol. Paper 6/71, 1971. Geology of the Bird River sill; Manitoba Mines Br., Prel. Map, 1971, A-1.

New Brunswick

797. Martin, R.F., White, M.V., McGill Univ.:
The origin of non-orogenic gabbro-granite and basalt-rhyolite associations, 1971-73; M.Sc. thesis (White).
Under investigation are the Devonian Welsford complex, Nerepis Hills, New Brunswick and the Proterozoic Aillik complex south of Kaipokok Bay, Labrador.

798. Rast, N., Grant, R., Wardle, R., Univ. of New Brunswick:
Structural project across the Caledonian-Appalachian intercontinental orogenic belt, 1971-74.
To establish the general chronological petrologic and structural relationships in specific orogenic profiles in New Brunswick and to test their pre-Tertiary drift correlation with Europe, U.S.A. and Mexico. Parallel scaled model studies would be used to examine the dynamic processes responsible for the formation of the orogenic belt.

Newfoundland and Labrador

799. Bachinski, D.J., Univ. of New Brunswick:
Sulphur isotopic composition of cupriferous iron sulphide deposits associated with volcanic rocks, Notre Dame Bay, Newfoundland, 1965-71.

800. Hughes, C.J., Memorial Univ.:
Granites and volcanic rocks of eastern Newfoundland, 1966-.
See Metasomatism in the Late Precambrian Bull Arm Formation; Proc. Geol. Ass. Can., vol. 24, pp. 85-93, 1971.

801. Kennedy, M.J., Memorial Univ.:
Metamorphic rocks of the Grand Lake - Deer Lake region, Newfoundland, and their relationship to the Cambro-Ordovician shelf sequence, 1971-73.

802. Martin, R.F., White, M.V., McGill Univ.:
The origin of non-orogenic gabbro-granite and basalt-rhyolite associations, 1971-73; M.Sc. thesis (White).
Under investigation are the Devonian Welsford complex, Nerepis Hills, New Brunswick and the Proterozoic Aillik complex south of Kaipokok Bay, Labrador.

803. Papezik, V.S., Memorial Univ.:
Petrology and geochemistry of the Late Precambrian Harbour Main Group, Avalon Peninsula, Newfoundland, 1969-.
The predominantly volcanic Harbour Main Group of Proterozoic age forms a northerly-trending belt 20 miles wide on the Avalon Peninsula of Newfoundland. The rocks range from basalts to soda rhyolites. Most of the rocks are dominantly sodic; the basalts show an alkalic affinity. Investigation is now concentrated on the basalts of the western flank of the belt.

804. Papezik, V.S., Nixon, G.M., Memorial Univ.:
Petrology of Late Precambrian ignimbrites on the Avalon Peninsula, Newfoundland, 1969-73; M.Sc. thesis (Nixon).
Well-preserved Proterozoic ignimbrites, part of the Harbour Main Group, form several northerly-trending belts on the Avalon Peninsula of Newfoundland. The rocks are dominantly sodic, with abundant albite phenocrysts. The ignimbrite sheets have steep dips and are broken into a series of fault blocks. Their mineralogy, chemistry, structure and provenance are now under investigation.

805. Singh, S.K., Univ. of Ottawa:
Petrology of the Joan Lake agpaitic pluton, central Labrador, 1969-72; Ph.D. thesis.
Pluton is composed of two main rock suites: 1) ijolite-urtite; 2) lujavrite-naujaite-kakortokite. Naujaite and kakortokite commonly contain essential amounts of aenigmatite. The complex is enriched in Zr, Nb, Ti, RE, Th, Pb. Surrounding these igneous rocks is a broad zone (40 sq. miles total area) of fenitization characterized by aegirine and soda amphiboles and with abnormally high concentrations of Be, Nb, Ba, Ti, RE, Th, Zn.

806. Strong, D.F., Malpas, J.G., Kean, B.F., Thurlow, J.G., Norman, R.E., Memorial Univ.:
Petrology and petrogenesis of Newfoundland mafic and ultramafic rocks, 1970-; M.Sc. thesis.

Northwest Territories

807. Clarke, D.B., Dalhousie Univ.:
Petrology and geochemistry of Tertiary volcanics of the Davis Strait area and their relation to continental drift, 1970-.
Study is now expanded into the submarine rocks of Davis Strait in order to trace the petrochemical evolution of an aseismic ridge and into the rocks of Ubekendt Island, West Greenland in order to trace the history of magnetic evolution in a single locality. Other research projects include: phase relations in pyroxenes; concentration gradients in natural glasses; melting experiments on picritic rocks; and petrogenesis of spilites.

808. Kamineni, D.C., Univ. of Ottawa:
Petrology and geochemistry of some metamorphic rocks near Yellowknife, District of Mackenzie, Northwest Territories, 1969-72; Ph.D. thesis.

PETROLOGY AND PETROGRAPHY

Nova Scotia

809. Colwell, J.A., Acadia Univ.:
Petrology and geochemistry, Triassic basalts of Nova Scotia, 1969-72.
Samples have been collected to determine chemical variation within and among flows (differentiation) as well as regional variation in identifiable units. Analyses for most major and several minor elements are nearly complete. Results to date indicate significant differentiation only in the thick (250 feet) lower unit, marked especially by variation in Mg and Cr. Copper, of interest because of minor (about 1000 ppm) native copper occurrences, shows erratic high concentrations in a few samples.

810. Linthorne, G.E., Acadia Univ.:
Structure and metamorphism in Meguma Group (Ordovician) sediments, Shelburne, Nova Scotia, 1971-72; M.Sc. thesis.
A detailed mapping and petrologic study is in progress to determine the relation of folding and faulting to metamorphism and to explain metamorphism in terms of orogeny, structural development, and emplacement of Devonian granite.

811. Muecke, G.K., Dalhousie Univ.:
Investigations of a detailed history of thermal events for the low pressure metamorphic complex of pre-Mesozoic, mainland Nova Scotia, 1970.
Petrochemical, isotopic and magnetic studies are in progress: delineation of metamorphic zones in the Meguma Group and White Rock Formation; detailed studies of metamorphic reactions at the isograds and their relation to Nova Scotia granites and ore deposits; magnetic properties of these rocks and the mineralogy of their magnetic phases in order to determine the manner in which they change in response to increases in metamorphic grade; studies on the suitability of whole-rock K/Ar slate ages in dating regional metamorphic events and the thermal stability of slate ages; systematic investigations of problems in the microprobe analysis of phyllosilicates.

812. Sherwood, H.G., Davis, J.D., Nova Scotia Technical College:
Evaluation of mafic intrusive rocks in the Chedabucto Bay-St. Peters Bay area of Nova Scotia, 1971-72.
An aeromagnetic-geologic compilation investigation at 1 inch to 8 miles indicated some interesting trends and patterns for the mafic rocks in the Chedabucto Bay area of Nova Scotia. Follow-up petrological and rock geochemical studies on a number of exposures of mafic rocks of poorly-defined composition (gabbroic to diabasic) at the eastern end of the Minas Basin-Chedabucto Bay fault zone is underway to classify and evaluate these igneous rocks.

813. Smith, T.E., Univ. of Windsor:
Oxygen gradient in the Nova Scotia granitic batholith, 1970-72.

814. Smith, T.E., Univ. of Windsor:
Geology and geochemistry of the granitic rocks of southwestern Nova Scotia, 1970-.

Ontario

815. Appleyard, E.C., Univ. of Waterloo:
Geology of the Reid Lake - Rosenthal Nepheline - Corundum Belt, Renfrew County, Ontario, 1969-72.
Study combines mineralogical, structural and geochemical approaches to the history of the alkaline gneisses, unravelling the phases of diastrophism, metamorphism and magmatism.

816. Ayres, L.D., Ontario Dept. of Mines and Northern Affairs:
Early Precambrian volcanism and sedimentation, Lake Superior Provincial Park, Ontario, 1961-72.

817. Ayres, L.D., Ontario Dept. of Mines and Northern Affairs:
North Trout Lake batholith, Ontario, 1965-74.
A petrologic and geochemical study of a composite Early Precambrian, granitic batholith.

818. Ayres, L.D., Ontario Dept. of Mines and Northern Affairs:
Gamitagama Lake Complex, Ontario, 1967-74.
Petrographic and geochemical study of a differentiated calc-alkaline stock.

819. Card, K.D., Ontario Dept. of Mines and Northern Affairs.
Pattison, E.F., International Nickel Co.:
Nipissing diabase of the Southern Province, Ontario, 1970-72.
Geological relationships, petrology, and metallogenesis of the early Proterozoic tholeiitic diabase of the eastern Southern Province. See Nipissing diabase of the Southern Province, Ontario; Geol. Assoc. Can. - Mineral Assoc. Can., Annual Meeting Abstract, 1971.

820. Carmichael, D.M., Queen's Univ.:
Metamorphic studies in the greenschist and amphibolite facies, Hastings and Peterborough Counties, Ontario, 1967-72.
Field, petrographic, and chemical work is continuing in the biotite and garnet zones in Lake twp., Hastings County where a complex grid of intersecting isograds in the system SiO_2-Al_2O_3-(Mg, Fe) O-CaO-Na_2O-H_2O-CO_2 is superbly developed. Elucidation of the many metamorphic reactions that may lead to the prograde appearance of hornblende and of oligoclase will help to clarify the relationship between greenschist and amphibolite facies.
Several computer programs have been developed to aid in calculating the coefficients of reactions and in plotting their isobaric equilibrium curves as a function of temperature and mol fraction of CO_2 in the hypothetical vapour phase.

PETROLOGY AND PETROGRAPHY

821. Clifford, P.M., McMaster Univ.:
Physical nature of Archean volcanic activity, 1967-.
See Evolution of Mt. St. Joseph - an Archaean volcano; Can. J. Earth Sci., vol. 8, No. 1, pp. 150-161, 1971.

822. Davies, J.F., Brown, D.S., Laurentian Univ.:
Petrology and geochemistry of rocks enclosing the McIntyre disseminated copper deposit, 1971-73; M.Sc. thesis (Brown).
The Pearl Lake "porphyry" is a quartz-sericite schist, in large part carbonatized and commonly pyritized. There is little or no evidence of primary texture or original mineralogy.
Gradational contacts, widespread alteration, lack of primary phenocrysts and, on the contrary, the presence of metacrysts cast doubt on the intrusive and porphyritic nature of the body. Rather, the Pearl lake rocks represent a structurally controlled pipe of widespread metasomatism to which are genetically related both the contained disseminated copper deposit (with its own particular phases of alteration) and the peripheral gold-bearing quartz veins in the adjacent carbonatized volcanic rocks.

823. Douglas, G., Burley, B.J., McMaster Univ.:
Examination of scapolite petrogeneses of Ontario, 1971-73.

824. Durocher, M., Univ. of Ottawa:
Mineralogy and petrology of the Bryson gabbroic pluton, 1971-73; M.Sc. thesis.

825. Edgar, A.D., Duke, N., Univ. of Western Ontario:
Petrology and geochemistry of the Blue Mountain litchfieldite and associated rocks, Peterborough County, Ontario, 1971-73; M.Sc. thesis (Duke).

826. Fabbri, A., Univ. of Ottawa:
Structure and texture of gneisses near Sparrow Lake, Muskoka area, Ontario, 1968-73; Ph.D. thesis.

827. Herdman, D., Burley, B.J., McMaster Univ.:
Petrology of selected portion of the Port Coldwell Intrusion, Marathon, Ontario, 1971-73.
A number of rock types are present in the intrusion, probably the largest single alkaline intrusion in Canada and one of the largest in the world, and the genetic significance of the spatial relationships in not understood.

828. Loubat, H., Lakehead Univ.:
Petrology of ophiolites from northwestern Ontario greenstone belts; the Coldwell syenitic complex; and igneous rocks from the Mid-Atlantic Ridge, 1969-.
See The Mid-Atlantic Ridge near 45°N serpentinized ultramafic intrusions; Can. J. Earth Sc., vol. 8, No. 6, pp. 631-663, 1971.

829. McNutt, R.H., Mummery, R.C., McMaster Univ.:
The origin of coronite garnet amphibolites adjacent to the Whitestone anorthosite, Parry Sound, Ontario, 1969-72; Ph.D. thesis (Mummery).
The coronite amphibolites are believed to be produced in the contact aureole of the intruding Whitestone anorthosite. A corona of plagioclase is developed around garnet porphyroblasts. At the same time pargasitic amphibole is breaking down to form clinopyroxene. These reactions are being studied by means of electron probe analysis. See Coronite smphibolites in the Whitestone Area, Parry Sound; Geol. Assoc. Can. - Mineral Assoc. Can., Abstract Annual Meeting, 1971.

830. Moore, J.M., Thompson, P.H., Hutcheon, I.E., Carleton Univ.:
Petrology and structure of metamorphic rocks, Grenville Province, eastern Ontario, 1960-72.
Studies are mainly restricted to the metamorphic belt extending northeastward from Madoc, Ontario, toward Ottawa. Detailed mapping by Moore and Thompson has confirmed the existence of the Flinton Group, a mainly clastic, metasedimentary sequence unconformably overlying plutons and older layered rocks of the Grenville Supergroup. Studies are directed to solving the structural pattern and understanding the metamorphic zoning in pelitic and impure calcareous rocks. Electron probe analyses of minerals and algebraic methods of representing multicomponent systems are being used to study the petrology. Hutcheon is studying the tremolite isograd in siliceous dolomitic marbles of the Flinton Group and older rocks. Index minerals in the pelites include chloritoid, staurolite, kyanite and sillimanite; in the calcareous psammites, actinolite, epidote, and diopside.

831. Naldrett, A.J., Gasparrini, E.L., Univ. of Toronto:
Petrology of the Sudbury nickel irruptive, 1967-72.

832. Naldrett, A.J., Peredery, W., Univ. of Toronto:
Study of rocks between the Sudbury nickel irruptive and the overlying Onaping Formation, 1968-72; Ph.D. thesis (Peredery).

833. Sampson, G.A., Fawcett, J.J., Univ. of Toronto:
Petrology of volcanic and pelitic rocks from the Madoc area of southeastern Ontario, 1967-72; Ph.D. thesis (Sampson).

834. Stevenson, J.S., McGill Univ.:
Strontium isotope abundance, electron probe and chemical studies bearing on the petrogenesis of the granophyre (micropegmatite) and the Onaping Formation, Sudbury, Ontario, 1970-73.

PETROLOGY AND PETROGRAPHY

835. Van Schmus, W.R., Card, K.D., Ontario Dept. of Mines and Northern Affairs:
Radiometric age and petrology of granitic rocks beneath the Paleozoic cover of Manitoulin Island, 1970-72.
Samples of granitic rocks from beneath the Paleozoic cover of Manitoulin Island recovered by drilling are being analyzed petrographically, chemically, and by Rb-Sr radiometric methods.

Quebec

836. Beland, R., Seguin, M.K., Beland, M., Laliberte, L., Univ. de Laval:
Pétrographie et géochimie d'une bande de rhyolite située dans le canton Malartic, Québec, 1970-72.
La "rhyolite" forme le sommet du groupe Blake River. La section échantillonnée, continue sur 800', traverse le contact présumé Blake River - Cadillac. 1. Résultats accumulés à date: a) Pétrographie - René Béland - 50 lames minces. Sept unités litho-stratigraphiques. La rhyolite (porphyre à quartz-albite) occupe la moitié centrale. Le métamorphisme est isochimique. b) L'unité "porphyre" tranche nettement sur les autres unités lithologiques, mais les distinctions entre ces dernières sont floues. c) L'unité "porphyre" se distingue par des teneurs plus constantes et plus basses. 2. Travaux en coursé. Analyses chimiques complètes des échantillons traités pour Cu, Ni, Zn. But: évolution des tufs acides - intermédiaires, déceler les changements de composition à travers l'unité "porphyre".

837. Bouillon, J.J., Univ. de Montréal:
Etude structurale et pétrographique de la couverture nord de l'Anorthosite de Morin, 1970-72; thèse de maîtrise.
La couverture nord de l'Anorthosite de Morin, située dans la région de St-Donat, est composée de roches métamorphiques du facies granulite. Lors de cette étude, nous examinerons l'allure du contact entre l'intrusif anorthositique et les roches métamorphiques adjacentes, les effets du métamorphisme de contact et ceux du métamorphisme régional sur cette couverture.

838. Darling, R., Gélinas, L., Campiglio, C., Guha, J., Ecole Polytechnique:
La pétrologie et la géochimie du batholithe Bourlamaque: développement d'une méthode de prospection, 1967-73; thèse de doctorate (Campiglio).

839. Dimroth, E., Ministère des Richesses Naturelles du Québec:
Facies types and environmental interpretation of iron formation, central Labrador trough, 1970-73.

840. Goldie, R.J., McGill Univ.:
A detailed petrologic and geochemical study of an 18 foot thick sill near Montréal, 1970-72; M.Sc. thesis.

841. Hocq, M., Univ. de Montréal:
Etude géologique (tectonique, métamorphique) des anorthosites et syenites du Réservoir Tipmuaian, 1969-72; thèse de maîtrise.

842. Hogarth, D.D., Univ. of Ottawa:
Igneous rocks of the southern Gatineau Region, 1960-.
Investigation of possible meta-andesites and meta-basalts; meta-diorite and meta-gabbro; granite pegmatites and aplites; syenite; and carbonatites.

843. Martignole, J., Univ. de Montréal:
Etudes petrographiques et structurales dans le Sud de la province de Grenville, 1965-.

844. Nixon, C., Univ. of Ottawa:
Study of a diabase dike in Gatineau Park, Quebec, 1967-72; M.Sc. thesis.

845. Sempels, Jean-Marie, Univ. of Ottawa:
A textural study of the Mt. Johnson pluton, Quebec, 1971-73.

846. Valiquette, G., Pouliot, G., Ecole Polytechnique:
Pétrologie des granites d'importance économique: Les granites à molybdène, 1969-72.

847. Williams-Jones, A.E., Carmichael, D.M., Queen's Univ.:
Metamorphic equilibria in the contact aureole of Mount Royal, Quebec, 1969-72; Ph.D. thesis (Williams-Jones).

General

848. Aumento, F., Dalhousie Univ.:
Detailed geological investigation of the oceanic crust, 1969-.
1. Elucidation of the tectonic and igneous cycles on the axes of mid-oceanic ridges: layered intrusions, differentiation, ultramafic intrusions, and the subsequent metamorphism, metasomatism and weathering effects of these rocks. 2. Establishment of set of criteria for the identification of ancient oceanic crusts on the continents. 3. Measurement of the geometric shape and dimension of igneous material which produces magnetic anomalies on the ocean floor, and correlation of measured polarities with anomalies. 4. Use of fission tracks as an absolute dating method, and for the analytical in-situ determination of uranium and thorium in rocks and minerals.

849. Bachinski, D.J., Univ. of New Brunswick:
Fabric changes in sulphide aggregates, 1970-73.
Textural changes in sulphide aggregates will be studied both in the field and through heating experiments.

PETROLOGY AND PETROGRAPHY

850. Bachinski, D.J., Univ. of New Brunswick:
Compositional variations in naturally occurring ferromagnesian silicate minerals in metamorphosed sulphide ore deposits, 1967-72.

851. Clifford, P.M., McMaster Univ., Walker, G.P.L., Imperial College:
Recent ignimbrites of central Italy: distribution, variation, and genesis, 1971-74.

852. Fawcett, J.J., Ruckling, J.C., Gasparnini, E.L., Univ. of Toronto:
Petrological studies of east Greenland basalts, 1967-72.

853. Kliske, A.E., Chevron Standard Ltd., Calgary:
Clastic rock petrography, 1971-.

854. Krausz, K., Univ. of Ottawa:
Diffusion in muscovite, 1969-72; M.Sc. thesis.

855. Naldrett, A.J., Arndt, N.T., Univ. of Toronto:
Study of Archean ultramafic rocks and associated nickel deposits, 1969-75; Ph.D. thesis (Arndt).

856. Naldrett, A.J., Mainwaring, P., Univ. of Toronto:
Study of relations between sulfides and silicates in a portion of the Duluth gabbro, 1968-72; Ph.D. thesis (Mainwaring).

857. Randall, J.A., Univ. of Saskatchewan:
Petrology of ore deposits in the Precambrian Shield and environs, 1971-75; Ph.D. thesis.

858. Vecsey, G.E., Gulf Oil Canada Limited:
Diagenesis and porosity in carbonate rocks.
The development of porosity in carbonate rocks by diagenesis is being investigated by means of petrographic studies of recent sediments from known sedimentary environments and from rocks of analogous environments. The role of diagenetic processes such as cementation, leaching, replacement and compaction that can enhance or destroy original porosity is being studied and related to the interpreted depositional environments.

859. Watkinson, D.H., Carleton Univ.:
Relation of ore deposits to intrusive igneous complexes, 1968-.
Two papers on the field and chemical aspects of this type of mineralization at Prairie Lake and Township 107/108, Ontario, are in preparation.

860. Wilson, H.D.B., Ramlal, K., Univ. of Manitoba:
Composition of magmatic types in the Canadian Shield, 1960-.
The compositions of various magmatic bodies are being determined and related to the stages of a eugeosynclinal cycle.

861. Wynne-Edwards, H.R., Neilson, M.J., Z.-ul Hasan, Oliver, R.L., Weir, M.Ann, LeAnderson, P.J., Tremblay, P., Karvinen, W.O., Allen, J., Bourne, J., Pirie, J., Queen's Univ.:

Geology of the Grenville Province, 1967-; graduate thesis.

The Grenville province is the southeastern part of the Canadian Shield with K/Ar ages of approximately 950 m.y. Investigation is underway of its tectonics, structure, petrology, mineralogy, and stratigraphy at all scales. Broad patterns of tectonic significance are apparent, for the terrain is one in which pre-orogenic crystalline basement representing the reworked equivalents of older provinces to the northwest is widely exposed. This has far reaching implications for the evolution of the continental crust, and the process of deep-seated deformation. See Plutonites, gneisses and granulites of the granulite facies; Freiberger Forschungshefte, Leipzig, vol. c. 268, pp. 11-24, 1971.

QUATERNARY GEOLOGY

Alberta

862. Bayrock, L.A., Research Council of Alberta:
Surficial geology of the Edmonton area, N.T.S. Sheet 83H, Alberta, 1958-72.
Expected that the map will be published by the end of 1972.

863. Bayrock, L.A., Research Council of Alberta:
Surficial geology of northeastern Alberta, 1969-71.
Includes the Athabasca-Peace Rivers delta.

864. Bayrock, L.A., Boydell, A.N., Research Council of alberta:
Surficial geology of the Rocky Mountain House area, Alberta, 1969-.
During Late Pleistocene (Wisconsin) time, the continental and mountain glaciers fused near the present townsite of Rocky Mountain House, producing a single ice sheet which flowed southeastward along the Foothills margin. Subsequent recession produced a separation of ice sheets with consequent development of a series of recessional moraines. A pre-Wisconsin till deposited by an older mountain ice sheet has been discovered on some of the high plateaus marginal to the Foothills.

865. Bayrock, L.A., Root, J.D., Research Council of Alberta:
Geology of the Peace-Athabasca delta complex, Alberta, 1970-.
To determine the origin and sedimentation pattern of the Peace-Athabasca deltas in northeastern Alberta. Field observations and detailed examination of aerial photos show that the deltaic complex can be divided into areas of active, semi-active (during flood stages), and inactive sedimentation.
Although both deltas have changed their areal configurations many times since the recession of the Pleistocene ice sheet 10,000 years ago, the Peace delta is now considered to have reached an old or senescent stage: irorganic sedimentation takes place only during flood stages when the suspended load (silt, clay) of the Peace River is carried southward across the delta surface. In contrast, Athabasca delta is still actively extending northward across the west end of Lake Athabasca as the bed and suspended loads of the Athabasca River may abruptly change its channel in the near future; for example, it could flow via the Embarras channel and by crevassing the levee to the west into Lake Claire. Lake Claire is shallow and would fill up with sediment very rapidly.

866. Berg, T.E., McPherson, R.A., Research Council of Alberta:
Surficial geology of the Medicine Hat area, N.T.S. Sheet 72L, Alberta, 1965-72.

867. Carlson, V.A., Research Council of Alberta:
Bedrock topography map series, M = 1:250000, Alberta, 1969-.
See Bedrock topography of the Wabamun map area, NTS 83G, Alberta; Alberta Research Council, 1971.

868. McPherson, R.A., Research Council of Alberta:
Urban geology of the greater Edmonton area, Alberta, 1971-72.

869. McPherson, R.A., Research Council of Alberta:
Surficial geology of the northern Foothills, 1972-.
Reconnaissance surficial geology mapping (1 inch = 4 miles) of the northern Foothills of Alberta will be conducted in the summer of 1972, utilizing helicopter mapping techniques developed in northeastern Alberta for forested terrain. The area to be mapped initially encompasses the Wapiti and north half of the Mount Robson sheets (N.T.S. Sheets 83L and 83E), and includes the portion of the Rocky Mountains and Foothills from the British Columbia border to the northern boundary of Jasper National Park.

870. Ozoray, G.F., Research Council of Alberta:
The scientific and economic value of karst studies in Alberta, 1971-72.

871. Rutter, N.W., Geol. Surv. of Can.:
Quaternary geology, Bow River Valley, Alberta, 1967-71.
See Geol. Surv. Can., Paper 72-1, pt. A, p. 170, 1972.

872. Rutter, N.W., Geol. Surv. of Can.:
Quaternary geology of Peace River reservoir area, 1966-72.

873. Stalker, A. MacS., Geol. Surv. of Can.:
Quaternary of southern Alberta, 1965-.
See Quaternary studies on the southwestern prairies; Geol. Surv. Can., Paper 72-1, pt. A, p. 136, 1972.

874. St-Onge, D.A., Geol. Surv. of Can.:
Quaternary geology and geomorphology of Whitecourt area, Alberta, 1966-71.

875. St-Onge, D.A., Geol. Surv. of Can.:
Quaternary geology and geomorphology of Tawatinaw area, Alberta, 1968-72.

876. Westgate, J.A., Fritz, P., Kalas, L., Green, R., Matthews, J.V., Aario, R., Delorme, L.D., Research Council of Alberta:
Watino section, Peace River district, Alberta, 1966-71.

British Columbia

877. Clague, J., Univ. of British Columbia:
Tertiary and Quaternary geology, southern Rocky Mountain Trench, British Columbia, 1970-72.

878. Danner, W.R., Univ. of British Columbia:
Stratigraphy and sedimentary structures of Pleistocene deposits of Point Grey, British Columbia and Point Roberts, Washington, U.S.A., 1965-72.

QUATERNARY GEOLOGY

879. Mathews, W.H., Geol. Surv. of Can., and Univ. of British Columbia:
Glacial geology, northeastern British Columbia, 1971-72.
See Quaternary geology, Charlie Lake, British Columbia; Geol. Surv. Can., Paper 72-1, pt. A, pp. 169-170, 1972.

880. Reimchen, T.H.F., Univ. of Western Ontario and Geol. Surv. of Can.:
Quaternary geology of the Peace River area, British Columbia, 1970-73; Ph.D. thesis.
See Quaternary geology, Dawson Creek, British Columbia; Geol. Surv. Can., Paper 71-1, pt. A, pp. 177-178, 1971.

881. Reimchen, T., Rutter, N.W., Geol. Surv. of Can.:
Quaternary geology, Pine Pass-Jasper area, British Columbia and Alberta, 1969-73; Ph.D. thesis (Reimchen).
See Quaternary geology, Dawson Creek, British Columbia; Geol. Surv. Can., Paper 72-1, pt. A, pp. 176-177, 1972.

882. Ryder, J.M., Blair, J., Univ. of British Columbia:
Quaternary Geomorphology and stratigraphy of south-central British Columbia, 1971-.
To establish a chronology for glacier fluctuations and associated sedimentation through late Quaternary time for the eastern side of the Coast Mtns. and adjacent parts of the Interior Plateau; to relate stratigraphic and sedimentological characteristics of valley-fill sediments to depositional processes, and to identify environmentally conditioned changes in the sedimentation process; to develop techniques of description, correlation and analysis applicable to valley-fill deposits in regions of high relief. See Some aspects of the morphometry of paraglacial alluvial fans in south-central British Columbia; Can. J. Earth Sci., vol. 8, pp. 1252-1264, 1971.

883. Terasmae, J., Brock Univ.:
Postglacial geochronology and paleoecology of the Kamloops area, British Columbia, 1971.
The objective of the study is to establish the chronology of late- and postglacial events (deglaciation, climatic changes, geological features, and history of vegetation) by a study of lake sediments and peat deposits, involving palynological investigations, radiocarbon dating, tephrochronology, and sediment characteristics.
Some pollen diagrams have been completed, reconnaissance of additional potential sites for study has been made, and a survey of airborne pollen was completed in co-operation with scientists of the Canada Dept. of Agriculture. A series of surface sediment samples has been collected and studied for the purpose of providing a means of reference for the interpretation of fossil pollen and spore assemblages.

QUATERNARY GEOLOGY

Manitoba

884. Fenton, M.M., Geol. Surv. of Can.:
Quaternary geology, Winnipeg (east half), 1970-73; Ph.D. thesis.
See Quaternary geology, Winnipeg map-area; Geol. Surv. Can., Paper 72-1, pt. A, p. 156, 1972.

885. Klassen, R.W., Geol. Surv. of Can.:
Quaternary geology and geomorphology of the Assiniboine River Valley and its tributaries, Manitoba and Saskatchewan, 1966-72.

886. Klassen, R.W., Geol. Surv. of Can.:
Quaternary geology, Duck Mountain, Manitoba and Saskatchewan, 1968-72.

887. Klassen, R.W., Geol. Surv. of Can.:
Quaternary geology, Riding Mountain, Manitoba and Saskatchewan, 1961-72.

888. Klassen, R.W., Geol. Surv. of Can.:
Bedrock topography and Quaternary stratigraphy, Virden, Manitoba, 1967-72.

889. Klassen, R.W., Geol. Surv. of Can.:
Quaternary geology inventory, lower Nelson River Basin, Manitoba, 1971-74.
Mapping of surficial deposits at a scale of 1:250,000 and obtaining information on Quaternary stratigraphy and history. See Quaternary geology inventory, lower Nelson River Basin; Geol. Surv. Can., Paper 72-1, pt. A, p. 166, 1972.

890. Teller, J.T., Univ. of Manitoba:
Stratigraphy and petrology of glacial sediments in southern Manitoba, 1970-.

New Brunswick

891. Gadd, N.R., Geol. Surv. of Can.:
Quaternary geology, southwest New Brunswick, 1967-72.
A source of information on the late glacial history of southern New Brunswick, the pattern of ice-margin recession in that area as well as for availability of structural material and in the fields of agriculture, forestry and drift prospecting.

892. Schafer, C.T., Bedford Institute:
Paraecology and pollution response of nearshore Benthonic Foraminifera, 1967-.

QUATERNARY GEOLOGY

Newfoundland and Labrador

893. Fulton, R.J., Hodgson, D.A., Minning, G.V., Thomas, R.D., Geol. Surv. of Can., and Brock Univ.:
Quaternary geology inventory, southern Labrador, 1969-72.
Compilation of field data collected during 1970 field phase of helicopter supported, ARDA sparked, surficial geology mapping project in southern Labrador, covering parts of Labrador accessible from Churchill Falls power development.

894. Grant, D.R., Geol. Surv. of Can.:
Quaternary geology St. Anthony-Blanc Sablon, Newfoundland, 1969-72.
Postglacial and recent rates of coastal emergence have been determined. Geomorphic features have been interpreted in terms of bedrock structures. See Surficial geology, western Newfoundland; Geol. Surv. Can., Paper 72-1, pt. A, pp. 157-160, 1972.

895. Grant, D.R., Hornbrook, E.H.W., Geol. Surv. of Can.:
Newfoundland Mineral Development Program - glacial geology and geochemistry, 1971-72.
In order to stimulate more fruitful types of mineral exploration, surficial deposits and geomorphic features are being mapped by airphoto interpretation over most of the island of Newfoundland, primarily to deduce the direction and sequence of glacial transport. Field studies in selected pilot areas in 1972 are designed to develop techniques of regional geochemical analysis of tills, derived stream and lake sediment, and of covering vegetation, that are appropriate in terms of the indicated modes and distance of glacial transport.

896. Hornbrook, E.H., Grant, D.R., Geol. Surv. of Can., Fleming, J.M., Newfoundland and Labrador Dept. of Mines, Agriculture and Resources:
Glacial geological-geochemical pilot project, 1971-72.

897. O'Donnell, N.D., Univ. of Western Ontario:
Investigation of an indicator train of sulphide ore at Gull Pond, Newfoundland, 1967-72; M.Sc. thesis.

Northwest Territories

898. Barnett, D.M., Geol. Surv. of Can.:
Surficial geology and geomorphology of Melville Island, 1971-73.
Mapping and interpretation of the surface and near surface materials, landforms, permafrost conditions and other aspects of the geomorphology on a reconnaissance scale, with particular reference to terrain information pertinent to the implementation of the Territorial Land Use Regulations, and to petroleum exploration and associated activities. See Surficial geology and geomorphology of Melville Island, District of Franklin; Geol. Surv. Can., Paper 72-1, pt. A, pp. 152-153, 1972.

899. Blake, W., Geol. Surv. of Can.:
Pumice on raised beaches, eastern Arctic Canada, 1968-.

900. Blake, W., Souchez, R.A., Geol. Surv. of Can., and Univ. Brussels:
Quaternary reconnaissance, southern Ellesmere Island and Devon Island, Northwest Territories, 1967-.
Denudation rates in postglacial time. See Ice-cored moraines in south-western Ellesmere Island, N.W.T., Canada; J. of Glaciology, vol. 10, No. 59, pp. 245-254, 1971.

901. Ford, D.C., Brook, G.A., McMaster Univ.:
Genesis of caves and karst of the Nahanni Formation in the South Nahanni River region, Northwest Territories, and associated chronology of glaciation and river canyon formation, 1971-74.
A remarkable wealth of complex cave and karst land forms has developed in the limestone Nahanni Formation at 1st canyon, S. Nahanni River, and in a belt extending 25 miles to the north. Part of this complexity is attributable to the fact that the region escaped the Wisconsin glaciation and, from our preliminary data, probably the Illinoian glaciation as well. By dating the caves (U-method of Thompson, Schwarcz and Ford, McMaster University), we hope to date the river canyon-cutting and glacial events in this region.

902. Hills, L.V., Sweet, A.R., Johnson, C., Andersson, B., Christiansen, O., McLaren, P., Univ. of Calgary:
Pleistocene and palynological research.
Projects include: palynology, paleobotany, and sedimentology of the Beaufort Formation, Arctic Canada; megaspores from the Upper Devonian, Banks Island, Arctic Canada; Jurassic dinoflagellates from Arctic Canada; and the origin and evolution of Azolla. See Fossil mosses, Beaufort Formation (Tertiary), Northwestern Banks Island, western Canadian Arctic; Can. J. Botany, vol. 49, No. 7, pp. 1089-1094, 1971.

903. Hodgson, D.A., Geol. Surv. of Can.:
Quaternary reconnaissance, northeastern Baffin Island, 1968-72.

904. Hughes, O.L., Hodgson, D., Zoltai, S., Pettapiece, W., Geol. Surv. of Can.:
Surficial geology and land classification, Mackenzie Valley transportation corridor, 1971-73.
The project is directed primarily at terrain inventory, with maps the main product. Experience indicates that the map-units adopted, based on genesis, geologic material and landform divide the terrain into meaningful and distinctive units with respect to vegetation patterns, soil types, ground-ice content and general engineering performance and behaviour. See Quaternary reconnaissance northwest District of Mackenzie; Geol. Surv. Can., Paper 72-1, pt. A, pp. 165-166, 1972.

QUATERNARY GEOLOGY

905. Mackay, J.R., Mathews, W.H., Univ. of British Columbia:
Geomorphology of the Fort Good Hope area, Northwest Territories, 1969-72.

906. Rampton, V.N., Geol. Surv. of Can.:
Quaternary geology, Beaufort-Mackenzie, Northwest Territories, 1969-72.
See Massive ice and icy sediments throughout the Tuktoyaktuk Peninsula, Richards Island, and nearby areas, District of Mackenzie; Geol. Surv. Can., Paper 71-21, 1971.

907. Rampton, V.N., Bouchard, M., Geol. Surv. of Can.:
Environmental geology of northern settlements, Mackenzie Valley - western Arctic (Tuktoyaktuk), Northwest Territories, 1971-72.
See Environmental geology, Tuktoyaktuk, District of Mackenzie; Geol. Surv. Can., Paper 72-1, pt. A, pp. 141-143, 1972.

908. Rutter, N.W., Minning, G.V., Geol. Surv. of Can.:
Surficial geology and land classification, Mackenzie Valley transportation corridor (southern part), 1971-74.
See Geol. Surv. Can., Paper 72-1, pt. A, p. 178, 1972.

909. Shearer, J.M., Geol. Surv. of Can.:
Surficial geology and geomorphology, Mackenzie Bay-Continental Shelf, 1970-.
See Submarine pingos in the Beaufort Sea; Science, vol. 174, No. 4011, pp. 816-818, 1971.

910. Shilts, W.W., Geol. Surv. of Can.:
Mineral indicator tracing, southern Keewatin, 1970-73.
See Drift prospecting in the Kaminak Lake area, District of Keewatin; Geol. Surv. Can., Paper 72-1, pt. A, pp. 182-189, 1972.

Nova Scotia and Prince Edward Island

911. Drapeau, G., King. L.H., Bedford Institute:
Surficial geology of the Yarmouth-Browns Bank map-area, 1967-72.

912. Grant, D.R., Geol. Surv. of Can.:
Surficial geology, southern Cape Breton Island, Nova Scotia, 1970-72.
See Glaciation of Cape Breton Island, Nova Scotia; Geol. Surv. Can., Paper 71-1, pt. B, pp. 118-120, 1971.
Surficial geology of southeast Cape Breton Island, Nova Scotia; Geol. Surv. Can., Paper 72-1, pt. A, pp. 160-163, 1972.

913. Gravenor, C.P., Univ. of Windsor:
Study of wave-cut drumlin off Yarmouth, Nova Scotia, 1971-74.

An analysis of fabric in wave-cut drumlins to determine if this will aid in an understanding of how these features are deposited from the base of the ice.

914. MacNeill, R.H., Nova Scotia Research Foundation:
Glacial geology of Nova Scotia (mainland area), 1951-72.

Ontario

915. Aaltonen, R., Univ. of Western Ontario:
Geology of the City of London, 1971-74; Ph.D. thesis.
Information gathered from 120 reports on soils investigations, and additional field observations and samples collected from excavations for construction of maps and storage in a computer file, by using the SAFRAS system.

916. Ashworth, A.C., Univ. of Waterloo:
A late Quaternary insect assemblage from southern Ontario, 1971.
Fossil insects are being extracted from some 10,000 year old sediments. The species which have been identified are identical to living forms and should provide information of both the habitat and climatic aspects of the environment in southern Ontario at this time.

917. Berti, A.A., Univ. of Western Ontario:
Paleobotanic investigation of Mid-Wisconsin interstadial deposits in the Lake Erie and Ontario basins, 1966-71; Ph.D. thesis.

918. Burwasser, G.J., Ontario Dept. of Mines and Northern Affairs:
Pleistocene geology and industrial minerals of Thunder Bay and vicinity, 1971-73.

919. Burwasser, G.J., Ontario Dept. of Mines and Northern Affairs:
Pleistocene geology and industrial minerals of the Sudbury Basin, 1970-72.

920. Dreimanis, A., Mills, K.B.-M., Zubrycki, A., Univ. of Western Ontario:
Waterlaid tills in southwestern Ontario, 1971-75; theses studies.
Waterlaid tills, probably deposited from ice-shelves, are very common in southwestern Ontario. Their structure, texture, lithology and relationship to basal till and lacustrine deposits are being investigated.

921. Dreimanis, A., Mörner, A., Dalrymple, R.W., Univ. of Western Ontario:
Late Wisconsin varved sediments in the area between London, Ontario, and Lake Erie, 1970-72.

QUATERNARY GEOLOGY

922. 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 The Plum Point Interstadial: age, climate and sub-division; Can. J. Earth Sci., vol. 8, No. 11, pp. 1423-1431, 1971.

923. Feenstra, B.H., Univ. of Western Ontario and Ontario Dept. of Mines and Northern Affairs:
Late Wisconsin stratigraphy between the Milverton and Elmira moraines, southwestern Ontario, 1967-72; M.Sc. thesis.

924. Feenstra, B.H., Pleistocene geology and industrial minerals of the Niagara area, 1969-72.

925. Gwyn, Q.H.J., Ontario Dept. of Mines and Northern Affairs:
Quaternary geology of the Dundalk area, 1971-72.
See Quaternary geology of the Dundalk area; Ontario Dept. of Mines and Northern Affairs, Misc. Paper 49, pp. 97-98, 1971.

926. Karrow, P.F., Univ. of Waterloo:
Quaternary geology, Stratford-Conestogo area, Ontario.
See Quaternary geology of the Stratford-Conestogo area, Ontario; Geol. Surv. Can., Paper 70-34, 1971.

927. Karrow, P.F., Anderson, T.W., Clarke, A.H., Ashworth, A., Miller, B.B., Univ. of Waterloo:
Stratigraphy, paleontology, and chronology, of Lake Algonquin and Lake Nipissing deposits near Lake Huron and Georgian Bay, Ontario, 1957-75.

928. Karrow, P.F., Univ. of Waterloo, Churcher, C.S., Univ. of Toronto:
Vertebrate paleontology of Hamilton Bay, Ontario, 1958-73.

929. May, R.W., Univ. of Western Ontario:
Chemical investigation of tills of southern Ontario, 1968-71; Ph.D. thesis.

930. McAndrews, J.H., Royal Ontario Museum:
Paleo-plant ecology of Ontario in postglacial time, 1971-74.
Rates of sedimentation in small lakes and in the eastern three Great Lakes through a study of lakes that are sedimenting organic varves to provide data that are used in absolute pollen frequency studies.

931. Mirynech, E., Brock Univ.:
Mineralogical and sedimentological analysis of the surficial deposits of the Belleville-Picton-Kingston-Tweed area, Ontario, 1961-.

932. Mirynech, E., Brock Univ.:
Particle analysis of surficial deposits of Trenton-Campbellford-Belleville area, Ontario, 1960-.

933. Morgan, A., Poplawski, S., Sreenivasa, B.A., Karrow, P.F., Univ. of Waterloo:
Paleontology of Toronto interglacial, 1957-.
Under investigation are the beetles of the Scarborough Formation, and the ostracods, midges and cladoceras of the Don and Scarborough Formation.

934. Morgan, A.V., Univ. of Waterloo:
Quaternary stratigraphy and palaeontology in southwestern Ontario, 1971-72.
Areal examination of the Pleistocene deposits of the Lucan-Parkhill-Thedford area with the view of determining the limits and stratigraphic range of the respective till sheets and interstadial deposits in this region.

935. Pikula, R.J., Wang, K.T., Roy, A.C., Ontario Water Resources Commission:
Northern Ontario water resources survey, 1966-74.
Overburden and bedrock geology maps to be compiled in connection with ground-water resources.

936. Pliva, G.L., Fligg, E.K., Ontario Water Resources Commission:
Geophysical surveys and well logging for hydrogeological investigations.

937. Ross, R.C., Univ. of Western Ontario:
Gravel deposits east of London, Ontario, 1971-73; M.Sc. thesis.

938. Scott, J.S., Richard, S.H., Code, J.A., Belanger, J.R., Geol. Surv. of Can.:
Environmental geology prototype study; Ottawa-Hull region, 1970-72.
Include surficial geology mapping of the Ottawa-Carleton area and adjacent parts of Quebec north of the Ottawa River; use of the SYMAP automated cartographic technique as a means of displaying geological data from a data bank, and the production of derived maps to provide background information for land use planning. See Geol. Surv. Can., Paper 72-1, pt. A, pp. 147-149, 1972.

939. Sibul, U., Choo-Ying, A., Ontario Water Resources Commission:
Water resources of the upper Nottawasaga River basin, 1968-72.
Pleistocene mapping carried out to prepare geologic map in connection with ground-water resources.

940. Sibul, U., Choo-Ying, A., Ontario Water Resources Commission:
Water resources survey of the Moira River basin, 1969-73.
Overburden and bedrock geology maps to be compiled in connection with ground-water resources.

941. Sibul, U., Choo-Ying, A., Goff, K., Ontario Water Resources Commission:
Water resources of the Duffin-Rouge Creek basins, 1970-74.
Overburden and bedrock geology map to be compiled in connection with ground-water resources.

QUATERNARY GEOLOGY

942. Skinner, R.G., Geol. Surv. of Can.:
Glacial-interglacial stratigraphy, James Bay Lowland, Ontario, 1969-71.

943. Terasmae, J., Brock Univ.:
Quaternary geochronology, paleoecology and dendroclimatology in Ontario, 1969-.
The primary objective of the proposed research is to establish a chronological framework for geological events (retreat of the continental ice-sheet, history of glacial lakes, and dating of the development of landscape features), climatic changes and history of vegetation since the last glaciation. This objective is achieved by making palynological, paleobotanical and sedimentological studies of selected peat and lake deposits which contain a biological and physical record that allows the reconstruction of past environmental changes. Results of these essentially paleoecological studies (supported by radiocarbon dating) are used for a regional correlation of stratigraphic units, geological events and landscape features (such as raised shorelines, moraines, and former outlets of lakes).

944. Tovell, W.M., Royal Ontario Museum, Lewis, C.F.M., Geol. Surv. of Can.:
Georgian Bay Basin, 1967-.
Completed regional coring and geophysical survey between June 20th and November 15th, 1971.

945. Vagners, U.J., Ontario Dept. of Mines and Northern Affairs:
Quaternary geology of the Windsor-Essex area, Ontario, 1970-72.

946. Walker, R.G., Eynon, G., McMaster Univ.:
Sedimentology of Pleistocene braid bars, Paris, Ontario, 1970-72; M.Sc. thesis (Eynon).

947. Yakutchik, T.J., Lammers, W., Ontario Water Resources Commission:
Water resources of the Big Creek basin, 1964-71.
Pleistocene mapping carried out and geologic map prepared in connection with ground-water resources. See Water resources of the Big Creek drainage basin; Ontario Water Resources Report 2, 1971.

Quebec

948. Bird, J.B., Dredge, L., McGill Univ.:
Late Quaternary coastal environments of the St. Lawrence estuary, 1968-73; Ph.D. thesis (Dredge).

949. DiLabio, R., Univ. of Western Ontario:
Indicator tracing in the Lac-Mistassini-Lac Waconichi area, Quebec, 1971-74; Ph.D. thesis.

950. Dredge, L., Geol. Surv. of Can.:
Surficial geology, Sept-Îles - Cap Chat, Québec, 1971-73.
Mapping and interpretation of Quaternary deposits and landforms relative to glacial and postglacial history and to provide areal geological information with particular reference to data pertinent to engineering geology. See Geol. Surv. Can., Paper 72-1, pt. A, pp. 153-154, 1972.

951. Gadd, N.R., Geol. Surv. of Can.:
Distribution of marine deposits, Ottawa-St. Lawrence Basin, 1971-.
To delimit the occurrence of deposits of the Champlain Sea of the St. Lawrence Lowlands and the quivalent Laflamme Sea of the Lac St-Jean area with particular reference to the distribution of marine clays within these areas; to investigate the stratigraphic and physical parameters and geomorphology of the deposits to aid in an evaluation of the causes and occurrence of landslides, particularly of the mud-flow type. See Marine deposits, Gatineau valley, Québec; Geol. Surv. Can., Paper 72-1, pt. A, pp. 156-157, 1972.

952. Hardy, L., Ministère des Richesses Naturelles du Québec:
Région de La Tuque, Comtés de Laviolette et Québec, 1971-73.

953. LaSalle, P., Ministère des Richesses Naturelles du Québec:
Région de la ville de Québec (géologie du Quaternaire), 1969-74.

954. LaSalle, P., Tremblay, Y., Ministère des Richesses Naturelles du Québec:
Région de Saint-Jean Vianney, Shipshaw, Comté Dubuc, Québec, 1971-72.

955. LaSalle, P., Warren, B., Ministère des Richesses Naturelles du Québec:
Etude geochimique de la moraine de fond dans la région miniere d'Abitibi, Québec, 1971-74.

956. Ledoux, R.L., Pichette, M., Univ. de Laval:
Quantitative mineralogical analysis of recent clay sediments in the St-Lawrence Lowlands, 1971-74; M.Sc. thesis.
The quantitative mineralogical analysis of the primary and secondary clay minerals is accomplished by the combination of a selective dissolution technique of minerals with X-ray diffraction, thermogravimetric analysis, and infrared spectroscopy.

957. Raudsepp, J.J., Ministère des Richesses Naturelles du Québec:
Région des Monts McGerrigle, Comté de Gaspé-Nord, Québec, 1971-73.

958. Romanelli, R., Univ. of Ottawa:
The sedimentary history of Pleistocene and Recent deposits of the Gatineau Valley, 1970-72; M.Sc. thesis.

Fossil populations, sedimentary structures, and lithologies are being studied in order to diagnose depositional environments.

959. Skinner, R.G., Geol. Surv. of Can.:
Application of Quaternary geology to mineral exploration, Timmins - Val-d'Or mining district, Ontario-Québec, 1971-73.
See Geol. Surv. Can., Paper 72-1, pt. A, p. 189, 1972.

960. Tremblay, G., Ministère des Richesses Naturelles du Québec:
Région d'Amos-Taschereau, Comtés d'Abitibi-est et Abitibi ouest, 1971-72.

961. Warren, B., Ministère des Richesses Naturelles du Québec:
Echantillonnage des eskers, district d'Abitibi, Québec, 1968-72.

962. Warren, B., LaSalle, P., Ministère des Richesses Naturelles du Québec:
Echantillonnage de la moraine de fond, district d'Abitibi, Québec, 1971-73.

Yukon Territory

963. Bouchard, M., Univ. de Montréal:
Geólogie du Quaternaire, Île Herschel, territoires du Yukon, 1970-72; thèse de Maîtrise.
See Surficial deposits, Herschel Island, Yukon Territory; in Geol. Surv. Can., Paper 71-1, pt. A, p. 158, 1971.

964. Rampton, V.N., Geol. Surv. Can.:
Quaternary geology, Snag-Kluane Lake, 1965-72.
See Late Quaternary vegetational and climatic history of the Snag-Klultan area, southwestern Yukon Territory, Canada; Bull. Geol. Soc. Am., vol. 82, pp. 959-978, 1971.

General

965. Bartlett, G.A., Molinsky, L., Queen's Univ.:
A history of the Gulf of St. Lawrence, 1968-.

966. Bartlett, G.A., Robertson, J., Molinsky, L., Queen's Univ.:
A geologic history of the MacKenzie River delta, 1970-.; M.Sc. thesis (Molinsky).

967. Craft, J.L., Univ. of Western Ontario:
Late-Wisconsin glaciation in the Adirondack Mountains, New York, 1965-72; Ph.D. thesis.

968. David, P.P., Univ. de Montréal:
Study of selected dune areas in Canada, 1965-.
Research is concentrated on the morphology, the development and the migration of sand dunes; the sedimentary properties of dune sands and source sediments; the stratigraphy of dune occurrences; and the chronology of dune activities. See The Brookdale Road section and its significance in the chronological studies of dune activities in the Brandon Sand Hills of Manitoba; Geol. Assoc. Can., Sp. Paper No. 9, pp. 293-300, 1971.

969. Delorme, L.D., Inland Waters Branch, Dept. of Environment:
Paleolimnology, 1965-.
See Paleoecology of Holocene sediments from Manitoba using freshwater ostracodes; Geol. Assoc. Can., Sp. Publ. 9, pp. 301-304, 1971.

970. Dreimanis, A., Stankowski, W., May, R.W., Vagners, U.J., Univ. of Western Ontario:
Lithologic, granulometric and fabric investigations of tills, aimed at establishing general rules on their formation, 1962-.
See Compositional variations in a thick till layer: (1) Pebble lithology, shape, roundness; Abstracts with Progr., Geol. Soc. Am., vol. 3, No. 7, pp. 715-716, 1971.

971. Fritz, P., Univ. of Waterloo:
Quaternary paleoclimatology and stratigraphy, 1970-.
Stable isotopes of fresh water mollusca will be used to obtain paleoclimatic information.

972. Gwyn, Q.H.J., Univ. of Western Ontario:
Heavy mineral assemblages in tills and their use in distinguishing glacial lobes in the Great Lakes region, 1969-71; Ph.D. thesis.

973. Gwyn, Q.H.J., Dreimanis, A., Sutterlin, P.G., Univ. of Western Ontario:
Investigation of heavy minerals in tills along the south edge of the Canadian Shield, 1969-71; Ph.D. thesis (Gwyn).
See Heavy mineral assemblages in tills along the southern periphery of the Canadian Shield in the Great Lakes region; Geol. Soc. Amer., vol. 3, No. 7, pp. 586-587, 1971.

974. Heginbottom, J.A., Geol. Surv. of Can.:
Erosion in a permafrost environment, 1969-.
See Erosion in a permafrost environment, Inuvik area, District of Mackenzie; Geol. Surv. Can., Paper 72-1, pt. A, pp. 190-191, 1972.

975. Mayr, F., Univ. de Montréal:
Wuerm stratigraphy of the type area, eastern Alps, 1968-73. A guide to geomorphology, 1971-74. Stratigraphy and chronology of postglacial morphogenetic processes, Mt. Albert and Mt. Jacques Cartier, Parc National de la Gaspésie, 1972-74.

QUATERNARY GEOLOGY

To work out an almost complete stratigraphy of "Wuerm" in the type area, and to summarize our present knowledge in a series of maps in order to provide better understanding of and towards more reliable correlations between the North-American and the European stratigraphy of the last Ice Age.

976. Rutter, N.W., Foscolos, A.E., Geol. Surv. of Can.:
Soils in glaciated and unglaciated terrain, 1969-72.

977. Vonhof, J.A., Inland Waters Branch, Dept. of Environment:
The effect of brine ponds on the groundwater regime, 1967-72.

Objectives: 1) to determine the rate and extent of groundwater pollution in the vicinity of waste disposal basins; 2) to evaluate the long-term effects of brine ponds on the surface water regime in the area; 3) to determine if and when remedial measures must be taken to limit the spread of subsurface pollution; and 4) to recommend possible alternative solutions to the waste disposal problem of the potash industry.

978. Vonhof, J.A., Inland Waters Branch, Dept. of Environment:
Jointed tills in western Canada, 1969-73.

To determine the significance of the joints on the rate of movement of groundwater and pollutants.

SEDIMENTOLOGY AND SEDIMENTARY PETROLOGY

Recent and Unconsolidated

979. Bartlett, G.A., Queen's Univ.:
Ecostratigraphy and biostratigraphy of waters and sediments adjoining the mid-Atlantic ridge, 1966-.

980. Bartlett, G.A., Hamdan, A., Slessor, D.K., Queen's Univ.:
Ecology, paleoecology, biostratigraphy and reconstruction of post-Wisconsin sediments of the Atlantic Provinces, 1962-; Ph.D. thesis (Hamdan), M.Sc. thesis (Slessor).

981. Bartlett, G.A., Reid, P., Holmes, G., Wilson, D., Queen's Univ.:
Ecology and the identification of environmental pollutants in marginal marine areas, 1971-.
Several marginal marine environments adjacent to the Atlantic Provinces have been monitored during the past 10 years. Biomass - watermass, biomass-substrate and water-mass-substrate characteristics have been analyzed. The previous history of these environments was investigated by coring.

982. Bartlett, G.A., Smith, L., Queen's Univ.:
Biostratigraphy and tectonic history of Canadian Atlantic continental margins, 1966-.
See Mesozic and Cenozoic history of the Grand Banks of Newfoundland; Can. J. Earth Sci., vol. 8, No. 1, pp. 70-116, 1971.

983. Bartlett, G.A., Smith, R., Queen's Univ.:
Ecostratigraphy and biostratigraphy of the North Atlantic, South Atlantic, Antarctic, South Pacific, North Pacific and Arctic Oceans, 1968-; M.Sc. thesis (Smith).

984. Bayrock, L.A., Root, J.D., Research Council of Alberta:
Geology of the Peace-Athabasca delta complex, Alberta, 1970-.
To determine the origin and sedimentation pattern of the Peace-Athabasca deltas in northeastern Alberta. Field observations and detailed examination of aerial photos show that the deltaic complex can be divided into areas of active, semi-active (during flood stages), and inactive sedimentation. Although both deltas have changed their areal configurations many times since the recession of the Pleistocene ice sheet 10,000 years ago, the Peace delta is now considered to have reached an old or senescent stage: irorganic sedimentation takes place only during flood stages when the suspended load (silt, clay) of the Peace River is carried southward across the delta surface. In contrast, Athabasca delta is still actively extending northward across the west end of Lake Athabasca as the bed and suspended loads of the Athabasca River are deposited there. However, there is good evidence that the Athabasca River may abruptly change its channel in the near future; for example, it could flow via the Embarras channel and by crevassing the levee to the west into Lake Claire. Lake Claire is shallow and would fill up with sediment very rapidly.

SEDIMENTOLOGY AND SEDIMENTARY PETROLOGY

985. Bird, J.B., Wong, P.P., Fitzgibbon, J., McGill Univ.:
Beach studies in tropical low energy environments, 1967-; Ph.D. thesis (Wong and Fitzgibbon).

986. Carson, M.A., Taylor, C.H., Grey, B.J., Chyurlia, J.P., Laronne, J., McGill Univ.:
Fluvial processes in Eaton River basin, Québec, 1968-73; Ph.D. thesis (Taylor), M.Sc. thesis (Grey).
Measurement of amounts, fluctuations and sources of suspended, bed and dissolved loads in the Eaton Basin during spring runoff. See The hydrologic response of the Eaton River Basin, Québec; Can. J. Earth Sci., vol. 8, No. 1, pp. 102-115, 1971.

987. Cronan, D.S., Univ. of Ottawa:
Regional geochemistry of sediments in the world ocean, 1966-.

988. Cronan, D.S., Sozanski, A., Univ. of Ottawa:
Geochemistry of ferromanganese oxide concretions in North American Lakes, 1967-73.

989. 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 limestone is a function both of the original ecology of the reef complex and the diagenetic processes, past and present, operating in the area. See A 60,000 year old terrace on northern Barbados and its importance to Late Pleistocene Climate Changes; Geol. Soc. Am., NE Section Annual Meetings; Programme with Abstract, 1971. An early Wisconsin reef terrace at Barbados, West Indies, and its climatic implications; Bull. Geol. Soc. Amer., vol. 82, No. 7, pp. 2011-2018, 1971.

990. Klassen, H.P., Univ. of Saskatchewan:
Recent sediments of Lac La Ronge, 1967-72.

991. Koster, E.H., Univ. of Ottawa:
The sedimentology of alluvial fans, Donjek Valley, Yukon, 1972-75; Ph.D. thesis.

992. Lawson, D., Baechler, F., Smith, D., Univ. of Waterloo:
Environmental fluvial sedimentology - the effect of agricultural and urban land use on water-sediment chemistry and sedimentation within the Grand River Basin, 1971-75.

993. Lawson, D., Smith, B., Univ. of Waterloo:
Point Bar sedimentation, 1971-73; BA thesis (Smith).
Inception and development of sedimentation that results in the formation of point bars in the modern fluvial environment (Nith River).

994. McCann, S.B., McMaster Univ.:
The dynamics of sediment movement in the beach and nearshore zone of the northern Berland Strait coastline of New Brunswick, 1970-75.
See Beach processes and shoreline changes, Kouchibouguac Bay, New Brunswick; Maritime Sediments, vol. 6, No. 3, pp. 116-117, 1971.

995. McCann, S.B., Taylor, R.B., McMaster Univ.:
An investigation of beach characteristics and nearshore processes in the Canadian Arctic, 1968-73.
See The depth of the frost table on Arctic beaches, Cornwallis and Devon Islands, N.W.T., Canada; J. Glaciology, vol. 6, pp. 116-117, 1971.

996. McDonald, B.C., Geol. Surv. of Can.:
Equilibrium bed forms and sedimentary structures in coarse glaciofluvial sand, 1971-72.
Experimental study of pebble transport, and of equilibrium bed forms and sedimentary structures in both pipe-flow and open-channel systems.

997. McDonald, B.C., Geol. Surv. of Can., Banerjee, I., Univ. of Calcutta:
Sedimentology and morphology of eskers, 1966-72.
Both morphologic and detailed sedimentologic study of eskers have been carried out.

998. Mountjoy, E.W., and graduate students, McGill Univ.:
Recent sediments west coast of Barbados and Carriacou, 1964-.
Research 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. See An Early Wisconsin reef terrace at Barbados, West Indies, and its climatic implications; Bull. Geol. Soc. Am., vol. 82, pp. 2011-2018, 1971. Sediments off the west coast of Barbados: Diversity of origins; Maritime Geol., vol. 9, pp. 5-23, 1970.

999. Murty, P.S.N., Cronan, D.S., Univ. of Ottawa:
Geochemistry of sediments from the north-eastern Atlantic Ocean, 1970-73.

1000. Pelletier, B.R., Atlantic Geosciences Centre:
Sediments and development of submarine topography in the Beaufort Sea, 1970-72.
To determine the distribution and origin of bottom marine sediments in an Arctic area under conditions of a rising sea level; and to describe unique physiographic features of the Arctic Shelf such as ice scouring and underwater pingos. See Submarine pingos in the Beaufort Sea; Science, vol. 174, No. 4011, pp. 816-818, 1971.

SEDIMENTOLOGY AND SEDIMENTARY PETROLOGY

1001. Pelletier, B.R., Atlantic Geosciences Centre:
Distribution of bottom sediments and models of sediment transport in Baffin Bay, 1970-73.
To complete a reconnaissance bottom sampling program in Baffin Bay in order to determine the distribution of sediment types and their method of dispersal.

1002. Pelletier, B.R., Atlantic Geosciences Centre:
Sedimentary-hydrodynamic models for deposition in Canadian embayments, 1965-75.
To present various models of sedimentation with reference to deposition and the hydrodynamic system, by comparing textural trends of the sediments in various percents.

1003. Pelletier, B.R., Swift, D.J., Miller, J., Lyall, A., Atlantic Geosciences Centre:
Quaternary sediments in the Bay of Fundy, 1966-.
To map the distribution of the Quaternary sediments in the Bay of Fundy and to relate their textures to the hydrodynamic environment at the depositional site. See Sedimentological sampling and results from the diver lookout facility of the submersible Shelf Diver, Bay of Fundy, Nova Scotia; Maritime Sediments, vol. 6, No. 3, pp. 102-109, 1970.

1004. Piper, D.J.W., Dalhousie Univ.:
Investigations in granulometry, bedding and mineralogy of fine grained sediments on the sea floor, 1971-.
Under investigation is material from (1) the Alaskan Abyssal Plain,(2) the Californian continental Borderland (including anaerobic basins), and (3) British lower Palaeozoic mudstones. This work will be integrated with in-situ marine studies in the future. The use of machine readable forms in logging cores will be investigated.

1005. Pullen, M.J., Univ. of British Columbia:
Sediments and sedimentary processes, Pitt Lake, British Columbia, 1967-72; Ph.D. thesis.

1006. Rust, B.R., Univ. of Ottawa:
Bottom sediments of the Ottawa River, 1972-76.
An interdisciplinary project with members of Biology and Civil Engineering Depts. at University of Ottawa to study the movements and changes that affect pollutants in the water-sediment-biota system of a river.

1007. Rust, B.R., Univ. of Ottawa:
The sedimentology of braided outwash in Iceland and Yukon Territory, 1968-73.
Structures, lithologies and gravel fabric are being studied in the coarse proximal deposits of braided outwash. A principal aim is to understand the mode of migration of longitudinal bars; low level air photos and pebble movements are also under investigation.

1008. Schafer, C.T., Bedford Institute:
Paleoclimatic significance of limestone deposits along the crest of the mid-Atlantic ridge, 1969-73.

1009. Schmidt, V., Mobil Oil Canada:
Electronluminescence of Recent and Pleistocene carbonate rocks, Persian Gulf and Caribbean, 1971.

1010. Shilts, W.W., Geol. Surv. of Can.:
Properties and provenance of till, 1969-.
A study of the variation of chemical, mineralogical and textural parameters in a 4 m by 10 m till exposure, southeastern Quebec.

1011. Slatt, R.M., Memorial Univ.:
Sedimentology and sedimentary geochemistry of Quaternary deposits of the Newfoundland coastal and nearshore regions and of the Newfoundland and Labrador continental shelf, 1971-74.
Involves textural, mineralogical and chemical analysis of surface grab-, core-, and dredge-sediment samples collected from several Newfoundland bays and the Newfoundland and Labrador continental shelf in order to evaluate (1) Quaternary stratigraphy and depositional environments, (2) sediment source, dispersal patterns, and depositional rates, and (3) trace metal-sediment interactions and associations.

1012. Sonnenfeld, P., Univ. of Windsor:
Recent dolomites in the Caribbean, 1970-73.

1013. Walker, R.G., Eynon, G., McMaster Univ.:
Sedimentology of Pleistocene braid bars, Paris, Ontario, 1970-72; M.Sc. thesis (Eynon).

1014. Yole, R.W., Jones, B.G., Carleton Univ.:
Sedimentology and stratigraphy of St. Clair delta, Ontario, 1968-72.

Sedimentary Rocks

1015. Aalto, K.R., McMaster Univ.:
Sedimentology of Ordovician flysch conglomerates at Cap-des-Rosiers, Québec, 1971.

1016. Bell, R.T., Brock Univ.:
Study of Aphebian sediments, 1969-74.
The present phase of study is extension beyond the Hurwitz Group for comparative purposes to the Belcher Islands and Great Slave Lake regions.

1017. Blakeney, R.S., Acadia Univ.:
A metallogenic study in the Windsor Group sediments (Mississippian), Nova Scotia, 1971-73; M.Sc. thesis.

Involves analyses of numerous rock samples collected in an effort to explain the mode of origin of heavy mineral deposits in the Windsor Group sedimentary rocks.

1018. Broughton, P.L., Whitaker, S.H., Saskatchewan Dept. of Mineral Resources:
Lignite stratigraphy of the Ravenscrag Formation, Saskatchewan, 1971-75.

Strippable coal seams are known to exist in the Ravenscrag Formation of Paleocene age. Production of lignite coal in the Ravenscrag is presently restricted to a few square miles in the Estevan area. The Formation, however, is known to cover about 10,000 square miles of the southern part os Saskatchewan.

A joint Federal-Provincial program will be undertaken in 1972 and 1973 to determine the extent of recoverable lignite reserves and to gain knowledge of the regional stratigraphy and structure of the Ravenscrag. Operational plans are to drill through the Formation in each township (six miles square), and to follow up with more closely spaced, shallower drilling in areas showing potentially economic lignite deposits.

1019. Carrigy, M.A., Research Council of Alberta:
Petrology of nonmarine Upper Cretaceous-Tertiary sandstones, 1961-71.

1020. Christopher, J.E., Saskatchewan Dept. of Mineral Resources:
The Vanguard (Jurassic) and Mannville (Cretaceous) Groups of southwestern Saskatchewan, 1969-72.

See Upper Jurassic and basal Cretaceous sandstones of southern Saskatchewan and vicinity; Bull. Am. Assoc. Petrol. Geol. p. 535, Abstract, 1971.

1021. Danner, W.R., Univ. of British Columbia:
Origin of bedded cherts and jaspers in the western Cordillera, 1966-.

To determine whether the bedded "ribbon cherts" are organic accumulations or chemical precipitates and whether they are of deep or shallow water origin. Define and determine the origin of "red" jaspers common in eugeosynclinal sediments and volcanic rocks.

1022. Donaldson, J.A., Macey, G., Kurt, V., Carleton Univ.:
Comparative studies of Proterozoic sedimentary rocks of Canada, 1963-.

Macey is nearing completion of a comparative petrological study of redbed basins in the northwestern part of the Canadian Shield, emphasizing the Baker Lake and Martin basins. Kurt has started a study of the Gowganda Formation at Cobalt, Ontario.

1023. Donaldson, J.A., Worth, J., Carleton Univ.:
Sedimentologic and stratigraphic study of the Coppermine River Group, Northwest Territories, 1969-73.

1024. Freeman, G.W., Acadia Univ.:
Stratigraphic analysis of the Cheverie Formation (Mississippian), Nova Scotia, 1971-72; M.Sc. thesis.

1025. Fuzesy, L.M., Saskatchewan Dept. of Mineral Resources:
Geology of the Ratcliffe Beds in south-central Saskatchewan, 1969-72.

1026. Gordon, A., Patel, I., Univ. of New Brunswick:
Provenance of Basal Cambrian and Carboniferous conglomerates of the Saint John, New Brunswick, 1968-72.

1027. Greggs, R.G., Queen's Univ.:
Physical conditions of carbonate lithification and deposition, 1968-.
See Algal bioherms of the Upper Gull River Formation (Middle Ordovician) near Kingston, Ontario; Can. J. Earth Sci., vol. 8, No. 11, pp. 1373-1381, 1971.

1028. Harris, I.M., Bedford Institute:
Sedimentology of the Goldenville Formation (Lower Paleozoic Flysch), eastern shore, Nova Scotia, 1969-72; Ph.D. thesis.

1029. Hendry, H.E., Univ. of Saskatchewan:
Sedimentology of rudites in turbidite sequences, 1970-.

1030. Hesse, R., McGill Univ.:
Pelagic and non-pelagic (turbidite) mudstones within flysch sections, 1968-72.

1031. Heese, R., McGill Univ.:
Sedimentology of Ordovician flysch deposits, Cloridorme Formation, Gaspé Peninsula, Québec, 1970-72.

1032. Heese, R., McGill Univ.:
Concretionary origin of lutitic dolomites in the Ordovician Cloridorme Formation, Gaspé Peninsula, Québec, 1970-72.

1033. Heese, R., McGill Univ.:
Selective silicification of ooids in greywackes of the Gault Formation, East Alps, 1965-72.

1034. Heese, R., McGill Univ.:
Initial reports of the deep-sea drilling project: leg 20, 1971-73.

1035. Heese, R., McGill Univ.:
Heavy minerals from site 113, XII, deep sea drilling project (Labrador Sea), 1970-72.

1036. Hill, J.D., Acadia Univ.:
The geology of a section of Silurian sediments near Petit Rocher, New Brunswick, 1970-71. Penecomtemporaneous slump structures in the Chaleur Bay Group in northeastern New Brunswick, 1970-71. The

petrography and genesis of basic intrusives within the Tetagouche Group, New Brunswick, 1971-73.

1037. Hofmann, H.J., Univ. de Montréal:
Precambrian paleontology. Phaneroroic organosedimentary structures and problematica, 1969-.
See Precambrian fossils, pseudofossils, and problematica in Canada; Geol. Surv. Can., Bull. 189, 1971.

1038. Hopkins, J.C., McGill Univ.:
Petrography, distribution and diagenesis of foreslope and basin sediments, Miette and Ancient Wall carbonate complexes (Devonian), Alberta, 1968-72; Ph.D. thesis.
Investigation is aimed at firstly establishing the sediments as exposed in the Colin Thrust sheet at the Ancient Wall Complex and the Miette Thrust Sheet at the Miette Complex.

1039. Hubert, C., Héroux, Y., Caty, J.L., Brisbois, D., Granger, B., Univ. de Montréal:
Stratigraphy of the Sayabec reef, Gaspé Peninsula, Québec; stratigraphy and sedimentology of the Precambrian sedimentary rocks of the Pépeshquasiti embayment of the Indicator basin, Québec; stratigraphy and sedimentology of the Quebec Supergroup in the area east of Lévis, Québec, 1969-.

1040. Jansa, L.F., Geol. Surv. of Can.:
Depositional history of oil producing Middle Devonian Formations in Western Alberta, Canada, 1969-72.
Study was undertaken to answer questions: 1. What was the nature of the processes forming the oil-bearing carbonate platform and organic buildups of Swan Hills? 2. Why and where the buildups are localized? 3. What was the nature of processes controlling initiation, localization and later development of the buildups?
The main controlling factors of development of Swan Hills biohermal mounds is inherited paleotopography, which is related to the sedimentation pattern of the underlying formations.

1041. Kramers, J.W., Research Council of Alberta:
Petroleum geology of the Mannville Group, east-central Alberta, 1971-.

1042. Lajoie, J., Univ. de Montréal:
Cambrian and Ordovician paleogeography in parts of the northern Appalachians: source area, relief, paleoclimate, transporting agents, 1968-.

1042. Long, D.G.F., Univ. of Western Ontario:
Stratigraphy and sedimentation of the early Proterozoic Chibougamau Formation, Québec, 1969-71; M.Sc. thesis.

1043. McIlwaine, W.H., Ontario Dept. of Mines and Northern Affairs:
Sedimentology of the Sibley Group, District of Thunder Bay, Ontario, 1970-.

To formally divide the Sibley Group into formations and determine depositional environments.

1044. Mukherji, K.K., Loyola College:
1. Thermoluminescence study of the Black River-Trenton limestone in southern Ontario, Canada. 2. Paleozoic geology of Rimouski, and Mont Joli, region Gaspé, Québec, with special reference to the study of Sayabec and St. Leon carbonate units, 1969-73.
1. The lithologic units in the Black River are time diachronous and at least the lower part of Trenton (Kirkfield) may represent a normal subtidal environment of the Black River facies mosaic. Using thermoluminescence study, an attempt is made to establish a new set of physical parameters which might aid in regional correlation, recognition of various facies and their relationships within the two stratigraphic groups. 2. The basal Sayabec (Wenlock) dolomitic sandstone and algalmicrite grade upward into a complex interfingering back reef and coral-algal biolithite (patch reef) type lithofacies. A complete gradation of back-reef-patch reef facies has been recognized within the carbonate member of the St. Leon Formation (Ludlow).

1045. Pounder, D.A., Chevron Standard Ltd., Calgary:
Sedimentology, diagenesis and stratigraphy of carbonate rocks, 1959-.

1046. Rosenstein, E.S., Queen's Univ.:
Depositional environments and diagenesis of the Ottawa and Oxford Formations near Cornwall, Ontario, 1971-73; M.Sc. thesis.

1047. Schenk, P.E., Dalhousie Univ.:
Detailed studies of the Meguma and Windsor Groups in Nova Scotia, 1965-.
The Early Devonian Torbrook Formation is highly important in relating Morocco and Atlantic Canada as well as being very significant in its own right. This unit is the last fill of the Meguma trough (continental rise-complex) and marks continental collision as the mile-thick formation changes upward from marine silty black shale to red, fluvial sandstones. An almost identical section of the same age in Morocco serves as one of our best bridges between the two continents. Fauna of the Torbrook is of the Old World Rhenish subprovince, unfound elsewhere in North America, but common in Europe and North Africa. See Southeastern Atlantic Canada, northwestern Africa, and continental drift; Can. J. Earth Sci., vol. 8, No. 10, pp. 1218-1251, 1971.

1048. Schmerber, G., Ministère des Richesses Naturelles du Québec:
Etudes en sedimentologie, Basses-Terres du Saint-Laurent et Appalaches, 1971.

1049. Schmidt, V., Mobil Oil Canada:
Reef growth and diagenesis of Middle Devonian Keg River reefs, Rainbow Field, northwest Alberta, 1969-72.

SEDIMENTOLOGY AND SEDIMENTARY PETROLOGY

1050. Schmidt, V., Mobil Oil Canada, Klement, K., Univ. of Texas:
Reef growth and diagenesis of Permian Capitan Reef complex in Texas and New Mexico, 1971-72.

1051. Simpson, F., Saskatchewan Dept. of Mineral Resources:
Sedimentology, palaeoecology and economic geology of Lower Colorado (Cretaceous) sediments, west-central Saskatchewan, 1969-72.
See Sequence elements in stratigraphic analysis of Lower Colorado (Cretaceous) strata, west-central Saskatchewan; Am. Assoc. Petrol. Geol., vol. 55, No. 3, pp. 541-542, 1971. Hydrocarbon potential of Saskatchewan; Saskatchewan Dept. Mineral Res., Rept. No. 157, 1971.

1052. Smith, L., Queen's Univ.:
Depositional and erosional history, and sequence correlations, of offshore Eastern Canada, 1969-.
Various Middle Paleozoic and Tertiary successions are being analyzed as to the area - time interrelations in each of both deposition and erosion, and their faunal and lithic parameters. They were selected widely in area and time to test the sequence concept of Sloss and Wheeler in relation to basic stratigraphic and sedimentologic principles. These in turn may be applied to both large and small-scale tectonic behaviour patterns of continental masses.

1053. Smith, L., Queen's Univ.:
Interrelations of carbonate and terrigenous sediments, 1968-.
See Lithostratigraphic controls of some Ordovician sphalerite; Proc. VIII International Sedimentologic Congr., 1971.

1054. Walker, R.G., McMaster Univ.:
Sedimentology of conglomerates, 1971-.
A general study of conglomerates has been initiated, with a view to determining transport mechanisms of boulders in different environments, and the origin of different textural features in conglomerates of different depositional environments.

1056. Walker, R.G., Davies, I.C., McMaster Univ.:
Deposition of resedimented conglomerates, Gaspé, Québec, 1970-72; M.Sc. thesis (Davies).
The conglomerates at St. Simon, Gaspé, Québec, were deposited in a deep water geosynclinal environment. A detailed study of the directional sedimentary structures, bedding continuity, internal sedimentary structures, and textures is being made in order to elucidate the mechanisms and direction of transport.

1057. Walker, R.G., Turner, C., Teal, R., McMaster Univ.:
Archaean sedimentation, 1969-74.
Investigation of the depositional histories of some sedimentary-volcanic greenstone belts within the Minnitaki, Abram and Savant Lake areas, with the object of defining

sedimentary facies and facies relationships, the relationship of sedimentation and volcanic activity, and the abundance of various minerals in the sandstones. See Archaean sedimentation: analysis of the Minnitaki basin, northwestern Ontario, Canada; Bull. Geol. Soc. Am., vol. 82, pp. 2099-2130, 1971.

1058. Wardlaw, N.C., Univ. of Calgary:
Cretaceous evaporite basins of eastern Brazil and west Africa, 1970-71.
Comparison of Cretaceous (Aptian) evaporites of Brazil and West Africa and their bearing on the theory of continental drift. Emphasis being placed on the chemical aspects of these deposits.

1059. Wardlaw, N.C., Univ. of Calgary:
Petrology and geochemistry of Paleozoic carbonates and shales, 1969-73.
See Carbonate and evaporite deposition and diagenesis Middle Devonian Winnipegosis and Prairie Evaporite Formations of south-central Saskatchewan; Bull. Am. Assoc. Petrol. Geol., vol. 55, pp. 1759-1786, 1971.

1060. Wardlaw, N.C., Statham, K., Univ. of Calgary:
Reservoir properties of sedimentary rocks, 1968-72.

1061. Wolf, K.H., Laurentian Univ.:
Sedimentary geology of the zeolitic volcanic lacustrine Pliocene Rome Beds, Oregon, 1966-72. Comparative sedimentological and petrologic study of uranium and other metal-bearing Precambrian sediments, 1971-75.
See Sedimentary geology of the zeolitic volcanic lacustrine Pliocene Rome Beds, Oregon. Part I; Sed. Geol., vol. 6, 1971.

1062. Yole, R.W., James, C.M., Carleton Univ.:
Sedimentary petrology of carbonate rocks of selected areas in Canada, 1969-72.

1063. Yole, R.W., Sawford, E.C., Carleton Univ.:
Microfacies of ordovician carbonates, Ottawa valley, Ontario, 1969-72.

1064. Young, G.M., Univ. of Western Ontario:
Stratigraphy and sedimentation of Hadrynian rocks of the Arctic Archipelago, 1971-.

1065. Young, G.M., Parviainen, E.A.U., Univ. of Western Ontario:
Stratigraphic and sedimentological investigation of Huronian rocks of north shore of Lake Huron, Ontario, 1964-; Ph.D. thesis, (Parviainen).
Recent emphasis has been on the Ramsay Lake, Bruce and Espanola Formations.

1066. Young, H., Queen's Univ.:
Stratigraphy and carbonate petrology of the Virden Member, Lodgepole Formation (Mississippian) in southern Manitoba, 1968-72; Ph.D. thesis.

SEDIMENTOLOGY AND SEDIMENTARY PETROLOGY

1067. Young, H.R., Brandon Univ.:
Petrology of the Virden Member, Lodgepole Formation, in southwestern Manitoba, 1965-72.
A petrographic analysis of one of the oil producing horizons in southwestern Manitoba, with a view to reconstructing the original patterns of sedimentation and environments of deposition.

1068. Yorath, C.J., Havard, C.J., Geol. Surv. of Can.:
Mesozoic and Cenozoic stratigraphy and sedimentation, Beaufort-Mackenzie Basin, Northwest Territories, 1969-.

General

1069. Drapeau, G., Bedford Institute:
Sediment bed of herring spawning, 1970-72.
The types of sediments and the geodynamic conditions that prevail on spawning grounds are being studied to help biologists to understand the phenomenon of herring spawning better. On Georges Bank, herring spawned on fine gravel swept by strong currents exclusively.

1070. Drapeau, G., Bedford Institute:
Seashore pollution and coastal geodynamics of Chedabucto Bay, Nova Scotia, 1970-72.
To continue the research related to the natural cleaning and geodynamics of seashores undertaken during Operation Oil. Chedabucto Bay is an ideal area to correlate the geodynamic processes observed on the seashores with such phenomena as tide propagation, wave refraction, seiches, and currents. Detailed investigations on the seashore of Crichton Island eventually will be expanded to other areas of the Bay.

1071. Drapeau, G., Bedford Institute:
Dynamics of sediment transport in coastal waters, 1968-.
Correlation between surficial sediments and intensity of currents and waves is being determined through visual observations from submersibles, underwater photography and television, and grab sampling. In the laboratory, a sediment settling tube (almost completed) will be used to correlate current velocities with sediment settling velocity rather than grain size. See Sand waves on Browns Bank observed from a submersible; Maritime Sediments, vol. 6, pp. 90-100, 1970.

1072. Peach, P.A., Brock Univ.:
Solving some geological measurement problems with the Quantimet 720, 1971-72.
The Quantimet 720 Image Analysing Computer permits extremely rapid measurement of size parameters. The study is of the application of this to problems of size, shape, distribution, orientation and modal analysis.

STRATIGRAPHY AND PALEONTOLOGY

Precambrian

1073. Bell, R.T., Brock Univ.:
Study of Aphebian sediments, 1969-74.
The present phase of study is extension beyond the Hurwitz Group for comparative purposes to the Belcher Islands and to the Great Slave Lake regions.

1074. Chandler, F.W., Ontario Dept. of Mines and Northern Affairs:
Wakomata Lake area, Ontario, 1971-73.
Part of continuing project aiming at resolving Huronian stratigraphy west of (approximately) longitude 83°. See Wakomata Lake area (west half). District of Algoma; in Ontario Dept. of Mines and Northern Affairs, Misc. Paper 49, pp. 76-81, 1971.

1075. Donaldson, J.A., Jones, B.G., Carleton Univ.:
Proterozoic stromatolites, 1970-72.
Stromatolites and other structures from the Hornby 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.

1076. Franklin, J.M., Wanless, R.K., Loveridge, W.D., Lakehead Univ., and Geol. Surv. of Can.:
Stratigraphy and age of the Sibley Group, a Paleohelikian red-bed sequence, 1967-72.
Rb-Sr whole rock isochron data has been used to determine the age of this sequence. The stratigraphy of the southern area of Sibley outcrop has been determined and detailed petrographic and clay mineralogy studies are under way. The Sibley Group is a thin (max. 700 ft) laterally extensive (approx. 15,000 sq. miles) Paleohelikian red-bed sequence formed of coarse to fine clastic sediments, carbonate beds, and chert-stromatolite zone.

1077. Hofmann, H.J., Univ. de Montréal:
Precambrian Paleontology. Phanerozoic organosedimentary structures and problematica, 1969-.
See Precambrian fossils, pseudofossils, and problematica in Canada; Geol. Surv. Can., Bull. 189, 1971.

1078. Long, D.G.F., Univ. of Western Ontario:
Stratigraphy and sedimentation of the early Proterozoic Chibougamau Formation, Québec, 1969-71; M.Sc. thesis. thesis.

1079. Young, G.M., Univ. of Western Ontario:
Stratigraphy and sedimentation of Hadrynian rocks of the Arctic Archipelago, 1971-.

1080. Young, G.M., Parviainen, E.A.U., Univ. of Western Ontario:
Stratigraphic and sedimentological investigation of Huronian rocks of north shore of Lake Huron, Ontario, 1964-.; Ph.D. thesis (Parviainen).
Recent emphasis has been on the Ramsay Lake, Bruce and Esponola Formations.

STRATIGRAPHY AND PALEONTOLOGY

Cambrian to Silurian

1081. Bolton, T.E., Geol. Surv. of Can.:
Silurian and Ordovician macro-biostratigraphy of Anticosti Island, Québec, 1957-.
Systematic investigation of the total fauna commencing with echinoderms and tabulate corals. See Geological map and notes on the Ordovician and Silurian litho- and biostratigraphy, Anticosti Island, Québec; Geol. Surv. Can., Paper 71-19, 1972.

1082. Bond, I.J., Queen's Univ.:
Lower Ordovician biostratigraphy of southeastern Ontario, 1970-73; Ph.D. thesis.
See Conodonts from the March and Oxford Formations in the Brockville area, Ontario; Can. J. Earth Sci., vol. 8, No. 11, pp. 1455-1472, 1971.

1083. Copper, P., Laurentian Univ.:
Paleoecology, morphology and evolution of components of Benthic marine communities during Ordovician-Devonian time, 1962-75.

1083. Cumming, L.M., Geol. Surv. of Can.:
Ordovician stratigraphy of Hudson Bay Lowlands, 1967-71.
To study and map Ordovician formations of the Moose River Basin and Hudson Bay Basin as a part of the assessment of the mineral resources of the region (Operation Winisk). See Ordovician strata of the Hudson Bay Lowlands in northern Manitoba; Geol. Assoc. Can., Sp. Paper No. 9, pp. 189-197, 1971.

1084. Dixon, O.A., Williams, S.R., Dixon, J., Jones, B., Univ. of Ottawa:
Silurian and older sedimentary rocks and faunas on Somerset and Prince of Wales Islands, Northwest Territories, 1968-73; Ph.D. theses.
Current studies concern the Read Bay Formation (Sil.), Allen Bay Formation and basal Paleozoic rocks (?Camb-Sil.) and Hunting Formation (?Proterozoic) near the Boothia Arch. Objectives include more precise dating of the rocks, the definition or refinement of local stratigraphic boundaries, the establishment of a zonal scheme where possible in the Paleozoic rocks, and the interpretation of the faunal and sedimentary facies in terms of the sedimentary environments and paleogeography. See The Aston Formation (?Proterozoic) on Prince of Wales Island, Arctic Canada; Can. J. Earth Sci., vol. 8, pp. 732-742, 1971.

1085. Greggs, R.G., Queen's Univ.:
Upper Cambrian biostratigraphy of North America, 1964-.

1086. Greggs, R.G., Queen's Univ.:
Conodont faunas of the Gull River Formation, southeastern Ontario, 1969-.

1087. Greiner, H.R., Howells, K., Univ. of New Brunswick:
Silurian-Devonian contact relationships and faunas of northern New Brunswick, 1959-71.

1088. Hamilton-Smith, T., New Brunswick Dept. of Natural Resources:
Silurian stratigraphy and sedimentation of Western New Brunswick.
Paleogeography of northwestern New Brunswick during the Llandovery: a study of the provenance of the Siegas Formation; Can. J. Earth Sci., vol. 8, No. 2, pp. 196-203, 1971. See A proximal-distal turbidite sequence and a probable submarine canyon in the Siegas Formation (Early Llandovery) of northwestern New Brunswick; J. Sedimentary Petrol. vol. 41, No. 3, 1971.

1089. Hill, J.D., Acadia Univ.:
The geology of a section of Silurian sediments near Petit Rocher, New Brunswick, 1970-71. Penecomtemporaneous slump structures in the Chaleur Bay Group in northeastern New Brunswick, 1970-71. The petrology and genesis of basic intrusives within the Tetagouche Group, New Brunswick, 1971-73.

1090. Lenz, A.C., Univ. of Western Ontario:
Lower Paleozoic geologic history of northern Yukon and adjacent District of Mackenzie, 1970-74.

1091. Lespérance, P.J., Univ. de Montréal:
Ordovicien supérieur au Devonien Inferieur des Appalaches du Québec, 1957-.
See The Synphoriinae: an evolutionary pattern of Lower and Middle Devonien trilobites; J. Pal., vol. 45, pp. 182-208, 1971.

1092. Liberty, B.A., Brock Univ.:
Carbonate rocks in Ontario, 1964-.

1093. Mountjoy, E.W., McGill Univ., and Geol. Surv. of Can.:
Cambrian stratigraphy and petrology of northern Jasper Park, Alberta, 1960-.
A regional study of Cambrian stratigraphy to determine the distribution, thickness and petrography of various units. A study of Ordovician strata and the pre-Devonian unconformity is also included.

1094. Noble, J.P.A., Howells, K., Roulston, B., Univ. of New Brunswick:
Silurian-Devonian stratigraphy and paleoenvironments, New Brunswick, 1970-75.

1095. Norford, B.S., Geol. Surv. of Can.:
Faunal study of Late Ordovician and Silurian rocks of southeast British Columbia and adjacent Alberta, 1960-.
Operation Winisk-Silurian stratigraphy of the Hudson Bay and James Bay Lowlands, 1967-. See Silurian stratigraphy of northern Manitoba; Geol. Assoc. Can., Sp. Paper No. 9, pp. 199-208, 1971.

1096. Pugh, D.C., Geol. Surv. of Can.:
Subsurface Cambrian stratigraphy and "granite wash" in northern and central Alberta, 1970-72.

STRATIGRAPHY AND PALEONTOLOGY

Preparation of structure, isopach and isolith maps and stratigraphic cross-section of Cambrian strata and pre-Devonian topography, including delineation of Precambrian regolith to provide the basis of understanding of geological events preceeding the Devonian. See Subsurface Cambrian stratigraphy in southern and central Alberta; Geol. Surv. Can., Paper 70-10, 1971.

1097. Pugh, D.C., Geol. Surv. of Can.:
Subsurface Cambrian stratigraphy in northeastern British Columbia, 1972-.

1098. Riva, J., Univ. of Laval:
Study of Middle Ordovician graptolites on a regional basis, 1966-.

1099. Ruitenberg, A.A., Buttimer, S., New Brunswick Dept. of Natural Resources:
Structural, stratigraphic and metallogenic studies of the Silurian-Devonian rocks in southern New Brunswick, 1967-.
To assist in economic development of mineralized zones and to produce mineral forecast maps. See Mineralized structures in the Johnson Croft, Annidale, Jordan Mountain and Black River areas; New Brunswick Dept. of Natural.Resources, Rept. Investigation No. 13, 1971.

1100. Trettin, H.P., Geol. Surv. of Can.:
Stratigraphy and sedimentology of Silurian and Devonian clastic formations, Canon Fiord regions, Ellesmere Island, 1969-73.

1101. Trettin, H.P., Geol. Surv. of Can.:
Lower Paleozoic geology, Foxe Basin, northeastern Melville Peninsula and parts of northern and central Baffin Island, 1968-72.

1102. Usher, J.L., Queen's Univ.:
Lower and Middle Paleozoic geologic history of eastern Ontario, and Québec, 1967-73.

1103. Winder, C.G., Giles, P., Hughes, M.J., Univ. of Western Ontario:
Paleozoic geology of southern Ontario, 1951-; theses studies.
A more detailed study of lithostratigraphic, biostratigraphic and chronostratigraphic units, primarily by carbonate petrology, and insoluble residues with particular emphasis on conodonts. The study has been directed to the Ordovician with most effort toward the outcrop at Bowmanville, Colborne, and Lakefield, regional study of the Beekmantown in the Ottawa-Cornwall area, and the petrology and geochemistry of the Gasport carbonate at Queenston, Ontario, to determine reasons for a brown mottling which appears on this rock when used as a building stone.

1104. Young, F.G., Geol. Surv. of Can.:
Stratigraphy of Gog and Cariboo Groups near the Rocky Mountain Trench, McBride, British Columbia, 1967-72.
See Early Cambrian and older trace fossils from the southern Cordillera of Canada; Can. J. Earth Sci., vol. 9, No. 1, pp. 1-17, 1972.

Devonian to Permian

1105. Bamber, E.W., Geol. Surv. of Can.:
Description of stratigraphic sections through Carboniferous and Permian rocks of northern Yukon, 1971.
See Carboniferous and Permian stratigraphy and paleontology, northern Yukon Territory, Canada; Bull. Can. Petrol. Geol., vol. 19, No. 1, pp. 29-250, 1971.

1106. Barss, M.S., Geol. Surv. of Can.:
Palynological zonation of the Carboniferous and Permian rocks of Atlantic Provinces, Gulf of St. Lawrence and northern Canada, 1971-.
Seven miospore zones can be recognized, ranging in age from Mid-Devonian to possible early Visean within the Horton Group of the Atlantic Provinces.

1107. Beland, J., Brisebois, D., Univ. de Montréal:
Montée diapirique de formation gypsifère aux Iles de la Madeleine, Province de Québec, 1971-73; thèse de doctorat (Brisebois).

1108. Caldwell, W.G.E., Lomenda, M.G., McNeil, D.H., Wright, E., Univ. of Saskatchewan:
Biostratigraphic studies in western Canada, 1959-; M.Sc. theses.
Studies include Devonian sequences in the Mackenzie River valley of the Northwest Territories, using brachiopods and corals, and Cretaceous sequences in the Canadian Great Plains using Foraminifera. See The biostratigraphy of some Middle and Upper Devonian rocks in the Northwest Territories: an historical review; Muskox, No. 9, pp. 15-34, 1971.

1109. 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 along the Chetamon Thrust Sheet between Mt. Simla and Mt. Henday, Jasper National Park.

1110. Danner, W.R., Univ. of British Columbia:
Paleontology, stratigraphy and carbonate petrology of the Cache Creek Group (Pennsylvanian-Permian) and correlated units in the western Cordillera, 1957-.

To shed light on sea-floor spreading and plate tectonics of the western Cordillera as well as establish the stratigraphic succession, environment of deposition and fossil content of this assemblage.

1111. Harrington, J.W., Univ. of Calgary:
Correlation and comparison of the western Canadian and New York Frasnian (Upper Devonian) based on rhynchonelloid brachiopod zonations, 1969-74.

1112. Jull, R.K., Univ. of Windsor:
Upper Devonian corals from the ancient wall reef complex, Jasper Park, Alberta, 1970-74.
The lateral and vertical distribution of corals in relation to the reef complex and surrounding sediments is being studied in the south-east flank of the Ancient Wall reef complex, exposed on Mount Haultain, Jasper Park, Alberta.

1113. Kobluk, D.P., McGill Univ.:
Paleoecology and stratigraphy of the Devonian section on Slide Creek, Miette Reef Complex, Alberta, 1971-73; M.Sc. thesis.

1114. MacDonald, D.J., Acadia Univ.:
A stratigraphic study of the Horton Bluff Formation (Mississippian), Wolfville map area, Wolfville, Nova Scotia, 1971-73; M.Sc. thesis.
To study, interpret, and define lithogies, lateral facies equivalents, and depositional environments of the sediments comprising the Horton Bluff Formation, and to divide the formation into lithologically mapable units, and to establish a type section of the formation.

1115. Mamet, B.L., Univ. de Montréal:
Zonation micropaléontologique du Carbonifère. Etude de la répartition paléogéographique d'assemblages de microfaunes et détermination des relations bio- et lithostratigraphique, 1965-.
See Preliminary foraminiferal zonation of early Carboniferous strata in the North American Cordillera; I.U.G.S. Subcommission on Carboniferous stratigraphy, Congrès et Colloques de l'Université de Liège, vol. 55, pp. 327-348, 1971.

1116. McCabe, H.R., Manitoba Dept. of Mines, Resources and Environmental Management:
Devonian stratigraphy of southwestern Manitoba, 1970-72.
See Stratigraphic and industrial minerals core hole programme; Manitoba Mines Br., Geol. Paper 6/71, 1971.

1117. McCulloch, P., Acadia Univ.:
Stratigraphy of the Kennetcook Limestone unit (Windsor Group, Mississippian), Nova Scotia, 1971-73; M.Sc. thesis.
Includes a study of a chonetid species restricted to this unit.

1118. McGregor, D.C., Geol. Surv. of Can.:
Biostratigraphic study of Paleozoic palynomorphs of the Arctic Islands, 1968-75.
See Devonian spores and conodonts of Melville and Bathurst Islands, District of Franklin; Geol. Surv. Can., Paper 71-13, 1971.

1119. McGugan, A., Scott, J.A.B., Univ. of Calgary:
Permian stratigraphy in western Canada.

1120. Meijer-Drees, N.C., Geol. Surv. of Can.:
Study and correlation of Devonian formations in the subsurface of the Redstone River map sheet, Northwest Territories, 1971-73.

1121. Moore, R.G., Acadia Univ.:
Stratigraphy of the Lower Windsor Group in the Minas subbasin, 1967-72.
Publication will involve a faunal and lithological description of at least 12 siltstone and carbonate units within the lower part of the Windsor Group (B subzone) and will give consideration to known lateral facies variation within some of these, plus unit correlation with the type section and a section lying outside of the Minas sub-basin will be made (Cape Breton).

1122. 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.

1123. Nautiyal, A.C., Brooke, M.M., Braun, W.K., Univ. of Saskatchewan:
Frasnian biostratigraphy and acritarchs of western Canada; Jurassic microfaunas and biostratigraphy of Saskatchewan and Montana; and Devonian ostracod faunas and biostratigraphy of western Canada, 1964-1972.

1124. Noble, J P.A., Howells, K., Roulston, B., Univ. of New Brunswick:
Lower and Middle Devonian faunas: controlling factors in their evolution and distribution, 1968-75.
See Facies and faunal relations at edge of early Mid-Devonian carbonate shelf, south Nahanni River area, Northwest Territories; Can. Petrol. Geol., vol. 19, No. 4, 1971.

1125. Norris, A.W., Geol. Surv. of Can.:
Devonian biostratigraphy of the northern Yukon Territory and adjacent District of Mackenzie, 1970-73.

1126. Norris, A.W., Geol. Surv. of Can.:
Devonian biostratigraphy of Lake Manitoba - Lake Winnipegosis region, Manitoba, 1964-73.
See Stratigraphy and conodont faunas of Devonian outcrop belts, Manitoba; Geol. Assoc. Can., Sp. Paper

No. 9, pp. 209-224, 1971. Devonian biostratigraphy of Lake Manitoba - Lake Winnipegosis region; Geol. Surv. Can., Paper 72-1, pt. A, p. 222, 1971.

1127. Norris, A.W., Sanford, B.V., Geol. Surv. of Can.:
Operation Winisk: Devonian of the Hudson Bay Lowlands, 1967-72.

1128. Paterson, D.F., Saskatchewan Dept. of Mineral Resources:
Devonian macrofossils of Saskatchewan, 1971-73.

1129. Risk, M.J., McMaster Univ.:
Species diversity in some Middle Devonian brachiopod assemblages, 1971-73.

Rigorous quantitative methods will be used to calculate the information - theory species diversity of a series of brachiopod "life assemblages" at several stratigraphic levels within the Ludlowville Formation in western New York State.

1130. Schenk, P.E., Dalhousie Univ.:
Detailed studies of the Meguma and Windsor Groups in Nova Scotia, 1965-.

The Early Devonian Torbrook Formation is highly important in relating Morocco and Atlantic Canada as well as being very significant in its own right. This unit is the last fill of the Meguma trough (continental rise-complex) and marks continental collision as the mile-thick formation changes upward from marine silty black shale to red, fluvial sandstones. An almost identical section of the same age in Morocco serves as one of our best bridges between the two continents. Fauna of the Torbrook is of the Old World Rhenish subprovince, unfound elsewhere in North America, but common in Europe and North Africa. See Southeastern Atlantic Canada, northwestern Africa, and continental drift; Can. J. Earth Sci., vol. 8, No. 10, pp. 1218-1251, 1971.

1131. Stabbins, R., Saskatchewan Dept. of Mineral Resources:
The Middle Devonian Dawson Bay Formation of southeastern Saskatchewan, 1969-71.

The Dawson Bay Formation of southeastern Saskatchewan consists largely of fine grained carbonates and of evaporites - mainly anhydrite and halite - and was deposited under quiet, shallow, marine conditions, with periods of short-lived supra-tidal sedimentation. A thin, basal argillaceous member, the Second Red Bed, separates these sediments from the halite-sylvite-carnallite sequence of the underlying Prairie Evaporite.

Numerous exploratory wells, many of them cored, have penetrated the formation which though it has not yet produced oil in Saskatchewan, is regarded as a possible petroleum reservoir where not halite-plugged. The study is based on a detailed analysis of core, thin sections, samples and well logs.

1132. Thorpe, L., Acadia Univ.:
Taxonomy and paleoecology of Mississippian (Windsor Group) productid brachiopods, 1970-72; M.Sc. thesis.

1133. Uyeno, T.T., Geol. Surv. of Can.:
Conodont biostratigraphy of Middle and Upper Devonian strata of southern and central Manitoba, 1967-.
See Stratigraphy and conodont faunas of Devonian outcrop belts, Manitoba; Geol. Assoc. Can., Sp. Paper No. 9, pp. 209-224, 1971.

1134. Van de Poll, H.W., New Brunswick Dept. of Natural Resources:
Carboniferous geology in New Brunswick, 1965-.
Investigations into the stratigraphic, sedimentological, tectonic and palaeogeographic aspects of post-Acadian (orogeny) geology in New Brunswick.

1135. Von Bitter, P.H., Royal Ontario Museum:
Environmental control of conodont distribution in the Shawnee Group (U. Pennsylvanian) of eastern Kansas, U.S.A., 1968-72.
See Dating conodonts using electron spin resonance: a possible technique; Kansas Geol. Survey, Bull. 199, pt. 1, pp. 17-19, 1970.

1136. Yeager, D., Danner, W.R., Univ. of British Columbia:
Geology of the Ballenas Islands, British Columbia, 1971-72.
To study stratigraphic sequence and paleontology of these small islands with the only known Middle Pennsylvanian faunas in western British Columbia.

1137. Yole, R.W., Carleton Univ.:
Upper Paleozoic stratigraphy of Vancouver Island, British Columbia, 1960-72.

Mesozoic

1138. Balkwill, H.R., Geol. Surv. of Can.:
Structure and stratigraphy, Ringnes Islands and nearby smaller islands, District of Franklin, 1971-75.
See Structure and stratigraphy, Ringnes Islands and nearby smaller islands, District of Franklin; Geol. Surv. Can., Paper 72-1, pt. A, pp. 196-197, 1971.

1139. Caldwell, W.G.E., Lomenda, M.G., McNeil, D.H., Wright, E., Univ. of Saskatchewan:
Biostratigraphic studies in western Canada, 1959-; M.Sc. thesis.
Studies include Devonian sequences in the Mackenzie River valley of the Northwest Territories, using brachiopods and corals, and Cretaceous sequences in the Canadian Great Plains using Foraminifera. See The biostratigraphy of some Middle and Upper Devonian rocks in the Northwest Territories: an historical review; Muskox, No. 9, pp. 15-34, 1971.

STRATIGRAPHY AND PALEONTOLOGY

1140. Chamney, T.P., Geol. Surv. of Can.:
Foraminiferal zonation of the Mesozoic and lower Cenozoic rocks of the MacKenzie River delta and adjacent Arctic Coastal Plain, 1969-73.
See Biostratigraphic contributions from the Arctic Coastal Plain west of the Mackenzie River delta; Geol. Surv. Can., Paper 72-1, pt. A, pp. 202-203, 1971.

1141. Gibson, D.W., Geol. Surv. of Can.:
Triassic stratigraphy and petrology in the Foothills and Front Ranges of western Canada, 1962-73.
See Triassic petrology of Athabasca-Smoky River region, Alberta; Geol. Surv. Can., Bull. 194, 1971.

1142. Hanson, W.B., Oregon State Univ.:
The stratigraphy and sedimentology of the Late Cretaceous Nanaimo Group, Saltspring Island, British Columbia, 1972-; Ph.D. thesis.
To create a detailed structural and stratigraphic map of Saltspring Island with supporting lithologic descriptions, and to make detailed paleoevnironmental interpretations of all sedimentary rock units.

1143. Langhus, B.G., Gulf Oil Canada Limited:
Biostratigraphy of Arctic mainland, Canada.
Current research centers around Mesozoic and Tertiary subsurface biostratigraphy of northern Canada through the use of fossil macroinvertebrates, foraminifera, and nannoplankton. As background for a comprehensive biochronology, many outcrop sections from Arctic and western Canada, western United States, and the Gulf coast were examined for benthonic foraminifera and nannoplankton.

1144. Mountjoy, E.W., McGill Univ., and Geol. Surv. of Can.:
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.

1145. Nautiyal, A.C., Brooke, M.M., Braun, W.K., Univ. of Saskatchewan:
Frasnian biostratigraphy and acritarchs of western Canada; Jurassic microfaunas and biostratigraphy of Saskatchewan and Montana; and Devonain ostracod faunas and biostratigraphy of western Canada, 1964-72.

1146. Preto, V.A., Church, B.N., British Columbia Dept. of Mines and Petroleum Resources:
Structure, stratigraphy and mineral deposits of the Upper Triassic Nicola Group, British Columbia, 1972-75.
The stratigraphy and structure, and the relationship of the distribution of volcanic centres and comagnetic intrusions to the distribution of mineral deposits will be investigated.

1147. Roy, K.J., Geol. Surv. of Can.:
Stratigraphy of the Boundary Member, Charlie Lake Formation (Triassic), northeastern British Columbia, 1971.

1148. Singh, C., Research Council of Alberta:
Lower Cretaceous microfloras of the Peace River district, Alberta, 1965-71.

1149. Singh, C., Research Council of Alberta:
Cenomanian-Turonian microfloras of the Peace River district, Alberta, 1969-.

1150. Singh, C., Research Council of Alberta:
Late Cretaceous-Tertiary microfloras, west-central Alberta, 1970-.
Approximately 70 siltstone and mudstone samples collected by G.B. Mellon from the Late Cretaceous-Tertiary succession of west-central Alberta have been processed to delineate the Cretaceous-Tertiary boundary in that area. From the 40 samples examined to date 67 microfloral species typical of Maestrichtian and early Paleocene ages have been identified.

1151. Stott, D.F., Geol. Surv. of Can.:
Cretaceous stratigraphy, Peace River to 60°, British Columbia, 1961-73.

1152. Stott, D.F., Geol. Surv. of Can.:
Cretaceous subsurface studies in northwestern British Columbia, 1962-73.

1153. Stott, D.F., Geol. Surv. of Can.:
Jurassic and Cretaceous stratigraphy, Sikanni Chief River to 53°30', British Columbia and Alberta, 1968-73.

1154. Toy, B.R., Mobil Oil Canada:
Biostratigraphic investigations of Jurassic through Tertiary sediments on the Scotian Shelf and Grand Banks, 1971-.
Foraminifera (planktonic and benthonic), ostracods, and nannoplankton from well cuttings and cores are being utilized to establish, for correlation purposes, a biostratigraphic zonation of the sediments on the Scotian Shelf and Grand Banks.

1155. Wall, J.H., Anan-Yorke, R., Given, M.M., Rosene, R., Research Council of Alberta:
Bearpaw microfaunal studies, 1966-.
Microfaunal studies of subsurface sections of the Bearpaw Formation in the Cypress Hills and in the Strathmore well, and of surface sections in the southern Alberta Foothills are in progress. See Microfauna from the Upper Cretaceous Bearpaw Formation of south-central Alberta; Bull. Can. Petrol. Geol., vol. 19, No. 2, pp. 504-546, 1971.

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1156. Yorath, C.J., Havard, C.J., Geol. Surv. of Can.:
Mesozoic and Cenozoic stratigraphy and sedimentation, Beaufort-Mackenzie Basin, Northwest Territories, 1969-.

1157. Young, F.G., Geol. Surv. of Can.:
Basin analysis of Mesozoic and Tertiary strata in northern Yukon Territory and northwestern District of Mackenzie, 1970-.
Currently, emphasis is being placed on the Arctic Coastal Plain in northern Yukon Territory. See Cretaceous stratigraphy between Blow and Fish Rivers, Yukon Territory; Geol. Surv. Can., Paper 72-1A, pt. A, pp. 229-235, 1972.

Cenozoic

1158. Clague, J., Univ. of British Columbia:
Tertiary and Quaternary geology, southern Rocky Mountain Trench, British Columbia, 1970-72.

1159. Kuc, M., Geol. Surv. of Can.:
Fossil mosses in the Arctic, 1969-.
See Fossil mosses, Beaufort Formation (Tertiary), northwestern Banks Island, western Canada Arctic; Can. J. Botany, vol. 49, No. 1, pp. 1089-1094, 1971.

1160. Medioli, F., Dalhousie Univ.:
Foraminifera ecology on the Scotian Shelf and other selected areas, 1966-.
Projects include: sedimentology and stratigraphy of several basins of the Mid-Atlantic Ridge, mainly concerned with the composition of biotic oozes (Foraminifera and Nannoplankton). Subbottom structure of the Bermuda Rise; it is hoped that a continuous seismic survey will reveal the relations between the basaltic substratum and the capping aeolianites (Nannoplankton and Ostracode). Subbottom structure, sedimentology and microneontology of the Halifax Harbour basin.

1161. Molinsky, L., Queen's Univ.:
Biostratigraphy and paleoecology of the Miocene strata in the western Atlantic and Caribbean area, 1971-73; M.Sc. thesis.
Detailed taxonomic and paleoecologic study of Miocene faunas in sediments from Trinidad, Scotian Shelf, Gulf of St. Lawrence and Grand Banks. Benthonic faunas are utilized to interpret the environment of formation; planktonic faunas are utilized for intercontinental correlation.

1162. Russell, L.S., Royal Ontario Museum:
Faunas and correlation of the Early Tertiary Formations of Saskatchewan and Montana, 1967-72.
A stratigraphic and faunistic study of the Ravenscrag Formation of Saskatchewan to determine its

time range and its correlation with the analogous Fort Union Group of Montana and North Dakota, and to compare the Cretaceous-Tertiary transitions of Saskatchewan and the adjacent United States.

1163. Stevenson, S.J., Queen's Univ.:
Ultramicrostructure of Miocene Foraminifera from Trinidad and the Scotian Shelf, 1971-72.
Comparison of the ultramicrosturcture of micro-organisms as a paleoclimatic and paleooceanographic index. Detailed taxonomy for faunal zonation in widely separated geographic areas.

General

1164. Bartlett, G.A., Queen's Univ.:
Ecostratigraphy and biostratigraphy of waters and sediments adjoining the Mid-Atlantic ridge, 1966-.

1165. Bartlett, G.A., Molinsky, L., Queen's Univ.:
A history of the Gulf of St. Lawrence, 1968-.

1166. Bartlett, G.A., Robertson, J., Molinsky, L., Queen's Univ.:
A geologic history of the Mackenzie River delta, 1970-; M.Sc. thesis (Molinsky).

1167. Bartlett, G.A., Smith, L., Queen's Univ.:
Biostratigraphy and tectonic history of Canadian Atlantic continental margins, 1966-.
See Mesozoic and Cenozoic history of the Grand Banks of Newfoundland; Can. J. Earth Sci., vol. 8, No. 1, pp. 70-116, 1971.

1168. Bartlett, G.A., Smith, R., Queen's Univ.:
Ecostratigraphy and biostratigraphy of the North Atlantic, South Atlantic, Antarctic, South Pacific, North Pacific and Arctic Oceans, 1969-; M.Sc. thesis (Smith).

1169. Beales, F.W., Univ. of Toronto, and Dominion Observatory:
Sedimentary fill of the Brent Crater, Ontario, 1965-72.

1170. Brun, J., Univ. de Laval:
Etude structurologique et stratigraphique du synclinorium de St-Alban, 1971-74; thèse de doctorat.
Cette étude a pour but d'étudier avec plus de détail l'évolution de la zone du géosynclinal à la zone de la plateforme. Elle reposera essentiellement sur le traitement des donées cartographiques, pétrographiques et structurographiques de la région considérée.

STRATIGRAPHY AND PALEONTOLOGY

1171. McCabe, H.R., Manitoba Dept. of Mines, Resources and Environmental Management:
Stratigraphy of the Grand Rapids area, 1971-73.
Study of newly accessible outcrop areas north of Grand Rapids, and correlation of outcrop geology with available subsurface core-hole data.

1172. Smith, R., Bartlett, G.A., Queen's Univ.:
Geotectonics and paleooceanography, 1971-73.
The stratigraphic and ecologic data from microfauna investigations have been utilized to interpret both the oceanic and climatic conditions that existed in the North Atlantic during deposition of Mesozoic and Cenozoic sediments. The relative position of landmasses and seafloor configuration is essential for the interpretation of paleooceanography and paleoclimatology.

1173. Uyeno, T.T., Geol. Surv. of Can.:
Conodont biostratigraphy of Paleozoic rocks of the Arctic Islands, Northwest Territories, 1968-.
See Devonian spores and conodonts of Mellville and Bathurst Islands, District of Franklin; Geol. Surv. Can., Paper 71-13, 1972.

STRUCTURAL GEOLOGY AND TECTONICS

Alberta

1174. Bielenstein, H.U., Mines Branch, Dept. of Energy, Mines and Resources:
Structure of the Cascade Coal basin, Alberta, 1971-.
A detailed study of the structure of this coal basin, with emphasis on the mesoscopic fabric, is continuing in order to relate geologic parameters to rock mechanics and mining problems.

1175. Mountjoy, E.W., McGill Univ., and Geol. Surv. of Can.:
Structure of Front and Main Ranges, northern Jasper Park, Alberta, 1967-.
Extent, geometry and development of fold and thrust structures, relationships of folds with abrupt termination of thrusts, interrelations of hanging-wall and foot-wall structures. See The Cordilleran foreland thrust and fold belt in the southern Canadian Rockies; Geol. Soc. Am., Abstracts, vol. 3, No. 6, pp. 404-405, 1971; Cadomin Conglomerate of Alberta - Derived from main range thrust sheets uplifted during Early Cretaceous time; ibid., pp. 411-412, 1971.

1176. 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-.

1177. Rector, R.J., Gulf Oil Canada Limited:
Structural geology - Rocky Mountains of southern Alberta and northeast British Columbia, 1970-.
Geometry and development of fold thrust structures.

1178. Reik, G.A., Univ. of Toronto:
Microfractures, joints, and residual strain in Cardium sandstone of the South Ram Falls area, Alberta; a field and experimental study of factors that contribute to fracture development in sedimentary rock, 1968-72; Ph.D. thesis.

British Columbia

1179. Balkwill, H.R., Geol. Surv. of Can.:
Structural analysis, western Main Ranges, Rocky Mountains, British Columbia, 1966-72.
See Structure of the Western Ranges and Western Main Ranges, Rocky Mountains, about 51°20'N. latitude; Geol. Soc. Am., Abstracts with programs, vol. 3, p. 367, 1971.

1180. Chase, R.L., Barr, S.M., Thomlinson, A.G., Bertrand, W.G., Univ. of British Columbia:
Geology of northeastern Pacific west of British Columbia, 1969-.
The relation of the features of the Pacific continental margin of Canada (Continental Shelf, slope, and

adjacent ridges, troughs, basins and seamounts) to plate tectonic processes has been studied since 1969. Techniques include dredging, coring, photography, continuous seismic reflection profiling, magnetic profiling, atomic absorption analysis, fission track dating. The deformation of sedimentary strata and the petrology, age and magnetic properties of submarine eruptives are related to the tectonic history of the region. See Preliminary analysis of geophysical measurements north of Juan de Fuca Ridge; Can. J. Earth Sci., vol. 8, No. 10, pp. 1265-1281, 1971.

1181. Eisbacher, G.H., Geol. Surv. of Can.:
Sustut-Sifton basin, British Columbia, 1969-73.

1182. Gilman, R.A., Price, R.A., Queen's Univ.:
The Clachnacuddain salient of the Shuswap metamorphic complex, 1971-72.
Investigation of the structural and petrologic relationships between the granitic gneisses and enveloping metasedimentary rocks in the area east of Revelstoke, British Columbia.

1183. Monger, J.W.H., Geol. Surv. of Can.:
Upper Paleozoic rocks of the western Canadian Cordillera, 1966-.
Upper Paleozoic rocks in the western Canadian Cordillera contains elements of island arcs and oceanic crust and are the oldest known rocks in the intermontane belt and Coast Mountains. Their distribution has an important bearing on the development of the Cordillera, according to current plate-tectonic hypotheses.

1184. Price, R.A., Queen's Univ.:
Tectonic evolution of the southwestern Canadian Cordillera and the nature and significance of variations in tectonic style, 1968-.
See Gravitational Sliding and the Foreland Thrust and Fold Belt of the North American Cordillera: Discussion; Bull. Geol. Soc. Am., vol. 82, pp. 3133-1138, 1971.

1185. 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, 1969-71; Ph.D. thesis (Thompson).

1186. Tiffin, D.L., Cameron, B.E.B., Geol. Surv. of Can.:
Geophysical and geological studies of the Pacific margin, 1970-.
Two main areas of investigation are the Queen Charlotte Fault, an active transform fault west of the Queen Charlotte Islands, and the Tofino Basin, a one-sided sedimentary basin west of Vancouver Island. The Queen Charlotte Fault separates two lithospheric plates at the continental margin, the America plate and the Pacific plate. Structures in the Tofino Basin may also be related to plate movements, in this case the Juan de Fuca Plate

and the America plate. By detailed mapping of geophysical and geological parameters it is possible to achieve a more complete understanding of Pacific continental margins and their relation to plate movements as well as to better determine the economic possibilities of the area.

1187. Zwanzig, H.V., Price, R.A., Queen's Univ.:
The Illecillewaet synform, 1970-72.

Manitoba

1188. Bailes, A.H., Manitoba Dept. of Mines, Resources and Environmental Management:
Metamorphic and deformational history of the File - Morton - Woosey Lakes area, Manitoba, 1970-72.
A detailed geological study of a small area straddling the contact between two major Precambrian lithologic units, the Flin Flon-Snow Lake greenstone belt and the Kisseynew sedimentary gneiss belt, to outline the metamorphic and deformational events which have affected this area, and to establish the relationship between these two major Precambrian lithologic and tectonic units.

1189. Stauffer, M.R., MacQuarrie, R., Univ. of Saskatchewan:
The Aphebian/Archean boundary between Flin Flon and Hanson Lake, 1968-; M.Sc. thesis (McQuarrie).
See The Hudsonian orogeny near Flin Flon, Manitoba: A tentative interpretation of Rb/Sr and K/Ar ages; Can. J. Earth Sci., vol. 8, No. 8, pp. 939-946, 1971.

1190. Stauffer, M.R., Reynolds, J., Univ. of Saskatchewan:
Structure and stratigraphy of the Missi Group, Manitoba, 1967-73; M.Sc. thesis (Reynolds).
See Superimposed deformations in the Missi metasedimentary rocks near Flin Flon, Manitoba; Can. J. Earth Sci., vol. 8, No. 2, pp. 217-242, 1971.

New Brunswick

1191. Garnett, J.A., Univ. of New Brunswick:
Structural analysis of part of the Lubec-Belleisle fault zone, southern New Brunswick, 1968-72; Ph.D. thesis.
Petrofabric elements of deformation (i.e. fold axes), mineral foliations and lineations, kink bands and fractures were analysed and correlated with strain measurements and microscopic investigation of the predominant cataclastic tectonites within this zone. An interpretation of the ductile and brittle rock movements associated with the structural history of the area is formulated.

STRUCTURAL GEOLOGY AND TECTONICS

1192. Helmstaedt, H., McGill Univ.:
Structural evolution of Bathurst-Newcastle district, New Brunswick, 1968-72.
Structural investigation of four areas in Bathurst-Newcastle district to assess changes in regional metamorphism, orientation and style of fabric elements.

1193. Luff, W.M., McAllister, A.L., Univ. of New Brunswick:
Structural geology of the Brunswick No. 12 Mine area, Bathurst, New Brunswick, 1971-73.
Oriented primarily to the solution of structural problems imposed by polyphase folding, the establishment of a stratigraphic sequence and examination of possible facies changes.

1194. Rast, N., Grant, R., Wardle, R., Univ. of New Brunswick:
Structural project across the Caledonian-Appalachian intercontinental orogenic belt, 1971-74.
To establish the general chronological petrologic and structural relationships in specific orogenic profiles in New Brunswick and to test their pre-Tertiary drift correlation with Europe, U.S.A. and Mexico. Parallel scaled model studies would be used to examine the dynamic processes responsible for the formation of the orogenic belt.

1195. Stringer, P., Univ. of New Brunswick:
Structural geology of selected areas in New Brunswick, and geological investigation of the Caledonian Mountains, southern New Brunswick, 1970-74.

1196. Stringer, P., Univ. of New Brunswick:
Correlation of polyphase deformation in the Palaeozoic rocks of New Brunswick, 1970-74.

Newfoundland and Labrador

1197. Kennedy, M.J., Colman-Sadd, S.P., McGonigal, M.H., McCann, A., Memorial Univ.:
Structural investigations of the metamorphic rocks of the Newfoundland Appalachians, 1969-72; Ph.D. thesis (Coleman-Sadd), M.Sc. theses (McGonigal, McCann).
Concerned with two groups of metamorphic rocks, the Fleur de Lys Supergroup in the northwest and the Gander Lake Group in the southeast of the Newfoundland Appalachian system. See Structure and stratigraphy of the Fleur de Lys Supergroup in the Fleur de Lys area, Burlington Peninsula, Newfoundland; Proc. Geol. Assoc. Can., vol. 24, pp. 59-71, 1971.

1198. Stevens, R.K., Memorial Univ.:
Geology of the Bonne Bay area, west Newfoundland, 1971-73.

1199. Williams, H., Comeau, R.G., Payne, J., Memorial Univ.:
Transported Cambrian-Ordovician clastic sedimentary rocks and ophiolite suites in western Newfoundland, 1970-73; M.Sc. theses (Comeau, Payne).

See Mafic-Ultramafic complexes in western Newfoundland Appalachians and the evidence for their transportation: a review and interim report; Proc. Geol. Assoc. Can., vol. 24, No. 1, pp. 9-25, 1971.

Northwest Territories

1200. Balkwill, H.R., Geol. Surv. of Can.:
Structure and stratigraphy, Ringnes Islands and nearby smaller islands, District of Franklin, 1971-75.
See Structure and stratigraphy, Ringnes Islands and nearby smaller islands, District of Franklin; Geol. Surv. Can., Paper 72-1, pt. A, pp. 196-197, 1971.

1201. Kerr, J.W., Geol. Surv. of Can.:
Stratigraphy and structure of central and eastern Ellesmere Island, Northwest Territories, 1961-72.

1202. Kerr, J.W., Geol. Surv. of Can.:
Southwest Ellesmere Island and western Devon Island, Northwest Territories, 1967-72.

1203. Rector, R.J., Gulf Oil Canada Limited:
Structural geology - Mackenzie Delta and Beaufort Sea, Northwest Territories, 1970-.
Tectonic framework of Mackenzie Delta and Beaufort Sea, relationships of tectonics and contemporaneous sedimentation.

1204. Trettin, H.P., Frisch, T.O., Sobczak, L.W., Niblett, E.R., Weber, J.R., Geol. Surv. of Can.:
The Innuitian Province, 1971-72.

Nova Scotia

1205. Fyson, W.K., Carrara, A., Robinson, S., Univ. of Ottawa:
Relationship of small-scale to large-scale structures in Palaeozoic rocks, Nova Scotia, Gaspé Peninsula, and eastern Townships, Québec.
See Comparison of sedimentary and tectonic foliations by X-ray diffraction; Can. J. Earth Sci., vol. 8, pp. 1190-1196, 1971.

1206. Helmstaedt, H., Tella, J., McGill Univ.:
Structural history of pre-Carboniferous rocks in parts of eastern Cape Breton Island, 1971-72.

1207. Jones, B.E., Acadia Univ.:
Structural geology of the White Rock Formation, Wolfville map sheet, Nova Scotia, 1971-72; M.Sc. thesis.
Includes mapping, structural analysis, fabric analysis by optical and X-ray methods.

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Ontario

1208. Brigham, R.J., Univ. of Western Ontario:
Structural geology of the Paleozoic, southern Ontario, 1964-71.
Includes structural and isopachon maps on all important stratigraphic units, along with details on faults, joints, results of salt leaching and reefs. Trend surface analysis was computer calculated for some stratigraphic surfaces.

1209. Card, K.D., Ontario Dept. of Mines and Northern Affairs, Hutchinson, R.W., Univ. of Western Ontario:
The Sudbury structure: its regional geological setting, 1970-72.
The Sudbury structure in relationship to regional structural elements and Proterozoic orogenic events, and its metallogenic evolution. See The Sudbury structure: its regional geological setting; Geol. Assoc. Can., Mineral. Assoc. Can., Annual Meeting Abstract, pp. 11-13, 1971.

1210. Clifford, P.M., McMaster Univ.:
Structural development of Archaean supracrustal complexes, 1963-.
See Behaviour of an Archaean granitic batholith; Can. J. Earth Sci., vol. 9, No. 1, pp. 71-77, 1972.

1211. Fabbri, A., Univ. of Ottawa:
Structure and texture of gneisses near Sparrow Lake, Muskoka area, Ontario, 1968-73; Ph.D. thesis.

1212. Fyson, W.K., Divi, R., Univ. of Ottawa:
Structural analysis of Grenville rocks, Madoc-Bancroft area, Ontario, 1967-72; Ph.D. thesis (Divi).

1213. Lumbers, S.B., Ontario Dept. of Mines and Northern Affairs:
Geology of the Tomiko area, Ontario, 1969-72.
In addition to outlining the major geological features and mineral potential of the Grenville Province and of the immediately adjacent Southern and Superior Provinces, the study attempts to define the Grenville Front and to determine relationships of the Southern and Superior Provinces to the Grenville Province. See Some aspects of the northwestern margin of the Grenville Province between Sudbury and Lake Timiskaning, Ontario; Geol. Assoc. Can.- Mineral. Assoc. Can., Annual Meeting Abstract, 1971.

1214. Nwachukwu, S.O., Currie, J.B., Univ. of Toronto:
Paleomagnetic and susceptibility anisotropy studies in the Wabigoon volcanics of Lac des Milles Lacs area, northwestern Ontario, 1971-73.
To determine the degree of magnetization stability in these Archean volcanics and to test the use of remanent vectors to delimit the altitude and extent of fold limbs.

Quebec

1215. Bouillon, J.J., Univ. de Montréal:
Etude structurale et pétrographique de la couverture nord de l'Anorthosite de Morin, 1970-72; thèse de maîtrise.
La couverture nord de l'Anorthosite de Morin, située dans la région de St-Donat, est composeé de roches metamorphiques du facies granulite. Lors de cette etude, nous examinerons l'allure du contact entre l'intrusif anorthositique et les roches metamorphiques adjacentes, les effets du metamorphisme contact et ceux du metamorphisme régional sur cette couverture.

1216. Brun, J., Univ. de Laval:
Etude structurologique et stratigraphique du synclinorium de St-Alban, 1971-74; thèse de doctorat.
Cette étude a pour but d'étudier avec plus de détail l'évolution de la zone du géosynclinal à la zone de la plateforme. Elle reposera essentiellement sur le traitement des données cartographiques, pétrographiques et structurographiques de la région considérée.

1217. Dimroth, E., Ministère des Richesses Naturelles du Québec:
Etudes structural de la fosse de Labrador (partie central), Québec, 1970-73.

1218. Martignole, J., Univ. de Montréal:
Etudes petrographiques et structurales dans le Sud de la province de Grenville, 1965-.

1219. St-Julien, P., Univ. de Laval:
Etudes structurales et stratigraphiques des régions de Québec et de Thetford-Mines, 1967-.

General

1220. Bau, A.F.S., Univ. of Toronto:
Analysis of adjustment-feature development in fractured rock, 1971-72; M.Sc. thesis.
Adjustment surfaces, developed as a consequence of movement along intersecting fractures of diverse orientation, can serve as a basis for drawing inference concerning stress conditions during the period of movement. This project examines the patterns of adjustment features to be anticipated under various combinations of principal stresses. See Analysis of fracturing in Precambrian volcanics north of Madoc, Ontario; Can. J. Earth Sci., vol. 8, No. 10, pp. 1302-1313, 1971.

1221. Clifford, P.M., McMaster Univ.:
Experimental rock deformation: effect of primary fabric on strain modes, 1966-.

1222. Currie, J.B., Univ. of Toronto:
Mechanics and development of fractures in sedimentary strata, 1971-73.

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Study of geological conditions that govern the occurrence of fracture systems in sedimentary strata to improve our understanding and prediction of fracture openings and of fluid-flow through fractured rock at depth. This knowledge bears upon study of oil reservoirs and gas-storage sites, of fluid disposal in sedimentary strata and of cross-flow in bed-rock aquifers.

1223. Fyson, W.K., Univ. of Ottawa:
Structural patterns in metamorphic rocks, 1970-.
See Fold attitudes in metamorphic rocks; Am. J. Sci., vol. 270, pp. 373-382, 1971.

1224. Jacobs, J.A., Russell, R.D., Oldershaw, A., Wilson, J.T., Univ. of Toronto:
Writing textbooks, 1966-72.
The text of the second edition of Physics and Geology by Jacobs, Russell and Wilson has been sent to McGraw-Hill Book Co. for publication.
The text of a book entitled "Earth Behaviour"-Readings from the Scientific American with commentaries by J.T. Wilson, has been sent to W.H. Freeman & Co. for publication. The text of an unnamed elementary textbook by A. Oldershaw and J.T. Wilson has been about 1/3 written for Jovanovich, Harcourt and Brace.

1225. Lajtai, E.Z., Univ. of New Brunswick:
Brittle fracture of rocks, 1965-.
To describe in quantitative terms the various stages of fracture formation starting from the appearance of the first fracture and ending with the full development of the through-going shear fracture or fault. The overall program involves a combination of theoretical and experimental studies, the latter including both model and rock testing. Standard geological and geophysical (mainly acoustic and seismic measurements) techniques are employed in fracture detection and in the evaluation of energies expended under experimental conditions. See A theoretical and experimental evaluation of the Griffith theory of brittle fracture; Tectonophysics, vol. 11, pp. 129-156, 1971.

1226. Kerr, J.W., Geol. Surv. of Can.:
Studies in continental drift, 1965-73.

1227. Picklyk, D.D., Price, R.A., Queen's Univ.:
Mathematical modelling of geologic structures, 1969-72; Ph.D. thesis (Picklyk).

1228. Ranalli, G., Carleton Univ.:
Global tectonics and the rheology of the earth, 1971-.
The dynamics of lithospheric plate motion and the rheological behaviour of the tectonically active layers of the earth are investigated, focusing on (1) the theoretical aspects of creep in polycrystals and their constitutive equations, (2) the mechanics of continuous and discontinuous tectonic deformation, and (3) the correlation between surface features and deep-seated processes. See The

Expansion-undation hypothesis for geotectonic evolution; tectonophysics, vol. 11, pp. 261-285, 1971.

1229. Rousell, D.H., Laurentian Univ.:
Strain analysis of experimentally deformed oolitic limestone, 1969-72.

1230. 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).

1231. Schwerdtner, W.M., Currie, A., Downing, B., Waddington, D.H., Univ. of Toronto:
Tectonic significance of schistosity and mineral lineation in metamorphic rocks, 1966-73; M.Sc. theses.
See Variation in degree of hornblende grain alignment within two boudinage structures; Can. J. Earth Sci., vol. 8, pp. 144-149, 1971.

1232. Smith, R., Bartlett, G.A., Queen's Univ.:
Geotectonics and paleooceanography, 1971-73.
The stratigraphic and ecologic data from microfauna investigations have been utilized to interpret both the oceanic and climatic conditions that existed in the North Atlantic during deposition of Mesozic and Cenozoic sediments. The relative position of landmasses and seafloor configuration is essential for the interpretation of paleooceanography and paleoclimatology.

1233. Stanton, M.S., Chevron Standard Ltd., Calgary:
Organic and petroleum chemistry; Geotectonics, 1967-.

1234. Stauffer, M.R., Univ. of Saskatchewan:
Geometry of folds, 1964-.

1235. Stevens, G.R., Acadia Univ.:
X-ray fabric analysis of movement in lavas and in deformed rock, 1967-72.
An attempt to employ flat-sample whole-rock specimens for qualitative definition of movement parameters via X-ray diffraction of specific lattice planes; correlation of these data with orientation and development of conjugate microshears which permeate deformed rocks and flows, including lunar lavas. Data suggest a primary, genetic relation between such flowage microshears and development of columnar jointing in basalt flows.

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