



Canadian Geoscience Council

Published for the Council by the
Geological Survey of Canada as
Paper 80-5

Le Conseil Canadien des sciences de la terre

Publié par la Commission
géologique du Canada pour le Conseil
Étude 80-5



Current research
in the Geological Sciences
in Canada
May 1979-April 1980

Projets de recherche
en cours d'exécution au
Canada-Sciences géologiques
mai 1979-avril 1980

Compiled by
THOMAS E. BOLTON

Préparé par
THOMAS E. BOLTON

This document was produced
by scanning the original publication.

Ce document est le produit d'une
numérisation par balayage
de la publication originale.



Energy, Mines and
Resources Canada

Energie, Mines et
Ressources Canada

**GEOLOGICAL SURVEY
PAPER 80-5**

**COMMISSION GÉOLOGIQUE
ÉTUDE 80-5**

CANADIAN GEOSCIENCE COUNCIL

LE CONSEIL CANADIEN DES SCIENCES DE LA TERRE

**CURRENT RESEARCH IN THE GEOLOGICAL SCIENCES
IN CANADA, MAY 1979-APRIL 1980**

**PROJETS DE RECHERCHE EN COURS D'EXÉCUTION
AU CANADA - SCIENCES GÉOLOGIQUES.
MAI 1979-AVRIL 1980**

Compiled by/Préparé par
THOMAS E. BOLTON

©Minister of Supply and Services Canada 1981

Available in Canada through

authorized bookstore agents
and other bookstores

or by mail from

Canadian Government Publishing Centre
Supply and Services Canada
Hull, Québec, Canada K1A 0S9

and from

Geological Survey of Canada
601 Booth Street
Ottawa, Canada K1A 0E8

A deposit copy of this publication is also available
for reference in public libraries across Canada

Cat. No. M44-80/5E Canada: \$4.00
ISBN - 0-660-10819-4 Other countries: \$4.80

Price subject to change without notice

CONTENTS/TABLE DES MATIERES

v	INTRODUCTION
1	AREAL MAPPING, 1:50 000 OR MORE DETAILED/ CARTOGRAPHIE, 1:50 000 OU A PLUS GRANDE ÉCHELLE
1	Alberta/Alberta
1	British Columbia/Colombie-Britannique
1	Manitoba/Manitoba
1	New Brunswick/Nouveau-Brunswick
1	Newfoundland/Labrador/Terre-Neuve/Labrador
2	Northwest Territories/Territoires du Nord-Ouest
2	Ontario/Ontario
3	Québec
3	Saskatchewan/Saskatchewan
3	Yukon Territory/Territoire du Yukon
3	General/Généralités
4	AREAL MAPPING, LESS DETAILED THAN 1:50 000/ CARTOGRAPHIE, A PLUS PETITE ÉCHELLE QU'AU 1:50 000
4	Alberta/Alberta
4	British Columbia/Colombie-Britannique
4	Manitoba/Manitoba
4	Newfoundland/Labrador/Terre-Neuve/Labrador
4	Northwest Territories/Territoires du Nord-Ouest
5	Ontario/Ontario
5	Québec
5	Saskatchewan/Saskatchewan
5	ENVIRONMENTAL GEOSCIENCE/SCIENCES DE LA TERRE APPLIQUEES A L'ENVIRONNEMENT
5	GEOCHEMISTRY/GÉOCHIMIE
5	Analytical methods and analysis/Méthodes analytiques et analyses
5	Exploration, organic/Appliquée, organique
6	Exploration, non-organic/Appliquée, non-organique
9	Theoretical/Pure
9	General/Généralités
11	GEOCHRONOLOGY/GÉOCHRONOLOGIE
12	GEOLOGICAL COMPUTER APPLICATIONS/APPLICATIONS DE L'INFORMATIQUE A LA GÉOLOGIQUE
13	GEOMATHEMATICS/MATHEMATIQUE DE LA TERRE
13	GEOMORPHOLOGY/GÉOMORPHOLOGIE
14	GEOPHYSICS/GÉOPHYSIQUE
14	Electrical/Méthodes électriques
14	Exploration/Prospection
15	Geomagnetism-paleomagnetism/Géomagnétisme-paléomagnétisme
16	Geothermal/Géothermique
17	Gravity/Gravité
17	Seismology and physics of interior/Sismologie et physique de l'intérieur de la terre
18	Other/Autre
18	GEOTECHNIQUE/GÉOTECHNIQUE
18	Engineering geology/Géologie de l'ingénieur
19	Muskeg/Muskeg
19	Permafrost/Pergélisol
19	Rock mechanics/Mécanique des roches
20	Soil mechanics/Mécanique des sols
21	Snow and ice/Neige et glace
21	GLACIOLOGY/GLACIOLOGIE
22	HYDROGEOLOGY/HYDROGÉOLOGIE

24	MARINE GEOSCIENCE/OCÉANOGRAPHIE
24	MINERAL/ENERGY GEOSCIENCE/SCIENCES DE LA TERRE APPLIQUÉES
	AUX MINÉRAUX ET À L'ÉNERGIE
24	Coal geology/Géologie du charbon
25	Industrial minerals/Substances minérales industrielles
27	Mineral deposition exploration/évaluation/Recherche et évaluation des gîtes de minéraux
29	Petroleum exploration/évaluation/Recherche et évaluation des gîtes de pétrole
30	General/Généralités
31	MINERALOGY/CRYSTALLOGRAPHY/MINÉRALOGIE/CRISTALLOGRAPHIE
33	PALEONTOLOGY/PALÉONTOLOGIE
33	Invertebrate/Invertébrés
35	Vertebrate/Vertébrés
36	Paleobotany/palynology/Paléobotanique et analyse pollinique
38	PETROLOGY/PÉTROLOGIE
38	Experimental/Expérimental
38	Igneous/Roches ignées
40	Metamorphic/Roches métamorphiques
41	Sedimentary/Roches sédimentaires
41	General/Généralités
42	QUATERNARY GEOLOGY/GÉOLOGIE DU QUATÉNAIRE
46	REMOTE SENSING/TELÉDETECTION
46	SEDIMENTOLOGY/SÉDIMENTOLOGIE
46	Ancient sediments/Sédiments anciens
47	Recent and unconsolidated sediments/Sédiments récents et non consolidés
49	SOIL SCIENCE/PÉDOLOGIE
50	STRATIGRAPHY/STRATIGRAPHIE
50	Precambrian/Précambrien
50	Paleozoic/Paléozoïque
52	Mesozoic/Mésozoïque
52	Cenozoic/Cénozoïque
53	STRUCTURAL GEOLOGY/TECTONICS/GÉOLOGIE STRUCTURALE/TECTONIQUE
53	Alberta/Alberta
53	British Columbia/Colombie-Britannique
53	New Brunswick/Nouveau-Brunswick
53	Newfoundland/Labrador/Terre-Neuve/Labrador
54	Northwest Territories/Territoires du Nord-Ouest
54	Ontario/Ontario
54	Québec
55	Saskatchewan/Saskatchewan
55	Yukon Territory/Territoire du Yukon
55	General/Généralités
56	VOLCANOLOGY/VOLCANOLOGIE
56	ORGANIZATIONS REPORTING/ÉTABLISSEMENTS DÉCLARANTS
58	LIST OF GRANT AWARDS IN THE EARTH SCIENCES FOR 1979-80/ LISTE DES SUBVENTIONS ATTRIBUÉES AUX SCIENCES DE LA TERRE EN 1979-80
72	RESEARCHER INDEX/INDEX DES CHERCHEURS

INTRODUCTION

The present publication recording research in progress in Canada from May 1979 to April 1980 is the result of a survey conducted between November, 1979 and February, 1980.

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

Using the data supplied for this compilation by the respondents, some indication as to the lines of research receiving the greatest and least attention can be formulated. At least 360 research projects have not been previously reported. The greatest increase during the 1979-80 period, as in the previous survey year, was in the fields of Mineral/Energy Geoscience (44), Geochemistry (34), and Paleontology (31). Research projects undertaken as graduate thesis in the universities are so specified wherever possible.

Additional details on research in the earth and related sciences underway in Canada during 1979 can be obtained through the annual reports prepared by individual University departments, research councils, and museums. Comprehensive reports on geophysical research and development, including volcanology and oceanography related research, are contained within the Canadian Geophysical Bulletin volume 32 (1980) published by the Earth Physics Branch of the Department of Energy, Mines and Resources. Summaries of progress and short research reports related to hydrology/water-related environmental research and glaciology are provided annually by the Water Resources Branch of the Department of Environment Canada and the Associate Committee on Hydrology, National Research Council. Quaternary research in Québec is reviewed annually in the "Bulletin d'information de l'Association québécoise pour l'étude du Quaternaire".

Again this year a listing is included of the 1979 awards provided for geological research within the Research Agreements programs of the Departments of Energy, Mines and Resources, and Environment Canada. The Natural Sciences and Engineering Research Council Canada also provided a computer print-out of the operating grants actually awarded in 1979. The 1979 Ontario Research Grants and Polar Continental Shelf Project field support to non-governmental activities are also listed.

Use of the compilation

The projects are grouped under main headings that cover the majority of disciplines within the geological and allied sciences. These groupings are unchanged from last years compilation (Geological Survey of Canada, Paper 79-5, 1979).

A complete list of organizations contributing to the present survey is included. Acknowledgment is made in particular to those who assembled and forwarded the data on research projects underway in the organizations under their direction. As a convenience, an alphabetically arranged index lists each investigator and the reference number(s) of his project(s).

INTRODUCTION

La présente publication, qui fait état de la recherche réalisée au Canada de mai 1979 à avril 1980, est le fruit d'une enquête effectuée entre novembre 1979 et février 1980.

Les projets de recherche énumérés sont exécutés surtout par des ministères fédéraux et provinciaux, et par des universités. Les données sur la recherche industrielle se limitent à une des compagnies pétrolières. Un aperçu assez complet de l'activité de recherche scientifique au Canada pour la période visée dans le domaine de la géologie et des sciences connexes est cependant fourni.

À partir des renseignements donnés par les participants à l'enquête, il est possible de voir quels genres de recherche retiennent le plus et le moins l'attention. Au moins 360 projets nous ont été signalés pour la première fois. Les domaines où la recherche s'est le plus accrue durant l'année 1979-1980 sont, comme l'année sur laquelle portait la dernière enquête, les sciences de la Terre - Énergie/Minéraux (44), la géochimie (34) et la paléontologie (31). Les projets de recherche de 2^e cycle, dans les universités, sont également précisés, dans la mesure du possible.

On peut se procurer de plus amples détails sur la recherche réalisée en 1979 au Canada dans le domaine des sciences de la Terre et des sciences connexes en consultant les rapports annuels mis au point par les différents départements d'universités, conseils de recherche et musées. Le volume 32 (1980) du Canadian Geophysical Bulletin, publié par la Direction de la physique du Globe du ministère de l'Énergie, des Mines et des Ressources, comprend des rapports complets sur les travaux de recherche et les dernières réalisations en géophysique, y compris la recherche connexe en volcanologie et en océanographie. Des résumés des progrès réalisés et de brefs rapports ayant trait à la glaciologie et à la recherche environnementale liée à l'hydrologie sont publiés annuellement par la Direction des ressources en eau d'Environnement Canada et par le Comité associé de l'hydrologie, du Conseil national de recherches du Canada. La recherche sur le Quaternaire au Québec est signalée annuellement dans le "Bulletin d'information de l'Association québécoise pour l'étude du Quaternaire".

Nous incluons à nouveau cette année une liste des prix décernés en 1978 pour la recherche géologique dans le cadre des programmes d'accords de recherches des ministères de l'Énergie, des Mines et des Ressources, et de l'Environnement. Le Conseil de recherches en sciences naturelles et en génie du Canada a également fourni un imprimé d'ordinateur détaillant les subventions aux travaux réellement accordées en 1979. On a signalé également dans ce rapport les subventions de recherche de la Commission géologique de l'Ontario (Ontario Research Grants) et l'aide de l'Étude du plateau continental polaire en faveur d'activités non gouvernementales pour 1979.

Présentation

Les projets sont groupés sous des titres généraux s'appliquant à la majorité des disciplines que comprennent la géologie et les sciences connexes. Ces catégories sont les mêmes que l'année dernière (Étude 79-5, Commission géologique du Canada, 1979).

Une liste complète des organismes qui ont contribué à l'enquête a été dressée. Nous tenons à remercier particulièrement les personnes qui ont recueilli et envoyé les données concernant les projets de recherche en cours dans les organismes dont elles sont responsables. Pour vous faciliter la consultation, un répertoire alphabétique donne les noms de tous les enquêteurs et le(s) numéro(s) de référence de son(s) projet(s).

ALBERTA/ALBERTA

1. GODFREY, J.D., Alberta Research Council (Geol. Surv.): Fort Chipewyan district map area, Alberta, 1970-80.
2. GODFREY, J.D., Alberta Research Council (Geol. Surv.): Alexander-Wylie Lakes map area, Alberta, 1971-80.
3. GODFREY, J.D., Alberta Research Council (Geol. Surv.): Geology of the Ryan-Fletcher Lakes district, Alberta, 1972-80.
Map compilation complete, publication drafting in progress.
4. GODFREY, J.D., Alberta Research Council (Geol. Surv.): Geology of the Bocquene-Turtle Lakes district, Alberta, 1973-80.
Map compilation completed, report in preparation.
5. GODFREY, J.D., LANGENBERG, C.W., Alberta Research Council (Geol. Surv.): Geology of the South Fitzgerald, Myers, Daly Lakes district, Alberta, 1973-80.
Map compilation in progress.
6. GODFREY, J.D., LANGENBERG, C.W., Alberta Research Council (Geol. Surv.): Geology of the North Fitzgerald-Tulip-Mercer Lakes district, Alberta, 1974-80.
Map compilation and supporting laboratory studies underway.
7. OLLERENSHAW, N.C., Geol. Surv. Can.: Geology of the southern Alberta Foothills, Highwood River to Athabasca River, 1970-.

BRITISH COLUMBIA/COLOMBIE-BRITANNIQUE

8. CHRISTOPHER, P.A., British Columbia Ministry Energy, Mines, Petrol. Res. (Geol. Div.): Geology of the Surprise Lake Batholith near Atlin, British Columbia, 1979-82.
 9. EASTWOOD, G.E.P., British Columbia Ministry Energy, Mines, Petrol. Res. (Geol. Div.): Sicker project - Mount Richards area, British Columbia, 1978-81.
- See:**
Sicker Project (992B/13, 92C/16E); British Columbia Ministry Energy, Mines, Petrol. Res., Paper 1979-1, p. 38-40, 1979.
- On Big Sicker Mountain the Sicker Group is host to the Lenora-Tyee sulphide orebodies, which were mined around the turn of the century, and this belt of Sicker rocks has been explored intermittently since. A restudy of the Sicker Group was initiated in 1978 and continued in 1979. Around the Lenora-Tyee mine the rocks are schists, and their original nature and relationships are uncertain. Eastward from the Island Highway, however, schists are confined to the north side of the belt, and the group of hills and ridges comprising Mount Richards was accordingly mapped in detail. There is a general progression across the belt from sericite-quartz schists through felsic volcanic rocks to intermediate and mafic volcanic rocks. Some black argillite is intercalated in the schists near the north limit of exposure, and less-sheared rocks adjacent to the felsic volcanic rocks are banded and chert-like. The siliceous schists are therefore concluded to be largely of sedimentary origin. The intermediate and mafic volcanic rocks are characterized by sporadic to abundant fragments ranging from pea to football size, in varying stages of alteration to epidote. Certain bands are also characterized by coarse plates and rounded grains of hornblende, and probably represent a primary layering, now close to vertical.
10. McMILLAN, W.J., CARTER, N.C., British Columbia Ministry Energy, Mines, Petrol. Res. (Geol. Div.): Nicola project, British Columbia, 1976-.

See:

The Nicola project; in Geological Fieldwork 1978, British Columbia Ministry Energy, Mines, Petrol. Res., Paper 1979-1, p. 41-46, 1979.

Mapping at 1:15,840 in the Merritt area of British Columbia is primarily concerned with the distribution and internal stratigraphy of volcanic

and sedimentary rocks of the late Triassic Nicola group. Environments of deposition favorable for Craigmont-type copper pyrometasomatic deposits, volcanogenic massive sulphide deposits and alkalitic-type porphyry copper deposits are being sought.

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

See:

Chemistry and origin of the Eocene Metchosin volcanics, Vancouver Island, British Columbia; Can. J. Earth Sci., vol. 17, no. 2, p. 199-209, 1980.

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

MANITOBA/MANITOBA

16. BAILES, A.H., Manitoba Dep. Energy and Mines (Mineral Res. Div.): Geology of the Saw Lake area, Manitoba, 1976-80.
 17. BAILES, A.H., SYME, E.C., Manitoba Dep. Energy and Mines (Mineral Res. Div.): White Lake-Mikanagan Lake project, Manitoba, 1979-82.
- See:**
Manitoba Mineral Res. Div., Rep. Field Activities 1979, p. 46-54, 1979.
- To provide a sound geological base for future exploration for volcanogenic massive sulphide deposits in the White Lake-Mikanagan Lake area. To achieve this, 1:20 000 scale mapping and detailed examination of volcanological features and processes have been undertaken.
 18. HERD, R.K., Geol. Surv. Can.: Geology of the Island Lake map-area (53E), Manitoba and Ontario, 1974-.

19. SCOATES, R.F.J., MACEK, J.J., Manitoba Dep. Energy and Mines (Mineral Res. Div.): Thompson Nickel Belt project, Manitoba, 1977-84.

The Thompson Nickel Belt, a segment of the Churchill-Superior boundary zone in Manitoba is characterized by: 1) re-orientation of structure in Archean migmatites and retrogressed granulites and by, 2) deformed and metamorphosed supracrustal rocks (Ospwagan Group). The re-orientation of Archean structures, the retrogression of Archean granulites and the deformation and metamorphism of the Aphebian supracrustal rocks is due to a late (post?)-Hudsonian overprinting event that has affected rocks on both side of the Churchill-Superior boundary.

Space and time constraints on intrusion of Aphebian dykes (Molson dyke swarm) and deposition of Aphebian supracrustal rocks (Ospwagan Group) can be removed if the portion of the Churchill Province now immediately adjacent to the Superior Province evolved independently as a spatially separate domain. The overprinting event thus could be considered the manifestation of the event by which the Churchill and Superior Provinces became juxtaposed.

The intrusion of the Molson dyke swarm and the deposition of Ospwagan Group supracrustal rocks accordingly would be confined to the Superior Province craton. Their intrusion and deposition being dated geologically by the late-Kenoran event (≈ 2450 Ma) and the overprinting event (≈ 1700 Ma).

20. WEBER, W., SCHLEDEWITZ, D.C.P., Manitoba Dep. Energy and Mines (Mineral Res. Div.): Molson Lake - Kallicahoolie Lake project, Manitoba, 1979-81.

See:

Manitoba Mineral Res. Div., Rep. Field Activities 1979, p. 29-37, 1979.

The oldest rocks are supracrustal and igneous rocks preserved in greenstone belts, along the margin of the Molson-Red Sucker Lakes granitoid belt and in lenses within the granitoid belt. These

supracrustals are migmatized by tonalites and subsequently intruded by Sues-type tonalite-granodiorites and Daly-type porphyritic batholiths, similar to those dated as 2.7-2.9 Ga elsewhere in the Superior Province of Manitoba. A set of northeasterly trending, mafic to ultramafic dykes intruded, followed by widespread K-metasomatism and finally, by intrusion of granites in the form of stocks and dykes. Related pegmatites, alaskitic and aplitic dykes are the youngest Archean granitic rocks. Mafic Molson dykes of Proterozoic age are the youngest magmatic event.

The young alaskitic dykes give the highest mean U spectrometer readings and appear to be the cause for the >2 ppm eU URP anomalies.

21. ZWANZIG, H.V., SYME, E.C., GILBERT, H.P., Manitoba Dep. Energy and Mines (Mineral Res. Div.): Lynn Lake project, Manitoba, 1976-81.

The project area straddles the Lynn Lake greenstone belt and covers small areas at the margin of the Kisseynew sedimentary gneiss belt in the south, and the Southern Indian gneiss belt in the north. The greenstones (Wasekan Group) comprise 1) tholeiitic basalts, overlain by 2) sedimentary rocks, 3) a mafic to felsic calc-alkaline suite, and 4) a heterogeneous volcanic succession. These rocks were deposited during the Aphebian and were intruded and deformed early in the Hudsonian orogeny. They are unconformably overlain by Aphebian metaconglomerate and metasediments (Sickle Group). The adjacent gneiss represent 1) greywacke-mudstone turbidities conformably overlain by 2) arkosic sandstone. They were deposited at the same time as the Wasekan and Sickle Groups and were deformed and highly metamorphosed during the main stages of the Hudsonian orogeny.

NEW BRUNSWICK/NOUVEAU-BRUNSWICK

22. SKINNER, R., Geol. Surv. Can.: Plaster Rock (east half) map-area, New Brunswick, 1970-.
23. SKINNER, R., Geol. Surv. Can.: Juniper (east half) map-area, New Brunswick, 1971-.

NEWFOUNDLAND/LABRADOR/
TERRE-NEUVE/LABRADOR

24. BLACKWOOD, R.F., Newfoundland Dep. Mines and Energy: Gander Rivers, Newfoundland, 1978-81.

See:

Geology of the Gander (west) area (2D/15), Newfoundland; Newfoundland Dep. Mines and Energy, Rep. 80-1, 1980.

Continued 1:50,000 mapping of tectono-stratigraphic units in the contact area of the Botwood and Gander Zones, northeastern Newfoundland. The area forms a linear zone underlain by the Gander Group which is in fault contact with the Gander River ultrabasic belt (GRUB line). The Ordovician Davidsville Group nonconformably overlies the GRUB line and is succeeded westward by the Silurian Botwood Group. Economic potential is greatest along the GRUB line. Approximately 70 km of the 20 km wide belt has been systematically mapped.

25. COLMAN-SADD, S.P., ELIAS, P., STRONG, D.F., Newfoundland Dep. Mines and Energy, Memorial Univ. (Geology):
1. Geological mapping, Bay d'Espoir, Newfoundland. 2. Bay d'Espoir Granite geochemistry project, 1974-81; M.Sc. thesis (Elias).
1. Mapping has completed Gaultois (1M/12), St. Alban's (1M/13), Twillick Brook (2D/4), and part of Brunt Hill (2D/5) 1:50,000 NTS areas. Open file maps available for all these areas; report and map available for St. Alban's and in press for Twillick Brook.
2. Sampling of plutonic intrusions in 1M/13, 1M/12, 2D/4, and 2D/5 areas complete. Samples at present being analyzed and data processed.

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

See:

The Annieopsquoch ophiolite complex, southwest Newfoundland, and its regional relationships; Geol. Surv. Can., Paper 80-1A, p. 227-234, 1980.

27. HIBBARD, J.P., MUGGRIDGE, W.W., Newfoundland Dep. Mines and Energy: Geology of the Baie Verte Peninsula, Newfoundland, 1977-80.
1:50,000 scale geological mapping of the Baie Verte Peninsula was completed during the 1979 field season. The southerly portion of the Fleur de Lys belt was the focus of the final season. Mapping has revealed that metamorphic units, identified by previous workers and previous mapping during the present project, are continuous as far south as Brichy Lake, where they appear to be truncated by the Green Bay fault. These units are dominantly metasedimentary with subordinate mafic metigneous rocks, all of which are poly-deformed. In the southwest portion of the area, these rocks unconformably overlie a predeformed gneissic (Grenville?) basement. These rocks are all intruded by a postkinematic composite granitic to dioritic batholith; locally, a contact aureole is evident in the country rocks. The contact with the country rocks is rarely sharp, and generally agmatitic.
28. HYDE, R.S., Newfoundland Dep. Mines and Energy: Geologic mapping of the Carboniferous Deer Lake basin, western Newfoundland, 1977-81.
Mapping in 1979 in the Deer Lake area of Newfoundland was conducted in two adjacent NTS sheets (12H/6 and 12H/11), which when combined cover an area approximately equal to one NTS sheet. This work has led to a substantial revision of the distribution of map units in 12H/6 from that which appears on the existing 1:250,000 map. The work has also resulted in new knowledge regarding the areal and stratigraphic distribution of uranium occurrences in the Deer Lake Group.
29. KEAN, B.F., JAYASINGHE, N.R., Newfoundland Dep. Mines and Energy: Victoria Lake project, 1975-81.
See:
Geology of the Badger map-area, Newfoundland; Newfoundland Dep. Mines and Energy, Rep. 80-1, 1980.
During 1980 the project will continue as a regional mapping program. The King George IV (12A/14) NTS area will be mapped and a report with map will be published in the spring of 1981.
30. KNIGHT, I., Newfoundland Dep. Mines and Energy, Memorial Univ. (Geology): Geological mapping of Cambro-Ordovician carbonates of the Daniels Harbour area, Great Northern Peninsula, Newfoundland. Ph.D. thesis: Stratigraphy, sedimentology and palaeogeography of the Carboniferous of the Bay St. George sub-basin, southwestern Newfoundland; 1974-80.
See:
Geological mapping of parts of the Eddies Cove, Salmon River and adjacent map areas: Newfoundland Dep. Mines and Energy, Rep. 80-1, 1980. Platformal rocks and geology of the Roddickton map area, Great Northern Peninsula; ibid.
31. PAJARI, G.E., Jr., PICKERILL, R.K., CURRIE, K.L., Univ. New Brunswick (Geology), Geol. Surv. Can.: The geology of the Carmanville area, Newfoundland, 1977-80.
Geology mapping has revealed that the eastern margin of the Proto-atlantic consists of oceanic crust obducted onto a continental rise prism. The obduction event occurred in early Ordovician time but did not totally disrupt sedimentation which continued through to the Silurian. During and/or after the Caradoc, large scale slides (olistromes) disrupted the stratigraphy and resulted in the Carmanville Mélange. This mélange contains olistoliths of all the lithologies in the area older than Caradoc in age.
32. RIVERS, T., Newfoundland Dep. Mines and Energy: Geological mapping in the southern Labrador Trough, Grenville Province, 1977-81.
See:
(a) Geological mapping in the Wabush Lake area, southwestern Labrador; (b) Geological mapping in the Evening Lake - Wightman Lake area, western Labrador; (c) Geological mapping in the McKay River - Gabbro Lake area, western Labrador; Newfoundland Dep. Mines and Energy, Rep. 80-1, 1980.
33. THOMAS, A., Newfoundland Dep. Mines and Energy: Regional study: Red Wine - Grenville Province sub-project 1.08, 1978-81.
See:
Geological mapping in the Red Wine - Letitia Lake Area (13L/1, 13L/2, 13L/8), central Labrador; Newfoundland Dep. Mines and Energy, Rep. 79-1, p. 109-114, 1979.
Regional 1:50,000 scale mapping has been completed on NTS sheets 13K/4, 13L/1 and the southeast part of 13L/5. These maps are in the process of being draughted as preliminary maps to accompany a report due in April 1980. This mapping will now be extended onto NTS sheets 13E/10, 13E/11, 13E/15, 13F/12 and 13F/13. Upon completion of the project these sheets will be reduced to 1:100,000 scale and coloured. They will accompany a memoir on the geology of a portion of Central Labrador. Petrographic, probe and geo-chronological studies on rocks from this area are all ongoing. A B.Sc. thesis study is in progress on the structural geology of rocks along the Seal Lake Group - Letitia Lake Group unconformity. Two Ph.D. thesis projects are also planned for 1980-81. One will research the structural geology in more detail of the Letitia Lake Group and lower part of the Seal Lake Group. The second will investigate geochemistry and petrology of peralkaline granites and syenites associated with the Red Wine alkaline complex.
34. WARDLE, R.J., Newfoundland Dep. Mines and Energy: Regional geological synthesis of the central Labrador Trough, western Labrador, 1976-80.
See:
Geology of the eastern margin of the Labrador Trough; Newfoundland Dep. Mines and Energy, Prel. Rep. 78-9, 1979.
Geology of the Sims - Evening Lake area, western Labrador, with emphasis on the Helikian - Sims Group; Newfoundland Dep. Mines and Energy, Prel. Rep. 79-5, 1979.
Field work component of Labrador Trough project now complete. Project is being written up as memoir. New project commencing June 1980 will concentrate on 1:100,000 mapping of Archean, Apehian and Helikian metamorphic rocks along the Churchill-Grenville Province boundary, east of the Labrador Trough, NTS areas 23H/10, H/9.
- NORTHWEST TERRITORIES/TERRITOIRES DU NORD-OUEST**
35. COOK, D.G., Geol. Surv. Can.: Operation Norman, District of Mackenzie, 1967-.
36. EADE, K.E., Geol. Surv. Can.: Geology of the Tulemalu Lake map-area, District of Keewatin, 1975-.
37. HENDERSON, J.B., Geol. Surv. Can.: Yewllowknife and Hearne Lake map-areas, District of Mackenzie, 1970-.
38. HENDERSON, J.B., Geol. Surv. Can.: Keskarrah Bay map-area, District of Mackenzie, 1976-.
39. HEYWOOD, W.W., Geol. Surv. Can.: Geology of Amer Lake map-area, District of Keewatin, 1976-.
40. HODGSON, D.A., Geol. Surv. Can.: Surficial geology, geomorphology and terrain inventory of the Ringnes and adjacent islands, 1976-.
41. HOFFMAN, P.F., Geol. Surv. Can.: East arm of Great Slave Lake, District of Mackenzie, 1976-.
42. KERR, J.W., Geol. Surv. Can.: Southwestern Ellesmere - western Devon Islands (Operation Grinnell), District of Franklin, 1967-.
43. KERR, J.W., Geol. Surv. Can.: Boothia Peninsula and Somerset Island (Operation Boothia), District of Franklin, 1974-.
44. THOMAS, R.D., Geol. Surv. Can.: Surficial geology, terrain inventory, north-central Keewatin, 1976-.
- ONTARIO/ONTARIO**
45. AMUKUN, S.E., GILLESPIE, R.T., MACKASEY, W.O., Ontario Geol. Surv.: Klob Lake area, District of Thunder Bay (Long Lac area), Ontario, 1979-80.
See:
Klob Lake area, District of Thunder Bay, Ontario; Ontario Geol. Surv., Misc. Paper 80, p. 97-99, 1979.
Klob Lake area, District of Thunder Bay, Ontario; Ontario Geol. Surv., Prel. Map, 1979.
Detailed geological mapping of Klob Lake area (Longlac) was completed in the summer of 1979. Preliminary synthesis of the field mapping indicates similarities and differences with the Beardmore-Geraldton Belt to which it forms the easternmost extension. Profound difference appears to be lack of intermediate to felsic metavolcanics and the development of diatexites within 4 miles of the sedimentary-volcanic contact.
46. BLACKBURN, C.E., Ontario Geol. Surv.: Detailed geology, Kawashegamuk Lake area, Kenora District, Ontario, 1979-81.
See:
Ontario Geol. Surv., Misc. Paper 90, p. 35-37, 1979.
47. BOND, W.D., Ontario Geol. Surv.: Melchett Lake, District of Thunder Bay, Ontario, 1979.
See:
Ontario Geol. Surv., Misc. Paper 90, p. 26-30, 1979.
48. BRIGHT, E.G., Ontario Geol. Surv.: Geology of the Center Lake area, Haliburton and Hastings counties, Ontario, 1979-80.
See:
Ontario Geol. Surv., Misc. Paper 90, p. 86-88, 1979.
49. CARTER, M.W., PYKE, D., Ontario Geol. Surv.: Geology of Schreiber area, District of Thunder Bay, Ontario, 1979-80.
See:
Ontario Geol. Surv., Misc. Paper 90, p. 44-47, 1979.
The area is underlain by Early to Late Precambrian rocks. Early Precambrian rocks comprise a metavolcanic-metasedimentary series synclinally folded about an east-plunging East-West axis. The metavolcanics predominate and range from mafic to felsic. These rocks are intruded by granitic and syenitic rocks. Both groups are overlain unconformably by Middle Precambrian sedimentary rocks which are intruded by diabase sills. Early to Late Precambrian rocks comprise diabase dikes which trend West-Northwest mainly with a few trending northwesterly. All the Precambrian rocks are patchily overlain by Cenozoic sand and gravel. Mineralization in the area comprises gold, silver, molybdenum-copper, nickel-copper and massive sulphide copper-zinc-silver.
50. FUMERTON, S.L., Ontario Geol. Surv.: Geology of the Righteye Lake area, District of Rainy River, Ontario, 1979-80.
See:
Ontario Geol. Surv., Misc. Paper 90, p. 38-40, 1980.
The Righteye Lake area is located west of Atikokan on the main highway between Thunder Bay and Fort Frances. The area is situated astride the boundary between the Quetico Subprovince to the south and the Wabigoon Subprovince to the north. Within the Quetico Subprovince there is a monotonous sequence of metamorphosed wackes and mudstones whereas the Wabigoon Subprovince within the map-area is composed of mafic and felsic metavolcanics and intrusive granitic rocks.
Intense faulting, related to the Quetico Fault, is the dominant structural feature and tends to obscure the folds which are present and confuses the correlation of lithological units.
51. PAGE, R.O., Ontario Geol. Surv.: Geology of the Lateral Lake area, Ontario, 1979-80.
See:
Ontario Geol. Surv., Misc. Paper 90, p. 92-96, 1979.

52. SUTCLIFFE, R.M., MACKASEY, W.O., Ontario Geol. Surv.:
Funger Lake area, District of Thunder Bay, Ontario, 1979-80.
- See:**
Ontario Geol. Surv., Misc. Paper 90, p. 41-43, 1979.
Areal mapping of supracrustal and plutonic rocks adjacent to the Caribou Lake greenstone belt has been completed. Petrographic, geochemical, structural and economic studies are in progress.
53. TROWELL, N.F., Ontario Geol. Surv.:
Geology of the Flying Loon Lake area, District of Kenora, 1977-79.
54. TROWELL, N.F., Ontario Geol. Surv.:
Geology of the Gibi Lake area, District of Kenora, 1979-81.
- See:**
Ontario Geol. Surv., Misc. Paper 90, p. 31-34, 1979.
Detailed mapping of Gibi Lake area with reference to mineral potential, mapping at 1:15,840 for reproduction at 1:31,680.
55. TROWELL, N.F., Ontario Geol. Surv.:
Geology of the Savant Lake area, Ontario, 1980.
- QUÉBEC**
56. CHARBONNEAU, J.-M., FRANCONI, A., Québec Ministère Énergie et Ressources:
Synthèse géologique du secteur Chapais-Lac Bachelor, Québec, 1980.
Faire une synthèse géologique du secteur décrit plus haut et dont les derniers levés datent de 30 ans et plus. Utiliser à cette fin les concepts géologiques et métallogéniques développés durant les dernières décennies.
57. CLARK, T., MAURICE, O.D., CATY, J.-L., Québec Ministère Énergie et Ressources:
Géologie de la région du Lac Cambrien (24C/6 1/2 ouest), Territoire du Nouveau-Québec, 1976-.
- Voir:**
Région du Lac Napier, Territoire du Nouveau-Québec (Rapport préliminaire); Québec Ministère des Richesses naturelles, DPV-663, 1979.
Dresser la carte de la fosse du Labrador à l'échelle de 1:50,000; à l'exception de la région actuelle et une autre petite région, toute la fosse a été couverte (au Québec) à l'échelle de 1:50,000 ou 1:63,360.
58. FRANCONI, A., DUBE, C., CHARBONNEAU, J.-M., Québec Ministère Énergie et Ressources:
Cartographie à l'ouest de Chapais, Québec, 1980-83.
Connaitre la stratigraphie des formations volcano sédimentaires à l'ouest de Chapais; établir leurs possibles corrélations avec les formations de Chibougamau; connaitre le potentiel minéral de la région.
59. FRANCONI, A., GIRAUD, P., LAURIN, A.F., Québec Ministère Énergie et Ressources:
Partie Ouest de la bande volcanosédimentaire Frotet-Evans, 1971-; thèse de doctorat (Franconi).
Connaitre la stratigraphie d'une bande volcanosédimentaire; pétrographie et pétrochimie; cartographie achevée; études pétrographiques et pétrochimique achevées; début de la rédaction.
60. GLOBENSKY, Y., Québec Ministère Énergie et Ressources:
Géologie de la région de Vandreuil-Lachute, Québec, 1979-80.
61. VEILLETTE, J.J., Geol. Surv. Can.:
Géologie du Quaternaire, région de l'Outaouais supérieur, Québec, 1977-.
- SASKATCHEWAN/SASKATCHEWAN**
62. DAVISON, W.L., Geol. Surv. Can.:
Milliken Lake-Goldfields mining area, Saskatchewan, 1975-.
63. RAMAEKERS, P., Saskatchewan Mineral Res. (Geological Surv. Br.):
Surface geology of the Athabasca Group, NEA/IAEA test area, 1979-81.
Compilation of bedrock geological mapping at 1:50,000 for the NEA/IAEA test area was undertaken. The sandstones in the entire area form part of the Manitou Falls Formation, and are composed largely of the conglomeratic and sandy braided stream facies of this formation. The sediments consist predominantly of quartz sandstones, with interbedded conglomerates in the basal eastern areas and thin, discontinuous siltstone or mudstone seams in the upper and western parts of the area. The paleocurrent pattern as presented in previous summary reports was substantiated by work done this field season. The data presently available suggest that the conglomerates in this area (i.e., the basal units) were deposited by streams that flowed to the north and northwest, whereas the overlying sandstones were laid down by more westerly flowing rivers. The conglomerates in the test area may be the northern part of a large alluvial fan, the southern part of which is not exposed in outcrops suitable for making paleocurrent measurements.
The distribution of maximum grain sizes indicates the overall fining upwards and basinwards nature of the Manitou Falls Formation. Discontinuities in this pattern at the surface are generally due to faulting.
- YUKON TERRITORY/TERRITOIRE DU YUKON**
64. BLUSSON, S.L., Geol. Surv. Can.:
Operation Stewart, Yukon-District of Mackenzie, 1968-.
65. CAMPBELL, R.B., Geol. Surv. Can.:
Operation Mount St. Elias, Yukon-British Columbia, 1973-.
66. KLASSEN, R.W., Geol. Surv. Can.:
Surficial geology and terrain evaluation, southern Yukon, 1977-.
- See:**
Thermokarst terrain near Whitehorse, Yukon Territory; Geol. Surv. Can., Paper 79-1A, p. 385-388, 1979.
67. NORRIS, D.K., Geol. Surv. Can.:
Operation Porcupine, Yukon-District of Mackenzie, 1961-.
- See:**
A new mineral occurrence of unknown economic potential in northern Yukon Territory; Geol. Surv. Can., Paper 79-1C, p. 103-104, 1979.
- GENERAL/GÉNÉRALITÉS**
68. GOSSON, C.M.C., FAIRBAIRN, D.M., EMR (National Geographical Mapping Div.):
CANADA - SOIL CAPABILITY FOR AGRICULTURE (thematic map), 1977-81.
One of a series of small-scale thematic maps in The National Atlas of Canada series, CANADA - SOIL CAPABILITY FOR AGRICULTURE will present, at 1:7 500 000, the first comprehensive national portrayal of Canada's soils classified according to the Canada Land Inventory Soil Capability Classification for Agriculture. The CLI classification groups mineral soils according to actual or potential climatic, soil and landscape limitations for field crop production. The productive capacity of soils for common field crops is also considered. For this presentation, CLI classes are grouped into five capability categories which reflect the severity rather than kind of limitations present. A simultaneous publication, CANADA - AGRICULTURAL LANDS will appear as a companion map in the series and will show in detail, at the same scale, land in agricultural use, potential agricultural land and non-agricultural land.
69. KELLY, S.A., FAIRBAIRN, D.M., EMR (National Geographical Mapping Div.):
Canada - RELIEF (thematic map), 1979.
One of a series of small scale thematic maps in The National Atlas of Canada series, CANADA - RELIEF will portray, in metric units, the relief of Canada's landmass and the bathymetry of ocean areas adjacent to Canada at a scale of 1:7 500 000. This will be the first definitive national relief portrayal represented in metric units. Contour intervals, differentiated by layer colouring, will appear for both land and water at 200, 500, 1,000, 2,000, 3,000 and 4,000 metres. Supplementary land contours of 100, 300, 700 and 1,500 metres will not be differentiated by colour. Land contours will be generalized from the International Map of the World series (1:1,000,000). Bathymetry will be derived from the most recent and accurate source materials available and will represent the first truly accurate small scale representation of this subject.
70. KELLY, S.A., FAIRBAIRN, D.M., EMR (National Geographical Mapping Div.):
Canada - GLACIERS (thematic map component), 1980-82.
CANADA - GLACIERS, a national portrayal of the areal extent of glaciers at scales of 1:2,000,000 and 1:7,500,000, will be the standard glacier component to be used in The National Atlas of Canada series of small-scale thematic maps. Delineations will be as accurate and detailed as scale will permit.

ALBERTA/ALBERTA

71. MORAN, S.R., Alberta Research Council (Geol. Surv.):
Geology of the Calgary urban area and environs, Alberta, 1974-81.
Field mapping has been completed. Open file maps of surface geology at 1:50K (some of area at 1:25K) to be available early spring 1980. Test drilling completed with textural and mineralogical analyses of samples underway. Stratigraphic synthesis is still in rudimentary stages. However at least two subdivisions of each of the uppermost and the lowermost tills previously recognized in the area appear present.

BRITISH COLUMBIA/COLOMBIE-BRITANNIQUE

72. EWING, T.G., ARMSTRONG, R.L., MATHEWS, W.H., McTAGGART, K.C., Univ. British Columbia (Geological Sciences):
Geology, petrology and tectonic setting of the Kamloops Group (Eocene), south-central British Columbia, 1977-80; Ph.D. thesis (Ewing).
Continuation of lab work - major element and trace element geochemistry, petrology and microprobe - will lead to publication (or submission) during the year of two major papers on 1) the regional stratigraphy and tectonic setting, and 2) the petrology and geochemistry of Eocene volcanism in the Thompson Valley region of British Columbia. Side studies on paleomagnetism, vitrinite reflectance and palynology are at varying stages. Geochronology of selected samples U/Ar and Rb/Sr is continuing.
73. GABRIELSE, H., Geol. Surv. Can.:
Operation Finlay, British Columbia, 1970-.
See:
Operation Finlay; Geol. Surv. Can., Paper 80-1A, p. 348, 1980.
74. GABRIELSE, H., Geol. Surv. Can.:
Operation Dease, British Columbia, 1977-.
See:
Isotopic dating of Early Jurassic volcanism and plutonism in north-central British Columbia; Geol. Surv. Can., Paper 80-1A, p. 27-32, 1980.
Structural style in northeastern Cry Lake map area, north-central British Columbia; *ibid.*, p. 33-35, 1980.
Operation Dease; *ibid.*, p. 347, 1980.
75. REESOR, J.E., Geol. Surv. Can.:
Geology of Nelson map area (E/2), British Columbia, 1979-.
76. RODDICK, J.A., Geol. Surv. Can.:
Coast mountains project, British Columbia, 1963-.
77. WHEELER, J.O., Geol. Surv. Can.:
Lardeau map area, British Columbia, 1979-.
78. WOODSWORTH, G.J., Geol. Surv. Can.:
Kemano project, British Columbia, 1977-.
- MANITOBA/MANITOBA**
79. CORKERY, M.T., LENTON, P., Manitoba Dep. Energy and Mines (Mineral Res. Div.):
Lower Churchill River project, Manitoba, 1979-81.
To develop 1:100 000 scale geological maps for NTS areas 64 A, 64 H, 54 E-West half, 54 D-West half, in the Churchill structural Province. Where necessary, this coverage will be intensified to provide 1:20 000 and 1:50 000 maps of those areas between Ullman and Partridge Breast Lakes where metavolcanic rocks are found to occur.
- NEWFOUNDLAND/LABRADOR/
TERRE-NEUVE/LABRADOR**
80. ERMANOVICS, I., Geol. Surv. Can.:
Archean rocks of the Nain Province in Hopedale (13 N), Snegamook Lake (13 K), and Makkovik (13 O) maps-areas, Labrador, 1978-.
See:
Geology of the Hopedale Block of eastern Nain Province, Labrador: Report 1; Geol. Surv. Can., Paper 79-1B, p. 341-348, 1979.
81. GOWER, C.F., Newfoundland Dep. Mines and Energy:
The geology of the Benedict Mountains region, eastern Labrador, 1979-81.
Mapping the eastern extension of the Central Mineral Belt; assessing the mineral potential of the region; and deciphering Grenvillian and Pre-Grenvillian geological histories in the Grenville Province south of the Central Mineral Belt.
82. HILL, J.D., Newfoundland Dep. Mines and Energy:
Regional mapping in the Davis Inlet - Mistastin Lake corridor, Labrador, 1977-82.
The fourth year in a five year mapping project in the southern part of the Nain igneous complex. Most of the mapping will be completed in 1980. The final map will be published after 1981 at a scale of 1:100,000 and will be accompanied by a memoir on the geology. The study area is bounded on the west by the eastern margin of R.E. Emslie's mapping for the Geological Survey of Canada and on the east by Davis Inlet and Flowers Bay. Latitudes 55°30' and 56° mark the southern and northern limits of the project.
83. RYAN, B., Newfoundland Dep. Mines and Energy:
Geological mapping and mineral potential studies along the northern margin of the Grenville Province, central Labrador, 1980-81.
See:
Preliminary reconnaissance study of the northern Grenville Province, Naskaupi River area, Labrador; Newfoundland Dep. Mines and Energy, Rept. 80-1, 1980.
This project is one of several presently underway to elucidate the geological history of the Grenville structural provinces in Labrador. It is concerned with mapping a corridor through the gneissic and granitic rocks of the Grenville south of the volcano-sedimentary sequences of the Central Mineral Belt. The mapping will be carried out at a 1:100,000 scale, and will be aimed at: 1) identifying the rocks which make up this presently poorly known region; and 2) establishing the pre-Grenvillian history in relation to the surrounding areas. Uranium mineralization is suspected from the area as a result of an anomaly discovered during a URP survey in 1977. Ground follow-up will be conducted during this project.
84. SMYTH, W.R., Newfoundland Dep. Mines and Energy:
Regional geology of the Hermitage flexure belt, southern Newfoundland, 1978-80.
See:
Reconnaissance of the Burgeo map area (11 P west half), Newfoundland; Newfoundland Dep. Mines and Energy, Rep. 79-1, 1979.
Geology of the Grey River area - regional summary; Newfoundland Dep. Mines and Energy, Rep. 80-1, 1979.
Reconnaissance geology of the White Bear River (11 P/14) and Dolland Brook (11 P/15) map sheets; *ibid.*
The region consists of a 10 km wide, roughly southeast-northwest trending belt of sedimentary, metasedimentary and minor silicic volcanic(?) rocks of lower Paleozoic age. The belt is bounded to the north by a post-tectonic megacrystic granite and to the south by a syn-tectonic megacrystic granite.
To the south of the syn-tectonic granite at the coast near Grey River, tonalitic to granodioritic gneisses crop out. These rocks may represent pre-Appalachian basement that formed the south-eastern margin of Iapetus.
- NORTHWEST TERRITORIES/TERRITOIRES
DU NORD-OUEST**
85. BOSTOCK, H.H., Geol. Surv. Can.:
Fort Smith-Hill Island Lake region, District of Mackenzie, 1979-.
See:
Reconnaissance geology of the Fort Smith-Hill Island Lake area, Northwest Territories; Geol. Surv. Can., Paper 80-1A, p. 153-155, 1980.
86. CAMPBELL, F.H.A., Geol. Surv. Can.:
Geology of the Bathurst Inlet area, District of Mackenzie, 1974-.
87. CIEZIŁSKI, A., Geol. Surv. Can.:
Gneissic basement to the Fury and Hecla Formation and the Autridge Formation on Baffin Island, District of Franklin, 1979-.
See:
Geological studies of the Late Precambrian supra-crustal rocks and underlying granitic basement, Fury and Hecla Strait area, Baffin Island, District of Franklin; Geol. Surv. Can., Paper 80-1A, p. 125-132, 1980.
88. EADE, K.E., Geol. Surv. Can.:
Kamilukwak Lake map-area, District of Keewatin, 1979-.
89. FRISCH, T., Geol. Surv. Can.:
Precambrian geology of southeast Ellesmere, Devon and Coburg Islands, District of Franklin, 1976-.
90. FRITH, R.A., Geol. Surv. Can.:
Geology of Indin Lake map-area, District of Mackenzie, 1972-.
91. FRITH, R.A., Geol. Surv. Can.:
Geology of Nose Lake and Beechey Lake, District of Mackenzie, 1975-.
See:
Regional deformation and emplacement of granitoid plutons in the Hackett River greenstone belt, Slave Province, Northwest Territories; Can. J. Earth Sci., vol. 16, no. 6, p. 1187-1193, 1979.
92. GORDEY, S.P., Geol. Surv. Can.:
Geology of Nahanni map area (105 I), Yukon Territory, 1979-.
See:
Stratigraphic cross-section, Selwyn Basin to Mackenzie Platform, Nahanni map area, Yukon Territory and District of Mackenzie; Geol. Surv. Can., Paper 80-1A, p. 353-355, 1980.
93. HENDERSON, J.B., Geol. Surv. Can.:
Healey lake map-area, District of Mackenzie, 1978-.
See:
The Healey Lake map-area (northern part) and the enigmatic Thelon Front, District of Mackenzie; Geol. Surv. Can., Paper 80-1A, p. 165-169, 1980.
94. HEYWOOD, W.W., Geol. Surv. Can.:
Operation northern Melville Peninsula, District of Franklin, 1970-.
95. HOFFMAN, P.F., Geol. Surv. Can.:
Sloan River map-area, District of Mackenzie, 1973-.
96. JACKSON, G.D., Geol. Surv. Can.:
Operation Bylot, District of Franklin, 1967-.
97. JACKSON, G.D., Geol. Surv. Can.:
Operation Penny Highlands, District of Franklin, 1969-.
98. LeCHEMINANT, A.N., Geol. Surv. Can.:
MacQuoid Lake (W 1/2) and Thirty Mile Lake (E 1/2) map-areas, District of Keewatin, 1975-.
99. LeCHEMINANT, A.N., Geol. Surv. Can.:
Geology of Thirty Mile Lake 65 P (W 1/2) and Tebesjuak Lake 65 O (W 1/2) map-areas, District of Keewatin, 1978-.
See:
Thirty Mile Lake map area, District of Keewatin; Geol. Surv. Can., Paper 79-1B, p. 319-327, 1979.
Geology of the Tebesjuak map area, District of Keewatin: A progress report with notes on uranium and base metal mineralization; Geol. Surv. Can., Paper 80-1A, p. 339-346, 1980.
100. McGLYNN, J.C., Geol. Surv. Can.:
Calder River map-area (86 F), District of Mackenzie, 1973-.
101. MORGAN, W.C., Geol. Surv. Can.:
Geology to the Foxe Fold belt, Baffin Island, District of Franklin, 1974-.

ONTARIO/ONTARIO

102. CARD, K.D., Geol. Surv. Can.:
Regional geological synthesis, central Superior Province, Ontario and Québec, 1977-.

See:

Progress report on regional geological synthesis, central Superior Province; Geol. Surv. Can., Paper 80-1A, p. 61-68, 1980.

QUÉBEC

103. TAYLOR, F.C., Geol. Surv. Can.:
Operation Nuivilik, Quebec, 1972-.

See:

Reconnaissance geology of a part of the Precambrian Shield, northeastern Quebec, northern Labrador and Northwest Territories; Geol. Surv. Can., Mem. 393, 1979.

SASKATCHEWAN/SASKATCHEWAN

104. GILBOY, C.F., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.):
Reconnaissance bedrock geology, Stony Rapids North (part of NTS area 74 P), 1978-80.

See:

Reconnaissance bedrock geology, Stony Rapids North (part of NTS area 74 P); Sask. Geol. Surv., Summ. Investig., p. 12-18, 1979.

Reconnaissance geology, Stony Rapids area (part of NTS area 74 P); Sask. Geol. Surv., Summ. Investig., p. 35-42, 1978.

1:100,000 scale bedrock reconnaissance mapping of a 3500 km² area situated immediately south of the Saskatchewan-Northwest Territories border between longitudes 104°W and 106°W. The area is one of good outcrop exposure consisting

predominantly of gneissic complexes with minor metasediments and supracrustal rocks. Three molybdenite showings were encountered during the mapping as well as a gossan containing a trace of malachite.

105. JOHNSTON, W.G.Q., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.):
Compilation bedrock geology, Reindeer Lake South (NTS area 64 D), 1978-.

See:

Sask. Geol. Surv., Summ. Investig., p. 39-50, 1979.

The centre of the Reindeer Lake South area which extends west from the Manitoba-Saskatchewan boundary is 210 km northeast of LaRonge. A 1:250,000 scale map was compiled from available data and field work in 1978. Field manuscript maps, notes, rock specimens and specimen location maps are available for parts of this area and over 1,500 rock specimens of other geologists were examined, classified and the map units, as indicated by the specimens, plotted and employed in the compilation. Map units have been assigned to groups with some groups including more than one unit. Most subunit designations have no stratigraphic significance. Each group forms a contiguous well-defined belt extending across the entire area.

106. RAY, G.E., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.):
Reconnaissance bedrock geology, Wollaston Lake East (part of NTS area 64 L), 1978-80.

See:

Sask. Geol. Surv., Summ. Investig., p. 19-28, 1979.

This 780 km² area situated 400 km north-northeast of LaRonge covers two contrasting geological regimes. The Wollaston domain which consists of upper amphibolite facies, northeast

striking Archean metasedimentary gneisses of the Wollaston Group interfolded with foliated granitoid bodies interpreted to be reworked Archean basement. The Peter Lake domain (a newly introduced term) contains the Parker Lake Gneisses, the Campbell River Group and the Peter Lake Complex which is composed of mafic and felsic intrusive rocks with minor supra crustal gneisses. Several radioactive granite and pegmatite boulders were encountered during the study, as well as an isolated occurrence of fluorite and three outcrops containing malachite-stained fracture surfaces.

107. SCOTT, B.P., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.):
Reconnaissance geology, upper Clearwater River (part of NTS area 74 F); Interim report, 1977-.

See:

Sask. Geol. Surv., Summ. Investig., p. 61-67, 1979.

The reconnaissance mapping was carried out in 1977. Outcrops of Precambrian rocks are sparse, except in the central and southeast portions of the area. Most rocks consist of mixed metasediments-migmatite, felsic granulite, and granite. The latter occurs throughout the area, however the felsic granulites and mixed metasediments-migmatites become less common towards the southeast corner of the map area. Heterogeneous felsic gneiss, diorite, the Virgin Schist Group, and anorthosite are restricted to the southeast quadrant of the map area. Pegmatite occurs rarely. Mylonite occurs in several zones within a few km of the east boundary of the map area. Several outcrops of Athabasca Formation Sandstone occur near the north boundary. Sporadic late dykes occur along north-northwest-trending and north-northeast-trending fault zones. A couple of small sulphide showings were encountered in the study area.

ENVIRONMENTAL GEOSCIENCE/SCIENCES DE LA TERRE APPLIQUEES A L'ENVIRONNEMENT

108. ANDERSON, J.C., GELL, A.W., Environment Canada (National Hydrology Res. Instit.):

Hydrologic studies, Mackenzie Delta region, Northwest Territories, 1975-.

Hydrologic studies continued during the 1979 open water season at twelve watersheds in the taiga and tundra zones of the eastern Mackenzie Delta Region, N.W.T. (the Inuvik-Tuktoyaktuk region). Data were gathered on snowpack water equivalent, river channel and culvert icings, precipitation, air temperature, river discharge, suspended sediment and water temperature. Late winter snowpack water equivalents were generally low, resulting in low snowmelt flood magnitudes. A mid-summer drought occurred as in 1978, causing very low river discharge by late summer. Suspended sediment concentrations were low in response to low flood volumes. A major river icing was observed to recur on Hans Creek, just upstream of the planned Inuvik-Tuktoyaktuk Highway crossing point.

109. DELORME, L.D., ESTERBY, S.E., Environment Canada (National Water Res. Instit.):

(1) Successional development during the last 200 years in Lake Erie. (2) Paleolimnology of acid susceptible lakes, 1979-80.

(1) To define and quantify the nature of past environment conditions and process (e.g. chemical, physical and biological responses) which have affected the aquatic environment of Lake Erie.

(2) To delineate, within a time frame work of the last 200 years, the changes in hydrogen ion concentration within a given lake.

110. EGGINTON, P.A., Geol. Surv. Can.:
Periglacial processes and slope movement, central District of Keewatin, 1977-.

See:

Mudboil activity, central District of Keewatin; Geol. Surv. Can., Paper 79-1B, p. 349-356, 1979.

111. HENDRIE, L.K., SZEICZ, G., PRICE, A.G., Univ. Toronto (Geography), AECL (Chalk River):
Transpiration and snowmelt in the water balance of Canadian forests, 1977-; Ph.D. thesis (Hendrie).

A.G. Price will examine the mode of water movement in the ground, and the concomittant transports of dissolved materials, and residence times.

L.K. Hendrie will finish the project, to define the role of the summer transpiration and spring snowmelt on the movement of soil moisture and groundwater.

G. Szeicz: (1) intends to look at the overall water balance of forested areas in Canada that are affected by large rainfall interception ratios, and where the water balance pathways may have to be revised;

(2) the chemical composition of throughfall and stemflow (richer in nutrients) is also intriguing, and is important from the point of view of forest ecology and nutrient status of forest soils.

112. JACKSON, L.E., Jr., Geol. Surv. Can.:
Environmental assessment of coal resource development, Canadian Cordillera, 1977-.

113. JACKSON, L.E., Jr., Geol. Surv. Can.:
Debris flow hazard assessment methodology, alpine and northern upland areas, 1978-.

To identify and determine the relative importance of the environmental factors favouring the development of debris flows in the Rocky Mountains (49°N-54°N).

See:

A catastrophic glacial outburst flood (jökulhlaup) mechanism for debris flow generation at the Spiral Tunnels, Kicking Horse River basin, British Columbia; Can. Geotechnical J., vol. 16, no. 4, p. 806-813, 1979.

114. KAMENKA, L.A., RUTTER, N.W., Univ. Alberta (Geology):

Rates of weathering of spoil piles from open pit mines in the Rocky Mountains of Alberta from field observation and a laboratory experimental system, 1978-80; M.Sc. thesis (Kamenka).

This project is being designed to determine rates at which rocks weather, to set up a laboratory procedure which could best duplicate natural weathering processes, but at an accelerated rate. These data if correlated to natural rates of weathering i.e. one week of experimental weathering is equal to 3 years of natural weathering, would have great implications in reclamation work in a most difficult environment. Soil type and times of formation, toxic elements, quick and slow weathering material could be identified and a set pattern of stripping of overburden may be set up as well as returning the material in reclamation sites.

115. MUNRO, D.S., Univ. Toronto (Geography):
Energy exchange and water loss from a swamp, 1976-80.

See:

Daytime energy exchange and evaporation from a wooded swamp; Water Resour. Res., vol. 15, p. 1259-1265, 1979.

To document the energy basis of the evaporation mechanism, and to determine an operational procedure for estimating water loss. Some aspects of the former have been reported; aspects associated with soil moisture storage are currently being prepared for publication. Progress to date indicates that an equilibrium evaporation model will be tested as an operational procedure for water loss estimation. Future research will examine the evaporation mechanism in greater detail.

116. RUKAVINA, N.A., Environment Canada (National Water Res. Instit.):
Time-lapse photographic studies of nearshore erosion and sediment transport, 1977-80.

To complete time-lapse studies of sediment transport at Van Wagner's Beach on the Burlington Bar and to begin studies of erosion of the nearshore till surface at Stoney Creek, Ontario.

117. RUKAVINA, N.A., Environment Canada (National Water Res. Instit.):
Nearshore geology data reports and atlas, 1978-82.
See:
Lake Erie nearshore sediments, Point Pelee to Port Burwell, Ontario; Inland Waters Directorate (DOE), Scientific Ser. No. 99, 1979.
Georgian Bay nearshore sample data, 1978 nearshore survey; Hydraulics Res. Div. Tech. Note 79-02, 1980.
Nearshore sediment data, Fifty Mile Point, Lake Ontario; Hydraulics Res. Div. Tech. Note 79-80, 1980.
To organize and publish field and laboratory data for Great Lakes nearshore sediments and to develop a format for a coastal sediment atlas.
118. RUKAVINA, N.A., LEWIS, E.O., Environment Canada (National Water Res. Instit.):
Nearshore profile modification by storms and seasonal water level variations, 1978-81.
See:
A fixed transducer system for recording nearshore profile change; Proc. A.C.R.O.S.E.S. Workshop October 1979.
To develop and use a fixed transducer system for monitoring nearshore profile changes at the Burlington Bar and to relate observed profile change to storm activity and seasonal water level variations.
119. RUTHERFORD, G.K., BRECK, W.G., CROWDER, A., DIMMA, D., McLAUGHLIN, B., Queens Univ. (Geography, Chemistry, Biological Sciences);
The properties and nature of mining tailings and devastated soils and their influence on plant growth, 1979-81; M.Sc. theses (Dimma, McLaughlin).
This project comprises two major endeavours: 1) the soil-type processes obtaining in tailing in various mining operations in the Sudbury Basin, and 2) the nature of the additions to soil materials devastated by mining and smelting operations.
Although vegetation has been successfully maintained on tailings, the nature of the new formations occurring in the tailing bodies has been offered little attention. One of the objects of this project is to show the properties of tailings as measured by typical soil criteria such as soil chemistry and mineralogy. The chemical content and growth patterns of vegetation on the tailings will also be determined and correlations between tailing properties and plant distribution and chemical content will be made.
The chemical properties of soils devastated by mining activities will be correlated with chemical content of vegetation and distribution of species will also be attempted.
120. SOLES, J.A., EMR (CANMET):
Identification and characterization of mineral phases in the working environment and in human tissues, 1975-.
Accurate and precise identification of particulate mineral materials in samples of residues of ashed human tissues are being carried out to assist Health and Welfare Canada in assessment of environmental hazards.
121. TAYLOR, R.B., Geol. Surv. Can.:
Coastal reconnaissance of the Sverdrup Basin, Northwest Territories, 1978-.
To map and analyze the coastal environments of the Sverdrup Basin and to provide information on the shore types, processes and effects of massive shore ice piles.
122. TAYLOR, R.B., Geol. Surv. Can.:
Coastal reconnaissance of Bylot and northeastern Baffin Islands, Northwest Territories, 1979-.
123. ZEMAN, A.J., Environment Canada (National Water Res. Instit.):
Monitoring of piezometers and slope-indicator casings at the Port Burwell sandy site, central Lake Erie, 1975-.
Changes in pore-water pressure and subsurface displacements during the progressive failure of a bluff slope undergoing rapid recession at the toe were monitored throughout 1979. A topographic survey was carried out at the site in July 1979 in order to establish morphological changes along the 850 m long stretch of the shore.
124. ZEMAN, A.J., Environment Canada (National Water Res. Instit.):
Shoreland management study - Canada/Ontario shore damage task force, 1977-79.
All data, pertaining to the geotechnical investigation of the western Lake Erie shoreline in two townships, have been compiled in a final report.

GEOCHEMISTRY/GÉOCHIMIE

ANALYTICAL METHODS AND ANALYSIS/
MÉTHODES ANALYTIQUES ET ANALYSES

125. ABBEY, S., Geol. Surv. Can.:
Analysis of international reference samples, 1969-.
126. ABBEY, S., Geol. Surv. Can.:
Development of methods for the analysis of geological materials, 1969-.
See:
An improved method for total carbon and total water determination in rocks; Can. Geol. Surv., Paper 79-1B, p. 417, 1979.
127. JOHNSON, W.M., RALPH, P.F., VILKOS, V.V., DAVIES, J.B., British Columbia Ministry Energy, Mines, Petrol. Res. (Geol. Div.):
The determination of trace levels of uranium and thorium in rocks and minerals by gamma-ray spectrometry, 1978-80.
A method for the rapid screening of rock and soil samples for low levels of uranium concentration has been developed. It involves measuring the gamma-ray emission of the sample for a 100 second period using a NaI(Tl) phosphor crystal detector and a multi-channel analyzer.
A method using the same equipment has been developed for the analysis of uranium and thorium in rock samples and ores. The equipment is such that it can be transported to the field for the analysis of diamond drill cores. The application of simple simultaneous equations using peak areas as determined by the integrate mode of the multi-channel analyzer permits the rapid determination in the field of such information as quantitative measures of uranium and thorium content and whether or not the uranium is geologically young or old (i.e. in radiometric equilibrium).
128. RALPH, P.F., British Columbia Ministry Energy, Mines, Petrol. Res.:
Accurate analysis of rocks for minor and trace elements, 1979-.
A method for highly accurate major element analysis of rocks has been developed using atomic absorption flame spectrophotometry. Extension of this scheme to trace analysis does not give sufficient sensitivity. Using XRF it has been shown, so far, that detection limits of 1 ppm and accuracies approaching 1% RSD can be achieved
- for matrices varying from lithium carbonate to iron oxide without prior knowledge of the matrix. Method uses scattered spectrum to account for matrix variability. Grain size problems appear to be limiting factor for accuracy and work requires testing in borax glass medium.
129. STEGER, H.F., SUTARNO, R., BOWMAN, W.S., EMR (CANMET):
Canadian certified reference materials project (CCRMP), 1970-.
See:
Soil samples SO-1, SO-2, SO-3 and SO-4 - certified reference materials; CANMET Rep. 79-3, 1979.
Uranium ore BL-5 - A certified reference material; CANMET Rep. 79-4, 1979.
Zinc concentrate CZN-1 - A certified reference material; CANMET Rep. 79-14, 1979.
Lead concentrate CPB-1 - A certified reference material; CANMET Rep. 79-15, 1979.
Copper concentrate CCU-1 - A certified reference material; CANMET Rep. 79-16, 1979.
In this period, certification programs have been initiated for DL-1a, a low-grade uranium ore, SU-1a, a nickel-copper-cobalt ore and OKA-1, a niobium ore. The preparation of a zinc-lead-copper-tin ore, MP-1a, has been begun as has the cutting into disks of 7 zinc-aluminum alloys as reference standards for emission spectrography and X-ray fluorescence. Two lake sediments were prepared for the Inland Waters Directorate of Environment Canada for use as reference materials.
130. BARNES, M.A., Univ. British Columbia (Geological Sciences):
Factors influencing the solubilization of polycyclic aromatic hydrocarbons from Kootenay coal by natural waters, 1979-81.
131. BARNES, M.A., BARNES, W.C., Univ. British Columbia (Geological Sciences):
Lipid geochemistry of sediments from oxic and anoxic basins of Powell Lake, southwestern British Columbia, 1974-.
- See:**
Organic compounds in lake sediments; in Lerman, A., ed., Lakes: chemistry geology, physics, Springer-Verlag, New York, p. 127-152, 1979.
132. BERTRAND, R., KUBLER, B., DESJARDINS, M., INRS-Pétrole, Univ. Neuchâtel:
Interprétation des gaz adsorbés de 7 puits de l'offshore du Labrador par l'application de l'analyse des correspondances et des coefficients de corrélation partiels, 1977-80.
Reconnaissance des zones de maturation des hydrocarbures avec les gaz adsorbés, par l'utilisation de méthodes statistiques globales. Travaux terminés, publication en rédaction.
133. BOILY, M., BROOKS, C., Univ. Montréal (Géologie):
Rapport entre les zones paléoséismiques, le volcanisme Archéen, et la métallogénèse ancienne; thèse de maîtrise (Boily).
Project de recherche à pour but de réunir les données de Sr des basaltes de l'Abitibi, d'établir une carte géochimique du Sr et par conséquent une carte de la profondeur des zones paléoséismiques.
134. BOURBONNIERE, R.A., Environment Canada (National Water Res. Instit.):
Organic geochemistry of lake sediments, 1979-.
To develop the capability for detailed statement-of-the-art analysis of natural organic components in sediments, primarily humic matter and lipids. The techniques developed will be applied to sediments from the Great Lakes and small lakes in Ontario. Data from such analysis will be used to address such problems as 1) the effect of lake acidification on the cycling of organic carbon, 2) the diagenesis of organic matter in freshwater sediments, and 3) the degree of anthropogenic influence on the organic geochemistry of fresh water sediments.
135. BROOKS, C., Univ. Montréal (Géologie):
Géochimie et géochronologie des roches métavolcaniques de la ceinture Michipicoten, Ontario.
136. BROOKS, C., Univ. Montréal (Géologie):
Migration des isotopes dans les roches felsiques et mafiques due à l'altération sous-marine et au métamorphisme régional.

- Les isochrones des roches de la région de Chibougamau ont été étudiées en référence à un âge U-Pb du zircon. La différence obtenue entre l'âge Rb-Sr et U-Pb s'explique par le degré de migration des éléments pendant les événements qui ont eu lieu après la cristallisation des roches.
137. BROOKS, C., Univ. Montréal (Géologie):
Le développement du Bouclier Canadien et son rapport avec les autres régions Précambriennes.
Son principal objectif est la chronologie radiométrique des anciennes roches ignées et métamorphiques du Québec et la corrélation de leurs âges absolus et de leurs compositions géochimiques.
138. BROOKS, C., Univ. Montréal (Géologie):
Pétrogénèse des tholéïtes Mésozoïques de l'hémisphère sud.
L'étude des isotopes du Sr, O, Nd et Pb, dans les tholéïtes de Tasmanie suggère que ces roches ne sont pas contaminées par la croûte continentale. Le rapport isotopique élevé en Sr est donc une propriété du manteau. Le manteau serait donc plus hétérogène que prévu. La poursuite de cette étude éclaircira peut-être cette question.
139. BROWN, H.M., Esso Resources Canada Ltd. (Production research):
Use of carbon isotopes in oil-oil and oil-source correlation, 1978-.
140. CHARBONNEAU, R., BROOKS, C., Univ. Montréal (Géologie):
Géochronologie et géochimie des roches granulitiques, ceinture Pilwitonei, Manitoba; thèse de maîtrise (Charbonneau).
Cette étude dans une région près d'un front orogénique (ceinture Thompson) démontre que le métamorphisme granulitique avait lieu il y a 2600 m.a. et que par conséquent, il n'est pas le résultat de l'orogénèse Hudsonien. Les roches de la ceinture Pilwitonei ont un âge d'au moins 3000 m.a.
141. CREANEY, S., Esso Resources Canada Ltd. (Exploration research):
Organic geochemical prediction of oil and gas occurrence, 1979-.
142. DUNN, C.E., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.):
Biogeochemical survey of two deeply buried uranium deposits, NEA/IAEA test area, 1979-81.
See:
Sask. Geol. Surv., Summ. Investig. 1979, p. 166-167, 1979.
Two areas were selected for study this year: 1) McClean Lake area (NTS 64 L, 11 km west of Collins Bay, Wollaston Lake): over the uranium ore deposit discovered by Canadian Occidental Petroleum Ltd. and the Inco Metals Company in 1979; and 2) Midwest Lake area (NTS 74 I, 25 km west of Collins Bay, Wollaston Lake): over the uraniumiferous boulder train and part of the ore deposit discovered in 1978 (Esso Minerals and a group including Bow Valley Industries and Numac Oil and Gas Ltd.).
The choice of the McClean Lake area was influenced by the excellent opportunity to sample the vegetation before it was disturbed and possibly contaminated by drilling operations. The Midwest Lake site was chosen because of the near-surface occurrence of radioactive boulders. It will be of interest to determine whether or not the vegetation reflects the presence of these boulders, and/or a biogeochemical halo around the ore deposit.
143. GARIÉPY, C., BROOKS, C., Univ. Montréal (Géologie):
Systématique des systèmes Rb/Sr et Sm/Nd dans les tholéïtes continentales: Implications pour l'évolution chimique du manteau sub-continentale; thèse de doctorat (Gariépy).
144. GARIÉPY, C., LUDDEN, J.N., BROOKS, C., Univ. Montréal (Géologie):
Pétrogénèse des complexes "granitiques" Archéens région de Chibougamau, Québec.
Ce projet est basé sur l'étude de la distribution des éléments-traces (Sc, Cr, Ni, Rb, Sr, Y, Zr, Nb, Ba, Hf, Ta) et des terres-rares dans des échantillons provenant de différents plutons. A l'aide des résultats analytiques, nous espérons établir les caractéristiques chimiques essentielles de chacune des suites et déterminer l'origine de même que l'évolution pétrologique de ces magmas.
145. GAUTHIER, G., BROOKS, C., Univ. Montréal (Géologie):
Implantation au Québec, de la méthode uranium-plomb de datation en utilisant le minéral zircon; thèse de maîtrise (Gauthier).
Une étude géochronologique du Massif de Duxbury dans la région Estmain, Province de Québec, à l'aide de cette méthode de datation.
146. HEROUX, Y., BERTRAND, R., CHAGNON, A., INRS-Pétrole:
Signification de la réflectance sur Kérogène. Comparaisons diagenèse-catagenèse minérale et organique: Applications aux séries du Paléozoïque inférieur et moyen, 1977-79.
147. HUTCHEON, I.E., NAHNYBIDA, C., Univ. Calgary (Geology and Geophysics):
Geochemistry and diagenesis, 1979-.
148. JONASSON, I.R., Geol. Surv. Can.:
Environmental geochemistry, 1974-.
149. MACHADO, N., BROOKS, C., HART, S.R., Univ. Montréal (Géologie), M.I.T.:
Évolution géochimique du manteau terrestre dans le Bouclier Canadien.
Bien que la plupart des roches précambriennes soient métamorphosées et/ou altérées, il arrive que les clinopyroxènes gardent leurs caractéristiques primaires. L'analyse des isotopes du Sr et du Nd ainsi que de certains éléments hygromagmatophyles (K, Rb, Cs, Ba, Zr, Hf, Lanthanides) de ces minéraux permettra d'évaluer les variations de composition du manteau terrestre dans le temps pour une région déterminée, soit la ceinture de l'Abitibi et ses environs.
Les résultats préliminaires de l'analyse du rapport isotopique $^{87}\text{Sr}/^{86}\text{Sr}$ dans des clinopyroxènes provenant des komatites du Canton de Munro et des pyroxénites du filon-couche de Dundanlad semblent indiquer une hétérogénéité du manteau terrestre de l'ordre de 0.00003-0.00004 dans la région. D'autres clinopyroxènes provenant des régions de Royun-Noranda, Matagami et Chibougamau sont en train d'être analysées.
150. MACHADO, N., GARIÉPY, C., BROOKS, C., LUDDEN, J.N., Univ. Montréal (Géologie):
Géochimie des isotopes dans les collines montérégiennes; thèse de doctorat (Machado).
Cette recherche a trois objectifs:
1) datation précise des intrusions majeures par les méthodes Rb/Sr et/ou Sm/Nd;
2) établir le rôle de l'assimilation dans la genèse des magmas intermédiaires et felsiques en comparant la composition isotopique de xénocristaux d'origine profonde avec celle de phases minéralogiques plus tardives; et
3) évaluer l'homogénéité chimique du manteau source de ces magmas.
151. MILNER, C.W.D., Esso Resources Canada Ltd. (Exploration Research):
Petroleum geochemistry of the Canadian frontier, 1972-.
152. PIGEON, Y., BROOKS, C., LUDDEN, J.N., Univ. Montréal (Géologie):
Association shoshonite dans l'archéen.
153. POWELL, T.G., Geol. Surv. Can.:
Hydrocarbon geochemistry of Arctic Archipelago and Canadian East Coast offshore, 1976-.
See:
Geochemistry of Snorri and Gudrid condensates, Labrador Shelf: Implications for future exploration; Geol. Surv. Can., Paper 79-1C, p. 91-95, 1979.
154. SAWATZKY, H., GEORGE, A.E., FURIMSKY, E.E., MONTGOMERY, D.S., EMR (CANMET):
Geochemical information obtained during investigation of bitumen, heavy oils from western Canada and products derived from them. Investigation of oils from frontier areas, 1978.
155. SNOWDON, L.R., Geol. Surv. Can.:
Development of extraction, identification and correlation systems for organic compounds from sedimentary rocks and crude oils, 1973-.
156. SNOWDON, L.R., Geol. Surv. Can.:
Hydrocarbon geochemistry of northern Interior Plains and Beaufort Sea, 1976-.
- See:**
Geology and organic geochemistry of the Dome Hunt Nektoralik K-59 well, Beaufort Sea; Geol. Surv. Can., Paper 79-1C, p. 85-90, 1979.
- EXPLORATION, NON-ORGANIC/
APPLIQUÉE, NON-ORGANIQUE**
157. BOYLE, D.R., Geol. Surv. Can.:
Regional geochemistry, Newfoundland and Labrador, 1976-.
158. BUTLER, A.J., DAVENPORT, P.H., Newfoundland Dep. Mines and Energy:
Regional lake sediment survey of Island of Newfoundland, 1972-81.
Project is a helicopter assisted reconnaissance geochemical survey which consists of collecting lake centre bottom sediment samples at pre-selected sites on a density of approximately one sample per 506 km². These samples are analysed for Cu, Pb, Zn, Co, Ni, Ag, Mn, Fe, U, Mo, F and LOI (loss on ignition). The data is computerized and basic statistics are performed. The resulting information is released to the public as an open file containing individual element distribution maps for each of the above elements, a sample location map (all on a scale of 1:250,000) and a data listing for the samples collected including field and analytical data.
159. CAMERON, E.M., Geol. Surv. Can.:
National geochemical reconnaissance, 1975-.
See:
Investigation of base metal mineralization in Proterozoic metasediments, Melville Peninsula, District of Franklin; Geol. Surv. Can., Paper 79-1A, p. 187-196, 1979.
160. CARRIGAN, J., GÉLINAS, L., DARLING, R., DAVID, M., Ecole Polytechnique (Génie minéral):
Géochimie et géostatistique appliquées à l'exploration des gisements volcanogènes: le gisement Millenbach, 1973-80; thèse de doctorat (Carrigan).
161. COKER, W.B., Geol. Surv. Can.:
Regional geochemistry, southern Canadian Shield, 1976-.
See:
Initial geochemical results and exploration significance of two uraniumiferous peat bogs, Kasmere Lake, Manitoba; Geol. Surv. Can., Paper 79-1B, p. 199-206, 1979.
Lacustrine geochemistry around the north shore of Lake Superior: implications for evaluation of the effects of acid precipitation; Geol. Surv. Can., Paper 79-1C, p. 1-13, 1979.
162. DARLING, R., Ecole Polytechnique (Génie minéral):
The trace element geochemistry of the altered wallrocks around the Louvem Copper deposit, Val d'Or, Québec, 1980-82.
163. DAVENPORT, P.H., Newfoundland Dep. Mines and Energy:
Ore-element patterns in lake sediment as a guide to mineralization in granitoid rocks in Newfoundland, 1978-.
See:
Ore-element distribution patterns in lake sediment associated with the St. Lawrence Granite, Newfoundland; in Prospecting in Areas of Glaciated Terrain, I.M.M., London, p. 80-90, 1979.
The lake sediments over mineralized granites in Newfoundland are characterized by relatively high values of granitophile elements such as Mo, U and F, and in some cases Pb and Zn. Over some mineralized plutons an ore-element zoning is developed in the lake sediments with Mo, F and U being highest over the intrusive body itself and Pb, and in some cases Ag being highest at its margins and over the adjacent country rocks. The zoning of ore-elements in lake sediment reflects the spatial distribution of metals in these mineralized plutons. This type of metal zoning associated with mineralized granitoids has been widely noted, for example - in many porphyry copper and molybdenum deposits, and also from rare-metal deposits such as the Cornish tin granites. The recognition of these zoning patterns in regional lake sediment survey data where the sample density is 1 sample per 4-6 km² offers a rapid method of definition of mineralized granitoids and their differentiation from barren bodies.

164. DICKSON, W.L., SMYTH, W.R., Newfoundland Dep. Mines and Energy:
 Geology and geochemistry of the Ackley Granite, eastern Newfoundland, 1979-80.
 During summer 1979 approximately 757 samples were collected from the Ackley Granite in eastern Newfoundland. Sampling was carried out using a grid system based on Garrett's (G.S.C.) plan. The boundaries of the batholith were more accurately defined and areas of deformed (pre-Ackley) granitoids were delimited. Major findings include:
 1) An area of non-megacrystic granite which underlies about 20% of the batholith, is located in the south.
 2) Radioactivity is highest in this uniform coarse to medium grained variety.
 3) The Dover-Hermitage Bay fault does not cut the pluton. Thus, the fault must be pre-Middle Devonian.
 4) Molybdenite is apparently restricted to the marginal facies in the Rencontre Lake area.
 5) Beryl occurs in pegmatites in the deformed granitoids.
165. FOSCOLOS, A.E., Geol. Surv. Can.:
 Clay and clay minerals investigation, 1968.
See:
 Catagenesis in shales and occurrence of authigenic clays in sandstones, North Sabine H-49 well, Canadian Arctic Islands; Can. J. Earth Sci., vol. 16, no. 6, p. 1309-1314, 1979.
166. FYFE, W.S., KERRICH, R., Univ. Western Ontario (Geology):
 Gold in felsic igneous intrusions in greenstone belts, 1979-82.
167. GODWIN, C.J., WATSON, P., Univ. British Columbia (Geological Sciences):
 Silver-gold zonation in the Beaverdell vein system, south-central British Columbia, 1979-81; M.Sc. thesis (Watson).
168. HATTORI, K., Univ. Alberta (Geology):
 Stable isotope study on marine hydrothermal activity at Kuroko, Japan, 1978-80.
See:
 $\delta^{18}\text{O}$ and δD study of Kuroko ores; EOS, Trans. Am. Geophys. Union, vol. 60, no. 18, p. 425-426, 1979.
 Oxygen and hydrogen isotopic compositions are determined for country rocks and mineral separates from the Uwarnuki Kuroko ore, Kosaka, Japan. Formation temperatures calculated from oxygen isotope fractionation between sericite and quartz from sulfide ores are in excellent agreement with filling temperatures of fluid inclusion in quartz, indicating that they formed in equilibrium at $\approx 300^\circ\text{C}$ from the ore fluid having $\delta^{18}\text{O}$ of -2 and δD of -10 smow.
 Underlying Tertiary volcanic rocks have uniform $\delta^{18}\text{O}$ values, $+8.1 \pm 1.0$ although Paleozoic basement rocks have large $\delta^{18}\text{O}$ values, $+18$ to $+19$, suggesting that hydrothermal circulation system mainly occurred within Tertiary formations.
 The Tertiary rocks have large variation in hydrogen isotopic compositions, -34 to -64 . The variation would have been caused by the mixing of different kinds of hydrothermal fluids, perhaps mixing of pre-existing "evolved" seawater-magmatic fluid and seawater.
 Chlorite and sericite in anhydrite bodies adjacent to the sulfide ore bodies from several Kuroko have low $\delta^{18}\text{O}$ and high δD values, indicating that they were precipitated from descending seawater at hydrothermal temperatures, $140-270^\circ\text{C}$.
169. HATTORI, K., MUEHLENBACHS, K., Univ. Alberta (Geology):
 Stable isotope study (oxygen, carbon, hydrogen, sulfur) on uraninite and uranium ore deposits, 1977-80.
 Uraninites from various localities in the world have the lowest $\delta^{18}\text{O}$ values for any terrestrial minerals, ranging from -8 to -30 smow, though the ore-forming fluids were enriched in ^{18}O based on $\delta^{18}\text{O}$ values of the associated minerals. For example, the Kitts, Labrador and the Eldorado, N.W.T. were formed from ore-solutions of $\delta^{18}\text{O} = \approx 0$ at moderate temperatures ($\approx 150^\circ\text{C}$), a pegmatite in Keewatin district was formed at $\approx 400^\circ\text{C}$ from a fluid of $+5$, but coeval uraninite has a $\delta^{18}\text{O}$ of -24 . The low $\delta^{18}\text{O}$ value must be attributed to re-equilibration with meteoric waters at low temperatures. Our conclusion is supported by a correlation between the $\delta^{18}\text{O}$ of uraninite and present-day local meteoric waters.
 Hydrogen isotope compositions of kaolinite associated with uraninite at Oklo show surprisingly low δD values, -97 and -98 smow, which are too light to be equilibrated with present-day meteoric waters. The δD may preserve the original value when they formed or may indicate that they were exposed to cold climatic conditions.
 In order to gather information on the fluid movement related to the uranium mineralization, we are now analyzing the country rocks as well as vein minerals from the Fay ore deposit, Sask. Country rocks have $\delta^{18}\text{O}$ values of $+5$ to $+18$, whereas hematitized red rocks close to the ore are enriched in ^{18}O , $+10$. Quartz and calcite in the ore are more enriched in ^{18}O , $+10$ to $+14$.
170. HATTORI, K., MUEHLENBACHS, K., Univ. Alberta (Geology):
 Stable isotope study on Icelandic deep drilling cores, 1978-80.
 3 km succession of Tertiary basalt lavas has been obtained from Eastern Iceland; 1 km from outcrop and 2 km from drilling core. Stable isotopic compositions are being determined for the hydrothermally altered basalts and for alteration minerals as one part of International Crustal Research Drilling Project organized by university of Dalhousie.
 Light $\delta^{18}\text{O}$ values of calcite, $+2$ to 9 smow, suggest that the alteration occurred under meteoric hydrothermal conditions. Low δD of epidote, -79 , supports the evidence of meteoric hydrothermal activities.
 Whole rocks have also low $\delta^{18}\text{O}$ values, ranging from $+4.0$ to 6.5 . However, the altered basalts from Reykjavik (Pliocene) and from Krafla recent volcano show much depleted $\delta^{18}\text{O}$ values, $+8.0$ to $+4.2$ and -5.6 to -10.5 , respectively. As their mineral assemblage are similar to each other, there might be temporal variation in $\delta^{18}\text{O}$ in the altered rocks; the younger rock has the lower $\delta^{18}\text{O}$ values. The variation may be attributed to the temporal variation in $\delta^{18}\text{O}$ of fresh magma and/or to the difference in climate in Iceland since Tertiary.
171. JONASSON, I.R., Geol. Surv. Can.:
 Trace elements in sulphides, 1974-.
See:
 Zn:Cd ratios for sphalerites separated from some Canadian sulphide ore samples; Geol. Surv. Can., Paper 78-1B, p. 195-201, 1978.
172. KERRICH, R., HUTCHINSON, R.W., HODDER, R.W., Univ. Western Ontario (Geology):
 Au, Ni, Cr in Archaean greenstone belts, 1978-81.
See:
 Lode gold deposits in greenstone belts, geochemical and hydrodynamic constraints; Gold, exploration and outlook, E.A. Eakins (edit.), Montreal, 1979.
 Archaean precious metal hydrothermal systems, Dome Mine, Abitibi greenstone belt II. REE and oxygen isotope relations; Can. J. Earth Sci., vol. 16, p. 440-458, 1979.
 Field relations and geochemistry of Au, Ni and Cr deposits in ultramafic-mafic volcanic rocks; Ontario Geol. Surv., Misc., Paper 87, p. 84-94, 1979.
 Archaean precious metal hydrothermal systems, Dome Mine, Abitibi greenstone belt I. Patterns of alteration and metal distribution; Can. J. Earth Sci., vol. 16, p. 421-439, 1979.
 Epidotization of diorites at Al Hadah, Saudi Arabia: fluid influx into cooling plutons; Contrib. Mineral. Petrol., vol. 68, p. 281-284, 1979.
 Archaean volcanogenic oceans; Chem. Geol., vol. 24, p. 25-33, 1979.
173. KISH, L., CREVIER, M., Québec Ministère Energie et Ressources:
 Lithogéochimie des roches granitoïdes de la région des Monts Otish, Québec, 1979-80.
 Etude géochimique et minéralogique des roches granitoïdes le long du contact (120 km) du bassin sédimentaire protérozoïque des Monts Otish et l'évaluation du potentiel uranifère des roches protérozoïques.
174. LALONDE, J-P., CHOUINARD, N., TREMBLAY, R., Québec Ministère Energie et Ressources:
 Exploration géochimique par l'échantillonnage des eaux souterraines au Québec, 1974-.
Voir:
 Dispersions géochimiques et minéralogiques d'intérêt dans les tills, les eaux souterraines et les sédiments de ruisseau; Québec Ministère Richesses Naturelles, DPV-608, 1979.
 De nombreux levés d'orientation et études de cut ont été effectuées pour évaluer l'efficacité de la méthode et déterminer le type de signal recherché. Les travaux sont rendus à la phase de couverture systématique des territoires habités du Québec.
175. LaTOUR, T.E., KERRICH, R., Univ. Western Ontario (Geology):
 Iron formations, 1978-81.
176. McCONNELL, J.W., DAVENPORT, P.H., Newfoundland Dep. Mines and Energy:
 Geochemical evaluation of areas with anomalous concentrations of uranium and base metals in lake sediments, 1978-81.
See:
 The Grenville of Labrador: A possible target for uranium exploration in light of recent geological and geochemical investigations; Geol. Surv. Can., Paper 79-1B, p. 329-339, 1979.
 Field work includes detailed geochemical sampling and, in some instances, ground and airborne radiometric surveys. Several field procedures are being tested to determine their effectiveness as exploration methods in a variety of geological and physiographic settings.
177. MALPAS, J.G., TALKINGTON, R.W., LANGDON, G.S., FOLEY, S., DUNNING, G.R., Memorial Univ. (Geology):
 Studies of ophiolites and related oceanic crust, 1976-; M.Sc. theses (Langdon, Foley), Ph.D. theses (Talkington, Dunning).
See:
 The dynamothermal aureole of the Bay of Islands ophiolite suite; Can. J. Earth Sci., vol. 16, no. 11, p. 2086-2101, 1979.
 Ophiolites: Field and geochemical investigations of the ophiolite suite and comparisons to the oceanic crust and mantle, especially the determination of spreading centre magmatic and post magmatic processes; recognition of the tectonic setting and environment of formation of various ophiolites and their modes of emplacement onto the continental margin. Approach to be taken involves field mapping and sampling followed by analysis for major and particularly trace elements and isotopes. Trace element modelling of petrogenesis, and direct investigation of mantle melting on collected samples. Consideration of the bearing of the results on ocean crust magnetisation, seismicity, heat flow and spreading rates. From an economic standpoint this work will be important in constraining models of massive sulphide formation.
 Kimberlites: Investigation of eastern Labrador ultrabasic rock suites involving field mapping, sampling and phase chemistry. Emphasis to be placed on determining a palaeogeotherm for subcrustal rocks during the opening of the Labrador Sea.
178. MAURICE, Y.T., Geol. Surv. Can.:
 Regional geochemistry, northern Canadian Shield, 1976-.
See:
 Geological studies of the Late Precambrian supracrustal rocks and underlying granitic basement, Fury and Hecla Strait area, Baffin Island, District of Franklin; Geol. Surv. Can., Paper 80-1A, p. 125-132, 1980.
179. POULIOT, G., BERGERON, M., Ecole Polytechnique (Génie minéral):
 Minéralogie et géochimie des principaux gîtes d'ilménite associés aux complexes anorthositiques du Québec, 1978-81; thèse de doctorate (Bergeron).
 Définir, à l'aide de la géochimie, l'évolution et la filiation des minerais d'ilménite vis-à-vis leurs cadres anorthositiques et fournir ainsi une meilleure appréciation géochimique et économique de ces minéralisations. Les données géochimiques et pétrologiques permettront également une exploration plus rationnelle pour ces minéralisations.

180. PRETO, V.A., British Columbia Ministry Energy, Mines, Petrol. Res.:
Background distribution of Cu, Pb, Zn, Ni and Co in volcanic rocks of the Upper Triassic Nicola Group in south-central British Columbia, 1975-80.
181. ROBERT, F., DARLING, R., GÉLINAS, L., Ecole Polytechnique (Génie minéral):
The geochemistry of altered wallrocks surrounding the Manitou-Barvue volcanogenic ore deposits, Val d'Or, Québec, 1978-80; thèse M.Sc.A (Robert).
182. ROY, C., DARLING, R., LUDDEN, J.W., Ecole Polytechnique (Génie minéral):
Geochemistry of host rocks at Kiema Gold Mines, Val d'Or, Québec, 1980-82; thèse M.Sc.A. (Roy).
183. SAWYER, S.J., NALDRETT, A.J., Univ. Toronto (Geology):
Models for the origin of Ni sulphide-bearing komatites from the Abitibi Belt, Ontario, 1979-83; Ph.D. thesis (Sawyer).
Involves detailed investigations of the geology and geochemistry (including REE and PGE analysis) of five Ni-sulphide bearing komatites in the Abitibi Belt of northern Ontario. It is hoped that the information gained may shed some light on the origin of the komatites and their sulphide deposits.
184. SCOTT, S.D., URABE, T., KALOGEROPOULOS, S., BRYNDZIA, T., TOMONO, T., FARR, B., Univ. Toronto (Geology):
The Kuroko ores of the Hokuroku district, Japan, and their comparison with Canadian massive sulphide deposits, 1977-81; Ph.D. thesis (Kalogeropoulos); M.Sc. theses (Bryndzia, Tomono).
To understand the genesis of massive sulphides from the type locality in Japan and thereby develop new exploration guides for such deposits worldwide. Toronto projects include studies of footwall alteration, geochemistry of associated chemical sediments ("exhalites"), U/Pb dating of zircons and role of lineaments in ore emplacement. Areas of study in Canada include: southern British Columbia; northwestern and northeastern Ontario; Noranda, Québec; Bathurst, New Brunswick; and Buchans, Newfoundland.
185. SCOTT, S.D., KALOGEROPOULOS, S., SIRIUNAS, J., Univ. Toronto (Geology):
Geochemistry of chemical sediments ("exhalites") as an exploration guide to massive sulphide ores, 1977-81; M.A.Sc. thesis (Siriunas).
See:
Sulphide ironstones as a guide to massive sulphide ores; Ontario Geol. Surv., MP 37, p. 42-44, 1979.
Siriunas has shown that trace element distributions in an iron formation ("exhalite") define a halo around the contemporaneous massive sulphide mineralization of the Willroy no. 4 orebody at Manitouwadge, Ontario. Multi-element factor analysis for the grouping Cu-Au-Ag-As and Zn-Sb-As-Sn gave the best results providing statistically significant halo effects for several hundred metres from ore.
Kalogeropoulos is comparing exhalites from a Kuroko deposit in the Holoroku district of Japan ("tetsusehie") with those of the Millenbach mine, Noranda, Québec ("contact tuff"). Except for the lack of hematite, the Millenbach exhalites are very similar to the Japanese "tetsusehie". Trace elements, mineral chemistry and stable isotopes promise to provide useful exploration guides for massive sulphide mineralization.
186. SCRATCH, R.B., HUTCHINSON, R.W., KERRICH, R., Univ. Western Ontario (Geology):
Geology, geochemistry and genesis of the Lake George Antimony Mines, south-central New Brunswick, 1977-80; Ph.D. thesis (Scratch).
The Lake George Antimony deposit has been studied over the past three years by means of detailed mapping of the geology and structure of the ore deposit coupled with major and trace element geochemical studies of the vein and associated alteration zone. Fluid inclusion study of the quartz vein has been completed and oxygen isotope work is in progress on mineral assemblages separated from the ore zone and the alteration zone. A genetic model based on the above data is proposed.
187. SIRAGUSA, G.M., PYKE, D., Ontario Geol. Surv.:
Geochemistry of the metovolcanics, Jerome area, Ontario, 1979-81.
See:
Ontario Geol. Surv., Misc. Paper 90, p. 57-63, 1979.
188. VOS, M.A., THOMPSON, I., Ontario Geol. Surv.:
Lithium exploration methods (Geochemical), 1979-81.
To develop methods of geochemical exploration for lithium pegmatites. Initial series of analyses of Centre Lake samples (33) for Li, Rb, Cs, B, Be, Sn, Ta has been completed. Survey will consist of analysing an adequate number of available Centre Lake samples in select areas of northwestern Ontario for major elements associated with lithium pegmatites. Results will allow assessment of the method employed.
- THEORETICAL/PURE**
189. ANDERSON, G.M., Univ. Toronto (Geology):
Sulfide mineral solubilities.
The solubilities of galena and sphalerite in NaCl brines saturated with H₂S and up to 95°C have been measured, and also calculated using thermodynamics data. The experimental data is used to test the validity of the calculations, which are then extended to place limits on possible conditions of formation of certain types of lead-zinc ore bodies.
190. CERMIGNANI, C., ANDERSON, G.M., Univ. Toronto (Geology):
Nephelinization reactions, 1979.
Phase relations and equilibrium constants have been determined for several reactions in the system Ab-An-Ne-Na₂CO₃-CaCO₃-H₂O at high pressures and temperatures. The results are applied to interpreting the petrogenesis of the nepheline gneisses in the Bancroft area. A model has been proposed whereby NaCl-bearing solutions react with marble, creating Na₂CO₃. The "nephelinizing" reaction is then Anorthite (in plagioclase) + Na₂CO₃ = 2 Nepheline + CaCO₃.
191. RUCKLIDGE, J.C., LITHERLAND, A.E., KILIUS, L.C., GORTON, M.P., Univ. Toronto (Geology, Physics):
Ultra sensitive analysis of geological material using a tandem accelerator mass spectrometer, 1979-83.
See:
Secondary ion mass spectrometry at close to single-atom concentration using D.C. accelerators; Surface and Interface Analysis, vol. 1, p. 12-19, 1979.
The discovery that a D.C. Tandem accelerator, normally the exclusive domain of nuclear physicists, can be made to function as an ultra sensitive mass spectrometer, has prompted experiments on stable isotopes of trace elements in rocks. Platinum has been selected as the first trial element for a number of reasons, one which is its geological and economic significance, and another the lack of existing techniques to analyse at levels below 10 ppb. Preliminary experiments on the accelerator at the University of Rochester have given results which suggest that sensitivities of the order of 1 in 10¹¹ should be feasible on milligram quantities of rock or mineral material.
192. SCOTT, S.D., GOBLE, R., URABE, T., HANCOCK, R.V.G., Univ. Toronto (Geology):
Self diffusion of zinc and iron in sphalerite, 1978-
Self diffusion of ⁶⁵Zn and ⁵⁹Fe between tightly clamped sphalerite cubes is being measured by a radio-tracer technique involving γ ray spectroscopic analysis of successive sections from the diffused cube. For Zn self-diffusion our preliminary experiments have given D₀ = 1.25 x 10⁻⁸ cm²/sec and Q = 21.9 kcal/mole, where D = D₀ exp (-Q/RT). These values are significantly lower than published vapour diffusion data. Our preliminary results for Fe give values slightly lower than those for Zn. Both Zn and Fe self-diffusion are weak functions of the iron content of the sphalerite. Our data demonstrate quantitatively that sphalerite is indeed a refractory sulfide that is unlikely to re-equilibrate readily in diffusion-controlled geological processes.
193. THURSTON, P.C., Ontario Geol. Surv.:
Economic evaluation of Archean felsic volcanic rocks using rare earth element geochemistry, 1979-80.
See:
Felsic centres of volcanism, Uchi and Gods Lake Subprovince, northwestern Ontario; Ontario Geol. Surv., Misc. Paper 90, p. 19-25, 1979.
- GENERAL/GÉNÉRALITÉS**
194. APPELYARD, E.C., Univ. Waterloo (Earth Sciences):
Gain-loss calculations in metasomatism and wall-rock alteration, 1975-81.
See:
Fenitization: an example of the problems of characterizing mass transfer and volume changes; Chem. Geol., vol. 26, p. 1-15, 1979.
195. APPELYARD, E.C., Univ. Waterloo (Earth Sciences):
Geochemistry and metallogeny of calc-silicate rocks with possible meta-evaporite associations, 1978-82.
- 195a. APPELYARD, E.C., Univ. Waterloo (Earth Sciences):
Host rock alteration and metallogeny of the Silverfields Mine, Cobalt, Ontario, 1979-82.
See:
Processing lithochemical data for exploration; Ontario Geol. Surv., Geoscience Res. Seminar, p. 1, 1979.
- 195b. ARNDT, N.T., COLEMAN, L.C., FORESTER, R.W., Univ. Saskatchewan (Geological Sciences):
Stable isotope study of serpentinized and metamorphosed komatiites, 1979-80.
Measurements will be made of the hydrogen and oxygen isotopic compositions of variously serpentinized and metamorphosed komatiites from the following areas: Munro Township, Ontario; Cape Smith fold belt, northern Quebec; Thompson belt, Manitoba. The petrography of the samples will be studied, and these data will be combined with chemical data already available to deduce the alteration and metamorphic history of the rocks, types of waters involved, P, T conditions, etc.
- 195c. BARAGAR, W.R.A., Geol. Surv. Can.:
Stratigraphy and geochemistry of the volcanic rocks of the Circum-Ungava Belt, District of Keewatin, 1978-
196. BEAUMIER, M.B., LALONDE, J.-P., Québec Ministère Energie et Ressources:
Étude méthodologique de l'échantillonnage géochimique des sols dans les régions d'argiles lacustres de l'Abitibi, Québec, 1977-81.
Le but est de mettre au point une méthode de prospection géochimique rapide et efficace permettant éventuellement de couvrir systématiquement les vastes régions pratiquement inexplorées entre Matagami et Chibougamau.
Présentement nombreux travaux ont été effectués:
1) vérification des corrélations entre un levé régional de sol avec d'autres méthodes géochimiques; 2) levé d'orientation de géochimie régional de sol dans une région à fort recouvrement glacio-lacustre avec détermination de la maille optimale; 3) vérification de la reproductibilité des cibles; 4) forages stratigraphiques du recouvrement avec échantillonnage continu et analyse systématique; 5) levé systématique utilisant la méthode développée sur un territoire mal connu; 6) détermination de diverses associations caractéristiques de diverses minéralisations ou environnement géologique; 7) étude des méthodes analytiques optimales par dosage sélectif en vue d'accroître le contraste géochimique; 8) étude et définition des divers mécanismes migratoires des ions dans le milieu; et 9) mise au point d'un appareillage permettant l'échantillonnage systématique par voie aérienne.
197. DUNN, C.E., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.):
Geochemical data file, northern Saskatchewan, 1978-82.
See:
Sask. Geol. Surv., Summ. Investig. p. 141-144, 1978.
All geochemical data obtained by, or filed with the Saskatchewan Department of Mineral Resources are being transferred to a computer-based file as soon as they reach a non-confidential status. This is an on-going project, now in its second year. It is estimated that all available data will be on the master file by 1982.
Progress in the last year is as follows: 1) all available lake sediment, lake water and biogeochemical data in the assessment files have been coded and entered on to the master file: this includes the three major lake-sediment sampling programs conducted by the Geological Survey of

- Canada (GSC files numbered 488, 508 and 566). Some data from samples collected by the Saskatchewan Geological Survey remain to be coded; 2) all geochemical data from NTS map sheets 63 K, 63 L, 63 M, 64 D, 74 F and 74 K are on the master file; and 3) thirty-one percent of the non-confidential files have now been coded and transferred on to the master file: this comprises data from about 22,000 sample sites and represents about 200,000 geochemical analyses.
- Regional or detailed data searches and simple statistical analyses can now be undertaken at the request of any interested party for the nominal computer costs incurred.
198. DYCK, W., Geol. Surv. Can.:
Material balance of uranium series in a natural environment, 1978-.
199. EDGAR, A.D., Univ. Western Ontario (Geology):
Source of K for anomalous K-enriched upper mantle, 1979-80.
200. EDWARDS, G.R., HODDER, R.W., Univ. Western Ontario (Geology):
Evolution of an Archean felsic volcanic-plutonic complex, 1979-81; Ph.D. thesis (Edwards).
A relatively complete Archean felsic volcanic-plutonic complex at Kakagi-Pipestone Lakes, District of Kenora and Rainy River, Ontario, has been mapped and affords an opportunity to study local magma genesis, sequential development, and metal distribution, and to comment on broad aspects of Archean crustal evolution. The rocks are currently being analyzed for major and trace elements including rare earth elements.
201. ELLWOOD, D.J., Geol. Surv. Can.:
Geochemical data systems, 1975-.
202. FLETCHER, W.K., DOYLE, P.J., EVANS, F., Univ. British Columbia (Geological Sciences):
Development and utilization of regional geochemical techniques, 1974-83; Ph.D. thesis (Doyle), M.Sc. thesis (Evans).
See:
Regional geochemical mapping in areas lacking surface drainages: Cu, Fe, Mn and Zn content of overburden and soil in south-central Saskatchewan; Can. J. Earth Sci., vol. 16, p. 1088-1093, 1979.
Studies in the Rosetown area of Saskatchewan have established the significance of soil parent material as the regional control on trace element levels in soils. Using this information as the basis for a hierarchical analysis of variance sampling scheme it was found that as few as 20 samples per parent material unit were necessary to account for as much as 75% of the regional geochemical variation for regions up to 10,000 km².
203. FLETCHER, W.K., LEWIS, A.J., HOLMES, G., Univ. British Columbia (Geological Sciences):
Trace metal speciation and biological effects, Fraser River, 1979-81.
Interactions between dissolved trace elements and suspended particulates are being investigated in the Fraser River estuary as freshwaters and St. of Georgia waters mix under different river flow conditions. Total and adsorbed metals are being determined for particulates (which are also being characterized by XRD, thin film XRF and SEM) and total and IX reactive dissolved metals by graphite furnace atomic absorption. Results are being related to biological availability of metals by bioassay. So far there have been two, four day courses (August and December 1979) with four more planned for 1980.
204. FLETCHER, W.K., SINCLAIR, A.J., Univ. British Columbia (Geological Sciences):
Interpretation of data from multi-element regional geochemical programs in British Columbia, 1979-81.
Preliminary results, emphasizing a simple systematic approach to regional geochemical data have been published. Further work will focus in the usefulness of field data in terms of (i) the frequency with which the various parameters are reported, (ii) their value in defining geochemical environments and (iii) relationships between anomalous field conditions and metal concentrations.
205. FORESTER, R.W., Univ. Saskatchewan (Geological Sciences):
Stable isotope study of uranium vein-type ore deposits, 1978-81.
206. FRANCIS, D.M., HYNES, A.J., ERIKS, S., OZORAY, J., BEDARD, J., PRESCOTT, J., McGill Univ. (Geological Sciences):
Evolution and economic potential of the Cape Smith project, Québec, 1977-; M.Sc. theses.
We again fielded 3 two-man teams in the Cape Smith fold belt this summer. We concentrated on: 1) Detailed mapping and sampling of the Chukotat Group volcanics between Cross Lake and Lac Watts. The field work for this is now complete. We are preparing a paper on the volcanic stratigraphy, and the transition from komatiitic to tholeiitic volcanism in this group. 2) Reconnaissance mapping of the sediments and volcanics of the Povungnituk Group. This was initiated along a section near Kenty Lake and will continue next year. It is aimed at determining the relationship of the Chukotat Group with the Archean basement to the south. In addition, Professor R. Doig joined us for 2 weeks to investigate the relationship of the northern Churchill gneisses to the supracrustal rocks of the belt, by means of Rb/Sr studies.
Three immediate results of this summer's field work are: 1) the first discovery of olivine spinifex in the Chukotat volcanics, 2) the recognition of the distinctly more Fe-rich character of the Povungnituk volcanics, and 3) the finding of an extensive turbidite sequence in the Povungnituk sedimentary rocks. The results of work to date have been presented in papers in E.P.S.L. and the Canadian Mineralogist and as talks at the G.A.C./M.A.C. meeting in Quebec and the Penrose conference on komatiites at Val d'Or.
207. GOODFELLOW, W.D., Geol. Surv. Can.:
Regional geochemistry, Yukon Territory, 1977-.
208. GOODFELLOW, W.D., Geol. Surv. Can.:
Geochemistry of mineral occurrences and their host rocks in the Northern Cordillera, 1979-.
209. KERRICH, R., Univ. Western Ontario (Geology):
Fluid influx into batholiths, 1979-81.
See:
Epidotization of diorites at Al Hadah, Saudi Arabia: fluid influx into cooling plutons; Contrib. Mineral Petrol., vol. 68, p. 281-284, 1979.
Structural and geochemical relations of the gold-bearing veins, Con Mine, Yellowknife; Conf. on Gold Geol., Yellowknife, 1979.
210. LEVINSON, A.A., KNOX, A.W., SILLS, T.K., Univ. Calgary (Geology and Geophysics):
Exploration and environmental geochemistry, 1974-; M.Sc. theses (Knox, Sills).
See:
Disequilibrium in the ²³⁸uranium series in samples from Yeellirrie, Western Australia; J. Geochem. Explor., vol. 12, p. 57-65, 1979.
Progress continues to be made in applying the concepts of disequilibrium in the exploration for uranium.
211. MUEHLENBACHS, K., SCARFE, C.M., HOUGHTON, R.L., COCKER, J., GOFF, S.P., Univ. Alberta (Geology):
Isotopic and mineralogical study of the alteration and aging of the basaltic seafloor, 1978-81.
212. NICHOLLS, J., Univ. Calgary (Geology, Geophysics):
Estimating H₂O contents of magmas, 1979-82.
Prediction of H₂O contents in magmas: Two small plutons south of Smithers, British Columbia were sampled to obtain material for testing methods of predicting H₂O contents of magmas. One has an extensive metamorphic aureole; the other a small one. If the H₂O content of the magmas which formed the plutons was a factor in the formation of the aureoles, then this should be reflected in the mineralogical nature and compositions of the plutons. A variety of rock types will be collected which have the mineral assemblage necessary to determine the mole fraction of H₂O.
213. SCARFE, C.M., Univ. Alberta (Geology):
Physical properties and structure of silicate melts of geological interest, 1976-.
See:
Invariant melting behavior of mantle material: partial melting of two hercynite nodules; Carnegie Instit. Washington, Year Book 78, 1979.
Changes in viscosity and density of melts of sodium disilicate, sodium metasilicate and diopside composition with pressure; *ibid*.
Viscosity of silicate melts as a function of pressure: structural interpretation; *ibid*.
Pressure dependence of the glass transition in glasses of diopside, albite and sodium trisilicate composition; *ibid*.
Pressure dependence of the viscosity of melts of geological interest; XVII Assembly Int. Union Geodesy and Geophysics, Canberra, IAVCEI Symp. 3, Abstract.
214. THORPE, R.I., Geol. Surv. Can.:
Lead isotopic studies on genesis of ore deposits, 1978-.
215. TURNER, J., FRITZ, P., KARROW, P.F., Univ. Waterloo (Earth Sciences):
Carbon isotopes in marl lakes, 1979-81.
Carbon isotopes distributions and relationships are being studied in marl lakes to improve understanding of errors commonly encountered in attempting to date calcareous materials from such environments.

216. ARMSTRONG, R.L., de CSERNA, Z., Univ. British Columbia (Geological Sciences):
Age of basement metamorphism, and volcanic rocks in southwestern Mexico (Taxco-Acapulco region).
Extensive collection from undated basement complex (Precambrian?) now under study (Sr and Pb). Cenozoic volcanic rocks related to major engineering projects are being K-Ar dated.
217. ARMSTRONG, R.L., HAKAKAL, J.E., SOUTHER, J.G., Univ. British Columbia (Geological Sciences):
K-Ar dating of late Cenozoic volcanic centres.
See:
Miocene peralkaline volcanism in west-central British Columbia – its temporal and plate tectonic setting; *Geology*, vol. 7, p. 389-92, 1979.
Principal dating activity is in Garibaldi Belt (clearing up odds and ends) and Mount Edziza (a major project underway). Plateau lavas are also under study (9 dates in progress).
218. ARMSTRONG, R.L., MISCH, P., BROWN, E.H., Univ. British Columbia (Geological Sciences):
Dating of metamorphism – Shuksan allochthon and exotic blocks in underlying melange.
Sr isochrons for pelitic units are nearly complete Sr and Ar dates on blueschist and epidote amphibolite in exotic blocks are in progress. Late Paleozoic, Triassic(?) and Jurassic to early Cretaceous metamorphic episodes are represented in different blocks and tectonic slices.
219. ARMSTRONG, R.L., PARRISH, R.R., SIMONY, P.S., BROWN, R.L., DAVIS, G., READ, P., Univ. British Columbia (Geological Sciences):
Omineca Belt – ancient gneisses, metamorphic ages, granitic plutons.
See:
Sr isotopes in igneous rocks of the Canadian Cordillera and the extent of Precambrian rocks; Cordilleran Sec. Geol. Assoc. Can., Programme and Abstracts, 1979 Meeting, p. 7, 1979.
Isotopic systematics in a metamorphosed granitic terrain, southeast California (abstr.); *EOS*, vol. 60, p. 425, 1979.
Work is completed on core gneisses of Frenchmans Cap dome. Future work will be on mantling paragneiss.
Trail Gneiss and related rocks are in progress for Rb-Sr and K-Ar.
Valhalla-Slocan study (Parrish) complete and ready for publication.
Whipple Mountains, California (Davis) – Sr dating in progress to determine time(s) of mylonitization, denudation.
220. ARMSTRONG, R.L., PARRISH, R.R., VAN DER HEYDEN, P., SHORE, P.J., WOODSWORTH, G., WHITFORD, D., Univ. British Columbia (Geological Sciences):
Rb-Sr, K-Ar, U-Pb, fission track dating of plutons and cooling history in Coast Mountains, British Columbia; Ph.D. thesis (Parrish), M.Sc. thesis (Van der Heyden, Shore).
See:
Rb-Sr geochronometry of the Ecstall, Kitkiata, and Quottoon plutons and their country rocks, Prince Rupert region, Coast Plutonic Complex, British Columbia; *Can. J. Earth Sci.*, vol. 16, p. 387-399, 1979.
Geochronology and thermal history of the Coast Plutonic Complex near Prince Rupert, British Columbia; *Can. J. Earth Sci.*, vol. 16, p. 400-410, 1979.
Shore thesis work complete (U-Pb-dating of zircons from Squamish area). Parrish thesis in progress (fission track-cooling history and thermal models).
Sr isotope-dating and initial ratios-studies in progress on traverses in Bella Coola and Alice Arm areas and some cleanup near Mount Raleigh. Van der Heyden thesis in progress (Coast-Intermontane boundary between Tahtsa Lake and Tsayits River).
221. ARMSTRONG, R.L., PRETO, V.A., McMILLAN, W.J., GODWIN, C.L., McDONALD, J.A., Univ. British Columbia (Geological Sciences):
Intermontane Belt – Sr isotope and Sr and Ar dating studies.
See:
Interpretation of isotopic ages and $^{87}\text{Sr}/^{86}\text{Sr}$ initial ratios for plutonic rocks in the Whitehorse map area, Yukon; *Can. J. Earth Sci.*, vol. 16, p. 1989-1997, 1979.
Isotopic dates and strontium isotopic ratios for plutonic and volcanic rocks in the Quesnel Trough and Nicola Belt, south-central British Columbia; *Can. J. Earth Sci.*, vol. 16, p. 1658-1672, 1979.
Follow up work on Coldwater and Nicola batholiths is in progress. Central British Columbia Traverse (Terrace to Smithers and vicinity) near completion. Endako suite will soon be run for Sr isotopic composition.
222. ARMSTRONG, R.L., SCOTT, K.L., MULLER, J.E., ZHOU, X., Univ. British Columbia (Geological Sciences):
Vancouver Island geochronometry – all major units. K-Ar and chemistry of Alert Bay volcanic belt (ready to write paper).
Rb-Sr for major tectonostratigraphic units largely complete (writing in progress). Sicker Group Rb-Sr dating still incomplete.
223. BAADSGAARD, H., Univ. Alberta (Geology):
Isotope geology of the potash-bearing horizons of the Prairie Evaporite section in Saskatchewan, 1979-.
The suitability of carnallite and sylvite for geochronology can be fully evaluated, by using K-Ar, Rb-Sr and K-Ca dating of the stratigraphically-known potash horizons. However, the susceptibility to recrystallization under load pressure should emerge from an isotope study and the mode of formation of sylvite can also be studied or checked by isotopic analysis. Information about the short-term stability of salt deposits should be obtained. This latter information could be important for studies in mine stability and in regard to the storage of nuclear wastes in salt mines.
224. BAADSGAARD, H., CHAPLIN, C., Univ. Alberta (Geology):
Geochronology and isotope geology of the Glosheia pegmatite, Froland, Norway, 1979-81; M.Sc. thesis (Chaplin).
A study of the isotopic relationship of lead and Sr in five zones of a complex replacement pegmatite. The geochronology should be obtained, but more important is a careful look at the continuity of source material and replacement/alteration reactions from zone to zone within the pegmatite.
225. BAADSGAARD, H., LAMBERT, R. St. J., LONGSTAFFE, F., CUMMING, G.L., Univ. Alberta (Geology, Physics):
Igneous and metamorphic history of the early Archean rocks of the North Atlantic craton, western Greenland and East Labrador, 1969-.
See:
The Archean gneiss complex of northern Labrador. I. Preliminary U-Th-Pb geochronology; *Can. J. Earth Sci.*, vol. 16, no. 4, p. 951-961, 1979.
Great progress has been made in the past year because of samples collected by the principal researcher in the summer of 1978. The nature of the strong metamorphic effects on zircon has enabled a proper evaluation of the zircon geochronology of the Nuk gneisses. The uncovering of the true times of emplacement of the two old gneissic rock types of the north Atlantic craton is now much more certain, and two definite times of intense early metamorphism are now demonstrable. Papers are in preparation concerning these latter discoveries. Still to be obtained are a determined time of intrusion for the Ameralik dykes (critical time-stratigraphic workers), a mineral-geochronologic investigation of the Isua gneisses and further dating of cobbles in the ancient Isua sediments.
226. BAADSGAARD, H., LERBEKMO, J.F., EVANS, M., Univ. Alberta (Geology, Physics):
Magnetic reversals and stratigraphic – time-scale correlation in the Upper Cretaceous, 1977-.
See:
Magnetostratigraphy, biostratigraphy and geochronology of Cretaceous-Tertiary boundary sediments, Red Deer Valley; *Nature*, vol. 279, no. 5708, p. 26-30, 1979.
Besides K-Ar dating of bentonites, we are now employing U-Pb (Zircons) and Rb-Sr (mica + sanidine + plagioclase) to determine the time of deposition of the original ash-fall. Only the $^{206}\text{Pb}/^{238}\text{U}$ date is sufficiently precise on Mesozoic zircons, but good comparative dates have been obtained. The degree and nature of the zircon discordance must be established, however, before the zircon dates are reliable enough to be used in time scale calibration. The use of biotite mica, variably altered, in Rb-Sr isochrons seems to give dates which check closely with U-Pb ($^{206}\text{Pb}/^{238}\text{U}$) and K-Ar data. The nature of the alteration process (which makes the Rb-content variable) must be further classified before truly reliable time scale data may be amassed.
227. BACHINSKI, S.W., FOLAND, K.A., Univ. New Brunswick (Geology):
K-Ar dating of shallow alkaline intrusions of New Brunswick (lamprophyres and gabbro), 1978-80.
Lamprophyres and an alkaline gabbro sill spatially associated with Lower Devonian volcanic rocks of the Dalhousie area, northern New Brunswick, have been assumed to be of Devonian age. K-Ar dating of these intrusions should establish if they are Devonian or are younger and perhaps associated with major episodes of alkaline magmatism in northeastern North America.
228. DREIMANIS, A., HUTT, G., RAUKAS, A., WHIPPEY, P.W., Univ. Western Ontario (Geology):
Thermoluminescence dating, 1977-79.
229. FLETCHER, I.R., FARQUHAR, R.M., Univ. Toronto (Physics):
A lead isotope study of lead-zinc mineralization associated with the central metasedimentary belt of the Grenville Province, 1974-; Ph.D. thesis (Fletcher).
Lead isotope analyses have been made of examples of almost all known Pb-Zn mineralization types and type locations within the central metasedimentary belt of the Grenville Province. Three data groups have so far been distinguished: a) Balmat-Edwards, N.Y.-there are small, systematic isotopic variations between groups of ore zones within the Balmat synform, possibly the result of mixing of lead from at least two sources. Model ages range from 1180 Ma to 1050 Ma; b) Precambrian deposits in Hastings and Mont-Laurier Basins, and at Montauban, Quebec. The various mineralization types all have low $^{238}\text{U}/^{206}\text{Pb}$ characteristics, suggesting mantle-related processes dominated during genesis; model ages of earliest sulphides are 1275 Ma. Isotopic variations observed may reflect crustal processes acting during metamorphism. Inter-basinal differences are also observed; and c) Post-Ordovician calcite-barite-galena veins. Lead isotopic compositions reflect uninterrupted and reasonably localized radiogenic lead production from at least 1100 Ma to 450 Ma or later. Lead was presumably leached from either Grenville crystalline basement or reworked Grenville material in sediments. Work on class B sulphides is continuing.
230. FORD, D.C., SCHWARCZ, H.P., GASCOYNE, M., LATHAM, A.G., YONGE, C.S., DAOUD, M., BLACKWELL, B., KARAKOSTANOGLU, J.K., McMaster Univ. (Geology, Geography):
Uranium Series dating, stable isotope; palaeomagnetic and electron spin resonance studies of calcite speleothems, 1967-; Ph.D. theses (Gascoyne, Latham, Yonge, Karakostanoglou), M.Sc. theses (Daoud, Blackwell).

See:

An isotopic palaeotemperature record for Late Wisconsinan time in northeast Iowa; *Geology*, vol. 7, p. 430-433, 1979.

Palaeomagnetism of stalagmite deposits; *Nature*, vol. 280, no. 5721, p. 383-385, 1979.

Sea-level lowering during the Illinoian Glaciation: evidence from a Bahamas 'Blue Hole'; *Science*, vol. 205, no. 4408, p. 806-808, 1979.

Gascoyne has completed a Ph.D. which considers U Series ages and O isotope profiles of speleothem in Vancouver Island, Yorkshire (England) and the Bahamas. He is investigating possible applications of the $^{234}\text{U}/^{238}\text{U}$ method. Latham has established that certain speleothem carry a chemical remanent magnetism of high resolution. He has determined inclination and declination of many dated specimens and most recently has obtained the first palaeointensity profile. Yonge is comparing the stable isotopes composition of modern percolation waters with those of fluid inclusions in speleothems. Daoud is studying solute U in groundwaters of the Niagara Escarpment and Bancroft (Ontario) area. Karakostanoglou is commencing an appraisal of electron spin resonance decay in speleothem dated by U Series methods. Schwarcz is particularly concerned with deposits associated with Neanderthal and other Lower Palaeolithic remains in Israel and France (B. Blackwell). Ford is investigating rates of landform evolution and Quaternary chronology in the Rocky Mountains, Vancouver Island, Quebec, southern England and the Pyrenees.

231. FRAREY, M.J., *Geol. Surv. Can.*: Correlation and geochronological studies in the Canadian Shield, 1975-.

232. GODWIN, C.I., SINCLAIR, A.J., *Univ. British Columbia (Geological Sciences)*: Pb isotope study of mineral deposits in the Canadian Cordillera, 1978-.

See:

Preliminary interpretation of lead isotopes in galena-lead from British Columbia mineral deposits; *British Columbia Ministry Energy, Mines, Petrol. Res.*, Paper 1980-1, p. 171-182, 1980.

233. GODWIN, C.I., SINCLAIR, A.J., RYAN, B.D., *Univ. British Columbia (Geological Sciences)*: Interpretation of galena-lead from ore deposits throughout the Canadian Cordillera, 1978-82.

234. HUNTLEY, D.J., BERGER, G.W., WINTLE, A.G., *Simon Fraser Univ., (Physics)*: Thermoluminescence dating of sediments, 1975-.

See:

Thermoluminescence dating of a deep-sea sediment core; *Nature*, vol. 279, p. 710-712, 1979.

Thermoluminescence dating of ocean sediments; *Can. J. Earth Sci.*, vol. 17, no. 3, p. 348-360, 1980.

Data on the thermoluminescence (TL) of ocean sediments has led us to propose that exposure to sunlight prior to deposition reduces any previously acquired TL to a small 'residual' value. Subsequent radiation from radionuclides in the sediment increases the TL and this increase is used for dating. Three methods of separating these two TL components are described. In the preferred one the reduction in TL (R) caused by a standard sun-lamp exposure is measured as a function of an administered gamma dose; extrapolation to R = 0 yields the natural dose.

An equation relating this dose to the age and to dose rates derived from radioactivity analyses is presented. The details are given for six samples from each of two cores and their TL ages calculated; these range from 9 to 140 ky. For one core independent dates from *Cycladophora davisiana* variations and an $\text{O}^{18}/\text{O}^{16}$ stratigraphic marker were available for comparison; the agreement is satisfactory. The TL age uncertainty is primarily set by the uncertainty in the water content.

Similar studies on land sediments (loess, till, archaeological) are underway to determine to what extent if any TL dating can be applied to them.

235. MATHEWS, W.H., *Univ. British Columbia (Geological Sciences)*: Tertiary geochronology in southern British Columbia, 1973-81.

Investigations are being made at the fringes of the Shuswap Metamorphic Complex on the metamorphic grade reached in pelitic rocks before resetting of K-Ar dates takes place. Additional dates are being obtained on rocks of the Pemberton 'Volcanic' Belt, and on the Plateau Basalts of the central interior of British Columbia.

236. STEINER, J., *Univ. Alberta (Geology)*: Illite Rb/Sr dating of pre-Pleistocene tillites, 1978-.

To attempt to obtain a sedimentation-diagenesis age of particularly the Precambrian tillites and tilloids of Canada. Depending on the nature of the clay minerals in some cases it may be only possible to obtain a recrystallization age representing the time of deep burial. It is proposed to attempt to separate and concentrate clay minerals and illite species by electrophoresis. These separations will then be dated by the Rb/Sr method and depending on the nature of the clay mineral separates the meaning of these isochrones will be interpreted in terms of the history of the deposit. The initial dating priorities are: Rapitan Group, Northwest Territories, Hurwitz Group, Windemere diamictites of southern British Columbia and late Precambrian tillite of Newfoundland. The Rapitan Group has been adequately sampled and sampling of the Hurwitz Group has been started last summer.

237. TUREK, A., SMITH, P., *Univ. Windsor (Geology)*: Geochronology of the Lake Superior region Wawa area, Ontario, 1979-81; M.Sc. thesis (Smith).

The Gamitagma greenstone belt, approximately 50 km south of Wawa, Ontario has been dated by Rb-Sr and U-Pb methods. The oldest rocks, the volcanics, are 2.70 b.y. old, this is a zircon age on a middle volcanic member of the sequence. The intrusive pre-tectonic or syntectonic trondhjenite plutons are 2.67 b.y. old while the post tectonic Gamitagma gabbro is 2.65 b.y. old. Potassic granitoids give an age of 2.57 b.y. while the Southern Batholith is similar in age 2.59 b.y. The agreement between Rb-Sr and U-Pb zircon ages is good. These age determinations prove that the area is Archean in age.

This study is now being expanded to the Wawa greenstone belt for which K-Ar ages range from 800-2500 m.y. Of particular interest is the age of the volcanics to see if they are correlative with other greenstone belts such as the Gamitagma, Uchi, Timmins, etc.

238. WANLESS, R.K., *Geol. Surv. Can.*: Geochronological research and control studies, 1973-80.

See:

Zircon age measurements for Uivak II gneisses from the Saglek area, Labrador; *Can. J. Earth Sci.*, vol. 16, no. 4, p. 962-964, 1979.

The age and geological history of the Wollaston, Peter Lake, and Rottenstone domains in northern Saskatchewan; *Can. J. Earth Sci.*, vol. 17, no. 3, p. 333-347, 1980.

239. ZHOU, X., ARMSTRONG, R.L., *Univ. British Columbia (Geological Sciences)*: Sr isotopic study of Cenozoic volcanic rocks of eastern China, 1980-82.

A cooperative project with samples of volcanic rocks and ultramafic rocks collected by Chinese geologists is now underway. K-Ar dating will be done in China, Sr isotopes and later possibly Pb and Nd will be done at University of British Columbia.

GEOLOGICAL COMPUTER APPLICATIONS/APPLICATIONS DE L'INFORMATIQUE À LA GÉOLOGIQUE

240. FUH, Tsu-Min, *Saskatchewan Dep. Mineral Res. (Geological Surv. Br.)*: Precambrian geological data file, 1978-.

At present more than 40,000 sample locations from 29 (to Sept. 1979) mapped areas have been indexed on the computer. In addition selected geological data have also been filed as a preliminary to design of a full data system.

Computerization of the Mineral Deposits Index has been completed for approximately 90 percent of the shield area. More data derived from CANMINDEX of GSC and MINSYS of EMR were added to the file in 1979. The mineral deposits data have now been transferred into GSC format, enabling faster access and more flexible retrieval for users.

241. GRUNSKY, E.C., *Ontario Geol. Surv.*: Abitibi alteration study, 1979-82.

See:

Ontario Geol. Surv., Misc. Paper 90, p. 116-120, 1979.

An attempt to determine the types of chemical profiles that are associated with altered volcanic rocks and associated sulphide mineralization. Several methods will be applied in order to determine the amount and type of alteration associated with economic mineralization and the host volcanic rocks. Much of this work will be performed on a computer-based system, using a large number of chemical analyses. Petrographic studies of the altered and unaltered areas will be carried out in order to aid understanding the nature of alteration. Presently, the scope of the study is being restricted to the Clifford-Ben Nevis Townships area. A regional study, however, will evolve following the preliminary investigation of the Clifford-Ben Nevis area.

242. KOPF-JOHNSON, A., STANGL, C.A., PORUKS, M., HAMILTON, W.N., *Alberta Research Council (Geol. Surv.)*: Geoscience Data Index for Alberta (GEODIAL), 1974-.

GEODIAL is fully operational and accessible online through the University of Alberta computer at

Edmonton. The file now includes all published references on Alberta by the GSC, CSPG and ARC, and all unpublished assessment reports on mineral dispositions.

243. MISSAN, H., McARTHUR, G., *Newfoundland Dep. Mines and Energy*: Mineral occurrence data system 1978-81.

Work is continuing in the documentation of the mineral occurrences of the province. At the present time, data has been compiled on approximately 700 occurrences. There are at least 1500 occurrences left.

One of the present objectives of the project is to develop a computer plotting interface whereby the spatial distribution of the mineral occurrences would be plotted by an automatic plotter utilizing the geographic parameters, e.g., easting and northing co-ordinates.

Plans are also in progress to implement changes to the GRASP software, thereby making it a more effective retrieval tool.

244. AGTERBERG, F.P., Geol. Surv. Can.: Probability models for estimating mineral potential, 1969-.
245. AGTERBERG, F.P., Geol. Surv. Can.: Mineral and energy resource evaluation: Probabilistic methods, 1976-.
246. DUMITRIU, M., BLAIS, R.A., Ecole Polytechnique (Génie minéral): Nouvelles méthodes de classification appliquées en géologie, 1979-81.
- Voir:**
Classification automatique avec distances adaptatives appliquée à la géologie; 2nd symp. on data analysis and informatics, Versailles, France, 1979.
249. CARSON, M.A., WILCOCK, P., McGill Univ. (Geography): Erosion processes at Rupert House, Québec, 1979-80; M.Sc. thesis (Wilcock).
A study of the mechanisms and rates of present erosion processes acting on the banks of the Rupert River and the cliffs of Rupert Bay at Rupert House. A photogrammetric study of cliff recession is being supplemented by analysis of existing survey records. The 1979 open-water field season (March-October) was used to identify mechanisms of erosion and bank instability in the clay sediments and to determine factors of safety of the banks at the present time. These calculations are based on strength parameters from block samples, and pore pressure values from piezometers. A detailed stratigraphic description was made of the cliffs supplemented by measurements of undrained strength, fall-cone sensitivity, grain-size characteristics, porefluid salinity etc. Computer simulations will be made to examine the decrease in the Factors of Safety under conditions of accelerated basal erosion of the banks. Field observations were made in 1979 relating to river velocity, wave characteristics, stage etc. as they presently affect bank undercutting.
250. CLAVET, D., Univ. Sherbrooke (Géographie): Géomorphologie et potentiel de productivité des rivières des principales régions physiographiques du Québec pour les salmonidés, 1979-80; thèse de maîtrise.
Voir:
La photo-interprétation et l'aménagement de la faune aquatique au Québec: exemple des rivières à saumon; ADGUS, Dépt. géogr., Univ. Sherbrooke, Bull. recherche nos 39-40, p. 17-44, 1979.
Utilisation de la photographie aérienne panchromatique dans l'inventaire hydro-morphologique des rivières à saumon; Comptes rendus de l'Ass. Qué. Télédétection, vol. 1 et 2, p. 99-100, 1979.
Ce projet de deux buts. Le premier est de démontrer l'efficacité de la télédétection dans l'étude de la géomorphologie et de la sédimentologie des cours d'eau. Le deuxième est d'établir des relations entre la géomorphologie et la localisation des habitats des salmonidés.
251. DESMARAIS, G., DUBOIS, J.M.M., Univ. Sherbrooke (Géographie): Géomorphologie quaternaire du bassin de la rivière Matamek, Côte-Nord du Saint-Laurent, 1975-79; thèse de maîtrise (Desmarais).
Voir:
La déglaciation et la mer de Goldthwait dans le bassin de la rivière Matamek, Moyenne Côte Nord du Saint-Laurent; Réunion ann. AGC-AMC, Québec, Progr. et résumés, vol. 4, p. 46, 1979.
252. DUBOIS, J.M.M., Univ. Sherbrooke (Géographie): Bibliographie sur les caractéristiques physiques des Cantons de l'Est, Québec, 1971-.
- Voir:**
Bibliographie sur les caractéristiques physiques des Cantons de l'Est, Québec, Canada; supplément no 4; Dépt. de géographie, Université de Sherbrooke, Bull. de recherche nos 43-44, 1979.
- Nouvelles méthodes de classification appliquées à la géologie; Séminaire IRIA-LABORIA (France), 1979.
Des algorithmes de classification automatique ont été élaborés et sont en cours d'application dans les domaines de la géologie, géochimie, géophysique, etc. (nuées dynamiques, analyse factorielle typologique, classification avec distances adaptatives, etc.). Les avantages d'ordre économique sont spécialement importants: la mise en évidence de zones intéressantes quant à la présence des minéralisations, devient possible.
247. FABBRI, A.G., Geol. Surv. Can.: Quantification of geological variables and geomathematical estimation of mineral potential, 1972-.
248. MAY, R.W., JONES, B., Univ. Alberta (Geology): Stochastic analysis of a complex tidal-intertidal sequence from the Arctic Islands, 1979-80.
Quantitative analysis of the stochastic properties of a series of sections from the Arctic Islands has been done. Two papers are currently in preparation.
- Cinq rapports totalisant plus de 4,000 références ont été publiés à date pour couvrir tout le domaine physique des Cantons de l'Est. Les références sont regroupées par thèmes. L'acquisition de données est continue.
253. DUBOIS, J.M.M., Univ. Sherbrooke (Géographie): Télédétection et cartographie des fronts glaciaires sur la Côte Nord du Saint-Laurent entre le lac Saint-Jean et le Labrador, 1978-80.
Voir:
Télédétection, cartographie et interprétation des fronts glaciaires sur la Côte Nord du Saint-Laurent entre le lac Saint-Jean et le Labrador; Dépt. de géographie, Université de Sherbrooke, Bull. de recherche no 42, 1979.
Premier essai de corrélation des systèmes morainiques et des positions frontales de la glace au Québec-Labrador à partir d'évidences géomorphologiques obtenues par photo-interprétation. Une deuxième étape pourra comprendre des levés de terrain.
254. DUBOIS, J.M.M., Univ. Sherbrooke (Géographie), Hydro-Québec.
Evolution récente des littoraux de l'estuaire et du golfe du Saint-Laurent, 1979-83.
Evaluation principalement par télédétection de l'évolution historique des rivages (érosion-sédimentation) et caractérisation des types de côte.
255. DUBOIS, J.M.M., GWYN, Q.H.J., Univ. Sherbrooke (Géographie): Le Quaternaire d'Anticosti, Québec, 1979-83.
1) Cartographie au 1:100 000^e de la géomorphologie et des formations meubles; 2) étude de la limite marine maximale; 3) stratigraphie et événements quaternaire; 4) évolution post-glaciaire de la zone côtière; et 5) étude de l'évolution récente des littoraux.
256. DUBOIS, J.M.M., ST-ONGE, D.A., FULTON, R.J., Univ. Ottawa (Géographie), Geol. Surv. Can.: Géologie du Quaternaire de la Côte-Nord de l'estuaire maritime du Saint-Laurent, Québec, 1974-79; thèse de doctorat (Dubois).
Voir:
Les plates-formes rocheuses littorales en Minganie, Côte-Nord du Saint-Laurent; Réunion ann. AGC-AMC, Québec, Progr. et résumés, vol. 4, p. 47, 1979.
257. FORD, D.C., MILLS, P.M., McMaster Univ. (Geography): Karst geomorphology and hydrologic systems in a sample area of Quatsino limestone outcrop; Tahsis-Port Alice, Vancouver Island, British Columbia, 1979-81; M.Sc. thesis (Mills).
The Quatsino Formation outcrops extensively in valley side and floor locations in the northern half of Vancouver Island. It is much fragmented by faulting and structural settings are complex. Recent exploration has detected more than 200 cave entrances and a lesser wealth of surface karst features such as sinkholes. There have been no formal studies. It appears likely that due to the structural conditions and to glacial interrupting effects, the karst systems are of local scale and comparatively young. But reconnaissance in 1979 revealed active river caves that predate the last glaciation.
- The proposed investigation is a pilot study of the karst morphogenesis, emphasising cave system genesis, and of the chemistry of the karst waters. Speleothems will be sampled to determine the minimum ages of cave passages and, from these results, it is hoped to obtain further data on the glacial history and rates of landform evolution on the Island.
258. GANGLOFF, P., GRAY, J.T., RICHARD, P.H.J., HÉTU, B., LABELLE, C., GAUTHIER, R., Univ. Montréal (Géographie): Les séquences morphogénétiques tardiglaciaires et holocènes du Québec, 1978-82; thèse de maîtrise (Gauthier); thèse de doctorat (Héту, Labelle).
Voir:
Paléophytogéographie de l'épisode de Saint-Narcisse dans la région de Sainte-Agathe; Géogr. Phys. Quat., vol. 33, no. 2, p. 175-188, 1979.
Établir la succession des séquences morphogénétiques post-wisconsinniennes au Québec, les causes des ruptures d'équilibre (oscillations climatiques, feux de forêts, etc.), l'âge, la fréquence et la périodicité éventuelle de ces ruptures. Des ruptures ont déjà été identifiées et datées, qui sont indépendantes du schéma classique de la géomorphologie climatique. La région de la Gaspésie est actuellement le lieu des recherches les plus intensives dans le cadre de ce projet.
259. GRAY, J.T., LAURIOL, B., Univ. Montréal (Géographie): Le littoral actuel et les anciens littoraux du sud-ouest de la baie d'Ungava (Nouveau-Québec), 1975-79; thèse de doctorat (Lauriol).
Voir:
Le quaternaire à Aupaluk (Ungava): Paléogéographie marine et continentale; Géogr. Phys. Quat., 1979.
Nos travaux ont pour but de définir l'évolution du littoral du sud-ouest de la baie d'Ungava sous l'effet conjugué du soulèvement isostatique, de la glace annuelle et des fortes marées.
Nous essayons aussi de déterminer l'âge et l'altitude des anciens niveaux marins ainsi que les conditions hydroclimatiques (vagues, marées, courants, salinités, températures) qui ont prévalu depuis la déglaciation. Actuellement nous étudions les modalités de celle-ci dans le but de comprendre les déformations des anciens rivages.
260. GREENWOOD, B., MCGILLIVRAY, D.G., Univ. Toronto (Scarborough College, Geography): Computer simulation of littoral transport in the Toronto waterfront: A tool for impact assessment, 1976-81; Ph.D. thesis (McGillivray).
See:
Modelling the impact of large structures upon littoral transport in the central Toronto waterfront, Lake Ontario, Canada; Zeit. für Geomorphol., Suppl. Bd., vol. 34, p. 97-110, 1980.
Further refinement of the theoretical base and validation and verification of the computer model is being undertaken. Attempts to calibrate the model to predict actual volume transports are being made.

261. GREENWOOD, B., PRICE, A.G., BRYAN, R.B., Univ. Toronto (Scarborough College, Geography): Hydrodynamical, geotechnical and artificial controls on shoreline change in the Toronto Waterfront: the assessment of a natural hazard, 1978-81.
- See:**
A preliminary report on the recession of Scarborough Bluffs; Zeit. fur Geomorphol., Suppl. Bd., vol. 34, p. 64-96, 1980.
Continuation of an integrated study of the geo-hydrology, mass wasting processes and nearshore hydrodynamics controlling shoreline recession along a section of the north shore of Lake Ontario.
262. GWYN, Q.H.J., BOISSONNAULT, P., Univ. Sherbrooke (Géographie): Géologie et géomorphologie quaternaire à l'Est du lac Memphremagog, 1979-80; thèse de Maîtrise (Boissonnault).
Connaître les principaux événements du Wisconsin supérieur dans la région qui relie les études faites au centre des Cantons de l'Est et le nord du Vermont. Notamment: Définir les différents niveaux du lac glaciaire Memphremagog et les corrélés avec ceux trouvés dans les régions avoisinantes.
263. JOPLING, A.V., HARVEY, L.D.D., Univ. Toronto (Geography): Geomorphology and Pleistocene stratigraphy of the Old Crow Basin, Northern Yukon.
264. LUK, S.H., Univ. Toronto (Geography): Soil loss variability under laboratory and field simulated rainfall, 1979-83.
The laboratory work is now complete and the results are now being written up for publication. A pilot study of the field rainfall simulation study is also completed. The main part of the field study is an attempt to verify the high level of soil loss variability found under apparently constant laboratory conditions. Soil loss variability data will be obtained for representative soil types in Southern Ontario at a variety of slope steepness and plot size (0.1 m², 1 m², 10 m²). The observed soil loss variability will be explained in terms of surface (as distinct from average) soil properties including soil aggregate size, surface micro-relief, soil shear strength, soil compressive strength and soil bulk density.

GEOPHYSICS/GÉOPHYSIQUE

ELECTRICAL/MÉTHODES ÉLECTRIQUES

265. DOSSO, H.W., WRIGHT, J.A., GREENHOUSE, J.P., NIEWABER, W., BAILEY, R.C., Univ. Waterloo, Victoria, Memorial, Toronto (Earth Science Physics): Analogue model of electromagnetic induction in eastern North America, 1978-80.
A scaled model of the eastern Atlantic seaboard from South Carolina to Baffin Bay has been constructed from graphite and brine materials, and its response to ionospherically generated magnetic variations measured. The results are to be used to correct field measurements in eastern Canada and northeastern United States for the effects of induction in the ocean.
266. DYCK, A.V., Geol. Surv. Can.: Borehole geophysics (electrical and magnetic techniques), 1974-.
267. GENDZWILL, D.J., PANDIT, B.I., Univ Saskatchewan (Geological Sciences): Electromagnetic sounding for strata control in Saskatchewan potash mines, 1976-80.
Computer programs have recently become available for the accurate computation of electromagnetic soundings over multi-layered earth. We have demonstrated the use of the program for the optimum design of an electromagnetic system for an engineering study in Saskatchewan potash mines. The study requires the measurement of the thickness of the layer of rock salt which remains between the level of the potash ore and the overlying shale.
268. PITCHER, D.H., BARLOW, R.B., Ontario Geol. Surv.: Multifrequency airborne electromagnetic survey, Cretaceous basin area, James Bay Lowlands, 1978-80.
- See:**
Airborne electromagnetic survey, James Bay Lowlands, Cretaceous basin area, District of Cochrane: by Scintrex Limited, for the Ontario Geological Survey; Maps P.1986 to P.2003, Geophysical Ser., 1979.
Ontario Geol. Surv., Misc Paper 90, p. 178, 179, 1979.
A total of 8000 line km of multifrequency electromagnetic data were compiled by Scintrex Limited over an 8000 km² area covering the southern and eastern parts of the Cretaceous basin, James Bay Lowlands. The data have been obtained for the purpose of mapping the electrical properties of the subsurface unconsolidated material and related lignite occurrences within the area. The survey technique was designed on the basis of results of a previous research project carried out over the Onakawana lignite field located between Cochrane and Moosonee, Ontario and represents the first large scale attempt to use multifrequency data obtained in the audio frequency range for terrain mapping.
270. WONG, J., STRANGWAY, D.W., Univ. Toronto (Geology): Electrical properties and water content.
Wong has documented the effect of particle size and shape on the induced polarization phenomena and had a paper published in Geophysics. He also studied the effect of small amounts of soil moisture on antenna impedances and made measurements at a test site in Ottawa where other measurements had been done. This experience combined with their experience on the electrical properties of dry rock and on field studies in very resistive terrains is being used to develop theoretical models for 3-dimensional electrical sounding in the subsurface. The problem of finding moisture-free and fracture-free volumes of rock in the subsurface is the key issue in hard-rock nuclear waste disposal and electrical methods are expected to be among the suitable for these studies.
275. CHARBONNEAU, B.W., Geol. Surv. Can.: Evaluation of uranium reconnaissance data, 1976-.
- See:**
Investigation and regional significance of airborne gamma ray spectrometry patterns in the Sharbot Lake area, eastern Ontario; Geol. Surv. Can., Paper 79-1B, p. 207-222, 1979.
Geological studies of the Late Precambrian supra-crustal rocks and underlying granitic basement, Fury and Hecla Strait area, Baffin Island, District of Franklin; Geol. Surv. Can., Paper 80-1A, p. 125-132, 1980.
276. DAVIS, J.L., Geol. Surv. Can.: Radar sounding for geological mapping, 1975-.
277. FOLINSBEE, R.A., Geol. Surv. Can.: East coast offshore surveys, 1973-.
278. GRASTY, R.L., Geol. Surv. Can.: Gamma-ray spectrometry, 1972-.
- See:**
Skyshine and the calibration of ground gamma ray spectrometers; Geol. Surv. Can., Paper 80-1A, p. 133-135, 1980.
279. MACDONALD, R., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.): Techniques in regional shield mapping: gradiometric survey, Jan Lake area, Saskatchewan, 1979-.
- During the summer of 1979 about 3,400 line-kilometers of gradiometric survey were flown under contract by the Geological Survey of Canada at a mean terrain clearance of 150 m and a spacing of 300 m over an area of 1050 km² in the Jan Lake vicinity. The main purpose of this survey is to test the airborne gradiometric method as a regional mapping tool in the Shield area of Saskatchewan. More specifically the survey is expected to include evaluation of the use of gradiometric maps to:
- 1) identify aeromagnetic signatures of lithological units, by comparing aeromagnetic results with geological maps produced in areas of high geological control and a wide variety of lithological types;
 - 2) interpolate lithological units over areas of poor rock exposure (lakes and areas of surficial overburden); and
 - 3) determine the position of and discriminate between shear zones, fault lines and other lineaments.
- In addition to evaluating the gradiometric techniques, the survey is expected to contribute to the solution of regional geological problems currently under investigation.

EXPLORATION/PROSPECTION

271. BOYLE, R.W., Geol. Surv. Can.: Primary halos and metallogenic distributions of the elements, 1973-.
272. BURKE, K.B.S., Univ. New Brunswick (Geology): Development of seismic reflection techniques for shallow investigations, 1974-80.
Field tests with an electromagnetic vibrator being used as a seismic source continue at various sites in New Brunswick. The vibrator system produces successive pulsed signals with the same waveform that is ideally suited to use with signal enhancement seismographs. However, a large proportion of seismic waves produced with the present disc shaped coupler plate are in the form of surface waves. Other forms of couplers are therefore under consideration and will be field tested in 1980.
273. BURKE, K.B.S., MOHAMMED, S.K., Univ. New Brunswick (Geology): Gradient measurements of gravity in New Brunswick, 1979-82; Ph.D. thesis (Mohammed).
To demonstrate that measurements of the horizontal gradient of gravity can be used to locate salt deposits in the Carboniferous rocks of the Moncton Basin. Problems of gradient noise from terrain effects and near surface geological variations are being studied. Gradient measurements made in the summer of 1979 have shown that the method would have been successful in locating one of the known deposits.
274. CHANDRA, J., BURKE, K.B.S., Univ. New Brunswick (Geology): Ground investigation of airborne gamma-ray radiometric anomalies in New Brunswick by vehicle mounted and hand-held gamma ray sensors, 1978-80; M.Sc. thesis (Chandra).
Fifteen airborne gamma ray anomalies have been investigated in New Brunswick and the relationship between airborne values, ground measurements and chemical analyses for ⁴⁰K, U and Th examined. Factors affecting calibration, background determinations and the use of different sensor configurations have also been studied. Uranium favorability indices have been calculated from the regional spectrometry data and their relationships to geology and uranium potential are presently being investigated.
280. SCHWARZ, E.C., FOURNIER, D., LAVERDURE, L., GALOPIN, C., Ecole Polytechnique (Génie Minéral): Magnetic properties of sulphide ore deposits and their significance in magnetic prospecting, 1979-80.
Détermination de la minéralogie magnétique - "Zoning"; détermination de la susceptibilité magnétique et l'anisotropie: "Fabric"; détermination de l'aimantation remanente: paléomagnétisme; et construction des modèles: Evaluation des effets magnétiques et gravimétrique prévus à la surface.

281. SINHA, A.K., Geol. Surv. Can.: Applied EM problems, 1973-.
- See:**
Maxiprobe EMR-16: A new wide-band multifrequency ground E.M. system; Geol. Surv. Can., Paper 79-1B, p. 23-26, 1979.
Electromagnetic resistivity mapping of the area around Alfred, Ontario, with Geonics EM 34 system; Geol. Surv. Can., Paper 80-1A, p. 293-300, 1980.
282. STOLZ, H., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.): Heatflow determinations, Midwest Lake uranium deposit, 1979-81.
This project is part of the NEA/IAEA program for evaluation of uranium exploration techniques in uranium metallogenic provinces throughout the world and is attempting to determine whether unconformity-type uranium deposits underlying the Athabasca Formation of Northern Saskatchewan produce detectable radiogenic heat halos. Simple model considerations of the high grade, compact unconformity-type deposits indicate that a temperature anomaly in excess of 1°K could be expected at the boundary of the ore deposit, and the heat flux or temperature gradient in this area could be two or three times normal. The very high thermal conductivity of the sandstone causes the radiogenic heat to be quickly dissipated, resulting in rather low temperature anomalies.
"Small" temperature and heat-flow anomalies might be considered useful indicators of mineralization only if the "noise" level is sufficiently low to allow recognition of anomalous patterns. Noise will be caused by many factors such as: the presence of lakes and swamps, varying conductivity of the sandstone, groundwater circulation, varying conductivity of the basement units, topography etc. In view of the many factors contributing to the shape of the temperature profiles, it was decided to run a small test survey at Midwest Lake to determine if the method had potential application to uranium exploration.
283. STOLZ, H., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.): Induced polarization test survey, Midwest Lake uranium deposit, 1979-81.
The purpose of this test survey and others planned in the future under the NEA/IAEA program, is to evaluate the IP method as a tool for ground follow-up to airborne surveys as well as a stand-alone technique in areas unsuitable for prospecting by air. The 1979 test was completed on part of the existing grid covering the Midwest Lake uranium deposit. Severe logistical difficulties were encountered due to wind and traffic on the lake and, since most of the mineralization is located directly beneath the lake, it was necessary to obtain continuous survey coverage from the land on the west side of the lake, across the water, to the land on the east side of the lake.
284. WOODS, D.V., Queen's Univ. (Geological Sciences): Scale model study of the Crone borehole pulse EM system: quantitative results, 1979.
Scale analogue model experiments have been carried out with the borehole pulse electromagnetic (PEM) system using metal sheets and plates to simulate tabular conductive orebodies. The results have been plotted as channel response versus depth for various conductor sizes, thicknesses and conductivities, and also for the many possible geometries between the conductor, the borehole and the surface transmitter loop. Certain characteristics of the model response curves such as the rate of decay of the transient response, the width of the response curve and the fundamental shape of the response curve (i.e. whether it is all positive or whether it has a negative peak), can be related to some of the electromagnetic and geometric parameters of the tabular conductor causing the response, such as its conductivity-thickness, its size or its position in relation to the borehole. Characteristic curves have been constructed to display these various relationships and it is shown how these curves can be used to quantitatively interpret borehole PEM field results.
- GEOMAGNETISM-PALEOMAGNETISM/
GÉOMAGNÉTISME-PALÉOMAGNÉTISME**
285. BAMBRICK, J., LETROS, S., STRANGWAY, D.W., Univ. Toronto (Geology): High resolution aeromagnetic data interpretation in the Abitibi greenstone belt; M.Sc. thesis (Letros).
An interpretative geologic map of the high resolution aeromagnetic from the Blake River region has been completed. This interpretation has used various maps such as vertical derivative, downward continuation, reduction to the pole and equivalent susceptibility and has made use of the newly available colour plotters. These procedures have permitted the definition of boundaries between units with differing magnetization and the mapping of stratigraphy in some detail. Contour levels could be set to correspond with the measured magnetic properties.
Spectral determinations of the high resolution aeromagnetic maps in the Timmins area have been made and these show that the abundant north-south Matchewan dikes can be separated from the dominant features associated with the east-west volcanic stratigraphy.
286. BAMBRICK, J., LETROS, S., STRANGWAY, D.W., Univ. Toronto (Geology): MAGSAT investigation of the Superior Province.
MAGSAT is a satellite which was launched into high inclination orbit in October, 1979 for the purpose of mapping the time and space variation in the earth's magnetic field. Specific interest is to examine the raw data and formatted data to see if some of the large scale features seen in the Canadian aeromagnetic studies can be detected from orbit. Preliminary data tapes have already been received but one sensor is not working properly and further studies to work around this are in progress.
287. BOWER, M.E., Geol. Surv. Can.: Ocean aeromagnetics, 1965-.
288. CHRISTIE, K.W., Geol. Surv. Can.: Paleomagnetism and rock magnetism instrumentation and technological development, 1970-.
289. CHRISTIE, K.W., Geol. Surv. Can.: Paleomagnetism of the Hopland diabase dykes, Newfoundland, 1972-.
290. CURRIE, R.G., Geol. Surv. Can.: Geological and geophysical studies in the Beaufort Sea, 1971-.
291. ERNST, R., HALLS, H.C., Univ. Toronto (Geology): A paleomagnetic study of the diabase dikes in the vicinity of the Kapuskasing structural zone, Ontario, 1979-80; M.Sc. thesis (Ernst).
More than 30 diabase dikes have been paleomagnetically sampled in the vicinity of the Kapuskasing Structural Zone (KSZ) to test, through detailed analysis of multicomponent remanent magnetization, the possibility of large scale rotations and uplift which on geological evidence appear to be associated with the KSZ. In particular diabase dike patterns show systematic changes of up to 30° in strike across the zone. Providing that dike swarms are correlative between the regions to the east and west of the KSZ it should be possible to test for differential rotation using paleomagnetic means.
Preliminary results from the survey show that all dikes on the west side of the KSZ show coherent stable remanence components which will be compared with those reported by various workers from the eastern side.
292. FAHRIG, W.F., Geol. Surv. Can.: Paleomagnetism of the dykes of west Greenland, 1972-.
293. FAHRIG, W.F., Geol. Surv. Can.: Paleomagnetism of Proterozoic to Devonian strata across Boothia Arch, 1974-.
294. GEISSMAN, J., TASILLO, A., STRANGWAY, D.W., Univ. Toronto (Geology): Magnetic properties of the Blake River volcanics and adjacent rocks.
The magnetic properties, in general, are very weakly magnetic but they have several stable components present in them. These components however seem to range over a wide range of directions suggesting that they were remagnetized at various times and/or they were subjected to a very complex folding history. Samples from the younger Timiskaming conglomerate suggest these samples have not been remagnetized and that the conglomerate pebbles are randomly oriented. Samples of iron-rich and magnesium-rich tholeiites of the region are largely due to the highly magnetic iron-rich tholeiites. Samples from the Timmins area are being tested for levels of magnetization and in an attempt to recover the paleomagnetic direction for these early Archean times.
295. GODFREY, J.D., SPENKE, K., LANGENBERG, C.W., Alberta Research Council (Geol. Surv.): Geophysical aspects of the Shield in Alberta, 1960-80.
Physical parameters measured include: specific gravity of hand specimens, and magnetic susceptibility of rock cores, powders and outcrops. To improve quality of interpretation of aeromagnetic surveys in Shield terrains and to describe the tectonic history and 3-dimensional geometry of major structural elements (plutons, fault zones) in the Shield of Alberta.
296. HALL, D.H., MILLAR, T., Univ. Manitoba (Earth Sciences): Interpretation of detailed aeromagnetic surveys, Lynn Lake, Manitoba, 1978-80.
297. HALL, D.H., MILLAR, T., KHAN, S., Univ. Manitoba (Earth Sciences): Crustal magnetic anomalies from aeromagnetic and MAGSAT data, 1979-82; M.Sc. thesis (Khan).
See:
The distribution of surface magnetization in the English river and Kenora Subprovinces; Can. J. Earth Sci., vol. 16, p. 1764-1777, 1979.
Models for crustal magnetization adjacent to the Superior-Churchill boundary are being constructed.
298. HALLS, H.C., Univ. Toronto (Geology): A study of shock remanent magnetization associated with meteorite impact craters, 1974-82.
See:
Separation of multicomponent NRM: combined use of difference and resultant magnetization vectors; Earth Planet. Sci. Lett., vol. 43, p. 303-308, 1979.
The Slate Islands meteorite impact site: a study of shock remanent magnetization; Geophys. J. Roy. Astr. Soc., vol. 59, p. 553-591, 1979.
Diatremes and shock features in Precambrian rocks of the Slate Islands, NE Lake Superior: DISCUSSION; Geol. Soc. Am. Bull., Pt. II, vol. 90, p. 1084-1086., 1979.
A remanent magnetization caused by shock pressures above 20 kb is present in the impacted rocks of the Slate Islands, and decreases in intensity away from the impact point. Whether such a paleomagnetic halo is a common feature of impact craters is to be tested. Two sampling programs, one from the Gosses Bluff crater in Australia, the other from the Lonar Crater in Central India, have been made and measurements are underway.
299. HALLS, H.C., PALMER, H.C., PESONEN, L.J., Univ. Toronto (Geology), Univ. Western Ontario (Geophysics): Paleomagnetism of Keweenaw rocks, 1976-81.
Detailed paleomagnetic measurements on volcanic pebbles from Keweenaw conglomerates show evidence of a partial magnetic overprint. The effect is particularly noticeable on the Keweenaw Peninsula (KP) where there is in addition an increase in the degree of resetting in a westward direction along a 40 km strike length within the Copper Harbor Conglomerate. There is a strong inverse correlation between the magnetization intensity of individual pebbles and their degree of magnetic resetting. This relation indicates that the overprint is due to chemical alteration.
A similar study in lava flows interbedded with the conglomerate shows the same phenomenon, and also that the apparent stability of remanent magnetization is not necessarily an indicator of a primary or early-formed component.
Further tests are to be made to see how extensive the overprinting episode is and whether it is related to native copper mineralization which also increases westwards along the KP in the underlying Portage Lake Volcanics.

300. HODYCH, J.P., HAYATSU, A., Memorial Univ. (Physics, Geology):
Paleomagnetism and K-AR isochron age of Triassic dikes of Newfoundland and rifting of Atlantic, 1978-79.
- See:**
K-AR isochron age and paleomagnetism of diabase along the trans-Avalon aeromagnetic lineament - evidence of Late Triassic rifting in Newfoundland; Can. J. Earth Sci., vol. 17, no. 4, p. 491-499, 1980.
301. HSU, D., REDMAN, J.D., STRANGWAY, D.W., Univ. Toronto (Geology):
Audiofrequency magnetotelluric sounding for nuclear waste disposal, for geothermal studies and for crustal sounding.
- See:**
Geophysical methods of selection and in situ testing of waste disposal sites; Geol. Surv. Can., Paper 79-10, p. 59-65, 1979.
- Reports have been completed on work at the nuclear disposal test sites at Chalk River, Ontario and Pinawa, Manitoba which are sites extensively fractured and covered by conductive clays respectively. A large new survey was carried out in western New Mexico on the Zuni Indian Reservation. This work was done on contract to Woodward-Clyde consultants on behalf of the U.S. Department of Energy. All together 119 stations were occupied. The sedimentary stratigraphy in the region was such that the results were very uniform from station to station and they could be subjected to 1-dimensional inversion procedures (Hsu). There is also access to another four frequency decades of apparent resistivity collected by Woodward-Clyde so that ultimately the inversions will span the frequency range from 10^4 to 10^8 Hz. In southwestern Manitoba and southeastern Saskatchewan the results will be combined with other data gathered by a group from Alberta and do a similar 8 decade inversion.
302. LERBEKMO, J.F., Univ. Alberta (Geology):
Magnetostratigraphy of the late Cretaceous and Paleocene of Alberta, 1973-.
- See:**
Magnetostratigraphy, biostratigraphy and geochronology of Cretaceous-Tertiary boundary sediments, Red Deer Valley; Nature, vol. 279, no. 5708, p. 26-30, 1979.
- The Cretaceous-Tertiary boundary in south-central Alberta - a revision based on additional dinosaurian and microfossil evidence; Can. J. Earth Sci. vol. 16, no. 9, p. 1866-1869, 1979.
- A Rb/Sr age for the Cretaceous-Tertiary boundary (Z coal), Hell Creek, Montana; Can. J. Earth Sci., vol. 17, no. 5, p. 671-673, 1980.
- The magnetostratigraphy across the Cretaceous-Tertiary boundary of one section each in the type areas of the Hell Creek Formation of Montana and the Cannonball Formation of North Dakota has been determined for comparison with the Red Deer Valley area of Alberta and the Gubbio section of Italy. A combination of faunal, microfaunal and microfossil control along with geomagnetic polarity reversals makes it possible to establish the degree of synchronicity between the biostratigraphically determined Cretaceous-Tertiary boundary in continental sediments of this part of North America and that of marine sediments in Italy. Summer 1980 the magnetostratigraphy of the Red Deer Valley will be carried downward to the base of the Maestrichtian.
303. McGLYNN, J.C., Geol. Surv. Can.:
Paleomagnetic study of Proterozoic red beds of the western Canadian Shield, 1968-.
304. OLSON, D.G., Geol. Surv. Can.:
High resolution aeromagnetics (experimental surveys), 1968-.
305. REDMAN, J.D., STRANGWAY, D.W., Univ. Toronto (Geology):
Instrumentation for tensor audiofrequency magnetotelluric sounding.
- A prototype system for digital acquisition of audio-frequency magnetotelluric data has now been assembled. This system is microprocessor and has been used to collect several sets of sounding data at the sounding test site near Milton, Ontario. It appears that even the process of digital filtering has sharply improved the quality of apparent resistivity determinations. They are still carrying out further field trails to develop optimum operating procedures and to collect tensor data. In the meantime Scintrex Ltd. has plans to assemble a field system following our prototype and will make available a high sensitivity magnetometer to them for testing. Their frequency range (10 Hz to 10 kHz) can be added to the results of other members of the Geophysics group at Toronto to provide a many decade sounding.
306. ROCHESTER, M.G., TODOESCHUCK, J.P., Memorial Univ. (Physics):
Compressibility and anti-dynamo theorems, 1977-79.
307. SAWATZKY, P., Geol. Surv. Can.:
High resolution aeromagnetics (instrumentation development), 1977-.
308. SCHWARZ, E.J., Geol. Surv. Can.:
Paleomagnetism of the Circum-Ungava Belt, 1973-.
309. SEGUIN, M.K., RAO, K-V., Univ. Laval (Géologie):
Paléomagnétisme des granites Hadryniens du Cap-Breton et tectono-physique de la zone d'Avalon, 1979-81.
- Voir:**
Paleomagnetism of the Thetford Mines, ophiolites, Québec; J. Geomag. Geoelectr., vol. 31, p. 103-113, 1979.
- One-dimensional spectral analysis of aeromagnetic data for Temiscouata area and the western sector of the Gulf of St-Lawrence; Geoexploration, vol. 17, p. 269-283, 1979.
- Paleomagnetism jelezistex kuartzitou iojnogo prodoljenja labradorskoj kotlovin; Geomagnetizm i aeronomija; Tom XIX, no. 2, p. 339-348, 1979.
- L'objectif principal de cette étude paléomagnétique est de délimiter de façon objective et précise les bordures de la zone d'avalon et de déterminer les rotations de cette paléomini-plaque par rapport à la plaque nord américaine au cours des âges géologiques (Pc + C).
310. STRANGWAY, D.W., SUGIURA, N., Univ. Toronto (Geology):
Magnetic fields of the early solar nebula.
- Direct evidence for primitive solar magnetic field is likely to be found in chondrules because they were formed before the whole meteorites accreted. Directions of the natural remanences in chondrules (which were oriented relative to the whole rock) of Allende were measured. The NRM directions were not initially random, but they became scattered after either alternating field or thermal demagnetization, which suggest that the chondrules have both pre- and post-accretionary remanence. Remanent magnetization of chondrules in other chondrites is to be studied in future.
311. STRANGWAY, D.W., SUGIURA, N., Univ. Toronto (Geology):
Paleomagnetic field intensity determination on lunar samples.
- Paleomagnetic field intensity determination on lunar samples by Thellier's method has not been successful because lunar samples are easily oxidized during heat treatment. They have conducted a variety of heating experiments in an attempt to reproduce the original cooling history, without changing the properties of the magnetic minerals. A new approach, in which the sample was sealed in a quartz tube with a titanium getter under vacuum, has been the most successful we have used to date. This approach was applied to a very young lunar sample (2 m.y.) and a relatively strong (2500 nT) paleointensity was obtained.
312. SUGIURA, N., STRANGWAY, D.W., Univ. Toronto (Geology):
Basic problems in rock magnetism.
- See:**
Earth Planet. Sci. Lett., vol. 42, p. 452-455, 1979.
- To experimentally examine the basic theories of rock magnetism which describe the behaviour of magnetic moment on cooling through Curie temperature. A new approach in which remanence and induced moment are measured in a field at high temperature, gives more information than the traditional, zero-field measurements. Unblocking temperature in a field, in particular, is easily determined by this approach. Their study confirmed Neel's single domain theory works well. Current studies are focussing on examination of pseudo-single and multi-domain theories.
313. SYMONS, D.T.A., Univ. Windsor (Geology):
Paleomagnetism of the Canadian Cordillera, 1979-82.
- See:**
Positive test of the paleomagnetic method for estimating buried depth using a dike contact; EOS Trans. 60, p. 668, 1979.
- Defining a paleomagnetic polarity pattern in the Monteregian intrusive; Can. J. Earth Sci., vol. 16, no. 9, p. 1716-1725, 1979.
- Aimed at studying the pre-Jurassic geotectonic evolution of the Canadian Cordillera in the Insular, Coast Complex, and Interior Plateau Belts. The oldest known or suspected rock units in each belt will be examined. Work has begun on the Westcoast Complex of the Insular Belt.
314. SYMONS, D.T.A., DEY, S., Univ. Windsor (Geology):
Paleomagnetism and boundary geotectonics of the Superior Geologic Province, 1976-79; M.Sc. thesis (Dey).
- An examination of rock units in the 2.1 Ga to 2.6 Ga time frame adjacent to the boundary of the Superior Province with the Southern and Grenville Provinces. Units involved include Nipissing diabase, Huronian Supergroup, several late Archean plutons, and Archean volcanics. Geotectonic and metamorphic effects on the original remanence of the rocks are being examined.
315. SYMONS, D.T.A., STUPAVSKY, M., WALLEY, D., QUICK, A., Univ. Windsor (Geology):
Component magnetization of iron formation and deposits, Moose Mountain and Adams Mines, Ontario, 1978-81; M.Sc. thesis (Walley), M.A.Sc. thesis (Quick).
- See:**
Magnetic characteristics of the iron formation near Temagami, Ontario; Ont. Geol. Surv., Misc. Paper 87, p. 133-147, 1978.
- Anomaly interpretation and age of magnetism of the Algoman iron formations at the Sherman and Moose Mountain Mines; EOS Trans. 60, p. 816, 1979.
- Entails detailed magnetic analysis of iron ore deposits - the Sherman, Adams, Moose Mountain, and Griffiths - and their host rocks including vertical component magnetization, magnetic susceptibility, anisotropy of susceptibility, natural remanence and demagnetized remanence to permit a rational interpretation of existing air-borne and ground magnetic surveys and to study the ore genesis.
316. WILLIAMS, H., HAWORTH, R.T., ZIETZ, I., DANIELS, D.L., Memorial Univ. (Geology):
Magnetic anomaly map of the Appalachian Orogen, 1978-80.
- In colour and available at scales of 1:1,000,000 and 1:2,000,000, this map portrays the latest magnetic data for the Appalachian Orogen and nearby offshore regions. The map is contoured at 200 nanotesla intervals and the data corrected with respect to the 1965 International Geomagnetic Reference Field. The magnetic data are superposed on a specially prepared base that contains the geologic linework and structural nomenclature of the Tectonic Lithofacies Map of the Appalachian Orogen (Memorial Univ., Map No. 1, H. Williams, compiler). This allows quick and direct comparison between surface geology and magnetic signature. The magnetic patterns permit the extension of several major structures and zones that are not clearly expressed in the surface geology alone.
- The 1:1,000,000 presentation comprises two sheets with combined dimensions of 3.5 x 1 metres. The 1:2,000,000 presentation is a single sheet, compatible with the reduced version of the Tectonic Lithofacies Map, which is now also available. Magnetic contour maps are also available in black and white (for information, write Department of Geology, Memorial University of Newfoundland, St. John's, Newfoundland, A1B 3X5).
- GEOTHERMAL/GÉOTHERMIQUE**
317. PALMER, J.H.L., SVECE, O.J., National Research Council of Canada (DBR):
Ground heat storage, 1978-.

Research consists of the testing of four full-scale in-ground storage systems, model testing of a laboratory prototype and developing of a numerical model. The full-scale storage units are designed to cover the range from an insulated buried conventional water tank to a novel in-ground heat storage scheme. In this new approach a nest of deep lined holes provides heat exchange between the working fluid (water) and the storage medium (undisturbed natural ground). These full-scale systems will be controlled and monitored by a PDP 1134 B computer with most of the software already developed. A laboratory and a field prototype of a single heat exchanger for the novel storage scheme have been successfully constructed and tested. The completed systems will be operational in 1980. Monitoring of the thermal regime around a 200,000 gallon in-ground storage reservoir at Aylmer, Ontario, is continuing.

GRAVITY/GRAVITÉ

318. GUPTA, V.K., RAMANI, N., DUSANOWSKYJ, T.H., Ontario Geol. Surv.: Gravity modelling, 1975-80.

The Bouguer gravity field measured over two Archean greenstone belts of Northwestern Ontario was analyzed using three different regional-residual separation techniques. The methods used to derive the regional and residual maps were spectral factorization, upward continuation and graphical smoothing. The substantial differences in the three sets of maps emphasize the ambiguity and subjectivity of the separation process. The purpose of the analysis was to obtain a residual map suitable for gravity modelling studies to help define the subsurface characteristics of the greenstone belts and associated granitic areas. Eight two-dimensional gravity models, incorporating most of the major hypotheses proposed for the development of Precambrian greenstone belts were computed. Maximum use was made of geological and geophysical constraints, in an attempt to explain the disparity between the 11 000 m measured stratigraphic thickness and the maximum 5000 m interpreted vertical extent of a portion of the Birch-Uchi metavolcanic-metasedimentary belt.

319. HAWORTH, R.T., DANIELS, D.L., WILLIAMS, H., ZIETZ, I., Memorial Univ. (Geology): Bouguer gravity anomaly map of the Appalachian Orogen, 1978-80.

See:

In colour and available at scales of 1:1,000,000 and 1:2,000,000, this map portrays the latest gravity data for the Appalachian Orogen and nearby offshore regions. The map is contoured at 5 milligal intervals and the data corrected with respect to the 1971 International Gravity Reference Field. The data are superposed on a specially prepared base that contains the geologic linework and structural nomenclature of the Tectonic Lithofacies Map of the Appalachian Orogen (Memorial Univ., Map No. 1, H. Williams, compiler). This allows quick and direct comparison between surface geology and gravity expression.

The 1:1,000,000 presentation comprises two sheets with combined dimensions of 3.5 x 1 metres. The 1:2,000,000 presentation is a single sheet. Both presentations are compatible with the Magnetic Anomaly Map of the Appalachian Orogen and the Tectonic Lithofacies Map of the Appalachian Orogen, also available at the 1:1,000,000 and 1:2,000,000 scales. Gravity contour maps are also available in black and white (for information, write Department of Geology, Memorial University of Newfoundland, St. John's Newfoundland, A1B 3X5).

320. LAWTON, D.C., Univ. Calgary (Geology and Geophysics):

Gravity studies of Precambrian basement structures in southern Alberta, 1980-81.

Involves undertaking detailed gravity studies in southern Alberta to determine whether observed anomalies can be related to block-faulted structures in the Precambrian basement rocks. It is considered that structural movement in basement rocks may have played a significant role in the stratigraphic entrapment of petroleum in Cretaceous oilfields. Hence, delineating basement structures by this gravity method may assist in the exploration for new hydrocarbon fields.

SEISMOLOGY AND PHYSICS OF INTERIOR/ SISMOLOGIE ET PHYSIQUE DE L'INTÉRIEUR DE LA TERRE

321. AU, D., CLOWES, R.M., Univ. British Columbia (Geophysics and Astronomy):

Interpretation of ocean bottom seismometer reflection/refraction data on Explorer/Juan de Fuca plates, 1977-80; Ph.D. thesis (Au).

Three seismic refraction lines, two reversed and one unreversed, were shot using a total of 150 explosive shots in the northern Cascadia basin where the Nootka fault forms the boundary between the Juan de Fuca plate and its northern extension, the Explorer plate. In addition, a 16 litre airgun provided closely spaced shots along and perpendicular to the explosive lines to distance ranges of 15 km from the receivers. The data are analysed by a number of interpretational techniques: a linearized version of the tau method, synthetic seismograms, and ray tracing techniques. Preliminary results indicate that a gross crustal model of the region consists of a 2 km thick layer of sediment with average P-wave velocity of 3.0 km/s overlying a layer of high velocity gradient material in which the velocity increases from 4.5 to 6.0 km/s in an interval of 1 km. Beneath this, the velocity increases slowly to 7.8 km/s at a depth of 9 km. Significant lateral variations in the crustal structure are evident in this region of complex plate interaction.

322. CLOWES, R.M., ELLIS, R.M., Univ. British Columbia (Geophysics and Astronomy):

Seismic reflection/refraction studies of the oceanic-continental transition near the Queen Charlotte Islands, 1979-81.

In 1979, a combined seismicity/refraction program using ocean bottom seismometers and portable land stations was carried out over the South Queen Charlotte fault zone in collaboration with R.D. Hyndman of Pacific Geoscience Centre. The aspects of this project are 1) the marine reflection/refraction profiles and 2) the land refraction data. Two profiles, one in deep water parallel to the coast and one reversed line across Moresby Is., were shot using 6400 kg of explosives. Initial playbacks from the 3 recovered OBS's indicate that the shots were well recorded. A sonobuoy system with digital recording and a 16 litre airgun enabled acquisition of detailed reflection/refraction data for the sediments. A preliminary record section from the shelf region shows coherent reflections and probably thick sediments. In addition to the shots at sea, land stations also recorded mine blasts from North Moresby Island and a large shot located south of the Queen Charlotte Islands to form a reversed profile on the continental side of the fault. The land-based data are generally good.

323. DION, D.-J., Québec Ministère Énergie et Ressources: Notions d'interprétation de la méthode sismique réflexion appliquée au génie géologique, 1978-80.

Le but de ce manuel est de présenter l'aperçu le plus détaillé possible de la théorie de base de la méthode sismique réflexion et de fournir les éléments essentiels nécessaires pour l'interprétation des mesures. Les principaux cas sont analysés de façon théorique (effet du pendage des terrains, des inversions de vitesse et des terrains cachés). La théorie élaborée est suivie de l'analyse de deux exemples locaux qui résument les difficultés rencontrées dans la pratique.

324. GENDZEILL, D.J., Univ. Saskatchewan (Geological Sciences):

Seismic studies relating to the Prairie Evaporite, 1970-.

A seismic study of Winnipegosis mounds in the potash district of Saskatchewan shows that they are associated with partial solution of the Prairie Evaporite salt over them. The salt removal appears to have been limited by accumulation of insoluble clays and anhydrite, eventually plugging the porosity in the mound. High resolution seismic techniques have been used for the mound studies as well as engineering studies for some of the potash mines.

325. GENDZWILL, D.J., HAJNAL, Z., ARNOLD, J., Univ. Saskatchewan (Geological Sciences):

Seismicity of southern Saskatchewan, 1974-.

Significant seismic activity in southern Saskatchewan has been recognized only in the past ten years. A few small earthquakes apparently are

related to regional tectonic features under the sediments. Some small tremors may be induced by brine injection or mining activity. Natural subsidence could also create tremors. We have designed and built a six-channel computer controlled seismic system which we have operated for various periods during the last four years. A pattern recognition program controls the computer to turn on a digital tape recorder. We have recorded many distant earthquakes and a few from western Canada.

326. HALL, D.H., Univ. Manitoba (Earth Sciences): Compilation of crustal geophysical surveys under University of Manitoba Negotiated Development Grant, 1979-80.

327. HAWORTH, R.T., Geol. Surv. Can.: A geophysical investigation of the submarine extension of geological zonation of Newfoundland, 1979-.

See:

High resolution reflection seismology studies in Late Quaternary sediments of the northeast Newfoundland continental shelf; Geol. Surv. Can., Paper 79-1B, p. 357-364, 1979.

Geophysical evidence for the extent of the Avalon zone in Atlantic Canada; Can. J. Earth Sci., vol. 16, no. 3, p. 552-567, 1979.

328. HUNTER, J.A.M., Geol. Surv. Can.: Seismic properties of earth materials in the permafrost environment, 1978-.

See:

Seabottom seismic refraction array designs; Geol. Surv. Can., Paper 79-1C, p. 101, 102, 1979.

329. KEEN, C.E., Geol. Surv. Can.: Development of analytical and theoretical techniques for refraction seismology interpretations, 1977-.

See:

Geophysical review of the continental margins of eastern and western Canada; Can. J. Earth Sci., vol. 16, p. 712-747, 1979.

New geophysical evidence for sea-floor spreading in central Baffin Bay; *ibid.*, p. 2122-2135, 1979.

330. LEVY, S., CLOWES, R.M., Univ. British Columbia (Geophysics and Astronomy):

Development of analysis techniques for marine seismic data, 1978-79; M.Sc. thesis (Levy).

Phase-only Processing: Research in optics has demonstrated that the phase information contained within a reflected wavefront thoroughly dominates the reconstruction of an image from that wavefront. We discuss phase-only processing and demonstrate its applicability to seismic data. In particular, the phase-only component of a seismic trace provides an estimate of the earth's impulse response function if a zero-phase or near-zero-phase wavelet is assumed. As well, an appropriate zero-phase wavelet can be estimated from a given seismic trace by a very simple procedure. A number of examples with synthetic data demonstrates these points. Phase-only processing of marine seismic data shows the effectiveness of the procedure for removal of bubble-pulse oscillations.

Debubbling: A new approach, based on generalized linear inverse theory, to the solution of the problem of bubble pulse oscillations is proposed. Assuming a seismogram can be modelled as the convolution of the earth's impulse response and a source wavelet, we know that estimation of either the wavelet or the impulse response can be formulated as a generalized linear inverse problem. This parametric approach involves solution of a system of equations by minimizing the error vector ($\Delta X = X^{Obs} - X^{Calc}$) in a least squares sense.

331. MOON, W., Univ. Manitoba (Earth Sciences):

Theoretical seismic modelling, 1979-81.

In this research, new theoretical technique will be tested to obtain:

1) seismic diffraction patterns from circular objects; and

2) reflection seismograms using WFBJ algorithm developed by Chapman (1978).

The results of this project will have great importances in seismic exploration for oil as well as in the study of deep crust and upper mantle using seismic methods.

332. MOON, W., DELANDRO, W., AMING, A.J., Univ. Manitoba (Earth Sciences):
The interpretation of co-crust seismic refraction data (1977, 1979), 1979-80; M.Sc. theses (Delandro, Aming).
As part of CO-CRUST, the University of Manitoba and the University of Saskatchewan obtained seismic refraction data over Brandon-Virden area of Manitoba and in southeastern Saskatchewan. In this project our group is in charge of interpreting the data to obtain:
1) general seismic-geological section;
2) detailed informations on the nature of Churchill-Superior (Precambrian provinces) boundary;
3) correlation with seismic reflection data; and
4) test of the usefulness of the new "WKB3" synthetic seismogram method to refraction and wide angle reflection data.
333. OVERTON, A., Geol. Surv. Can.:
Seismic-Precambrian Shield, 1970-.
- See:
Seismic reconnaissance survey of the Dubawnt Group, Districts of Keewatin and Mackenzie; Geol. Surv. Can., Paper 79-1B, p. 397-400, 1979.
334. ROCHESTER, M.G., SMYLIÉ, D.E., CROSSLEY, D.J., Memorial Univ. (Physics), York Univ., McGill Univ.:
Long-period core oscillations, 1977-.
335. SLAWSON, W.F., Univ. British Columbia (Geophysics and Astronomy):
Radon detection, 1978-80.
Two and one half years of data collection at several sites has shown a seasonal pattern in radon emanation from soil. Superimposed on top of seasonal effect is a rising trend which has accelerated toward the end of 1979.
Meteorologic effects are being compared with the seasonal variation and the best fits are with mean temperature and temperature gradient in the soil.
So far no viable explanation for the rising trend has been put forth.
To test the effect of ground undergoing strain upon the emanation of radon several monitoring sites have been established over the regions near the Sullivan mine which subsidence is expected to occur.
336. SURYAM, J.V., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.):
Athabasca basin studies, regional seismic refraction survey (NTS areas 64 L and 74 I), 1976-.
- See:
Sask. Geol. Surv., Summ. Investig., p. 162-165, 1979.
Objectives are 1) to obtain a cross-section of the Athabasca Basin in an east-west direction from Wollaston lake at the eastern margin to Pasfield Lake in the west, as part of the originally planned regional east-west cross-section of the Athabasca Basin from Wollaston lake at the eastern margin to the Alberta/Saskatchewan border in the west, via Rabbit Lake, Midwest Lake and Cluff Lake ore bodies; 2) to delineate the topography of the sub-Athabasca surface along the regional line; 3) to locate major and minor basement faults along the line; and 4) to compare the structural configuration of the basement at the location of the ore bodies with similar features along the profile.
The profile extends for 130 kms between Wollaston Lake and Pasfield Lake (NTS map sheets 64 L, and 74 I). The region supports a dense growth of vegetation, including jack-pine and birch, and presents a rough topography punctuated by major eskers, drumlins, kames and flat low-lying stretches of swamps, muskegs and lakes. The varying topography poses a major technical problem for conducting seismic surveys, necessitating rapid changes in shooting and recording procedures.
337. TIFFIN, D.L., Geol. Surv. Can.:
Geological and geophysical studies of the Pacific continental margin, 1971-.
- OTHER/AUTRE
338. GREENHOUSE, J.P., Univ. Waterloo (Earth Sciences):
Geophysical investigations of overburden in the vicinity of Waterloo, Ontario, 1974-.
A continuing project to explore the hydrogeological and geomorphological properties of the glacial overburden in the Waterloo area. The effort has concentrated on: 1) well-logging (whenever invited) to correlate geophysical responses with groundwater and/or core data; 2) locating and mapping of buried valley systems, with a view to studying their till stratigraphy and water supply potential; and 3) delineation of contaminated groundwater near land fill sites by surface and borehole geophysical techniques.
339. KILLEEN, P.G., Geol. Surv. Can.:
Borehole geophysics (nuclear techniques), 1974-.
- See:
The effects of borehole diameter, borehole fluid, and casing thickness on gamma ray logs in large diameter boreholes; Geol. Surv. Can., Paper 79-1C, p. 37-40, 1979.
340. KING, M.S., PANDIT, B.L., Univ. Saskatchewan (Geological Sciences):
Acoustic properties of clathrate hydrates and hydrate-saturate porous rocks, 1979-80.
To study the acoustic velocities and attenuation of waves in clathrate hydrates and hydrate-saturated sands and sedimentary rocks at temperatures encountered in Northern Canada. To prepare the above hydrates, a small ultrasonic-measurement bath and pressure cell has been manufactured in the university workshop. Accessory equipment is now being assembled. Initial work will be confined to propane hydrates.
341. McMILLAN, R.K., Environment Canada (National Water Res. Instit.):
Acoustic survey techniques, 1977-80.
342. SLAWSON, W.F., SAVAGE, J.C., Univ. British Columbia (Geophysics and Astronomy):
Geodata deformation associated with the 1946 Vancouver Island, Canada, earthquake, 1978-79.
See:
Bull. Seis. Soc. Am., vol. 69, no. 5, p. 1487-1496, 1979.
343. SOONAWALA, N.M., Manitoba Dep. Energy and Mines (Mineral Res. Div.):
Geophysical investigations, 1979-80.
344. STESKY, R.M., BRAR, N.S., TANOU, S.K., JAGDAT, R., Univ. Toronto (Erindale College, Earth and Planetary Sciences):
Geophysical properties of fractured rock, 1978-; M.Sc. thesis (Tanou).
An examination of the effect of large fractures on a variety of geophysical properties, namely, seismic velocities, electrical conductivity, fluid permeability, and thermal conductivity. The approach is to measure these properties, under pressure, for a suite of rock specimens, each specimen containing one or more sawcut surfaces used to simulate fractures. The aims are to understand how fractures close under pressure, how the closure depends on rock type, and how these fractures might be detected using surface geophysical measurements. The work done so far includes studies of the effects of fractures on compressional wave velocity, electrical conductivity and permeability under pressure to 200 MPa. The results of this project have wide application: the interpretation of crustal sounding data; groundwater hydrology; the siting of nuclear waste disposal facilities; the identification of oil, gas or steam reservoirs; the siting of hot-dry-rock geothermal energy facilities.

GEOTECHNIQUE/GÉOTECHNIQUE

ENGINEERING GEOLOGY/GÉOLOGIE DE L'INGÉNIEUR

345. CHAGNON, J.-Y., Univ. Laval (Géologie):
Evaluation de la rétrogression des coulées dans l'argile sensible, 1979-81.
Revue critique des données sur les coulées dans l'argile sensible afin de dégager les paramètres pertinents à l'évaluation de la rétrogression.
346. CHAGNON, J.-Y., COCKBURN, D., Univ. Laval (Géologie):
Cartographie géotechnique de la Région de Québec, 1978-81; thèse de maîtrise (Cockburn).
La partie initiale du projet est terminée. Il s'agissait de cueillir toutes les données géotechniques disponibles dans la région de Québec. Ces données sont analysées et compilées. Une méthode de représentation cartographique des données est en voie de développement et une carte est en préparation.
347. DEMERS, B., LEFEBVRE, G., Univ. Sherbrooke (Géographie):
Résistance cyclique des argiles de Grande Baie (Québec), 1979-80; thèse de maîtrise (Demers).
Lorsqu'une argile est soumise à une sollicitation cyclique, il existe un déviateur critique au-dessus duquel l'échantillon rupture. L'objectif de ce projet est de déterminer le déviateur critique d'une argile très sensible et d'étudier l'influence de quelques paramètres sur les déviateur critique.
348. DOUVILLE, S., ROHAN, K., LEFEBVRE, G., Univ. Sherbrooke (Géographie):
Mécanismes d'érosion de l'argile intacte, 1979-81; thèse de maîtrise (Douvillé).
Détermine les mécanismes d'érosion de l'argile intacte et établir une classification de la susceptibilité à l'érosion des argiles sensibles de l'Est du Canada.
349. EGGINTON, P.A., Geol. Surv. Can.:
Hydraulic, morphologic and morphometric studies of selected rivers along the Mackenzie Highway, 1975-.
350. GADD, N.R., Geol. Surv. Can.:
Geological variability of marine deposits, Ottawa-St. Lawrence Lowland, 1974-.
351. GRICE, R.H., KIM, C., McGill Univ. (Geological Sciences):
Weathering mechanisms and variations in susceptibility of different species of Ordovician shales (mudrocks), 1979-82; Ph.D. thesis (Kim).
Shale, or more precisely, mudrocks are usually a potentially difficult rock in engineering project. For the older non-expansive mudrocks, some stable non-fissile species are encountered and in such projects, shales loses its aura of danger until it behaves 'unexpectedly' according to its reputation. Continued observations particularly of the Montreal Metro over the last 14 years has proved this point and established the need for:
1) more precise mineralogical and textural laboratory classification of mudrocks; 2) new quantitative laboratory methods of measuring weathering using physical, geophysical and chemical parameters; 3) formulation of mechanisms; 4) design of emplacements in controlled environments to test mechanistic theories; and 5) new methods for field classification and establishment of optimum field treatment.
A new BET type surface area apparatus has now been built and will be used (subject to financial restrictions). Attempts will also be made to make pore water micro analyses.
352. HEGINBOTTOM, J.A., Geol. Surv. Can.:
Slope processes and cryogenic movements, Arctic Islands, 1977-.

353. LOCAT, J., LEFEBVRE, G., Univ. Sherbrooke (Géographie):

Processus de sur consolidation et modèle generalise de comportement des argiles sensibles, 1977-81; these de doctorat (Locat).

Voir:

Origine de la structure des argiles postglaciales; etat des connaissances; Dep. Génie Civil, Univ. Sherbrooke, Rapport GEO-79-04, 1979,

354. MORIN, R.M., LUPIEN, C., ARTEIN, P.C., Univ. Sherbrooke (Géographie):

Etude du comportement des sols soumis au gel, (simulation en laboratoire et comparaison) avec resultats mesures sur le terrain, 1980-81; these de maîtrise (Morin).

Le projet propose a pour but de permettre une meilleure comprehension de certains mecanismes relies a la galurté des sols. Etapes du projet: 1) developpement d'un simulateur de gel; 2) etudes des mecanismes mis en jeu lors de la congelation des sols; 3) revue de litterature sur tout les criteres de gel deja établis; 4) echantillonnage de differents types de sols; 5) phase experimentale; et 6) redaction d'un memoire du maîtrise.

355. PHIUBERT, A.P., LEFEBVRE, G., Univ. Sherbrooke (Géographie):

Influence de la structure des argiles du nord ouest du québec sur leur comportement mécanique en application au calcul de la stabilite et des tassements de remblai, 1977-81; these de doctorat (Phiubert).

Voir:

Mesure des pressions latérales durant la consolidation unidimensionnelle d'une argile structurée; 32^e conf. canadienne de géotechnique québec, 1979.

Influence de la structure des argiles sur le comportement mécaniques: état des connaissances; section géotechnique, Univ. Sherbrooke, Rapport de recherche Geo-79-03, 1979.

La recherche porte sur la mesure de la contrainte latérale in situ et a l'oedometre durant la compression uniaxiale et la maniere dont la resistance au cisaillement vaire durant l'ecrasement de la structure argileuse; nous debutons la phase de l'etude de la resistance au lisaillage.

356. SOLES, J.A., MIRKOVICH, V.V., EMR (CANMET): Nuclear Waste Repository: Thermal and mechanical properties of host rocks, 1976-80.

See:

Petrography of cores from the White Lake experimental test site, Ontario; Atomic Energy Canada Ltd., Technical Record TR-5, 1979.

Thermal conductivity of certain rock types and its relevance to the isolation of nuclear wastes; Atomic Energy Canada Ltd., Technical Record TR-8, 1979.

Some thermophysical properties of a granodiorite rock from Nevada test site; Atomic Energy Canada Ltd., Technical Record TR-18, 1979.

Detailed petrography and measurement of thermal conductivity and diffusivity of rocks from selected sites and being carried out for AECL.

357. WADE, R.P., AZIZ, K., Univ. Calgary (Chemical Engineering):

Massive acid fracturing in the carbonate structures of northeastern British Columbia, 1979-80; M.Eng. thesis (Aziz).

The massive acid fracture stimulations of the Triassic carbonates of northeastern British Columbia have met with varying degrees of success. Since these stimulations cost in the order of \$300,000 to \$400,000, the thesis isolates or eliminates a number of parameters which may affect the results of the stimulations in an attempt to increase the likelihood of a successful stimulation. The thesis will also establish a number of areas where future research is required.

MUSKEG/MUSKEG

358. JARRETT, P.M., Royal Military College of Canada (Civil Engineering):

Design and construction of pavements on peats, 1970-.

Large scale laboratory tests of gravel-fabric-peat constructions have been made to assess the value of geotextiles in pavement construction over peat subgrades. The properties of the fabrics and their

positioning in the pavement have been studied with a view to optimising their use.

Tensile testing of a wide variety of peat deposits has been undertaken in an attempt to develop a correlation between peat classification and tensile strength.

PERMAFROST/PERGÉLISOL

359. BAKER, T.H.W., National Research Council of Canada (DBR):

Strength and deformation of frozen and thawing soil, 1971-85.

Concrete cylinders tested with compliant platens showed increased failure strength and failure time over conventional methods. Tests will continue using compliant platens.

Unconfined compression tests showed strength of under-saturated frozen soil to be proportional to the degree of saturation. Little strength is achieved by freezing soils with less than 10% saturation with water.

Frozen saline sands (salinity of 0.55% at -6°C) showed a strength reduction of 60 to 90% compared to similar conditions at zero salinity. This answered an enquiry from Gulf Oil Ltd., for construction of artificial islands in the Beaufort Sea.

Time-domain reflectometry (TDR) techniques have been used to measure moisture content and freezing front progression in laboratory specimens. This project is in association with J.L. Davis of the GSC.

Continued work on the TDR measurements will investigate the use of discontinuities to act as location markers and aid in the measurement of moisture gradients and freezing front positions. It is thought that this technique could be developed as a monitoring device in artificial freezing projects.

360. BROWN, R.J.E., National Research Council of Canada (DBR):

Distribution of permafrost and related climatic and terrain factors, 1953-.

See:

A permafrost monitoring program at Alert, N.W.T. - Preliminary results; EMR Open File Rep., 1979.

Symposium on permafrost field methods and permafrost geophysics; NRC Assoc. Committee Geotechnical Res., Tech. Mem. 124, 1979.

Permafrost investigations on peat plateaus at Thompson, Manitoba, in discontinuous zone. Distribution of permafrost through discontinuous-continuous permafrost boundary. Distribution and temperatures of alpine permafrost in Rocky Mountains.

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

Terrain characteristics and ground ice dynamics in a thermokarsted peatland, Fort Simpson, Northwest Territories, 1976-80; M.Sc. thesis (Chatwin).

362. GELL, A.W., ANDERSON, J.C., Environment Canada (National Hydrology Res. Instit.):

Ground ice and icings, Mackenzie Delta, Northwest Territories, 1978-.

Field and laboratory study of several ice types in permafrost was continued in Tuktoyaktuk, Northwest Territories area. Criteria for identifying ice types have been established. Growth of ice is being monitored.

Icing mounds on Hans Creek, Northwest Territories, have been studied, and growth histories inferred. Geotechnical significance to a proposed highway is being assessed. A study has also been initiated at icing sites on the Alaska Highway in the Yukon Territory.

363. GOODRICH, L.E., JOHNSTON, G.H., PENNER, E., National Research Council of Canada (DBR):

Ground thermal regime, 1970-.

Work is in progress on field study of thermal effects of road embankment on permafrost, Mackenzie Highway, Mile 419.5. Field measurements of soil thermal conductivity are being maintained at Ottawa, Thompson, Manitoba, and Mile 419.5, Mackenzie Highway. A report will be prepared describing the instrumentation. A paper dealing with the influence of snow covers on the

ground thermal regime has been prepared for publication. Work has begun on a numerical model which will eventually be extended to model frost heaving.

364. JOHNSTON, G.H., National Research Council of Canada (DBR):

Preparation of manual on permafrost engineering, field observations of performance of foundations of buildings, bridges, roads, airfields, utilities, etc., 1950-.

Manual on Permafrost Engineering: Design and Construction completed - in press. Observations on performance of bridge and building foundations and data collection for evaluating parameters for design and construction of embankments, buried utilities and foundations of structures constructed in permafrost areas were continued.

365. JOHNSTON, G.H., GOODRICH, L.E., National Research Council of Canada (DBR):

Insulated embankments of permafrost, 1972-80.

Observations continuing on performance of insulated and uninsulated test sections installed on the Mackenzie Highway south of Inuvik and south of Wrigley, Northwest Territories, and on Dempster Highway in northern Yukon, to evaluate the thermal behaviour and determine the parameters required for design.

366. PARAMESWARAN, V.R., National Research Council of Canada (DRB):

1. Model studies of behaviour of foundations in frozen ground. 2. Micromechanics of flow of frozen soils, 1973-.

See:

Creep of model piles in frozen soil; Can. Geotechnical J., vol. 16, no. 1, 1979.

Deformation behaviour and strength of frozen sand; Can. Geotechnical J., vol. 17, no. 1, 1980.

The adfreeze strength and creep of piles in frozen soils, under constant rate of loading and under constant loads, are being investigated at temperatures varying between -2°C and -10°C.

Unconfined uniaxial and confined triaxial compressive strength of frozen sand and soils at temperatures between -2°C and -15°C have also been carried out. At -2°C, the compressive strength is decreased considerably due to the presence of unfrozen water in the soil.

The aim is to combine the results from the above two projects and obtain a criterion for calculating the bearing capacity of piles and other foundations in frozen soils.

ROCK MECHANICS/ MÉCANIQUE DES ROCHES

367. CRUDEN, D.M., Univ. Alberta (Geology):

Stability of natural slopes in rock, 1971-.

See:

Estimating densities in contoured orientation diagrams; Geol. Soc. Am., Bull. II, vol. 90, p. 580-607, 1979.

Estimating joint roughness coefficients; Internat. J. Rock Mechanics and Mining Sci., vol. 16, p. 303-308, 1979.

Simple rock slides at Jonas Ridge, Alberta, Canada; Proc. Internat. Symp. Landslides, New Delhi, 1980.

Detailed mapping of selected sites at which large downslope movements in rock are occurring, or have occurred has continued. Laboratory work has provided a theoretical basis for these studies.

368. CRUDEN, D.M., Univ. Alberta (Geology):

Reconnaissance of karst in the Salt River area, northeast Alberta, 1979-82.

Closed depressions visible on air photographs of the Salt River area will be examined to determine whether they form by collapse or subsidence. The properties of the bedrock surrounding these structures which are believed to be significant in their formation will be determined.

369. DYKE, L.D., Geol. Surv. Can.:

Geotechnical study of rock heave, central Arctic Canada, 1977-.

370. EISBACHER, G.H., Geol. Surv. Can.:

Study of large landslides in the Western Cordillera, 1976-.

371. EVANS, S., CRUDEN, D.M., Univ. Alberta (Geology): Landslides in the Kamloops Group in south-central British Columbia, 1977-81.

1) To rationalize the regional distribution of landslides in the volcanic rocks of the Kamloops Group in south-central British Columbia. 2) To determine the failure mode and mechanics of selected landslides in the Kamloops Group. 3) To isolate the factors contributing to slope failure in the Kamloops Group. 4) To formulate a landslide slope development model for the Kamloops volcanics in south-central British Columbia for use as an indicator of potential natural hazards.

372. GELLER, L., EMR (CANMET): Underground nuclear waste repository - mechanical rock properties, 1978-85.

As part of validation of the concept of geological burial of nuclear waste, establish methods for the determination of mechanical properties and determine the mechanical properties of intersected lithologies in research area plutonic structures.

373. HERGET, G., EMR (CANMET): Stress measurements in Canadian Shield, 1979-80.

Using existing stress data from mines located in the Superior Province, to investigate stress field variation across the province in relation to regional structural feature.

374. HUDEC, P.P., Univ. Windsor (Geology): Effect of de-icing salts on expansion and durability of carbonate rock aggregates, 1977-80.

Involves determination of expansion coefficients in carbonate rocks in dry and in saturated states and their relationship to water absorption, the effect of de-icing salts (NaCl) on these expansion coefficients, and the relationship of water adsorption to the durability and expansion coefficients.

375. HUDEC, P.P., Univ. Windsor (Geology): Development of new tests and specifications for concrete aggregate, 1978-80.

To develop new series of engineering tests that will better discriminate between good, marginal, and poor rock materials used as aggregates in concrete, and evaluate present tests and compare the results between the new and old tests to the actual service record of the rock

376. HUDEC, P.P., RUSSELL, D.J., Univ. Windsor (Geology): Engineering properties of sedimentary rocks of Manitoulin Island, Ontario, 1979-80.

To provide for engineering classification of carbonates for possible use as sources of concrete aggregate on Manitoulin. This is a continuation of the project previously reported for rocks in southwestern Ontario. Same tests are applied to cores and surface specimens collected on the Island as were applied to the rock blocks collected in southwestern Ontario. They include: water absorption/adsorption, compressive and tensile strength, durability as measured by freeze-thaw and magnesium sulphate tests, thermal and isothermal (on wetting) expansion coefficients.

377. LAJTAI, E.Z., SVAB, M., Univ. New Brunswick (Geology): Tensile fracture in rocks, 1979-81.

The propagation of tensile fractures becomes a time dependent process when it occurs through stress corrosion. Stress corrosion cracking has been identified to have an important role in a number of tectonic processes such as magma intrusion, earthquake phenomena and in load-release type of fracture mechanisms (sheeting joints, exfoliation, etc.). From a more immediate and practical (as opposed to theoretical) sense, stress corrosion cracking could occur in the plutonic rock formation that will be selected to contain the repository for Canada's nuclear waste. Under the influence of temperatures around 100°C and stress of about 100 MPa, stress corrosion cracking could be significant enough to increase permeability and thus facilitate the dispersion of nuclear waste products.

It is planned to investigate stress corrosion cracking in granite and perhaps gabbro through standard techniques used in the field of fracture mechanics of metals, glasses and ceramics with one significant difference; loading will be in compression rather than in tension to better simulate tectonic processes. There are two basic

objectives: one is to measure the velocity of slow crack growth as a function of environmental factors (water chemistry, temperature and stress), and the other to try to define the chemical processes taking place at a slow-propagating crack tip.

In addition, research on fracture in New Brunswick sandstones will be continued by investigating joint development in "undeformed" flat-lying sandstones of the Pictou Formation.

378. MIRKOVICH, V.V., SOLES, J.A., BELL, K.A., EMR (CANMET): Underground nuclear waste repository - thermal rock properties, 1979-85.

See: Thermal dilatometry of eleven rock samples from Chalk River; CANMET, MSL-INT 79-101, 1979.

As part of validation of the concept of geological burial of nuclear waste establish the high-temperature thermal properties of intersected lithologies in research area plutonic structures.

379. PALMER, J.H.L., National Research Council of Canada (DBR):

Field performance of tunnels under conditions of high in situ stress, 1976-.

See: Results of instrumentation and observation of a tunnel in bedded rock with high residual (in situ) stresses; Proc. 4th Rapid Excavation and Tunnelling Conf., Atlanta, 1979, vol. 1, p. 917-935, 1979.

Performance of a shallow tunnel in a shaly rock with high horizontal stresses; Proc. Tunnelling '79, London, England, March 1979, p. 105-123, 1979.

Long-term monitoring of the pressure acting on a tunnel is continuing.

380. WALLIS, P.F., KING, M.S., Univ. Saskatchewan (Geological Sciences):

In situ determination of rock mass quality and discontinuity frequency by acoustic borehole logging techniques, 1978-80; M.Sc. thesis (Wallis).

See: Discontinuity spacings in a crystalline rock; Internat. J. Rock Mechanics Mining Sci., vol. 16, no. 6, 1979.

SOIL MECHANICS/MÉCANIQUE DES SOLS

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

See: Triaxial-vane tests on a soft marine clay; Can. Geotechnical J., vol. 16, no. 1, p. 11-18, 1979.

Bridge foundations move; Transportation Res. Board, Washington, TRB Record No. 678, p. 17-21, 1979.

Field studies of landslides in clay. Settlement of buildings and fills on clays. Skin friction on piles in clay. Laboratory studies on stress-deformation characteristics of clays.

382. DION, D.-J., Québec Ministère Energie et Ressources: Levé géotechnique de la région de Chicoutimi-LaBaie, Québec, 1978-80.

383. DION, D.-J., Québec Ministère Energie et Ressources: Levé géotechnique de la région de LaPrairie-St-Jean, Québec, 1979-80.

Cette cartographie a pour but de caractériser les dépôts en fonction de leurs aptitudes à recevoir des fondations. Les paramètres géotechniques seront résumés pour chaque unité. Les cartes jointes au rapport seront la carte d'aptitude, la carte des épaisseurs des dépôts meubles et la carte de la topographie du rock.

384. DUSSEAULT, M.B., SCAFE, D.W., Alberta Research Council (Geol. Surv.), Univ. Alberta (Civil Engineering):

A geotechnical and clay mineralogical investigation of the roof and floor rocks of Alberta Prairie coals, 1979-81.

Samples of cores from seven holes drilled through the Ardley coal zone were taken from material stored at ERCB. Atterberg limits, swell capacity, slaking tendency, grain size, bulk density, porosity, clay mineralogy, and minus-clay porosity for argillaceous sandstones are the tests performed on

these dried samples in order to establish the characteristics of each lithology. Once a characteristic suite of lithologies is identified we will attempt to obtain specimens, with their natural moisture content, of similar lithologies for testing in a high pressure triaxial cell in order to determine permeability, stress-strain characteristics, and strength. Shear box tests will determine the effect of displacement rate on strength parameters and delineate the range of strengths. Specimens will be prepared for scanning electron microscope and optical thin section analysis of intergranular relationships and their influence on behavior. All index tests noted above will be repeated on these specimens to permit a generalization to the regional case and to establish a predictive capacity based on index testing.

Samples of the Horseshoe Canyon Formation were collected, at the drill site, from six cores drilled by industry and one core taken by the ARC coal program in the Drumheller area. These samples were wrapped immediately in layers of plastic wrap, dipped in melted wax to preserve their natural moisture, then stored in the "moist room" at University of Alberta. Similar tests to those outlined above will be performed on these samples. Slaking and swelling tests on the Ardley samples show that all samples are extremely water susceptible and this will have profound significance on mine planning and operation.

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

386. PENNER, E., National Research Council of Canada (DBR): Frost action in soils, 1953-.

See: Effects of temperature and pressure on frost heaving; Engineering Geol., vol. 13, p. 29-39, 1979.

Laboratory frost heave studies designed to explore further the conditions leading to shut-off pressures showed that the influence of cold side temperature T and overburden pressure P on total heave rate $\frac{dh}{dt}$ could be expressed by the equation

$$\frac{dh}{dt} \text{ Total} = ae^{-b P/T}$$

This relationship has been advanced in a recent paper as a basis for normalizing frost susceptibility tests carried out under different conditions of P and T.

387. PROVENCAL, J., BALLIVY, G., Univ. Sherbrooke (Géographie):

Contribution à l'étude du comportement d'un dépôt d'argile marine à la périphérie d'un tunnel, 1979-80; thèse de maîtrise (Provencal).

La revue de l'état des connaissances sur le sujet est terminée et la rédaction de cette partie du rapport sera entreprise au début du mois de mars, 1980. Quelques cas de tunnel dans l'argile marine sont connus et l'étude de ceux-ci constituera la seconde partie du rapport qui sera rédigée vers la mi-avril. Le rapport final devrait être terminé au mois de juin 1980.

388. RISSMANN, P., LEBUIS, J., Québec Ministère Energie et Ressources:

Cartographie des zones exposées aux risques de mouvement de terrain sur la rive nord de la vallée de l'Outaouais entre Plaisance Quyon et le long des rivières Lelièvre et Gatineau. Carte géotechnique de Thurso-Buckingham, 1978-80.

1) Etablir les zones à risque potentiel de mouvement de terrain et définir l'intensité du risque. 2) Effectuer une cartographie géotechnique incluant la topographie du socle, les épaisseurs de dépôts meubles, les caractéristiques géotechniques des dépôts et finalement l'élaboration des zones d'aptitudes. Etat d'avancement des travaux: Entre Plaisance et Gatineau, autant pour la carte géotechnique que pour les cartes des zones exposées aux risques de mouvement de terrain, le projet est à l'étape de la mise en plan. La partie entre Hull et Quyon s'effectuera au cours de l'été 1980.

389. RISSMANN, P., LEBUIS, J., CHAGNON, J.-Y., Univ. Laval (Géologie), Québec Ministère Energie et Ressources:

Relation entre les aspects géologiques et géotechniques des différentes unités stratigraphiques dans la vallée de l'Outaouais, 1978-81; thèse de maîtrise (Rissmann).

Le projet consiste à caractériser à l'aide des propriétés géologiques et géotechniques les différentes unités stratigraphiques rencontrées dans la vallée de l'Outaouais entre Plaisance et Quyon. On cherchera à établir une relation entre ces unités stratigraphiques et la présence de coulées argileuses. De nombreux forages, essais scissométriques, essais au pénétromètre, ainsi que des essais au laboratoire ont été effectués entre Plaisance et Gatineau.

390. SITAR, N., Univ. British Columbia (Geological Sciences):

Behaviour of slopes in cemented soils under static and dynamic loading, 1976.

See:

Behavior of slopes in weakly cemented soils under seismic loading; Proc. 2nd U.S. National Conf. Earthquake Engineering, Stanford, Ca., 1979.

To develop methods for seismic slope stability analysis of slopes in weakly cemented soils.

SNOW AND ICE/NEIGE ET GLACE

391. FREDERKING, R.M.W., SINHA, N.K., NAKAWO, M., National Research Council of Canada (DBR):

Ice mechanics, 1960-.

See:

Laboratory tests on downdrag loads developed by floating ice covers on vertical piles; Proc. POAC 79, 5th Internat. Conf. on Port Ocean Eng. under Arctic Conditions, Trondheim, p. 1097-1110, 1979.

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

392. POWER, J.M., Environment Canada (National Hydrology Res. Instit.):

Simulation modelling of runoff from snow and ice melt, 1976-.

The UBC Model containing a glacier runoff algorithm is currently being transposed to the Goldstream River basin within the Upper Columbia River basin as part of a joint co-operative project with B.C. Hydro. The model will then be applied to the Kicking Horse River basin within Yoho National Park, to determine the effects on runoff of varying degrees of glacier cover contained within the sub basins of the Kicking Horse. The SSARR model is being run on six sub basins in the upper St. John River basin to determine its sensitivity to errors in snowpack estimation and to test for improvements in runoff simulation as a result of using new methods, including satellite image analysis, for determining snow distribution.

393. SCHAEERER, P.A., McCLUNG, D.M., National Research Council of Canada (DBR):

Avalanche engineering, 1966-.

GLACIOLOGY/GLACIOLOGIE

395. GROSS, H., LANGHAM, E.J., Environment Canada (National Hydrology Res. Instit.):

Time domain reflectometry applied to ground frost on snow pack moisture measurement, 1976-80.

During the winter of 1977-78, the Glaciology Division of Environment Canada, undertook the evaluation of TDR for determination of snowpack moisture conditions. Probes were constructed and installed at Crystal Beach, near Ottawa. A series of measurements were made over the winter to track changing conditions. Concurrent with the field work, laboratory studies were performed under controlled conditions. The next season, other probes were installed in a site in Ottawa.

Present studies focus on probe design, area of sensitivity around a probe, and data reduction. A later portable version of this instrument will be used to conduct rapid ground truth surveys for use in conjunction with remote sensing methods.

396. HOLDSWORTH, G., Environment Canada (National Hydrology Res. Instit.):

Ice core-climate change project, 1975-85.

Two ice core sites have been identified and subjected to reconnaissance surveys. One site is on Mt. Logan, Yukon Territory, and the other is on Penny Ice Cap, Baffin Island, Northwest Territories. Several 20 m cores have been retrieved and analysed for isotopes and chemistry. Geophysical measurements at the site (ice depth, deformation) have been used to determine the final core site and the expected manipulations with the core data. Cores are expected to be obtained in the depth range 200-300 m corresponding (at both sites) approximately to the last 1000 years.

A suitable electro-mechanical core drill has recently been fabricated and will be deployed in the field in 1980.

Time series of oxygen isotopes, main cations, conductivity, sulphate and nitrate, particulates (and pollen) will be obtained. Other measurements relate to in situ borehole quantities: temperature, closure rate and inclination rate. Densification processes will be examined for the Mt. Logan site.

397. JONES, S.J., JOHARI, G.P., CHEW, H.A.M., Environment Canada (National Hydrology Res. Instit.):

Physical properties of ice and snow, 1975-85.

See:

The dipolar correlation factor and dipole moment of a water molecule in ice III; Philosophical Magazine B, vol. 39, no. 3, p. 219-228, 1979.

See:

Time series modelling of avalanche activity from meteorological data; J. Glaciology, no. 88, 1979.

To determine the characteristics of snow avalanches in motion, the amount of snow moved by avalanches, the feasibility of measures for avalanche protection and to develop techniques of evaluating avalanche hazard.

394. SHERSTONE, D.A., Environment Canada (National Hydrology Res. Instit.):

Liard River spring flood study - River ice break-up component, 1978-81.

Collection of baseline scientific data on timing and processes involved in break-up of Liard River and major tributaries. Attempt to determine importance of break-up events on sediment production and transport within the Liard system. Attempt to determine importance of Liard spring flood break-up events to break-up on and regime of Mackenzie River and ultimately on Mackenzie Delta.

Sub-projects include study of ice jam prone locations to quantify agents responsible for ice jams during break-up. Also attempts to quantify channel geometry/hydraulic changes due to ice action and/or extreme storm events.

Ultimately sufficient data should be available to permit prediction of effects of large changes to river regime due to regulation schemes, etc.

The emphasis is on the mechanical and electrical properties of ice. The present mechanical experiments include triaxial testing of polycrystalline ice and also of a sand/ice composite. The electrical experiments include measurement of dielectric permittivity and conductivity of pure and impure ice.

398. OMMANNEY, C.S.L., STROME, M.M., CLARKSON, J.W., Environment Canada (National Hydrology Res. Instit.):

Snow and ice information and data systems, 1968-.

See:

Recent work-Canada; Ice, News Bull. Internat. Glaciological Soc., 1st Issue, no. 59, p. 3-15, 1979.

Glacier National Park, British Columbia - bibliography; Glacier Nat. Park Glacier Inventory Rept. no. 1, Environment Canada, 1979.

In 1980 emphasis will be on the completion of the glacier inventory of Glacier National Park, British Columbia for Parks Canada and as a pilot study for determining the variable contribution of glacier runoff to flows in the Columbia River and the threat posed by glaciological hazards to human activities in the Park.

Over the long-term, the intent is to complete a one-time assessment of the distribution and quantity of Canada's frozen water resources, consolidate and collate all the relevant background information and data and establish sampling areas for the determination of changes in the contribution of perennial snow and ice runoff over time and the impact of this on water management.

399. PATERSON, W.S.B., KOERNER, R.M., FISHER, D.A., ALT, B., PARNANDI, M., Polar Continental Shelf Project (EMR):

Paleoclimate of Canadian Arctic from analyses of cores from ice caps, measurements of present mass balance of ice caps and their relation to the synoptic meteorology of the region, 1971-.

See:

Accumulation, ablation and oxygen isotope variations in the Queen Elizabeth Islands ice caps; J. Glaciology, vol. 22, p. 25-41, 1979.

Comparison of 10⁵ years of oxygen isotope and insoluble impurity profiles from the Devon Island and Camp Century ice cores; Quaternary Res., vol. 11, p. 299-305, 1979.

1) One 140-m core to bedrock near summit of Agassiz Icefield, Ellesmere Island. 2) Oxygen isotope analysis of this core completed.

3) Continuing analysis of core from 1977 borehole through same ice cap with particular emphasis on detection of volcanic eruptions from measurements of acidity of the ice, and on measurement of variations in concentration of microparticles. 4) Continuing measurements of mass balance of Meighen Ice Cap, Devon Island Ice Cap, and Agassiz Icefield. 5) Relating mass balance data to synoptic meteorology in order to clarify the paleoclimatic interpretation of data from the ice cores.

400. PERLA, R.I., Environment Canada (National Hydrology Res. Instit.):

Metamorphism of the mountain snowpack, 1980-82.

a) Analysis of Sunshine data 1976-77; b) developing new techniques for studying plane-sections of snow samples (as opposed to disaggregated grains); c) developing new techniques for snow specimen photography; d) developing new techniques for snow compaction at various strain-rates and stress-rates.

401. TERROUX, A.C.D., Environment Canada (National Hydrology Res. Instit.):

Remote sensing of surface temperatures and surface melting, Columbia Icefield, Alberta-British Columbia, 1972-80.

Glacier runoff provides a source of late season flow in rivers with glacierized head waters which can be important for hydro-electric projects and irrigation in downstream areas. The Columbia Icefield has a good range of elevation and surfaces of various aspect with relation to incoming solar radiation. Thermal infrared surveys were conducted in 1972 and 1978, the latter with simultaneous colour and false colour photography. Preliminary analysis shows areas of melt and areas of "wet" and dry snow. Further analysis will be facilitated with a new map of the Columbia Icefield to be published in 1980.

402. YOUNG, G.J., Environment Canada (National Hydrology Res. Instit.):

Glacier hydrology and glacier-climate relationship: Peyto Glacier, Alberta, 1965-.

See:

Hydrochemical separation of components of discharge in Alpine catchments; Proc. 47th Western Snow Conf., p. 1-9, 1979.

To monitor the heat, ice and water budget of a mountain glacier in order to explain the hydrological processes and glacier-climate relationships in a glacierized mountain catchment.

403. BARKER, J.F., Univ. Waterloo (Earth Sciences): Organic geochemistry and its influence on the transport of radionuclides in groundwaters, 1979-81.
This study is evaluating the ability of natural organics (mainly humic substances) to complex metals and radionuclides. Samples are being collected mainly from crystalline terrains and a gel filtration technique used to evaluate their ability to complex metals added.
404. BELLAMY, K., JOPLING, A.V., Univ. Toronto (Geography): Paleohydrological reconstruction, Oak Ridges Moraine, Ontario.
See: The late depositional history of the western end of the Oak Ridges Moraine, Ontario; Can. J. Earth Sci., vol. 16, p. 1094-1107, 1979.
Previous work on the Oak Ridges Moraine has emphasized the paleoflow directions associated with the glacioluvial Goodwood Formation of late Wisconsinan age. The study now being initiated seeks to gain quantitative information on the flow discharges associated with the deposition of this formation.
405. BORNEUF, D.M., Alberta Research Council (Groundwater Dep.): The flow regime of some Alberta springs, 1978-80.
Monitoring of discharge of a few Alberta springs is being continued. Sampling of spring waters at monthly interval is being continued. Report is being written, to be finished by March 31st, 1980.
406. BORNEUF, D.M., OZORAY, G., Alberta Research Council (Groundwater Dep.): Hydrogeological atlas of Alberta, 1974-83.
Map scale 1:2 000 000 - Potential yield of aquifers in surficial sediments of the province of Alberta; 1:2 000 000 - Bedrock topography of the province of Alberta; 1:2 000 000 - Cumulative thickness of sand and gravel within the surficial sediments; 1:2 000 000 - Drift thickness map for the whole province.
Five cross sections showing thickness, lithology, potential yield of surficial sediments in Alberta.
407. CEROICI, W.J., Alberta Research Council (Groundwater Dep.): Hydrogeology of the Pigeon Lake area, Alberta, 1978-81.
To obtain detailed information about the groundwater movement, quantity and quality in the Pigeon Lake area and especially on the groundwater resources of Millet, Thorsby and Wetaskiwin.
The Cretaceous - Tertiary bedrock of the area is covered by a thin veneer of till. There are two major preglacial valleys: the Red Deer one and an unnamed valley underlying Pigeon Lake. The Paskapoo Formation has the greatest groundwater potential in the study area.
Sodium bicarbonate water is predominant in the bedrock while the water of the surficial deposits is either similar or of the calcium-magnesium bicarbonate type. Total dissolved solids rarely exceed 2000 mg/L.
408. CEROICI, W.J., Alberta Research Council (Groundwater Dep.): International system (SI) of units in hydrogeology, 1979-80.
To standardize the use of SI units in hydrogeological reports. The report contains a standard list of SI units used in hydrogeology, conversion tables, and a listing of the metric version of pump testing formulae.
409. CEROICI, W.J., TÓTH, J., Alberta Research Council (Groundwater Dep.): Saline seep amelioration experiment, Trochu, Alberta, 1978-81.
To determine the feasibility of ameliorating saline soil conditions by pumping groundwater from an artesian aquifer.
The saline soil and 'quick' ground conditions in the study area are attributable to ascending groundwater from an artesian aquifer. This sandstone and fractured shale aquifer is located within 20 m of the land surface in the study area. The salts in the salinized soil which are primarily the sodium sulphate result from the evaporation of mineralized groundwater.
- Short term pumping in the study area has demonstrated that quick ground conditions can be rectified. The next and most important aspect of the study is to determine if saline soil amelioration is feasible by sustained pumping.
410. DAVISON, C.C., GRISAK, G.E., PICKENS, J.F., FLAVELLE, P.A., Environment Canada (National Hydrology Res. Inst.): Radionuclide transport in fractured rock, 1979-.
To investigate the physical and hydrogeochemical controls on radionuclide transport in fracture-controlled hydrogeologic systems. In particular, particular attention will be focussed on the development and assessment of various in situ field methods which can be used to investigate these factors to depths of 1000 metres in fractured crystalline rock masses.
411. DAVISON, C.C., GRISAK, G.E., PICKENS, J.F., FLAVELLE, P.A., Environment Canada (National Hydrology Res. Inst.): Hydraulic testing of fractured crystalline rock, 1979-.
To develop and apply field and analytical methods for determining the physical hydrogeologic parameters of fractured crystalline rock to 1000 metre depths by using multiple and single borehole hydraulic response techniques, and to assess the limitations and utility of these methods to analyse the various scales of groundwater flow at potential high-level nuclear waste disposal sites.
During 1979-80 additional boreholes will be drilled, logged and instrumented in crystalline rock to serve as piezometers to monitor the hydrogeologic characteristics of a fractured crystalline rock mass. A long term pump test will be performed from a packer isolated borehole interval and the hydraulic response at isolated zones in adjacent boreholes will be measured during this test. Further hydraulic testing will be performed to depths of 1000 m in a borehole penetrating a fractured crystalline rock mass, using modified equipment and methods.
412. EGBOKA, B.C.E., FARVOLDEN, R.N., CHERRY, J., FRITZ, P., Univ. Waterloo (Earth Sciences): Field studies of groundwater flow using tritium and some other environmental tracers, 1978-80; Ph.D. thesis (Egboka).
Several piezometer nests, bundle piezometers and multi-level samplers were installed in the shallow aquifers at the ZEUS-FIG site at the WNRE, Pinawa, Manitoba, and at a landfill site at CFB Borden, Ontario. Waterlevel measurements were used to construct water table and piezometric surface contours and to interpret the groundwater flow regime. Observation well records were used to study the seasonal effects on the watertable. The tritium in precipitation at Ottawa combined with data from tree ring analyses and water level records were used to construct the tritium step input functions (TSIF).
Groundwater samples were analyzed for ^3H , ^2H , ^{18}O , Cl^- and SO_4^{2-} in a multi-tracing approach to understand the hydraulics of the two groundwater flow regimes. The ^2H distributions at both areas show an obvious effect of hydrodynamic dispersion. The 1962-64 ^3H were diluted by at least a factor of 3, and there is no detectable ^3H below a depth of about 32 feet. At a location in Pinawa a high ^3H peak of 403 TU was measured at a depth of about 12 feet and this decreased to 24 TU at a depth of about 20 feet. With a TSIF of about 1250 TU (corrected for radioactive decay) this implies low dispersion. Computer programmes that can use a TSIF to compute dispersion coefficient values under the known boundary and initial conditions are being developed.
413. FARVOLDEN, R.N., SOLOMAN, S., FRIND, E.O., KARROW, P.F., Univ. Waterloo (Earth Science): The use of statistical analysis in predicting water levels in the Greenbrook aquifer, Kitchener, Ontario, 1978-80.
The Greenbrook well field produces between 1.0 and 3.0 million gallons of water daily or about 15% of the average daily demand of the twin cities of Kitchener-Waterloo, all of which is supplied by wells. In order to manage the groundwater resources for maximum benefit it is necessary to predict the response of the aquifer system to both short term and long term changes in pumping rate. In addition to pumping rate, water levels in wells within the aquifer system are dependent upon the entire hydrologic cycle. Hence, water level changes must show some accordance with changes in total precipitation as well as changes in stream discharge. The aim of this paper is to determine the statistical relationships among water level changes and changes in withdrawal by pumpage, changes in monthly total precipitation, and changes in stream discharge. Statistical relationships can then be used for prediction of water levels.
A technique of removing seasonality and persistency from water levels leaving a white noise or random component is used for predicting water levels. The white noise array or second order differences are estimated by a multiple regression equation and water levels are in turn estimated based on the removed seasonality and persistency components.
414. FOGARASI, S., MOKIEVSKY-ZUBOK, O., Environment Canada (National Hydrology Res. Inst.): Hydro-climatological studies on Sentinel-Bridge River glaciers and in the Liard River Basin, 1978-81.
Energy Budget Components will be estimated, multiple regression will be applied on the principal components of the energy budget parameters for the estimation of snow-melt runoff. In progress: a) preliminary computer program to calculate snow, surface Albedo changes over Sentinel Glacier, British Columbia, and b) net radiation at Sentinel Glacier.
415. FORD, D.C., SMART, C.C., McMaster Univ. (Geography): Groundwater hydrology of the Mt. Castleguard-Columbia Icefield area, Banff National Park, 1979-82; Ph.D. thesis (Smart).
Major karst drainage systems occur in the Cathedral Formation (Middle Cambrian limestone) and overlying Stephen, Eldon and Pika mixed carbonate formations. Early, preliminary studies suggested that a substantial part of the central Columbia Icefield drained through its base to a series of major springs, Big Springs, 5+ kms distant, This is a detailed study of the Springs, using water level recorders and fluorescent dye tracers recorded with a field fluorometer. In the 1979 melt season it was established that (a) the system of Springs is more extensive than previously supposed; in aggregate discharge they, not the Saskatchewan Glacier, are probably the principal source of the North Saskatchewan River; (b) seasonal rise of head in the underground system exceeds 300 m. There were multiple traces at differing stages of the springs from a sinkhole in discontinuous permafrost at the top of the carbonate stratigraphic section. Flowthrough times to the Springs, close to the stratigraphic base, revealed good relation to stage and were astonishingly rapid.
416. FREEZE, R.A., GARVEN, G., Univ. British Columbia (Geological Sciences): Role of regional groundwater flow systems in generation of stratabound lead-zinc deposits, 1979-82; Ph.D. thesis (Garven).
417. FREEZE, R.A., RULON, J., Univ. British Columbia (Geological Sciences): Role of groundwater flow systems in development of geomorphological landforms, 1979-81; M.Sc. thesis (Rulon).
418. GABERT, G.M., WITHERS, D.W., Alberta Research Council (Groundwater Dep.): Alberta groundwater observation well network, 1956-.
419. GRAHAM, B.W., Environment Canada (National Hydrology Res. Inst.): Groundwater contamination by sewage effluent and sludge, 1978-81.
420. HACKBARTH, D.A., NASTASA, N., Alberta Research Council (Groundwater Dep.): Regional hydrogeology of the Athabasca oil sands area, Alberta, 1974-78.
421. JACKSON, R.E., PATTERSON, R.J., INCH, K.J., Environment Canada (National Hydrology Res. Inst.): Characterization of radionuclide adsorbents found in detrital aquifer sediments, 1980-85.
See: Oxidation-reduction sequences in groundwater flow systems; Can. J. Earth Sci., vol. 16, p. 12-23, 1979.

- To develop techniques for isolating adsorbents; to develop techniques for desorbing radionuclides from contaminated aquifer sediments; to characterize adsorbents by chemical and mineralogical techniques; and to chemically model radionuclide retention by aquifers.
422. LYTVIK, A.T., BROOKS, C., Alberta Research Council (Groundwater Dep.):
Central data file.
423. LYTVIK, A.T., OZORAY, G., Alberta Research Council (Groundwater Dep.):
Hydrogeology of Fort Chipewyan and Lake Claire, Alberta, 1976-80.
424. LYTVIK, A.T., OZORAY, G., Alberta Research Council (Groundwater Dep.):
Hydrogeology of Wadlin Lake and Vermilion Chutes, Alberta, 1977-80.
425. MORAN, S.R., WALLICK, E.I., MACYK, T., Alberta Research Council (Groundwater Dep.):
Plains hydrology and reclamation project, 1979-85.
- 1) To evaluate the potential for change, over time, in the productive capability of soils that are established on reclaimed landscapes as a result of the release of salts through weathering of cast overburden material followed by transport and accumulation of salt by subsurface water.
 - 2) To evaluate the potential for the change, over time, in the chemical quality of groundwater within or below reclaimed areas and of surface water fed from reclaimed areas.
426. MORAN, S.R., WALLICK, E.I., MACYK, T., LI, R., MacLEAN, A., SCAFE, D., Alberta Research Council (Geol. Surv.):
Environmental geology studies, coal mining areas of Alberta, 1979-84.
- To assess the potential for reclamation of lands that are subject to large-scale surface mining of coal in the plains region of Alberta and to assess the long-term impacts of mining and reclamation practices on the land and water resources of the region. More specifically the objectives of the project are: to evaluate the potential for change, over time, in the productive capability of soils that are established on reclaimed landscapes as a result of the release of salts through weathering of cast overburden material followed by transport and accumulation of salt by subsurface water; to evaluate the potential for the change, over time, in the chemical quality of groundwater within or beneath reclaimed areas and of surface water that is fed from reclaimed areas; to evaluate the potential for reoccupation and utilization of post-mining landscapes from the standpoint of availability of water supply, surface subsidence and stability, and slope stability adjacent to valley edges; and to evaluate whether techniques of surface contouring or selective material placement can significantly mitigate any potential deleterious conditions that are identified as likely to occur.
427. MUEHLENBACHS, K., SCHWARTZ, F.W., Univ. Alberta (Geology):
Isotope geochemistry of the Milk River Aquifer, 1977-81.
- See:**
Isotope and ion geochemistry of groundwaters in the Milk River Aquifer, Alberta; Water Res. Res., vol. 15, no. 2, 1979.
- Analysis of stable isotope and major ion data for waters collected from the Milk River aquifer, located in southeastern Alberta, reveals a variety of striking patterns. Oxygen-18 and deuterium concentrations for groundwater from the areas of recharge to the aquifer are isotopically unaltered meteoric waters. Proceeding downip in the aquifer groundwaters become enriched by up to 70% and 12% with respect to deuterium and oxygen-18 of waters from the recharge part of the aquifer. The major ion chemistry of aquifer waters also changes from the recharge areas northward. Generally, Na⁺, Cl⁻, F⁻ and HCO₃⁻ concentrations increase and SO₄²⁻ concentrations decrease to zero.
428. OZORAY, G., BORNEUF, D.M., WALLICK, E.I., Alberta Research Council (Groundwater Dep.):
Hydrogeological atlas of Alberta, 1976-82.
429. PICKENS, J.F., GRISAK, G.E., Environment Canada (National Hydrology Res. Instit.):
Dispersion of solutes in groundwater flow systems, 1978-80.
- See:**
Groundwater transport of a salt tracer through a sandy lakebed; Limnol. Oceanog., vol. 25, no. 1, p. 45-61, 1980.
- To assess existing types of field dispersion tests and methods of data analysis to obtain values of dispersivity, and to determine the effect of heterogeneity on dispersion of solutes in granular geologic materials.
430. SKLASH, M.G., WILSON, B., Univ. Windsor (Geology):
The role of groundwater in storm runoff, 1978-80; M.A.Sc. thesis (Wilson).
- See:**
J. Hydrology, vol. 43, p. 45-65, 1979.
- Groundwater has been shown to be a significant and responsive factor in the generation of storm and snowmelt runoff. Most of the evidence for these conclusions is derived from mass balance studies using environmental isotopes (O¹⁸, D, T). Hydrometric monitoring and computer modelling studies have corroborated these results. It has been suggested that the rapid and significant groundwater contributions to runoff events stem from the quick conversion of the near surface tension-saturated capillary fringe into phreatic water. This theory is the subject of the present investigation which involves the continuous monitoring of both the saturated and unsaturated zones during runoff events. Field work for this project should be completed in the summer of 1980.
- New areas of related research will involve the evaluation of alternate tracers for runoff studies, the role of groundwater in storm runoff generation in areas of climatic extreme, and an investigation of the isotopic character of 'subsurface storm flow' to determine its origin.
431. SLAWSON, W.F., Univ. British Columbia (Geophysics and Astronomy):
Oxygen isotopes in hydrology, 1977-80.
- Rainfall, tap water and soil water (@ 70 cm depth) have been collected on a regular basis (soil water is available only when the soil becomes saturated to the point of allowing gravity flow into a lysimeter; this has occurred during 23 weeks out of over 100 sample periods) for over two years. Based upon a preliminary analysis it appears the soil water isotopic composition lags the rain water composition by several months. Such an interpretation seems inconsistent with information in the literature with respect to irrigation of crops lands.
432. STEIN, R., Alberta Research Council (Groundwater Dep.):
Hydrogeology of the Edmonton area (southeast segment), Alberta, 1972-80.
433. STEIN, R., Alberta Research Council (Groundwater Dep.):
Hydrogeology of the Peace Point and Fitzgerald map areas, Alberta, 1978-80.
434. TÓTH, J., Alberta Research Council (Groundwater Dep.):
Relation between groundwater movement and radiocarbon accumulation, phase: Petroleum hydrogeology, Taber area, Alberta, 1978-81.
- See:**
Patterns of dynamic pressure increment of formation-fluid flow in large drainage basins, exemplified by the Red Earth region, Alberta, Canada; Bull. Can. Petrol. Geol., vol. 27, no. 1, p. 63-68, 1979.
- The objective of the present phase of the project is to verify and enlarge upon the Generalized Hydraulic Theory of Petroleum Migration developed during previous phases of the Groundwater Division's petroleum hydrogeological studies.
435. van EVERDINGEN, R.O., BANNER, J.A., Environment Canada (National Hydrology Res. Instit.):
Northern groundwater, and engineering problems related to groundwater flow, Mackenzie Valley and Yukon, 1974-.
- See:**
Use of long-term automatic time-lapse photography to measure the growth of frost blisters; Can. J. Earth Sci., vol. 16, p. 1632-1635, 1979.
- Frost gauges and freezing gauges; Inland Waters Directorate, IWD Technical Bulletin No. 110 (NHRI Paper No. 3), 1979.
- Automatic time-lapse camera systems; Inland Waters Directorate, IWD Technical Bulletin No. 112 (NHRI Paper No. 4), 1979.
- Potential interactions between pipelines and terrain in a northern environment; Inland Waters Directorate, IWD Technical Bulletin No. 114 (NHRI Paper No. 8), 1979.
- Final reports are in preparation for the studies of frost blisters at Bear Rock, near Fort Norman, and of the morphology, hydrology and geochemistry of the karst area north of Mahony Lake, both in Northwest Territories. These studies were terminated late in 1978. In 1979 a study of icing formation in Alaska Highway corridor was initiated. Twelve time-lapse cameras have been installed to observe growth of icings at eight separate locations in the corridor between Whitehorse and the Alaska border.
436. VOGWILL, R.I.J., Alberta Research Council (Groundwater Dep.):
Aquifer hydraulics and evaluation of aquifer parameters in Alberta, 1976-.
- See:**
Estimating sustainable yield to a well in heterogeneous strata; Alberta Research Council, Bull. 37, 1979.
437. VOGWILL, R.I.J., BERRWALD, A.R.S., DALAL, G.P., Alberta Research Council (Groundwater Dep.):
Hydrogeology of the Edson area, NTS 83 F, Alberta, 1975-77.
438. WALLICK, E.I., BALAKRISHNA, T.S., Alberta Research Council (Groundwater Dep.):
Water quality in Alberta, 1976-82.
- Sampling of control point wells has been completed for the populated sector of the province and completion of chemical and isotope analysis is expected within the next four months. Maps of the General Hydrochemistry of Alberta (1:2 000 000), chloride content of groundwater in map view and in depth profiles, and groundwater chemical type analyzed by the CLUSTER technique are to be completed by June 30, 1980. Trace-element and isotope distribution in groundwater maps to be complete by December 31, 1980.
439. WALLICK, E.I., WILSON, M., ARNOLD, L.D., Alberta Environmental Centre, Vegreville (Hydrogeochemistry Sec.):
Groundwater age dating, sediment geochemistry, 1979-.
- Program entails development of a laboratory for radiocarbon and tritium analysis of groundwater and for analysis of the chemical composition of water associated with soil and rock. A research advisory committee, consisting of government and university personnel with an interest in isotope hydrology, will make recommendation as to specific projects.
440. WANKIEWICZ, A.C., Environment Canada (National Hydrology Res. Instit.):
Permafrost near Arctic streams, 1976-81.
- To determine heat and moisture flows within the bed and banks of an Arctic stream and their effects on streambed heaving and icing formation. The research should help in finding solutions to engineering structure and water supply problems in the Far North. Temperature profiles have been measured to a depth of 13 metres beneath the bed of streams on Melville Island in the Arctic Islands and near Inuvik, N.W.T., for a period of two years. The observations are currently being analyzed in terms of a hydrothermal simulation model and to develop a procedure for predicting the existence of unfrozen zones beneath Arctic streams.
441. WEIRICH, F., JOPLING, A.V., Univ. Toronto (Geography):
Monitoring of density flows in a lacustrine environment.
442. WEYER, K.U., Environment Canada (National Hydrology Res. Instit.):
Investigation of groundwater flow in the Pine Point region, Northwest Territories, 1977-81.
- The terms of the Joint Research Agreement with Cominco Ltd. (Pine Point Mines, Ltd.) call for an identification of regional and local groundwater movements and flow systems affecting the Pine Point area. The regional hydrogeological field work has been defined between the Caribou Mountains and the Great Slave Lake.

443. BLASCO, S.M., Geol. Surv. Can.:
Surficial geology of Lomonosov Ridge, Arctic Ocean, 1978-.
- See:**
Preliminary results of surficial geology and geomorphology studies of the Lomonosov Ridge, central Arctic Basin; Geol. Surv. Can., Paper 79-1C, p. 73-83, 1979.
444. CHASE, R.L., MURRAY, J.W., GRILL, E.V., HANSEN, K., PRICE, M.J., COOK, R., Univ. British Columbia (Oceanography, Geological Sciences):
Spreading rift valleys, Explorer and Juan de Fuca Ridges: sediments and tectonics, 1977-81; M.Sc. theses (Hansen, Price, Cook).
Three cruises have been mounted and another is planned to sample by coring Quaternary sediments in rift valleys of actively spreading oceanic ridges. Fresh basalt and hydrothermal crusts have been dredged.
445. GREENWOOD, B., Univ. Toronto (Scarborough College, Geography):
Hydrodynamics monitoring system, 1978-81.
An integrated wave and current monitoring system is being developed based upon the use of continuous resistance wave staffs, pressure transducer wave recorders and electromagnetic current meters. The sensor signals are scanned and stored with a Hewlett-Packard 3052A Data Acquisition System which has a mini-computer controller. Forty channels of data can presently be handled in either a sampling or high-speed burst mode. The system provides "real-time" data analysis. The sensor network can provide a wide range of possible configurations for the measurement of water motion in the zones of wave shoaling, wave breaking and surf-swash.
446. HALL, J.M., ZENTILLI, M.Z., REYNOLDS, P.H., Dalhousie Univ. (Geology):
Study of a 3.5 km thick section of Iceland unit, 1977-81.
See:
Crust oceanic affinity in Iceland; Nature, vol. 281, p. 347-351, 1979.
447. LEWIS, C.F.M., Geol. Surv. Can.:
Ice scouring of Continental Shelves, 1979-.
To investigate the geomorphology and sedimentology of ice scour tracks and their relationship to bathymetry, geology, oceanography and drift ice.
448. LOGAN, A., Univ. New Brunswick, Saint John (Geology):
Recent sessile invertebrate communities of cryptic habitats, Bay of Fundy and Caribbean Sea and their paleoecological significance, 1979-82.
449. MACLEAN, B., Geol. Surv. Can.:
Eastern Baffin Island shelf bedrock and surficial geology mapping program, 1976-.
See:
Geological/geophysical studies in Baffin Bay and Scott Inlet - Buchan Gulf and Cape Dyer - Cumberland Sound areas of the Baffin Island Shelf; Geol. Surv. Can., Paper 79-1B, p. 231-244, 1979.
450. MUEHLENBACHS, K., SCARFE, C.M., Univ. Alberta (Geology):
Isotopic and mineralogical study of the basaltic sea floor, 1976-82.
More than 150 basalts and separated mineral samples were analysed for $\delta^{18}\text{O}$ from Holes 417A, D and 418A. A simple model of the low temperature alteration of the oceanic crust can explain that data as well as $\delta^{18}\text{O}$ data from other DSDP and dredged basalts of known age. It is proposed that the new sea floor is open to cold sea water circulation, which weathers the basalts more or less uniformly to a depth of at least 600 meters. The massive circulation ceases after about 10 m.y. but that is sufficient time to have had the $\delta^{18}\text{O}$ of the rocks raised to about 7.5‰. Some low temperature alteration proceeds in the upper few hundred meters of the old oceanic crust but at a much slower rate and at a slightly warmer temperature causing some ^{18}O -gradients. In addition, there are highly transmissive units throughout the crust through which sea water can circulate for much longer times (25-50 m.y.).
451. RYALL, P.J.C., HALL, J.M., ZENTILLI, M.Z., REID, I., CARLSON, I., REYNOLDS, P.H., Dalhousie Univ. (Geology):
An investigation of the structure and magnetic data of upper oceanic layer on the mid Atlantic Ridge crest with the Bedford Institute electric drill, 1978-82.
452. SCHAFER, C.T., Geol. Surv. Can.:
The Newfoundland continental slope at 49°N to 50°N: nature and magnitude of contemporary marine geologic processes, 1979-.
See:
Observations on depositional environments and benthos of the continental slope and rise, east of Newfoundland; Can. J. Earth Sci., vol. 16, no. 4, p. 831-846, 1979.
453. STEARN, C.W., ROBERTS, M., McGill Univ. (Geological Sciences):
Geological role of microborring endolithic algae on a Barbados reef, 1978-80; M.Sc. thesis (Roberts).
454. UMPLEBY, D.C., Geol. Surv. Can.:
Regional subsurface geology, continental shelf and slope, offshore Labrador, Baffin Island and related areas, 1976-.
See:
Geology of the Labrador Shelf; Geol. Surv. Can., Paper 79-13, 1979.
455. VILKS, G., Geol. Surv. Can.:
Environmental geology of the deep ocean, 1979-.
To investigate the capacity of the deep ocean environment to maintain normal processes under stress imposed by exploration of waste disposal.

MINERAL/ENERGY GEOSCIENCE/SCIENCES DE LA TERRE APPLIQUÉES
AUX MINÉRAUX ET À L'ÉNERGIE

- COAL GEOLOGY/GÉOLOGIE DU CHARBON**
456. BROUGHTON, P., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.):
Tectonic controls on sand distribution in the Late Cretaceous-Tertiary coal basins of southern Saskatchewan.
See:
Sask. Geol. Surv., Summ. Investig., p. 214-221, 1979.
There are seven major coal basins in the Ravenscrag Formation (Palaeocene) in the northern Williston Basin of southern Saskatchewan. Contemporaneous crustal subsidence is not adequate to explain the origin and geometry of thick coal beds within them. Many of the coal basins are interpreted as an effect of salt solution tectonics. Leaching of up to 137 metres thickness of salt from the Prairie Evaporite (Middle Devonian) during Late Cretaceous to Tertiary time resulted in sufficient local subsidence to be structurally reflected in the 1800 to 2400 metres of overlying Palaeozoic to Cenozoic strata. Several Palaeocene coalfields accumulated above vertically stacked deltaic deposits of the Frenchman Formation (Late Cretaceous) linked to subsidence in the salt solution troughs. The initiation of thick seam deposition on the northern limb of the Williston Basin occurred in successively younger coal basins southeastward toward the cratonic depocentre in northwestern North Dakota. This was contemporaneous with the transition up-section of subsidence dominated by salt solution to one dominated by the craton. Salt solution subsidence only affected the flanking coal basin whereas that basin next to the depocentre was controlled primarily by cratonic movements. The distribution of sands and silty sands are similarly related to the structural controls that affect the accumulation of coal.
457. BROWN, T.D., GRANSDEN, J.F., JORGENSEN, J.C., PRICE, J.T., MONTGOMERY, W.J., EMR (CANMET):
Evaluation of Canadian coking coals.
See:
Coke making with Canadian medium and high-volatile commercial coking coals; CANMET Rept. 79-36, 1979.
CANMET (formerly Mines Branch) has evaluated the coking properties of Canadian coals periodically during the past fifty years, in accordance with the changes in the pattern of the market requirements for coking coals. In order to provide data which is readily acceptable by industry, technical-scale ovens of various designs have been used (along with relevant analyses and testing). In 1961, Mines Branch, through the good offices of the former Dominion Coal Board, acquired a 300-pound-capacity 12-inch movable-wall test oven. This was the beginning of a new era of studies and investigations on our Canadian coals. The facilities have expanded during the interim years to the extent that the pilot-plant equipment now comprises 3 technical-scale ovens. These ovens have been used extensively to evaluate the coking properties of western Canadian coking coals. It is generally recognized that this scale of testing is required for a realistic interpretation of the coking propensities of coals from new sources, particularly when there has been no prior history of their use for the manufacture of conventional coke. The results which have been obtained are well-known to the Japanese steel industry and are regarded as important to the extent that they have insisted, on occasion, that coal from certain seams be tested in these facilities.
458. BUSTIN, M., Geol. Surv. Can.:
Geology of mine sites, Alberta and British Columbia, 1978-.
459. CAMERON, A.R., Geol. Surv. Can.:
Petrographic examination of coking coals from the Kootenay Formation, Alberta and British Columbia, 1961-.
460. CAMERON, A.R., Geol. Surv. Can.:
Petrographic analysis of Saskatchewan lignites, 1972-.
461. CAMERON, A.R., Geol. Surv. Can.:
Relationship of reflectance to chemical rank parameters of western Canadian coals, 1979-.
462. CHURCH, B.N., MATHESON, A., HORA, Z.D., British Columbia Ministry Energy, Mines, Petrol. Res. (Geol. Div.):
Geothermal resources, 1979-.
See:
Combustion metamorphism in the Hat Creek area, British Columbia; Can. J. Earth Sci., v. 16, no. 9, p. 1882-1887, 1979.
The Hat Creek Bocanne-Buchite; Geological Fieldwork 1979, British Columbia Dep. Mines, Petrol. Res., Geol. Div., Paper 1980-1, 1980.
To focus on geothermal effects and alterations which may serve as a useful guide to the discovery and exploitation of energy and mineral resources.
463. CREANEY, S., Geol. Surv. Can.:
Optical properties of coals and dispersed organic materials, 1975-.
464. CREANEY, S., Geol. Surv. Can.:
An investigation of the semi-inert constituents of western Canadian coals, 1979-.
465. GRAHAM, P.S.W., Geol. Surv. Can.:
Evaluation of coal deposits of western Canada, 1976-.

466. HACQUEBARD, P.A., Geol. Surv. Can.: Rank and petrographic studies of coal and organic matter dispersed in sediments, 1968--.
467. HUGHES, J.D., Geol. Surv. Can.: Resource evaluation of coal deposits of western and northern Canada, 1977--.
468. KARST, R.H., WHITE, G.V., British Columbia Ministry Energy, Mines, Petrol. Res. (Geol. Div.): Coal rank distribution of northeastern British Columbia, 1979-81.
Northeastern British Columbia has six geologic formations (all Cretaceous in age) which are coal-bearing. Of these, at least three formations have the potential to support one or more coal-mining operations. The object of the study is two-fold. First is the determination of the spatial variation of coal rank within the surface (outcrop) - near-surface (subcrop) coals of northeastern British Columbia. The information obtained will be useful in assessing the quality and type of coal reserves for that portion of the province. Second, the study will determine the spatial variation of coal-rank within specific geologic formations. This information will be useful in assessing organic maturation of the sediments and the post-depositional history of British Columbia's portion of the Western Canadian Sedimentary Basin. The coal rank values will be determined petrographically by the mean-maximum reflectance values of vitrinite within the coal.
469. LONG, D.G.F., Geol. Surv. Can.: Studies of coal deposits of western and northern Canada, 1977--.
470. McLEAN, J.R., Geol. Surv. Can.: Stratigraphy and sedimentary of Blairmore Group and equivalent strata in Alberta and northeastern British Columbia, 1976--.
471. MARCHIONI, D.L., Geol. Surv. Can.: Compositional characteristics of coals from Hat Creek, British Columbia, 1977--.
472. MARCHIONI, D.L., Geol. Surv. Can.: Surface oxidation of variously ranked coals, 1977--.
473. MARCHIONI, D.L., Geol. Surv. Can.: Mineral matter and trace element content of Canadian coals, Alberta, 1978--.
474. MATHEWS, W.H., BUSTIN, R.M., Univ. British Columbia (Geological Sciences): In situ gasification of coal, a natural example, 1979-82.
475. NANDI, B.N., MacPHEE, J.A., EMR (CANMET): Behavior of different coal macerals during coal liquefaction, 1978-81.
See:
Changes within tin-containing catalyst under hydro-refining conditions; Fuel Processing Technol., vol. 2, p. 221-226, 1979.
Objective was to develop petrographic techniques to investigate the behaviour of different coal macerals during thermal and catalytic hydrogenolysis. This was accomplished by microscopically examining the residue from coal liquefaction experiments at various intermediate stages of the hydrogenolysis process.
476. NANDI, B.N., MacPHEE, J.A., CIAVAGLIA, L., EMR (CANMET): Oxidation studies and alkane distribution of eastern and western Canadian coals, 1977-81.
It has been observed by several European coal scientists that certain types of paraffinic and bituminous materials are present in coal. The bitumen content of coal influences not only the carbonization properties but the behaviour of coal during hydrogenation and partial gasification. A certain type of black material which is present in western Canadian coals gives a yellow fluorescence when a combination of a mercury lamp and a blue is used. European scientists reported that this fluorescence originated from paraffinic and bituminous materials. The generation and decomposition of petroleum-like substances in coal seams appear to have an important influence upon certain coal properties, i.e. agglomeration and coking. Various coals of eastern and western Canadian origin, including naturally weathered coals, are being extracted with different solvents and the extracted materials are being studied by gas and liquid chromatography for alkane distribution.
- Studies on the physical and chemical changes which occurred in coal during induced low-temperature oxidation are in progress.
The work done on oxidized coals concerns, in a fundamental way, the nature of the physical and chemical changes which take place - their diversity and, most important, their reversibility. A key technique used in this work is the relatively new ¹³C NMR with cross polarization and "magic angle" spinning which allows, for the first time, the determination of aromaticity of solid coal samples. Preliminary results indicate that the aromaticity of coals decreases on oxidation, which is in contradiction to the currently held theories. Further work is in progress to determine the generality of this result. Infra-red techniques, as well as other chemical methods, are being used to determine possible changes in functional groups during oxidation which are apparently responsible for the loss of coking properties. The chemical role of additives in reversing the oxidation (restoration of coking properties) is being examined.
477. PEARSON, D.E., GRIEVE, D.A., British Columbia Ministry Energy, Mines, Petrol. Res. (Geol. Div.): Distribution, structural disposition, rank and quality of coal in the East Kootenay coalfields, British Columbia, 1976-84.
See:
Rank distribution and codification pattern, Crowsnest coalfield, British Columbia; Compte Rendu, Internat. Congress. Carboniferous Strat. Geol., Urban, Illinois, 1979.
Mineral matter as a measure of oxidation of a coking coal; Fuel, vol. 58, p. 63-66, 1979.
Spontaneous carbonization of oxidized high-volatile coal by a lightning strike; Can. J. Earth Sci., vol. 17, p. 36-42, 1980.
478. RAHMANI, R.A., Alberta Research Council (Geol. Surv.): Stratigraphy, sedimentology and coal resources of the Edmonton Group (Cretaceous-Tertiary) of the Alberta Plains, 1979-83.
- INDUSTRIAL MINERAL/SUBSTANCES
MINÉRALES INDUSTRIELLES**
479. BANNATYNE, B.B., Manitoba Dep. Energy and Mines (Mineral Res. Div.): Dolomite resources of southern Manitoba, 1976-81.
See:
Dolomite resources of the southern Interlake area - preliminary maps 1979 DR-1 to DR-2 (depth to bedrock, geology and bedrock topography); Manitoba Mineral Res. Div., 1979.
Dolomitic limestone and dolomite in the Ordovician, Silurian and Devonian strata of southern Manitoba are sources of raw material for crushed stone, lime, and decorative building stone. Continued development of the area, particularly in the Winnipeg - Southern Interlake region, has made necessary a more detailed knowledge of the abundant quarriable resources of these rocks.
480. BUCHANAN, R.M., DEAN, R.S., BELL, K.E., EMR (CANMET): Alumina from non-bauxitic resources: anorthosite, nepheline syenite, argillaceous rocks, 1975-80.
See:
Canadian clay resources for alumina: Summary report; CANMET, Mineral Sci. Lab., Report MRP/MSL 79-52(IR), 1979.
A survey and appraisal of published information on anorthosite in Canada; CANMET, Mineral Sci. Lab., Report MRP/MSL 79-110(LS), 1979.
Evaluation of the Hat Creek, B.C. coal deposits as potential sources of non-bauxitic alumina: a preliminary mineralogical investigation; CANMET, Mineral Sci. Lab., Report MRP/MSL 79-138(IR), 1979.
A survey and appraisal of published information on nepheline syenite in Canada; CANMET, Mineral Sci. Lab., Report MRP/MSL 79-143, 1979.
Further work is being carried out on materials from the Hat Creek coal deposit and Fourier Transform Infrared Analysis (FTIR) is being explored as a means of making quantitative mineral analysis of clay mineral assemblages. Sampling and testing of the most promising of accessible anorthosites and nepheline syenites is underway.
481. CHRISTIE, R.L., Geol. Surv. Can.: Geology of bedded phosphate deposits in Canada, 1976--.
See:
Phosphorite in sedimentary basins of Western Canada; Geol. Surv. Can., Paper 79-1B, p. 253-258, 1979.
482. EDWARDS, W.A.D., Alberta Research Council (Geol. Surv.): Sand and gravel resources of the Canmore Corridor, Alberta, 1976-80.
See:
Sand and gravel deposits in the Canmore Corridor area, Alberta; Alberta Research Council, Earth Sciences Rep. 79-2, 1979.
The Canmore Corridor is rich in sand and gravel. Four areas could be utilized as gravel resources: the outwash terraces east of Canmore, the outwash plain at the east end of the Corridor, gravel bars in the Bow River, and alluvial fans.
The outwash terraces contain an estimated 16 million m³ (21 million yd³) of high quality gravel of which 75 percent is under overburden less than 3 m (10 ft) thick. The deposit is only 5 km (3 miles) from Canmore and is the closest deposit to Banff outside the Park boundaries. Access to the terraces is easy from Highway 1A. The high quality, large volume, lack of physical constraints on extraction, and the location of this deposit make the terraces the prime choice for gravel extraction.
The outwash plain contains a very large volume of good quality material. However, the deposit encompasses a large area, one third of which is already restricted from gravel development because of conflicting land use. The deposit is farther from both Canmore and Banff than the terraces and haul costs would be higher than from the terraces.
Extraction of gravel from the Bow River is restricted because of environmental concerns and the presence of alternative sources. No detailed investigation of river gravel was made and the deposit is not presently considered a resource.
483. EDWARDS, W.A.D., Alberta Research Council (Geol. Surv.): Sand and gravel resources of the St. Paul and Bonnyville areas, Alberta, 1977-80.
Within the area there are six sites which can supply aggregate. The largest deposit, 26 km southeast of St. Paul, contains an estimated 10,000,000 m³ of sandy gravel, another, 29 km east-southeast of St. Paul contains 5,000,000 m³ of gravelly sand. These deposits will become the major sources of aggregate for the St. Paul area. The Bonnyville area contains an abundance of granular deposits, but most is in the form of fine sand. Three sites contain over a million cubic metres of gravel. Two of these are terraces along the Beaver River, located 13 km north and 53 km northwest of Bonnyville. The third site is a fluvial bar in the Mooselake River valley, 20 km northwest of Bonnyville. Little coarse aggregate remains in the eastern portion of the Bonnyville study area and future supplies for Medley, Grande Centre and Cold Lake will have to come from the Mooselake River valley, or outside the area studied. Bonnyville will continue to get aggregate from the La Corey pit (13 km north) but with an increasing reliance on the Mooselake River valley sites.
484. EDWARDS, W.A.D., FOX, J.C., Alberta Research Council (Geol. Surv.): Sand and gravel resources of the Cold Lake area, Alberta, 1978-80.
The surficial geology of the project area was initially evaluated by aerial photo interpretation. Field checking, at a reconnaissance level (scale of field mapping - 1,50,000) of the geological units delineated followed, with particular emphasis on sand and gravel deposits of various genesis. Selected sand and gravel deposits were further investigated with auger drilling, backhoe test pits and resistivity traverses (EM-31).
Data and information accumulated will be used to estimate quantity and quality of the deposits and to indicate a possible range of uses. The latter is based only on pit run material.
485. EDWARDS, W.A.D., FOX, J.C., Alberta Research Council (Geol. Surv.): Sand and gravel resources of the Edmonton region, Alberta, 1979-81.

- To delineate and describe the sand and gravel resources in the metropolitan Edmonton region and the Highway 2 corridor as far as Lacombe. Preglacial aggregate occurs in Tertiary river channels and as highland caps. These deposits are being investigated through the establishment of a bedrock topography map which accentuates both the valleys and bedrock high. Field investigation and selected drilling is used to delineate actual deposits. Glaciofluvial and alluvial aggregate is located by airphoto interpretation and aerial surveys. These deposits are examined in pits and natural sections and by the use of drilling (auger) and resistivity surveying (EM-31).
486. HAMILTON, W.N., BAINEY, S.J., Alberta Research Council (Geol. Surv.):
Economic minerals map of Alberta, 1975-80.
All known deposits or occurrences have been compiled. Map editing is in progress. A system of coding and cross indexing to mineral deposit lists and information sources is in preparation.
487. HORA, Z.D., British Columbia Ministry Energy, Mines, Petrol. Res.(Geological Div.):
Sand and gravel resources in British Columbia, 1978-82.
Inventory to be prepared in three stages: Lower mainland, Vancouver Island and Interior British Columbia. The survey will cover the existing market areas and producing centers.
488. HORA, Z.D., British Columbia Ministry Energy, Mines, Petrol. Res. (Geological Div.):
Limestone deposits of British Columbia, 1979-81.
Geology of Davie Bay and Anderson Bay limestone deposits, structure and correlation with Marble Bay deposit, and potential of Anderson Bay deposit as a source of ornamental stone.
489. MACDONALD, D.E., Alberta Research Council (Geol. Surv.):
Marl study, 1976-78.
490. MACDONALD, D.E., MORTON, R.D., Alberta Research Council (Geol. Surv.), Univ. Alberta (Geology):
Phosphate evaluation study, 1978-81; M.Sc. thesis (Macdonald).
To evaluate the resource potential of phosphate rock in Alberta, primarily as an industrial mineral commodity and secondarily as a possible source of uranium. Half a summer's fieldwork was completed last year in which sections of the Exshaw (Mississippian), Rocky Mountains (Permian), Sulphur Mountain (Triassic) and Fernie (Jurassic) Formations (and Groups) were examined and sampled for phosphate. Most of the Foothills - Front Ranges areas (in Alberta) were examined except for the area south of Kananaskis Provincial Park.
491. McLAWS, I.J., Alberta Research Council (Geol. Surv.):
Silica sand in the Fort McMurray area, Alberta, 1973-78.
See:
Alberta Research Council, Econ. Geol., Rep. 6, 1979.
Tailings sands, waste sand from the processing of the Athabasca Oil Sands, average 95 to 98 percent silica (SiO₂) in the raw bulk samples. These sands, together with other high quartz sands in the Fort McMurray area including McMurray Formation sands where the formation is not impregnated with bitumen, alluvial (bedrock channel) sands from the Clearwater River valley, and dune sands, were studied for their potential as a source of silica sand for glass manufacture and other uses.
The main contaminants of the tailings sands are the residual oil film, the "fines," the iron content, and mica. After beneficiation, the tailings sands analyzed 98 to 99 percent silica (SiO₂), with iron contents of 0.02 to 0.04 percent Fe₂O₃, well within range for high quality glass manufacture. Mica is present in minor amounts but may not have to be removed.
The alluvial (bedrock channel) sands, located within easy access of Fort McMurray, are also a good potential source of high quality silica sand. After beneficiation, silica (SiO₂) is over 98 percent and iron content (Fe₂O₃) is 0.03 to 0.05 percent. Iron is the main contaminant; mica is not present. These sands are well sorted and within the specified size range for glass and glass fiber manufacture.
- The non bitumen-saturated McMurray Formation sands are very high in quartz, ranging from 97 to 98 percent SiO₂ and have iron contents as low as 0.01 percent Fe₂O₃ after beneficiation. Mica is a major problem and would have to be removed to bring these sands to glass grade quality. Exploitation is uncertain as overburden is thick in many localities, and access difficult. Overall, the unsaturated McMurray Formation sands are not considered a potential source of silica sand.
492. PETERSON, B.N., Alberta Research Council (Geol. Surv.):
Sand and gravel resources of the Grande Prairie area, Alberta, 1977-80.
Nearly all of the major sources for concrete and road construction aggregate in the area are from terraces associated with the Wapiti and Smoky Rivers. These gravels generally tend to be poorly sorted and consist of over 50 percent subangular to rounded quartzite clasts.
Extensive sand dunes have developed south of Grande Prairie and in other areas along the Wapiti River, but their very fine grained nature makes them useful only as fill material. A fine to medium grained beach sand deposit is located approximately 30 km northeast of Grande Prairie and is presently being used on a minor scale. Other beach deposits were found in the area but they generally are less than 1 m thick and not extensive in area.
Auger drilling of most of the gravels in the Grande Prairie area was not practical due to the coarse, dense nature of the material, however, the Becker Hammer Drill was very successful in penetrating and recovering samples of these coarse alluvial gravels. An average penetration rate of 7 m per hour was realized.
493. PETERSON, B.N., Alberta Research Council (Geol. Surv.):
Sand and gravel resources of the Whitecourt area, Alberta, 1978-80.
Five types of sand and gravel deposits were mapped in the Whitecourt area: coarse gravel terraces along the Athabasca and MacLeod Rivers; isolated occurrences of sheared preglacial gravels; cobbly Tertiary gravel capping Whitecourt Mountain (south of town); coarse, very stony, washed till in the northeast portion of the area, and medium- to fine-grained dune and deltaic sands south of the Athabasca River.
The terraces are the major deposits in the area and supply the concrete, construction, and road building needs of the area. They are composed of well-rounded quartzite pebbles and cobbles and contain a high percentage of gravel. Hammer drilling of the terraces (40 holes) was undertaken to establish their thickness and stratigraphy. The preglacial and washed till deposits are used for local road maintenance.
494. PETERSON, B.N., Alberta Research Council (Geol. Surv.):
Sand and gravel resources of the Valleyview area, Alberta, 1978-80.
The area mapped around Valleyview has little present and no potentially developable gravel resources; small point bar deposits on the Little Smoky River are now depleted and beach deposits south and east of Sturgeon Lake are composed of medium-grained sand.
495. PETERSON, B.N., Alberta Research Council (Geol. Surv.):
Sand and gravel resources of the Lloydminster-Wainwright area, Alberta, 1979-81.
Seven of fifteen 1:50 000 NTS sheets were surveyed during the first season of this two-year project.
The largest concentrations of granular material in the area studied in the 1979 field season occur as sheets of fine-medium grained outwash sand. This sand has limited usage in the area. A few localized concentrations of coarser material (gravel size) occur within these outwash deposits but do not amount to a significant source of coarse aggregate.
The major source of gravel in the area is along former meltwater channels. These deposits, which occur in limited amounts, supply the needs for road construction and asphalt in the area but are not of high enough quality for concrete production.
Minor amounts of gravel occur in ice contact features such as kames, eskers and occasionally in crevasse fillings. These gravels are also of less than concrete quality.
496. RICKETTS, R., KIRBY, F., VANDERVEER, D.G., Newfoundland Dep. Mines and Energy (Mineral Develop. Div.):
Inventory of aggregate resources, 1978-81.
See:
Inventory of aggregate resources in Newfoundland and Labrador; Newfoundland Dep. Mines and Energy, Rept. 79-7, 1979.
Inventory of aggregate resources; Newfoundland Dep. Mines and Energy, Rept. 79-1, p. 197-200, 1979.
Sampling has been completed along 95% of the 6 km wide corridor study area (parallel all major transportation routes) in insular Newfoundland and along a similar corridor along the Goose Bay to Esker road in Labrador. In addition helicopter reconnaissance surveys were conducted between Gull Island and Forteau, between Twin Falls and Labrador City - Wabush and along the proposed road from North West River to the Kitts-Michelin uranium development site. A total of 3039 samples (1058 gravel, 745 sand, 46 silt, 68 clay, 236 rock, 884 till, and 2 organics) were collected during the 1979 field season.
The zones of granular potential within the study area are being compiled onto 1:50,000 and 1:250,000 scale maps. A summary of the geology particularly in relation to its geotechnical properties for quarry activity is being prepared on 1:250,000 scale maps for the study area. Releases of available data is planned for early 1980.
497. RINGROSE, S.M., NIELSEN, E., LARGE, P., MATILE, G., GROOM, H., Manitoba Dep. Energy and Mines (Mineral Res. Div.):
Quaternary geology and gravel resources of selected portions of Manitoba.
Reports and maps will include the Quaternary geology and gravel resources of the Portage-Winkler, Island Lake, Whiteshell and The Pas areas. Mapping includes: 1) a 1:250,000 series of Quaternary maps for southern Manitoba; 2) a 1:1 000 000 Quaternary geology deposit map of Manitoba; and 3) Quaternary maps around northern towns.
498. SCAFE, D.W., HAMILTON, W.N., Alberta Research Council (Geol. Surv.):
Potential industrial clays of Alberta, 1973-80.
The enthusiasm previously expressed for the good potential of material from the Luscar Formation, cannot be maintained in the Grande Cache or Cadomin areas. Fragile bars are produced because most samples show little plasticity and with minor exceptions the firing range is extremely short. Also, the previously mentioned appealing chocolate fired color usually is absent. The Lea Park Formation in east-central Alberta has good plasticity and working properties in its shales but bars warp and crack on drying, and extruded bars bloat badly on firing. No significant improvement is made in the firing characteristics when bars are hand molded. This formation is of little value as a source of ceramic material. Samples from the Kaskapau Formation taken at Dunvegan Crossing and near Grande Cache dry and fire better than samples taken previously to the north of these locations. Blending with other clays to improve drying and firing characteristics would be necessary in order to use material from the Dunvegan Formation. In northwestern Alberta the Shaftesbury Formation has minor drying problems and bars crack badly on firing. Material from this formation probably is of no value for ceramic production.
499. SHETSEN, I.P., Alberta Research Council (Geol. Surv.):
Sand and gravel resources of the Calgary area, Alberta, 1978-80.
The field work has been done for the most part of the area in the summer of 1979. The sand and gravel deposits were mapped at a scale of 1:50 000. Over 500 dry auger and Becker Hammer drillholes provided the information on the extent and thickness of gravel-bearing deposits. The preliminary geologic and gravel maps will be completed in the spring of 1980 at a scale of 1:50 000.
500. TELFORD, P.G., JOHNSON, M.D., HODGSON, C.B.P., Ontario Geol. Surv.:
An assessment of the limestone-dolostone resources of Manitoulin Island, Ontario, 1978-83.
See:
Ontario Geol. Surv., Misc. Paper 90, p. 158-161, 1979.

- The geology of Manitoulin Island is being studied with the objective of producing maps showing the distribution of Paleozoic rocks according to their physical and chemical properties, and applicability as construction materials, rather than their stratigraphic relationships.
- Manitoulin Island contains an approximate 1,000 feet sequence of Ordovician and Silurian limestones, dolostones, and shales. Thus far, emphasis has been placed on the mapping and analysis of the Silurian dolostone units as they display the greatest potential for crushed stone resources. In 1979, fieldwork was carried out in the eastern part of the island within the Little Current, Manitowaning, and Providence Bay 1:50,000 NTS map areas. During the fall of 1978 and 1979, 16 drillholes were completed and about 2,400 feet of core obtained for petrographic, chemical, and micro-paleontological analysis. The engineering properties of core from selected drillholes are also being assessed.
501. TROYER, R., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.):
Peat resource study, 1978-.
- See:**
Sask. Geol. Surv., Summ. Investig., p. 206-213, 1979.
Sask. Geol. Surv., Summ. Investig., p. 156-160, 1978.
- Past activities included: 1) formation of a library of articles, reports, journals and texts on peat; 2) compilation of a "Potential Peat Areas of Saskatchewan" map from 1 inch to 1 mile air photo interpretation; 3) minor sampling of peat deposits in order to establish the logistics of a peat survey and to evaluate a variety of peat samplers and an all-terrain vehicle; and 4) conduct of a detailed survey and analysis of six peat deposits in east-central Saskatchewan.
- In March 1979, Montreal Engineering Co. Ltd., under a Federal-Provincial contract completed a six-month assessment of the technical and economic feasibility of energy peat utilization in northern Saskatchewan. The report discusses the composition and distribution of the peat deposits in Saskatchewan with particular reference to distances from the communities selected for study. One of the preferred areas outlined in this report, the Buffalo Narrows, Beauval, Ile-a-la-Croise, Canoe Narrows Region, was selected for study during the summer of 1979.
- MINERAL DEPOSITION EXPLORATION/
EVALUATION/RECHERCHE ET ÉVALUATION
DES GÎTES MINÉRAUX**
502. APPELBYARD, E.C., Univ. Waterloo (Earth Sciences):
Wall-rock alteration at the Currawang deposit, Tarago, New South Wales, Australia, 1979-80.
503. BARNES, S.J., NALDRETT, A.J., Univ. Toronto (Geology):
Origin of platinum-palladium mineralization in the Stillwater Complex, Montana, 1979-82; Ph.D. thesis (Barnes).
- Involves detailed field and underground mapping, core logging, microprobe analysis of silicate and sulphide minerals in, above and below main ore zone; neutron activation analyses for PGE and associated elements in ore zone and other sulphide horizons within the complex.
504. BELL, R.T., Geol. Surv. Can.:
Geology of uranium resources of Canada, 1975-.
505. BRISTOL, C.C., Brandon Univ. (Geology):
Alteration geochemistry of the Centennial Orebody, Flin Flon, Manitoba, 1978-81.
- A search for additional elements and factors of use in discriminating between non-economic and economic Precambrian volcanogenic sulphide deposits.
506. BURTON, D.M., McALLISTER, A.L., Univ. New Brunswick (Geology):
Geology of the Cam-Kerr pegmatitic uranium deposit, Bancroft, Ontario, 1978-80; M.Sc. thesis (Burton).
- Geological mapping in the Adit workings was completed on a scale of 1" = 50' and is continuing on a scale of 1" = 20'. 10,000' (feet) of core has been relogged and 1500 lbs. of rock samples was shipped to New Brunswick for geochemical analyses and petrographic investigation. The aim is to carry out a petrological study and to relate the uranium mineralization to the distribution of country rocks in terms of ore genesis and original environment of deposition.
507. CARTER, T.P., CLOVINE, A.C., FAWCETT, J.J., Univ. Toronto (Geology):
The geology and genesis of carbonate hosted Cu-Sb-Au-Ag mineralization in the Lavant-Darling area, southeastern Ontario, 1977-80; M.Sc. thesis (Carter).
- Work completed to date indicates that the mineralization was originally deposited as synsedimentary sulfides in the host marbles, and was remobilized and redeposited in its present form as a result of regional metamorphism. Fluid inclusion studies will help determine the P-T conditions of deposition of the quartz-dolomite veins. The results of the project will aid in establishment of a more reliable model for metallogenesis in the Grenville Province of southeastern Ontario.
508. CHUTE, M.E., AYRES, L.D., Univ. Manitoba (Earth Sciences):
Emplacement of a porphyritic sill suite in the Missi Island volcanic centre and its associated alteration and mineralization, 1975-81; Ph.D. thesis (Chute).
509. COOMBE, W., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.):
Mineral deposits and regional metallogeny, southeastern shield.
- See:**
Sask. Geol. Surv., Summ. Investig., p. 120-133, 1979.
- Advances in the understanding of the regional geology of the southeastern Churchill Province, have led to a clearer picture of the lithological and tectonic framework of the area and enable a preliminary review of the metallogeny of the area. In general, metal deposition is largely confined to the Apebian rocks. Metamorphism and deformation during the Hudsonian orogeny have modified the majority of deposits, and may have been a major factor in concentrating some metals. Within the eastern area mineral deposits are generally restricted to the volcano-plutonic belts. Deposits of Au, Ni, Cu-Zn and Pb-Zn are widespread and the majority of the deposits can be classed broadly as 'volcanogenic'. Mineral deposits are much more restricted in the western area. Deposits of Cu-U and Zn-Pb are generally hosted by meta-arenites and can be broadly described as 'sedimentogenic'.
510. COSTA, U.R., HUTCHINSON, R.W., Univ. Western Ontario (Geology):
Geochemical study of footwall alteration and zoning at Mattagami Lake Mine, Matagami, Québec, 1976-80; Ph.D. thesis (Costa).
511. COUSINEAU, P., CIMON, J., Québec Ministère Énergie et Ressources:
Le Tungstène au Québec, 1979-80.
- Compilation des indices de tungstène connus au Québec et évaluation du potentiel du Québec en tungstène par région.
512. DAGBERT, M., HOULE, A., Ecole Polytechnique (Génie minéral):
Fiabilité des réserves radiométriques dans les gisements d'uranium, 1979-81; thèse de maîtrise (Houle).
- Revue des méthodes disponibles pour estimer la teneur chimique d'un bloc dans un gisement d'uranium à partir des teneurs radiométriques des échantillons autour du bloc. Extension du cokrigage au cas lognormal (cokrigage lognormal) et général (cokrigage disjointif). Effet d'une coupure radiométrique sur les réserves chimiques.
513. DAWSON, K.R., Geol. Surv. Can.:
Geology of chromium deposits of Canada, 1970-.
514. DAWSON, K.R., Geol. Surv. Can.:
Geology of barium, fluorine and strontium deposits in Canada, 1972-.
515. DiLABIO, R.N.W., Geol. Surv. Can.:
Drift prospecting methods and models, 1978-.
- See:**
Initial geochemical results and exploration significance of two uraniumiferous peat bogs, Kasmere Lake, Manitoba; Geol. Surv. Can., Paper 79-1B, p. 199-206, 1979.
516. DUNSMORE, H.E., Geol. Surv. Can.:
Geology of uranium resources of Canada, 1976-.
517. EKSTRAND, O.R., Geol. Surv. Can.:
Geology of Canadian nickel and platinum group deposits, 1963-.
- See:**
Mineral assemblage polarity in magmatic sulphide blebs in a komatiitic nickel deposit; Geol. Surv. Can., Paper 80-1A, p. 385-389, 1980.
518. GANDHI, S.S., Geol. Surv. Can.:
Geology of uranium resources of Canada, British Columbia - District of Mackenzie, 1977-.
519. GAUTHIER, M., Ecole Polytechnique (Génie Minéral), Québec Ministère Énergie et Ressources:
Métallogénie du zinc dans la région de Maniwaki, Québec, 1977-82; thèse de doctorat.
- Voir:**
Minéralisation de zinc dans la région de Maniwaki; Québec Ministère des Richesses Naturelles, DP-599, 1979.
520. GODWIN, C.I., EATON, D., Univ. British Columbia (Geological Sciences):
Geology of uranium deposits associated with the Tombstone stock, west-central Yukon, 1979-81; M.Sc. thesis (Eaton).
521. GODWIN, C.I., GORZYNSKI, C., Univ. British Columbia (Geological Sciences):
Geology of the cirque stratiform Pb-Zn-Ba deposit, northeastern British Columbia, 1980-; M.Sc. thesis (Gorzynski).
522. GODWIN, C.I., THORSTAD, L.E., Univ. British Columbia (Geological Sciences):
Regional setting of the Kutcho Creek volcanogenic deposit, north-central British Columbia, 1979-81; M.Sc. thesis (Thorstad).
523. HAMILTON, W.N., Alberta Research Council (Geol. Surv.):
Geology of the Clear Hills iron formation, Alberta, 1974-81.
- All drill hole and outcrop data have been compiled. Detailed correlations have been established. Petrologic studies are planned.
524. HARPER, C.T., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.):
Uranium metallogenetic studies: Maurice Bay area, geology and mineralization, 1978-.
- See:**
Sask. Geol. Surv., Summ. Investig., p. 96-106, 1979.
Sask. Geol. Surv., Summ. Investig., p. 74-83, 1978.
- The Maurice Bay project, begun in 1978 in informal cooperation with the Saskatchewan Research Council continued during 1979 with the following investigations: 1) finalization of 1:50 000 scale geological map (74N5) of the area surrounding the Maurice Bay uranium deposit; 2) logging and sampling of diamond drill core from the deposit and the area adjacent. A 34 hole section across the Maurice Bay deposit (Main zone) along profile 107+25E from 100+50N to 102+80N, then northeasterly across B and A zones to 105+20N on section 110+00E, then north along 110+00E to 106+50N, was examined; 3) systematic collection of samples across the Main zone for trace metal and whole rock geochemical analyses; and 4) examination and sampling of core, obtained by Eldorado Nuclear Limited from 43 drill holes extending from Ness Bay to about 10 km northeast of Lobstick Island, to gather data on the depth to and nature of the basement rocks.
- In conjunction, M. Mellinger of the Saskatchewan Research Council, made detailed observations of alteration and mineralization and their interrelationships and assembled material for mineralogical, chemical and other studies.
525. IMREH, L., HAINCE, S., HEBERT, R., WILSON, C., LECLERC, A., LAURIN, J., Québec Ministère Énergie et Ressources:
Gtologie prévisionnelle des roches volcaniques du N.O.Q. région 08, 1972-84.
- Voir:**
Lithostratigraphie et roches ultramafiques du secteur de Val-d'Or-Amos; Ass. Geol. Can., Excursion A-4 (livret-guide), Québec, p. 1-40, 1979.
Gtologie prévisionnelle, rapport d'analyse; Min. de l'Industrie et du Commerce, Bur. de la statistique du Québec (B.S.Q.), 1979.
- La définition des facteurs de contrôle lithostratigraphiques, structuraux, pétrochimiques et volcanologiques des minéralisations associées aux volcanites constitue l'objet principal de ce projet. Le but a été atteint relatif aux minéralisations associées aux laves ultramafiques.

- Dès 1978 le travail fut étendu aux régions du volcanisme pyroclastique acide et effusif mafique. Jusqu'à 1984, au cas où les moyens d'investigation seront maintenus, la quasi-totalité sud de l'Abitibi-est sera ré-interprété. L'édition systématique des nouvelles cartes au 1/50 000 débutera le cas échéant en 1980 et celle des cartes au 1/20 000 en 1981.
526. JURAS, S.J., BACHINSKI, D.J., Univ. New Brunswick (Geology): Stockwork sulfide mineralization, Brunswick No. 12 Mine, New Brunswick, 1978-80; M.Sc. thesis (Juras).
Stringer/stockwork sulphide zones underlying the Brunswick Mining and Smelting No. 12 deposits have been examined in underground workings and drill core. Sampling is complete. The principal stringer/stockwork sulphides are pyrite, pyrrhotite and chalcocite though in places significant sphalerite and lesser galena are present. Early minor phases of mineralization (footwall metasediment-located) are characterized by pyrite, sphalerite, lesser chalcocite and trace galena probably predating the main phase of mineralization at Brunswick No. 12. A probable brine discharge site has been identified in the southern portion of the original Brunswick No. 12 depression. Felsic submarine metapyroclastic rocks in this area are altered. Work continues on documenting the extent of mineralogic change attendant on brine-rock interaction. Two to three other possible discharge sites have been identified but lack of underground development and drilling currently precludes establishing the relationship between these areas and the southern site.
527. KIRKHAM, R.V., Geol. Surv. Can.: Geology of copper and molybdenum deposits in Canada, 1970-.
See:
Copper in iron formation; Geol. Surv. Can., Paper 79-1B, p. 17-22, 1979.
528. KWONG, Y.T.J., GREENWOOD, H.J., Univ. British Columbia (Geological Sciences):
A new look at the Afton copper deposit, south-central British Columbia, in the light of mineral distributions and mineral-solution equilibria, 1978-80; Ph.D. thesis (Kwong).
The Afton copper deposit in south-central British Columbia lies in the northwestern extremity of the hypabyssal Iron Mask pluton emplaced in contemporaneous Upper Triassic Nicola volcanic rocks. It is unique among other porphyry copper deposits in its high native copper content and apparent lack of supergene enrichment. This project aims at exploring for an explanation for such unusual phenomena and the reconstruction of the supergene alteration based on mineral-solution equilibria considerations.
Whereas the fine-grained, highly fractured and altered nature of the host rocks defies easy identification, detailed pit mapping, petrographic studies of over 200 specimens and x-ray diffractometry work on blasthole samples enable delineation of zoning patterns of both primary and secondary minerals. Of special interest is an intense carbonate alteration particularly obvious in the western portion of the orebody. The alteration is probably deuteric in origin. Its presence could have effectively controlled the pH during the supergene event.
About 100 whole rock analyses on samples from the orebody and its vicinity afford estimation of gross elemental exchange accompanying alteration. They also shed light on the possibility of hypogene mineralization being related to magmatic differentiation and immiscibilities.
Electron microprobe analyses are in line for precise determination of mineral compositions. After establishing the nature of hypogene mineralization and the mineral assemblages at various stages of alteration, a thermodynamic approach to the reconstruction of the supergene alteration processes will be attempted.
529. LEDUC, M., CIMON, J., Québec Ministère Energie et Ressources: Projet MO - Preissac, 1979-80.
Définir l'environnement géologique et structural dans lequel se situe la minéralisation de molybdène - Bismuth de la région de Preissac - La Motte - Poursuite prévue en étendant les travaux à l'est.
530. LYDON, J.W., Geol. Surv. Can.: Geology of lead and zinc resources of Canada, 1977-.
See:
Genetic control of Selwyn Basin stratiform barite/sphalerite/galena deposits: An investigation of the dominant mineralogy of the Tea deposit, Yukon; Geol. Surv. Can., Paper 79-1B, p. 223-229, 1979.
531. MacINTYRE, D.G., British Columbia Ministry Energy, Mines, Petrol. Res. (Geol. Div.): Driftpile Creek and Akie River Project, British Columbia, 1979-82.
A regional mapping project was initiated in the Driftpile Creek and Akie River districts of northeastern British Columbia during the 1979 field season to obtain additional information on the stratigraphic and structural setting of recently discovered shale-hosted barite-lead-zinc-silver occurrences of Devonian age. More detailed mapping, concentrating on delineation of sedimentary facies within the Devonian succession, is planned for the 1980 field season.
532. MEYN, H.D., Ontario Geol. Surv.: Iron deposits of Ontario, 1974-.
533. MEYN, H.D., Ontario Geol. Surv.: The uranium deposits of the southern Cobalt embayment, 1979-81.
See:
Ontario Geol. Surv., Misc. Paper 90, p. 218-221, 1970.
534. NELSON, G.E., BACHINSKI, D.J., Univ. New Brunswick (Geology):
Volcanic stratigraphy and mineralization in the Austin Brook - Brunswick No. 6 area, New Brunswick, 1979-81; M.Sc. thesis (Nelson).
Volcanic stratigraphy and alteration of submarine felsic metapyroclastic rocks (ashflow, ash fall, epiclastics) underlying stratobound volcanogenic massive sulfide ores at Brunswick Mining and Smelting No. 6 mine and Austin Brook are being studied by field, petrographic and petrochemical means. Recent deep drilling in this sector of the Bathurst district provides an enhanced opportunity to document relationships between the oxides and sulfides at Austin Brook and BMS No. 6.
535. PANTELEYEV, A., British Columbia Ministry Energy, Mines, Petrol. Res. (Geological Div.): Geology of the Cassiar map-area, British Columbia, 1978-80.
536. PEARSON, J.G., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.): Flin Flon gold prospects, Saskatchewan, 1979-.
See:
Sask. Geol. Surv., Summ. Investig., p. 145-151, 1979.
The Flin Flon-Amisk Lake area gold occurrences are being re-examined in detail. In 1979 work was concentrated in the Douglas Lake-Wekach Lake area, which includes two former gold producing mines and six prospects. Because of the close proximity of these occurrences the area was mapped at a scale of 1:4,800 (1 inch = 400 feet) with aerial photographic enlargements. Samples of representative rock types have been sent for major and trace element analysis.
537. RANKIN, L.D., McALLISTER, A.L., DAVIES, J.L., Univ. New Brunswick (Geology):
Comparison of the Murray Brook - Restigouche sulphide zones, Bathurst, New Brunswick, 1977-80; M.Sc. thesis (Rankin).
The area between the two sulphide bodies has been mapped in detail. The ore zones have been re-examined by logging available drill cores. The sulphide bodies have been placed in their respective horizons. The general features of the ore bodies in terms of structures, stratigraphy and mineralogy have been established.
538. ROBERTSON, J.A., GORDON, J.B., Ontario Geol. Surv.: Uranium deposits of Ontario, 1975-82.
See:
Uranium mineralization and its controls in the immediate Bancroft area; Ontario Geol. Surv., Misc. Paper 90, p. 190, 191, 1979.
539. ROBINSON, D.J., HUTCHINSON, R.W., HODDER, R.W., KERRICH, R., FLEET, M.E., Univ. Western Ontario (Geology):
Petrogenesis of an Archean volcanic igneous stratabound massive nickel sulphide deposit and komatiitic rocks from Redstone, Eldorado Township, Ontario, 1978-81; Ph.D. thesis (Robinson).
See:
Field relations and geochemistry of Au, Ni and Cr deposits in ultramafic-mafic volcanic rocks; Geoscience Res. Seminar, Abstracts, Ontario Geol. Surv., 1979.
A petrological and geochemical examination of a recently discovered Archean volcanic massive nickel sulphide deposit near Timmins, Ontario. The objectives of the research are: 1) documentation of texture and composition of host rocks, sulphide mineral assemblages and alteration; 2) a comparison of the Redstone deposit to other unmineralized ultramafic belts within the immediate area; 3) an interpretation of the Ni genesis of the deposit and its significance in regional geology; 4) a discussion on regional metamorphic and contact metasomatic assemblages; and 5) a statement on the application of descriptive and analytical studies to exploration for additional occurrences of this nature.
540. ROSCOE, S.M., Geol. Surv. Can.: Metallogeny of the northwestern part of the Canadian Shield, 1977-.
541. ROSE, E.R., Geol. Surv. Can.: Geology of titanium and titaniferous deposits of Canada, 1958-80.
542. ROSE, E.R., Geol. Surv. Can.: Geology of rare earth deposits of Canada, 1967-80.
543. RUZICKA, V., Geol. Surv. Can.: Geology of uranium and thorium resources of Canada, 1975-.
544. SANGSTER, D.F., Geol. Surv. Can.: Geology of lead and zinc deposits in Canada, 1965-.
545. SCHROETER, T.G., British Columbia Ministry Energy, Mines, Petrol. Res. (Geol. Div.): Economic geology studies, British Columbia.
Examination and study of lode gold-silver deposits in northwestern British Columbia: Chappelle, Lawyers, Goosly, Capoose, Babe, Queen Charlotte Islands, and Big Missouri; porphyry \pm Cu \pm Mo prospects in northwestern British Columbia; and massive sulphide prospects, especially the Tulsequah area.
546. SCOTT, P.M., COLWELL, J.A., MACDONALD, A.S., Acadia Univ. (Geology):
Geochemistry and petrography of the Yava Mines lead deposit, Cape Breton Island, Nova Scotia, 1979-80; M.Sc. thesis (Scott).
547. SINCLAIR, W.D., Geol. Surv. Can.: Geology of copper and molybdenum resources of Canada, 1977-.
548. SMEE, B.W., Geol. Surv. Can.: Development and/or adaptation of mineral exploration approaches to clay covered areas, 1977-.
See:
The stability of some anions in natural water samples; Geol. Surv. Can., Paper 79-1B, p. 137-146, 1979.
549. STEGER, H.F., SABOURIN, R.G., EMR (CANMET): Oxidation of sulfide minerals, 1973-80.
See:
Oxidation of sulphide minerals. VI. Ferrous and ferric iron in the water-soluble oxidation products of iron sulphide minerals; Talanta, vol. 26, p. 455, 1979.
A report on the study of the effect of various temperatures and relative humidities on the oxidation of pyrrhotite is being prepared.
550. SUTHERLAND, I.G., McCARTER, P., STUDEMEISTER, P., COLVINE, A.C., Ontario Geol. Surv.: Early Precambrian porphyry deposits.
See:
Ontario Geol. Surv., Misc. Paper 90, p. 230-243, 1979.

- Focus is on detailed documentation of the nature, extent and economic potential of copper, molybdenum and/or gold mineralization in the vicinity of apparent early Precambrian porphyry-type deposits in Ontario. Also of particular interest are the possible relationships between this mineralization and the intrusive body(ies) and wallrocks as well as characteristics of these host rocks.
551. SWINDEN, H.S., Newfoundland Dep. Mines and Energy (Mineral Res. Div.):
A study of the economic geology of the Hermitage flexure, Newfoundland, 1979-81.
To investigate the economic geology and metallogeny of the Hermitage flexure area, southern Newfoundland. Mineralization related both to Ordovician volcanism and to later granitoid intrusion is present in the area and it is the purpose of this project to investigate the known mineral occurrences, classify them as to origin and develop a model for metallogeny in this region.
552. THOMPSON, J.F.H., NALDRETT, A.J., Univ. Toronto (Geology):
The intrusion and crystallization of gabbros, central Maine, and genesis of their associated sulphides, 1978-81; Ph.D. thesis (Thompson).
553. THORPE, R.I., Geol. Surv. Can.:
Geology of silver and gold deposits in Canada, 1968-.
554. TREMBLAY, L.P., Geol. Surv. Can.:
Geology of uranium resources of Canada, 1975-.
555. VALLIANT, R.I., HUTCHINSON, R.W., Univ. Western Ontario (Geology):
Genesis and place in volcanic stratigraphy of the Bousquet Gold Mine, Northwestern Québec, 1977-80; Ph.D. thesis (Valliant).
The Blake River Group of volcanic rock has been mapped in the north half of Bousquet township and a detailed geological survey conducted on the Bousquet Mine Property. Stratabound, quartz, muscovite and pyrite rich chemical sedimentary rocks hosting gold mineralization occur within pyroclastic and volcanoclastic sedimentary units of the Blake River Group. A detailed study of the gold bearing rock is in progress using geologic, petrographic and geochemical techniques. A manganese-garnet-bearing horizon underlying the Au-orebody is also being studied to determine its relationship to Au-mineralization.
556. WATSON, G.P., MCALLISTER, A.L., HALE, W.E., Univ. New Brunswick (Geology):
Wallrock alteration at Lake George Antimony Mine, York County, New Brunswick, 1977-80; M.Sc. thesis (Watson).
Study of major and minor element variations in wallrock alteration zone surrounding quartz-stibnite veins at Consolidated Durham Mines and Res. Ltd.'s Lake George antimony mine. Chemistry and mineralogy of alteration zone, general geology of the deposit, nature and structure of Silurian host metasediments, mineralogy and paragenesis of ore minerals.
557. WILKINSON, S.J., GORDON, J.B., Ontario Geol. Surv.:
Gold deposits of the Atikokan area, Ontario, 1978-80.
See:
Ontario Geol. Surv., Misc., Paper 90, p. 208-212, 1979.
Three types of gold mineralization occur in the Atikokan area: 1) veins of quartz (\pm carbonate) within shear zones associated with major lineaments in the Marmion Lake batholith; 2) veins of quartz and carbonate located at or near the contact of batholiths with metavolcanic belt; and 3) stratabound mineralization contained within metavolcanic belt.
Seventeen gold occurrences have thus far been investigated by detailed geological mapping and sampling. Continued research will consist of geochemical analysis of host rocks and mineralization and regional interpretations based upon air photo interpretation and existing geological maps. The final report will consist of descriptions of each occurrence, discussions on deposit, genesis, and suggestions for prospecting aids.
558. WILSON, H.D.B., DUKE, N., GABOURY, B., KNIGHT, D., Univ. Manitoba (Earth Sciences):
Metamorphosed chemical sediments and ore deposits, 1975-; Ph.D. theses (Duke, Gaboury), M.Sc. thesis (Knight).
See:
Copper-nickel bearing rocks of the Precambrian; USSR Acad. Sci. - U.N. Sem. Moscow Aug. 1979, p. 1-28, 1979.
A large proportion of the ore deposits in gneissic terrain occur in a characteristic stratigraphic system. Recognition of this stratigraphy is one key to area selection for exploration of gneissic terrain. The stratigraphic section begins with a gneissic basement consisting mainly of granite and paragneiss derived from preexisting sialic material, followed by an unconformable supracrustal sedimentary series consisting of a lower group, now composed of monotonous quartz-feldspar-biotite gneiss, and an upper chemical group containing biotite-sillimanite-garnet-gneiss, quartzite, carbonate rocks, and iron formation. The supracrustal series usually also contains amphibolite derived from basalt, and generally conformable intrusions ranging from gabbro to dunite. The metamorphism of the supracrustal series is a second metamorphism which may also result in extensive intrusion of younger granites.
The sedimentation, intrusion, and metamorphism result in a number of mineral facies which may produce large ore deposits. These facies include a sedimentary sulphide facies (Broken Hill, Geco, Gamsburg, Balmat); sedimentary zinc and manganese oxide, silicate, or carbonate facies (Franklin, Amapa); igneous facies with Ni-Cu (Thompson, Botswana); igneous facies with Cu (O'okiep); igneous chromite facies (Fiskanaeset, Bird River); and hydrothermal facies (Messina).
The ore deposits are most commonly closely associated with the sillimanite gneiss, but may also occur in carbonate, iron formation, or quartzite horizons.
- PETROLEUM EXPLORATION/EVALUATION/
RECHERCHES ET ÉVALUATION DES
GÎTES PÉTROLE**
559. AMAJOR, L.C., LERBEKMO, J.F., Univ. Alberta (Geology):
Depositional analysis of the Viking Formation in Alberta, 1978-80; Ph.D. thesis (Amajor).
The log and core study has been completed, including the drawing of necessary cross-sections and isopach maps. The thesis text is currently being written.
560. BARNES, C.R., LEGALL, F., BARKER, J.F., FRITZ, P., Univ. Waterloo (Earth Sciences):
Source, correlation and thermal maturation history of hydrocarbon mineral deposits of southern Ontario, 1978-82.
561. BENNION, D.W., DONNELLY, J.K., MOORE, R.G., HADJITOFI, M., Univ. Calgary (Chemical Engineering):
Pyrolysis and oxidation kinetics of Marguerite Lake bitumen, 1979-82.
To develop mathematical descriptions of both the pyrolysis and oxidation processes for Marguerite Lake bitumen. The mathematical descriptions will be in a form suitable for incorporation into a numerical simulator of the in-situ combustion process. The equipment and procedures for pyrolysis have been fully tested. Oxidation kinetics equipment is presently under construction.
562. CREANEY, S., Geol. Surv. Can.:
The relationship between kerogen type (known petrographic rank) and chemical extract data, for the purpose of source rock evaluation, 1977-.
563. CURRIE, J.B., Univ. Toronto (Geology):
Fractures and fracture porosity in shale reservoirs, 1978-82.
This involves study of subsurface data concerning fractured shale reservoirs and of data from laboratory experiments which examine the physical properties of shales cored from these intervals. Specifically, it deals with analysis of geological conditions that have controlled the incidence of fracture systems in Cretaceous shales of the Alberta Basin and Devonian shales of the Appalachian Basin.
564. GILL, J.F., CURRIE, J.B., Univ. Toronto (Geology):
An investigation of natural fractures in Cardium strata of the Ricinus field, Alberta, 1977-80; M.A.Sc. thesis (Gill).
Examines the types and numbers of natural fractures to be expected in the reservoir, the relationship between fracture trends and structural trends in the field, and the relation between fracture incidence and the lithology of Cardium rocks.
565. GRANT, A.C., Geol. Surv. Can.:
Geological interpretation of geophysical data as an acid to basin synthesis and hydrocarbon inventory, 1974-.
566. IWUAGWU, J.C., LERBEKMO, J.F., Univ. Alberta (Geology):
Depositional and post-depositional analysis of the basal Belly River Formation in southwestern Alberta, 1979-81; Ph.D. thesis (Iwuagwu).
An analysis of depositional environments and patterns of the basal sandstones of the Belly River Formation was begun summer 1979 by measuring and describing 14 well exposed outcrop sections in the Foothills south of the Saskatchewan River. Field work will be completed summer 1980 and the study extended to the examination of subsurface samples and electric logs east of the outcrop belt.
567. NANDI, B.N., CIAVAGLIA, L., EMR (CANMET):
Coking characteristics of the various constituents of Athabasca bitumen, 1976-.
The fractions of the bitumen which contribute the most significantly to coke formation during thermal hydrocracking of bitumen appear to be the asphaltenes and the heavy aromatic oils. These two fractions have differing coking properties which result in distinct coke structures during carbonization. The mechanism of coking of the asphaltenes and the heavy aromatic oils have been investigated.
The deposition of coke precursors (e.g., asphaltenes and heavy oils) on coal fragments has been observed during thermal hydrocracking of bitumen. The process appears to be highly sensitive to the type of coal used and possibly to the inorganic constituents present in the coal. Experiments have been carried out using various ranks of coals and a patent application is being prepared describing the results of these experiments.
Additional experiments are in progress to test the effect of catalyst addition on the inhibition of coke formation during thermal hydrocracking of bitumen.
568. NANDI, B.N., CIAVAGLIA, L.A., EMR (CANMET):
Petrographic characterization of great Canadian oil sands coke and fly ash, 1977-81.
This project was aimed at petrographically characterizing delayed coke produced by Great Canadian Oil Sands Ltd. during up-grading of Athabasca bitumen. Bench-scale combustion trials were carried out with this coke and the fly-ash was examined microscopically to determine the nature of the unburnt carbon.
569. NANDI, B.N., CIAVAGLIA, L.A., EMR (CANMET):
Binders processed from Athabasca bitumen for non-coking coals, 1977-81.
The Cretaceous coals of western Canada are rich in inert macerals and consequently possess low fluidity. Some of these coals have also undergone extensive weathering and are therefore unsuitable for the production of metallurgical coke. In Japan, binders produced from Kuwait petroleum residue are being added to such poor coking coals to improve their coking characteristics. Recent investigations in our laboratory have revealed that the residual pitch material from thermal hydrocracking of Athabasca bitumen is an excellent binder material for poor coking coals from western Canada. Utilization of hydrocracked pitch would create a market for poor coking coals and also make thermal hydrocracking more economically feasible.
Investigations have been carried out to determine the type of bitumen best suited as a binder material and the optimum operating conditions during thermal hydrocracking for the production of the pitch binder. In addition, a study was undertaken to investigate the interaction between the pitch and the coal during co-carbonization and to determine the influence of pitch concentration on coke strength.

570. POWELL, T.G., Geol. Surv. Can.:
Diagenesis of organic matter and clay minerals in sediments in relation to petroleum generation, 1978-.
- See:**
Catagenesis in shales and occurrence of authigenic clays in sandstones, North Sabine H-49 well, Canadian Arctic Islands; Can. J. Earth Sci., vol. 16, no. 6, p. 1309-1314, 1979.
571. STEVENS, G.R., COLWELL, J.A., Acadia Univ. (Geology):
Burial diagenesis and origin of clay minerals in Mesozoic-Tertiary strata of Labrador-Newfoundland continental shelf, 1976-80.
Clay minerals separated from Mesozoic and Tertiary sediments of the Labrador and Northeast Newfoundland shelves have been analyzed to show the stratigraphic relevance of the clay mineral content, and to evaluate the degree of diagenesis of these minerals in relation to the hydrocarbon potential of the areas. Samples from six Northeast Newfoundland shelf wells have now been analyzed and results are being interpreted.
- GENERAL/GÉNÉRALITÉS**
572. BACHINSKI, D.J., Univ. New Brunswick (Geology):
Metamorphism of sulfide-rich rocks, 1978-81.
The metamorphosed Bathurst base metal massive sulfide deposits show limited spreads in $\delta^{34}\text{S}$ (6 to 8 ‰) regardless of metamorphic grade. There is little variation stratigraphically: footwall Cu-rich ores (stringers, massive) are not consistently different than hanging wall banded PbZn-rich ores. Deposits characterized by large amounts of pyrrhotite usually have high mean $\delta^{34}\text{S}$ values (BMS12, +16 ‰; Heath Steele, +13 ‰) whereas those lacking much pyrrhotite and characterized by pyrite-magnetite assemblages have much lower values (Caribou, +8 ‰). Exceptions like Chester (+9.5 ‰) locally display textures indicating pyrrhotite generation during metamorphism. Much of the pyrrhotite in deposits like BMS12, and Heath Steele is therefore considered primary: ore fluids contained a higher proportion of reduced sulfur than those at Caribou.
573. DAGBERT, M., DAOUST, G., Ecole Polytechnique (Génie minéral):
Développement d'un simulateur informatique pour l'échantillonnage des gisements miniers, 1978-81.
See:
The simulation of space dependent data in geology; Future trends in Geomathematics, (J.C. Griffiths, R.G. Craig and M. Labovitz eds.), Pion Ltd., London, 1979.
Le simulateur projeté est un système interactif pouvant générer des images possibles de la répartition des quantités et des qualités du minerai dans un gisement. Il est destiné à aider le géologue, l'ingénieur ou tout responsable économique à percevoir les conséquences possibles de décisions en matière d'exploration et de mise en production des gisements.
574. DAWSON, K.M., Geol. Surv. Can.:
Metallogeny of the northern Canadian Cordillera, 1974-.
575. FRANKLIN, J.M., Geol. Surv. Can.:
Metallogeny of the southwestern part of the Canadian Shield, 1975-.
- See:**
Stratigraphy and depositional setting of the Sibley Group, Thunder Bay district, Ontario, Canada; Can. J. Earth Sci., vol. 17, no. 5, p. 633-651, 1980.
576. GALE, G.H., Manitoba Dep. Energy and Mines (Mineral Res. Div.):
A geological evaluation of Precambrian stratatound massive sulphide potential in Manitoba, 1975-80.
577. GRIFFITHS, J.R., Univ. Alberta (Geology):
Mineralization in British Columbia, 1975-81.
Based upon the UBC MINDEP file (computerized inventory of mineral deposits in British Columbia), a detailed compilation of geological data relating to deposits in central British Columbia has been compiled, and is being extended southwards. The data is being analysed in relation to regional tectonic models, aimed at elucidating detailed metallogenic patterns in time and space, particularly for deposits related to volcanic and plutonic activity. Metals appear to have four well-defined sources: a) within the magmatic products of subducted oceanic lithosphere (e.g.: Cu in basic volcanics); b) in anatectic melts of crust underplated by "andesitic" magmas (Cu, Zn (Pb, Ag, Au)) massive sulphides; dioritic Cu-porphry; c) in anatectic melts of a variety of crustal types over-riding the subducted lithosphere (Cu-Mo porphyries, varying with primary melt composition; U (Sn)-bearing granitoids); and d) "sweated out" from host rocks to intrusions (a variety of vein and skarn deposits).
Further studies are aimed at quantifying these conclusions, and attempts to define an exploration parameters based on the regional geology and on tectonic models.
578. GROSS, G.A., Geol. Surv. Can.:
Geology of mineral resources in the ocean, 1976-.
579. INNES, D.G., COLVINE, A.C., Ontario Geol. Surv.:
Metallogenic development of the eastern part of the Southern Province of Ontario, 1978-84.
See:
Ontario Geol. Surv., Misc. Paper 90, p. 184-189, 1979.
To provide general and specific guidelines for further exploration for already known deposits and others heretofore unrecognized. Field work involves examination and characterization of the geological association and complete mineral content of a wide variety of mineral deposits.
580. KISSIN, S.A., Lakehead Univ. (Geology):
The genesis of silver deposits in the Southern Province of northwestern Ontario, 1976-.
- Electron microprobe analyses of coexisting amalgam (Ag, Hg) and an unidentified Ag-Hg alloy, revealed that the latter is not moschellandsbergite (Ag₂Hg₃) as previously believed, but a mineral with a considerably lower Hg-content. More study, perhaps in conjunction with experimental work, is needed in order to resolve the problem.
581. NORTH, F.K., IRVING, E., Carleton Univ. (Geology), EMR (Earth Physics Br.):
Paleogeographic and age relationships of sediment-related resource deposits, 1979-81.
See:
Pole positions and continental drift since the Devonian; The Earth - its origin, structure, and evolution, ed. M.W. McElhinny, Academic Press 1979.
Episodes of source-sediment deposition (1); J. Petrol. Geol., vol. 2, no. 2, p. 199-218, 1979.
Episodes of source-sediment deposition (2); J. Petrol. Geol., vol. 2, no. 3, 1980.
RESMAP program about one-third complete; its transfer to the Carleton University computer also about one-third complete. Plotting of age and facies data for all sediment-related resource deposits (hydrocarbon source sediments; oil shales; phosphorites; magnesite, etc) will reveal relationships to latitude, continent/ocean distribution, etc., for all epochs of Phanerozoic.
582. OWSIACKI, L., McALLISTER, A.L., DAVIES, L., STRINGER, P., Univ. New Brunswick (Geology):
Correlation and interpretation of pyroclastic volcanism and sulphide deposition in northern New Brunswick, 1979-83; Ph.D. thesis (Owsiacki).
An area of approximately 10 sq. mi. has been mapped in detail (1:400') in an attempt to define stratigraphy and structure South and North of the Heath Steele Mine. Samples are being examined micro and geochemically. Comparison between Stratmat and Heath Steele Mine deposits will ensue in order to establish whether similar or separate events are responsible for deposition.
583. PATTERSON, G.C., COLVINE, A.C., Ontario Geol. Surv.:
Metallogenic relationships of base metal occurrences in the Cobalt area, 1979-82.
See:
Ontario Geol. Surv., Misc. Paper 90, p. 222-229, 1979.
To document base metal occurrences in Archean and Huronian rocks of the Cobalt area; to describe the Archean volcanics and sediments, petrology and chemistry, and relationships of these to Ag-Co mineralization.
Field work during the summer of 1979, showed that base metal mineralization was wide spread and related to Archean volcanic rocks. Base metal mineralization in Huronian sediments was derived by weathering of pre-existing Archean volcanogenic mineralization. In virtually every instance, Keewatin base-metal mineralization was observed associated with Co-Ag vein deposits, in some instance veins followed Keewatin interflow units rich in sulfides. Textures of the sulfides were intersected by carbonate veins indicated remobilization of metals in the Archean rocks. Further field work will test these relationships in the South Lorrain, Elk Lake, and Gowganda area.
584. POTTER, D., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.):
Investigation of basic igneous rocks, Peter Lake Domain, 1979-80.
See:
Sask. Geol. Surv., Summ. Investig., p. 56-60, 1979.
Three areas of basic igneous rock exposure, in part layered, were briefly examined in the Peter Lake Domain (NTS sheets 64 E/16, 64 L/1) in an attempt to determine the economic potential. Basic igneous rocks, generally represented as amphibolitic gneisses, are found throughout the Peter Lake Domain in a dominantly granitic terrain and have been determined to be Archean in age. A number of grab samples collected from each exposure examined have been analysed for Cu, Ni, Va, Pa, Pd, Au, and Ag. Similar layered igneous rocks hosting exploitable quantities of Cu, Ni, Co, Pt, Pd, and Au are found in Precambrian exposures to the east of a major shear zone in the Medicine Bow Mountains of Wyoming.
585. SIBBALD, T.I.I., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.):
NEA/IAEA test-area: Basement geology, 1979-81.
See:
Sask. Geol. Surv., Summ. Investig., p. 77-85, 1979.
Crystalline basement rocks exposed to the east of the Athabasca Formation within the NEA/IAEA test area were mapped to provide base-line data for other test area projects, at scales of 1:31670, 1:12,000, and 1:48,000 depending on outcrop and availability of cut line for ground control, and compiled at 1:31,680 scale. Two lithostratigraphic domains of Precambrian basement are represented in the area. The Mudjatik domain, typified by (possibly Archean) granitoid gneisses and subordinate (probably Apehian) supracrustals elsewhere is exposed only in the north, to the west of Collins Bay as granitoids. By contrast the Wollaston domain comprises a wide range of Apehian supracrustal lithologies overlying a relatively homogeneous Archean granitic basement, which is not exposed in the area.
586. SINCLAIR, A.J., Univ. British Columbia (Geological Sciences):
Multivariate classification of porphyry deposits of the Canadian Cordillera, 1979-.
- Compilation of assay and geochemical data, much of it unpublished, for porphyry-type deposits in Canadian Cordillera.
587. SINCLAIR, A.J., CAMPBELL, S.W., Univ. British Columbia (Geological Sciences):
Metallogeny in Kluanne Mountains, southwestern Yukon, 1972-81; Ph.D. thesis (Campbell).
588. SINCLAIR, A.J., CHAMPIGNY, N., Univ. British Columbia (Geological Sciences):
Geology and geostatistical study of Specogna gold deposit, Queen Charlotte Islands, British Columbia, 1979-81; M.A.Sc. thesis (Champigny).
See:
Progress report on the geology of the Specogna (Babe) gold deposit; British Columbia Ministry Energy, Mines, Petrol. Res., Paper 1980-1, p. 158-170, 1980.
More than 5000 m of drill core logged on computer-based format. Detailed description of principal rock units underway. Limited whole rock K-Ar dating indicates an age of mineralization of about 14 Ma. Specimens collected for fluid inclusion study. Mineralogical study of ores underway including microprobe analyses.
589. SINCLAIR, A.J., GOLDSMITH, L.B., Univ. British Columbia (Geological Sciences):
Application of grade, tonnage and location data for mineral deposits, to exploration modelling, 1978-80; M.Sc. thesis (Goldsmith).

- See:**
Preliminary evaluation of summary production statistics and location data for vein deposits, Slocan, Ainsworth and Slocan City camps, southern British Columbia; Geol. Surv. Can., Paper 79-1B, p. 173-178, 1979.
590. SOUTHER, J.G., Geol. Surv. Can.:
Geothermal energy resources in Canada, 1973-.
- See:**
Geothermal reconnaissance in the central Garibaldi Belt, British Columbia; Geol. Surv. Can., Paper 80-1A, p. 1-11, 1980.
591. SPRINGER, J.S., Ontario Geol. Surv.:
Mineral potential of the Hudson Bay Lowlands, 1978-80.
592. SPRINGER, J.S., MACDONALD, C.A., Ontario Geol. Surv.:
Mineral potential southern Ontario, 1:100,000, 1979-82.
593. SUTHERLAND BROWN, A., SINCLAIR, A.J., British Columbia Ministry Energy, Mines, Petrol. Res., (Geol. Div.), Univ. British Columbia (Geological Sciences):
Metallogeny of Cordillera, 1970-.
- Relating abundant surface geochemistry production records and distribution of occurrences to geology of Cordillera.
594. THEYER, P., Manitoba Dep. Energy and Mines (Mineral Res. Div.):
Stratigraphic setting of ultramafic bodies in the Superior and Churchill Provinces and certain aspects of nickel-copper deposits in the Thompson nickel belt, Manitoba, 1976-80.
- Studies of ultramafic bodies in the province of Manitoba indicated that a large number of these occupy a stratigraphic level that appears to be repeated in several greenstone belts. The discovery of spinifex textures in one of these strata controlled ultramafic bodies of the Island Lake greenstone belt, and the characteristic chemistry of this and several other ultramafic bodies of this belt, led the author to conclude that they are komatiitic ultramafic flows or shallow intrusions. Similar strata-controlled ultramafic occurrences were described from parts of the Churchill Province.
595. WARREN, H.V., Univ. British Columbia (Geological Sciences):
Trace elements in pollen and their application to mineral exploration and detection of contamination and pollution, 1977-87.
- So far we have been able to identify both trace element, urban, and industrial contamination and pollution. Eventually we anticipate that we shall be able to develop a new prospecting tool.
596. WARREN, H.V., GOULD, C.E.G., HORSKY, S., Univ. British Columbia (Geological Sciences, Pathology):
Trace elements and their possible relationship to multiple sclerosis, 1959-87.
- To investigate and report on possible relationships between anomalous trace element concentrations in an environment-as revealed by soil, dust and vegetables and anomalous trace elements in former multiple sclerosis patients as revealed by cerebrum, cerebellum, nerve and muscle tissue and liver, from autopsy material.
- MINERALOGY/CRYSTALLOGRAPHY/MINERALOGIE/CRISTALLOGRAFIE**
597. CABRI, L.J., EMR (CANMET):
Platinum, 1971-81.
- See:**
Keithconite, telluropalladinite and other Pd-Pt tellurides from the Stillwater complex, Montana; Can. Mineral., vol. 17, p. 589-594, 1979.
598. CABRI, L.J., EMR (CANMET):
Mineralogical characterization of inorganics in Canadian coals, 1977-.
- To provide, on a continuing basis, mineralogical characterizations of inorganics in Canadian coals, in particular low-rank coals, stressing, whenever possible, applications to current or future beneficiation or other industrial processes.
599. CERNY, P., Univ. Manitoba (Earth Sciences):
Mineralogy and petrology of pegmatites, 1971-.
- See:**
Stibiobetafite, a new member of the pyrochlore group from Vezna, Czechoslovakia; Can. Mineral., vol. 17, p. 583-588, 1979.
- Pollucite and its alteration in geological occurrences and in deep-burial radioactive waste disposal; Sci. Basis for Nuclear Waste Manag., vol. 1, p. 231-236, 1979.
- Crystal chemistry of milarite; Can. Mineral., vol. 18, no. 1, 1980.
- Continuing investigation of the Tanco pegmatite deals recently with the compositional variations of the Ta-oxide minerals and associated phases, and their distribution in the deposit; a study of hafnian zircon and geochemistry of Ga and Tl are ready for publication. Crystal chemistry of monazite from southeastern Manitoba, pollucite, beryl, petalite, and simonite are in progress; stibiobetafite and milarite studies have been published. Feldspar investigation concentrates on the petrology of feldspar crystallization in different paragenetic and geochemical types of pegmatites.
600. CHAGNON, A., BRUN, J., INRS-Pétrole, Québec Ministère Energie et Ressources:
Minéralogie, géochimie et stratigraphie des horizons de K-Bentonite des groupes de Black River et Trenton du sud du Québec, 1977-81.
- See:**
Rock stratigraphy and clay mineralogy of volcanic ash beds from the Black River and Trenton groups (Middle Ordovician of Southern Quebec); Can. J. Earth Sci., vol. 16, no. 7, p. 1499-1507, 1979.
- Etude de la minéralogie très spéciale et de la géochimie des horizons de K-Bentonite des Groupes de Black River et Trenton et leur utilisation comme marqueur stratigraphique. Ces horizons contiennent en effet des interstratifiés "longs" et réguliers d'illite et smectite, ainsi que des chlorites alumineuses qui les différencient les uns des autres ainsi que des roches encaissantes.
601. CHAGNON, A., ESQUEVIN, J.S., INRS-Pétrole, Pau: Etude des illites néoformées des grès du Potsdam, 1978-80.
- Etudier les minéraux argileux néoformés des grès du Potsdam en vue de déterminer le potentiel réservoir de cette unité. Certains de ces minéraux (illites) ont été datés par K/Ar et ont donné un âge Dévonien.
602. CHEN, T.T., EMR (CANMET):
Distribution of silver and other trace elements in New Brunswick ore, 1976-80.
- The studies of mineralogy of sulfosalts, and distribution of silver and other trace elements in the milling circuit of Heath Steel Mines, Limited, New Brunswick have been completed; report is in preparation. A study has also been made on the mineral sources of mercury in the sulfide ore from Hudson Bay Mining and Smelting Limited, Manitoba.
603. CHERRY, M.E., TREMBATH, L.T., Univ. New Brunswick (Geology):
Disordering of alkali feldspar: The effect of H₂O on the disordering process, 1979-80.
- See:**
The disordering of alkali feldspars. I. Dry-heating of a microcline perthite; Canadian Mineral., vol. 17, p. 527-535, 1979.
- To unravel the disordering/ordering process(es) in alkali feldspars by systematically varying pertinent controls of the process(es).
604. DUKE, J.M., Geol. Surv. Can.:
Mineralogy of nickel deposits in serpentinized ultramafic rocks, 1975-.
605. FOSCOLOS, A.E., Geol. Surv. Can.:
Mineralogy and chemistry of fine-grained rocks in central Sverdrup Basin, 1973-.
606. HAWTHORNE, F.C., Univ. Manitoba (Earth Sciences):
Crystal chemistry of the amphiboles, 1970-.
- A complete review of amphibole crystallography and crystal chemistry has nearly been completed.
607. HAWTHORNE, F.C., FERGUSON, R.B., Univ. Manitoba (Earth Sciences):
Crystal structures of minerals, 1974-.
- See:**
The crystal structure of morinite; Can. Mineral., vol. 17, p. 93-102, 1979.
- An examination of the factors affecting the general architecture of crystal structures.
608. JAMBOR, J.L., EMR (CANMET):
Producibility of resources, 1977-82.
- See:**
Mineralogical evaluation of proximal-distal features in New Brunswick massive-sulfide deposits; Can. Mineral., vol. 17, p. 649-664, 1979.
609. KISSIN, S.A., Lakehead Univ. (Geology):
Crystal chemistry and stabilities of sulphide minerals, 1976-.
- See:**
New data on stannite and related tin sulfide minerals; Can. Mineral., vol. 17, p. 125-135, 1979.
- A device for the measurement of sulfur fugacities mountable on the precision camera; Amer. Mineral., vol. 64, p. 1306-1310, 1979.
- Studies have been conducted on the petrography and compositions of sulphides in Group IAB iron meteorites. The sulfides are uniformly low in minor elements, except for those contained in silicate inclusions. The Fe-content of sphalerite and alabandite both appear to vary as a function of pressure. Work is continuing in order to definitively confirm this finding and understand its genetic significance for the group.
610. MELLINGER, M., MOSSMAN, D.J., Univ. Saskatchewan (Geological Sciences):
Geology of the Maurice Bay uranium deposit, Saskatchewan, 1980-83; Ph.D. thesis (Mellinger).
611. MIURA, Y., RUCKLIDGE, J.C., Univ. Toronto (Geology):
Ion microprobe analysis of exsolution lamellae in peristerite and cryptoperthite, 1978-80.
- See:**
Am. Mineralogist, vol. 64, p. 1272, 1279, 1979.
- Combined data from electron microscope, electron microprobe, and ion microprobe analyzers can be used to determine the composition and thickness of lamellae in peristerite and cryptoperthite feldspars. Blue iridescent peristerite from Hybla, Ontario has a bulk composition of An₅Or₁ and lamellae compositions An₂Or and An_{1.9}Or₁. Orange-red iridescent peristerite from the same location has a bulk compositions of An₇Or₁, and lamellae An₂Or₁ and An_{2.3}Or₃. Two pale blue iridescent cryptoperthites from Quebec and Johana, Japan have the following compositions: An₁₁Or₃₀ (bulk) and An_{1.9}Or_{1.5}, An₀Or₅ for lamellae; and An_{1.9}Or₅₀ (bulk) and An₆Or_{3.5}, An₀Or_{7.2} for lamellae. The irregular nature of the lamellae in peristerites and cryptoperthites precludes ion microprobe depth profiling, such as has been applied to the more regular labradorite lamellae. Point analysis must be performed instead, which may result in possible overlap onto adjacent lamellae and compositional values that do not reflect the extreme limits.
612. MIURA, Y., RUCKLIDGE, J.C., KATO, T., MATSUEDA, H., Univ. Toronto (Geology):
Crystal chemistry and mineralogy of apophyllite, 1978-80.
- X-ray diffraction and electron probe studies have been used to show chemical and crystallographic variations in the apophyllite group of minerals. Na-K substitution coupled with complex changes in

- the symmetry show that the solid solution series formerly thought to describe the mineral is in fact a far too simple explanation. Tetragonal and orthorhombic forms exist and the assignment of a nomenclature and classification scheme is non-trivial.
613. MOSSMAN, D.J., DELABIO, R.N., MacINTOSH, D., Univ. Saskatchewan (Geological Sciences), Geol. Surv. Can., Cominco:
Mineralogy of clay seams in the potash ore zone of Prairie Evaporite Formation, Saskatoon region, 1978-80.
Clays are important in potash mining from 3 main points of view: 1) pollution, 2) recovery of K_2O , and 3) instability of the mining backs.
Clay seams from potash mines at Vanscoy, Allen, Lanigan and Colonsay have been studied by X-ray methods. In addition to anhydrite dolomite, quartz and hematite, a variety of clay minerals are identified. Illite, two species of chlorite, vermiculite and/or montmorillonite-chlorite mixed layer material are the main clay minerals present. At one locality the fibrous Mg-Si clay mineral sepiolite is also recorded. These clay minerals occur highly dispersed throughout the salt as well as relatively concentrated within the clay seams. Contrary to previous published reports kaolinite is absent in the clay seams.
The presence of highly magnesian chlorite, vermiculite and/or mixed layer clays, and sepiolite is strongly suggestive of the fact that extreme Mg-diagenesis is responsible for a substantial portion of the presently observed clay mineralogy.
614. MOSSMAN, D.J., PLANT, A.G., Univ. Saskatchewan (Geological Sciences), Geol. Surv. Can.:
Mineralogy and geochemistry of davidite in Canada, 1978-80.
There are six known localities in Canada at which davidite has been documented on the basis of X-ray study. Material is available for only three of these localities.
Samples are being probed in order to provide chemical analyses of the Canadian davidites and to allow comparison with type locality material from Radium Hill, Australia. Mineral assemblages accompanying davidite are in each case being identified.
A recently discovered davidite, from Kommes Lake, Foster Lakes area, northern Saskatchewan is strongly zoned. In comparison the specimen from the Faraday Mine in a Bancroft pegmatite, Ontario, is homogeneous. Preliminary chemical results indicate that the REE contact of davidites ranges from about 0.4 to 4.0%.
615. PAUL, B.J., CERNY, P., Univ. Manitoba (Earth Sciences):
The Huron Claim pegmatite, southeastern Manitoba, 1976-80; M.Sc. thesis (Paul).
Huron Claim pegmatite is the best developed member of the Shaford Lake pegmatite group which surrounds the Lac du Bonnet quartz monzonite. It carries a moderate Be, Nb, REE, U, Th mineralization typical of pegmatites associated with an early leucogranite phase of the Lac du Bonnet batholith, English River subprovince. Field work was finished in 1977 and lab studies are in progress, revealing multiple generations of some accessory minerals and a wide variability in feldspars, both previously unsuspected.
616. PERRAULT, G., GAGNON, G., ROBERT, M., Ecole Polytechnique (Génie minéral):
Le pyrochlore et la columbite de St-Honoré, Québec, 1977-80.
La columbite s'est développée en remplacement du pyrochlore dans certaines zones de la mine Niobec.
617. PERRAULT, G., LAPLANTE, R., Ecole Polytechnique (Génie minéral):
Les minéralisations en U-Nb-Ta des intrusifs alcalins du canton crevier, région du Lac St-Jean, Québec, 1978-80; thèse M.Sc.A. (Laplanche).
Les minéralisations ont été observées dans une phase pegmatitique d'une syénite à néphéline (pyrochlore tantalifère) et dans des carbonatites (uran pyrochlore).
618. PERRAULT, G., MCCANN, J., Ecole Polytechnique (Génie minéral):
Les minéralisations en terres rares de la région de Walker Lake, Québec, 1978-80; thèse M.Sc.A. (McCann).
Nous avons identifié la chevkinite, la fergusonite, la gadolinite, l'yttrropyrochlore dans les mobilisats de paragneiss de la région de Walker Lake, P.Q. Cette occurrence nous informe sur l'évolution des terres rares dans ces milieux.
619. PERRAULT, G., TRUDEAU, M., Ecole Polytechnique (Génie minéral):
L'amiante dans l'eau de la Rivière Bécancour, Québec, 1976-80; thèse de doctorat (Trudeau).
Nous avons mesuré l'abondance de l'amiante dans l'eau de la Rivière Bécancour qui draine la région de Thetford.
620. PETRUK, W., EMR (CANMET):
Mineralogy applied to ore dressing of Zn-Pb-Cu ores from northwestern New Brunswick, 1975-80.
1) To define the behaviour of minerals from the Brunswick No. 12 ore during flotation - paper in preparation.
2) To define the behaviour of minerals from the Heath Steele and Brunswick No. 12 orebodies during grinding - samples have been collected from grinding circuits and studies are being performed by image analysis.
3) To define mineralogical characteristics that affect metal recoveries from the ore of Brunswick mining and smelting - work completed, paper in preparation.
4) To define mineralogical characteristics that affect mineral liberation from the base metal ores in New Brunswick - sizes of minerals being determined by image analysis and compared to products in grinding circuit.
621. PETRUK, W., HUGHSON, M.R., EMR (CANMET):
Effect of chalcopyrite exsolutions in sphalerite on Cu recovery, 1979-80.
See:
Image analysis study of exsolution chalcopyrite in sphalerite from the east sulphide orebody of the Caribou deposit, N.B.; CANMET, Investig. Rept., MRP/MSL 79-5(IR), 1979.
An image analysis study of exsolution chalcopyrite in sphalerite from the South Sulphide Orebody of the Caribou deposit; CANMET, Investig. Rept., MRP/MSL 79-156(IR), 1979.
To determine the quantities and sizes of exsolutions in sphalerite in the ores from the Brunswick No. 12, Heath Steele, and Anaconda deposits, and to determine the quantities and sizes of chalcopyrite exsolutions recovered in concentrates from the Brunswick No. 12 and Heath Steele ores.
622. PLANT, A.G., Geol. Surv. Can.:
Electron beam microanalysis, 1962-.
See:
Some mineralogical and geochemical characteristics of uranium occurrences in the Nonacho Lake area, District of Mackenzie; Geol. Surv. Can., Paper 79-1B, p. 179-188, 1979.
Duranite from the Mount Washington copper deposit, Comox District, Vancouver Island, British Columbia; Geol. Surv. Can., Paper 79-1C, p. 97, 98, 1979.
623. RIMSAITE, J.Y.H., Geol. Surv. Can.:
Mineralogical research on the Rabbit Lake uranium deposit, Saskatchewan, 1975-.
See:
Petrology of basement rocks at the Rabbit Lake deposit and progressive alteration of pitchblende in an oxidation zone of uranium deposits in Saskatchewan; Geol. Surv. Can., Paper 79-1B, p. 281-299, 1979.
624. RIMSAITE, J.Y.H., Geol. Surv. Can.:
Mineralogy of uranium deposits in granite rocks in the Grenville structural province, Ontario and Quebec, 1977-.
See:
Mineralogy of radioactive occurrences in the Grenville structural province, Bancroft area, Ontario: A progress report; Geol. Surv. Can., Paper 80-1A, p. 253-264, 1980.
625. RUKLIDGE, J.C., MIURA, Y., Univ. Toronto (Geology):
The structural occurrence of chlorine in serpentine, 1970-80.
This continuing study of occurrence of Cl in serpentine mineral has recently moved to the realm of high resolution electron microscopy. Electron micrographs and diffraction pattern of suitable ion thinned specimens has shown that only serp minerals are present (in contrast to possible hydroxy-chlorides) but the features of the regions with and without Cl are quite different. Serpentine free of Cl has a coarse microstructure in the order of 50 to 30 nm. On the other hand, serpentine with Cl has a very fine microstructure in the order of 10 nm, which gives a diffuse ring diffraction pattern. These Cl rich areas, which may contain up to 1% U also are richer in Fe, N, Mn and Cr, and strings of metallic Ni-Fe (aworuite) grains are often associated.
It appears that the fine grained regions are transitional between olivine and coarse serpentine, and that the chlorine may serve as an agent for transporting the metals such as Fe, Ni etc away, leaving an almost pure Mg serpentine which develops in coarseness with time.
626. SCOTT, S.D., URABE, T., HUTCHISON, M.W., FARKAS, A., SPRY, P., BOTH, R.A., Univ. Toronto (Geology):
Mineralogical geobarometers and geothermometers; Ph.D. theses (Both, Spry).
A variety of refractory sulfide and sulfide-oxide reactions are being evaluated experimentally as potential mineralogical thermometers and barometers over a wide range of geologically significant temperatures and pressures.
1) Both and Scott are determining the pressure dependence of the FeS content of alabandite (MnS) in equilibrium with troilite as a potential "cosmobarometer".
2) Farkas has measured the partition coefficients for Co and Ni between pyrite and pyrrhotite from 350-725°C and has modelled the system thermodynamically. The partitioning is probably not sufficiently sensitive to temperature effects to constitute a useful geothermometer.
3) Hutchinson and Scott have shown that the sphalerite geobarometer provides unambiguous pressures in hydrothermal deposits but interpretation of data from metamorphosed ores is complex. Furthermore they have refined the sphalerite "cosmobarometer" for estimating pressure of formations of meteorites.
4) Spry is studying the synthesis and stability of the zinc spinel, gahnite.
5) Urabe and Scott are extending the work of Kretschmar and Scott (1976) on the Fe-As-S system to high pressure.
627. TRAILL, R.J., Geol. Surv. Can.:
Studies of meteorites and other extra-terrestrial materials, 1957-80.
628. TRAILL, R.J., Geol. Surv. Can.:
X-ray diffraction analyses and mineralogical studies, 1968-80.
629. TURNOCK, A.C., RAUDSEPP, M., Univ. Manitoba (Earth Sciences):
Synthesis of amphiboles, 1979-82; Ph.D. thesis (Raudsepp).
To synthesize a broad range of compositions of the amphibole group, hopefully in crystals of good size and homogeneity, and then to proceed on measurements of their physical properties and experiments on their stability. Oxide mixes have been made and treated, with spotty success. The gel-mixture method is now being attempted.
The main relevance is to contribute to fundamental knowledge of the synthesis, properties, and stabilities of the amphibole group mineralogy. The secondary relevance is the application of this data in petrology, to such problems as the nucleation and growth of various amphiboles in various rocks during metamorphism, and their changing compositions during metamorphism. One specific problem would be to relate the compositions of greenschist amphiboles of meta-volcanics in the Precambrian greenstones to the composition of the original volcanic rocks. Also, improved knowledge of cell parameters of the amphibole end-members would permit predictions of exsolution during cooling.
630. UCAKUWUN, E.K., CERNY, P., Univ. Manitoba (Earth Sciences):
Granitic pegmatites and granitoids of the Dryden area, northwestern Ontario, 1979-80; M.Sc. thesis (Ucakuwun).
Several dispersed localities of granitic pegmatites with diversified mineralization occur northeast of Dryden, in a greenstone belt flanked and perforated by a variety of granitoid plutons. Geochemical and economic characteristics of the pegmatites are being established, and their genetic linkage to granitoid intrusions is investigated.
631. von BITTER, P.H., GAIT, R., Royal Ontario Museum (Invert. Palaeontol., Mineralogy and Geology):
Calcite pseudomorphs from the Pleistocene of western Newfoundland - possible palaeoenvironmental indicators, 1976-80.

- INVERTEBRATE/INVERTÉBRÉS**
632. BAMBER, E.W., Geol. Surv. Can.: Carboniferous and Permian biostratigraphy and coral faunas, western and northern Canada.
- See:**
An occurrence of Lower Carboniferous fish remains from Alberta, Canada; Can. J. Earth Sci., vol. 16, no. 8, p. 1628-1630, 1979.
633. BARNES, C.R., CARSON, D.M., LANDING, E., Univ. Waterloo (Earth Sciences): Ordovician conodont biostratigraphy of southern Devon Island, eastern Arctic Archipelago, 1978-81; M.Sc. thesis (Carson), Ph.D. thesis (Landing).
634. BARNES, C.R., McCracken, A.D., NOWLAN, G.S., DUFFIELD, S.L., LEGAULT, J.A., UYENO, T.T., FAHRAEUS, L.E., Univ. Waterloo (Earth Sciences), Geol. Surv. Can., Memorial Univ. (Geology): Conodonts and acritarch biostratigraphy and paleoecology of the Upper Ordovician and Lower Silurian of Anticosti Island, Quebec, 1975; M.Sc. thesis (McCracken), Ph.D. thesis (Duffield).
635. BARNES, C.R., SASS, D.B., NORD, G., Univ. Waterloo (Earth Sciences): Conodont ultrastructure, 1965-.
636. BARNES, C.R., UYENO, T.T., DRUCE, E., COOPER, B.J., BASSETT, M.G., BERGSTROM, S.M., Univ. Waterloo (Earth Sciences), Geol. Surv. Can., Nat. Mus. Wales, Ohio State Univ. (Geology): Paleontology, conodont biostratigraphy and paleoecology of Lower Paleozoic sequences in Canada, Spitsbergen, Norway and Australia, 1976-.
- See:**
Middle Ordovician conodont faunule from the Tetagouche Group, Camel Back Mountain, New Brunswick; Can. J. Earth Sci., vol. 16, p. 540-551, 1979.
Progress in Proterozoic and Lower Paleozoic geology, northern Ellesmere Island; Geol. Surv. Can., Paper 79-1B, p. 269-279, 1979.
637. BOLTON, T.E., KLEIN, K.P., JULL, R.K., Geol. Surv. Can., Univ. Windsor (Geology): The Fossils of Ontario: The Coelenterata, 1979-81.
Royal Ontario Museum Miscellaneous publication series on fossils of Ontario: The Coelenterata - an introductory and professional look at the corals of Ontario - for both the amateur and academic.
638. BRAUN, W.K., BROOKE, M.M., JOHNSTON, P.F., FOWLER, S.P., MATHISON, E.J., YAYCHUK, D.D., Univ. Saskatchewan (Geological Sciences): Biostratigraphy and microfaunas of the Devonian and Jurassic-Cretaceous (Lower) Systems of western and northern Canada, 1965; Ph.D. theses (Johnston, Fowler), M.Sc. theses (Mathison, Yaychuk).
Ostracode fauna of the Middle and Upper Devonian Slave Point and Swan Hills formations, Alberta; Middle and Late Devonian ostracode faunas and biostratigraphy of Saskatchewan and western Manitoba; aspects of the Upper Devonian, Nisku Formation, central Alberta; Upper Devonian ostracode faunas, biostratigraphy and faunal provincialism, southern Northwest Territories.
639. CAMERON, B.E.B., Geol. Surv. Can.: Tertiary foraminiferal succession of western Cordillera and Pacific Margin, 1969-.
640. CHATTERTON, B.D.E., Univ. Alberta (Geology): Systematic and biostratigraphic studies of trilobite and conodont faunas of western and northern Canada, 1972-.
- See:**
Acanthalomina Prantl & Pribyl, a valid subgenus of the trilobite genus *Diacanthaspis*; J. Paleontol., v. 53, no. 6, p. 1327-1342.
Silicified Lower Devonian trilobites from New South Wales; Palaeontology, vol. 22, Pt. 4, p. 799-837, 1979.
In the near future, work will be concentrated on publishing on collections of Devonian and Silurian conodont faunas from western and northwestern Canada; and silicified and other trilobite faunas of Silurian age from northwestern and arctic Canada.
641. COPELAND, M.J., Geol. Surv. Can.: Paleozoic ostracodes of Canada, 1972-.
642. DIXON, O.A., Univ. Ottawa (Geology): Ordovician and Silurian heliolitid corals of Anticosti Island, Quebec, and Canadian Arctic Islands, 1968-.
- See:**
Late Silurian plasmoporiid and stelliporellid corals (Heliolitidae) from the Canadian Arctic; J. Paleontol., vol. 53, p. 642-656, 1979.
Long term investigation of systematics, environmental variability, associated sedimentary environments and evolutionary succession of Ordovician-Silurian heliolitid coral faunas. Material presently under investigation includes late Ordovician-early Silurian faunas of Anticosti Island, and late Silurian faunas of Somerset Island and Cornwallis Island, Canadian Arctic.
643. ELIAS, R.J., Univ. Manitoba (Earth Sciences): Solitary rugose corals of the Stony Mountain Formation (Upper Ordovician), southern Manitoba, 1979-80.
644. FERGUSON, L.A., Mount Allison Univ. (Geology): A biometrical study of the scottish Carboniferous ostracod genera *Bairdia* and *Paraparchites* and its implications on their taxonomy.
Work is continuing on topotype material of the genotype *Bairdia curta* McCoy from near Granard, County Longford, Ireland.
645. GRADSTEIN, F.M., Geol. Surv. Can.: Biostratigraphic history of the Mesozoic and Cenozoic sediments of the Grand Banks, Northeast Newfoundland and Labrador shelves (based on Foraminifera and Ostracoda), 1974-.
646. GRADSTEIN, F., Geol. Surv. Can.: Taxonomy, biostratigraphy, paleoecology and paleobiogeography of Mesozoic-Cenozoic agglutinated Foraminifera, 1979-.
647. HALL, R.L., STRONACH, N., Univ. Calgary (Geology and Geophysics): Lithostratigraphy and biostratigraphy of the Fernie Group (Jurassic), Alberta, 1978-81; Ph.D. thesis (Stronach).
Further fieldwork during 1979 was conducted in southeastern British Columbia where collections of ammonites and other samples were made for comparison with these already known in neighbouring parts of Alberta. Laboratory analysis is now being conducted on this new material. Work is also being continued on analysis and interpretation of the paleoecology of the shelly accumulations within the Rock Creek Member and the *Gryphaea* Bed.
648. HANNA, J.C., Esso Resources Canada Ltd. (Exploration Research): Mesozoic and Tertiary foraminifers and coccoliths of the Beaufort, Arctic and East Coast areas, 1979-.
649. JONES, B., Univ. Alberta (Geology): Silurian-Devonian brachiopods of Arctic Canada, 1971-.
- See:**
Atrypoida zonation of the Upper Silurian Read Bay Formation of Somerset and Cornwallis Islands, Arctic Canada; Can. J. Earth Sci., vol. 16, p. 2204-2218, 1979.
Atrypoida polaris: A new atrypoid brachiopod species from Arctic Canada; J. Paleontol., vol. 54, no. 3, p. 577-583, 1980.
The taxonomic, biostratigraphic and community work on the brachiopods in the Read Bay Formation of Somerset Island is nearly complete and the final manuscript will be submitted shortly. Work on the taxonomy and distribution of brachiopods in Member C of the Read Bay Formation on Cornwallis Island is in progress. Work on brachiopods from the upper part of the Eids Formation on southwest Ellesmere Island is complete and will be published within the next year. Work on brachiopods from the Bird Ford Formation of Southwest Ellesmere Island is near completion. Over next 2 years field work will be carried out on Bathurst Island in order to obtain collection from the Devonian formations of that island.
650. KOBLUK, D.R., Univ. Toronto (Geology): Paleozoology of Lower Cambrian patch reefs, southern Labrador, 1976-81.
- An investigation of the paleoecology of some exceptionally well preserved and well-exposed Lower Cambrian patch reefs in the Forsteau Formation of southern Labrador. These reefs are dominated by algae and archaeocyathids; associated fauna include trilobites, brachiopods, salterellids, archaeogastropods, etc. as well as the oldest known macroborers in the geologic record.
651. KOBLUK, D.R., Univ. Toronto (Geology): Modern reef cavity-dwelling organisms (coelobionts), Bonaire, Netherlands Antilles, 1977-81.
A detailed study of cavity-dwelling (coelobiontic) invertebrates in coral reefs on the western side of Bonaire, Netherlands Antilles. Framework, shelter, and intraskeletal cavities occurring from 10 m to 45 m in depth are being mapped in detail by hand together with the coral reef surface fauna and flora.
Organisms inhabiting the cavities are diverse and extremely abundant and have a very different community organization at the surface.
652. KOBLUK, D.R., Univ. Toronto (Geology): Cavity-dwelling (coelobiontic) organisms in Paleozoic reefs, 1977-83.
An investigation of the paleoecology of reef cavity-inhabiting organisms in reefs and mounds of Lower Cambrian (Nevada), Middle Ordovician (Ontario and Quebec), Silurian (Ontario), and Upper Devonian (Alberta) age. Work in the Lower Cambrian of Labrador has shown that lower and middle Paleozoic cavity communities were diverse and well organized. Deposit and detritus feeders, filter feeders, suspension feeders, soprophytes, and photosynthetic algae were all present in the earliest known reef cavities. By the Ordovician endoliths had invaded the cryptic habitat, together with corals and bryozoans, thereby assuming a "character" very reminiscent of modern cavity communities.
653. KOBLUK, D.R., Univ. Toronto (Geology): Colour patterns in Paleozoic invertebrate fossils, 1978-81.
Preserved colour patterns in invertebrates of Paleozoic age have an extensive record ranging as far back as the Middle Cambrian. This work is a synthesis of all known occurrences of colour-patterned Paleozoic invertebrates into a model of the history, origins, and early significance of colour patterns in marine invertebrates.
654. KOBLUK, D.R., HALLS, H., Univ. Toronto (Geology): The Lower Cambrian paleoequator and the distribution of archaeocyathids in North America, 1979-81.
655. KUKALOVA-PECK, J., Carleton Univ. (Geology): Morphology and evolution of Paleozoic insects with reference to phylogeny of recent insects, 1977-80.
The project is introducing a new intermediary discipline: evolutionary insect morphology based upon the fossil record. The idea is to use the detailed data available in Paleozoic insects, for systematics, phylogeny, and morphology of Recent insects and arthropods. I researched the origin and evolution of the insect wing (1978) and found that the wings developed from articulated appendages (not from solid outgrowth, as believed); that Recent juveniles have secondarily (not primitively, as believed) immobilized wind pads; that the insect metamorphosis is polyphyletic and originated many times, etc. I also researched insect mouthparts and found that the palps are derived from the legs; the primitive number of leg segments is 10 (not 7, as believed); that insects used to have free knee segment, as spiders; and that the Arthropoda are a monophyletic group. Manton's phylum "Uniramia" is an unnatural grouping because the structure of the mandible in the Paleozoic insects is homologous to that of the Crustacea and the Chelicerata and not to that of the Onychophora, as Manton anticipated.
656. LENZ, A.C., Univ. Western Ontario (Geology): Ordovician to Devonian paleontology, paleoecology, biostratigraphy, northern and Arctic Canada, 1977-81.
See:
A planktic problematicum from the Silurian of northern Yukon, Canada; J. Paleontol., vol. 54, no. 3, p. 584-587, 1980.
Project is in two parts, one a detailed study of Llandovery and Wenlock graptolite taxonomy and biostratigraphy of the northern Canadian Mainland

- in a region ranging from southern Northwest Territories to northern Richardson Mountains, Yukon. A large Llandovery graptolite taxonomic paper has been submitted to Royal Ontario Museum. Work is about to begin on Ordovician graptolites. The other project involves a study of taxonomy, biostratigraphy and ecology of Llandovery to Pridolian brachiopods of central Mackenzie Mountains to central Arctic Archipelago.
657. LUDVIGSEN, R., LANDING, E., VON BITTER, P.H., Univ. Toronto (Geology):
Uppermost Cambrian – lowest Ordovician conodont biostratigraphy and biofacies, Rabbitkettle Formation, District of Mackenzie, 1978-79.
The sparse and low diversity conodont faunas of the Rabbitkettle resemble coeval Appalachian continental slope and outer shelf faunas rather than those reported from the inner carbonate platform in Texas and Utah. The *Proconodontus* and *Cordylodus oklahomensis* Zones can be recognized, but cannot be divided into the subzones established in Utah. These data suggest that lithofacies associations and biofacies developments in conodont distributions may prohibit highly resolved conodont-based correlations of Cambrian-Ordovician boundary beds.
658. LUDVIGSEN, R., Univ. Toronto (Geology):
Middle Ordovician trilobites of northwestern Canada, 1972-..
See:
A trilobite zonation of Middle Ordovician rocks, southwestern District of Mackenzie; Geol. Surv. Can., Bull. 312, 1979.
A sequence of nine assemblage zones based on bathyurid, encrinurid, and cheirurid trilobites has been established for the Middle Ordovician interval in platform strata in the South Nahanni River area. A Llandoilo fauna with *Cnemidopyge*, *Agerina*, *Lonchodomas*, and *Robergiella* from dark limestones of slope aspect from the Mount Burgess area of northern Yukon is also being studied.
In the Middle Ordovician, platform trilobite faunas differ on the genus and family levels from correlative slope trilobite faunas. The ecologic and biogeographic characteristics of platform to slope trilobite biofacies parallel those shown by living marine isopod crustaceans and suggest that actualistic models can be used to interpret trilobite distributional patterns.
659. LUDVIGSEN, R., Univ. Toronto (Geology):
Trilobites of Ontario.
See:
Fossils of Ontario, Part I The trilobites; Roy. Ontario Mus., Life Sci. Misc. Contrib., 1979.
The Ordovician trilobite *Pseudogygites* in eastern and arctic North America; Roy. Ontario Mus., Life Sci., Contrib. 120, 1979.
With few exceptions, the more than 60 genera of trilobites that occur in Ordovician, Silurian, and Devonian strata of Ontario are insufficiently known in terms of morphology, taxonomy, distribution, and ecology. Modern revision of some of these taxa has been started. *Ceraurinus*, *Bathyurus*, and *Pseudogygites* has been completed and work has started on *Hemiarges*, *Encrinuroides*, *Achatella*, *Triarthrus*, "*Calyptaulax*", *Terataspis*, *Emonorachus*, and *Xylabion*.
660. LUDVIGSEN, R., Univ. Toronto (Geology):
Trilobite biostratigraphy of the Cambrian-Ordovician boundary beds of the Rabbitkettle Formation, western District of Mackenzie, 1977-79.
A section through the upper Rabbitkettle Formation in the western Mackenzie Mountains provides a record of silicified trilobite faunas across the Cambrian-Ordovician boundary in an open marine setting on the deeper part of the Mackenzie Platform. Three assemblage zones are recognized: A mid to late Trempealeuan *Yukonaspis* Zone with three divisions, an early Tremadocian *Parabolinaella* Zone with three divisions, and an early Tremadocian *Symphysurina* Zone.
The base of the Ordovician is drawn at the first appearance of *Parabolinaella* at the base of the *Parabolinaella* Zone. This horizon probably correlates with the base of the Tremadocian and is probably slightly older than the base of the Ordovician as recognized elsewhere in North America; that is, at the base of the *Missisquoi* Zone.
- The base of both the "Hystricoid" Biome and a Grand Cycle is drawn within the upper *Yukonaspis* Zone at the first appearance of olenid trilobites and black laminated lime mudstones. The extinction, immigration, and diversity patterns that define the Ptychaspid-"Hystricoid" Biome boundary are explained with reference to the diversity-area relationships inherent in the equilibrium model of biogeography.
661. LUDVIGSEN, R., Univ. Toronto (Geology):
A zonation of Late Cambrian trilobites in the Selwyn Basin, District of Mackenzie, 1979-..
A 600 m section through the Rabbitkettle Formation in the Misty Creek Embayment of the Selwyn Basin (Bonnet Plume map area, western District of Mackenzie) has yielded over 40 collections of trilobites which range in age from the *Cedaria* Zone (Dresbachian, Early Late Cambrian) to the *Symphysurina* Zone (Canadian, Early Ordovician). These trilobites are currently being studied with the aim of establishing a sequence of trilobite zones that will have biostratigraphic utility within the Selwyn Basin and in adjoining areas of northern Canada.
662. McCracken, A.D., LENZ, A.C., Univ. Western Ontario (Geology):
Late Ordovician and early Silurian graptolites and conodonts of northern and Arctic Canada, 1978-81; Ph.D. thesis (McCracken).
A taxonomic and evolutionary study of biserial graptolites and conodonts of the late Ordovician and early Silurian of northern Yukon, Arctic Islands and Hudson's Bay in an effort to better define evolutionary developments of the two fossil groups through the Ordovician-Silurian transition.
663. McGUGAN, A., Univ. Calgary (Geology and Geophysics):
Cretaceous and Late Paleozoic Foraminifera.
See:
Biostratigraphy and paleoecology of Upper Cretaceous (Campanian and Maestrichtian) Foraminifera from the upper Lambert, Northumberland, and Spray Formations, Gulf Islands, British Columbia, Canada; Can. J. Earth., vol. 16, no. 12, p. 2263-2274, 1979.
664. McNEIL, D.H., Geol. Surv. Can.:
Mesozoic and Cenozoic Foraminifera of the Arctic western mainland of Canada, 1978-..
665. MATTHEWS, J.V., Jr., Geol. Surv. Can.:
Late Cenozoic fossil insects and Late Cenozoic paleoecology, 1973-..
666. MORGAN, A.V., MORGAN, A., Univ. Waterloo (Earth Sciences):
Paleontomology – An analysis of climatic change, 1977-..
See:
The fossil coleoptera of the Two Creeks Forest Bed, Wisconsin; Quaternary Res., vol. 12, p. 226-240, 1979.
On the *gibbulus* group of *Anotylus*, and fossil occurrences of *Anotylus gibbulus* (Staphylinidae); Systematic entomology, vol. 4, p. 215-221, 1979.
Research is continuing in the analysis of a number of fossil sites, centred in southern Ontario, with the objective of understanding the distribution of beetle species through the Sangamon and Wisconsin stages.
667. NOBLE, J.P.A., Univ. New Brunswick (Geology):
Faunal and sedimentary history of the North Appalachian Orogen, 1975-85.
See:
Early Silurian biofacies and lithofacies in relation to Appalachian Basins in New Brunswick; Bull. Can. Petrol. Geol., vol. 27, no. 2, p. 242-265, 1979.
The relative significance of depth and substrate in Lower Paleozoic community distributions; Paleogeography, Paleoclimatology, Palaeoecology, vol. 27, p. 167-178, 1979.
Large paleontologic and sedimentary collections have allowed the establishment of a stratigraphic framework, based mostly on brachiopods and lithostratigraphy, in northern New Brunswick. More detailed work on corals and stromatoporoids has just been initiated.
Paleoenvironmental and paleogeographic interpretations have been made for the Llandovery and Wenlock sediments of the Petit Rocher, Charlo and
- Upsalquitch areas of New Brunswick and preliminary ideas relating them to the Appalachian Orogen have been published. In addition the relative significance of depth and substrate and other factors in the distribution of Lower Paleozoic communities has been assessed and published.
668. NORRIS, A.W., Geol. Surv. Can.:
Brachiopods of the lower Upper Devonian Waterways Formation of northeastern Alberta, 1977-..
669. NOWLAN, G.S., Geol. Surv. Can.:
Paleozoic conodonts of eastern Canada, 1977-..
See:
A microfauna associated with Early Cambrian trilobites of the *Callavia* Zone, northern Antigonish Highlands, Nova Scotia; Can. J. Earth Sci., vol. 17, no. 13, p. 400-418, 1980.
A Late Ordovician fossil assemblage from an outlier north of Aberdeen Lake, District of Keewatin; Geol. Surv. Can., Bull. 321, p. 1-26, 1979.
670. PARKINS, W.G., DIXON, O.A., Univ. Ottawa (Geology):
Late Silurian rugose corals of Somerset and Cornwallis Islands, Arctic Canada, 1977-82; Ph.D. thesis (Parkins).
Systematic, paleoecological and biostratigraphic study of solitary rugose coral faunas from the Late Silurian Read Bay Formation of Somerset and Cornwallis Islands. All field work has been completed in 1979.
671. PEDDER, A.E.H., Geol. Surv. Can.:
Stratigraphically important cystimorph corals from the Lower Devonian of western Canada, 1975-..
See:
Devonian corals of late Eifelian age from the Ogilvie Formation of Yukon Territory; Can. J. Earth Sci., vol. 17, no. 3, p. 594-616, 1980.
672. PICKERILL, R.K., Univ. New Brunswick (Geology):
Paleontology, ichnology, sedimentation and stratigraphy of selected Lower Paleozoic sequences in eastern Canada, 1976-..
Ichnology of the Trenton Group in the Quebec City area; Can. J. Earth Sci., vol. 16, no. 10, p. 2022-2039, 1979.
A reinterpretation of *Astropolithon hindi* Dawson 1878; J. Sed. Petrology, vol. 49, no. 3, p. 1029-1036, 1979.
The nature, origin and significance of the Carmanville ophiolitic mélange, northeastern Newfoundland; Can. J. Earth Sci., vol. 16, no. 7, p. 1439-1451, 1979.
Chemistry and prehnite-pumpellyite facies metamorphism of calc-alkaline Carboniferous volcanic rocks of southeastern New Brunswick; Can. J. Earth Sci., vol. 16, no. 5, p. 1071-1085, 1979.
673. PLINT-GEBERL, H.A., VON BITTER, P.H., Univ. Toronto (Geology), Royal Ontario Museum (Invert. Paleontol.):
Conodont biostratigraphy, palaeoecology, and taxonomy, Windsor Group, Lower Carboniferous, Magdalen Islands, Québec, 1978-81; M.Sc. thesis (Plint-Geberl).
A total of ninety-two samples of Lower Carboniferous Windsor group were collected in June/1979, and approximately one-third of these samples have been processed. Recovery of conodonts is variable in those samples picked. The genus *Cavusgnathus windsorensis* has been recognized.
674. RAFEK, M.B., Univ. Saskatchewan (Geological Sciences):
Triassic conodonts from Alberta, British Columbia, and southern Yukon, 1978-80.
675. RIGBY, J.K., DIXON, O.A., Brigham Young Univ., (Geology), Univ. Ottawa (Geology):
Late Silurian sponges of Somerset and Cornwallis Islands, Canadian Arctic, 1979-..
See:
Sponge fauna of the Upper Silurian Read Bay Formation, Somerset Island, District of Franklin, Arctic Canada; J. Paleontology, vol. 53, p. 587-627, 1979.,

676. RIVÁ, J.R., Univ. Laval (Geology):
Taxonomy and biostratigraphy of Ordovician graptolites and the problem of the Ordovician/Silurian boundary, 1961-.
- See:**
Revision and correlation of late Middle Ordovician stratigraphy northeast of Quebec City; Can. J. Earth Sci., vol. 16, no. 7, p. 1467-83, 1979.
- The following project are in the way of completion:
1) *Didymograptus bifidus* (Hall) and its actual biostratigraphic position; 2) Deformed latest Ordovician graptolites from Maine; 3) Review of Middle Ordovician graptolites from Oklahoma; and 4) Revision of latest Ordovician graptolites from the Upper Ordovician of Oklahoma, Arkansas and Nevada-Idaho.
677. RUDKIN, D.M., Royal Ontario Museum (Invert. Palaeontol.):
Additions to the trilobite fauna of the Georgian Bay Formation (Upper Ordovician) at Toronto, Ontario, 1980-81.
- Two species, representing two previously unrecorded orders, have been discovered in old and new collections from the Georgian Bay Formation at Toronto. A single poorly preserved specimen of an odontopleurid, and a large number of a possibly new proetid trilobite, can be added to the older published records of *Flexicalymene*, *Isotelus*, and *Cryptolithus*. A rich ichnofauna from the same formation includes traces attributable to *Flexicalymene* and *Isotelus*.
678. RUDKIN, D.M., LUDVIGSEN, R., Univ. Toronto (Geology):
Trilobites of the Verulam Formation (Middle Ordovician), southern Ontario, 1978-81; M.Sc. thesis (Rudkin).
- Collections from the lower member of the Verulam Formation in the Lake Simcoe region have yielded an abundance of well-preserved trilobites including at least two subfamilies not previously known from the Ordovician of Ontario, the Otariinae and Acanthoparyphinae. In addition, a number of species which have been considered rare are now known to occur locally in large numbers.
679. SKEVINGTON, D., FORTEY, R.A., LANDING, E., Memorial Univ. (Geology):
Graptolite faunas of the North Atlantic region, with special reference to Newfoundland, 1976-.
- See:**
A mixed Atlantic/Pacific province Middle Ordovician graptolite fauna in western Newfoundland; Can. J. Earth Sci., vol. 16, no. 9, p. 1899-1902, 1979.
- Correlation of Cambrian-Ordovician boundary between Europe and North America: new data from western Newfoundland; Can. J. Earth Sci., vol. 17, no. 3, p. 382-388, 1980.
- Emphasis on collection of graptolites, and associated faunas, across the Cambrian-Ordovician boundary interval in western Newfoundland, aimed at the establishment of a boundary stratotype in the region. Also, extensive collecting carried out with a view to improving early Middle Ordovician graptolite zonation in eastern Canada.
680. STEARN, C.W., McGill Univ. (Geological Sciences):
Stromatoporoids and the paleoecology of Canadian Paleozoic reefs.
- See:**
Biostratigraphy of Devonian stromatoporoids; Palaeont. Soc., Sp. Paper 23, p. 229-232, 1979.
- Stromatoporoids; The Encyclopedia of Paleontology, p. 775-778, Dowden, Hutchinson and Ross, 1979.
681. STOREK, P., VON BITTER, P.H., Royal Ontario Museum (Invert. Palaeontol.):
Micropalaeontology and source bed analysis of cherts used by Palaeo-Indians of Ontario, 1978-81.
682. SULEK, J.A., Esso Resources Canada Ltd., (Exploration Research):
Tertiary, Cretaceous, Jurassic and Triassic micropaleontology of the Beaufort, Arctic and East Coast Areas, 1975-.
683. TELFORD, P.G., Ontario Geol. Surv.:
Silurian and Devonian conodont taxonomy and biostratigraphy, Ontario, 1973-.
684. TOZER, E.T., Geol. Surv. Can.:
Canadian Triassic Ammonoidea and Bivalvia, 1967-.
- See:**
Latest Triassic ammonoid faunas and biochronology, Western Canada; Geol. Surv. Can., Paper 79-1B, p. 127-135, 1979.
- New genera of Triassic Ammonoidea; Geol. Surv. Can., Paper 80-1A, p. 107-113, 1980.
685. UYENO, T.T., Geol. Surv. Can.:
Stratigraphy and conodont zonation of Lower and Upper Devonian strata of southwestern Ontario, 1966-.
686. UYENO, T.T., Geol. Surv. Can.:
Conodont biostratigraphy of Siluro-Devonian rocks of the Arctic Islands, 1968-.
- See:**
Subsurface stratigraphy and conodont zonation of the Lower Paleozoic succession, Arctic Platform, southern Arctic Archipelago; Geol. Surv. Can., Paper 80-1A, p. 209-215, 1980.
687. VON BITTER, P.H., LUDVIGSEN, R., Royal Ontario Museum (Invert. Palaeontol.), Univ. Toronto (Geology):
Formation and function of protegular pitting of some Acrotretid brachiopods from North America, 1977-79.
- See:**
Formation and function of protegular pitting in some North American Acrotretid brachiopods; Palaeontology, vol. 22, pt. 3, p. 705-720, 1979.
688. VON BITTER, P.H., MERRILL, G.K., Royal Ontario Museum (Invert. Palaeontol.), College of Charleston (Geology):
Conodont distributions in the Pennsylvanian of North America—their taxonomic and palaeoecologic implications, 1968-.
- See:**
Evolution of Carboniferous conodont communities: Conodont biofacies through time; 8th Internat. Congr. Carboniferous Strata and Geol., vol. 3, p. 222-229, 1979.
689. VON BITTER, P.H., PLINT-GEBERL, H.A., Royal Ontario Museum (Invert. Palaeontol.), Univ. Toronto (Geology):
Palaeoecology and biostratigraphy of Lower Carboniferous (Windsor and Codroy Groups) conodonts, Atlantic Provinces, Canada, 1971-.
690. WADDINGTON, J., Royal Ontario Museum (Invert. Palaeontol.):
A soft substrate community with edrioasteroids, from the Verulam Formation (Middle Ordovician) at Gamebridge, Ontario, 1975-79.
- See:**
Can. J. Earth Sci., vol. 17, no. 5, p. 674-679, 1980.
691. WADDINGTON, J., Royal Ontario Museum (Invert. Palaeontol.):
Pentamerid brachiopods of Manitoulin Island, Ontario, 1979-.
692. WALL, J.H., Geol. Surv. Can.:
Reconnaissance of Mesozoic Foraminifera of Arctic Islands, 1972-.
693. WALL, J.H., Geol. Surv. Can.:
Triassic Foraminifera of the Sverdrup basin, District of Franklin, 1979-.
694. WESTROP, S., LUDVIGSEN, R., Univ. Toronto (Geology):
Systematics and paleoecology of Upper Ordovician trilobites from the Red River Formation, southern Manitoba, 1977-79; M.Sc. thesis (Westrop).
- The Selkirk Member of the Red River Formation at Garson, Manitoba contains a trilobite association of 22 species representing 19 genera. This association is dominated by illaenids (*Bumastoides* and *Illaenus*), cheirurids (*Ceraurinus*) and lichids (*Amphiliichas*) and is an example of the illaenid-cheirurid community type. The trilobites form a minor portion of a subtidal, level-bottom palaeocommunity dominated by deposit feeder burrows, mound stromatoporoids, tabulate and rugose corals, receptaculitids, cephalopods and gastropods. The Selkirk palaeocommunity differs markedly in composition from coeval subtidal palaeocommunities from the Trenton Group of New York State. These differences appear to reflect differences in palaeoenvironmental setting.
695. WESTROP, S., LUDVIGSEN, R., Univ. Toronto (Geology):
Systematics and paleoecology of the trilobites of the Ptychaspis biomere, southern Canadian Rocky Mountain, 1979-; Ph.D. thesis (Westrop).
- In the southern Canadian Rockies, the Ptychaspis biomere occurs in the Bison Creek (Upper Franconian) and Mistaya (Trempealeau) Formation of southwestern Alberta and in the lower half of the McKay Group of southeastern British Columbia. The former two formations represent a Grand Cycle of Sullivan type: the Bison Creek records an influx of clastic sediment over the shelf following a transgression while the limestones of the Mistaya Formation were deposited as a peritidal carbonate complex prograded across the shelf. Carbonate deposition was terminated by a transgression at the base of the Ordovician Survey Peak Formation. The variety of palaeoenvironments present within the Bison Creek and Mistaya Formations and the McKay Group offer an opportunity to make a detailed examination of relationships between trilobite biofacies and lithofacies.

VERTEBRATE/VERTÉBRÉS

696. EDMUND, A.G., Royal Ontario Mus. (Vert. Palaeo.):
Tertiary radiation of giant armadillos (Pampatheriinae, Mammalia) in South America, 1964-82.

In the course of reviewing North American pampatheres, it became evident that the entire group was in need of a rigorous review. Little has been done to elucidate relationships or to review the taxonomy for almost thirty years. Of particular interest will be the South American phyletic lines leading to the two North American genera. However, the position of the fine specimens collected by the R.O.M. in Peru in 1958 has yet to be determined, as does that of the material from the caverns of Lagoa Santa in Brasil. New material from several localities will be examined, along with previously known specimens which were inadequately described. The result should be the first comprehensive revision based on modern concepts of phylogeny and taxonomy.

697. EDMUND, A.G., Royal Ontario Mus. (Vert. Palaeo.):
Osteology, taxonomy and distribution of the giant ground sloths of the Genus *Eremotherium* (Xenarthra, Mammalia), 1964-83.

During the period 1968 to 1978 a large suite of bones referable to the genus *Eremotherium* were collected in the city of Daytona Beach, Florida. These were identified and composite skeletons were selected by the writer. One was mounted by the Royal Ontario Museum and erected at the Museum of Arts and Sciences, Daytona Beach, Florida. Much of the remaining collection was donated to the Royal Ontario Museum where it complements the large collection of the same genus from Ecuador and Peru. In the meantime, other specimens have been found in various localities in the U.S. and Central and South America, and have been made available for study. Most seem to be referable to Leidy's species *E. mirabile*, but a few specimens of gigantic size or different morphology may suggest either sexual dimorphism or the presence of undescribed taxa.

In addition to a complete description based on the recently collected material, the plethora of older names must be reexamined and the taxonomy reviewed. Much of the descriptive work has been done, but the systematic section will require several years of careful research, some of it in South American institutions.

698. EDMUND, A.G., Royal Ontario Mus. (Vert. Palaeo.):
Osteology and functional morphology of the Pleistocene giant armadillo, *Holmesina septentrionalis* (Pampatheriinae, Xenarthra, Mammalia), 1965-80.

All known specimens of the giant armadillo *Holmesina septentrionalis* were measured and described. The species is confined to an area bounded by Kansas, Central Mexico, South Carolina and Florida, with most of the specimens from Florida. It evolved from a late Pliocene or early Pleistocene ancestor and is confined to the Rancholebrean and latest Irvingtonian Land Mammal Stage. The range of size and morphological variability has been determined, and illustrations of most of the individual bones were completed. While no complete skeleton is known, adequate partial individuals permit a detailed description. The animal attained a length of almost three metres and is characteristic of subtropical or at least warm temperate climate, confined to coastal areas and major river valleys. It became extinct approximately 10,000 years B.P.

699. EDMUND, A.G., Royal Ontario Mus. (Vert. Palaeo.): Evolution of a single phyletic line of giant armadillos (Pampatheriinae, Mammalia) in Florida during the Pleistocene, 1975-80.
- The description of fragmentary remains of a small pampatherium from the late Pliocene or early Pleistocene of Florida suggested it was ancestral to the later *Holmesina septentrionalis*. Named *Kraglievichia floridanus* Robertson because of its similarity to the Argentinian species *K. paranense*, this animal appears to have migrated to Florida with the first wave of migrants from South America following the establishment of the Panamanian isthmus.
- A fine series of intergrades between the Blancan species, *K. floridanus* and the Rancholabrean species *Holmesina septentrionalis*, made available mainly by the Florida State Museum, showed that there was a gradual increase in size and change in morphological characters during a period of approximately three million years. Except for a rapid range extension, probably in the Sangamon, this evolutionary process occurred entirely in Florida. A first draft of the manuscript outlining this well-documented evolutionary history has been prepared.
700. EDMUND, A.G., Royal Ontario Mus. (Vert. Palaeo.): A new giant armadillo (Pampatheriinae, Mammalia) from the Late Pleistocene of Texas and Mexico, 1977-80.
- While surveying all known specimens of giant armadillos, it was noted that several from Texas and Mexico showed minor but constant differences from the more widely distributed *Holmesina septentrionalis*. The affinities of the Texas-Mexico population appear to lie closest to those of *Pampatherium* of Argentina and Brazil. The osteoderms (scutes) are flatter and less ornamented, the anterior dentition is less "molarized", and the skeleton appears to be slightly more gracile than in *H. septentrionalis*. The known specimens are confined to the later Pleistocene, probably the Rancholabrean, indicating a late migration of an already established South American species. A paper describing this animal, with speculation regarding its ancestry, is in manuscript form.
701. MCDONALD, H.G., EDMUND, A.G., Royal Ontario Mus. (Vert. Palaeo.): A description of *Scelidodon* from the Pleistocene tar seeps of Ecuador and Peru, and review of the scelidotheres (Mylodontidae, Mammalia), 1978-81; Ph.D. thesis (McDonald).
- Collections made by G. Edmund of the Royal Ontario Museum in Peru and Ecuador in 1958 and 1961 contained large numbers of isolated elements assigned to the giant ground sloth genus *Scelidodon*. Comparison with the literature and with specimens in other museums revealed that the taxonomic status of the genera *Scelidodon* and *Scelidotherium* required restudy and revision. Many of the species have been erected on the basis of minor differences or on inadequate material. A thorough description of the single population from Ecuador and Peru will indicate the normal range of variability, permitting a critical review and reassessment of the large number of named and unnamed specimens collected elsewhere in South America. While some of this work can be done from the literature, first-hand examination of the original materials will be necessary, requiring travel to South America, and, if possible, to Europe.
702. SKWARAWOOLF, T., KUPSCH, W.O., Univ. Saskatchewan (Geological Sciences): Quaternary biostratigraphy and paleoecology of the Interior Plains, Canada, 1979-82; Ph.D. thesis (SkwaraWoolf).
- See:
Mammals of the Riddell local fauna (Floral Formation, Pleistocene, Late Rancholabrean), Saskatoon, Canada; Saskatchewan Culture and Youth, Mus. Natural Hist., Nat. Hist. Contrib. No. 2, 1980.
- Vertebrate fossils from the Riddell member of the Floral Formation in the Saskatoon area (M.Sc. thesis, Univ. Saskatchewan, 1979) are Late Rancholabrean in age and represent a major interglacial episode. The Floral Formation is known across southern Saskatchewan where some deposits have been dated at 600,000 years B.P. Includes: investigation of vertebrate palaeontology and intraformational stratigraphy of the Floral Formation, palaeoecology and palaeoenvironmental reconstruction, and biostratigraphical correlation of Pleistocene deposits in Saskatchewan with Pleistocene sequences near Medicine Hat, Alberta.
703. STORER, J.E., Saskatchewan Mus. Nat. Hist.: Mammals of the Cypress Hills Formation (Oligocene, Chadronian), 1978-.
- See:
Rodents of the Calf Creek local fauna (Cypress Hills Formation, Oligocene, Chadronian), Saskatchewan; Nat. Hist. Contrib., Saskatchewan Mus. Nat. Hist., No. 1, 1979.
- Manuscript on Lagomorpha in final stages of preparation, on Leptomericidae (Artiodactyla) in preparation, on Protoceratidae (Artiodactyla) and Multituberculata in preparation, in collaboration with other authors.
704. STORER, J.E., Saskatchewan Mus. Nat. Hist.: Miocene mammals, Cypress Hills Formation (Miocene, Hemingfordian), 1976-81.
705. WELLSTEAD, C.F., Redpath Museum, McGill Univ. (Biology): Taxonomic re-assignment of the Miocene lizard *Peltosaurus minimus*, from Nebraska, U.S.A., 1976-80.
- Fossil material from the Miocene Valentine Formation of Nebraska incorrectly assigned to the anguid species *Peltosaurus minimus* is re-assigned to the scincid genus *Emeces*. This re-assignment returns the upper limit of the known stratigraphic range of *Peltosaurus* to the Gering Formation to the lower Miocene.
706. WELLSTEAD, C.F., CARROLL, R.L., McGill Univ. (Biology): Comparative study and taxonomic revision of the extinct amphibian families Lysorophidae and Molgophidae, 1977-80; Ph.D. thesis (Wellstead).
- An anatomical description and reconstruction of the lysorophid genera *Lysorophus* and *Cocytinus* and molgophid genera *Molgophis* and *Megamolgophis*. The planned comparative study of the musculature in extant amphibians should allow a reasonable reconstruction of the skull musculature of *Lysorophus* and a conclusion as to the probable kinesis of the skull. As the genera concerned are based on limited material originally, the results of the project may necessitate taxonomic revision.
707. WELLSTEAD, C.F., CARROLL, R.L., McGill Univ. (Biology): The oldest known lepospondyl amphibian, 1979-80.
- The mid-Visean, elongate lepospondyl amphibian discovered in 1882 by Th. Stock and identified by him as "Ophiderpeton" has lain undescribed for nearly a century. Although the skull is obscured by a recalcitrant matrix, study of the post-cranial anatomy of the specimen shows it to lack limbs and to possess vertebrae similar to those of other aistopods in having foramina for spinal nerves and in general form. However, K-shaped ribs and dorsal osteoderms, typical of *Ophiderpeton*, are absent. Differences from members of the Ophiderpetontidae support the erection of a new genus and family for this specimen.
708. WIGHTON, D.C., MITCHELL, P., WILSON, M.V.H., Univ. Alberta (Zoology, Genetics): Fossil insects from the Paleogene of western Canada, 1975-.
- See:
Larval and adult insects from the Paleocene of Alberta, Canada; Can. Entomologist, vol. 11, p. 777-782, 1979.
- Continued collecting of fossil insects in Paleocene formations in Alberta and in Eocene formations in British Columbia. Description of adult and larval tipulids from the Paskapoo Formation is in preparation.
709. WILSON, M.V.H., Univ. Alberta (Zoology): Eocene fossil fishes of western North America, 1975-.
- See:
A second species of *Libotonius* (Pisces: Percopsidae) from the Eocene of Washington State; Copeia, p. 400-405, 1979.
- Continued collecting of Eocene fishes in British Columbia and of Eocene and Oligocene fishes elsewhere in western North America. Description of Eocene *Amia* from the Allenby Formation of British Columbia and an Eocene teleost assemblage from the Coalmont Formation of Colorado are in preparation.
710. WILSON, M.V.H., Univ. Alberta (Zoology): Eocene lake environments: depth and distance-from-shore variation in fish, insect and plant assemblages, 1975-80.
711. WILSON, M.V.H., Univ. Alberta (Zoology): Paleocene freshwater fishes of western Canada, 1978-.
- See:
Oldest known *Esox* (Pisces: Esocidae), part of a new Paleocene teleost fauna from western Canada; Can. J. Earth Sci., vol. 17, no. 3, p. 307-312, 1980.
- Continued collecting of Paleocene freshwater fishes, especially in the Paskapoo Formation of Alberta. Main objectives are reconstruction of the Paleocene freshwater fish fauna, clarification of the anatomy of some of the fish taxa present, determination of the geologic ages of some of the assemblages, and reconstruction of the habitats and phylogenies of some of the fishes.

PALEOBOTANY/PALYNOLOGY/
PALÉBOTANIQUE ET ANALYSE POLLINIQUE

712. ACHAB, A., INRS-Pétron: Etude palynologique de l'Ordovicien moyen et supérieur de l'île d'Anticosti et des Basses Terres du Saint-Laurent, 1977-81.
713. ACHAB, A., INRS-Pétron: Etude des Chitinozoaires de l'Ordovicien inférieur et moyen de la province de Québec, 1978-81.
714. ARTZNER, D., NORRIS, G., Univ. Toronto (Geology): Palynology of the Upper Cretaceous marine and non-marine strata, Book Cliffs, east-central Utah, 1974-80; Ph.D. thesis (Artzner).
- Integrated studies of miospore and dinoflagellate distributions in transitional environments represented in the Mancos Shale, Star Point Sandstone, Blackhawk Formation, and Price River Formation have allowed assessment of facies and their correlation along approximately a 45 km section. All lithologies have been studied to ascertain the effect of lithofacies on palynomorph abundances. Coal seams in the Blackhawk Formation have distinctive palynomorph assemblages which may indicate that restricted marine conditions were common in the coal swamp environment. Opeel zonation of the miospore and dinoflagellate assemblages has allowed correlation between sections and indicated diachronous lithosomes. Comparative palynostratigraphic studies indicate an age for the studied formations close to the Cretaceous-Tertiary boundary. Recycling is important in the area and confuses age determinations.
715. BARSS, M.S., Geol. Surv. Can.: Palynological zonation of the Carboniferous and Permian rocks of Atlantic Provinces, Gulf of St. Lawrence and northern Canada, 1968-.
716. BROOKES, I., VON BITTER, P.H., McANDREWS, J.H., York Univ (Geography), Royal Ontario Museum (Invert. Paleontol.): Biostratigraphy of a Pleistocene section containing 40,000 ± year old wood, western Newfoundland, 1978-81.
717. BUJAK, J., Geol. Surv. Can.: Biostratigraphy and paleoecology (palynology) of Mesozoic and Cenozoic of the Atlantic Shelf, 1976-.
718. DAVIS, A.M., LIU, K-B., Univ. Toronto (Geography): Holocene history of the Boreal forest in northern Ontario, 1978-81; Ph.D. thesis (Liu).
- Documents the vegetational history of the boreal forest in northern Ontario since deglaciation. The reconstructions will be based on pollen analysis from the sediments of four lakes in a N/S transect from Sudbury to Cochrane. An attempt will be made to determine internal variations in the pollen signatures of the boreal forest that result from climate and from substrate differences.
719. DONALDSON, J.A., HORODYSKI, R.J., KERANS, C., Carleton Univ (Geology), Tulane Univ. (Geology): Stromatolites and microfossils of the Dismal Lakes Group, Northwest Territories, 1977-82.
- See:
Microfossils from the middle Proterozoic Dismal Lakes Group, Arctic Canada; Precambrian Res., vol. 2, 1980.

- Description, identification and interpretation of stromatolites and microfossil assemblages from the Dismal Lakes Group, with emphasis on stratigraphic persistence, paleoecology and potential for correlation.
720. DUFFIELD, S.L., LEGAULT, J.A., BARNES, C.R., Univ. Waterloo (Earth Sciences):
Palynostratigraphy and paleoecology of the Llandoverly rocks of Anticosti Island, Quebec, 1979-81; Ph.D. thesis (Duffield).
721. EDLUND, S.A., Geol. Surv. Can.:
Vegetation distribution and relationship to surficial materials, Arctic Canada, 1976-.
- See:
Vegetation of Lougheed Island, District of Franklin; Geol. Surv. Can., Paper 80-1A, p. 329-333, 1980.
722. FASOLA, A., NORRIS, G., Univ. Toronto (Geology):
Upper Cretaceous palynostratigraphy, southern and central Manitoba, 1974-80; Ph.D. thesis (Fasola).
Albian to Campanian dinoflagellates from the Cretaceous of central and southern Manitoba have been investigated taxonomically and biostratigraphically. Established zones are being correlated locally and with sections in offshore eastern Canada. Abundant spores and pollen and certain horizons indicate proximity to shorelines but generally an offshore environment prevailed.
723. HOPKINS, W.S., Jr., Geol. Surv. Can.:
A palynological study of the Shell Anglo Harlequin D-86, Murrelet L-15, Auklet G-14, and Osprey D-36 wells, offshore British Columbia, 1974-.
724. HOPKINS, W.S., Jr., Geol. Surv. Can.:
Mesozoic and Tertiary continental microfloras from Northwest Territories, Yukon Territory, British Columbia, Alberta, 1979-.
725. IOANNIDES, N.S., Geol. Surv. Can.:
Taxonomy, biostratigraphic and paleoecology of Mesozoic and Cenozoic palynomorph assemblages from the Mackenzie Delta, Beaufort Sea and Arctic regions, District of Mackenzie, 1978-.
- See:
A preliminary palynological study of the Caribou Hills outcrop section along the Mackenzie River, District of Mackenzie; Geol. Surv. Can., Paper 80-1A, p. 197-208, 1980.
726. JANSONIUS, J., Esso Resources Canada Ltd. (Exploration Research):
Stratigraphic application of fungus spores, 1973-82.
A number of species and genera of fungus spores have been circumscribed, and initial stratigraphic ranges for them tabulated.
727. JANSONIUS, J., GANNON, E.M., Esso Resources Canada Ltd. (Exploration Research):
Paleogene biostratigraphy, Tuk Peninsula, Northwest Territories, 1977-80.
728. JANSONIUS, J., HILLS, L.V., Esso Resources Canada Ltd. (Exploration Research), Univ. Calgary (Geology):
Genera file of fossil spores, 1964-.
- See:
Genera file of fossil spores; Sp. Publ., Dept. Geol., Univ. Calgary, Supplement III, p. 3521-3628, 1979.
729. LEGAULT, J.A., Univ. Waterloo (Earth Sciences):
Palynostratigraphy of the Upper Ordovician - Lower Silurian of Manitoba, 1976-80.
730. LEGAULT, J.A., Univ. Waterloo (Earth Sciences):
Palynostratigraphy of the Road River Formation, Richardson Mountains, District of Mackenzie, 1978-81.
731. LEGAULT, J.A., Univ. Waterloo (Earth Sciences):
Palynostratigraphy of Trenton rocks of the Peterborough area, Ontario, 1979-81.
732. LICHTI-FEDEROVICH, S., Geol. Surv. Can.:
Diatom analysis and paleoecological studies of Quaternary sediments, 1972-.
- See:
Contributions to the diatom flora of Arctic Canada: Report I Scanning electron micrographs of some freshwater species from Ellesmere Island; Geol. Surv. Can., Paper 79-1B, p. 71-82, 1979.
733. MCGREGOR, D.C., Geol. Surv. Can.:
Silurian and Devonian spores of Canada, 1975-.
- See:
Devonian spores from the Barrandian region of Czechoslovakia and their significance for interfacies correlation; Geol. Surv. Can., Paper 79-1B, p. 189-197, 1979.
734. MAMET, B., BÉLAND, J., HUBERT, C., LESPÉRANCE, P.J., Univ. Montréal (Géologie):
Microfacies carbonates du Paléozoïque.
- Voix:
Algues et stratigraphie du Paléozoïque supérieur de l'Arctique Canadien; Bull. Centre Rech. Explor. - Prod. Elf-Aquitaine, vol. 3, no. 3, p. 669-683, 1979.
- Zonation du Carbonifère par Formainifères. Echantillons de tous les bassins canadiens (Alberta, Colombie-Britannique, Yukon, Arctique, Appalachés) et américains. Etude des Algues de ces mêmes bassins en relation avec les environnements carbonatés. Carbonates de l'Ordovicien des Basses Terres du Saint-Laurent. Microfacies et écologie. Algues de l'Ordovicien, Silurien et Dévonien de Gaspésie, d'Anticosti et des Basses-Terres.
735. MOTT, R.J., Geol. Surv. Can.:
Quaternary palynology, 1969-.
736. NORRIS, G., Univ. Toronto (Geology):
Tertiary palynostratigraphy, Mackenzie Delta region, Northwest Territories, 1979-83.
Thick deltaic clastic sections of Cenozoic age are being investigated to document the occurrence of spores, pollen, and dinoflagellates. Several zones have been erected spanning the Paleocene-Pliocene interval. Most assemblages appear to be non-marine but marine assemblages have been extracted from specific - mostly Paleogene - horizons. The terrestrial assemblages record a progressive cooling of the climate from possibly sub-tropical in the Eocene to Boreal commencing in the Pliocene. Sub-Recent sediments from the southern Beaufort Sea have been examined for dinoflagellates and proved to be characterized by assemblages quite unlike any encountered in the subsurface or elsewhere in the Recent or sub-Recent.
737. NORRIS, G., DOBELL, P., Univ. Toronto (Geology):
Palynostratigraphy of lignite-bearing Mesozoic sediments, Moose River Basin, Ontario, 1979-82; Ph.D. thesis (Dobell).
Surface and subsurface sampling of the Mattagami Formation indicates a Middle Albian age for the Onakawana Lignite. Correlative strata are present in the southern and eastern portions of the basin. The newly discovered Adam Creek lignite is demonstrated to be younger than the Onakawana lignite. Thus the commercially significant lignites appear to occupy a wider stratigraphic interval than originally thought and potentially may occur near the surface away from the margins of the Basin.
738. NORRIS, G., DOBELL, P., Univ. Toronto (Geology):
Palynology of the Cargill carbonatite Northern Ontario: a far northern occurrence of the Upper Cretaceous *Normapalles* genera.
Palynological analysis of detrital material on the karstic surface of the Cargill carbonatite yielded a diverse flora of Upper Cretaceous *Normapalles* plus numerous bryophyte spores. This occurrence is unique in being a) the first reported occurrence of Upper Cretaceous sediments in Ontario, and b) the most northerly occurrence of the "*Normapalles* suite" an unusual pollen group known from the southeastern United States seaboard, Europe, and parts of the U.S.S.R. Future work will involve palynological analysis of the rest of the drill hole plus descriptions and taxonomy of the new species present.
739. POCOCK, S.A.J., Esso Resources Canada Ltd. (Exploration Research):
Jurassic and Cretaceous palynology, 1957-.
Work during 1979 has concentrated upon palynological dating and correlation of Jurassic strata in the Arctic Islands. Currently most time is being spent in elucidating Middle Jurassic assemblages from the region.
740. POCOCK, S.A.J., Esso Resources Canada Ltd. (Exploration Research):
Gymnosperm palynology of the Early Tertiary and Late Cretaceous strata of the Yukon Coastal Plain and northwestern Mackenzie Delta, 1979-80.
- To study problems inherent in the employment of Gymnosperm pollen as a tool in Cretaceous-Tertiary palynostratigraphy. Its aim is to describe the taxa of Gymnosperm pollen present in the sediments in detail and to employ them in both qualitative and numerical studies of the dating, correlation and paleoecology of the sediments of the study area.
741. POCOCK, S.A.J., MASRAN, T.C., Esso Resources Canada Ltd. (Exploration Research):
Classification and interpretation of particulate organic matter in sediments, 1974-.
- To establish a practical and meaningful classification for particulate organic matter in sediments and investigate the value of these materials in petroleum source rock analysis and in the investigation of paleoenvironments. Investigation of both Recent and fossil organic sedimentary materials is being undertaken.
742. POCOCK, S.A.J., VASANTHY, G., Esso Resources Canada Ltd., (Exploration Research), Institut Français, Pondichery, India:
A key to the genera of fossil and living Gymnosperm pollen, 1978-80.
The construction of an annotated key to the genera of fossil and living Gymnosperm pollen - including a key, full bibliography and glossary of terms employed. The project is aimed at gaining a better understanding of these types of pollen and attempting to make them more generally useful for purposes of stratigraphic dating and correlation.
743. POPLAWSKI, S., NORRIS, G., Univ. Toronto (Geology):
Maastrichtian-Lower Paleogene dinoflagellate stratigraphy and paleoecology in Alabama, 1975-80; Ph.D. thesis (Poplawski):
Dinoflagellate assemblages from the Alabama Upper Cretaceous-Lower Tertiary limestones and sandstones are very rich and well preserved. A very clear change takes place at the base of the Tertiary with introduction of many new taxa - the floral assemblages will be compared with others of similar age from other parts of the world. Statistical analysis of the distributions will be undertaken to reveal and separate the ecologic and stratigraphic components - trace element analyses will be continued to investigate the potentiality of this approach.
744. RICHARD, P.J.H., BOUCHARD, M., DENTON, D. D., Univ. Montréal (Géographie et Géologie):
Histoire de la déglaciation et de la végétation postglaciaire dans la Région du Lac Delorme, Nouveau-Québec (100 km à l'ouest de Schefferville), 1979-80.
5 carottes de sédiments lacustres ont été obtenues, le long d'un transect de 90 km orienté SW-NE et se terminant au centre de la dernière zone de fonte de l'inlandsis (calotte de scheffer). L'objectif est de dater le retrait du glacier et de reconstituer l'histoire de l'environnement.
745. RICHARD, P.J.H., GAUTHIER, R., JETTE, H., Univ. Montréal (Géographie):
Paléobiogéographie post-Wisconsinienne du Québec, 1979-82; thèse de maîtrise (Gauthier, Jetté).
Cadre visant la reconstitution de l'histoire de la végétation du Québec depuis le retrait glaciaire. Projets spécifiques: Gaspésie, Montérégienne, et morphologie pollinique. Poursuite des travaux entrepris depuis 1968.
746. SARJEANT, W.A.S., FENSOME, R.A., WHEELER, J.W., Univ. Saskatchewan (Geological Sciences):
Dinoflagellates and acritarchs in the Mesozoic: stratigraphical application in Western and Arctic Canada and use in intercontinental correlation, 1962-.
- During the past year, further work has been completed on English Jurassic type sections, specifically on latest Cretaceous assemblages from four localities in England and Scotland. I have also travelled to Europe, to examine dinoflagellate cyst holotypes in the collections of the Institut Royal des Sciences Naturelles and the University of Liège (Belgium) and the Universities of Kiel, Göttingen, Frankfurt-am-Main and Tübingen (Germany) and Sheffield (England). R.A. Fensome has continued his work on spore-pollen assemblages from the Jurassic - lowest Cretaceous of the Yukon and Northwest Territories; and J.W. Wheeler is presently completing his work on the Jurassic - lowest Cretaceous of the Alborz Mountains, Iran.

747. SARJEANT, W.A.S., MOSSMAN, D.J., CURRIE, P., STRINGER, P., Univ. Saskatchewan (Geological Sciences), Univ. New Brunswick, Alberta Prov. Mus.: Vertebrate footprints in the Carboniferous and Triassic rocks of the Maritime Provinces and the Cretaceous rocks of eastern British Columbia, 1976-80.
748. SINGH, C., Alberta Research Council (Geol. Surv.): Cenomanian microfossils of the Peace River district, Alberta, 1969-81.
The microphotographic work and compilation of data on age and stratigraphic distribution of 195 species of microspores, megaspores, pollen and microplankton, characterizing the strata of Cenomanian age in northwestern Alberta, have been completed. A manuscript is currently being compiled for publication as an Alberta Research Council Bulletin.
749. SINGH, C., Alberta Research Council (Geol. Surv.): Late Cretaceous-Tertiary microfossils, west-central Alberta, 1970-81.
750. SINGH, C., Alberta Research Council (Geol. Surv.): Palynological study of the coal-bearing Late Cretaceous strata in the Red Deer River Valley, Alberta 1973-84.
- See:
The Cretaceous-Tertiary boundary in south-central Alberta - a revision based on additional dinosaurian and microfloral evidence; Can. J. Earth Sci., vol. 16, no. 9, p. 1866-1869, 1979.
751. STAPLIN, F.L., GANNON, E.M., POCOCK, S.A.J., Esso Resources Canada Ltd. (Exploration Research): Early Tertiary and Late Cretaceous paleontological correlation, surface to subsurface, Yukon Coastal Plain and Mackenzie Delta areas, 1976-.
752. SWEET, A.R., Geol. Surv. Can.: Palynological studies of Mesozoic and Tertiary coal measures in western and northern Canada, 1971-.
753. SWEET, A.R., Geol. Surv. Can.: Palynological study of the Tertiary coals and associated clastic rocks of the Ravenscrag and Frenchman formations, Saskatchewan, 1973-.
754. SWEET, A.R., Geol. Surv. Can.: Taxonomy and biostratigraphic distribution of Mesozoic and Paleogene megaspores, 1977-.
755. WILLIAMS, G.L., Geol. Surv. Can.: Classification of dinocysts, 1973-.
756. WILSON, M.A., KUPSCH, W.O., Univ. Saskatchewan (Geological Sciences): A study of the climatic and vegetational history of some Quaternary sediments from north-central Saskatchewan, 1977-80; Ph.D. thesis (Wilson).
The Precambrian Shield of northern Saskatchewan is in part overlain by glacial and postglacial deposits. These sediments are composed of organic deposits, peat and gyttja, as well as lacustrine, glaciofluvial, and glacial deposits. Palynomorphs and microfossils are well preserved in the organic and lacustrine deposits. A systematic study of three cores from small lakes in the area has been completed and will be followed by an interpretation of the climatic and vegetational history of the area. Extensive use of the computer will be made for the purposes of the vegetational interpretation.

PETROLOGY/PÉTROLOGIE

EXPERIMENTAL/EXPÉRIMENTAL

754. ALLEN, J.M., FAWCETT, J.J., Univ. Toronto (Geology):
Phase equilibria involving clinzoisite and anorthite: reaction mechanisms in hydrothermal experiments, 1977-81.
Determination of equilibria among clinzoisite/zoisite, tremolite, chlorite, anorthite, calcite and quartz in H_2O-CO_2 fluids at 2-5 kbars. These equilibria are important in the interpretation of mineral assemblages and isograds in carbonate-bearing rocks of the upper greenschist-lower amphibolite facies. The experimental procedure adopted involves determining reaction directions in unseeded and seeded runs, and using the SEM to examine reaction products.
755. BARTHOLOMEW, P.W., GREENWOOD, H.J., Univ. British Columbia (Geological Sciences):
Ion-exchange equilibria and thermodynamic properties of Fe-Mg anthophyllite, enstatite, and olivine, 1979-82; Ph.D. thesis (Bartholomew).
Phases in the system $MgO-FeO-H_2O-SiO_2$ are being equilibrated with Fe-Mg Chloride solutions to determine the equilibrium constants for Fe-Mg exchange. Thermodynamic mixing models will be applied to natural assemblages as potential geothermometers and indicators of equilibrium.
756. CHERRY, M.E., TREMBATH, L.T., Univ. New Brunswick (Geology):
Monoclinic-triclinic alkali feldspar ordering paths, 1978-80.
See:
Order-disorder paths of alkali feldspars; Am. Mineral., vol. 64, 1979.
The pressure quench formation of rapakivi texture; Contrib. Mineral. Petrol., vol. 68, p. 1-6, 1979.
The disordering of alkali feldspars. I. Dry-heating of a microcline perthite; Canadian Mineral., vol. 17, pt. 3, p. 527-535, 1979.
Alkali feldspars from coarse grained and porphyritic granite have been heated at 1025°C for runs of different duration and a 2 step disordering path established. A detailed disordering path for an individual phenocryst has been determined and the study will be extended to include disordering under hydrothermal conditions.
757. EDGAR, A.D., ARIMA, M., Univ. Western Ontario (Geology):
Studies in the system analcite - H_2O at 1 Kbar P_{H_2O} ; importance of the vapour phase, 1977-80.
758. EDGAR, A.D., ARIMA, M., Univ. Western Ontario (Geology):
Stability of wadeite ($K_4Zr_2Si_6O_{18}$) under upper mantle conditions, 1979-80.
759. EDGAR, A.D., ARIMA, M., Univ. Western Ontario (Geology):
Distribution coefficients of K between solids and liquids in mafic-ultramafic liquids at high pressures, 1979-81.
760. EDGAR, A.D., ARIMA, M., Univ. Western Ontario (Geology):
Genesis of katungitic magmas, 1979-81.
761. ENGI, M., GREENWOOD, H.J., Univ. British Columbia (Geological Sciences):
Thermodynamic properties of supercritical chloride solutions from synthetic fluid inclusions, 1979-81.
Fluid inclusions have been prepared by holding cracked quartz in contact with alkali chloride solutions at 2kb, 700°C. The cracks heal and enclose the fluid, permitting examination on a heating-cooling stage. It is proposed to use this technique to sample fluids stable at pressures to 20 kbar and to study the resulting inclusions on the heating stage. It should be possible to derive thermodynamic properties of the fluid from these measurements.
762. GREENWOOD, H.J., Univ. British Columbia (Geological Sciences):
Stability of hydrogrossular and activity of hydrogrossular solid solutions, 1977-81.
Hydrogrossular is synthesized and its equilibrium with quartz, anorthite, and wollastonite is displaced by reducing the activity of H_2O through solid-vapor oxygen buffers. The equilibrium constant will be applied to the substitution $4\text{ protons} = 1\text{ Si}$ in silicate structures and to metamorphosed rodingites.
763. GREENWOOD, H.J., Univ. British Columbia (Geological Sciences):
Thermodynamic properties of edenite, 1978-81.
See:
Geol. Surv. Can., Paper 79-1B, p. 365-370, 1979.
The equilibrium conditions of the reaction tremolite + albite = edenite + 4 quartz are being sought. Amphibole near the edenite composition has been synthesized and analysed by microprobe, together with coexisting plagioclase and clinopyroxene. The equilibrium constant will be used as a geothermometer reversibility in the equilibrium can be demonstrated.
764. MacLELLAN, E.H., TREMBATH, L.T., Univ. New Brunswick (Geology):
Crystallization of granite minimum melts, 1977-80; M.Sc. thesis (MacLellan).
Incubation times, growth rates and compositional changes of the crystallizing phases are being determined by a combination of X-ray diffraction and optical methods. We are concentrating on the first stages of crystallization and are making textural comparison with reaction products from highly undercooled conditions.
765. ROEDER, P.L., JAMIESON, H., Queen's Univ. (Geological Sciences):
Olivine-spinel equilibrium at high temperatures, 1978-81; Ph.D. thesis (Jamieson).
See:
A re-evaluation of the olivine-spinel geothermometer; Contrib. Mineral. Petrol., vol. 68, p. 325-334, 1979.
Experiments are being conducted at 1300°C under controlled oxygen fugacities in order to study the equilibrium between olivine and spinel. Systems currently being studied include $MgO-FeO-Fe_2O_3-SiO_2$ and $MgO-FeO-SiO_2-Fe_2O_3-Al_2O_3$. The composition of coexisting olivine and spinel in these systems is determined with the electron microprobe. The results of these studies are being used to calculate activity-composition models for the spinel phase.
- IGNEOUS/ROCHES IGNÉES
766. ARNDT, N.T., Univ. Saskatchewan (Geological Sciences):
Petrogenesis of komatiites, 1978-.
- See:
A review of the field characteristics and petrology of Archean and Proterozoic komatiites; Can. Mineral., vol. 17, p. 147-164, 1979.
Stable and metastable pyroxene crystallization in layered komatiitic lava flows; Amer. Mineral., vol. 64, p. 856-864, 1979.
The petrogenesis of komatiites (ultramafic lavas) and komatiitic basalts is being studied with samples from Munro Township, Ontario, Cape Smith fold belt, Quebec, and Thompson, Manitoba. Techniques used include field mapping, major and trace and radiogenic isotope analysis, microprobe studies and some experimental work. Problems considered include the relationship between komatiites and basalts, the role of metastable pyroxene crystallization and the production of high CaO/Al_2O_3 ratios.
767. ARNDT, N.T., STAUFFER, M.E., COLEMAN, L.C., Univ. Saskatchewan (Geological Sciences):
Petrology and geochemistry of Flin Flon volcanic rocks, Saskatchewan-Manitoba, 1979-81.
Metavolcanic rocks in the area surrounding Flin Flon, Manitoba, have been mapped and sampled along two up-section traverses. Seventy samples have been petrographically studied and are currently being analyzed for major elements.
768. BACHINSKI, S.W., HENDERSON, P.H., ROGERS, N.W., PARRY, S.J., Univ. New Brunswick (Geology):
Rare-earth element contents of minette lamprophyres from the Navajo Country, U.S.A., 1977-80.

- See:**
Rare-earth and other trace element contents and the origin of minettes (mica-lamprophyres); *Geochim. Cosmochim. Acta.*, vol. 43, 1979.
Rare-earth element contents of lamprophyres associated with kimberlites are virtually identical with those of lamprophyres elsewhere not associated with kimberlites (Bachinski and Scott, 1979). Minettes magma is from the mantle, but minettes are not related to kimberlites by any crystal-liquid fractionation process.
769. BAER, A.J., Univ. Ottawa (Geology): Geotherms and lithographic thickness, 1977-.
Modelling geothermal evolution of the Proterozoic lithosphere; its consequences for plate tectonics.
770. BALD, R.C., AYRES, L.D., CLARK, G.S., Univ. Manitoba (Earth Sciences):
Recrystallization, Rb-Sr dating, and development of basement trondhjemite, Lake of the Woods greenstone belt, Ontario, 1977-80; M.Sc. thesis (Bald).
771. BARR, S.M., Acadia Univ. (Geology):
Petrology and tectonic significance of mafic intrusions in southwestern Nova Scotia, 1977-81.
Students working partly under my supervision have mapped areas of Lower Palaeozoic metasedimentary rocks in southwestern Nova Scotia. They have shown the distribution of abundant mafic sills in these areas, which they sampled for petrographic and preliminary geochemical studies. I am now compiling these data and completing trace element studies, hopefully leading to an understanding of the chemical affinities, and tectonic settings of these intrusions.
772. BARR, S.M., MACDONALD, A.S., DOSTAL, J., Acadia Univ. (Geology):
Geochemistry of gem-bearing alkaline basalts of Southeast Asia and origin of magacryst phases, 1974-81.
See:
Palaeomagnetism, age, and geochemistry of the Denchai basalt, Northern Thailand; *Earth Planetary Sci. Letters*, vol. 46, p. 113-124, 1979.
A compilation of petrologic data available for the Southeast Asian basaltic province is near completion, together with an assessment of current understanding of their petrogenesis. Studies of trace element geochemistry of megacrysts and nodules associated with these basalts are in progress.
773. BARR, S.M., O'REILLY, G.A., O'BEIRNE, A.M., Acadia Univ. (Geology):
Petrology of granitoid plutons of Cape Breton Island, Nova Scotia, 1978-84.
A study of the petrology and geochemistry of granitoid plutonic rocks in Cape Breton Island was initiated during the summer of 1978. Six plutons representing various ages, geographic areas, and lithologies (both mineralized and unmineralized) were mapped and sampled in detail. An additional pluton was mapped and sampled during 1979, and field studies of two plutons are planned for 1980.
774. BERNDT, K., BURWASH, R.A., Univ. Alberta (Geology):
Petrology of Coryell intrsive rocks near Salmo, British Columbia, 1979-81; M.Sc. thesis (Berndt).
The petrology and geochemistry of the Coryell intrusive rocks in the Salmo-Rossland area of southeastern British Columbia are being studied with special reference to concentration of uranium, thorium and other trace elements.
775. BICZOK, J., AYRES, L.D., Univ. Manitoba (Earth Sciences):
Altered subvolcanic trondhjemite plutons in the Missi Island volcanic centre, Amisk Lake, Saskatchewan, 1977-80; M.Sc. thesis (Biczok).
776. BOOTH, G.W., FAWCETT, J.J., GORTON, M.P., LeCHEMINANT, A.N., Univ. Toronto (Geology):
The Pamiutuk Lake intrusion, Ontario, 1978-81; M.Sc. thesis (Booth).
The Pamiutuk Lake batholith is a 700 km² hypabyssal intrusion of granitic compositions and Paleohelikian age found in the Baker Lake Basin of the Churchillian Structural province. The granite intrudes basement or paragneisses and overlying volcanics and sediments of the Christopher Island formation with the exception of a coarsely porphyritic chill margin, and minor aplitic granite intrusions, the batholith is extremely homogeneous. The pink to red porphyritic granite contains phenocrysts of potassic feldspar, salic plagioclase and quartz set in a fine grained micrographic groundmass. Scattered sodic plagioclase megacrysts, minor concentrations of gneissic xenoliths and a discontinuous red banding account for most of the limited internal variation present in the body.
777. BOSTOCK, H.H., Geol. Surv. Can.:
Volcanic rocks of the Appalachian region, 1973-.
778. CAMPBELL, R.M., BARR, S.M., COLWELL, J.A., Acadia Univ. (Geology):
The petrology, geochemistry and economic geology of the Creignish Hills granitoid pluton of southwest Cape Breton Island, Nova Scotia, 1978-80; M.Sc. thesis (Campbell).
Involves mapping, sampling and petrological studies of the Creignish Hills granitoid pluton in southwestern Cape Breton; field relationships, phases present, structural features, mineralization (if present), and petrogenesis will be studied, together with general petrography and geochemistry.
779. CERNY, P., Univ. Manitoba (Earth Sciences):
The Yellowknife pegmatite field, Northwest Territories, 1980-83.
A study aimed at petrochemistry of pegmatitic muscovite-granites, and at mineralogy and trace-element geochemistry of associated pegmatites is being initiated. It is expected to lead to establishing the origin of the granitic intrusions, the distribution of different pegmatite types, and guidelines for exploration.
780. CERNY, P., TRUEMAN, D.L., ZIEHLKE, D., GOAD, B.E., PAUL, B.J., Univ. Manitoba (Earth Sciences):
Pegmatite mineral evaluation project, 1976-80.
See:
The Cat Lake-Winnipeg River and the Wekensho Lake pegmatite fields, Manitoba; Manitoba Mineral Res. Div., Econ. Geol. Rept. ER80-1, 1980.
The project documents the character of pegmatites and their geological setting in the Cat Lake - Winnipeg River district and in the Herb Lake district, Manitoba, and it is expected to provide a scientific basis for future exploration activities. In the Cat Lake - Winnipeg River district, pegmatites are generated from a late- to post-tectonic series of leucogranites and pegmatitic granites which seem to be of juvenile origin but modified to different degrees during their ascent. Earth of the leucogranite and pegmatitic granite intrusions generated its characteristic pegmatite swarm.
781. CHANCE, P., EDGAR, A.D., Univ. Western Ontario (Geology):
Petrogenesis of some "shoshonitic" rocks of Eastern Iran, 1977-80; M.Sc. thesis (Chance).
782. CHERRY, M.E., PAJARI, G.E., Jr., Univ. New Brunswick (Geology):
Petrogenesis of the Charlotte Pluton, southwestern New Brunswick, 1978-.
A continuing study of post-Acadian granites (S.S.) in southwestern New Brunswick. Field studies, petrography, major and trace element geochemistry and isotope studies are incorporated in petrogenetic studies.
783. CHERRY, M.E., TREMBATH, L.T., PAJARI, G.E., Jr., Univ. New Brunswick (Geology):
Petrogenetic implications of textural variations in a granite dike, 1979-80.
To use textural and chemical variations across a 30 m wide granitic dike to evaluate the conditions of emplacement, solidification and cooling of the dike.
784. COLWELL, J.A., KEPPIE, J.D., Acadia Univ. (Geology), Nova Scotia Dep. Mines:
Stratigraphy and geochemistry of the North Mountain basalt, Nova Scotia, 1969-80.
A study of variation within and among the Triassic basalt flows and the tectonic significance of the vulcanism. A complete core of the North Mountain basalt flow sequence has recently been obtained. Major and some trace element analyses are complete. Other trace analyses in progress.
785. CURRIE, K.L., Geol. Surv. Can.:
Alkaline rocks in Canada, 1968-.
- See:**
A contribution to the petrology of the Coldwell alkaline complex, Northern Ontario; *Geol. Surv. Can., Bull.* 287, 1980.
786. CURRIE, K.L., Geol. Surv. Can.:
Granite studies in the Appalachians, 1973-.
- See:**
Comments on the boundaries of the Davidsville Group, northeastern Newfoundland; *Geol. Surv. Can., Paper* 80-1A, p. 115-118, 1980.
787. DAVIDSON, A., Geol. Surv. Can.:
Granite studies in the Ennadai-Rankin Inlet region, District of Keewatin, 1966-.
788. DAVIDSON, A., Geol. Surv. Can.:
Granite studies in the Slave Province, District of Mackenzie, 1971-.
789. EMSLIE, R.F., Geol. Surv. Can.:
Anorthosite study, Newfoundland-Quebec, 1967-.
790. EMSLIE, R.F., Geol. Surv. Can.:
Petrology, petrogenesis and economic potential of the anorthosite suite in southern Labrador, 1975-.
- See:**
The Mistastin Batholith, Labrador-Quebec: An Elsonian composite Rapakivi suite; *Geol. Surv. Can., Paper* 80-1A, p. 95-100, 1980.
791. EMSLIE, R.F., Geol. Surv. Can.:
Petrology, mineralogy, geochemistry and mineral potential of a Helikian non-orogenic granitic suite in central Labrador and adjacent Quebec, 1979-.
792. FINN, G., EDGAR, A.D., Univ. Western Ontario (Geology):
Petrology and economic potential of the Nipissing gabbro, Ontario, 1979-81; M.Sc. thesis (Finn).
793. GOAD, B.E., CERNY, P., Univ. Manitoba (Earth Sciences):
Mineralogy, geochemistry, and petrology of pegmatitic granites in the Winnipeg River area, southeastern Manitoba, 1976-80; M.Sc. thesis (Goad).
Geochemistry of four major bodies of pegmatitic granites suggests, contrary to earlier views, a juvenile origin modified to different degrees during their ascent. Diversified mineralogy of accessory phases and variable trace element contents show gross differences among the four bodies and within individual intrusions. At a given erosion surface, each body is accompanied by a pegmatite swarm of similar or more fractionated mineralization. Vertical differentiation within individual intrusions is indicated at some localities.
794. GORDON, T.M., Geol. Surv. Can.:
Petrology and structure of the Daly Bay Complex and environs, District of Keewatin, 1970-.
795. HABIB, M.K., FYSON, W.K., BAER, A.J., Univ. Ottawa (Geology):
Structural fabric and uranium distribution in shear zones near Cardiff, Ontario, 1978-80; M.Sc. thesis (Habib).
796. HILL, J., EDGAR, A.D., Univ. Western Ontario (Geology):
Petrogenesis of the felsic plutons of the Back River - Nose Lake area, Slave Province, Northwest Territories, 1975-80; Ph.D. thesis (Hill).
797. JACKSON, T.A., SMITH, T.E., Univ. Windsor (Geology), Univ. West Indies:
The petrology and geochemistry of the Cretaceous volcanic rocks of Jamaica, 1978-80.
See:
The tectonic significance of basalts and dacites in the Wagwater Belt, Jamaica; *Geol. Mag.*, vol. 116, p. 365-374, 1979.
The petrochemistry of some Cretaceous mafic volcanics, Jamaica, West Indies; *Proc. 4th Latin American Cong., Trinidad*, 1979.
Metasomatism in the Tertiary volcanics of the Wagwater Belt, Jamaica, West Indies; *Geol. en Mijn.*, vol. 57, p. 213-220, 1978.
To carry out major and trace element analyses of the volcanic rocks of the volcanic rocks of the Cretaceous inliers of Jamaica. At present all of the inliers have been mapped in some detail by geologists of the Mines and Geology Division, Ministry of Mining and Natural Resources. These rocks have been classified on the basis of

mineralogy but almost no whole rock analyses are available. The rocks involved range from Lower to Upper Cretaceous in age and the chemical analyses will be used to identify the rock suites, to locate their spatial and chronological variations and fit these into the pattern of evolution of the Cretaceous Island Arc which our present state of knowledge allows us to reconstruct in general outline. This reconstruction together with the detailed chemical variation determined will be of great use in guiding further prospecting for base metal deposits of economic importance. The presence of such deposits is indicated by the general geological environment and by the existence of numerous mineral prospects many of which have been mined in a small way of the past.

798. KRAG, P., ANDERSON, G.M., Univ. Toronto (Geology):

Alkali diffusion in hydrous silicate melts, 1976-79; M.Sc. thesis (Krag).

Silicate glasses of $Ab_{80}Or_{20}$ and $Ab_{70}Or_{30}$ containing 7.5% water have been prepared at 750°C and 5000 bars pressure. These glasses are then placed together at the same P and T, then later sectioned and analyzed to determine how far K and Na have diffused. Measurement of the diffusion profile allows calculation of the diffusion coefficients.

799. KUEHNER, S., EDGAR, A.D., Univ. Western Ontario (Geology):

Origin of the ultrapotassic rocks of the Leucite Hills, Wyoming, 1978-80; M.Sc. thesis (Kuehner).

800. LAJOIE, J., GÉLINAS, L., TASSÉ, N., VERPAELET, P., GAUTHIER, N., Univ. Montréal (Géologie):

Origine des roches volcanoclastiques de la ceinture volcanique de l'Abitibi; thèse de doctorat (Verpaelst), thèse de Maîtrise (Gauthier).

Malgré les nombreux travaux effectués dans la région de Rouyn-Noranda, très peu de chercheurs ont reconnu l'importance de l'origine pyroclastique des rhyolites de la région. Le modèle généralement accepté veut que les rhyolites soient des coulées de lave. Notre étude montre cependant que dans les séquences étudiées les volcanoclastites prédominent et qu'ils occupent des chenaux coincés entre les domes rhyolitiques. L'étude de ces volcanoclastites est donc essentielle pour mieux comprendre le mode de mise en place des gisements qui sont associés au volcanisme rhyolitique.

801. LAMBERT, M.B., Geol. Surv. Can.:
Archean volcanic studies in the Slave-Bear Province, District of Mackenzie, 1973-.

802. LAMBERT, M.B., Geol. Surv. Can.:
Archean felsic volcanic complex near Regan Lake, District of Mackenzie, Northwest Territories, 1974-.

803. LUDDEN, J.N., GÉLINAS, L., Univ. Montréal (Géologie):

La pétrogénèse des roches volcaniques de l'Abitibi, Québec.

Une procédure d'étude chimique des roches de la région de Rouyn-Noranda a été établie. Avec l'aide des éléments-traces et des terres rares, nous essayerons de: 1) confirmer la stratigraphie chimique; 2) évaluer la valeur des études d'éléments-traces sur les terrains de l'Archéen; 3) construire un modèle pétrogénétique pour les roches volcaniques de l'Abitibi. Une fois ces points bien établis, nous procéderons à une évaluation beaucoup plus détaillée de la région en considérant des complexes volcaniques individuels.

804. MITCHELL, R.H., PLATT, R.G., Lakehead Univ. (Geology):

Petrology of kimberlites and alkaline rocks, 1971-.

See:

The alleged kimberlite-carbonatite relationship: additional contrary mineralogical evidence; *Am. J. Sci.*, vol. 279, p. 570-589, 1979.

Petrology of Somerset Island kimberlites, Northwest Territories; Coldwell alkaline complex, Ontario; Poohbah Lake complex, Ontario; and nephelinites and related volcanic rocks from Bathurst Island, Northwest Territories.

805. NICHOLLS, J., STOUT, M.Z., Univ. Calgary (Geology and Geophysics):

Petrology of Quaternary volcanic rocks, British Columbia, 1972-80.

The rock types are basanites, basalts, ankaramites, hawaiites and one nephelinite. Members of the alkali olivine basalt suite are chemically similar to rocks from the Mid-Atlantic islands. Associated with the volcanic rocks are ultramafic, gabbroic, granulitic and granitic xenoliths.

The suite of ultramafic xenoliths spans a greater variety of rock types than can be generated by partial melting of a uniform source. Using the rock and mineral analyses in thermodynamic expressions and calculations indicates that the residual olivine compositions in equilibrium with the magmas at low velocity zone depths are more Fe-rich than olivines in the typical xenolith. This suggests that the residua from the partial melting episodes which produced the volcanic rocks are different in composition from the upper mantle above the low velocity zone.

806. PAJARI, G.E., Jr., GUNTER, W.D., STUPAK, W.A., Univ. New Brunswick (Geology):

The petrology of the Rattlesnake Hills, Wyoming, U.S.A., 1978-80; M.Sc. thesis (Stupak).

The Rattlesnake Hills volcanic field, Wyoming, ranges from undersaturated mafic through to silica oversaturated felsic compositions. This project will endeavour to define the character of this variation through detailed mapping and major, trace element and isotope analyses.

807. PAJARI, G.E., Jr., TREMBATH, L.T., CORMIER, R.F., FYFFE, L.R., CHERRY, M.E., BUTT, K.A., Univ. New Brunswick (Geology):

The plutonic rocks of southwestern New Brunswick, 1970-; M.Sc. thesis (Fyffe), Ph.D. theses (Cherry, Butt).

The post Acadian plutons in southwestern New Brunswick comprise a bimodal granite-gabbro suite which were intruded over a period of 60 m.y. Small volumes of intermediate rocks were formed by hybridization between granite melt and older but still hot gabbro. The bimodal character of these rocks precludes their origin directly through subduction related processes.

808. SABAG, C., ANDERSON, G.M., Univ. Toronto (Geology):

The geochemistry and petrology of the Meggisi Lake granitoids, 1977-79; M.Sc. thesis (Sabag).

809. SAGE, R.P., PYKE, D.R., Ontario Geol. Surv.:
Alkaline rock-carbonatite complexes of Ontario, 1975-81.

See:

Ontario Geol. Surv., Maps, P 2219, P 2221, P 2236, P 2237, P 2238, P 2239, 1979.

810. SCHAU, M., Geol. Surv. Can.:
Volcanic rocks of the Prince Albert belt, Districts of Franklin and Keewatin, 1972-.

811. SCHAU, M., Geol. Surv. Can.:
Geology of southeast Baker Lake, District of Keewatin, 1976-.

812. SIMPSON, E.L., BACHINSKI, S.W., Univ. New Brunswick (Geology):

Role of liquid immiscibility in the crystallization history of a minette sill from northern New Brunswick, 1978-80; M.Sc. thesis (Simpson).

Texture, and rock and mineral chemistry are being used to determine the role of possible liquid immiscibility in the history of a minette sill. Research has been completed. Thesis is being written.

813. SMITH, T.E., Univ. Windsor (Geology):

Archean magmatism and tectonics: A geochemical study of the evolution of granitic rocks in the Superior Province, Ontario, 1976-83.

Major and trace element studies have been carried out on the Archean rocks of the Shebandowan (Wawa) volcano-plutonic belt of Northern Ontario that indicate a systematic evolution of the crust in that area. Early outpourings of mafic volcanic rocks which show chemical affinities to oceanic tholeiitic basalts (low Rb, Sr, Ba, Zr, K₂, P₂O₅ and very high Cr). These mafic volcanics show some increases in Rb, Sr, Ba, and K₂O, and decreases in TiO₂, Zr and P₂O₅ content at higher stratigraphic levels but the very high Cr content persists. No

andesitic rocks have been identified. Dacitic volcanics appear higher in the section and have very similar chemistry to the foliated tonalitic plutons of Rabbit Blanket Lake and Mijinemungshing Lake. These acid rocks show remarkable resemblances to many of the oldest (3.5-3.8 b.y.) gneissic terrains in K₂O, TiO₂, P₂O₅, K/Rb, and Rb, Sr, Ba, Zr, Ni and Cr contents, and have Al₂O₃ contents in excess of 15 wt%. The Gamitagama Complex, a cumulate hornblende biotite diorite-tonalite pluton also penetrates the volcanic pile. The latest igneous activity recognized in the area is marked by the intrusion of a series of highly siliceous potassic granites which are spatially associated with the greywackes in the sequence. Present interpretation of this data suggests that the earliest rocks recognized in this area are the mafic volcanics and that the high Al₂O₃ tonalitic rocks evolved from these mafic rocks by differentiation of a wet basaltic magma and/or by partial melting of amphibolite (Barker and Arth 1976), to yield a bimodal basalt-tonalite suite. The presence of the Gamitagama Complex which differentiates to a late tonalitic phase supports the hypothesis of differentiation from a wet basaltic magma. However, the large tonalites predate (i.e. are foliated) the Gamitagama Complex and may have formed by partial melting of an amphibolite. The late potassic granites have chemical characteristics which suggest they may have been formed by partial melting of metasediments. This hypothesis is supported by their spatial association with greywackes.

814. SOUTHER, J.G., Geol. Surv. Can.:
Geology of the Mt. Edziza volcano, British Columbia, 1965-.

815. STEVENSON, J.S., McGill Univ. (Geological Sciences):
Environment of Nickel deposits, Thompson, Manitoba, 1969-81.

Detailed petrographic studies of the gneisses and those metasediments most closely associated with the ore bodies and related ultramafics are helping to explain the genesis of the ore.

816. STEVENSON, J.S., McGill Univ. (Geological Sciences):
Origin of the Onaping Formation, Sudbury, and its relation to the granophyre (micropegmatite), 1972-80.

See:

Geological concepts developed in the Precambrian of Sudbury, Ontario; *Geol. Assoc. Can., Sp. Paper 19*, p. 225-244, 1979.

New studies are being made on the petrography and chemistry of the Onaping Formation, with special reference to its origin and probable relations to the underlying granophyre (micropegmatite).

817. STEVENSON, L.S., STEVENSON, J.S., Redpath Mus., McGill Univ. (Geological Sciences):

Feldspar replacement in Dawsonite-bearing rocks in the Montreal area, Québec, 1976-81.

The original study of feldspar replacement in rocks from Mont St. Hilaire and Mount Royal has been extended to cover similar replacement in rocks from the Francon quarry, Montreal, and the St. Bruno area. The alteration of feldspar phenocrysts to an aggregate of dawsonite, quartz and calcite seems to be developed most clearly in Mont St. Hilaire.

818. SUTCLIFFE, R.H., FAWCETT, J.J., Univ. Toronto (Geology):

Petrological and geochronological studies of the Rainy Lake granitoid complex, northwestern Ontario, 1976-80; M.Sc. thesis (Sutcliffe).

METAMORPHIC/ROCHES METAMORPHIQUES

819. BARAGAR, W.R.A., Geol. Surv. Can.:
Studies in the Seal Lake volcanic province, Newfoundland, 1968-.

820. BURWASH, R.A., Univ. Alberta (Geology):
Uranium and thorium in crystalline rocks of the Western Shield, 1976-82.

See:

Uranium and thorium in the Precambrian basement of western Canada. II. Petrologic and Tectonic Controls; *Can. J. Earth Sci.*, vol. 16, p. 472-483, 1979.

- During the period 1976 to 1979 study was concentrated on the buried Shield. In the absence of field relations of samples from deep drill holes, interpretations were based on statistical and trend surface assessments. During the period 1979 to 1982 the emphasis will be in correlating the buried and exposed Shield areas and in testing the statistical models against field criteria for uranium and thorium accumulation.
821. DUDLEY, J.S., GHENT, E.D., Univ. Calgary (Geology and Geophysics):
Low grade alteration of the Howson subaerial volcanics, Smithers, British Columbia; Ph.D. thesis (Dudley).
- See:
Zeolitic alteration of the Howson facies volcanics (Jurassic), British Columbia, Canada; Symp. vol. Fifth Internat. Conf. on Zeolites, Naples, 1980.
Field relationships of zeolites in the Howson facies volcanics indicate that they are of hydrothermal origin. Mesolite, thomsonite, scolecite, analcime, and heulandite are commonly followed by laumontite, wairakite, and/or stilbite. Electronmicroprobe analyses have shown the zeolites to be relatively pure in composition.
The complex stratigraphic distribution of the zeolites does not reflect progressive dehydration with burial but is controlled instead by a combination of fluid composition, host rock composition, permeability, and temperature. The regional distribution of authigenic mineralogy has been governed by variations in rock composition and temperatures away from the volcanic centre.
Equilibrium geochemical modelling is currently being attempted in order to ascertain the variables controlling mineral associations documented through petrography.
822. FRASER, J.A., Geol. Surv. Can.:
Metamorphism in the Canadian Shield, 1974-.
823. FRISCH, T., Geol. Surv. Can.:
Gneisses of the Prince Albert belt, Districts of Franklin and Keewatin, 1972-.
824. FROESE, E., Geol. Surv. Can.:
A survey of metamorphism in the Canadian Shield, 1978-.
- See:
A reaction grid for medium grade mafic rocks; Geol. Surv. Can., Paper 80-1A, p. 53-55, 1980.
825. GETSINGER, J.S., GREENWOOD, H.J., ROSS, J.V., Univ. British Columbia (Geological Sciences):
Geology of the Late Cambrian to Cambrian Isaac Formation, Cariboo Mountains, British Columbia, 1979-82; Ph.D. thesis (Getsinger).
Includes mapping the Isaac Formation in the Three Ladies Mountain area, distinguishing within it mappable lithologic units, analysing both large and small-scale structures, and studying metamorphic reactions in order to reach a better understanding of the structural and metamorphic history of the area. In two weeks of preliminary mapping in August 1979 of an area of 10 square km it was found that the Isaac Formation is divisible into at least four locally mappable lithologies, including pelitic schist (garnet-kyanite-staurolite two-mica schist), quartzite (micaceous, with some pelitic layers), carbonate (calcite marble with pelitic and calc-silicate layers), and hornblende-rich rocks (amphibolite, carbonate/pelite reaction zone rocks, and possible local meta-intrusives). At least two periods of penetrative deformation are indicated by refolded minor folds and the strong pervasive foliations and lineations. Large-scale folds (on the order of 1 km) were also recognized. Metamorphic assemblages observed in rocks near Three Ladies Mountain are consistent with kyanite-staurolite grade of amphibolite facies metamorphism, agreeing with previous mapping. During the summer 1980 it is intended to map in relative detail the geology of an area of approximately 100 square km around Three Ladies Mountain, including the shore of the North Arm of Quesnel Lake.
826. GODFREY, J.D., LANGENBERG, C.W., Alberta Research Council (Geol. Surv.):
Metamorphism in the Precambrian Shield of Alberta, 1976-80.
Continuing microprobe analytical studies in collaboration with Peter A. Nielsen (University of Alberta).
827. GORMAN, B.E., EDGAR, A.D., Univ. Western Ontario (Geology):
Deformation mechanisms of plagioclase and hornblende in the shear zone of the Fiskaeneset anorthosite, western Greenland, 1975-80; Ph.D. thesis (Gorman).
828. HUBREGTSE, J.J.M.W., WEBER, W., Manitoba Dept. Energy and Mines (Mineral Res. Div.):
Age and relationship of the Superior Greenstone belts - Pikwitonei granulite domain - Thompson mobile belt, Manitoba, 1976-81.
The southern limit of Pikwitonei granulites is now better defined in the Cross Lake area. The orthopyroxene isograd transects the Cross Lake greenstone belt east of the mouth of the Minago River. Thus, the Cross Lake greenstone belt was involved in granulite facies metamorphism. A preliminary Rb-Sr whole rock isochron age of 2475 Ma. (Charbonneau and Brooks, pers. comm.) dates the granulite facies metamorphism as late Kenoran. This confirms our earliest investigations that the granulite facies metamorphism is Kenoran and postdates the Superior greenstone belts, and that the granulites are not a basement to the greenstone belt terrain.
The Hudsonian tectono-metamorphic front affected the western margin of the Pikwitonei granulites and resulted in the formation of the north-northeasterly-trending Thompson mobile belt. A preliminary Rb-Sr whole rock isochron age of 1720 Ma (Charbonneau and Brooks) dates this event. This event led also to deformation and metasomatism of Molson dykes.
829. LENTERS, M., ANDERSON, G.M., Univ. Toronto (Geology):
Petrogenesis of Bancroft nepheline gneisses, 1976-80; M.Sc. thesis (Lenters).
Diamond drill core has been obtained through a syenite body which intrudes nepheline syenite gneiss, and through a granite-syenite-nepheline syenite transition. Rock and mineral compositions are being determined to try to define the metasomatic reactions involved.
830. NIELSEN, P.A., Geol. Surv. Can.:
Fe-Mg cation exchange thermobarometry of paragneisses from the Churchill Structural Province Saskatchewan, 1978-80.
A suite of pelitic paragneisses from the Churchill Structural Province of the Canadian Shield from south of the Athabasca Basin, Saskatchewan, comprising portions of the Western Craton, Cree Lake Zone, Rottenstone Complex and Southeastern Complex have been studied. Microprobe analyses of co-existing cordierite-garnet and biotite-garnet pairs from quartz-plagioclase K-feldspar-sillimanite-biotite-cordierite-garnet gneisses have been used to calculate the pressure-temperature environment of equilibration using Fe-Mg cation exchange thermometry and barometry.
Samples from the Archean Western Craton, which also contain spinel and hypersthene, record the highest P-T environment (P>4.8 kb, T>650°C and X_{H₂O} 0.4). Minor retrograde re-equilibration is present in some samples (P<4.1 kb, T<550°C).
Samples from the Aphebian age Cree Lake Zone, Rottenstone Complex, and Southeastern Complex, which lack spinel and hypersthene, record lower P-T conditions and generally display more extensive retrograde re-equilibration during the waning stages of the Aphebian metamorphic episode. From west to east, pressure ranged from 4.4 to 3.5 kb and temperature ranged from 650 to 600°C with X_{H₂O} 0.5. Biotite-garnet thermometry records the final thermal equilibration at T 450°C.
Samples from the major shear zones which separate these major tectonic units are characterized by lower T, muscovite bearing assemblages.
831. NIELSEN, P.A., LANGENBERG, C.W., BAADSGAARD, H., GODFREY, J.D., Geol. Surv. Can., Alberta Research Council:
Fe-Mg cation exchange thermobarometry of polymetamorphic rocks from the Precambrian Shield of northeastern Alberta, 1978-80.
Microprobe analyses of co-existing biotite-cordierite-garnet pairs from 27 polymetamorphic gneisses of the Churchill Structural Province, northeastern Alberta have been used to calculate the P-T-P_{H₂O} conditions of equilibration. Rb/Sr geochronology indicates an extensive Archean basement complex cut by pegmatites (2505 ± 27 Ma, initial ⁸⁷Sr/⁸⁶Sr. 7030 ± .0008).
- The widespread formation of granitoids by anatexis and ultrametamorphism is shown by the Rb/Sr system (1938 ± 28 Ma, initial ⁸⁷Sr/⁸⁶Sr. 710 ± .002) and the calculated metamorphic conditions (P=5kb, T>700°C). Final equilibration at P<3.5kb, T<600° preceded closure of the K-Ar system at 1790 ± 40 Ma.
832. RAESIDE, R., GHENT, E.D., Univ. Calgary (Geology and Geophysics):
Migmatization and pegmatite intrusion, Mica Creek, British Columbia, 1978-81; Ph.D. thesis (Raeside).
Mapping and sampling was carried out in the Mica Creek area of the Shuswap metamorphic complex (NTS 1:50000 sheet 83 D/2). The metamorphic grade ranges from garnet to sillimanite-K-feldspar grade.
Migmatites are developed in pelitic horizons and at higher grades also occur in semipelites and amphibolites. They are mineralogically closely related to the host rock. Small scale trondhjemite pegmatites shows no relation to host rock type. Larger garnet-bearing granitic pegmatites are neither chemically dependant on, nor confined to, any one unit.
Garnet-biotite geothermometry and garnet-plagioclase geobarometry indicate a temperature gradient and uniform pressure (550-700°C, 6.2 ± 0.3 kb). Preliminary studies indicate all large pegmatites are genetically linked and migmatites and small-scale pegmatites may have originated by local initial melting in pelites.
833. TWYMAN, T.R., FAWCETT, J.J., Univ. Toronto (Geology):
Trace elements in metamorphism, 1980-82; Ph.D. thesis (Twyman).
A sequence of interbedded pelites and carbonate rocks of the Waterville-Vassalboro area, south-central Maine has been metamorphosed from chlorite to sillimanite grade. Intrusion of quartz monzonite and biotite granite stocks of Devonian age into the metamorphic sequence is coeval with the metamorphic event. Trace and RE element abundances may prove to be a powerful tool in understanding the petrogenesis of these metamorphic rocks. The abundance and distribution of the trace and RE elements will be used to determine: the partitioning of the elements during metamorphism of units which parallel the metamorphic gradient; the magnitude of equilibrium domains for the trace and RE elements in beds with differences in chemical potentials of CO₂ and H₂O; the relative mobilities of the trace and RE elements during mass transfer of water from the stocks or from dehydration of minerals in the surrounding pelitic rocks; and the effect of mixing of H₂O and CO₂ in the fluid phase on the mobilities of the trace and RE elements.

SEDIMENTARY/ROCHES SÉDIMENTAIRES

834. DIXON, O.A., JONES, B., NARBONNE, G.M., Univ. Alberta (Geology), Ottawa Univ. (Geology):
Sedimentology and stratigraphy of the Upper Silurian Leopold Formation, District of Franklin, 1971-.

See:

- Upper Silurian Leopold Formation in the Somerset-Prince Leopold Islands type area, Arctic Canada; Bull. Can. Petrol. Geol., vol. 26, no. 4, p. 411-423, 1979.

Research is continuing with main aims being further documentation and delineation of the sedimentary and diagenetic facies. Also study and delineation of cycles and interpretation of paleo-environment and paleogeography.

GENERAL/GÉNÉRALITÉS

835. ALLARD, G.O., Québec Ministère Energie et Ressources:
Quart SW du Canton de Rinfret et angle Sud-Est du Canton de Lemoine, Québec, 1980.

Voir:

Pétrologie et potentiel économique du prolongement des roches vertes de Chibougamau dans le Grenville; Québec Ministère des Richesses naturelles, DPV604, 1979.

Fait partie d'une étude du prolongement de l'Archeen dans le Grenville incluant cartographie détaillée à 1:10 000.

836. DRESSLER, B.O., MILNE, V.G., Ontario Geol. Surv.: Geology of the footwall of the Sudbury Basin, 1979-83.
Involves a detailed study of the footwall of the Sudbury Irruptive and of the "Sublayer", the ore bearing unit of the Sudbury mining camp; a study of the structure, metamorphism and petrography of the footwall and sublayer rocks; an investigation of the Sudbury breccias; and a synthesis of published data. A two year mapping project of the geology of the Wanapitei Lake area, District of Sudbury was completed in 1979.
837. HOGARTH, D.D., Ottawa Univ. (Geology), Québec Ministère Energie et Ressources: Région de Quinville, Québec, 1979-80.
Cartographie détaillée et évaluation des gîtes minéraux.
838. HOGARTH, D.D., GRIFFIN, W.L., Univ. Ottawa (Geology), Univ. Oslo (Mineral. Mus.): Petrology and origin of Lapislazuli, 1973-81.
See:
Afghanite: new occurrences and chemical composition; Can. Mineralogist, vol. 17, p. 47-52, 1979.
839. HOGARTH, D.D., MOORE, J.M., Univ. Ottawa (Geology), Carleton Univ. (Geology): Geology of the National Capital Region, Ontario and Québec, 1976-82.
Incorporation of previous data (including that gathered by the authors) and supplementary these with additional data in order to draft a new map and report on the geology of the National Capital area.
840. KRETSCHMAR, U., VOS, M.A., Ontario Geol. Surv.: Talc, magnesite and asbestos deposits of the ultramafic rocks in the Kirkland Lake-Timmins area, Ontario, 1979-82.
A comparative petrogenetic study of major talc, magnesite and asbestos deposits. The deposits are to be placed in their regional geological and structural context and the mineralogy, chemistry and process of alteration are to be defined. As well, industrial mineral testing is to be done and guidelines for exploration are to be developed.
841. LAMOTHE, D., Univ. Cambridge, Québec Ministère Energie et Ressources: Région de Potton, Québec, 1979-81; thèse de doctorat.
Voir:
Région de Bolton-Centre; Québec Ministère Richesses Naturelles, DPV-687, 1979.
842. LUDDEN, J.N., Univ. Montréal (Géologie): L'évolution géochimique des Iles Mascarene de l'Océan Indien.
843. LUDDEN, J.N., BAXTER, A., Univ. Montréal (Géologie), Univ. London: Les études océanographiques et pétrologiques de la crête Rodrigues dans l'Océan Indien.
La crête de Rodrigues est une structure aiséismique dans l'ouest de l'Océan Indien qui montre une divergence importante du point de vue de la tectonique régionale. Une croisière océanographique en 1980 se concentrera sur des études géophysiques et bathymétriques d'un échantillonnage de cette structure et de son intersection avec la ride médio-océanique de l'Océan Indien. Des études géochimiques et pétrologiques de ces roches seront faites.
844. LUDDEN, J.N., GARIEPY, C., GÉLINAS, L., Univ. Montréal (Géologie): La mobilité des éléments-traces et des terres-rares pendant les processus métamorphiques.
Les études préliminaires ont porté sur l'altération des roches des fonds océaniques. Nos recherches prennent maintenant en considération des séquences volcaniques archéennes et paléozoïques.
845. LUDDEN, J.N., THOMPSON, G., BRYAN, W.B., DICK, H.B.J., Univ., Montréal (Géologie), Woods Hole Oceanographic Inst: La pétrogénèse des roches provenant de zones de fractures océaniques.
Nos recherches visent à déterminer l'origine des roches basaltiques provenant de zones de fractures de l'Océan Atlantique, en particulier la zone de fracture Kane, à 23°N, où suite à deux croisières océanographiques, nous avons recueilli des échantillons et des données bathymétriques et photographiques. Le projet d'étude prévu pour 1980 utilisera un submersible.
846. MacQUARRIE, R.R., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.): Geological re-investigation mapping, Birch Portage South (NTS area 63 L-15 S), 1979-.
The area straddles the boundary between the Flin Flon Greenstone belt and what may be termed the Hanson Lake block. Both these major rock units have been affected by metamorphism and deformation usually ascribed to the Hudsonian Orogeny, but their compositions and structures are sufficiently different that they are best considered separately. The purpose of the 1979 investigation was to determine the relationship of supracrustal rocks of the Tulabi Lake - Hanson Lake - Jan Lake areas with the economically supracrustal rocks of the Amisk Lake - Flin Flon areas. Preliminary results from four months' field work have confirmed that these two groups of supracrustal rocks are different and are confined to separate Precambrian blocks. Although mineral exploration is currently at a low level, the area includes localities favourable for deposits of volcanogenic massive sulphides, hydrothermal base and precious metals, and industrial minerals.
847. SCOTT, R.W. NALDRETT, A.J., Univ. Toronto (Geology): Petrology and geology of a portion of the Bell River Complex in Bourbaux Township Québec, 1976-80; M.Sc. thesis (Scott).
Rare earth elements for a suite of Bell River Complex rocks and several associated volcanic samples are presently being determined by neutron activation. Whole rock analyses of a representative suite of complex samples are nearly complete. Electron microprobe analysis on plagioclase, from samples across a 2.3 km stratigraphic interval of the Bell River Complex, and on pyroxene and olivine, from samples across several units within the complex, are also nearly complete.
848. SIMARD, A., Ecole Polytechnique (Génie minéral), Québec Ministère Energie et Ressources: Partie NW du Canton de Clairy et NE du Canton 1222, Québec, 1978-81; thèse de doctorat.
2^e année de cartographie au 1:10 000 dans la région du Lac Frotet où des gisements de cuivre-zinc sont connus.
849. VIGRASS, L.W., POTTER, J., KYBETT, B.D., Univ. Regina (Energy Research): Petrographic analysis of coal conversion feedstocks and residues, 1979-80.
To investigate the relationship between petrographic composition of lignites from Southern Saskatchewan and their gasification and liquefaction potentials by the microscopical examination of feedstocks and chars from conversion tests at the bench scale and pilot plant levels. In this way we hope to monitor the behavior of individual coal constituents during conversion to establish the most reactive and inert components and thereby to develop a method of predicting the conversion potential by petrographic analysis of the feedstock only which would drastically cut the time and costs incurred during preliminary testing. We hope to extend these studies to include sub-bituminous coals and coking coals and investigate the effect of blending coals of different type and rank.
850. VOS, M.A., Ontario Geol. Surv.: Industrial minerals of the alkalic complexes in Northern Ontario, 1980-84.
The potential for Industrial Minerals in major Alkalic Complexes in Northern Ontario will be evaluated and some drilling may be undertaken to complement studies of these complexes by R. Sage.

QUATERNARY GEOLOGY/GÉOLOGIE DU QUATÉNAIRE

851. AALTONEN, R.A., DREIMANIS, A., Univ. Western Ontario (Geology): Geology of the city of London, 1970-81; Ph.D. thesis (Aaltonen).
852. ALLEY, D.W., KUPSCH, W.O., Univ. Saskatchewan (Geological Sciences): The Quaternary geology of the Reindeer Lake South (64 D) map area, 1975-80; Ph.D. thesis (Alley).
The Quaternary deposits overlying the Saskatchewan portion of the Canadian Shield reflect a complex interaction of glacial, glacio-fluvial and glaciolacustrine processes. Using a combination of geochemical, geophysical, sedimentological and glacial geological techniques, a glacial history for the Reindeer Lake South region has been ascertained. Evidence of post glacial permafrost affects are widespread in the region. Implications for Drift prospecting surveys are discussed.
853. ANDERSON, T.W., Geol. Surv. Can.: Quaternary paleoecology, Great Lakes, 1978-.
- See:**
Stratigraphy, age, and environment of a Lake Algonquin embayment site at Kincardine, Ontario; Geol. Surv. Can., Paper 79-1B, p. 147-152, 1979.
854. ANDRIASHEK, L.D., Alberta Research Council (Geol. Surv.): Surficial geology and Quaternary stratigraphy of Edmonton, NTS sheet 83 H, 1978-81.
Twenty one auger test holes were drilled in 1979. Most of these encountered bedrock near the surface, though some deep holes were drilled in the area known as Cooking Lake moraine. Gravel pit sections were studied at a number of sites in the Villeneuve area where buried preglacial sediment is being mined. Some North Saskatchewan River sections were also mapped. Data collected from the drill holes suggests two and possibly three texturally distinct tills in the Cooking Lake moraine area. The gravel pit sections show a more complex stratigraphy which, as yet, cannot be correlated outside of the Villeneuve area. Fabric analysis on one section of the study area shows two different ice advance directions.
855. ANDRIASHEK, L.D., RUTTER, N.W., FENTON, M., Univ. Alberta (Geology): Surficial geology and glacial stratigraphy in the Cold Lake area, north-central Alberta, 1976-80; M.Sc. thesis (Andriashek).
856. BAKER, C.L., Ontario Geol. Surv.: Quaternary geology of the Kirkland Lake area, Ontario, 1978-83.
See:
Ontario Geol. Surv., Misc. Paper 90, p. 149-151, 1979.
Quaternary mapping undertaken in the second year of the Kirkland Lake Initiatives Program (KLIP) involved the compilation of work in the Kirkland Lake (42 A/1) and Ramore (42 A/38) map sheets. The project included the outlining of the various Quaternary deposits with an emphasis on noting the extent, characteristics and local variation of basal till. Such information is of use in the assessment of aggregate resources and to engineering and geochemical studies in addition to township and timber planning and preservation of unique geological sites.

- Concurrent projects involved the monitoring of the over-burden basal till sampling program in the Larder Lake-Englehart area and maintaining liaison with the Engineering and Lands personnel of the Ministry of Natural Resources, Swastika District Office with regard to potential sources of aggregate material.
857. BARNETT, P.J., Ontario Geol. Surv.: Quaternary geology of parts of Renfrew County, Ontario, 1977-81.
- See:**
Ontario Geol. Surv., Misc. Paper 90, p. 138, 139, 1979.
- The Quaternary geology for 6 NTS map sheets in the Ottawa-Bonnechere Valley have been mapped during the summers of 1977, 1978, 1979. Compilation of this data is in progress and preliminary maps of the geology are now in progress. A report describing the properties, distribution, and relationships of the deposits mapped will follow.
858. BARNETT, P.J., Ontario Geol. Surv.: Quaternary geology of the Bancroft area, Ontario, 1978-80.
- See:**
Ontario Geol. Surv., Misc. Paper 90, p. 136, 137, 1979.
- The Quaternary geology of the Bancroft (NTS 31 F/4) map sheet was mapped during the fall of 1978 and spring of 1979. The material distribution will be presented on a preliminary map scale 1:50 000. Properties of the materials encountered both physical and chemical will be presented in a geological report. Special attention will be placed on the geochemistry of trace elements in the till of this area, for use in prospecting and/or environmental work.
859. BLAKE, W., Jr., Geol. Surv. Can.: Quaternary geochronology, Arctic Islands, 1975-.
- See:**
Age determinations on marine and terrestrial materials of Holocene age, southern Ellesmere Island, Arctic Archipelago; Geol. Surv. Can., Paper 79-1C, p. 105-109, 1979.
860. BLASCO, S.M., Geol. Surv. Can.: Surficial geology and geomorphology, Mackenzie Bay - continental shelf, 1970-.
861. BODE, A., RUTTER, N.W., Univ. Alberta (Geology): Surficial geology of the Flathead River area, British Columbia, 1979-80; M.Sc. thesis (Bode).
862. BOUCHARD, M.A., DELISLE, C.E., Univ. Montréal (Géologie), Ecole Polytechnique (Environnement): Libération du Hg des roches: étude expérimentale.
- Etude expérimentale, en aquarium, qui vise à évaluer le taux de libération par lessivage du Hg des roches. Les échantillons proviennent de la Région du Lac Mistassini et de l'Abitibi, où la pollution naturelle a été invoquée déjà pour les taux élevés de Hg mesurés dans l'environnement. L'étude cherche à vérifier également (et à quantifier) le taux de libération à partir de roches broyées, qui reproduisent le dépôt glaciaire (Till) de ces régions.
863. BOUCHARD, M.A., ELSON, J.A., Univ. Montréal (Géologie), McGill Univ. (Geology): Géologie du Quaternaire, région du Lac Mistassini, Québec.
- Etude régionale qui porte principalement sur: 1) classification des terrains morainiques, 2) contribution à la compréhension de l'origine et de la signification des moraines mineures de type Røgen, 3) chronologie et paléogéographie de la déglaciation wisconsinienne dans ce secteur, 4) phases glacio-lacustres dans le bassin du Mistassini; limite du Lac Glaciaire Ojibway; extension de la moraine de Sakami (7900 ans B.P.) dans la région, 5) palynostratigraphie de l'Holocène, Région du Lac Mistassini et des Monts Otish.
864. BOUCHARD, M.A., RICHARD, P., DENTON, D.D., Univ. Montréal (Géologie, Géographie), McGill Univ. (Anthropology): Phases glacio-lacustres et déglaciation, région du Lac Caniapiscou, Québec.
- La recherche vise spécifiquement à:
- 1) reconstituer les phases glacio-lacustres (extensions, niveaux d'eau) et la chronologie de ces derniers;
 - 2) à dater la disparition des lambeaux de glace.
865. BROOKES, I.A., McANDREWS, J.H., VON BITTER, P.H., EVANS, L.J., York Univ. (Geography): Multiple glaciation in Newfoundland, 1977-81.
866. BROSTER, B.E., DREIMANIS, A., Univ. Western Ontario (Geology): Huron lobe tills west of Wyoming moraine, Ontario, 1976-80; Ph.D. thesis (Broster).
867. BROSTER, B.E., DREIMANIS, A., Univ. Western Ontario (Geology): A sequence of glacial deformation, erosion and deposition, at the ice-rock interface during the last glaciation, Cranbrook, British Columbia, 1978.
- See:**
A sequence of glacial deformation, erosion and deposition at the ice-rock interface during the last glaciation, Cranbrook, British Columbia, Canada; J. Glaciology, vol. 23, p. 283-295, 1979.
868. CATTO, N.R., RUTTER, N.W., BYRNE, W., SCHWEGER, C.E., Univ. Alberta (Geology): The Late Quaternary geology and paleoecology of the western Cypress Hill, southeastern Alberta, 1979-80; M.Sc. thesis (Catto).
- Aims are threefold: 1) to delineate the Quaternary stratigraphy, sedimentology, and paleoecology of the deposits in the vicinity of archeological site Di-26, south of Elkwater, Alberta; 2) to ascertain the age of these sediments through correlation and radiocarbon dating of organic horizons; and 3) to describe this site in reference to the Quaternary events affecting the surrounding Cypress Hills region, through correlation of sediments and palaeoenvironmental associations with adjacent areas.
869. CHATWIN, S.C., Geol. Surv. Can.: Wisconsin glacial limit-surficial geology, northwest District of Mackenzie, 1979-.
- To characterize, date and correlate moraine systems between Mackenzie River and Brock Upland.
870. CHAUVIN, L., Québec Ministère Energie et Ressources: Géologie du quaternaire de la région de Thetford Mines, Québec, 1978-81.
- Voir:**
Dépôts meubles de la région de Thetford Mines-Victoriaville; Québec Ministère des Richesses naturelles, DPV-622, 1979.
Géologie des dépôts meubles, région d'Asbestos-Disraeli; Québec Ministère des Richesses naturelles, DPV-716, 1979.
871. CLAGUE, J.J., Geol. Surv. Can.: Quaternary geology, terrain inventory, Prince Rupert - Terrace, Smithers area British Columbia, 1975-.
872. CLARK, P.U., KARROW, P.F., Univ. Waterloo (Earth Sciences): Glacial geology of the Malone area, New York, 1979-80; M.Sc. thesis (Clark).
- Concentrates on ice recession from the northern Adirondack Mountains, extent of late-glacial lakes, and the Champlain Sea incursion. Fort Covington and Malone Tills are being analysed; little published data exists on these two well-known St. Lawrence valley tills. Marine faunas are being examined to clarify the age and history of the Champlain Sea.
873. CROSBIE, M.L.T., Ontario Geol. Surv.: Quaternary geology of the Nassau Lake area, District of Cochrane, Ontario, 1979-80.
- See:**
Ontario Geol. Surv., Misc. Paper 90, p. 152-154, 1979.
- Mapping of the Quaternary geology of Nassau Lake area (NTS 42 F/9) at a scale of 1:50,000 was carried out during the summer of 1979. The major goals were to provide an inventory map of the surficial geology, to determine potential aggregate resources in the area and to describe the glacial deposits and glacial history.
874. DREDGE, L.A., Geol. Surv. Can.: Quaternary geology, northeastern Manitoba, 1975-.
- See:**
Thermal sensitivity and the development of tundra ponds and thermokarst lakes in the Manitoba portion of the Hudson Bay Lowland; Geol. Surv. Can., Paper 79-1C, p. 23-6, 1979.
- Thaw depths and permafrost in polygonal peat terrain, Hudson Bay Lowland, Manitoba; *ibid.*, p. 27-30, 1979.
875. DREIMANIS, A., BROSTER, B.E., GIBBARD, P., HICOCK, R.P., Univ. Western Ontario (Geology): Tills, their genesis and classification, 1970-82.
- See:**
Methods of the field and laboratory investigations of glacial deposits in Europe and North America; Eesti NSV Teaduste Akad. Toimetised, vol. 28, Geoloogia, p. 60-67, 1979.
- The problems of waterlain tills; in *Moraines and varves*, p. 167-177, 1979.
876. DREIMANIS, A., LAMOTHE, M., PARENT, M., Univ. Western Ontario (Geology): Last glaciation in the eastern North America, 1958-; Ph.D. theses (Lamothe, Parent).
877. DYKE, A.S., Geol. Surv. Can.: Quaternary geology - terrain inventory, Boothia Peninsula, northeast Keewatin, and Somerset and Prince of Wales Islands, 1975-.
- See:**
Radiocarbon-dated Holocene emergence of Somerset Island, central Canadian Arctic; Geol. Surv. Can., Paper 79-1B, p. 307-318, 1979.
- Glacial geology of northern Boothia Peninsula, District of Franklin; *ibid.*, p. 385-394, 1979.
878. EDLUND, S.A., Geol. Surv. Can.: Surficial geology-terrain inventory, Bathurst-Cornwallis and eastern Melville Islands, District of Franklin, 1974-.
879. FEENSTRA, B.H., Ontario Geol. Surv.: Quaternary geology of the Markdale-Owen Sound area, southern Ontario, 1975-80.
- See:**
Ontario Geol. Surv., Misc. Paper 90, p. 133, 134, 1979.
- Areal mapping at scale of 1:50,000 completed.
880. FENTON, M.M., Alberta Research Council (Geol. Surv.): Quaternary stratigraphy and surficial geology of the Vermilion map sheet 73 E, Alberta, 1978-81.
- Surface field work completed 25 percent of area. A number of testholes were drilled.
881. FENTON, M.M., ANDRIASHEK, L.D., Alberta Research Council (Geol. Surv.): Quaternary stratigraphy and surficial geology Sand River map sheet, Alberta, 1976-80; M.Sc. thesis (Andriashek).
- Final map ready for drafting. Laboratory analyses 90 percent completed. Definition and correlation of stratigraphic units in progress.
882. FENTON, M.M., MORAN, S.R., ANDRIASHEK, L.D., RUTTER, N.W., Alberta Research Council (Geol. Surv.): Quaternary geology map of southern Alberta, 1978-83.
- See:**
Late Wisconsinan glacial stratigraphy and history of southeastern Manitoba; Can. J. Earth Sci., vol. 17, no. 1, p. 19-35, 1980.
883. FILLON, R.H., Geol. Surv. Can.: Late Cenozoic paleo-oceanography of the Labrador Sea, 1975-.
884. FILLON, R.H., Geol. Surv. Can.: Surficial geology and paleogeology of the central Labrador Shelf Nain, Makkovik and Harrison Banks, 1979-.
- To gain insight into recent sedimentary processes and hydrodynamic regime, the pattern of glaciation on the lakes, and the history of glaciation locally.
885. FITZGERALD, W.D., KARROW, P.F., Univ. Waterloo (Earth Sciences): History and paleoecology of Minesing swamp, Ontario, 1978-80; M.Sc. thesis (Fitzgerald).
- Two deep borings and several shallow cores and exposures are being examined for molluscs and pollen to determine effects of glacial lake history (Algonquin and Nipissing) on vegetational history and development of Minesing swamp. Profiles of shoreline sequences are being correlated to earlier work in the Lake Simcoe and Georgian Bay areas.

886. FULTON, R.J., Geol. Surv. Can.:
Quaternary geology inventory, southern Labrador, 1969-.
- See:
Wisconsin glacial retreat, southern Labrador; Geol. Surv. Can., Paper 79-1C, p. 17-21, 1979.
887. FULTON, R.J., Geol. Surv. Can.:
Quaternary geology of the Canadian Cordillera, 1975-.
888. GADD, N.R., Geol. Surv. Can.:
Correlation of Quaternary geology; Great Lakes - St. Lawrence Valley region, 1978-.
- See:
Ice flow patterns, Montreal - Ottawa Lowlands area; Geol. Surv. Can., Paper 80-1A, p. 375, 376, 1980.
889. GAUTHIER, C., DREIMANIS, A., Univ. Western Ontario (Geology):
Genetic and maturity distinctions of tills on the basis of micro-textural and mineralogical characteristics, northern New Brunswick, 1978-81; Ph.D. thesis (Gauthier).
890. GAUTHIER, R.C., Geol. Surv. Can.:
Géologie du Quaternaire région de Bathurst-Campbellton, Nouveau Brunswick, 1976-.
- See:
Aspects of the glacial history of the north-central Highlands of New Brunswick; Geol. Surv. Can., Paper 79-1B, p. 371-377, 1979.
891. GEDDES, R.S., DREIMANIS, A., Univ. Western Ontario (Geology):
Uranium exploration in glaciated terrain in northern Saskatchewan, 1977-80; M.Sc. thesis (Geddes).
892. GIBBARD, P.L., DREIMANIS, A., Univ. Western Ontario (Geology):
Trace fossils in late Pleistocene glacial lake sediments, 1978.
893. GORMAN, W.A., Queen's Univ. (Geological Sciences):
Problems of deglaciation of Southern Ontario and Quebec, 1963-.
894. GRANT, D.R., Geol. Surv. Can.:
Surficial geology, St. Anthony - Blac Sablon, Newfoundland, 1969-.
895. GRANT, D.R., Geol. Surv. Can.:
Surficial geology, Cape Breton Island, Nova Scotia, 1970-.
896. GRANT, D.R., Geol. Surv. Can.:
Surficial geology of Newfoundland, 1974-.
897. GRANT, D.R., Geol. Surv. Can.:
Quaternary stratigraphy Yarmouth Region, Nova Scotia, 1979-.
898. HICOCK, S.R., DREIMANIS, A., Univ. Western Ontario (Geology):
Pre-Fraser Pleistocene stratigraphy, geochronology and paleoecology of the Georgia Depression, British Columbia, 1976-80; Ph.D. thesis (Hicock).
899. HODGSON, D.A., Geol. Surv. Can.:
Surficial geology and geomorphology of central Ellesmere Island, District of Franklin, 1972-.
900. HUGHES, O.L., Geol. Surv. Can.:
Quaternary geology, Aishihik Lake, Yukon, 1965-.
901. HUGHES, O.L., Geol. Surv. Can.:
Quaternary stratigraphy of Old Crow Basin and Porcupine River Valley, Yukon, 1968-.
902. HUGHES, O.L., Geol. Surv. Can.:
Quaternary geology, Mayo-McQuesten, Yukon Territory, 1979-.
903. JACKSON, L.E., Jr., Geol. Surv. Can.:
Quaternary geology, terrain inventory, Kananaskis Lakes, Alberta, 1974-.
- See:
Glacial history and stratigraphy of the Alberta portion of the Kananaskis Lakes map area; Can. J. Earth Sci., vol. 17, no. 4, p. 459-477, 1980.
904. KARROW, P.F., GREENHOUSE, J.P., Univ. Waterloo (Earth Sciences):
Geophysical properties of Quaternary sediments and stratigraphy of buried valley fills, 1978-81.
- Deep rotary borings have been electrologged in the Fergus buried valley. Continuous core samples are being analysed to establish glacial stratigraphy to relate to the electrologs. Well records and several geophysics theses have allowed the valley to be traced from Belwood Lake to near Kitchener. The Ontario Ministry of the Environment is testing the valley as an aquifer.
905. KARROW, P.F., HEBDA, R.J., PRESANT, R., ROSS, G., Univ. Waterloo (Earth Sciences), Canada Agriculture:
Guelph buried soil and interstadial peat, Ontario, 1975-80.
- Stratified sediments with a buried soil and organic lens have yielded molluscs, ostracods, beetles, and plant remains. Pedologic analyses indicate a substantial weathering interval.
906. KARROW, P.F., MILLER, B.B., HEBDA, R.J., Univ. Waterloo (Earth Sciences), Kent State Univ. (Ohio):
Glacial lake history, Great Lakes area, 1957-.
- Molluscs continue to be collected from additional sites to expand on and test hypotheses relating migration routes and timing to Great Lakes history. Pollen is being analyzed from two long cores in Algonquin sediments to clarify pollen zonation and timing of lake changes.
907. KARROW, P.F., MORGAN, A., POPLAWSKI, S., HANN, B., WESTGATE, J.A., Univ. Waterloo (Earth Sciences), Univ. Toronto (Geology):
Stratigraphy and paleontology of the Toronto Pleistocene, 1957-.
- New borings have been made to clarify stratigraphy and recover fresh samples for study of fossil Cladocera in the Don Valley and at Scarborough (Toronto). Near Woodbridge new discoveries in the Woodbridge railway cut reveal fossil frost wedges and fossil molluscs between Illinoian(?) and Early Wisconsinan tills.
908. KLASSEN, R.A., Geol. Surv. Can.:
Surficial geology and Quaternary stratigraphy of north Baifin-Bylot Islands, District of Franklin, 1978-.
909. LEVINE, L.D., BROOKES, L.A., MACDONALD, M.M.A., DENNELL, R.W., Royal Ontario Mus. (West Asian):
Archaeological investigations in the MAHIDASHT, central West Iran, 1975-.
910. MAY, R.W., DREIMANIS, A., STANKOWSKI, A., Univ. Alberta (Geology), Univ. Western Ontario (Geology):
Fabric variation within the Catfish Creek Till, Ontario, 1980.
911. McCOURT, G., MAY, R.W., SCHWEGER, C.E., Univ. Alberta (Geology):
Quaternary palynology of Bluefish Basin, Yukon Territory, 1978-80; M.Sc. thesis (McCourt).
- The palynology of two Quaternary sections has been done. Data is currently being analyzed using multivariate statistics.
912. McNAMARA, S.J., KUPSCH, W.O., Univ. Saskatchewan (Geological Sciences):
Surficial geology of the Phelps Lake map sheet (64 M), Saskatchewan, 1979-80; M.Sc. thesis (McNamara).
913. MACNEILL, R.H., Nova Scotia Res. Foundation (Geophysics):
Pleistocene of Nova Scotia Mainland, 1951-80.
914. MARTINEAU, G., LA SALLE, P., Québec Ministère Energie et Ressources:
Géologie du Quaternaire du Bas Saint-Laurent, 1978-81.
915. MILLER, R.F., MORGAN, A.V., Univ. Waterloo (Earth Science):
Palaeontological analysis of a post-glacial site, Lockport Gulf, U.S.A., 1979-80; M.Sc. thesis (Miller).
- A palaeontological analysis of a post-glacial deposit at Lockport, New York was conducted to determine the environment of the local setting and to provide an interpretation of the climate of the W. Lake Ontario region 10,900 years B.P. (The radiocarbon date for the site is 10,920 ± 160 years (I-5841)). Environmental and climatic interpretations were based primarily on the insect fauna, consisting mostly of Coleoptera, but also Hemiptera, Trichoptera, Diptera and Hymenoptera fragments.
916. PELLETIER, B.R., Geol. Surv. Can.:
Quaternary paleo-sealevel map of Canada, 1978-.
917. PROUDFOOD, D.N., MORAN, S.R., RUTTER, N.W., Alberta Research Council (Geol. Surv.), Univ. Alberta (Geology):
Quaternary geology and stratigraphy of the Medicine Hat - Lethbridge area, Alberta, 1978-81.
- Conclusions from the first two years field work indicate that the three or four individual till sheets that can be recognized and correlated between the relatively closely spaced sections in the Medicine Hat area on the basis of their physical and mineralogical properties, can be traced as far as Bow Island. The Taber area remains as the only gap in the correlation between Medicine Hat and Lethbridge.
918. PROUDFOOD, D.N., RUTTER, N.W., Univ. Alberta (Geology):
The subsurface stratigraphy of the Pleistocene deposits of parts of southern Alberta, 1976-81; Ph.D. thesis (Proudfoot).
- Determination and correlation of the Pleistocene stratigraphy from an analysis of field relationships observed in exposed sections, auger holes and air photos. Field work will be augmented by laboratory work. Correlation with existing local and regional stratigraphy will also be included.
919. RICHARD, S.H., Geol. Surv. Can.:
Surficial geology, Tawatinaw area, Alberta, 1968.
920. RICHARD, S.H., Geol. Surv. Can.:
Surficial geology, Ottawa Valley lowlands, Ontario-Québec, 1974-.
921. RUTTER, N.W., Univ. Alberta (Geology):
Quaternary history of parts of Alberta, British Columbia, Yukon, 1976-.
922. RUTTER, N.W., CRAWFORD, R.J., HAMILTON, R., Univ. Alberta (Geology):
Development of amino acid racemization dating techniques, 1976-.
923. SADO, E.V., Ontario Geol. Surv.:
Quaternary geology to the Coniston-Copper Cliff areas, District of Sudbury, 1977-81.
- See:
Ontario Geol. Surv., Misc. Paper 90, p. 154, 155, 1979.
- To map the distribution of surficial Quaternary sediments (1:50,000 scale) (sand, gravel, till, organic terrain); place these sediments in a stratigraphic context; and determine their physical and chemical properties.
924. SADO, E.V., Ontario Geol. Surv.:
Quaternary geology of the Windsor-Essex area, southern Ontario, 1980.
- To prepare a map at a scale of 1:50,000 to show the distribution of sediments at the surface; determine the physical and chemical properties of sediments; place sediments in a stratigraphic context; and determine quality and quantity of mineral aggregate resources.
925. SADO, E.V., KARROW, P.F., Univ. Waterloo (Earth Sciences):
Till stratigraphy of the Lucan area, Ontario, 1972-80; M.Sc. thesis (Sado).
- Mapping and stratigraphy are completed and final lab results are awaited on till analyses. Field work was supplemented by several boreholes to clarify till stratigraphy. Two principal till sheets have been identified at the surface (Rannoch and Tavistock Tills) underlain by Catfish Creek Till.
926. SADO, E.V., KARROW, P.F., WHITE, O.L., Ontario Geol. Surv.:
Quaternary geology and stratigraphy of the Lucan map-area, Southern Ontario, 1978-80.
- To prepare a map (1:50,000 scale) to show distribution of sediments at the surface; determine their physical and chemical properties through surface sampling augmented by subsurface boreholes; and determine mineral aggregate resource potential.
927. ST-ONGE, D.A., Univ. Ottawa (Géographie):
Le lac glaciaire Coppermine, Territoires du Nord-Ouest, 1979-84.

- Etudier la stratigraphie et définir les milieux sédimentaires du Lac glaciaire Coppermine. Cartographier les dépôts quaternaires dans la vallée de la Coppermine.
928. SCARFE, C.M., HAMILTON, T.S., CASEY, J.J., Univ. Alberta (Geology):
The petrology of the Level Mountain and Heart Peaks volcanic centers, northern British Columbia, 1974-80; Ph.D. thesis (Hamilton).
See:
Summary of the petrology of the Heart Peaks volcanic centre, northwestern British Columbia; Geol. Surv. Can., Paper 80-1A, p. 356, 1980.
929. SCHREINER, B.T., KUPSCHE, W.O., Univ. Saskatchewan (Geological Sciences):
Quaternary geology of the Precambrian Shield area south of 58°, Saskatchewan, 1975-80; M.Sc. thesis (Schreiner).
Study of the surface deposits and landforms of glacial and postglacial age; granulometric analysis and X-ray diffraction study of the sediments; relation of bedrock geology to topography and resultant glacial deposits.
930. SHARPE, D.R., Ontario Geol. Surv.:
Urban geology of Toronto, Ontario, 1979-.
See:
Ontario Geol. Surv., Misc. Paper 90, p. 140-142, 1979.
A survey of major sources of geotechnical information has shown that summary cross-sections of portions of the Toronto area can be compiled readily from information held by public agencies. The level of detail of these data only warrant illustration of main stratigraphic elements however. This framework of cross-sections can be supplemented by a plentiful supply of geotechnical data from private consulting firms. The establishment of requirements to submit engineering borehole records to a central file would be beneficial to geological mapping in urban centres.
931. SHILTS, W.W., Geol. Surv. Can.:
Properties and provenance of till, 1969-.
See:
Lacustrine geochemistry around the north shore of Lake Superior: Implications for evaluation of the effects of acid precipitation; Geol. Surv. Can., Paper 79-1C, p. 1-15, 1979.
932. SHILTS, W.W., Geol. Surv. Can.:
Quaternary geology inventory - southern Keewatin, 1973-.
933. SHILTS, W.W., Geol. Surv. Can.:
Glacial erosion of the Canadian Shield, 1978-.
See:
Average depth of glacial erosion, Canadian Shield; Geol. Surv. Can., Paper 79-1B, p. 395, 396, 1979.
934. SLY, P.G., Environment Canada (CCIW):
Geology of lake sediments, 1967-81.
935. SPARKES, B.G., VANDERVEER, D.G., Newfoundland Dept. Mines and Energy:
Surficial and glacial mapping of the Central Mobile Belt, Insular Newfoundland, 1978-83.
See:
Badger - Grand Falls surficial and glacial mapping; Newfoundland Dep. Mines and Energy, Rept. 79-7, p. 97-100, 1979.
Mapping was completed on the Lake Ambrose - Noel Paul's Brook 1:50,000 sheets in 1978 and on the Badger - Grand Falls sheets in 1979. Information was obtained along all existing roads and most lake shorelines and streams. A backhoe was used to dig pits for samples and to provide suitable exposures to do fill fabrics. A helicopter provided access to the more remote areas.
Sixty five pits were dug and 54 fill fabrics obtained. During the field work 1400 sites were noted and 175 sets of glacial striae recorded. There were 800 samples taken of which 600 were till and the remainder either sand, gravel or rock. At 160 of the 500 sites for till sampling, a representative pebble fraction was obtained and the pebble lithologies were determined. Also profile sampling was conducted in many of the backhoe-dug pits. Samples will be sieved and analysed for Cu, Pb, Zn, Co, Ni, Ag, Mn, Fe, Mo.
936. STALKER, A. MacS., Geol. Surv. Can.:
Quaternary of southern Alberta, 1965-.
937. STALKER, A. MacS., Geol. Surv. Can.:
Synthesis of Quaternary geology, Great Plains of Canada, 1975-.
938. STEWART, R.A., DREIMANIS, A., Univ. Western Ontario (Geology):
Ice marginal deposition in Lake Maumee east of Port Stanley, Ontario, 1978-81; Ph.D. thesis (Stewart).
939. TUCKER, C.M., Ontario Geol. Surv.:
Quaternary geology of the Timmis map-area, NTS 42 A/6, Ontario, 1979.
See:
Ontario Geol. Surv., Misc. Paper 90, p. 155-157, 1979.
The mapping of the surficial deposits in the Timmins area was completed during the 1979 field season. Preliminary results are available and a detailed report and final map are in progress.
940. ULAMOS-FINN, C.K., RUTTER, N.W., CRAWFORD, R.J., Univ. Alberta (Geology):
Amino acid stratigraphy, 1979-81; M.Sc. thesis (Ulamos-Finn).
941. UNKAUF, J.C., RUTTER, N.W., Univ. Alberta (Geology):
The surficial geology and Quaternary stratigraphy of the Grande Prairie area, northwestern Alberta, 1976-80; Ph.D. thesis (Unkauf).
942. VALADE, V., BOUCHARD, M.A., Univ. Montréal (Géologie):
Pédrographie et sédimentologie du till de surface, région de Thetford Mines, Québec.
La recherche visera spécifiquement à:
1) vérifier la corrélation du till III de Thetford Mines avec le Till de Lennoxville, de Sherbrooke-Mégantic; 2) vérifier l'hypothèse de la mise en place des deux unités du till III de Thetford Mines; et 3) tirer les conclusions qui s'imposeront sur le plan de la déglaciation de ce secteur des Appalaches.
943. VANDERVEER, D.G., Newfoundland Dep. Mines and Energy (Mineral Develop. Div.):
Surficial and glacial geological mapping in selected areas under current mineral exploration, 1980-.
The project is mainly aimed at providing glacial transport information in selected areas of Newfoundland and Labrador. These areas are currently under active mineral exploration but due to extensive overburden and lack of outcrop these efforts are being hindered. In some areas mineralization has been found in boulders, the source in bedrock remains unknown.
944. VINCENT, J.-S., Geol. Surv. Can.:
Surficial geology inventory, Banks Island, District of Franklin, 1974-.
See:
Magnetostatigraphy of Pleistocene sediments of Banks Island, Northwest Territories: A feasibility study; Geol. Surv. Can., Paper 79-1B, p. 301-306, 1979.
945. VINCENT, J.-S., Geol. Surv. Can.:
Surficial geology, Lac Kipawa region, Quebec, 1979-.
946. WATERS, P.L., RUTTER, N.W., Univ. Alberta (Geology):
Early Quaternary stratigraphy and paleoecology of the Porcupine and Old Crow Basins, Yukon, 1978-81; Ph.D. thesis (Waters).
947. WATTS, S.H., Sir Sandford Fleming College (Geology):
An examination of rock weathering features in a portion of Eastern Arctic Canada, 1979-81.
Field studies on bedrock weathering features were initiated during July 1979 in eastern Ellesmere Island. Seventeen outcrop sites were examined working from bases at Alexandra Fiord and Cape Herschel. Emphasis was put on describing and photographing coastal and upland outcrops along and above Alexandra Fiord, which reveal particularly unusual weathering features. Detailed sampling was done at every site to begin to assess which factors have influenced processes and intensity of rock weathering. Evaluation of incipient weathering was also undertaken on Pim
- Island and on Cape Herschel. Laboratory work currently in progress includes: x-ray fluorescence analyses, petrographic studies, probe work and water chemistry analyses.
On the basis of field observations and preliminary lab data, it appears that outcrop weathering in the Alexandra Fiord area may be largely determined by position with respect to sealevel and by lithology and is not primarily determined by length of exposure. Further field work in southeastern Ellesmere Island is anticipated.
948. WESTGATE, J.A., Univ. Toronto (Geology):
Quaternary tephrochronology of western Canada and adjacent areas, 1967-.
See:
Dating methods of Pleistocene deposits and their problems: V. Tephrochronology and fission-trace dating; Geoscience Canada, vol. 7, no. 1, 1980.
Our earlier age estimates of tephra beds from the Yukon Territory, Alaska, western Canada, and Washington State are based on glass fission-trace dates. Acquisition of larger samples of many of these previously-studied units have enabled us to recover sufficient zircon grains for f-t dating. More reliable age estimates can be made with zircon as it is not so susceptible to trace-fading as glass. Happily, the zircon dates are indistinguishable from the glass f-t dates at the 2 σ criterion level, indicating that only a small amount of annealing has taken place in the glass. Thus, tephra from Lost Chicken, Alaska has a glass f-t age of 1.7 ± 0.3 m.y. and zircon f-t age of 2.6 ± 0.9 m.y. Similarly, the Auburn-Salmon Springs tephra in Washington has a glass f-t age of 0.66 ± 0.03 m.y. and a zircon f-t age of 0.87 ± 0.27 m.y. The tephra at Ft. Selkirk, central Yukon, has a glass f-t age of 0.86 ± 0.08 m.y. Zircon grains are relatively plentiful in this deposit and a f-t date on them is presently being determined. The important Wellsch Valley tephra in southern Saskatchewan, whose glass f-t age is 0.69 ± 0.11 m.y. contains abundant zircons but most are Precambrian and Cretaceous contaminants - the primary zircons with attached glass are very small and rare.
949. WESTGATE, J.A., Univ. Toronto (Geology):
Quaternary geology of the Metro Toronto-Markham area, Ontario, 1978-81.
Delineation of the areal distribution of surficial deposits and landforms in the Markham area commenced in 1978 and has now been completed. Detailed stratigraphic studies are currently active especially along the eastern part of the Scarborough Bluffs.
950. WESTGATE, J.A., KARROW, P.F., Univ. Toronto (Geology), Univ. Waterloo (Earth Sciences):
Fossil ice-wedge casts of early Wisconsin(?) age at Woodbridge, Ontario, 1978-81.
These periglacial structures occur beneath the Sunnybrook Till but clearly post-date the York Till and overlying stratified sands and gravels in which they are developed.
951. WILLIAMS, N., WESTGATE, J.A., WILLIAMS, D., Univ. Toronto (Geology, Zoology):
Invertebrate fossils from the late Pleistocene Scarborough Formation at Toronto, Ontario, and their palaeoenvironmental significance, 1978-80.
Fossils from the Scarborough Formation that are currently under investigation include insects of the Trichoptera and Diptera orders - specifically the caddisflies and chironomids. Sample sites are mostly in the eastern portion of the Scarborough Bluffs, but one locality is situated in the Woodbridge area.
952. YOUNG, D., RUTTER, N.W., Univ. Alberta (Geology):
Surficial stratigraphy of the Golden map sheet, British Columbia, 1980-83; Ph.D. thesis (Young).

REMOTE SENSING/TELEDTECTION

953. BELANGER, J.R., Geol. Surv. Can.: Remote sensing applied to Quaternary geology and mineral tracing, 1978-.
954. TANGUAY, M.G., SIDJQUI, S., ARBOUR, G., Ecole Polytechnique (Génie minéral): Applications des images Landsat en géologie et en génie, 1979-82; these des maîtrises (Sidjqui, Arbour).

955. TERROUX, A.C.D., Environment Canada (National Hydrology Res. Instit.): Liard River Basin, spring flood, 1978-80. The mixing of tributary waters with the Liard River main stream can be identified on the surface using thermal infrared remote sensing techniques since the temperature of tributary waters usually are different from that of the main river. Five tributaries to the Liard River were chosen and the mixing of their waters with the Liard River were traced downstream using thermal infrared images

obtained on 19 May 1978. At this time, the confluences of the Liard and North Nahanni Rivers with the Mackenzie River were also imaged.

Further infrared flights were conducted on 25 July 1979. Simultaneous colour photography was used but not successful. A unit series of multispectral flights is being planned for the spring of 1980. It is hoped that the analysis of these last flights will also yield some information on suspended sediment distribution.

SEDIMENTOLOGY/SÉDIMENTOLOGIE

ANCIENT SEDIMENTS/SÉDIMENTS ANCIENS

956. ASPLER, L., DONALDSON, J.A., Carleton Univ. (Geology): Sedimentology, stratigraphy and structure of the Nonacho Basin, Northwest Territories, 1978-81, Ph.D. thesis (Aspler). To 1) define stratigraphic and facies relationships within the Nonacho Group; 2) determine paleocurrent patterns; 3) determine depositional environments and prepare paleogeographic reconstructions; 4) define the relationship between tectonics and sedimentation and determine the structural evolution of the basin; 5) attempt to date directly, mudstones of the Nonacho Group using the Rb/Sr whole rock method; and 6) determine the relationship between the Nonacho Basin and other Proterozoic basins in the Canadian Shield.
957. BERTRAND, R., CHAGNON, A., HEROUX, Y., HUMBERT, L., ACHAB, A., INRS-Pétrole: Diagenèse des carbonates des Basses Terres du Saint-Laurent - Québec, 1975-80. Comparer les transformations diagénetiques des carbonates avec celles des argiles et de la matière organique. Travaux terminés, publication en rédaction.
958. CHANDLER, F.W., Geol. Surv. Can.: Redbed sequences in Canada, 1976-.
- See:** Proterozoic redbed sequences of Canada; Geol. Surv. Can., Bull. 311, 1980.
959. CHANDLER, F.W., Geol. Surv. Can.: Proterozoic red beds of Richmond Gulf, Quebec, 1977-.
960. CHESHIRE, S.G., WARDLAW, N.C., Univ. Calgary (Geology and Geophysics): An integrated geological and engineering study of the Devonian Meekwap Field, Alberta, 1974-79; Ph.D. thesis (Cheshire). The reservoir characteristics of the Meekwap Oil field are being investigated using an integrated approach which includes geological modelling, log analysis, statistical analysis, petrophysical methods and numerical simulation. A geological model has been constructed based on the identification of major petrophysical types within the field. All field wells have been subjected to log analysis using a computer program written by Mr. Cheshire. Reservoir properties have been determined at an interval of one foot in each producing well. The data includes log and core porosity, various measures of permeability, water saturation, an indication of secondary porosity, shaliness and dolomitization. It is intended to perform a factor analysis to attempt to elucidate the underlying relationships and casual influences on all these variables. An attempt to distinguish reservoir rock-types will be made using the same data and the technique of discriminant function. Thus the ultimate objectives of the project are to relate direct observations made from core with data derived from well logs, the emphasis being on the identification of petrophysical properties which affect reservoir performance and to relate both of these, integrated into a reservoir model, with a simulation which will provide some indication of sensitivity to several variables.
961. CHRISTIE, R.L., Geol. Surv. Can.: Cambro-Ordovician facies and correlation, Arctic Canada and Greenland, 1978-.

962. DONALDSON, J.A., KERANS, C., ROSS, G., Carleton Univ. (Geology): Sedimentology and stratigraphy of the Hornby Bay and Dismal Lakes groups, Northwest Territories, 1978-81; Ph.D. theses (Kerans, Ross). During the 1978 and 1979 field seasons, 12 detailed sections were measured across well-exposed parts of the Dismal Lakes Group in and adjacent to the type area, and 16 detailed sections were measured in the Hornby Bay Group south of Dismal Lakes and north Dease Arm of Great Bear Lake. To identify areas worthy of detailed study during the 1980 field season, additional sections were visited east of Coppermine River, north of Hornby Bay and west of Dease River. The information gathered will provide a basis for differentiating similar rock types within the Dismal Lakes and Hornby Bay Groups, particularly in the unmapped Bebensee Lake area. Thin sections of samples collected in 1978 and 1979 are now being studied to evaluate petrographic differences between lithologically similar units of the Dismal Lakes and Hornby Bay Groups. Paleocurrent data obtained in the field have served to substantiate and amplify earlier interpretations of depositional environments, and have revealed the importance of synsedimentary faulting during the early stages of basin infilling. Information obtained in 1979 provides documentation of submarine growth and diagenetic cementation of conical stromatolites (conophyton) in the Dismal Lakes Group. In addition, an extensive paleokarst surface has been recognized and mapped in the uppermost part of the Dismal Lakes Group, providing additional evidence to support earlier suggestions of correlation with the Parry Bay Formation of Bathurst Inlet.
963. DONALDSON, J.A., RICKETTS, B.D., ROOTS, C., Carleton Univ. (Geology): Sedimentology, stratigraphy and basinal analysis of the Belcher Group, Hudson Bay, 1976-81; Ph.D. thesis (Ricketts), M.Sc. (Roots). **See:** Stone rosettes as indicators of ancient shorelines: examples from the Precambrian Belcher Group; Can. J. Earth Sci., vol. 16, p. 1887-1891, 1979. Beachrock in Proterozoic dolostone of the Belcher Islands, Northwest Territories; J. Sedimentary Petrol., vol. 49, p. 1287-1294, 1979. Basin analysis of the eastern Belcher Islands has been completed, with emphasis on depositional environments, sedimentary structures, dispersal patterns and basin evolution. Work will continue in 1980 on the western Belcher Islands, with emphasis on the influence of volcanism on sedimentation and basin evolution.
964. FLACH, P.D., MOSSOP, G.D., Alberta Research Council (Geol. Surv.): Regional inventory of the Athabasca oil sands, Alberta, 1977-81. Data acquisition, consisting of lithology logs for four wells per township, is approaching completion for the northern part of the deposit. Core has been logged for four wells per township where available and facies interpretations have been made.
965. GLAISTER, R.P., NELSON, H.W., TURNBULL, H.M., Esso Resources Canada Ltd. (Exploration Research): Cold Lake heavy oil sands, 1978-80.

- Relationships between oil saturations, mean grain sizes, percent fines, depositional environments, and diagenetic clays are being investigated. Reservoir sand quality as defined by these relationships, is a key factor in acreage selection, in planning specific in situ recovery schemes, and in the analysis and prediction of production performance.
966. HESSE, R.F., ANDERSON, T., McGill Univ. (Geological Sciences): Diagenetic relationship between interbedded sandstone and shale in Gulf Coast Pleistocene and Tertiary geopressed and hydro pressured zones, 1978-80; M.Sc. thesis (Anderson). Abnormally high fluid pressures (or geopressures) are commonly encountered in deep drill-holes for hydrocarbons in the Gulf Coast region of the United States. The geopressure zones are presently being explored to locate potential petroleum reservoirs and source beds. The quality of a reservoir is determined to a large degree by the effects of diagenesis on the original sedimentary deposits. This study proposes to examine the role of geopressing in diagenesis in relation to additional parameters such as age, depth of burial and pore fluid salinities of the deposits. Drill-cores from two holes in Louisiana and off-shore Texas are being studied.
967. HESSE, R.F., OGUNYOMI, O., FONG, C., ISLAM, S., RUPPEL, S., MOROGAN, T., McGill Univ. (Geological Sciences): Diagenesis and depositional environments of Cambro-Ordovician deep-water sediments in Québec Appalachians, 1977-83; Ph.D. theses (Ogunyomi, Fong, Morogan), M.Sc. thesis (Islam). The tectonic setting of the Cretaceous Flysch à Helminthoids Basin, Embrunais, French West Alps, 1977-80; Ph.D. thesis (Tassé). Evaluation of the tectonic setting of Cretaceous deep-sea turbidites based on detailed sedimentological analysis of the depositional environments.
968. HESSE, R.F., TASSÉ, N., McGill Univ. (Geological Sciences): Continuing study of the sedimentology, facies relationships, petrology and diagenesis of the bitumen saturated Grand Rapids Formation in northeastern Alberta (Tp. 70-90, Rge. 13 W4 - Rge. 5 W5).
969. KRAMERS, J.W., Alberta Research Council (Geological Surv.): Sedimentology of the Grand Rapids Formation, Wabasca oil sand deposit, Alberta, 1972-82. Continuing study of the sedimentology, facies relationships, petrology and diagenesis of the bitumen saturated Grand Rapids Formation in northeastern Alberta (Tp. 70-90, Rge. 13 W4 - Rge. 5 W5).
970. LAST, W.M., TILLEY, B.J., Alberta Research Council (Geol. Surv.): Lloydminster heavy oil belt project, Alberta, 1979-83. Sixty-five fields in east-central and southern Alberta produce heavy-density oil from sands of the Lower Cretaceous Mannville Group. The overall objective of this project is to develop a complete geological and sedimentological understanding of these Mannville Group heavy oil reservoirs by combining subsurface mapping of the various units with more detailed field studies of the major pools. Initially, emphasis will be on the northern Lloydminster-Wainwright area (townships 35-52, ranges 1-10W4). For the first 6 to 8 months of the project, both geologists will be engaged in field studies. The stratigraphic and sedimentological information and conclusions reached in these initial reconnaissance field studies will then be used to guide: (a) a regional mapping and inventory of the deposits, and (b) investigation of specific sedimentological/petrologic problems.

971. LEGUN, A.S., RUST, B.R., Univ. Ottawa (Geology):
The sedimentology of Carboniferous coal-bearing deposits in northern New Brunswick, 1978-80; M.Sc. thesis (Legun).
To reconstruct the depositional environments and sedimentary processes operating for a sequence of clastic sediments exposed on the coast between Bathurst and Caraquet, New Brunswick and present in bore holes inland from the coast, and to identify which aspects of the environment and sedimentary processes favoured or hindered the deposition and preservation of coal-forming sediments.
972. LORSONG, J.A., Saskatchewan Dep. Mineral Res. (Geological Surv. Br.):
Lithofacies of the Lower Cretaceous Mannville Group, west-central Saskatchewan, 1979-.
- See:
Sask. Geol. Surv., Summ. Investig., p. 169-173, 1979.
A detailed sedimentological investigation of the Mannville Group in the Lloydminster area was initiated in early 1979, to develop the facies model which will aid in exploration for and development of heavy oil-bearing sandstone bodies. Preliminary descriptions of the constituent lithofacies of the Mannville Group are presented. Descriptions are based on detailed study of 500 m of core from the upper and middle parts of the succession (Colony, McLaren, Waseca, Sparky, General Petroleum and Rex formations) in the northern portion of the Lloydminster area.
973. MIALL, A.D., Univ. Toronto (Geology):
Tertiary molasse of the Canadian Arctic Islands; stratigraphy, sedimentology and relationship to regional tectonics, 1973-81.
See:
Tertiary fluvial sediments in the Lake Hazen intermontane basin, Ellesmere Island, Arctic Canada; Geol. Surv. Can., Paper 79-9, 1979.
Mesozoic and Tertiary geology of Banks Island, Arctic Canada. The history of an unstable craton margin; Geol. Surv. Can., Mem. 387, 1979.
The Eureka Sound Formation occurs in continental edge wedges flanking the Arctic Ocean and Baffin Bay, and in at least seven major intermontane basins within the Arctic Islands. Field work has been completed on all but two of these basins. A preliminary synthesis of the data reveals a dozen major facies assemblages ranging from alluvial fan to shallow marine. Basin evolution can be related to phases of the Eureka Orogeny, which reflects plate movements at the northern end of the North American continent. Field work will be completed in 1980.
974. MIALL, A.D., Univ. Toronto (Geology):
Basin analysis of Huronian clastic sediments of central Ontario, 1980-.
975. MOSSOP, G.D., Alberta Research Council (Geol. Surv.):
Sedimentology and petrology of the Athabasca oil sands, Alberta, 1975-82.
Facies distribution, depositional environments, paleocurrent patterns, paleohydrology, basin development, provenance, paleogeography, oil migration and maturation history, mineralogy, petrography, synergistic and geotechnical characteristics of the McMurray Formation oil sands in the Athabasca Deposit.
976. MUIR, I., RUST, B.R., Univ. Ottawa (Geology):
Sedimentology of Devonian Snowblind Bay Formation, Cornwallis Island, Northwest Territories, 1979-81; M.Sc. thesis (Muir).
Measure sections and compile sedimentological and stratigraphic data for the terrestrial clastic succession in relation to underlying shelf carbonates, and relate sedimentary history to tectonic development of region, in particular the Boothia Uplift.
977. NELSON, H.W., GLAISTER, R.P., JAMES, D.P., Esso Resources Canada Ltd. (Exploration Research):
Depositional and diagenetic controls on reservoir quality in low permeability sandstones, 1979-.
978. RENAUD, J.R., REINSON, G., DESJARDINS, M., INRS-Pétrole, Univ. Québec:
"Exosco Pie du quartz", calibration comme méthode de détermination de Paleomecanismes sédimentaires, 1979.
Utiliser des échantillons bien documentés provenant de régions géologiques bien étudiées, comme standard pour calibrer l'exoscopie du quartz.
979. REID, J., WARDLAW, N.C. Univ. Calgary (Geology and Geophysics):
Effects of vuggy porosity on the production of carbonate hydrocarbon reservoirs, 1978-80; M.Sc. thesis (Reid).
To investigate the form, origin and distribution of vugs or mega pores in carbonate rocks in selected formations in Alberta. The effects of the form and interconnection of various types of vuggy porosity on oil and gas production will be evaluated. Furthermore, it is hoped to compare estimates of vuggy (secondary) porosity made from well logs with direct measurements made on equivalent cores and likewise to compare "moveable" oil estimated from logs with measurements made on equivalent cores.
980. ROTTENFUSSER, B.A., Alberta Research Council (Geol. Surv.):
Peace River oil sands study, Alberta, 1975-81.
Cores have been logged throughout the heavy oil sands deposit and data on grain size, heavy oil saturation and mineralogy are being generated. Depositional environments, diagenesis, and mineralogy affect saturation and potential extraction of the heavy oil. Data will be provided to aid in planning in situ recovery projects.
981. RUST, B.R., Univ. Ottawa (Geology):
Ancient alluvial successions in relation to tectonic environments, 1975-80.
The Middle Devonian Malbaie Formation consists of sharply alternated sandstone and conglomerate units, deposited by proximal braided rivers or alluvial plains. It conformably overlies the Battery Point Formation, a Lower Devonian sandstone formed on distal braided or meandering alluvial plains. The Battery Point is in turn conformable on Siluro-Devonian shelf carbonates with interbedded andesitic volcanics and pyroclastics.
The Carboniferous (Viséan) Cannes de Roche Formation overlies the Malbaie with angular unconformity. It comprises proximal alluvial fan (including debris flow) deposits in the lower member, distal fan deposits (middle member) and distal braided river conglomerates (upper member). The differences between the Devonian and Carboniferous successions are attributed to different phases of the Acadian Orogeny: continental collision in the Devonian followed by transcurrent shearing along the inter-continental suture in the Carboniferous.
982. SHILTS, W.W., Geol. Surv. Can.:
Mineral indicator tracing, southern Keewatin, 1970-.
983. VAN DE POLL, H.W., Univ. New Brunswick (Geology):
Paleoclimatic influence on the economic geology and lithostratigraphy of the Carboniferous succession of eastern Canada, 1975-.
- See:
On the lithostratigraphy, sedimentology and paleobotany of the Pennsylvanian-Permian redbeds of central and western Prince Edward Island (Abstract); 9th Internat. Congr. Carboniferous Strat. Geol., Urban, Illinois, May 1979.
984. WARDLAW, N.C., Univ. Calgary (Geology and Geophysics):
Pore systems in sedimentary rocks and their influence on multiphase fluid movements, 1973-82.
See:
A treatise on hydrocarbon recovery from carbonate reservoirs; Petrol. Recovery Instit. Calgary, Res. Rep. RR-36, 1978.
Oil recovery efficiency and rock pore properties of some sandstone reservoirs; Bull. Can. Petrol. Geol., vol. 27, p. 117-138, 1979.
The efficiency with which oil and gas can be displaced from a reservoir is dependent on the nature of the fluids and the geometric and topologic aspects of the pore systems. Recovery efficiency (oil displaced as a % of oil in place) varies widely from 10% to 80%. A major objective of the project has been to understand how the geometry of pore systems influence recovery efficiency.
- Recovery efficiency is usually estimated by means of multiphase (water-oil or water-gas) relative permeability tests which are performed on core samples. These tests are difficult and expensive and are rarely made under reservoir conditions of temperature, pressure, displacement rate and wettability. Typically, fewer than 10 displacement tests, conducted on small, isolated core samples, are available for an entire, large Alberta oil reservoir. These tests are then used in simulating the performance of the reservoir as a whole.
There is a need for simpler techniques of estimating recovery efficiency in order to be able to process a larger number of samples which could more adequately represent the heterogeneous reservoir. There is also a need to identify those aspects of pore systems which are critically important in their effect on recovery efficiency. The major objective of the project has been to identify and evaluate these properties. Without some understanding of this, it is difficult to assess how representative the few samples chosen for relative permeability tests are of the reservoir as a whole.
985. WENDTE, J.C., Esso Resources Canada Ltd. (Exploration Research):
Controls on shallow marine carbonate play types, and general facies-reservoir models, Paleozoic, western Canada, 1979-81.
986. WIGHTMAN, D.M., Alberta Research Council (Geol. Surv.):
Cold Lake oil sands, Alberta, 1980-84.
To gain insight into the controls on oil saturation in the Lower Cretaceous Mannville Group by doing regional stratigraphy and detailed facies analysis on the sands.
987. ZAITLIN, B., RUST, B.R., Univ. Ottawa (Geology):
Sedimentology of Pirate Cove and Bonaventure formations of the Miguasha-Dalhousie area, Québec and New Brunswick, 1979-81; M.Sc. thesis (Zaitlin).
Comparative sedimentology of the two formations in relation to depositional process. Sedimentary environments, etc., and significance of facies associations in relation to tectonic history of area.

RECENT AND UNCONSOLIDATED SEDIMENTS/ SÉDIMENTS RÉCENTS ET NON CONSOLIDÉS

988. ADSHEAD, J.D., Geol. Surv. Can.:
Geological characterization of Arctic lakes: sediment properties and sedimentary processes, 1977-.
989. AMOS, C.L., Geol. Surv. Can.:
Sediment dynamics at the head of the Bay of Fundy, 1978-.
- See:
Geophysical and sedimentary studies in the Chignecto Bay system, Bay of Fundy - a progress report; Geol. Surv. Can., Paper 79-1B, p. 245-252, 1979.
990. AMOS, C.L., STEVENS, G.R., MOORE, R.G., Acadia Univ. (Geology):
Textural and mineralogical evaluation of the bottom sediments from Chignecto Bay, 1979-80.
An analytical approach will be made to work out probable provenance of the Chignecto Bay sediments. Main emphasis will be given to textural and mineralogical aspects of the sediments with a view to establish characteristic facies model in a megatidal environment.
991. BORNHOLD, B.D., Geol. Surv. Can.:
Marine surficial geology and sedimentation, British Columbia, 1975-.
992. BORNHOLD, B.D., Geol. Surv. Can.:
Coastal geology - British Columbia, 1978-.
993. BUCKLEY, D.E., Geol. Surv. Can.:
Multidisciplinary environmental marine geological analysis of the Miramichi Estuary and Bay, New Brunswick, 1975-1979.
994. DAVID, P., Univ. Montréal (Géologie):
Dunes de sable de la région du Lac Athabasca, Saskatchewan.
Le travail inclut une étude morphologique, structurale, sédimentologique des dunes, de même que du taux et du mode de leur migration, de leur chronologie et de leur origine.

- Cette recherche a débuté au printemps de 1979 par une étude des photos aériennes de la région et une recherche bibliographique. Durant l'été nous avons passé deux semaines sur le terrain dans les secteurs clés. Depuis ce temps, nous faisons l'analyse des données.
995. DAY, T.J., Geol. Surv. Can.: Gravel stream beds, 1975-.
- See:
A study of initial motion characteristics of particles in graded bed material; Geol. Surv. Can., Paper 80-1A, p. 281-286, 1980.
996. EDWARDS, T.W.D., Geol. Surv. Can.: A study of siltation within lakes in the District of Keewatin, Northwest Territories, 1977-.
997. FILLON, R.H., Geol. Surv. Can.: Surficial geology and paleogeology of Sagle Bank, Labrador Shelf, 1976-.
998. GILBERT, R., Queen's Univ. (Geography): Glaciomarine sediments in the fiords of Cumberland Peninsula, Baffin Island, District of Franklin, 1978-80.
Sedimentary environments of three fiords south of Broughton Island on the Davis Strait Coast of Baffin Island have been investigated. We made measurements of bathymetry, recovered grab samples and short cores of benthic sediments, made preliminary measurements of the characteristics of the fiord waters, and of currents and tides, and examined the littoral sedimentary and biologic environments. Analyses of results continue.
999. GREENWOOD, B., Univ. Toronto (Scarborough College, Geography): Sediment parameters and their use in the reconstruction of paleoenvironments of deposition, 1967-.
A continuing study of sediment properties as indicators of environments of deposition in both modern and ancient sedimentary sequences. Paleoenvironmental reconstruction based upon Key Environmental Indices is being carried out for coastal sedimentary deposits in Ontario, New Brunswick and Great Britain.
1000. GREENWOOD, B., MITTLER, P.R., Univ. Toronto (Scarborough College, Geography): Barrier island sedimentation, 1977-80.
See:
Structural indices of sediment transport in a straight wave-formed nearshore bar; Marine Geol., vol. 32, p. 191-203, 1979.
Barrier breaching: a case study in stability; Can. J. Earth Sci., vol. 16, p. 1533-1546, 1979.
Work is continuing on the sedimentation processes in the submarine environments associated with retrograding barrier island complexes on a coast with a low sediment budget. Relationships between oscillatory currents of wave origin, tidal currents, sediment transport patterns and the resultant textures, bedforms and sedimentary structures within the shoreface, inner shelf and tidal inlet sub-environments are being examined. Preservation of structures is being evaluated with the intent of developing more accurate facies models.
1001. GREENWOOD, B., MITTLER, P.R., SHERMAN, D., Univ. Toronto (Scarborough College, Geography): Coastal sedimentation: Sediment flux and nearshore equilibrium in a barred nearshore zone; Longshore current generation in a barred nearshore zone, 1977-82; Ph.D. theses (Mittler, Sherman).
Techniques for relating current vectors to sediment transport vectors have been developed for the nearshore zone particularly for use in areas of complex bathymetry. Relationships between high-energy storm-wave conditions and equilibrium forms are being explored. Particular emphasis is placed on the generation of bedforms (and the resulting structures) by complex oscillatory flows and the bed slope developed over the zone of wave shoaling.
1002. HARRISON, R.S., CONIGLIO, M., Univ. Manitoba (Earth Sciences): Genesis and diagenesis of the Late Pleistocene carbonates of the Florida Keys, 1978-80; M.Sc. thesis (Coniglio).
The late Pleistocene carbonates which constitute the Florida Keys consist, in surface outcrop, of two major facies: the reef and sand complex known as the Key Largo Limestone, and the Miami Oolite facies. Previous studies of these deposits have been largely confined to very limited surface outcrops. This current endeavour is based on 10 cored boreholes drilled on Key Largo, and eight cored boreholes on Big Pine Key. Several discrete stratigraphic units can be defined, based on regional extensive, but texturally highly-variable paleoexposure surfaces. Dominant facies include rather localized patch-reef buildups, skeletal grainstones and packstones burrowed, low energy wackestones, extensive but variable white shoal complexes and, in the northern keys, a thick horizon of quartz sand. Subaerial vadose diagenesis has resulted in extensive development of secondary porosity through most of the carbonate facies, and there is some suggestion of a distinct horizon of phreatic diagenesis. Additional petrographic, chemical, and isotopic analyses are continuing.
1003. HESSE, R.F., PRASAD, S., McGill Univ. (Geological Sciences): Heavy mineral assemblages from the Middle America Trench off Guatemala, 1979-80.
See:
Deep sea drilling results from the Pacific Middle America margin off Guatemala (IPOD, leg 67); Internat. Alfred Wegener Symp., 1980.
To study the diagenesis in an active margin environment and the influence of clathrate (gas-hydrate) formation on diagenesis.
1004. HESSE, R.F., VELDHUYZEN, H., McGill Univ. (Geological Sciences): Labrador Sea sediments, 1973-80; M.Sc. thesis (Veldhuyzen).
See:
The Northwest Atlantic Mid-Ocean Channel of the Labrador Sea: II: Deposition of parallel laminated levee muds from the viscous sublayer of low-density turbidity currents; Sedimentology, 1980.
The Northwest Atlantic Mid-Ocean Channel of the Labrador Sea: III: Head spill vs. body spill deposits from turbidity currents on natural levees; J. Sedimentary Petrol., vol. 50, no. 1, 1980.
1005. JANSÁ, L.F., Geol. Surv. Can.: Stratigraphy and sedimentology of the Mesozoic and Tertiary rocks of the Atlantic continental margin, 1971-.
See:
Upper Triassic salt deposits of the western North Atlantic; Can. J. Earth Sci., vol. 17, no. 5, p. 547-559, 1980.
1006. KOSTER, E.H., RUST, B.R., GENDZWILL, D.J., Univ. Saskatchewan (Geological Sciences): Flume and field study of fluvial gravels, 1976-.
Continuing research into the transport and deposition of gravel in proximal fluvial environments combines flume, field and theoretical research with the aim of 1) improving the quality of data collected at outcrop, 2) elucidating different fabric configurations, 3) developing guidelines for detailed paleohydrological analysis in ancient rocks, and 4) proposing criteria that could be used to recognise the attainment of equilibrium at ancient flow-bed boundaries.
1007. KOSTER, E.H., WALKER, E.R., Univ. Saskatchewan (Geological Sciences): The South Saskatchewan River at Saskatoon; surficial geology, geoarchaeology and geotechnical aspects, 1977-.
Study of the Gowen site (No. Fa; Nq-25), a bison-processing site occupied 6100 B.P. and located on the Saskatoon Terrace alongside the left bank of the South Saskatchewan River, is now complete. Because this site holds particular significance in terms of Plains archaeology, it was decided to investigate fully its geological setting. To deduce the nature of successive paleoenvironments, published data of a paleoclimatic, paleobotanic and radiometric nature were integrated with the results of on-site sedimentological and stratigraphic studies. It is concluded that the Gowen site was occupied following the final stages of valley incision and prior to the onset of widespread aeolian activity. The progressive effects of a local weir (built 1940 as a relief measure) and Gardiner Dam (completed 1967) on the hydrology and sedimentology of the river are now under investigation.
1008. LUTERNAUER, J.L., Geol. Surv. Can.: Fraser Delta sedimentation, British Columbia, 1974-.
1009. LUTERNAUER, J.L., Geol. Surv. Can.: Marine delta sedimentation, British Columbia, 1979-.
To provide geological/sedimentological data base for delta systems on coastal British Columbia.
1010. LYNCH, K., JOPLING, A.V., Univ. Toronto (Geography): The effect of sediment sorting on bed-form development in a laboratory flume.
The recirculating flume of the Department of Geography was used to study the influence of sediment sorting on the morphology of ripple bed forms (experimental work completed).
1011. MASSE, P., JOPLING, A.V., Univ. Toronto (Geography): Depth - discharge relationships in river channels.
A mathematical analysis of the hysteresis effect associated with flood waves in river channels (nearly completed).
1012. MAY, R.W., Univ. Alberta (Geology): Diagenesis in tills.
1013. MAY, R.W., LIVERMAN, D., Univ. Alberta (Geology): Sedimentology of an ice-dammed lake St. Elias Mountains, Yukon Territory, 1979-80; M.Sc. thesis (Liverman).
Hazard Lake created where the Steele Glacier dams Hazard Creek is located in the northern St. Elias Mountains. Sedimentological processes are being studied in the lake. Sampling was undertaken during summer 1979. Analytical work is currently being performed.
1014. McLAREN, P., Geol. Surv. Can.: Environmental geology of eastern Arctic coasts, 1976-.
See:
Basin computer programs for the positioning, recording and display of spatially distributed data; Geol. Surv. Can., Paper 79-1C, p. 41-50, 1979.
1015. PELLETIER, B.R., Geol. Surv. Can.: Bottom studies of the Beaufort Sea, 1972-.
See:
The Holocene marine environments of the Beaufort Shelf; Geol. Surv. Can., Bull. 303, 1979.
1016. RASHID, M.A., Geol. Surv. Can.: Geochemical transformations and reactions of organic computers in Recent marine sediments, 1975-.
See:
Observations on depositional environments and benthos of the continental slope and rise, east of Newfoundland; Can. J. Earth Sci., vol. 16, no. 4, p. 831-847, 1979.
1017. REINSON, G.E., Geol. Surv. Can.: Shelf environments of central Labrador and Ungava Bay, Newfoundland, 1979-.
To determine the nature and magnitude of sediment transport processes on the inner shelf, and delineate the Holocene stratigraphy.

1018. SHEPPERD, J., BARNES, W.C., ROUSE, G.E., Univ. British Columbia (Geological Sciences):
Factors influencing salt marsh progradation, Fraser Delta, southwest British Columbia, 1980-81; M.Sc. thesis (Shepperd).
1019. SYVITSKI, J.P., Univ. Calgary (Geology and Geophysics):
Sediment dynamics of West Coast fjords, 1980-83.
Fjords provide an excellent opportunity to study processes influencing the sedimentation of marine sediments. Insights into flocculation, sediment gravity flows, deep-water suspension deposition and delta formation will result from comparing fjords with various basin dimensions, seasonal water and sediment discharge, and sill depth. This proposal concerns the evaluation of the sediment dynamics of Bute Inlet. The effect of the high sedimentation rates and lower sill depth of Bute Inlet will be related to processes of flocculation and prodelta laminae formation. The suspended load will be sampled for inorganic and organic concentration, mineralogy, floc configuration, and size distribution. These data will be related to Bute Inlet water properties (T°C, pH, DO, conductivity). Sedimentation rates will be measured by in situ collectors and by Pb-210 dating. Bottom sediment response will be studied by submersible observation and detailed analysis of sediment cores.
1020. TELLER, J.T., LAST, W., NAMBU DIRI, E.M.V., Univ. Manitoba (Earth Sciences):
Post-glacial sedimentation and history in Lake Manitoba basin, 1977-80; Ph.D. thesis (Last).
See:
Post-glacial sedimentation and history in Lake Manitoba; Manitoba Dep. Mines, Natural Res. and Environ., Sediment. Rpt. 1, 1979.
Pre-Quaternary microfossils - a guide to errors in radiocarbon dating; Geology, vol. 8, 1980.
- The proposed study will identify, map, measure, describe, and sample the overflow channels and their sediments between Lake Agassiz and Lake Superior. These data will be related to the glacial, lacustrine and fluvial stratigraphy elsewhere in northwestern Ontario, and will be used to correlate with late Quaternary events in the Prairies and Great Lakes. The paleohydrology of these channels, and its key role in determining the inter-relationship between east and west, will be established.
1021. VAN DE POLL, H.W., THIBAUT, J., Univ. New Brunswick (Geology):
Sedimentation in the shallow marine coastal environment of the Northumberland Strait, 1976-80.
1022. VILKS, G., Geol. Surv. Can.:
Pleistocene-Holocene basin sedimentation, 1975-.
See:
The Holocene marine environment of the Beaufort Shelf; Geol. Surv. Can., Bull. 303, 1979.
- ### SOIL SCIENCE/PEDOLOGIE
1023. KING, R.H., KINGSTON, M.S., Univ. Western Ontario (Geography):
Identification and characterization of a Holocene paleosol, Fish Creek, Alberta, 1976-80; M.Sc. thesis (Kingston).
Physical, mineralogical, micromorphological and chemical analyses have been performed on a paleocatena exposed along a cutbank on the south side of Fish Creek (51°56'N, 114°05'W), Calgary, Alberta. The section contains a paleosol with a well developed 12 cm thick organic horizon underlain by a 15 cm thick Bm horizon which, in turn, grades into a Ck horizon. The paleosol has developed in a silty alluvium which is underlain by imbricated gravels. The presence of a Mazama volcanic ashfall deposit above the paleosol and in places in contact with the top of the buried Ah horizon is confirmed by electron microprobe analysis of included magnetites. Overlying the ash is a complex colluvial deposit in which the present-day Cumulic Rego chernozem has formed. The paleosol has been sampled at three points in the paleocatena and an analysis is presently underway of the variations in the paleosol within the paleocatena. Besides characterizing the paleosol a reconstruction of the paleoenvironment is being attempted based on relict features preserved in the paleosol in comparison with contemporary soil characteristics and environments.
1024. LUCKMAN, B.H., KING, R.H., CAWKER, K.B., KEARNEY, M.S., HOLLAND, K., BOWYER-BEAUDOIN, A., Univ. Western Ontario (Geography):
Holocene environmental change in Jasper National Park, Alberta, 1977-80; Ph.D. theses (Kearney, Bowyer-Beaudoin), M.Sc. thesis (Holland).
See:
Holocene glacier fluctuations in the Middle Canadian Rocky Mountains; Quaternary Res., vol. 11, p. 52-77, 1979.
Holocene environmental change in Jasper National Park - Third Interim Report; Rep. Parks Canada, Western Region, 1980.
Geomorphic, pedologic and palynologic techniques are being used to examine the record of paleoenvironmental changes. Field work in 1979 concentrated on the Sunwapta Pass (52°13'N, 117°13'W). A radiocarbon date of 8100 ± 100 B.P. (GSC 2589) from wood near the base of a peaty section provides a minimum date for deglaciation. Underlying the basal organic deposits is a relatively thick (> 3 M) proglacial lake deposit. Contemporaneous with this lake was the formation of a sequence of large paraglacial alluvial fans. Following the draining of the lake peat growth was probably initiated on terrestrial sediments as a hydrosere succession. Palynologic analysis suggests that the vegetation sequence in the Pass reflects predominantly local changes in the hydrology of a series of semi-autonomous basins, with only a weak regional climatic signal. The surficial sediments and soils on the valley sides contain a record of episodic environmental changes since deglaciation. A silt loam eolian veneer overlies a wide variety of subsurface deposits, including a partially decalcified till. The deposition of this veneer preceded the Mazama ashfall (6600 B.P.) and is essentially a feature of the Hypsithermal Interval in the area (8500-5500 B.P.). Incorporated within this veneer is volcanic ash of Mazama, St. Helens Y and Bridge River types. Eolian deposition had largely ceased by 2100 B.P. The soils display morphological features which appear to be relict in nature and which may be subsequently correlated with paleoenvironmental events.
1025. MOORE, T.R., McGill Univ. (Geography):
Soil forming processes and opal phytoliths in boreal, arctic and subarctic soils, 1979-81.
There are 3 major objectives:
1) The reasons for the northward decrease in podzolization in boreal-subarctic-arctic soils are being investigated by examining the ability of soil and vegetation leachates to mobilize Fe and Al compounds, and the stability of the metal-organic complexes. Initial experimental results suggest that there are no major decreases in the podzolizing power of vegetation northwards, and that perhaps the most important factor is the acidity of the soil, as it affects the stability of the complexes. The methods will now be applied to arctic plants and soils. 2) Preliminary results show that subarctic plants contain opal phytoliths. The aim is now to identify the amounts and morphologies of the phytoliths in the major vegetation types of boreal-subarctic-arctic areas. If differences can be detected, then soil phytoliths can be used to plot previous vegetation patterns, particularly the tree line. 3) Soil properties beneath subarctic pre-historical Indian sites are being examined, with the aim of improving our archaeological knowledge of the size, shape and interpretation of Indian activities in the subarctic.
1026. RUTHERFORD, G.K., KEMP, R., Queen's Univ. (Geography):
The pedogenesis of soils formed on granitic parent materials near Bon Eco, Ontario, 1979-80; M.Sc. thesis (Kemp).
In any dominantly sedimentary environment, homogeneity of parent materials must be problematical. This is a study in the development of soils on materials which appear to be wholly granitic in origin. The chemical, mineralogical and microscopic processes obtaining in the development of soils on granitic materials are being studied.

STRATIGRAPHY/STRATIGRAPHIE

PRECAMBRIAN/PRÉCAMBRIEN

1027. AITKEN, J.D., Geol. Surv. Can.:
Helikian and Hadrynian stratigraphy Eastern
Cordilleran and Interior Platform, 1973-.
1028. CAMPBELL, F.H.A., Geol. Surv. Can.:
Geology of the Coronation Gulf area, District of
Mackenzie, 1977-.
1029. CHANDLER, F.W., Geol. Surv. Can.:
Geology of the Helikian sediments and adjacent
gneisses, Fury and Hecla Strait area, District of
Franklin, 1979-.
- See:**
Geological studies of the Late Precambrian supra-
crustal rocks and underlying granitic basement,
Fury and Hecla Strait area, Baffin Island, District
of Franklin; Geol. Surv. Can., Paper 80-1A,
p. 125-132, 1980.
To determine the internal stratigraphy, sedi-
mentology, structure, age, and geological history
of the sediments, and to map the underlying
gneisses.
1030. DOWNES, M.J., Ontario Geol. Surv.:
Precambrian stratigraphic mapping, Kirkland Lake,
Ontario, 1979-82.
- See:**
Ontario Geol. Surv., Misc. Paper 90, p. 121-125,
1979.
Field work done in 1979 represents the first part of
a three year program, under the Kirkland Lake
Incentive Program (KLIP), to carry out stratigra-
phic mapping covering an area straddling the
Kirkland Lake-Larder Lake 'break', from the
Quebec border in the east to Highway 11 in the
west. This first year covers that area within
McGarry and McVittie Townships comprising the
alkalic volcanic rocks and associated sedimentary
rocks of the Timiskaming Group, together with the
ultramafic volcanic rocks and sedimentary rocks
north of Larder Lake.
1031. EISBACHER, G.H., Geol. Surv. Can.:
Stratigraphy and sedimentation of the Proterozoic
Rapitan Group and related rocks, Mackenzie,
Wernecke and Ogilvie Mountains, District of
Mackenzie and Yukon Territory, 1975-.
1032. EISBACHER, G.H., Geol. Surv. Can.:
Stratigraphy, sedimentation, structure and tectonic
setting of the Windermere Supergroup, 1979-.
1033. GAGNON, Y., CIMON, J., Québec Ministère Energie
et Ressources:
Complexe rhyolitique de Palmarolle, Québec,
1979-80.
Définition d'un complexe rhyolitique du point de
vue stratigraphique et structural et géochimique
pour évaluer son potentiel métallifère et orienter
la recherche de métaux.
1034. HENDERSON, J.R., Geol. Surv. Can.:
Geology of the Foxe Fold Belt (East half), Baffin
Island, District of Franklin, 1979-.
- To establish the stratigraphy, structure and meta-
morphism of the Aphebian sedimentary, volcanic
and plutonic rocks in the Piling Group and their
relationship to the rocks of the Mary River Groups.
1035. HOFFMAN, P.F., Geol. Surv. Can.:
Hepburn batholith, Hepburn Lake map area,
District of Mackenzie, 1977-.
- See:**
Syntectonic plutonism in north-central Wopmay
Orogen (early Proterozoic), Hepburn Lake map
area, District of Mackenzie; Geol. Surv. Can.,
Paper 80-1A, p. 171-177, 1980.
"Hot-side-up" and "hot-side-down" metamorphic
isograds in north-central Wopmay Orogen, Hepburn
Lake map area, District of Mackenzie; *ibid.*,
p. 179-182, 1980.
Conjugate transcurrent faults in north-central
Wopmay Orogen (early Proterozoic) and their dip-
slip reactivation during post-orogenic extension,
Hepburn Lake map area, District of Mackenzie;
ibid., p. 183-185, 1980.
On the relative age of the Muskox Intrusion and the
Coppermine River basalts, District of Mackenzie;
ibid., p. 223-225, 1980.
1036. HOFMANN, H., Univ. Montréal (Géologie):
Stratigraphie et paléontologie du Précambrien.
- Le projet consiste à chercher des fossiles
(microfossiles, mégafossiles, stromatolites) dans
des terrains précambriens choisis, à les identifier,
décrire, illustrer et interpréter leur importance
biologique, écologique et stratigraphique. Régions
couvertes: Cordillères canadiennes, Bouclier
canadien, Appalaches.
1037. HOY, T., British Columbia Ministry Energy, Mines,
Petrol. Res. (Geol. Div.):
The Purcell Supergroup in southeastern British
Columbia, sedimentation and mineral deposits,
1975-.
- An on-going study of the Proterozoic Purcell
Supergroup in southeastern British Columbia
focusing on the stratigraphy and sedimentation of
the Purcell Supergroup, the relationship between
tectonics and sedimentation, and the sedimentary
and tectonic controls of stratiform base metal
sulphide deposits. Detailed (1:50,000) mapping of
Proterozoic rocks on the east side of the Rocky
Mountain Trench is largely completed, and mapping
of Proterozoic rocks in the Purcell anticlinorium
south of Kimberley has begun, and will continue in
the 1980 season.
1038. JACKSON, G.D., Geol. Surv. Can.:
Operation Borden, District of Franklin, 1977-.
- See:**
Rift-related late Proterozoic sedimentation and
volcanism on northern Baffin and Bylot Islands,
District of Franklin; Geol. Surv. Can.,
Paper 80-1A, p. 319-328, 1980.
1039. JENSEN, L.S., PYKE, D.R., MILNE, V.G.,
LANGFORD, F.F., Ontario Geol. Surv., Univ.
Saskatchewan (Geological Sciences):
Synoptic mapping of Abitibi belt; Petrogenesis of
Abitibi belt - Kirkland Lake, 1972-82; Ph.D. thesis
(Jensen).
- See:**
Ontario Geol. Surv., Misc. Paper 90, p. 64-69, 1979.
1040. McGLYNN, J.C., Geol. Surv. Can.:
Stratigraphy, sedimentology and correlation of the
Nonacho Group, District of Mackenzie, 1965-.
1041. McGLYNN, J.C., Geol. Surv. Can.:
A study of Bear batholith rocks and basement to
the Bear batholith, 1978-.
1042. PATTERSON, J.G., GHENT, E., Univ. Calgary
(Geology and Geophysics):
Geology of the Amer Lake area, Northwest
Territories, 1979-81; M.Sc. thesis (Patterson).
Mapping of the area immediately east of Amer
Lake was completed in 1979. The belt of
metasediments (Amer Belt) will be mapped east to
its termination, in 1980.
1043. RAMAEKERS, P., Saskatchewan Dep. Mineral Res.
(Geological Surv. Br.):
Stratigraphy of the Athabasca Basin, 1979-80.
- See:**
Sask. Geol. Surv., Summ. Invest., p. 154-160,
1979.
In past years, studies on the Athabasca Basin
consisted of core collection and description,
preparation and study of thin sections and
preparation of samples for chemical analysis. One
month's field work was undertaken to cover areas
missed in previous years and to study areas of
interest in greater detail. The results obtained
established the distribution of lithofacies to the
extent that the clastics of the Athabasca Basin can
be subdivided into formations. The name
Athabasca Group is proposed to include the
Athabasca and Carswell Formations and the con-
formably intervening Douglas Formation. It is
proposed to divide the unmetamorphosed clastics
of the Athabasca Basin that are stratigraphically
below the Douglas Formation into six new
formations. Contacts are generally gradational
and are virtually never exposed although discon-
formities may exist. The Athabasca Group
resembles a typical molasse sequence in all but the
apparent chemical maturity of its sediments. This
may be accounted for by its long diagenetic
history.
1044. TROWELL, N.F., BLACKBURN, C.E., Ontario Geol.
Surv.:
Savant-Crow Lakes volcanic/sedimentary belt,
Kenora District, Ontario, 1976-80:
1045. VERPAELST, P., Ecole Polytechnique (Génie
minéral), Québec Ministère Energie et Ressources:
Complexe rhyolitique de Duprat, Québec, 1978-80;
thèse de doctorat.
Voir:
Complexe rhyolitique de Duprat; Québec Ministère
Richesses Naturelles, DPV-684, 1979.
1046. WALLACE, H., Ontario Geol. Surv.:
Geology of the Ferdinand Lake area, District of
Kenora, Patricia Portion, Ontario, 1979-80.
- See:**
Ontario Geol. Surv., Misc. Paper 90, p. 16-18, 1979.
The project is one in a series of detailed mapping
programs which are intended to upgrade knowledge
of stratigraphy, structural geology and economic
mineral potential of the central part of the Uchi
Subprovince in Northwestern Ontario. Specifically
the Ferdinand Lake area was mapped in an effort
to correlate volcanic stratigraphy between the
Birch Lake belt to the west, and the Bamaji Lake
belt to the east.
The structural relationships between the supra-
crustal sequence and the surrounding plutonic
complexes which dominant the region were
examined.
A number of molybdenum prospects occurring in
quartz veins and pegmatite dikes cutting felsic
plutonic rocks have been described.
1047. WOOD, J., Ontario Geol. Surv.:
Stratigraphy, sedimentation, and metallogenesis of
Huronian rocks of the Cobalt Embayment, Ontario,
1979-82.
- See:**
Regional geology of the Cobalt Embayment,
Districts of Sudbury, Nipissing and Timiskaming;
Ontario Geol. Surv., Misc. Paper 90, p. 79-81,
1979.
To elucidate the sedimentation and stratigraphy of
Huronian rocks in the Cobalt Embayment, to
examine the relationship between known mineral
deposits and Huronian sedimentation and
stratigraphy, and Archean source areas, and to use
this data to predict further areas of
mineralization.

PALEOZOIC/PALÉOZOÏQUE

1048. AITKEN, J.D., Geol. Surv. Can.:
Lower Paleozoic stratigraphy, southern Rocky
Mountains, Alberta and British Columbia, 1972-.
1049. BARNES, C.R., NORFORD, B.S., SKEVINGTON, D.,
Univ. Waterloo (Earth Sciences), Geol. Surv. Can.,
Memorial Univ. (Geology):
Correlation chart of Ordovician strata throughout
Canada, 1978-81.
1050. BOLTON, T.E., Geol. Surv. Can.:
Ordovician-Silurian biostratigraphy, Southampton
Island, District of Keewatin, 1970-.
- See:**
A late Ordovician fossil assemblage from an outlier
north of Aberdeen Lake, District of Keewatin;
Geol. Surv. Can., Bull. 321, p. 1-26, 1979.
1051. BOLTON, T.E., Geol. Surv. Can.:
Silurian-Ordovician macrobiostratigraphy of
Anticosti Island, Québec, 1974-.
- See:**
Some Late Ordovician colonial corals from Eastern
Canada; Geol. Surv. Can., Paper 79-1B, p. 1-12,
1979.
1052. BOURQUE, P.-A., Univ. Laval (Géologie):
Evolution tectonique et paleo-environnements du
Silurien des Appalaches du Nord, 1974-.
- Voir:**
Les facies du complexe récifal Silurien du West
Point, Baie des Chaleurs; Geol. Assoc. Can. Livret
guide excursion B-2, Québec, 1979.
A partie de travaux de détails dans la péninsule
Gaspésienne d'une compilation des travaux ailleurs
dans les Appalaches du Nord, on texte d'établir
l'évolution tectonique ainsi que celle des facies
sédimentaires pour le Silurien des Appalaches du
Nord. Reste à faire, des travaux à Terrebonne.
1053. BRUN, J., ST-JULIEN, P., Univ. Laval (Géologie),
Québec Ministère Energie et Ressources:
Stratigraphie, pétrographie et sédimentologie des
groupes de Black River et du Trenton (Ordovicien
moyen) du sud du Québec, 1973-80; thèse de
doctorat (Brun).

- See:**
Rock stratigraphy and clay mineralogy of volcanic ash beds from the Black River and Trenton Groups (Middle Ordovician) of southern Québec; *Can. J. Earth Sci.*, vol. 16, no. 7, p. 1499-1507, 1979.
- 1er étape. Travaux de terrain terminés à 100%.
2ème étape. Travaux de laboratoire terminés à 75%.
3ème étape. Travaux de bureau terminés à 50%.
1054. CECILE, M.P., *Geol. Surv. Can.:*
Lower Paleozoic basin-to-platform relationships in the Cordillera, District of Mackenzie-British Columbia, 1977-.
1055. CHORLTON, L.B., Newfoundland Dep. Mines and Energy (Mineral Develop. Div.), Memorial Univ. (Geology):
Geology of La Poile, La Poile River, Peter Snout, Grandy's Lake, southwest Newfoundland. Ph.D. thesis: The geological history of the La Poile - Cinq Cerf map area, southwestern Newfoundland, 1974-82.
1056. CHRISTIE, R.L., *Geol. Surv. Can.:*
Geological reconnaissance of eastern Devon Island and northwestern Ellesmere Island, District of Franklin, 1968-.
1057. FRITZ, W.H., *Geol. Surv. Can.:*
Cambrian biostratigraphy of the Canadian Cordillera, 1963-.
- See:**
Cambrian stratigraphy in the northern Rocky Mountain, British Columbia; *Geol. Surv. Can.*, Paper 79-1B, p. 99-109, 1979.
- Cambrian stratigraphic section between South Nahanni and Broken Skull rivers, southern Mackenzie Mountains; *ibid.*, p. 121-125, 1979.
- International Precambrian-Cambrian boundary Working Group's Field Study to Mackenzie Mountains, Northwest Territories, Canada; *Geol. Surv. Can.*, Paper 80-1A, p. 41-45, 1980.
1058. GARIEPY, C., HUBERT, C., *Univ. Montréal (Géologie):*
Étude géochimique des laves Cambro-Ordoviciennes des Appalaches du Québec.
- Trois complexes basaltiques cambro-ordoviciens du domaine interne des Appalaches du Québec, le Groupe de Caldwell, la Formation de la Montagne de Saint-Anselme et les laves de la région de Saint-Flavien, lesquels sont alloctones et légèrement métamorphisés, ont été analysés pour leur teneur en éléments majeurs, éléments-traces, terres-rares et isotopes du Sr trout en poursuivant trois objectifs principaux: 1) évaluer la mobilité des éléments chimiques sous des conditions de métamorphisme faible; 2) déterminer dans quel environnement tectonique se sont accumulés ces laves; et 3) déterminer dans quel ordre chronologique les complexes ont été formés.
1059. GELDSETZER, H.H.J., *Geol. Surv. Can.:*
Carboniferous and Triassic strata of Appalachian region, 1974-.
1060. GELDSETZER, H.H.J., *Geol. Surv. Can.:*
Middle and Upper Devonian rocks of central British Columbia and Alberta, 1979-.
1061. HOFMANN, H., *Univ. Montréal (Géologie):*
Stratigraphie et paléoécologie du Paléozoïque Inférieur.
- See:**
Chazy (Middle Ordovician) traces fossil in the Ottawa-St. Lawrence Lowlands; *Geol. Surv. Can.*, Bull. 321, p. 27-59, 1979.
1062. HOWIE, R.D., *Geol. Surv. Can.:*
Compilation of geoscientific data in the Upper Paleozoic basins of southeastern Canada, 1971-.
1063. INNIS, J., LENZ, A.C., *Univ. Western Ontario (Geology):*
Stratigraphy and sedimentation of late Ordovician to Wenlockian of Road River Formation, Richardson Mountains, Yukon, 1977-80; M.Sc. thesis (Innis).
- See:**
Llandoveryan graptolite zonation in the northern Canadian Cordillera; *Acta Palaeontologica Polonica*, vol. 24, p. 137-153, 1979.
- New occurrences of two Lower Devonian graptolites from northern Yukon; *Can. J. Earth Sci.*, vol. 16, p. 1121-1124, 1979.
- A detailed study of the middle of the Road River Formation from four sections on the east and west side of the Richardson Mountains in order to determine lithology, detailed stratigraphic correlations involving graptolite zones and sedimentary history of part of the Richardson Trough.
1064. KLEIN, K.P., SIMPSON, F., *Univ. Windsor (Geology):*
Lithofacies and biofacies of Middle Devonian (Eifelian) Formosa Reef Limestone (Detroit River Group) of Bruce and Huron Counties, Southwestern Ontario, 1979-80; M.Sc. thesis (Klein).
1065. LESPÉRANCE, P.J., *Univ. Montréal (Géologie):*
Stratigraphie des calcaires de Gaspé Supérieurs (Dévonien Inférieur de la Gaspésie et du Bas-du-Fleuve), 1973-80.
1066. McCABE, H.R., *Manitoba Dep. Energy and Mines (Mineral Res. Div.):*
Ordovician stratigraphy of southwestern Manitoba, 1979-84.
- To revise and redefine the subdivision of Ordovician strata in southwestern Manitoba, particularly with respect to the Red River Formation; to determine the detailed distribution of the various rock units in the light of new surface and subsurface (core hole) data; to define the lithofacies changes in the Ordovician formation; and to integrate subsurface data with the new and previously described outcrop data.
1067. MAYR, U., *Geol. Surv. Can.:*
Stratigraphy and correlation of lower Paleozoic subsurface, Arctic Islands, 1975-.
- See:**
Subsurface stratigraphy and conodont zonation of the Lower Paleozoic succession, Arctic Platform, southern Arctic Archipelago; *Geol. Surv. Can.*, Paper 80-1A, p. 209-215, 1980.
1068. MIALL, A.D., *Geol. Surv. Can.:*
Phanerozoic stratigraphy and sedimentology of Somerset Island and Northern Boothia Peninsula, 1975-.
1069. MONGER, J.W.H., *Geol. Surv. Can.:*
Upper Paleozoic rocks of western Canadian Cordillera, 1972-.
1070. MORROW, D.W., *Geol. Surv. Can.:*
Stratigraphy, sedimentology and diagenesis of Paleozoic rocks in the southern Mackenzie Mountains and northern Rocky Mountains, Yukon Territory-British Columbia, 1975-.
1071. NARBONNE, G.M., DIXON, O.A., *Univ. Ottawa (Geology):*
Silurian stratigraphy and depositional environments of southeastern Somerset Island, Northwest Territories, 1975-80; Ph.D. thesis (Narbonne).
- See:**
Nature and origin of rubby limestone in the Upper Silurian Read Bay Formation of Arctic Canada; *Sedimentary Geol.*, vol. 24, p. 227-252, 1979.
- Silurian trilobites from Arctic Canada; *Geol. Mag.*, vol. 116, p. 1-19, 1979.
- A study of the lithological and faunal succession in the Read Bay Formation on southeastern Somerset Island and its correlatives on Cornwallis Island. Three main subjects are being investigated: stratigraphic framework, composition and facies distribution of ichnofossils in these carbonate rocks, and nature and origin of sponge bioherms in the formation. Field work and most laboratory work are complete and the results are partly written up toward the thesis.
1072. NASSICHUK, W.W., *Geol. Surv. Can.:*
Stratigraphy and paleontology of Upper Paleozoic rocks on parts of Ellesmere and Axel Heiberg Islands, District of Franklin, 1968-.
- See:**
Algues et stratigraphie du Paléozoïque supérieur de l'Arctique Canadien; *Bull. Centre Rech. Explor - Prod. Elf - Aquitaine*, vol. 3, no. 2, p. 669-683, 1979.
1073. NASSICHUK, W.W., *Geol. Surv. Can.:*
Carboniferous biostratigraphy in the northern Yukon, British Columbia, and Alaska, 1975-.
1074. NORFORD, B.S., *Geol. Surv. Can.:*
Ordovician and Silurian biostratigraphy of British Columbia, Alberta, Manitoba, Yukon, Mackenzie and Franklin, 1961-.
1075. OKULITCH, A.V., *Geol. Surv. Can.:*
Stratigraphy and structures of the Mount Ida Group, southern British Columbia, 1972-80.
1076. PACKARD, J.J., DIXON, O.A., *Univ. Ottawa (Geology):*
Read Bay Formation (member C) on eastern Cornwallis Island, District of Franklin, 1977-81; Ph.D. thesis (Packard).
- A general stratigraphic study of member C of the Read Bay Formation on eastern Cornwallis Island, and detailed study of reefold coral-stromatoporoid facies and adjacent crinoidal facies in the formation. A major objective is the delineation and environmental interpretation of facies in this platform margin carbonate complex.
1077. PEDDER, A.E.H., *Geol. Surv. Can.:*
Upper Silurian and Devonian biostratigraphy western and northern Canada, 1968-.
1078. RICHARDS, B.C., *Geol. Surv. Can.:*
Carboniferous and Permian stratigraphy and sedimentation in the southwestern District of Mackenzie and southeastern Yukon Territory, 1977-.
1079. SANFORD, B.V., *Geol. Surv. Can.:*
Lower Paleozoic geology of Eastern Canada, 1975-.
1080. SCHENK, P.E., *Dalhousie Univ. (Geology):*
Sedimentologic-stratigraphic studies of Early through Late Paleozoic sedimentary rocks of Nova Scotia, 1977-.
- Early and Middle Paleozoics. The Meguma Zone is the largest unique block of the Appalachians, may be exotic as a part of another continent, and is prospected extensively now. Time-control is essential for relating detailed sedimentologic studies. Continued digestion will yield more acritarchs, Chitonozoa, possibly conodonts as well as macrofauna. The apparently glacio-genetic unit requires confirmation because of its paleogeographic implications. Strain analysis of widely spaced areas will assist construction of palinspastic maps. Analysis of rare earths may help trace the origin of Meguma sands.
- Late Paleozoics. A variety of carbonate mounds are now being extensively drilled and mined for Pb/Zn. Detailed petrographic studies of polished slabs and thin sections are necessary to map and interpret them, especially the succession of diagenetic processes such as dolomitization and leaching. Almost no detailed petrographic work has been done on anhydrite, despite the great quantities of core now available and rotting to gypsum (a major resource of the province). Preliminary work reveals several major varieties of anhydrite, and at least two major discoveries which need further work. Studies of the provenance and dispersal of Carboniferous red beds permit interpretation of paleogeography and sedimentary tectonics, possible solution of wrench-fault, geometries, and assistance to uranium exploration.
1081. STEARN, C.W., SMITH, G.P., POLAN, K., *McGill Univ. (Geological Sciences):*
Paleoenvironments in the late Early Devonian carbonate rocks of southwestern Ellesmere and eastern Bathurst Islands, District of Franklin, 1978-82; Ph.D. thesis (Smith), M.Sc. thesis (Polan).
1082. STOUGE, S., Newfoundland Dep. Mines and Energy (Mineral Develop. Div.):
Conodont data project, 1979-80.
- See:**
Conodonts from the Davidsville Group, north-eastern Newfoundland; *Can. J. Earth Sci.*, vol. 17, no. 2, p. 268-271, 1980.
- Conodont biostratigraphy of the Ordovician carbonate sequence (St. George Group - Table Head Formation) of western Newfoundland is in progress. To date the faunal sequence of the Upper Canadian - Lower Champlainian is completed, the work concentrates on Lower Canadian faunas, St. George Group.
- Conodonts of Upper Tremadocian - Lower Arenig age, Upper Arenig - Lower Llanvirn age and Upper Llanvirn-Llandello age have been recorded from central Newfoundland.
1083. TELFORD, P.G., CARSON, D.M., *Ontario Geol. Surv.:*
Ordovician stratigraphy of the Peterborough-Kingston area, Ontario 1979-80.

- See:**
Ontario Geol. Surv., Misc. Paper 90, p. 146-148, 1979.
During the summer of 1979, Burleigh Falls, Peterborough, Rice Lake, Fort Hope, Bannockburn, Campbellford, Trenton and Presqu'île map sheets were mapped at a scale of 1:50,000. Formations examined include the Shadow Lake, Gull River, Bobcaygeon, Verulam and Lindsay Formations. The Belleville, Wellington, Wolf Island, Bath, Sydenham, Gananoque, Kaladar and Tweed map-sheets will be mapped in the 1980 field season.
1084. THOMPSON, R.I., Geol. Surv. Can.:
Structure and stratigraphy of Paleozoic and lower Mesozoic rocks in Halfway River map-area, northeastern British Columbia, 1975-.
1085. THORSTEINSSON, R., Geol. Surv. Can.:
Structural stratigraphy of western Devon Island and Vendom Fiord map-area, Ellesmere Island, District of Franklin, 1976-.
1086. WINDER, C.G., Univ. Western Ontario (Geology):
Paleozoic geology of southern Ontario, 1960-.
- MESOZOIC/MÉSOZOÏQUE**
1087. ASCOLI, P., Geol. Surv. Can.:
Biostratigraphic zonation (Foramanifera-Ostracoda) of the Mesozoic and Cenozoic rocks of the Atlantic Shelf, 1971-.
1088. DIXON, J., Geol. Surv. Can.:
Geology of the Beaufort-Mackenzie Basin, 1979-.
- See:**
Geology and organic geochemistry of the Dome Hunt Nektoralik K-59 well, Beaufort Sea; Geol. Surv. Can., Paper 79-1C, p. 85-90, 1979.
1089. DUFF, P.McL.D., GILCHRIST, R.D., KARST, R.H., British Columbia Ministry Energy, Mines, Petrol. Res. (Geol. Div.):
Correlation studies in the Peace River coalfield, northeastern British Columbia, 1976-80.
Field studies have been completed and data plotted on longitudinal sections compiled from geophysical logs. These sections and a written text containing sections on stratigraphy, sedimentology, coal seams and general structure should be completed by early summer 1980.
1090. EMBRY, A.F., Geol. Surv. Can.:
Mesozoic stratigraphy and basin analysis of the western Queen Elizabeth Islands, Arctic Archipelago, 1975-.
1091. EMBRY, A.F., Geol. Surv. Can.:
Mesozoic stratigraphy and basin analysis of eastern Sverdrup Basin, Arctic Archipelago, 1975-.
1092. GIBSON, D.W., Geol. Surv. Can.:
Stratigraphic and sedimentological studies of Lower Cretaceous rocks, Rocky Mountain Foothills and Front Ranges, Alberta and British Columbia 1975.
1093. GIBSON, D.W., Geol. Surv. Can.:
Stratigraphy and sedimentology of the Lower Cretaceous Gething Formation, Rocky Mountain Foothills, Alberta and British Columbia, 1979-.
1094. GILCHRIST, R.D., British Columbia Ministry Energy, Mines, Petrol. Res. (Geol. Div.):
The Lower Cretaceous coal measures between Wolverine River and Hasler Creek, Rocky Mountain Foothills, northeastern British Columbia, 1977-80.
1979 was the final year of a three-year mapping project to define the coal measures of the central portion of the Peace River Coalfield. Originally only the Bullhead and Fort St. John groups were intended to be mapped, but discovery of clean, thick coal seams below the Bullhead encouraged the author to include beds of the Upper Mines Group in this study. A preliminary map at a scale of 1:50,000 is in preparation and will be available in early 1980. A Bulletin and final maps at a scale of 1:25,000 will follow.
1095. JANSA, L.F., Geol. Surv. Can.:
Reconnaissance field study of the Mesozoic sequences outcropping on the Iberian Peninsula, 1977-.
1096. JELETZKY, J.A., Geol. Surv. Can.:
Mesozoic and Tertiary rocks of the west coast of Vancouver Island and in Quatsino Sound, British Columbia, 1949-.
1097. JELETZKY, J.A., Geol. Surv. Can.:
Cretaceous and Jurassic of Richardson Mountains, Porcupine Plains and Eagle Plains, Yukon Territory and District of Mackenzie, 1955-.
- See:**
Eurasian craspeditid genera *Temnoptychites* and *Tollia* in the lower Valangian of Sverdrup Basin, District of Franklin with comments on taxonomy and nomenclature of Craspeditidae; Geol. Surv. Can., Bull. 299, 1979.
New stratigraphically and phylogenetically important oolostephanid (Ammonitida) taxa from the uppermost lower and upper Valangian of Sverdrup Basin, N.W.T.; Geol. Surv. Can., Paper 79-19, 1979.
New or formerly poorly known, biochronologically and paleobiogeographically important gastropolitid and cleoniceratinid (Ammonitida) taxa from Middle Albian rocks of mid-western and Arctic Canada; Geol. Surv. Can., Paper 79-22, 1980.
1098. KARST, R.H., British Columbia Ministry Energy, Mines, Petrol Res. (Geol. Div.):
Lower Cretaceous stratigraphy of northeastern British Columbia coal measures, foothills and plains, 1979-81.
To correlate the stratigraphic and sedimentologic data (from drill-core and geophysical logs) for the foothills and plains regions of northeastern British Columbia with respect to the Lower Cretaceous stratigraphy. Both petroleum and coal industry information sources will be used and the resulting regional correlation should be of benefit to both groups.
1099. MONGER, J.W.H., Geol. Surv. Can.:
Stratigraphy of the Takla Group, northwestern British Columbia, 1975-.
1100. POULTON, T.P., Geol. Surv. Can.:
Mesozoic biostratigraphy and Jurassic paleontology of northern Yukon and adjacent District of Mackenzie, 1975-.
- See:**
Jurassic trigonid bivalves from Canada and western United States of America; Geol. Surv. Can., Bull. 282, 1979.
1101. POULTON, T.P., Geol. Surv. Can.:
Jurassic biostratigraphy of selected areas of western and Arctic Canada, 1976-.
- See:**
Trigonid bivalves from the Bajocian (Middle Jurassic) rocks of central Oregon; Geol. Surv. Can., Paper 80-1A, p. 187-196, 1980.
1102. PRICE, L.L., Geol. Surv. Can.:
Geological observations at shafts of potash mines, Saskatchewan, 1964-.
1103. SIMPSON, F., Univ. Windsor (Geology):
Cratonic-interior sedimentation and related tectonic controls, 1977-81.
- See:**
Evolution of a graded Cretaceous shelf; Proc. Second Internat. Conf. Basement Tectonics, Newark, De, 1976, p. 423-434, 1979.
Lithologic descriptions of selected cored sections from Lower Colorado Group (Cretaceous) of west-central Saskatchewan; Saskatchewan Dep. Min. Res., Rept. 160, 1979.
Lithologic descriptions have been made for selected cored sections from the Colorado and Montana Groups (Cretaceous), obtained from some 360 boreholes in Saskatchewan. The major depositional systems were traced across the study area by means of well-log correlation.
1104. SIMPSON, F., Univ. Windsor (Geology):
Low-permeability gas reservoirs in marine, Cretaceous sandstones of Saskatchewan, 1979-81.
- See:**
Low-permeability gas reservoirs in marine Cretaceous sandstones of Saskatchewan: 1. Project outline and rationale; 2. Lower Colorado (middle Albian to Cenomanian) strata of southern Saskatchewan; 3. Lower Colorado (middle Albian to Cenomanian) strata of east-central Saskatchewan; 4. Upper Colorado and Montana (Turonian to Campanian) strata of western Saskatchewan; Saskatchewan Mineral Res., Misc. Rept. 79-10, p. 174-198, 1979.
The Cretaceous reservoir units under investigation are the Bow Island Formation, Viking Formation, Spikes Zone, Fish-Scale Sandstone, Phillips Sandstone, Bowdoin Sandstone, Martin Sandy Zone, Medicine Hat Sandstone, Milk River Sandstone, and the Victoria and Ribstone Creek tongues of the Belly River Formation. The aims are to accurately define variation in reservoir quality to delineate reservoir heterogeneities and to assess hydrocarbon potential.
1105. STOTT, D.F., Geol. Surv. Can.:
Cretaceous stratigraphy, Peace River to 60 degrees, British Columbia, 1961-.
1106. STOTT, D.F., Geol. Surv. Can.:
Jurassic and Cretaceous Minnes Group, Alberta and British Columbia, 1978-.
1107. TEMPELMAN-KLUIT, D.J., Geol. Surv. Can.:
Stratigraphy, structure and metallogeny of the northern part of the Intermontane Belt (Whitehorse trough) in the Canadian Cordillera, 1977-.
- See:**
Highlights of field work in Laberge and Carmacks map areas, Yukon Territory; Geol. Surv. Can., Paper 80-1A, p. 357-362, 1980.
Zircon ages for the Pelly Gneiss and Klotassin granodiorite in western Yukon; Can. J. Earth Sci., vol. 17, no. 3, p. 297-306, 1980.
1108. TIPPER, H.W., Geol. Surv. Can.:
Biostratigraphic study of Mesozoic rocks in the Intermontane and Insular Belts of the Canadian Cordillera, 1975-.
1109. WADE, J.A., Geol. Surv. Can.:
Regional subsurface geology of Mesozoic and Cenozoic rocks of the Atlantic continental margin, 1972-.
1110. WILLIAMS, G.L., Geol. Surv. Can.:
Palynostratigraphy and paleoecology of the Mesozoic and Cenozoic rocks of the Atlantic Continental margin, 1971-.
- See:**
Upper Triassic salt deposits of the western North Atlantic; Can. J. Earth Sci., vol. 17, no. 5, p. 547-559, 1980.
- CENOZOIC/CENOZOÏQUE**
1111. MIALI, A.D., Geol. Surv. Can.:
Stratigraphy and sedimentology of the Tertiary sediments of the eastern Arctic, 1977-.
1112. YORATH, C.J., Geol. Surv. Can.:
Stratigraphy and structure of the Pacific Continental Slope Shelf using manned and unmanned submersibles, 1977-.

ALBERTA/ALBERTA

1113. CHARLESWORTH, H.A.K., HILL, K.C., KILBY, W.E., WRIGHTSON, C.B., Univ. Alberta (Geology): Structure and stratigraphy of coal bearing and adjacent strata, Rocky Mountain Foothills, west-central Alberta, 1976-81; M.Sc. thesis (Hill).

1114. LANGENBERG, C.W., Alberta Research Council (Geol. Surv.):

Structural analysis of macroscopic structures in the Shield of Northeastern Alberta, 1976-80.

About 10 percent of my time was spent on the structural geology of northeastern Alberta. The paper was revised and accepted by Tectonophysics. Some work was spent on analysis, the concavity of some of the folds in the domal structures. A report that summarizes the structural geology of our study area will be prepared during the first half of 1980.

BRITISH COLUMBIA/COLOMBIE-BRITANNIQUE

1115. CAMPBELL, R.B., Geol. Surv. Can.: Geology of the Cariboo Mountains, British Columbia, 1968-.

1116. CROWE, G.G., SIMONY, P.S., Univ. Calgary (Geology and Geophysics):

Structure and petrology of Mackie Pluton, south-eastern British Columbia, 1979-81; M.Sc. thesis (Crowe).

The Mackie Plutonic Complex is a multiple and composite intrusive sequence, possibly Upper Cretaceous in age, located 10 kilometers south-west of Castlegar, British Columbia. It was mapped on a scale of 1:12,000 during the summer 1979.

An early diorite phase, preserved mainly as xenoliths, intruded regionally metamorphosed Carboniferous Mount Roberts sediments and older Trail Gneisses. This event was followed by the emplacement of granodiorite, characterized by a foliated and lineated margin. After cooling, a felsic composite sequence represented by an early K-feldspar porphyry granite, a medium grained biotite rich granite, and a coarse grained leucocratic granite, was forcibly injected. In the Eocene or later, Coryell syenites and related rocks invaded the area. Middle to Late Tertiary basaltic and lamprophyric dykes were emplaced through the complex, along major north-south trending fractures.

Plutonic contacts are steep, except along the south-east margin of the granodiorite, where it was injected as a series of lenses and dykes parallel to the regional foliation in the Trail Gneiss. All irruptive events were forceful, disrupting regional structures.

Geochemical studies are being carried out to gain insight into the origin of these plutonic bodies.

1117. DANNER, W.R., Univ. British Columbia (Geological Sciences):

Plate tectonics, stratigraphy and paleontology of the Paleozoic and early Mesozoic of southwestern British Columbia and adjacent parts of Washington State, U.S.A., 1967-81.

Work continuing on laboratory examination of rocks and fossils of Cache Creek, Sicker, Chilliwack and Harper Range Groups in south-western British Columbia.

M.Sc. student will start field work summer 1980 with Geological Survey of Canada for thesis project on nature of plate tectonic boundary between the Cache Creek Group and the plate containing the Harper Ranch Group and overlying Nicola Group (Triassic).

1118. HOY, T., British Columbia Ministry Energy, Mines, Petrol Res. (Geological Div.):

Structure, stratigraphy and mineral deposits of the autochthonous cover rocks, Frenchman Cap gneiss dome, Shuswap metamorphic complex, British Columbia, 1978-.

Involves detailed 1:50,000 mapping of the autochthonous cover rocks of the Frenchman Cap gneiss dome. Mapping at this scale of the high grade, in places intensely deformed rocks, is now largely completed, and correlation of units around the dome is possible. An integral aspect of the project is a study of the stratobound base metal deposits, their structural and stratigraphic setting, and their geochemistry.

1119. KLEPACKI, D.W., ROSS, J.V., GREENWOOD, H.J., Univ. British Columbia (Geological Sciences):

Geology of the Cariboo Group near Maeford Lake, northern Cariboo Mountains, British Columbia, 1979-80; M.Sc. thesis (Klepacki).

Displacement of stratigraphy along thrust faults is important as lead/zinc occurs in the upper thrust sequence. A possibility exists of a major deposit laying below the thrust plane and to the north. Work on mineral assemblages, now in progress, will help in determining depth differences between metamorphic rocks of the upper and lower thrust sequences.

Additional mapping further north will help 'nail down' the stratigraphy of this report by correlation with fossiliferous strata and resolve differences in the interpretation of structural histories of this report and those of previous workers.

1120. OLLERENSHAW, N.C., Geol. Surv. Can.: Structural analysis of the Fernie Basin, British Columbia, 1975-.

1121. PRETO, V.A., McLAREN, G.P., SCHIARIZZA, P.A., British Columbia Ministry Energy, Mines, Petrol. Res. (Geol. Div.):

Barriere Lakes - Adams Plateau area (82 L/13 E; 82 M/4, 5 W; 92 P/1 E, 8 E), British Columbia, 1978-82.

1122. SIMONY, P.S., Univ. Calgary (Geology and Geophysics):

Stratigraphy of Horsethief Creek Group - a subproject of geology of Southern Canoe River area, 1978-80.

See:

Structural and metamorphic evolution of the northeast flank of Shuswap Complex in southern Canoe River area; Geol. Soc. Am., Mem. 153, 1980.

Stratigraphy and structure of the Hadrynian Horsethief Creek Group was examined in the eastern Selkirk, northward from Rogers Pass. Unit for unit correlation was established with the Hadrynian of the northern Purcells and with the Hadrynian of the northern Selkirk and Monashee Mountains. In the Rogers Pass area a pair of major low angle thrusts juxtapose a western facies of the Hadrynian over an eastern facies which itself is transitional to the Hadrynian of the western Rocky Mountains. The western facies, characteristic of the Selkirk and Monashee Mountains is typified by an upper clastic division as much as 10 times as thick as its equivalent in the eastern facies.

1123. THOMPSON, R.I., Geol. Surv. Can.:

Detailed geological investigation of selected areas within the Foothills and Rocky Mountains of the Monkman Pass map area - with emphasis on the structure, 1978-.

NEW BRUNSWICK/NOUVEAU-BRUNSWICK

1124. STRINGER, P., Univ. New Brunswick (Geology): Relation of cleavage to folding in the Caledonian - Appalachian orogenic belt, northern Appalachians and Scotland, 1975-82.

See:

Cleavage in Triassic rocks of southern New Brunswick, Canada; Can. J. Earth Sci., vol. 16, p. 2165-2180, 1979.

Continuing fieldwork (1979) in the Galloway area, Southern Uplands, Scotland has shown that the regional ENE-WSW cleavage oblique to NE-SW trending F_1 folds, designated S_3 by previous workers, is the first cleavage (S_1) contemporaneous with and non axial planar to F_1 folding. The sequence of polyphase deformation has been reinterpreted. Regional mapping has shown that the F_1 folds in Silurian and Ordovician strata are (i) persistently asymmetric towards the southeast, (ii) uniformly distributed, and (iii) about 1-1000 m half wavelength. Major northwest-facing F_1 monoclines, previously interpreted in the area, are not supported by the present research. The folding and cleavage, previously attributed to oblique collision between converging continental plates, is consistent in style with deformation accompanying sequential accretion of sediments above a northward dipping subduction zone.

Subvertical NE-SW cleavage sporadically developed in folded Triassic red beds in southern New Brunswick is defined by anastomosing closely spaced fractures which follow (i) an incipient pressure solution/crenulation cleavage in shaly siltstone beds and in shaly siltstone clasts within

conglomerate beds, and (ii) an alignment of sub-microscopic cracks in sandstone beds inferred from laboratory tests. A shape orientation of the shaly siltstone clasts parallel to their cleavage within relatively undeformed conglomerate is attributed to internal rotation during folding of relatively unconsolidated conglomerate beds under lateral compression. The closely spaced fractures parallel to the cleavage fabric in both shaly siltstones and sandstones are interpreted as later structures formed during relaxation of tectonic stresses.

NEWFOUNDLAND/LABRADOR/
TERRE-NEUVE/LABRADOR

1125. CALON, T.J., Memorial Univ. (Geology): Structural studies of ophiolites and associated rocks, 1972-82.

Emphasis is placed on the determination of the sequence of deformational and metamorphic events accompanying the genesis, oceanic transport and final emplacement on the continental margin of the ophiolite and dynamothermal aureole. An attempt is made to assess the physical conditions (P , T , X_{fluid} , σ and ϵ) and the operative deformation mechanisms during mantle flow and transport on the basis of microstructural analysis. Field studies concentrate on the allochthonous St. Anthony Complex, Hare Bay, northern Newfoundland. In the peridotite two mylonite zones developed along the base are superimposed on rocks with a protogranular texture that is related to mantle flow structures. The older mylonites showing polygonal textures are indicative of high-T dislocation creep at differential stresses of 200-400 bars. The younger mylonites are heterogeneously superimposed on the high-T mylonites along a very narrow zone at the base. They are showing very fine mortar textures indicative of low-T dynamic recrystallization at stresses up to 1200 bars. In these zones a change of mechanism to Coble creep may have occurred.

1126. CALON, T.J., HIBBS, D.C., Memorial Univ. (Geology): Structure of the Letitia Lake area, Labrador, 1979-83.

The geometry and kinematics of the deformation in an area along the northern front of the Grenville Belt is analyzed. Basal conglomerates and quartzites of the Seal Lake Group occur in the cores of large refolded folds which have closed outcrop patterns and face towards the foreland of the belt. F_1 structures represent sheet folds associated with a strong transverse lineation. F_2 folds are asymmetric, overturned towards the foreland and trend parallel to the belt. The geometry of the structure indicates northwards directed transport during the Grenvillian orogeny.

The project will continue at graduate student level with emphasis on detailed mapping and quartz petrofabric analysis of the Seal Lake quartzites.

1127. GODFREY, S., WILLIAMS, H., Memorial Univ. (Geology):

Structural elements and relationships among rock groups within the Humber Arm Allochthon, Serpentine Lake, west Newfoundland, 1979-80; M.Sc. thesis (Godfrey).

The Humber Arm allochthon at Serpentine Lake contains a prominent structural slice of Ordovician carbonates. The carbonates are parautochthonous St. George Group and Table Head Formation rocks structurally incorporated within the allochthon during final assembly.

Melange terranes nearby that surround the Bay of Islands Complex contain a variety of heretofore unrecognized large volcanic blocks. The melange with volcanic blocks may be a southward continuation of the companion Melange at Humber Arm, and these rocks appear to continue southward to Fox Island River.

1128. KENNEDY, D., WILLIAMS, H., Memorial Univ. (Geology):

Relationship between carbonate terrane and metamorphosed clastic rocks in the Corner Brook-Grand Lake area, west Newfoundland, 1978-80; M.Sc. thesis (Kennedy).

Metamorphism and deformation increase eastward across carbonate and clastic rocks between Corner Brook and Grand Lake. A zone of intensely deformed mylonite marks the Grand Lake thrust that separates crystalline rocks (east) from carbonate rocks (west). Elsewhere to the north, structures of psammitic schists (east) are recognized in deformed carbonates of the Grand Lake Brook Group (west). The Grand Lake Brook Group is in stratigraphic contact with less deformed Paleozoic carbonates farther west.

1129. KNAPP, D., WILLIAMS, H., Memorial Univ. (Geology):
The Glover Island ophiolite complex and its relationships to nearby groups, west Newfoundland, 1978-80; Ph.D. thesis (Knapp).
Rocks and structures at Glover Island of Grand Lake correlate with rocks and structures of the Baie Verte Peninsula and confirm southward continuity of the Baie Verte-Brompton Line.
1130. LYNAS, C.M.T., CALON, T.J., Memorial Univ. (Geology):
Structure of the Hare Bay allochthon at Quirpon Island, northern Newfoundland, 1978-80; M.Sc. thesis (Lynas).
Quirpon Island provides a cross section of the base of the Hare Bay Allochthon (including the basal part of the dynamothermal aureole of the ophiolitic St. Anthony complex) and underlying autochthonous rocks. The substratum comprises middle Ordovician flysch. It is structurally overlain by (lower Cambrian?) psammites and pillow lavas. Sheets of graphitic slates and breccias occur at the contact. The pillow lavas seem to occur as small thrust slices in the psammites. The basal thrust unit is structurally overlain by greenschists containing synkinematic gabbro intrusions. This unit forms the lower part of the dynamothermal aureole. Two deformation events are presently recognized in all the units.
1131. MARTINEAU, Y., WILLIAMS, H., Memorial Univ. (Geology):
Relationships among rock groups between Grand Lake thrust and Cabot fault, west Newfoundland, 1978-80; M.Sc. thesis (Martineau).
Mapping at south end of Grand Lake has outlined a major thrust, Grand Lake thrust, separating Grenvillian basement gneisses (east) from Paleozoic carbonate rocks (west). Metamorphism and intensity of deformation increases eastward across the basement rocks and psammitic cover rocks from greenschist to amphibolite facies, and from retrograded granulite to completed recrystallized and polydeformed amphibolites.
1132. SCHILLERREFF, S., WILLIAMS, H., Memorial Univ. (Geology):
Nature of the Humber Arm Allochthon and underlying rocks in the Fox Island River area, western Newfoundland, 1978-80; M.Sc. thesis (Schillereff).
The Table Head carbonates are overlain stratigraphically by Middle Ordovician clastic sedimentary rocks, in turn overlain by (a) a basal melange, (b) sedimentary rocks of the Humber Arm allochthon with associated volcanic rocks, (c) a medial melange, (d) volcanic rocks, and (e) ophiolitic rocks of the Bay of Islands Complex.
1133. STANDER, E.J., CALON, T.J., Memorial Univ. (Geology):
Structure of the Twillingate pluton and its envelope, Newfoundland, 1978-80; M.Sc. thesis (Stander).
The trondhjemite pluton is intruded in basalts of ophiolitic affinity (Sleepy Cove Group). The units have been affected by two deformation events. The earliest produced two large scale, high-T shear zones. Along one of these island arc volcanics of the Moreton's Harbour Group are juxtaposed against the pluton and its envelope. Fabrics related to the shear zones in the pluton are characterized by elongate quartz set in a recrystallized sodic plagioclase matrix. Quartz C-axes show a crossed girdle pattern with a maximum in the foliation. The younger deformation formed upright folds in the envelope and locally in the pluton a strong L-S fabric which is in a few cases related to small scale folds. Quartz developed basal lamellae and mortar textures. It appears that the second event occurred at lower temperatures. Quartz C-axes patterns define a small circle girdle normal to the younger foliation. This pattern is interpreted to be due to a low-T overprinting of the earlier high-T crossed girdle pattern. Several stages in the fabric transition have been recorded.
1134. WILLIAMS, H., Memorial Univ. (Geology):
Stephenville map area (12 B), west Newfoundland, 1978-81.
- See:**
Stephenville map-area (12 B), Newfoundland; Geol. Surv. Can., Paper 80-1A, p. 217-221, 1980.
During the summer of 1979, the Serpentine Lake (12 B/16) and Shag Island (12 B/15) 1:50,000 sheets were completed suitable for 1:100,000 publication.
- NORTHWEST TERRITORIES/
TERRITOIRES DU NORD-OUEST**
1135. DILLON-LEITCH, H., FYSON, W.K., Univ. Ottawa (Geology):
Structure and petrology of the Courageous Lake volcanic belt, Slave Province, Northwest Territories, 1978-80; M.Sc. thesis (Dillon-Leitch).
1136. FALCONER, R.K.H., Geol. Surv. Can.:
Study of the structures and origin of Baffin Bay, 1976-.
- See:**
Geological/geophysical studies in Baffin Bay and • Scott Inlet-Buchan Gulf and Cape Dyer-Cumberland Sound areas of the Baffin Island Shelf; Geol. Surv. Can., Paper 79-1B, p. 231-244, 1979.
1137. OKULITCH, A.V., Geol. Surv. Can.:
Geology of the Penryn Fold Belt, Melville Peninsula, District of Franklin, 1976-.
1138. OSADETZ, K.G., SCHWERTNER, W.M., EMBRY, A.F., Univ. Toronto (Geology):
Tectonic style of the Grantland uplift-Tanquary Fiord, Ellesmere Island, Canadian Arctic Archipelago, 1979-80; M.Sc. thesis (Osadetz).
1139. PUGH, D.C., Geol. Surv. Can.:
Northern basin analysis program: Peel River map-area, District of Mackenzie and Yukon, 1971-.
1140. WILLIAMS, G.K., Geol. Surv. Can.:
Northern basin analysis program: Great Bear, Redstone and Great Slave map-areas, District of Mackenzie, 1971-.
- ONTARIO/ONTARIO**
1141. BAER, A.J., Univ. Ottawa (Geology):
Structural studies in the Grenville Province, Ontario, 1974-.
- Field studies in sveconorwegian province of Sweden; work on models of possible evolution for the Grenville Province.
1142. CULSHAW, N., FYSON, W.K., Univ. Ottawa (Geology):
Structural evolution of gneisses, northern part of Harvey-Cardiff arch, Grenville Province, Ontario, 1976-80; Ph.D. thesis (Culshaw).
1143. PYKE, D.R., MILNE, V.G., Ontario Geol. Surv.:
Tectonic map of Ontario, 1979-81.
1144. SCHWERTNER, W.M., Univ. Toronto (Geology):
Structure of the Grenville gneisses in the Muskoka Region, central Ontario, 1977-85.
To map the lithology and structure of the Muskoka gneisses and to understand the mechanism of large-scale deformation (diapirism or cross folding under conditions of crustal shortening). Many of the circular or oval structures apparent on air photos are structural basins. They may be part of mature mushroom-shaped diapirs whose roof has been depressed by lateral flow in the mushrooming stage of structural evolution. Alternatively, they may be buckle folds.
1145. SCHWERTNER, W.M., Univ. Toronto (Geology):
Emplacement of Hood Lake Syenite, Shebandowan greenstone belt, northwestern Ontario, 1979-81.
To reconstruct the mode of plutonic emplacement. Detailed field mapping is almost complete. Lab work is in progress.
Rival hypotheses to be tested: 1) gravity setting and later folding, or 2) diapirism of magma. The HLS is a heart-shaped body and resembles the Mokko Fiord evaporite dome, Canadian Arctic Islands. Both structures are bounded by major faults. The HLS displays excellent fluidal texture which may reveal whether the structure is a diapir or not.
1146. STOTT, G.M., SCHWERTNER, W.M., Univ. Toronto (Geology):
Structural analysis of central part of the Shebandowan metavolcanic-metasedimentary belt, 1977-81; Ph.D. thesis (Stott).
- The record of three successive phases of regional deformation is preserved in the Shebandowan belt. In addition, there is a generation of structures related to contact strain aureoles around individual late to post-tectonic plutons. The first regional deformation phase (D1) appears to have initially developed across the full width of the belt. The D2 phase of deformation was superimposed on structures of the D1 phase within megascopically discrete zones in the belt. The belt can thus be subdivided into oppositely plunging strain fields each dominated by the D1 or D2 phase of deformation. The result is a complex map pattern of strain fields with the D2 field dominating most of the northern half of the belt and the adjacent, structurally less competent Quetico metasedimentary terrain. Quantitative analysis of the strain fields is currently in progress in order to assess tectonic mechanisms for the belt structure.
- QUÉBEC**
1147. BAER, A.J., Univ. Ottawa (Geology):
Relationships between texture and mineralogy of some anorthosites, Québec, 1974-.
1148. BÉLAND, J., HUBERT, C., LESPÉRANCE, P.J., Univ. Montréal (Géologie):
Analyse structurale de la tectonique superposée de divers secteurs de l'anticlinorium d'Aroostook-Percé en Gaspésie, Québec.
Les résultats préliminaires montrent une tectonique superposée en dômes et bassins traversés par des failles majeures de décrochement. Dans un secteur à l'étude (Région de Carleton), des lentilles de conglomérat grossier de plusieurs centaines de mètres d'épaisseur délimitent des plis majeurs. Un problème tectonique soulevé est l'absence de schistosité reliée à la phase de plissement précoce et, dans certain secteurs, l'apparente non coplanarité (divergence d'attitude - "transected folds") de la schistosité et des plans axiaux des plis de phase tardive.
1149. BOUCHARD, M.F., Ecole Polytechnique (Génie minéral), Québec Ministère Energie et Ressources:
Structure et stratigraphie dans la région de Cadillac Malartic, Québec, 1978-80; thèse de doctorat.
Voir:
Tectonique - Région de Cadillac-Malartic; Québec Ministère Richesses Naturelles, DPV-683, 1979.
1150. HOCQ, M., Québec Ministère Energie et Ressources:
Géologie de la bande volcanique de Joutel-Quevillon, Québec, 1980-.
- Définir la lithologie et la stratigraphie des roches volcaniques des cantons de Ligneris-Dalet Mazarin-Celoron, porter une attention spéciale à la configuration tectonique, aux changements de facies lithologiques et aux mineralisations éventuelles.
1151. MARTIGNOLE, J., NANTEL, S., Univ. Montréal (Géologie):
Thermobarométrie des gneiss pelitiques catazonaux.
Depuis deux ans des travaux systématiques ont été entreprise sur les gneiss catazonaux de la province de Grenville pour essayer de calibrer le thermobaromètre plagioclase-grenat. Un calibrage empirique a été réalisé à partir des données disponibles dans la littérature et de données nouvelles basées sur une certaine d'analyses de plagioclase et de grenats dans les gneiss catazonaux situés au nord de Montréal.
1152. MARTIGNOLE, J., SISI, J.-C., Univ. Montréal (Géologie):
Le rôle l'eau dans la stabilité de la cordiérite.
Une étude sur la thermodynamique de l'eau dans la cordiérite-le travail est basé sur l'existence probable d'eau d'absorption dans les canaux de la cordiérite et des modèles thermodynamiques sont élaborés en fonction de cette possibilité.
1153. MARTIGNOLE, J., WILHELM, S., Univ. Montréal (Géologie):
Les inclusions dans les plagioclases des anorthosites.
1154. SANSCHAGRIN, Y., CIMON, J., Québec Ministère Energie et Ressources:
Projet Cobalt - Fabre, 1979-.

- Définition géologique et structurale de la région de Fabre dans le but d'évaluer son potentiel pour le cobalt à l'aide d'analyses des éléments en trace. Cartographie presque complétée. Poursuite des travaux prévus à l'aide de forages stratigraphiques pour définition en trois dimensions.
1155. VALLIERES, A., ST-JULIEN, P., Univ. Laval (Géologie), Québec Ministère Energie et Ressources: Stratigraphie et structure de l'orogène taconique dans la région de Rivière-du-Loup, Québec, 1973-80; thèse de doctorat (Vallières).
1156. VAN DER LEEDEN, J., FYSON, W.K., Univ. Ottawa (Geology): Nature of the Grenville Front in western Québec, 1976-80; Ph.D. thesis (van der Leeden).
- SASKATCHEWAN/SASKATCHEWAN**
1157. GENDZWILL, D.J., STAUFFER, M.R., Univ. Saskatchewan (Geological Sciences): Strain analysis in deformed rocks, 1979-81.
- A new method is presented for the analysis of strains in deformed rocks. The computer technique uses two-dimensional strain measurements in three non-parallel planes. An adjustment algorithm accounts for measurement errors. The dimensions and attitude of the triaxial strain ellipsoid is then solved. Other routines are presented to calculate the shape and attitude of plane sections of an arbitrary triaxial ellipsoid and also the plane projection of such an ellipsoid. The computer routines will be used for subsequent publications showing applications to geological data.
- YUKON TERRITORY/
TERRITOIRE DE YUKON**
1158. CLAGUE, J.J., Geol. Surv. Can.: Structural geology-geomorphology, southwest Yukon, 1978-.
- See:
An assessment of some possible flood hazards in Shakwak Valley, Yukon Territory; Geol. Surv. Can., Paper 79-1B, p. 63-70, 1979.
1159. COOK, D.G., Geol. Surv. Can.: Structural studies in the Mackenzie Arc, Franklin Mountains and Colville Hills, Yukon and District of Mackenzie, 1975-.
1160. NORRIS, D.K., Geol. Surv. Can.: Structural geology of northern Yukon Territory and northwestern District of Mackenzie, 1969-.
1161. TEMPELMAN-KLUIT, D.J., Geol. Surv. Can.: Stratigraphy, structure and metallogeny of Pelly Mountains, and Yukon Palteau, Yukon Territory, 1973-.
- GENERAL/GÉNÉRALITÉS**
1162. BORRADAILE, G.J., Lakehead Univ. (Geology): Structural and metamorphic investigations in Northwestern Ontario with special reference to finite strain, metamorphic textures and mylonites, 1978-.
- See:
Strain study of the Caledonides in the Islay region, S.W. Scotland: implications for strain histories and deformation mechanisms; J. Geol. Soc. Lond., v. 136, p. 77-88, 1979.
Temporal changes in heat-flow distributions; J. Geology, v. 88, p. 53-58, 1980.
1163. CURRIE, J.B., Univ. Toronto (Geology): Mechanics and development of fractures in sedimentary strata, 1970-82.
- Field and laboratory work has been directed at study of fracture development in Upper Cretaceous sandstones and in Mississippian carbonates of the Alberta Basin. Laboratory experiments on strength anisotropy point to significant fracturing effects that may arise during artificial stimulation of fluid reservoirs in the subsurface.
1164. FYSON, W.K., Univ. Ottawa (Geology): Structural patterns in metamorphic rocks, 1970-.
1165. GRIFFITHS, J.R., Univ. Alberta (Geology): Comparative studies of orogenic belts, 1979-81.
- A continuing study of the evolution of orogenic belts, based on earlier work in southeastern Australia, New Zealand and British Columbia, and further studies in British Columbia, South America and Japan. A series of time-space plots of these orogenic belts are being constructed, incorporating data relating to sedimentation, igneous activity, deformation, metamorphism and mineral deposits. These areas represent a variety of types of orogenic belts. Through analysis of individual sections, and comparison of them, detailed models for orogeny and metallogeny are being developed.
- It is apparent that the primary result of subduction is to provide a heat-flux, varying in space and time through the overriding crust in orogenic terrains. Apart from some members of the "tholeiitic" and calc-alkaline" suites, and certain granitoid plutons derived from partial melt of underplated crust, most of the volcanic and plutonic rocks in such belts appear to be derived from, and hence reflect the composition of, the over-riding crust. The distribution of mineral deposits clearly reflects this conclusion, thus suggests that a detailed study of regional geology and tectonics may lead to development of metallogenic models which can be used in exploration of orogenic belts.
1166. KEPPIE, J.D., BURNSNALL, J.T., FYFFE, L.R., HUBERT, C., RUITENBERG, A.A., ST-JULIEN, P., WILLIAMS, H., Nova Scotia Dep. Mines, Memorial Univ. (Geology): Time of deformation map of the Canadian Appalachians, 1979-80.
- A pastel background colour reflects the age of first deformation with colour intensity corresponding to intensity of deformation. Structural features such as faults, fold axes, attitude of bedding and schistosity, stretching lineation and direction of tectonic transport, are shown in bold colours that correspond to their age. Deformed and undeformed plutonic rocks are distinguished by different patterns and coloured according to age of intrusion.
- Map is compatible with 1:1,000,000 maps of Appalachian Orogen i.e. Tectonic Lithofacies, Magnetic Anomaly, Bouguer Gravity Anomaly.
1167. KING, L.H., Geol. Surv. Can.: Bedrock and surficial geology, Grand Banks, 1973-80.
1168. KUMARAPALI, S., Concordia Univ. (Geology): Investigations into seismotectonics of Eastern Canada, 1979-81.
- 1) Compilation from published maps and reports and from examination of Landsat images all potentially relevant tectonic information of the general region of seismicity of Eastern Canada. Scale 1:2,500,000. A larger scale will not be of much use for correlation with seismicity because of the large (≈ 40 km) epicentral errors of Canadian earthquakes. 2) Collect information on deformation on man-made structures in the general region. 3) Collect information on post-glacial deformation of geological features, especially glacially striated and polished rock surfaces which give a reference plane of about 12,000 years B.P. 4) Detailed field examination of selected features, such as through-going lineaments in the area, for recent movements. 5) Integrate the data obtained from 1 to 4 with available epicentral maps, data on in situ stress measurements, focal plane solutions, precise levelling and tilt meter studies in the general area. The integrated study will be aimed at developing a seismotectonic scheme for the area.
1169. LONCAREVIC, B.D., Geol. Surv. Can.: Study of the boundaries of lithospheric plates, 1977-.
1170. LONGIARU, S., STAUFFER, M.R., Univ. Saskatchewan (Geological Sciences): Structural geology of the Amisk volcanics on northeastern Amisk Lake, Saskatchewan, 1978-80; M.Sc. thesis (Longiaru).
- Basaltic to andesitic volcanic rocks have undergone three phases of folding resulting in complex foliation patterns. Late faulting has resulted in the production of shear zones and overprinting of shear foliations on older planar structures. Intrusion of a granodiorite pluton resulted in amphibolite grade contact metamorphism superimposed on the regional chlorite grade.
1171. ST-JULIEN, P., WILLIAMS, H., Laval Univ. (Géologie), Memorial Univ. (Geology): The Baie Verte-Brompton Line: Continent-ocean interface in the Canadian Appalachian, 1976-80.
- The Baie Verte-Brompton Line is described from Northeast Newfoundland to the Quebec Eastern Townships. Rocks and structures are correlated along its full length. The line is interpreted as the surface trace of an ancient continent-ocean interface within the deformed rocks of the Appalachian Orogen.
1172. SCHWERDTNER, W.M., MORGAN, J., Univ. Toronto (Geology): Structural evolution of Archean gneiss domes and greenstone belts, 1975-83; Ph.D. thesis (Morgan).
- See:
Granitoid complexes and the Archean tectonic record in the southern part of northwestern Ontario; Can. J. Earth Sci., vol. 16, p. 1965-1977, 1979.
Proof of diapiric origin of, and gravity tectonics in, gneiss domes and greenstone belts is being sought through: 1) detailed structural mapping and strain analysis; 2) analogue modeling of greenstone belts and diapirs in high-capacity centrifuges; and 3) comparison with evaporite diapirs (Canadian Arctic and New Brunswick). Progress: Gneiss diapirism occurred on various scales, resulting in superposition of finite strains.
1173. SOUTHER, J.G., Geol. Surv. Can.: Study of the Cenozoic evolution of the western Cordillera, 1977-.
- See:
Geothermal reconnaissance in the central Garibaldi Belt, British Columbia; Geol. Surv. Can., Paper 80-1A, p. 1-11, 1980.
1174. SRIVASTAVA, S.P., Geol. Surv. Can.: Comparative studies of the Continental margins of the Labrador Sea and of the North Atlantic, 1978-.

VOLCANOLOGY/VOLCANOLOGIE

1175. AYRES, L.D., Univ. Manitoba (Earth Sciences): Favourable Lake volcanic complex, northwestern Ontario, 1965-.
1176. CHURCH, B.N., British Columbia Ministry Energy, Mines, Petrol. Res. (Geol. Div.): Tertiary stratigraphy and resource potential in south-central British Columbia, 1979-.
- See:**
 Geology of the Penticton Tertiary outlier (Parts of 82 E/4, 5); British Columbia Dep. Mines Petrol Res., Prel. Map 35, 1979.
 Geology of the Terrace Mountain Tertiary outlier (Parts of 82 L/4, 5); British Columbia Dep. Mines Petrol Res., Prel. Map 317, 1979.
 Anomalous uranium in vicinity of the Summerland Caldera; Geological Fieldwork 1979, British Columbia Dep. Mines Petrol Res., Res. Geol. Div. Paper 1980-1, 1980.
 Exploration for gold in the Black dome area, Clinton Mining Division, British Columbia; *ibid*.
 A survey of Cenozoic magnetostratigraphy in south-central British Columbia; *ibid*.
 The Cenozoic rocks of the Interior of British Columbia are known to be important in the search for new energy and mineral resources, and it is the purpose of the present study to further define the stratigraphy, structure and history of these rocks.
1177. FERREIRA, W.S., AYRES, L.D., Univ. Manitoba (Earth Sciences): Stratigraphy of an andesitic to basaltic stratovolcano, Amisk Lake, Saskatchewan, 1977-; M.Sc. thesis (Ferreira).
1178. GILBERT, H.P., ZWANZIG, H.V., Manitoba Dep. Energy and Mines (Mineral Res. Div.): Melvin Lake, Manitoba, 1979-81.
 Investigate structure and stratigraphy of Wasekwan volcano-sedimentary greenstone belt; establish relationship of this belt to metasedimentary gneiss terrane to north and contiguous granitoid terrain; investigate geochemistry of volcanic rocks for interpretation of major structural setting and genesis; evaluate potential for base metal mineralization within map area.
1179. NIXON, G.T., ARMSTRONG, R.L., Univ. British Columbia (Geological Sciences): Petrology of Volcan Iztaccihuatl, central Mexico, 1975-80; Ph.D. thesis (Nixon).
1180. THURSTON, P.C., Ontario Geol. Surv.: Felsic centres of northwestern Ontario, 1979-81.
See:
 Felsic centres of volcanism, Uchi and Gods Lake subprovinces; Ontario Geol. Surv., Misc. Paper 90, p. 19-25, 1979.
- To characterize the stratigraphy, volcanic processes and trace element (rare earth) geochemistry of felsic centres in northwestern Ontario in order to better assess their economic potential. Work in 1979 included: 1) South Bay Mine area, Mitchell Tp.; 2) Woman Lake tuff, Dent Tp.; 3) Mabrun Mine area, Atikawa Lake; 4) Long Lake area; and 5) Stull lake area. Major changes in the geology of the Long Lake area are reported. Areas to be examined in 1980 include Bee Lake, south of Red Lake, Pickle Lake, Meen Lake and Stull Lake.
1181. THURSTON, P.C., HODDER, R.W., FRYER, B.J., NUNES, P.D., Ontario Geol. Surv., Univ. Western Ontario:
 Volcanology and trace element geochemistry of cyclical volcanism in the Archean Uchi-Conederation Lakes area, northwestern Ontario, 1976-80; Ph.D. thesis (Thurston).
 This project examines the temporal, stratigraphic, volcanologic and trace element aspects of Archean cyclical volcanism in an area with three superposed basalt to rhyolite cycles. Volcanologically a progression from a shield volcano to stratovolcano of the Krakatoan type to resurgent caldera activity occurs in cycles I to III. Basalts pass from evolving by crystal fractionation to liquid immiscibility. Several liquids are involved in evolution of the felsic members.

ORGANIZATIONS REPORTING/ÉTABLISSEMENTS DÉCLARANTS

Acadia University, Department of Geology, Wolfville, Nova Scotia B0P 1X0	Environment Canada, National Hydrology Research Institute, Ottawa, Ontario K1A 0E7	National Research Council, Division of Building Research, Ottawa, Ontario K1A 0R6	Saskatchewan University, Department of Geological Sciences, Saskatoon, Saskatchewan S7N 0W0
Alberta Research Council, Geology Survey, 11315-87 Avenue, Edmonton, Alberta T6G 2C2	Esso Resources Canada Limited, Research Department, 500 Sixth Avenue SW., Calgary, Alberta T2P 0S1	New Brunswick University, Department of Geology, Box 4400, Fredericton, New Brunswick E3B 5A3	Saskatchewan Department of Mineral Resources, Saskatchewan Geological Survey, 1211-1914 Hamilton Street, Regina, Saskatchewan S4P 4V4
Alberta Research Council, Groundwater Department, 3rd Floor, Campus Tower, 8625-112 Street, Edmonton, Alberta T6G 1K8	Geological Survey of Canada, Department of Energy, Mines and Resources, 601 Booth Street, Ottawa, Ontario K1A 0E8	New Brunswick University, Department of Geology, Tucker Park, P.O. Box 5050, Saint John, New Brunswick E2L 4L5	Université de Sherbrooke, Département de Géographie, Sherbrooke, Québec J1K 2R1
Alberta University, Department of Geology, Edmonton, Alberta T6G 2E1	Lakehead University, Department of Geology, Postal Station P, Thunder Bay, Ontario P7B 5E1	Newfoundland Department of Mines and Energy, Mineral Development Division, P.O. Box 4750, St. John's, Newfoundland A1C 5T7	Simon Fraser University, Department of Physics, Barnaby, British Columbia V5A 1S6
Alberta University, Department of Zoology, Edmonton, Alberta T6G 2E9	Laval University, Département de Géologie et Minéralogie, Cité universitaire, Québec, Québec G1K 7P4	Ontario Ministry of Natural Resources, Ontario Geological Survey, 11th Floor - 77 Grenville Street, Toronto, Ontario M5S 1B3	Sir Sandford Fleming College, Department of Geology, Frost Campus, P.O. Box 8000 Lindsay, Ontario K9V 4S6
Brandon University, Department of Geology, Brandon, Manitoba R7A 6A9	Manitoba University, Department of Earth Sciences, Winnipeg, Manitoba R3T 2N2	Ottawa University, Département de Géographie, Ottawa, Ontario K1N 6N5	Toronto University, Department of Geography, Sidney Smith Hall, 100 St. George Street, Toronto, Ontario M5S 1A1
British Columbia University, Department of Geological Sciences, 2075 Wesbrook Place, Vancouver, British Columbia V6T 1W5	Manitoba Department of Energy and Mines, Mineral Development Division, 993 Century Street, Winnipeg, Manitoba R3H 0W4	Ottawa University, Department of Geology, Ottawa, Ontario K1N 6N5	Toronto University, Department of Geology, Toronto, Ontario M5S 1A7
British Columbia University, Department of Geophysics and Astronomy, Vancouver, British Columbia V6T 1W5	McGill University, Department of Geography, 805 Sherbrooke St. West, Montréal, Québec H3A 2K6	Polar Continental Shelf Project, Department of Energy, Mines and Resources, 880 Wellington Street, Ottawa, Ontario	Toronto University, Erindale College, Department of Earth and Planetary Sciences, 3359 Mississauga Road, Mississauga, Ontario L5L 1C6
British Columbia Ministry of Energy, Mines, and Petroleum Resources, Geological Division, Parliament Buildings, Victoria, British Columbia V8V 1X4	McGill University, Department of Geological Sciences, 3450 University Street, Montréal, Québec H3A 2A7	Université du Québec à Québec, Institut National de la Recherche Scientifique (INRS-Pétrole), 555, boul. Henri IV, Case postale 7500, Ste-Foy, Québec G1V 4C7	Toronto University, Scarborough College, Department of Geographiy, West Hill, Ontario M1C 1A4
Calgary University, Department of Civil Engineering, Calgary, Alberta T2N 1N4	McGill University, Redpath Museum, 859 Sherbrook St. W., Montréal, Québec H3A 2K6	Queen's University, Department of Geography, Kingston, Ontario K7L 3N6	Toronto University, Department of Physics, Toronto, Ontario M5S 1A7
Calgary University, Department of Geology and Geophysics, Calgary, Alberta T2N 1N4	McMaster University, Department of Geography, Hamilton, Ontario L8S 4K1	Queen's University, Department of Geological Sciences, Kingston, Ontario K7L 3N6	Waterloo University, Department of Earth Sciences, Waterloo, Ontario N2L 3G1
Canada Centre for Mineral and Energy Technology (CANMET) Department of Energy, Mines and Resources, 555 Booth Street, Ottawa, Ontario K1A 0G1	Memorial University of Newfoundland, Department of Geology, St. John's Newfoundland A1B 3X5	Regina University, Department of Geological Sciences, Regina, Saskatchewan S4S 0A2	Western Ontario University, Department of Geography, London, Ontario N6A 5C2
Carleton University, Department of Geology, Ottawa, Ontario K1S 5B6	Memorial University of Newfoundland, Department of Physics, St. John's, Newfoundland A1C 5S7	Royal Military College, Department of Civil Engineering, Kingston, Ontario	Western Ontario University, Department of Geology, Biological and Geological Building, London, Ontario N6A 5B7
Concordia University, Department of Geology, 1455 de Maisonneuve Blvd. W., Montreal, Quebec H3G 1M8	Ministère de l'Énergie et des Ressources du Québec, 1620, boul. de l'Entente, Québec, Québec G1S 4N6	Royal Ontario Museum, Department of Invertebrate Palaeontology, 100 Queen's Park, Toronto, Ontario M5S 2C6	Windsor University, Department of Geology, Windsor, Ontario N9B 3P4
Dalhousie University, Department of Geology, Sir James Dunn Building, Halifax, Nova Scotia B3H 3J5	Université de Montréal, Département de Géographie, C.P. 6128, Succ. "A", Montréal, Québec H3C 3J7	Royal Ontario Museum, Department of Mineralogy and Geology, 100 Queen's Park Toronto, Ontario M5S 2C6	York University, Department of Geography, 4700 Keele Street, Downsview, Ontario M3J 1P3
École Polytechnique, Département de Génie minéral, Campus de l'Université de Montréal, Case postale 6079, Succ. "A", Montréal, Québec H3C 3A7	Université de Montréal, Département de Géologie, C.P. 6128, Succ. "A", Montréal, Québec H3C 3J7	Royal Ontario Museum, Department of Vertebrate Palaeontology, 100 Queen's Park, Toronto, Ontario M5S 2C6	
Environment Canada, National Water Research Institute, Canada Centre for Inland Waters (CCIW), 867 Lakeshore Road, P.O. Box 5050, Burlington, Ontario L7R 4A6	Mount Allison University, Department of Geology, Sackville, New Brunswick E0A 3C0	Saskatchewan Museum of Natural History, Wascana Park, Regina, Saskatchewan S4P 3V7	
	National Geographical Mapping Division, Department of Energy, Mines and Resources, 580 Booth Street, Ottawa, Ontario K1A 0E4		

**LIST OF GRANT AWARDS IN THE EARTH SCIENCES FOR 1979-80/
LISTE DES SUBVENTIONS ATTRIBUÉES AUX SCIENCES DE LA TERRE EN 1979-80**

**Department of Energy, Mines and Resources, Research Agreements 1979-80/
Ministère de l'Énergie, des mines et des ressources, conventions de recherche 1979-80**

BRITISH COLUMBIA

University of British Columbia

- Chase, R.L. (Oceanography)
Survey of metalliferous sediment in Explorer Deep, northeastern Pacific Ocean, \$5,000.00.
- Clowes, R.M. (Geophysics and Astronomy)
Interpretation of ocean bottom seismometer reflection/refraction data on Explorer/Juan de Fuca plates, \$6,350.00.
- Ellis, R.M. (Geophysics and Astronomy)
A combined seismicity-refraction experiment on the Queen Charlotte Islands, \$6,050.00.
- Perry, D.G. (Geological Sciences)
Silurian trilobite biostratigraphy of Mackenzie Mountains, Northwest Territories, \$5,000.00.
- Sinclair, A.J. (Geological Sciences)
A quantitative approach to metallogeny in the western Cordillera, \$8,000.00.
- Slawson, W.F. (Geophysics and Astronomy)
Radon detection, \$5,170.00.

Simon Fraser University

- Huntley, D.J. (Physics)
Thermoluminescence dating of land sediments, \$5,000.00.

University of Victoria

- Dosso, H.W. (Physics)
An analogue model study of electromagnetic induction in the Queen Charlotte Islands regions, \$5,000.00

ALBERTA

University of Alberta

- Burwash, R.A. (Geology)
Variation of uranium and thorium concentrations in alkaline intrusive complexes, \$2,000.00.
- Cruden, D.M. (Geology and Civil Engineering)
Landslides in the Kamloops Group in south-central British Columbia, \$9,000.00
- Evans, M.E. (Physics)
Chemical demagnetization investigations of Canadian Proterozoic redbeds, \$6,700.00.
- Lambert, R. St. J. (Geology)
Geochronology and origin of the Malton Gneiss and related complexes, British Columbia, \$4,300.00.
- Morton, R.D. (Geology)
Stable isotope (O, C, S, H) geochemistry of uranium mineralization, \$12,000.00.
- Rankin, D. (Physics)
Magnetotelluric measurements on the Churchill-Superior boundary, \$7,000.00.
- Rutter, R.W. (Geology)
Amino acid analysis of fossils from Old Crow, Yukon, \$4,000.00.
- Scarfe, C.M. (Geology)
Petrology of the Level Mountain volcanic center, northern British Columbia, \$4,340.00.
- Strausz, O.P. (Hydrocarbon Research Centre)
The thermal maturation of Alberta oil sand bitumen and the role of molecular oxygen therein, \$10,000.00

University of Calgary

- Gardner, P.N. (Economics)
Estimation of exploration and production functions for offshore petroleum in eastern Canada: Pilot Project, \$1,000.00.
- Glockner, P.G. (Mechanical Engineering)
Surface and underground deformations due to underground coal mining operations, \$17,000.00.
- Simony, P.S. (Geology)
Structural and metamorphic evolution of southern Canoe River area, British Columbia, \$10,000.00.

SASKATCHEWAN

University of Saskatchewan

- Braun, W.K., Caldwell, W.G.E. (Geological Sciences)
Biostratigraphy and microfaunas of the Mesozoic rocks in western Canada, \$5,000.00.
- King, M.S. (Geological Sciences)
Acoustic borehole logging in the Canadian Shield, \$7,000.00.
- King, M.S. (Geological Sciences)
Thermal conductivity of permafrost materials, \$5,500.00.

ONTARIO

Carleton University

- Brown, R.L. (Geology)
Stratigraphic and structural problems in the Selkirk Terrane, British Columbia, \$5,500.00.
- North, F.K. (Geology)
Paleogeographic, facies, and age relationships of sediment-related resource deposits, \$7,240.00.
- Watkinson, D. (Geology)
Geological mapping and interpretation of relationships of breccias and siliceous and chloritic alteration near Cu-Zn deposits, Noranda area, Québec, \$8,000.00.

University of Guelph

- Gibson, I.L. (Land Resource Science)
The structure and mineralization of the Oceanic Crust, \$8,000.00.

Laurentian University

- Beswick, A.E. (Geology)
Relations between volcanism, alteration and mineralization in the Southern Province, \$4,000.00.

McMaster University

- Clarke, W.B. (Physics)
Development of a new prospecting method for uranium - measurements of ³He/⁴He, He, Ne, and tritium in groundwater and lakes, \$10,200.00.
- Crockett, J.H. (Geology)
Gold mineralization of Archean greenstone belts: a study of genetic relationships using neutron activation analysis, \$11,500.00.
- McCann, S.B. (Geography)
Sediment dispersal patterns and shore morphology along the Georgia Strait coastline of Vancouver Island, British Columbia, \$8,000.00.
- McNutt, R.H. (Geology)
Geochronological studies in the English River Gneiss Belt and Wabigoon Greenstone Belt, northwestern Ontario, \$3,000.00.
- Schwarcz, H.P. (Geology)
Radiometric dating of fossil molluscs from raised Arctic beaches, \$9,000.00.

Queen's University

- Price, R.A. (Geological Sciences)
Tectonic analysis of the southeastern Cordillera in Canada, \$6,500.00.

Sir Sanford Fleming College

- Watts, S.H. (Geology)
An examination of rock weathering features in a portion of eastern Arctic Canada, \$4,670.00.

University of Toronto

- Bailey, R.C. (Physics)
Optimal least-squares analysis of airborne radiometric survey data, \$7,200.00.
- Beales, F.W. (Geology)
Paleomagnetism applied to the study of Mississippi Valley ore deposits, \$10,500.00.
- Dunlop, D.J. (Physics)
Multicomponent magnetizations and metamorphic overprinting in the paleomagnetism of Precambrian rocks, \$3,500.00.
- Edwards, R.N. (Physics)
Geomagnetic variations in the period band 2 sec. to 5 min. and the mapping of crustal conductivity anomalies, \$5,000.00.
- Fawcett, J.J. (Geology)
Petrological and isotopic studies of the Rainy Lake Dome, Ontario, \$2,300.00.
- Gittins, J. (Geology)
Chronology of alkalic magmatism in the Haliburton-Bancroft region, Ontario, \$5,000.00.
- Jopling, A.V. (Geography)
Continuous monitoring of density flows in a lacustrine environment, \$4,000.00.
- Ludvigsen, R. (Geology)
Ordovician trilobite biostratigraphy of western and central Canada, \$4,450.00.
- Naldrett, A.J. (Geology)
Platinum group elements and other trace elements in magmatic Ni-Cu sulfide ores associated with different host rocks, \$13,500.00.
- Schwerdtner, W.M. (Geology)
Emplacement of the Hood Lake syenite, an oval Archean pluton in the Shebandwan greenstone belt, western Thunder Bay region, Ontario, \$5,000.00.
- Strangway, D.W. (Geology)
Applications of audio frequency magnetotellurics, \$19,000.00.
- Westgate, J.A. (Geology)
Fission-track dating of late Cenozoic pyroclastic deposits in the Yukon Territory and adjacent areas of Alaska, \$5,000.00.

University of Waterloo

- Barnes, C.R. (Earth Sciences)
Ordovician conodont biostratigraphy of Devon Island, Northwest Territories, \$6,000.00
- Cherry, J.A. (Earth Sciences)
Geochemistry of groundwater in uranium mill tailings, \$7,000.00.
- Fransham, P.G. (Earth Sciences)
Ultrasonic testing and the evaluation of the mechanical behaviour of frozen soils, \$8,000.00.
- Legault, J.A. (Earth Sciences)
Palynological investigation of the Road River and Besa River formations, northwestern Canada, \$4,000.00.

University of Western Ontario

- Paomer, H.C. (Geophysics)
Verification of a geomagnetic excursion as recorded in Maumee Silts, \$7,000.00

University of Windsor

- Gravenor, C.P. (Science and Mathematics)
Comparison of the magnetic and mineralogical characteristics of Pleistocene and ancient glacial sediments, \$3,000.00.

QUEBEC

Concordia University

- Kumarapeli, P.S. (Geology)
Investigations into seismotectonics of eastern Canada, \$4,880.00.

Ecole Polytechnique

- Brown, A.C. (Génie minéral)
Etude métallogénique de cuivre dans les sédiments carbonifères des provinces maritimes, \$2,480.00.
- Dagbert, M. (Génie minéral)
Fiabilité des réserves radiométriques dans les gisements d'uranium, \$9,000.00.
- Gagné, J.-M. (Génie physique)
Séparation isotopique de l'uranium: méthodes spectroscopiques et lasers, \$20,000.00.
- Gélinas, L. (Génie minéral)
Etude des complexes rhyolitiques de la région de Rouyn-Noranda, \$7,000.00.
- Perrault, G. (Génie minéral)
Minéralogie, pétrologie, géochimie et métallogénie de certaines occurrences d'uranium au Québec, \$3,000.00.

INRS-Pétrole

- Achab, A.
Etude palynologique du Paléozoïque de l'Est du Canada et des îles de l'Arctique, \$5,000.00.
- Desjardins, M.
Etude des gaz adsorbés du bassin des côtes du Labrador, \$4,000.00.
- Desjardins, M.
Exoscopie du quartz, calibration comme instrument de détermination paléogéographique, \$6,000.00.
- Tessier, A.
Evaluation d'une méthode de lessivages "sélectifs" des sédiments aquatiques en vue de la prospection géochimique, \$6,000.00.

Université Laval

- Seguin, M.K. (Géologie)
Relevé gravimétrique détaillé de la masse serpentine du groupe de Maquereau, \$6,000.00.

McGill University

- Doig, R. (Geological Sciences)
Uranium deposits associated with granitic rocks, Grenville Province, Canada, \$5,760.00.
- Elson, J.A. (Geological Sciences)
Genesis and differentiation of diamictites on Somerset Island, Northwest Territories, \$4,000.00.
- Francis, D.M. (Geological Sciences)
The evolution and mineral potential of the Cape Smith Fold Belt, Québec, \$10,000.00.
- Hesse, R. (Geological Sciences)
Organic matter maturation and mineral diagenesis in the Québec Appalachians, \$5,900.00.
- Jensen, O.G. (Mining and Metallurgical Engineering)
Applications of natural and artificial EM sources to ground impedance measurement (ULF, VLF, LF), \$10,000.00.
- Stearn, C.W. (Geological Sciences)
Paleogeology of Devonian carbonate formations of the Blue Fiord area, Ellesmere Island, District of Franklin, \$4,000.00.

Université de Montréal

- Mamet, B. (Géologie)
Taxonomy and stratigraphy of Carboniferous foraminifers and algae, British Columbia, Yukon, and District of Mackenzie, \$6,660.00.

Université du Québec à Chicoutimi

- Dimroth, E. (Science Appliquées)
Evolution de la Province Grenville dans la région du Saguenay-Lac-St-Jean, Québec, \$4,000.00.
- Dimroth, E. (Sciences Appliquées)
Volcanologie physique et sédimentologie d'un bassin volcano-sédimentaire Archéen, \$10,000.00.

Université du Québec à Montréal

- Prichonnet, G.P. (Sciences de la Terre)
Cartographie des dépôts meubles des feuilles de St-Hyacinthe et de Sutton (31 H/10 et 31 H/2). Ech: 1/50,000, \$9,000.00.

Université du Québec à Trois-Rivières

Long, B. (Groupe Thermopol)
Etude de l'évolution et de la dynamique des sédiments du fleuve Saint-Laurent entre le lac Saint-Pierre et Gentilly. Etude des effets des opérations de dragage sur l'environnement, \$7,000.00.

NEW BRUNSWICK

University of New Brunswick

Burke, K.B.S. (Geology)
Development of a vibrator source for shallow seismic exploration, \$3,500.00.

NOVA SCOTIA

Dalhousie University

Beaumont, C. (Oceanography)
Rheology of the lithosphere in Canada from the correlation of Bouguer gravity and topography as a function of age, \$4,850.00.
Beaumont, C. (Oceanography)
A comparison of observed and theoretical Holocene apparent sea level variation in Atlantic Canada, \$9,000.00.
Hall, J.M. (Geology)
Continental margin and ocean crust geological investigations through the further development of the Bedford Institute shipborne electric drill, \$15,000.00.
Piper, D.J.W. (Geology)
Geological mapping and transportation processes, coastal Nova Scotia and Labrador, \$14,000.00.

Nova Scotia Technical College

Brown, J.D. (Civil Engineering)
Geotechnical properties of deep sea and Continental Shelf sediments, \$7,000.00.

NEWFOUNDLAND

Memorial University of Newfoundland

Dunsiger, A.D. (Engineering and Applied Science)
Ocean sediment properties using acoustic sensing, \$7,000.00.
Murthy, G.S. (Physics)
Paleomagnetic investigations of Precambrian and younger rock units from the Island of Newfoundland and their bearing on the interpretation of Newfoundland geologic structure, \$4,000.00.
Williams, H. (Geology)
Geology of Stephenville map-area (12 B), Newfoundland, \$12,000.00.

Department of Environment Canada, Water Resources Research Support Program, Research Agreements 1979-80/ Ministère des Environnement Canada, Programme de subvention à la recherche sur les ressources en eau, conventions de recherche 1979-80

University of British Columbia

Clarke, G.K.C. (Geophysics and Astronomy)
Glacier beds: their relationship to ice dynamics, glacier hydrology and erosion, \$8,000.00.

University of Saskatchewan

Gray, D.M. (Hydrology)
Hydrology of the Prairie environment, \$20,000.00.

McMaster University

Emery, J.J. (Civil Engineering and Engineering Mechanics)

Finite element simulation of glacial flow, \$2,000.00.
Woo, M-K (Geography)
Hydrology of nival-regime basins in the vicinity of Resolute, Cornwallis Island, Northwest Territories, \$12,000.00.

Queen's University

Patterson, R.J. (Geological Sciences)
Geochemical controls on the mobility of radioactive components in the groundwater flow system of Chalk River, Ontario, \$3,000.00.

University of Waterloo

Cherry, J.A. (Earth Science)
Groundwater flux as a mechanism for contaminant migration into surface waters, \$6,000.00.
Mitchell, B. (Geography)
Comparative appraisal of flood management and erosion control policy and practice in the Grand and Credit River watersheds, Ontario, \$8,000.00.

Polar Continental Shelf Project Field Support Non-Governmental Activities 1979-80/ Aide de l'étude du Plateau continental polaire en faveur d'activités non gouvernementales pour 1979-80

ALBERTA

University of Alberta

Chatterton, B.D.E.
Biostratigraphy and paleontology, Cornwallis and Baillie-Hamilton Islands.
England, J.
Glacier geomorphology, northern Ellesmere Island.
Jones, B.
Silurian-Devonian paleontology, Somerset, Melville and Ellesmere Islands.

SASKATCHEWAN

University of Saskatchewan

Coleman, I.C.
Stratigraphy, Richardson Mountains, Yukon.

ONTARIO

McMaster University

Woo, M-K.
Hydrological studies, Cornwallis and Devon Islands.

University of Ottawa

Dixon, O.A.
Stratigraphy and paleontology, Somerset and Cornwallis Islands.
French, H.M.
Geomorphic processes, Banks Island.
Royal Ontario Museum, Mineralogy and Geology
Sturman, B.D.
Mineralogy, Rapid Creek, Yukon.
Sir Sandford Fleming College
Watts, S.H.
Bedrock geology, Cape Herschel, Ellesmere Island.

University of Western Ontario

Lenz, A.C.
Silurian-Devonian paleontology, Cornwallis Island.
Young, G.M.
Precambrian sedimentology, Minto Inlet, Victoria Island.

University of Toronto

Ritchie, J.C.
Quaternary paleobotanical studies, Hyndman Lake, District of Mackenzie.

University of Waterloo

Fritz, P.
Permafrost studies, Richards Island.

QUEBEC

McGill University

Hélie, R.G.
Quaternary, Somerset Island.
Stearn, C.W.
Devonian stratigraphy, southwestern Ellesmere Island.

U.S.A.

Milwaukee Public Museum

West, R.M.
Biostratigraphy and paleontology, Devon, Axel Heiberg and Ellesmere Islands.

University of Washington

Washburn, A.L.
Periglacial features, Resolute area, Cornwallis Island.

Ontario Geological Survey, Geoscience Research Grants 1979-80/
Commission géologique de l'Ontario subventions de recherche en sciences de la terre pour 1979-80

Carleton University

Bell, K.
Radon decay products - U exploration, \$22,500.00.
Bell, K.
Rb/Sr geochronology of alkalic complexes, \$8,800.00.
Watkinson, D.H.
Potential for chromite ore deposits, \$13,283.00.

Laurentian University

Beswick, A.E.
Alteration patterns in Precambrian volcanic rocks, \$20,000.00.
Whitehead, R.E.
Gold exploration using CO₂, H₂O and alkali "anomalies", \$19,672.00.

McMaster University

Crocket, J.H.
Stable isotope studies - gold metallogeny, Timmins, \$18,272.00.

University of Ottawa

Armbrust, G.A.
Jograp Cu-Mo deposits, Ryan Township, \$13,100.00.
Fyson, W.K.
Structural control of uranium distribution, Cardiff, \$13,000.00.

Queen's University

Dixon, J.M.
Model study of Archean greenstone granite gneiss belts, \$8,671.00.
Hodgson, C.J.
Gold ore formation at Red Lake, \$32,625.00.

University of Toronto

Kenney, T.C.
Horizontal deep drains to stabilize clay slopes, \$11,500.00.
Kimberley, M.M.
Chemical and magnetic mineral characterization, Elliot Lake, \$2,600.00.
Naldrett, A.J.
Platinum group elements in magmatic sulfide deposits, \$30,000.00.
Norris, G.
Mesozoic palynostratigraphy, Moose River Basin, \$22,500.00.
Schwerdtner, W.M.
Structural analysis of Shebandowan greenstone belt, \$11,950.00.
Strangway, D.W.
Magnetism and stratigraphy in the Blake River volcanics, \$28,600.00.
West, G.F.
Interpretation for electromagnetic prospecting, \$25,000.00.
York, D.
Direct dating of ore minerals, \$17,785.00.

University of Waterloo

Appleyard, E.C.
Processing lithochemical data for exploration, \$14,000.00.
Roberts, R.G.
Alteration and gold vein environments, \$20,000.00.

University of Western Ontario

Fyfe, W.S.
Immobilization of U-Th-Ra in mine wastes, \$14,000.00.
Fyfe, W.S.
Geochemistry of lode gold deposits in felsic igneous intrusions, \$13,550.00.
Hodder, R.W.
Evolution of an Archean felsic volcanic-plutonic complex, \$21,000.00.
Hutchinson, R.W.
Field relations and geochemistry of Au, Ni and Cr deposits, \$23,985.00.
Mereu, R.F.
Micro-earthquake survey, Woodstock-Kitchener area, \$7,300.00.

University of Windsor

Hudec, P.P.
Engineering properties of sedimentary rocks of Manitoulin Island, \$16,000.00.
Symons, D.T.
Component magnetization of iron formations, \$25,674.00.

Natural Sciences and Engineering Research Council Canada Earth Science Operating Grants 1979-80/ Conseil de recherches en sciences naturelles et en génie Canada sciences de la terre subventions pour dépenses courantes 1979-80

Achab, A. 10454 3203	INRS-Pétrole Qué-Siège Soc	Etude des chitinozoaires de l'Ordovicien inférieur et moyen de la province de Québec	Beck, A.E. 00278 0174	Geophysics Western Ontario	Geothermal studies, pure and applied
Adamowski, K. 04611 0011	Civil Engineering Ottawa	Stochastic analysis of the hydrologic cycle	Becker, A. 05956 0175	Génie minéral Ecole Polytech.	Nouvelles techniques de la prospection électromagnétique
Aldridge, K.D. 09528 0034	Physics York	1) Non-axisymmetric inertial oscillations in spherical shells of rotating fluid. 2) coordinate system for the study of ccre dynamics	Bell, K. 06587 0189	Geology Carleton	Application of Sr isotopes to the evolution of the early crust
Allen, J. H. 11278 7806	Geology Toronto	Equilibrium relations of clinzoisite and other phases applicable to marbles	Berger, A. R. 07930 3380	Geology Memorial	Geology of Northeastern Gander Zone
Anderson, G. M. 00084 3235	Geology Toronto	Metasomatic and ore-forming solutions	Beswick, A. E. 00348 3394	Geology Laurentian	Determination of the primary geochemical characteristics of Precambrian volcanism and nature of the early upper mantle
Anderson, M. H. 00089 3237	Biology Memorial	Contributions to palaeontology and stratigraphy, mainly Newfoundland	Bilodeau, M. L. 10651 6234	Mining/Metal. Eng. McGill	Geostatistical grade and tonnage estimation in the presence of geological trends
Appleyard, E. C. 00107 3249	Earth Sciences Waterloo	Studies of metasomatic and altered rocks	Bonn, F. 06889 3427	Géographie Sherbrooke	Utilisation des données du satellite H.C.M.M. et du concept d'inertie thermique en télédétection du milieu naturel
Armbrust, G. A. 08437 3254	Geology Ottawa	Nature and origin of disseminated copper deposits associated with Precambrian felsic intrusive rocks	Borradaile, G. J. 11049 6102	Geology Lakehead	Metamorphic and structural geology with special emphasis on archaean rocks of NW Ontario
Armstrong, R. L. 08438 0076	Geological Sciences British Columbia	Geochronometry of cordilleran igneous and metamorphic rocks	Bourque, P. A. 09307 3444	Géologie Laval	Paléogéographie, paléocéologie et paléoenvironnements du Siluro-Dévonien de la Gaspésie
Arndt, N. T. 10649 3260	Geological Sciences Saskatchewan	Komatiite petrogenesis and nomenclature	Bovis, M. J. 11285 7813	Geography British Columbia	Slow mass movement in southwest British Columbia
Ayres, L. D. 08556 0100	Earth Sciences Manitoba	Early Precambrian volcanism and plutonism in the Superior and Churchill Provinces, Ontario and Saskatchewan - a contribution to early crustal evolution	Bowen, A. J. 08844 0298	Oceanography Dalhousie	The dynamics of coastal waters and sediments
Baadsgaard, H. 00166 3282	Geology Alberta	Isotope geology of polymetamorphic rocks, salt beds and uranium deposits	Braun, W. K. 00484 0317	Geological Sciences Saskatchewan	Microfaunas and biostratigraphy of western Canada
Bachinski, D. J. 08615 0106	Geology New Brunswick	Metamorphism of sulfide - rich rocks	Brookfield, M. E. 05984 0335	Land Resource Sc Guelph	Mesozoic evolution of the Pacific margins
Baer, A. J. 07928 0113	Geology Ottawa	1) Relationship between texture and mineralogy of some anorthosites 2) Structural studies in the Grenville Province	Brooks, C. 00517 0336	Géologie Montréal	The evolution of Precambrian Shields (with special reference to Canada) as determined by geochemical, isotopic and geochronologic analysis
Bailey, R. C. 08982 3287	Physics Toronto	Geomagnetic variations and tectonic structures	Brown, A. C. 06594 3486	Génie minéral Ecole Polytech.	Etude métallogénique des gisements stratiformes de métaux non-ferreux
Ballivy, G. 10199 3301	Génie civil Sherbrooke	Etude du comportement des coulis d'étanchéité et de scellement injectés dans les massifs rocheux	Brown, R. L. 00535 3493	Geology Carleton	Structural investigation of the Shuswap metamorphic core complex, British Columbia
Baracos, A. 00214 6971	Geological Eng. Manitoba	A coordinated study of Winnipeg clays * with I. Domaschuk, J. Graham (Manitoba)	Brown, T. H. 08446 3497	Geological Sciences British Columbia	Phase equilibria and ore genesis
Barnes, C. R. 00229 3320	Earth Sciences Waterloo	Lower Paleozoic conodont biostratigraphy, paleoecology and ultrastructure	Bryan, R. B. 00556 0362	Geography Toronto	Interaction of sheetwash, rainfall and soil characteristics in initiation of soil erosion
Barnes, W. C. 00230 3321	Geology British Columbia	Organic geochemistry and sedimentology of lacustrine and shallow marine sediments of southwestern British Columbia	Bunting, B. T. 00579 0381	Geography McMaster	Studies of fire effect (pyrolysis) on organic matter of Brunisol and Podzolic soils in central Ontario, and its influence on mineral weathering
Barr, S. M. 10201 3324	Geology Acadia	Petrography, geochemistry, palaeomagnetism, and geochronology of igneous rocks from Nova Scotia and Thailand	Burke, K. 04661 3524	Geology New Brunswick	Gradient measurements of gravity in New Brunswick
Bayliss, P. 00261 3339	Geology Calgary	Applied crystallographic-mineralogy	Burley, B. J. 00591 3526	Geology McMaster	Research on alkaline rocks and minerals. Fractionation of lithium between minerals and magma
Beales, F. W. 00265 3343	Geology Toronto	Limestone studies and strata-ground mineral deposits	Burling, R. W. 00592 3528	Inst. Oceanography British Columbia	Inlet studies and carbon dioxide in the ocean and atmosphere
Beaumont, C. 09859 3348	Oceanography Dalhousie	Earth rheology	Byrne, F. M. 00619 3552	Civil Engineering British Columbia	Analytical methods in soil & soil-structure interaction problems
			Caldwell, W. G. E. 05996 0402	Geological Sciences Saskatchewan	Biostratigraphic studies in the cretaceous system of western Canada

List of grant awards in the earth sciences for 1979/80
Liste des subventions attribuées aux sciences de la Terre en 1979-80

Calon, T.J. 10554 Geology 3559 Memorial	1) Structure of the Thillingate Pluton & its envelope 2) Structural studies of ophiolites and associated rocks	Clark, A.H. 00791 Geological Sciences 0514 Queen's	The origin and delimitation of metallogenetic provinces at active and older convergent and collisional plate boundaries
Cameron, R.A. 05999 Geology 6979 Laurentian	* Principal investigator J.F. Davies (Laurentian)	Clark, G.S. 00796 Earth Sciences 3656 Manitoba	Rubidium-strontium geochronology in the Precambrian of Northern Manitoba
Campanella, R.G. 00636 Civil Engineering 0406 British Columbia	Insitu testing and field behaviour of soil	Clarke, D.B. 06024 Geology 0516 Dalhousie	Petrogenesis of igneous rocks: 1) Basic rocks from accreting plate margins 2) Appalachian granites 3) Origin of Kimberlites
Campbell, F.A. 00639 Geology 0409 Calgary	Geochemistry, mineralogy and isotope studies of rocks and ore deposits	Clarke, G.K.C. 00803 Geophys./Astron. 0520 British Columbia	Glaciology: field study, theory and instrumentation
Cannon, W.H. 08093 Physics 3569 York	1) Applications of long baseline interferometry to geophysics and planetary science 2) Terrestrial gravity and tests of theories of general relativity	Clarke, W.B. 00805 Physics 0521 McMaster	Investigations of isotope patterns in nature
Carmichael, C.M. 00663 Geophysics 0423 Western Ontario	Geomagnetism	Clement, P.M.J. 00812 Géographie 6991 Sherbrooke	* Chercheur principal P. Gangloff (McGill)
Carroll, R.L. 00672 Redpath Museum 0429 McGill	Evolution and functional anatomy of Paleozoic and Early Mesozoic reptiles	Clifford, P.M. 00817 Geology 7427 McMaster	Granites and mylonites along the Grenville Front; paleovolcanicity
Casteel, R.W. 10217 Archaeology 3588 Simon Fraser	Holocene paleotemperature	Clowes, R.M. 06027 Geophys./Astron. 0534 British Columbia	Controlled source reflection/refraction seismology on land and at sea for crustal/upper mantle investigations
Cawker, K.B. 10487 Geography 0443 Western Ontario	* Principal investigator B.H. Luckman (West. Ont.)	Cogley, J.G. 09668 Geography 3673 Trent	Palaeoclimate and global tectonics
Cerny, P. 06922 Earth Sciences 0445 Manitoba	Mineralogy and petrology of pegmatites	Collerson, K.D. 08109 Geology 3682 Memorial	The development of Archean and Proterozoic crust in Northern Labrador
Chagnon, J.Y. 10657 Géologie 3599 Laval	Etude géotechnique de la région de la Ville de Québec	Cooke, H.B.S. 06035 Geology 0562 Dalhousie	1) Studies on the quaternary in Atlantic Canada 2) Studies on the neogene/quaternary of Africa and Eurasia
Chao, G.Y. 00723 Geology 6699 Carleton	Descriptive, comparative and structural studies of minerals from Mont St-Hilaire, Quebec	Cooke, R.C. 07648 Oceanography 3694 Dalhousie	Pressure-regulated reactions in the sea
Chapman, C.H. 00724 Physics 0463 Toronto	Seismic body wave theory	Cooke, R.C. 07648 Oceanography 8356 Dalhousie	Chemical oceanography - incorporation of toxic material into particulate form by bubble collapse (New Research Idea)
Chase, R.L. 00735 Geological Sciences 0469 British Columbia	Tectonics, petrology and sedimentation of the continental margin of British Columbia and related plate margins and seamount chains of the northeast Pacific Ocean	Copper, P. 00879 Geology 0567 Laurentian	Paleoecology, evolution and morphology of Ordovician to Devonian atrypid brachiopods on a global basis
Chatterton, B.D.E. 06925 Geology 0470 Alberta	Taxonomic, paleoecologic, biostratigraphic and biogeographic studies of Paleozoic faunas of western and northern Canada, with concentration on conodonts and trilobites	Corlett, M.I. 06944 Geological Sciences 3703 Queen's	Relations between chemistry, structure, temperature, and pressure in the system NaFePO ₄ -LiFePO ₄ (-NaMnPO ₄ -LiMnPO ₄)
Cherry, J.A. 00749 Earth Sciences 0483 Waterloo	Contaminant behaviour in groundwater flow systems	Cossa, D.J. 10223 INRS-Océanolog. 3708 Qué-Siège Soc	Biogéochimie du cadmium en milieu estuarien et marin
Chesworth, W. 00752 Land Resource Sc 0484 Guelph	Geochemistry of weathering	Crampton, C.B. 08569 Geography 0591 Simon Fraser	A study of synergistic interactions involving permafrost in a biophysical classification of Arctic and subarctic terrain
Church, M.A. 06930 Geography 3650 British Columbia	Studies of the hydraulics of rivers	Crocket, J.H. 00927 Geology 0596 McMaster	Application of isotopic and minor element distributions to geological problems
Church, W.R. 00781 Geology 0508 Western Ontario	1) Pre-Mesozoic crustal evolution of the North Atlantic region: ophiolites; eclogite-granulite complexes; alkali gabbro-peralkaline granite associations 2) Geology of the northern Grenville Province: the garnet-bearing metadiabases; 3) Ultramafic rocks of the Thompson belt	Crossley, D.J. 10140 Mining/Metal. Eng. 3730 McGill	Physics of the earth's core
Churcher, C.S. 00782 Zoology 9509 Toronto	Investigation and description of the quaternary mammalian faunas of Canada and comparison with those from other continents	Cruden, D.M. 07947 Geology 3733 Alberta	Stability of natural slopes in rock
		Cumming, G.L. 00943 Physics 0609 Alberta	Systematics of Pb isotope variations in ores and rocks - crustal seismic reflection studies
		Curran, J.H. 10773 Civil Engineering 3739 Toronto	Constitutive equations for porous rocks

List of grant awards in the earth sciences for 1979/80
 Liste des subventions attribuées aux sciences de la Terre en 1979-80

Currie, J.B. 00949 0614	Geology Toronto	Mechanics and development of fractures in sedimentary strata: fracture porosity in carbonate and sandstone rocks	Domaschuk, L. 01101 6972	Civil Engineering Manitoba	* Principal investigator A. Baracos (Manitoba)
D'Anglejan, B.F. 00956 0619	Marine Sci. Centre McGill	Suspended matter transport and composition, and sedimentation processes near the benthic boundary layer in subarctic estuaries	Donaldson, J.A. 06076 3866	Geology Carleton	Comparative studies of Precambrian sedimentary rocks
Dagbert, M. 10774 3747	Génie minéral Ecole Polytech.	Développement d'un simulateur informatique pour l'exploration et la mise en production des gisements miniers	Donnay, G. 06077 3868	Geological Sciences McGill	Relation of physical and chemical properties to crystal structure
Dalrymple, R.W. 11090 6465	Geological Sciences Brock	Investigations of the grain size characteristics of clastic sediments	Dosso, H.W. 01114 0708	Physics Victoria	Geomagnetic variations and electromagnetic modelling
Darling, R.G. 00975 0628	Génie minéral Ecole Polytech.	Applied lithogeochemistry	Dostal, J. 09886 3869	Geology Saint Mary's	Geochemical studies of some rocks
David, M. 00987 0635	Génie minéral Ecole Polytech.	Développements géostatistiques pour l'inventaire de réserves et de ressources minérales	Drake, J.J. 08947 3873	Geography McGill	Regional hydrochemistry: environmental controls
Davidson-Arnott, R.G.D. 10042 3769	Geography Guelph	Beach and nearshore processes and sedimentation	Drake, J.J. 08947 8348	Geography McMaster	Regional hydrochemistry: environmental controls
Davies, J.F. 00997 6978	Geology Laurentian	The relation of mineralization to lithologic, stratigraphic and geochemical variations in volcanic sequences, Timmins area, Ontario * With R.A. Cameron, R.E. Whitehead (Laurentian)	Dreimanis, A. 01129 0721	Geology Western Ontario	Last ice age deposits in east-central and south-western Canada and their correlations with other regions
Davis, J.F. 00997 6978	Geology Laurentian	The relation of mineralization to lithologic, stratigraphic and geochemical variations in volcanic sequences, Timmins area, Ontario * With R.A. Cameron, R.E. Whitehead (Laurentian)	Dudas, M.J. 09490 3890	Soil Science Alberta	1) Processes in the experimental weathering of fly ash 2) Effect of humic compounds on the transport of heavy metals in soil
Davis, A.M. 10559 3776	Geography Toronto	The character of the boreal forest - Gt. Lakes/St. Lawrence forest and boreal forest-tundra ecotones during the Holocene	Dumitriu, M. 10564 3893	Génie minéral Ecole Polytech.	Application du "lissage typologique" (une méthode de traitement des séries chronologiques incomplètes) à l'étude tridimensionnelle des données géologiques et minières, pour la prédiction des zones minéralisées de l'Abitibi
Davis, M.W.D. 11091 6466	Génie minéral Ecole Polytech.	Some practical problems encountered in the applications of geostatistics in the mineral industry	Dumitriu, S.C. 10668 3894	Génie minéral Ecole Polytech.	Application de l'analyse statistique des données à la géologie et la géochimie de la région de l'Abitibi
Davis, T.L. 10560 3780	Geology Calgary	Application of seismic stratigraphy to hydrocarbon exploration	Dunlop, D.J. 06088 3900	Physics Toronto	Rock magnetism and paleomagnetism of continental and oceanic rocks
De Albuquerque, C.A.R. 06621 0649	Geology Saint Mary's	Studies on the geochemistry of igneous and metamorphic rocks	Durand, M. 09314 3904	Sciences de la terre Qué-Montréal	Étude des implications de la géologie urbaine pour l'aménagement et la construction à Montréal
De Boutray, M.X.B. 06957 6992	Sciences de la terre Qué-Montréal	* Chercheur principal P. Gangloff (Montréal)	Dusseault, M.B. 10784 3907	Civil Engineering Alberta	Oil sands geotechnical project
De Vries, J. 01028 3800	Soil Science British Columbia	Hydrologic behaviour of soils of the urban-rural fringe area of the lower Fraser Valley	Edgar, A.D. 01192 3912	Geology Western Ontario	Geochemical and experimental studies of igneous rocks and minerals
Denner, W.W. 11296 7824	Physics Memorial	Numerical modeling of ice conditions in the Labrador current	Edwards, R.N. 08137 3916	Physics Toronto	Crustal electrosounding
Deutsch, E.R. 01062 3830	Physics Memorial	Rock magnetism and geological structure in the Newfoundland region	Eisenstein, Z. 06095 0765	Civil Engineering Alberta	1) Application of elasto-plastic constitutive models to analysis of earth structures 2) Soil-structure interaction problems 3) Properties of overconsolidated soils by pressuremeter testing
Dickinson, W.T. 01072 0681	Engineering Guelph	Statistical characteristics of hydrologic variables	Ek, C.M. 09088 7441	Géographie Montréal	Contribution à l'étude du Quaternaire du Québec par la sédimentologie en milieu karstique
Dimroth, E. 09313 3847	Sc. appliquées Qué-Chicoutimi	1) Volcanologie physique et sédimentologie d'un bassin volcano-sédimentaire Archéen et 2) Evolution de la Province Grenville dans la région Saguenay-lac-St-Jean	El-Sabh, M. 09316 0767	Océanographie Québec-Rimouski	1) The dynamics of the Gaspé Current 2) Circulation dynamics in the lower St. Lawrence Estuary
Dixon, J.M. 09012 3855	Geological Sciences Queen's	Centrifuge modelling of finite strain, progressive deformation and fabric in gravity-driven geologic structures	Ellis, R.M. 01217 0774	Geophys./Astron. British Columbia	Seismic crustal and array studies
Dixon, O.A. 01088 0694	Geology Ottawa	1) Ordovician-Silurian faunas and sedimentary facies, central Canadian Arctic 2) Ordovician-Silurian faunas and paleoecological studies, Anticosti Island	Doig, R. 01098 0699	Geological Sciences McGill	Geological applications of isotopic analysis

List of grant awards in the earth sciences for 1979/80
Liste des subventions attribuées aux sciences de la Terre en 1979-80

Elrick, D.E. 01219 0775	Land Resource Sc Guelph	Transport phenomena in natural porous media	Fransham, P.B. 11095 6470	Earth Sciences Waterloo	Ultrasonic testing of soils
Emery, J.J. 07420 0779	Civ Eng/Eng Mech McMaster	1) Seismic response of large foundation systems and underground openings 2) Simulation of creep and creep rupture problems involving rock, cohesive soils and ice	Fredlund, D.G. 01370 4018	Civil Engineering Saskatchewan	Engineering behavior of unsaturated and swelling soils
Emery, W.J. 10565 3931	Inst. Oceanography British Columbia	Dynamic topography maps from temperature profiles and spatial distributions of surface waters in Georgia Strait	Freeze, R.A. 08464 0893	Geological Sciences British Columbia	Hydrologic and geotechnical applications of hydrologic response models
England, J. 11093 6468	Geography Alberta	Quaternary glaciation and glacio-isostasy, Northern Ellesmere Island	French, H.M. 07701 4024	Geology/Geography Ottawa	1) Geomorphic process studies, Banks Island, Western Arctic 2) Late Quaternary coastal and fluvial environments, Ottawa region
Evans, L.J. 09676 3943	Land Resource Sc Guelph	Processes of soil formation	Frind, E.O. 07702 0898	Earth Sciences Waterloo	Mathematical modelling of groundwater flow systems
Evans, M.E. 08140 0791	Physics Alberta	Paleomagnetic and geomagnetic investigations of western Canadian rocks and rock magnetic studies	Fritz, F. 06991 0899	Earth Sciences Waterloo	1) Stable and radioactive isotopes in hydrogeology with special emphasis on organic compounds and processes 2) Paleoenvironmental studies using ¹³ C in organic freshwater sediments and ¹⁸ O and ¹³ C in freshwater mollusks
Everell, M.D. 09889 3944	Mines & métallurgie Laval	Dimensionnement des circuits industriels de combinaison	Fryer, E.J. 07963 4042	Geology Memorial	Igneous and sedimentary geochemistry of the Precambrian and the geochronology of Newfoundland
Fabraeus, L.E. 06105 0802	Geology Memorial	Paleozoic conodonts and Upper Cambrian, Ordovician, and Silurian bio- and chrono-stratigraphy	Fyfe, W.S. 07964 4047	Geology Western Ontario	Fluid flow in the crust: The limit on ancient geothermal gradients
Farquhar, R.M. 01262 3952	Physics Toronto	Lead isotope studies	Fyson, W.K. 01414 4048	Geology Ottawa	Structural patterns in metamorphic rocks
Farrar, E. 01263 0814	Geological Sciences Queen's	Potassium-argon geochronology	Gale, J.E. 10539 4054	Earth Sciences Waterloo	Factors controlling the movement of fluids through fractured argillaceous and crystalline rocks
Farvolden, R.N. 01265 0816	Earth Sciences Waterloo	Use of environmental isotopes in identifying sources of groundwater discharge	Gangloff, P. 09209 6990	Géographie Montréal	Morphosculpture du socle dans l'Ungava * avec P.M.J. Clement (Sherbrooke), M.X.B. De Boutray (Qué.-Mont.)
Fawcett, J.J. 01268 0820	Geology Toronto	Experimental and field studies in igneous and metamorphic petrology	Gardner, J.S. 09014 4067	Geography Waterloo	Ephemeral and episodic fluvial transport of debris on mountain slopes
Ferguson, R.B. 01283 0831	Earth Sciences Manitoba	Crystal-chemical studies of rock-forming and ore minerals	Garland, G.D. 01442 0917	Physics Toronto	Electrical and thermal properties of the crust and upper mantle
Finn, W.D.L. 01298 3975	Graduate Studies British Columbia	1) Seismic response of ground, slopes and earth dams 2) Simulated earthquake testing of soils 3) Geotechnical engineering in ocean 4) Soil-structure interaction 5) Yielding and deformation of soils 6) Seepage and heat condition in soils	Garrett, C.J.R. 07707 0920	Oceanography Dalhousie	Physical oceanography
Fleet, M.E.L. 01313 3985	Geology Western Ontario	Crystal chemistry and physics of minerals	Gaskin, P.M. 06650 4076	Civil Engineering Queen's	1) Effect of pressure and temperature gradient on frost heaving 2) Repeated loading of soil
Fletcher, W.K. 06123 6245	Geology British Columbia	Development and utilization of regional geochemical techniques	Gautier, C.H. 10148 4082	INRS-Océanolog. Qué-Siège Soc	Sea surface temperature variations in association with the passage of mesoscale convective systems, a satellite estimate
Flint, J.J. 06643 3990	Geological Sciences Brock	Fluvial morphology and sediment transport in armored streams	Gélinas, L. 01474 0934	Génie minéral Ecole Polytech.	Géochimie des éléments majeurs et mineurs des roches volcaniques de la ceinture volcanique de l'Abitibi, région Rouyn-Noranda
Ford, D.C. 01335 3994	Geography McMaster	1) Groundwater flow and cavern genesis in soluble rocks 2) Quaternary dating & palaeothermometry of calcite speleothem 3) Karst studies in Canada	Gélinas, P.J. 09210 4093	Géologie Laval	Hydrogéologie et propriétés hydrauliques des matériaux glaciaires
Forester, R.W. 08148 0866	Geological Sciences Saskatchewan	Oxygen, carbon, and hydrogen isotopic studies of igneous and metamorphic rocks	Geurts, M.A. 11306 7834	Géographie Ottawa	Application de la palynostratigraphie dans l'étude des dépôts marins et glacio-lacustres Tardiglaciaires
Fox, R.C. 01356 4010	Geology/Zoology Alberta	Upper cretaceous and lower tertiary vertebrates from western Canada	Ghent, E.D. 01487 4103	Geology Calgary	Petrologic and geochemical studies in the cordillera and electron microprobe study of minerals
Francis, D.M. 09139 0879	Geological Sciences McGill	* Principal investigator A. Hynes (McGill)	Gibbs, G.W. 10026 4106	Epidemiol. & Health McGill	Magnetic properties of asbestos and related minerals

List of grant awards in the earth sciences for 1979/80
 Liste des subventions attribuées aux sciences de la Terre en 1979-80

Gibson, I.L. 11419 8249	Land Resource Sc Guelph	The structure and nature of the upper part of the oceanic crust	Gwyn, Q.H.J. 10054 4220	Géographie Sherbrooke	Lithologie, stratigraphie et étude géotechnique des dépôts quaternaires dans le sud du Québec et de l'Ontario
Gibson, I.L. 11419 8338	Earth Sciences Waterloo	The structure and nature of the upper part of the oceanic crust	Hajnal, Z. 07017 1055	Geological Sciences Saskatchewan	1) Seismic investigation of deep seated structures in Saskatchewan 2) Seismic investigation of Precambrian contact zones
Gilbert, R. 09545 4113	Geography Queen's	Physical oceanography and marine sedimentation, Cumberland Sound, Baffin Island, N.W.T.	Hall, D.H. 01678 1059	Earth Sciences Manitoba	Deep magnetism and seismic structure of the crust-mantle system beneath the Superior Craton
Gill, D.E. 01511 0952	Génie minéral Ecole Polytech.	1) Le poinçonnement des roches dans les trous de sonde 2) Résistance des roches à long terme en atmosphère corrosive 3) Théorie de chargement des revêtements des souterrains	Hall, J.M. 06574 1061	Geology Dalhousie	Investigations of the nature and motion of crustal plates as determined from magnetic studies and deep drilling investigations
Gillham, P.W. 09892 4118	Earth Sciences Waterloo	Effect of the saturated and unsaturated zone interface on water and contaminant transport in groundwater	Hall, R.L. 10579 4235	Geology Calgary	Lithostratigraphy and biostratigraphy of the Fernie Group (Jurassic), Alberta
Gittins, J. 01524 4126	Geology Toronto	Petrogenesis of alkalic rocks and carbonatite complexes	Halls, H.C. 06662 4237	Geology Toronto	Paleomagnetism of Precambrian rocks
Godwin, C.I. 09546 0966	Geological Sciences British Columbia	Geochronology, geochemistry and metallogeny of Skeena Arch, Intermontane Belt, central British Columbia	Hanley, T.O. 10581 4242	Physics Regina	Electrical potentials in freezing soils
Goodchild, M.F. 06148 7976	Geography Western Ontario	* Principal investigator D.M. Mark (Western)	Harris, S.A. 06171 4254	Geography Calgary	Late glacial and postglacial geomorphology and climate in the south-eastern Rocky Mountains
Goodwin, A.M. 04711 0976	Geology Toronto	Origin of crust: nature and tectonic development of primitive earth's crust	Harrison, R.S. 08872 4261	Earth Sciences Manitoba	Sedimentology and diagenesis of pleistocene carbonate sequences
Gorton, M.P. 10674 4151	Geology Toronto	Geochemistry of the Irene-Eltrut granite complex	Hayatsu, A. 07034 1107	Geophysics Western Ontario	Study of initial argon by K-Ar isochron method
Gough, D.I. 01560 4155	Physics Alberta	Magnetometer array studies and paleomagnetism	Helmstaedt, H. 07731 1121	Geological Sciences Queen's	1) Fabrics of metamorphic rocks and tectonic settings of mineral deposits. 2) Tectonic history of xenoliths from kimberlites
Graham, J. 09782 6973	Civil Engineering Manitoba	* Principal investigator A. Baracos (Manitoba)	Hendry, H.E. 07446 4306	Geological Sciences Saskatchewan	Studies in clastic sedimentology
Gravenor, C.P. 07717 0997	Geology Windsor	Surface textures of heavy minerals which have undergone glacial transport: use in identifying tillites and other glaciogenic deposits and relationship to vibratory motion at the base of glaciers	Heroux, Y. 09326 4312	INRS-Pétrole Qué-Siège Soc	Signification de la réflectance sur kérogène par comparaison diagenèse-catagenèse minérale et organique pour application aux séries du Paléozoïque inférieur et moyen en tant que roche-mère
Gray, D.H. 01592 1000	Agricult. Eng. Saskatchewan	Simulation of the hydrologic cycle	Hesse, F.P. 04731 1136	Geological Sciences McGill	Clastic sedimentary sequences (processes and environments of deposition, diagenesis, tectonic significance)
Gray, J. 07437 4179	Physics Alberta	An investigation of long term climatic and environmental changes by stable isotope analyses of tree ring material	Hickin, E.J. 07733 1138	Geography Simon Fraser	River channel migration: its character, causes and controls
Gray, J.T. 07718 4181	Geography Montréal	Permafrost and active layer studies in sub-Arctic and mountain environments of southern and Central Quebec	Hill, A.R. 07044 1144	Geography York	The contribution of intensive farming to nitrogen and phosphorus levels in groundwater and rivers in the Alliston area, Ontario
Green, A.G. 09212 4184	Earth Sciences Manitoba	Seismic and magnetic studies of the Superior - Churchill Tectonic Boundary in Manitoba	Hillaire-Marcel, C. 09327 4324	Sciences de la terre Qué-Montréal	Applications de la géochimie isotopique à l'étude de paléoenvironnements quaternaires au Québec
Greenhouse, J.P. 07968 1006	Earth Sciences Waterloo	Groundwater and environmental geophysics	Hills, L.V. 01816 1147	Geology Calgary	Palynological and pleistocene research
Greenwood, B. 01601 1007	Geography Toronto	Coastal sedimentation	Hiscott, R.N. 10680 4329	Geology Memorial	1) Orogenic flysch sandstones, Ordovician, Appalachians 2) Late Precambrian and Early Paleozoic clastic sedimentology, Newfoundland and Labrador
Greenwood, H.J. 01603 4189	Geological Sciences British Columbia	Geological phase equilibrium studies	Hodgson, C.J. 08189 1156	Geological Sciences Queen's	Metallogenic studies of Canadian ore-bearing environments
Grill, E.V. 07011 4201	Inst. Oceanography British Columbia	The geochemistry of trace metals in British Columbia coastal waters and sediments	Hodych, J.P. 07738 4340	Physics/Geology Memorial	1) The effect of stress upon the magnetization of rock. 2) The magnetic properties of ultramafic rocks
Grundy, H.D. 01634 1025	Geology McMaster	The crystal chemistry of the silicates and related minerals			

Hofmann, H.J. 06185 Géologie 1162 Montréal	Precambrian and lower Paleozoic paleontology and stratigraphy	Jull, R.K. 02062 Geology 1315 Windsor	1) The paleoecology and biostratigraphy of middle and upper Devonian corals from Ontario and western Canada 2) Ontogeny and evolutionary history of early rugose and tabulate corals
Hogarth, D.D. 01843 Geology 4343 Ottawa	1) Igneous and metamorphic history of Gatineau - Lièvre district, Quebec 2) Genesis and nature of lapis lazuli	Kanasevich, E.R. 02085 Physics 1334 Alberta	Geophysical investigation of the crust and mantle
Hopkins, J.C. 10583 Geology 4361 Calgary	Sedimentation and diagenesis of Cretaceous hydrocarbon-bearing sandstones and related sediments	Karrow, P.F. 02101 Earth Sciences 1342 Waterloo	Quaternary environments during the last 125,000 years
Howarth, P.J. 01883 Geography 1199 McMaster	Remote sensing in geomorphological and hydrological studies	Kay, B.D. 02112 Land Resource Sc 1350 Guelph	Quantitative characterization of mass and heat transfer in freezing soils
Hron, P. 09147 Physics 1202 Alberta	Dynamic properties of seismic waves in structurally complicated media	Kehlenbeck, M.H. 07757 Geology 1357 Lakehead	Structural and petrological investigations leading to the tectonic evolution of parts of the Superior Province
Hubert, C. 01897 Géologie 1210 Montréal	Analyse stratigraphique intégrée des roches ordoviciennes et siluriennes de la ceinture d'Arcostook-Matapédia dans la Gaspésie, Appalaches du Québec	Kennedy, M.J. 02142 Geological Sciences 4526 Brock	Tectonic development in mobile belts
Hughes, C.J. 01905 Geology 1217 Memorial	Volcanic and granitic rocks of eastern Newfoundland	Kenney, T.C. 02144 Civil Engineering 4528 Toronto	Properties of natural soils and rocks
Huntley, D.A. 09045 Oceanography 1227 Dalhousie	Nearshore and boundary layer dynamics	Kerrich, R. 10688 Geology 4535 Western Ontario	Chemical studies of fluid interaction with submarine batholiths in greenstone belts
Hutcheon, I.E. 11057 Geology 6110 Calgary	Clay mineralogy and the interpretation of diagenetic conditions	Kimberley, M.M. 08880 Geology 4550 Toronto	Diagenesis and the origins of sedimentary ores
Hutchinson, R.W. 01938 Geology 1233 Western Ontario	Origin and metallogenic relationships of massive base metal sulfide and gold deposits	King, A.F. 02176 Geology 7459 Memorial	Pro-Cambrian studies on the Avalon and Western Platforms of Newfoundland
Hynes, A.J. 08877 Geological Sciences 1237 McGill	1) Geotraverse of the Cape Smith fold belt 2) Ultramafic magma project 3) Petrological study of the rift-related volcanic rocks of southeastern Quebec * with D.M.Francis (McGill)	King, M.S. 02183 Geological Sciences 4557 Saskatchewan	Mechanical and electrical properties of rocks
Ingram, R.G. 07454 Marine Sci. Centre 4413 McGill	Effect of environmental changes on estuarine circulation and mixing	King, R.H. 07080 Geography 1389 Western Ontario	* Principal investigator B.H.Luckman (West. Ont.)
James, N.P. 09046 Geology 1272 Memorial	Facies anatomy and diagenetic evolution of Paleozoic shelf carbonates: northern Maritime Appalachians	Kisak, E. 10366 Mathématiques 4565 Ecole Polytech.	Modelage magnétotellurique par éléments finis
James, R.S. 06210 Geology 1273 Laurentian	Petrology and geochemistry of igneous and metamorphic rocks	Kissin, S.A. 09902 Geology 4567 Lakehead	Crystal chemistry and stabilities of sulphide minerals
Jensen, O.G. 08587 Mining/Metal. Eng. 4446 McGill	Earth mechanics - seismology at ultra-long periods Seismic analysis - parametric deconvolution	Klovan, J.E. 02200 Geology 4571 Calgary	Devonian stratigraphic problems
Jeremic, M. 09072 Mineral Eng. 4448 Alberta	Deformation and failure of coal mine pillars in western Canada	Kobluk, D.R. 10690 Earth Sciences 4575 Toronto	Cavity-dwelling organisms in Paleozoic reefs
Johnson, P.G. 06213 Geography/Planning 1293 Ottawa	Mass movement in Alpine environments. The application of catastrophic and steady state models of flow	Koster, E.H. 10266 Geological Sciences 7461 Saskatchewan	Studies of fluvial and shallow-marine sedimentation
Jolly, W.T. 07750 Geological Sciences 4458 Brock	Major trace element geochemistry and metamorphism of Archean lavas	Kramer, J.R. 02242 Geology 1431 McMaster	Geochemical ligand speciation in natural waters
Jones, B. 10922 Geology 4459 Alberta	Devonian brachiopods of Arctic Canada	Kretz, R. 02251 Geology 4598 Ottawa	Mineral chemistry and metamorphism
Jones, P.W. 06216 Physics 1304 Alberta	Electromagnetic induction, heat flow, and Earth tides and tilts	Krogh, T.E. 10065 Geology 4601 Toronto	Research in geochronology techniques, tests and applications to geological problems
Joshi, R.C. 10589 Civil Engineering 4472 Calgary	1) Fly ash utilization for construction purposes 2) Engineering properties of lime injected soils	Krouse, H.R. 02258 Physics 4602 Calgary	Stable isotope fractionation studies
		Kukalova-Peck, J. 09557 Geology 1450 Carleton	Morphology and evolution of Paleozoic insects of North America, Europe and USSR with reference to phylogeny of Recent insects
		Kupsch, W.O. 02270 Geological Sciences 1454 Saskatchewan	Quaternary chronostratigraphy of the Interior Plains, Canada

List of grant awards in the earth sciences for 1979/80
 Liste des subventions attribuées aux sciences de la Terre en 1979-80

La Rochelle, P. 02342 G�nie civil 4623 Laval	Propri�t�s fondamentales et comportement des argiles sensibles	Luckman, B.H. 08493 Geography 1612 Western Ontario	Holocene environmental change in Jasper National Park * with R.H.King, K.B.Cawker (West. Ont.)
Ladanyi, B. 02292 G�nie civil 1469 Ecole Polytech.	1) Capacit� portante des fondations profondes en perg�lisol 2) Capacit� portante des pieux caissons de haute capacit� for�s dans la roche 3) Probl�mes g�otechniques du stockage souterrain	Ludden, J.W. 10702 G�ologie 4775 Montr�al	The petrogenesis of modern day oceanic crust, Archean crustal sections and island arc volcanic sequences
Lafleur, J. 10827 G�nie civil 4630 Ecole Polytech.	Drainage de pentes naturelles	Ludvigsen, R. 09702 Geology 1613 Toronto	Biostratigraphy and community paleoecology of Ordovician trilobites
Laidlaw, D.D. 11059 Mining/Metal. Eng. 6112 McGill	The post-failure behavior of rock	MacLean, W.H. 06279 Geological Sciences 1635 McGill	Phase relations and field studies pertaining to magmatic and massive volcanogenic sulfide ore deposits
Lajoie, J. 02304 G�ologie 4635 Montr�al	1) Etudes s�dimentologiques des roches volcanoclastiques de l'Abitibi 2) S�dimentologie du flysch cambro-ordovicien des Appalaches du Qu�bec	MacRae, N.D. 06282 Geology 1640 Western Ontario	Geochemistry of sulfur in mafic rocks
Lajtai, E.Z. 02305 Geology 1480 New Brunswick	Fracture studies of selected New Brunswick rocks	Mackay, J.R. 02570 Geography 4806 British Columbia	Origin of permafrost and ground ice, Western Arctic, and alpine permafrost in B.C.
Lambert, R.S.J. 06250 Geology 1492 Alberta	Isotopic and geochemical researches applied to continental margin tectonics and the Archean	Macqueen, R.W. 10077 Earth Sciences 1651 Waterloo	Paleozoic shale/carbonate suites, Western Canada: nature, origin, history, mineralization; Ontario Silurian carbonate studies
Langford, F.F. 05223 Geological Sciences 1502 Saskatchewan	Environment of pitchblende deposition in the Beaverlodge area, Saskatchewan	Malpas, J.G. 09349 Geology 4837 Memorial	Investigation of ophiolitic and related rocks and comparison to oceanic crust
Langleben, M.P. 02333 Physics 1504 McGill	Drift and thermal regime of sea ice	Mamet, B.L. 02608 G�ologie 4839 Montr�al	Microfaci�s carbonat�s de Pal�ozoique; microfaune et microflore
Laurent, R. 07472 G�ologie 4660 Laval	G�ologie des complexes ophiolitiques des Appalaches du Qu�bec	Mansinha, L. 02621 Geophysics 1676 Western Ontario	1) Rotational dynamics of the earth 2) Exploration methods
Le Blond, P.H. 06257 Inst. Oceanography 1523 British Columbia	Long waves and coastal oceanography	Mark, D.M. 11390 Geography 7975 Western Ontario	Accuracy in maps and geographical data processing: a fractal approach * with M.F.Goodchild (Western)
Lebel, J. 07772 Oc�anographie 4675 Qu�bec-Rimouski	Les ions majeurs du St-Laurent et du Saguenay: variations et �quilibres	Martignole, J. 02652 G�ologie 4861 Montr�al	Recherches p�trog�iques dans le sud de la Province de Grenville
Lefebvre, G. 07774 G�nie civil 4687 Sherbrooke	Etude des caract�ristiques des argiles ciment�es	Martin, R.F. 06296 Geological Sciences 4864 McGill	Magmatic and metasomatic processes in the genesis of "igneous" rocks
Legault, J.A. 10070 Earth Sciences 4690 Waterloo	Early Paleozoic palynomorphs and stratigraphy	Martini, I.P. 04783 Land Resource Sc 1700 Guelph	Quantitative studies of sands and sandstones
Leighton, H.G. 11061 Meteorology 6114 McGill	Model studies of the transfer of solar radiation through the atmosphere	Mathews, R.W. 09809 Biolog. Sciences 1712 Simon Fraser	Paleoecology of postglacial vegetation in coastal and interior biogeoclimatic zones of British Columbia
Lenz, A.C. 02422 Geology 1556 Western Ontario	Lower and middle Paleozoic stratigraphy, paleontology, biostratigraphy and fossil community analyses	Mathews, W.H. 02670 Geological Sciences 4874 British Columbia	Sedimentology, geomorphology, and Cenozoic geochronology in southern British Columbia
Lerbekmo, J.F. 06266 Geology 4706 Alberta	1) Sedimentation and correlation of Upper Cretaceous and Paleocene coal-bearing formations in Alberta 2) Genesis and petrophysics of sandstone petroleum reservoir rocks in western Canada	May, R.W. 08268 Geology 4884 Alberta	1) Lithology and genesis of quaternary deposits 2) Application of statistical methods to the analysis of geological data
Lesperance, P.J. 02431 G�ologie 4709 Montr�al	Biostratigraphie de l'Ordovicien Sup�rieur au D�vonien Inf�rieur du Qu�bec	Mayr, F.J. 02685 Sciences de la terre 4886 Qu�-Montr�al	Rapport entre les oscillations du champ magn�tique et les fluctuations climatiques
Levinson, A.A. 02439 Geology 1568 Calgary	Exploration and environmental geochemistry	McCann, S.B. 02698 Geography 4897 McMaster	Morphology, sediments and dynamics of the shore zone
Lewis, J.E. 09559 Geography 4722 McGill	Urban climate and land-cover: Surface energy exchange as a function of urban terrain characteristics	McCaughy, J.H. 08271 Geography 4898 Queen's	Measurement and estimation of radiation and energy balance components for forested and logged surfaces
Lo, K.Y. 02478 Fac. of Eng. Sci. 1592 Western Ontario	Stresses and deformations in underground structures	McGowan, C. 08275 Zoology 4913 Toronto	Functional anatomy and phylogenetic relationship within selected vertebrates, recent and fossil
Logan, A. 02484 Geology 4751 New Brunswick	Sessile invertebrate communities of cryptic habitats, Caribbean and Bay of Fundy, and their paleoecological significance	McNutt, R.H. 02769 Geology 1773 McMaster	1) Geochemical studies of Archean rocks 2) Geochemical studies of Andean Mesozoic and Cenozoic rocks

List of grant awards in the earth sciences for 1979/80
Liste des subventions attribuées aux sciences de la Terre en 1979-80

Meagher, E.P. 02775 Geological Sciences 1778 British Columbia	Structure and crystal chemistry of silicate minerals	Muecke, G.K. 07165 Geology 5030 Dalhousie	1) Development of a computerized neutron activation analysis and radiometric laboratory for geochemical studies on rocks and minerals, 2) Petrochemical, isotopic and mineralogical studies on metamorphic and igneous rocks
Medioli, F.S. 02779 Geology 4938 Dalhousie	Foraminiferal distribution in coastal and inland marine water and its importance in the study of eustatic sea level rise and land subsidence	Muehlenbachs, K. 09026 Geology 1885 Alberta	Stable isotopes exchange studies and their application to geological problems
Menzies, J. 11065 Geography 6118 Brock	The mechanics of dextral formation	Muller, F. 02935 Geography 5034 McGill	Glaciological research on Axel Heiberg Island
Mereu, R.F. 02798 Geophysics 1796 Western Ontario	Deep and shallow seismic sounding research	Munro, D.S. 09565 Geography 1899 Toronto	Energy exchange and water loss from a swamp
Michel, B. 02809 Génie civil 4959 Laval	Mécanique des glaces	Murray, J.W. 02952 Inst. Oceanography 1912 British Columbia	Marine geology of inland waterways of southwestern British Columbia
Middleton, G.V. 02811 Geology 4962 McMaster	Field and experimental studies of clastic sediments	Murthy, G. 08297 Physics 5041 Memorial	Paleomagnetic and rock magnetic investigations of anorthositic and other intrusive rocks from Labrador, Greenland and the island of Newfoundland and the study of implications of these results
Mitchell, R.H. 08287 Geology 1831 Lakehead	Petrology and geochemistry of kimberlites and alkaline rocks	Naldrett, A.J. 02965 Geology 1921 Toronto	Field and experimental studies relating to the origin of ultramafic and mafic rocks and associated ore deposits containing Ni, Cu, and the Pt group elements
Mitchell, R.J. 06334 Civil Engineering 1832 Queen's	Behaviour of sensitive clay soils: 1) Behaviour of sensitive soils under cyclic loadings 2) Landslide mechanics, monitoring and management 3) Analysis and design of flexible tunnel linings in sensitive clays	Nelson, S.J. 02987 Geology 5066 Calgary	Palaeozoic correlations
Moore, J.M. 02879 Geology 1853 Carleton	1) Stratigraphy, structure and metamorphism of the Grenville Supergroup 2) Metamorphism of Precambrian volcanic rocks and ores	Nichol, I. 03005 Geological Sciences 1951 Queen's	Geochemical exploration in Canada
Moore, E.M. 10610 Oceanography 5006 Dalhousie	Trace metal marine geochemistry and Arctic hydrography	Nicholls, J.W. 04807 Geology 5075 Calgary	Mineralogy and origin of the White River ash, chemical analyses of rocks and minerals, molar volumes of pyroxenes, H ₂ O contents of magmas
Moore, T.R. 07798 Geography 5007 McGill	Soil forming processes and opal phytoliths in arctic and subarctic soils	Nkemdirim, L.C. 06353 Geography 5082 Calgary	Calgary's urban heat island
Morgan, A.V. 07496 Environmental Sci. 1861 Waterloo	An analysis of Late Pleistocene climatic fluctuations using fossil Coleoptera * with M.A.Morgan(Waterloo)	Noble, J.P. 03021 Geology 1962 New Brunswick	1) Silurian-Devonian stratigraphy and Paleoenvironments - N. Appalachians 2) Ecology of recent and fossil brachiopods
Morgan, M.A. 08500 Biology 1863 Waterloo	* Principal investigator A.V.Morgan(Waterloo)	Norris, G. 03030 Geology 1966 Toronto	Biostratigraphy, biogeography, and paleoecology of Mesozoic - Cenozoic microspores, dinoflagellates, and other microplankton
Morgenstern, W.R. 02888 Civil Engineering 1864 Alberta	1) Geotechnical behavior of frozen ground 2) Geotechnical behavior of Athabasca oil sands 3) Failure and movement mechanisms in landslides 4) Cavities in jointed rock	Nyland, E. 06746 Physics 1978 Alberta	Geodynamics of slow plate deformation at plate margins
Morton, R.D. 02911 Geology 5022 Alberta	Uranium deposits: their nature and genesis	Oke, T.R. 03068 Geography 1996 British Columbia	The energy and water balances of urban areas
Mossman, D.J. 07498 Geological Sciences 1880 Saskatchewan	Petrology of ore deposits in the Precambrian Shield	Oldenburg, D.W. 10089 Geophys./Astron. 5103 British Columbia	Inversion and inference of geophysical data
Mothersill, J.S. 02917 Geological Sciences 5026 Lakehead	1) The utilization of paleomagnetic columns for time-parallel correlation of post-glacial sediments and determination of sedimentation rates, Lake Superior 2) Dynamics of sedimentary transport and the evolution of a near-shore area of Lake Superior (Batchawana Bay)	Oldershaw, A.E. 04811 Geology 5104 Calgary	Diagenesis and economics potential of sedimentary rocks
Mountjoy, E.W. 02920 Geological Sciences 5028 McGill	Carbonate sedimentation and diagenesis Paleozoic reefs and platform margins	Ongley, E.D. 07815 Geography 5108 Queen's	Design and application of continuous-flow centrifugation in fluvial suspended sediment studies and sediment-related phosphorus, trace metal and contaminant flux
		Osborn, G.D. 08782 Geology 5117 Calgary	Pleistocene geology, geomorphology, engineering geology

List of grant awards in the earth sciences for 1979/80
 Liste des subventions attribuées aux sciences de la Terre en 1979-80

Pajari, G.E. 03119 2024	Geology New Brunswick	The geology and petrology of the Carmanville area, northeastern Newfoundland	Quigley, R.M. 03313 2162	Fac. of Eng. Sci. Western Ontario	1) Application of clay mineralogy and soil chemistry to problems of pollutant migration through clay soils, pipeline impact on soil fertility and soil bonding 2) continued study of cyclic bluff instability and coastal erosion on Lakes Erie and Huron
Palmer, H.C. 03124 2028	Geophysics Western Ontario	Paleomagnetic studies of precambrian rock units	Rafek, M. 11117 6492	Geological Sciences Saskatchewan	Micropaleontological study of the Triassic of the Canadian Cordillera
Papezik, V.S. 03129 5141	Geology Memorial	Geology and industrial mineral deposits of volcanic rocks in the Avalon Zone of the Appalachian orogenic belt	Ranalli, G. 07208 2185	Geology Carleton	Rheological properties of lithosphere and mantle and their bearing on geodynamic processes
Parslow, G.R. 04815 2039	Geological Sciences Regina	1) Evaluation of uranium distribution in lake water and sediment 2) Mineralogy, petrology & sulphide potential of layered gabbros in the Lynn Lake area 3) Uranium migration and deposition within the Athabasca formation	Rankin, D. 03342 2189	Physics Alberta	Magnetotellurics and micropulsations
Patterson, R.J. 09570 5159	Geological Sciences Queen's	Geochemical controls on the subsurface transport of potential ground water contaminants	Rast, N. 07532 5296	Geology New Brunswick	Structural profiles across the Caledonian-Appalachian Intercontinental orogenic belt
Pearce, G.W. 08786 5169	Geology Toronto	Magnetic measurements of terrestrial and lunar samples	Reardon, E.J. 09094 5309	Earth Sciences Waterloo	1) Soil column studies of the effectiveness of carbonate solutions in precipitating strontinite 2) Gaseous transport in the unsaturated zone
Pearce, T.H. 08316 5170	Geological Sciences Queen's	Petrology of Archean and analogous Phanerozoic igneous rocks	Reid, I.D. 11118 6493	Geology Dalhousie	Marine seismic studies of the Canadian margin and Arctic Ocean
Perrault, G. 03186 2075	Génie minéral Ecole Polytech.	Recherche en minéralogie, cristallographie et géochimie analytique	Reynolds, P.H. 04832 2233	Physics/Geology Dalhousie	K/Ar and ⁴⁰ Ar/ ³⁹ Ar geochronology, zircon geochronology and oxygen isotope geochemistry
Perry, D.G. 10091 5186	Geological Sciences British Columbia	Biostratigraphy, taxonomy, paleoecology of Siluro-Devonian brachiopods, conodonts, trilobites of northern Canada	Risk, M.J. 07220 5344	Geology McMaster	1) Responses of modern and ancient reefs to siltation 2) Depositional environment of the Cardium Sandstone, based on trace fossils
Pewcker, T.K. 06388 5200	Geography Simon Fraser	Quantitative terrain evaluation by computer	Riva, J. 03439 6748	Géologie Laval	Study of Ordovician graptolites (a continuing project)
Phillips, B.A.M. 06390 5205	Geography Lakehead	The immediate offshore zone - morphology, history and present processes, Ontario shore of Lake Superior	Roberts, M.C. 03453 2264	Geography Simon Fraser	The impact of urbanization on the hydrology of selected watersheds, Surrey, B.C.
Pickerill, R.K. 09923 5216	Geology New Brunswick	Paleontology, ichnology, sedimentology and stratigraphy of selected Paleozoic sequences in eastern Canada	Roberts, R.G. 03454 5350	Earth Sciences Waterloo	The alteration of the volcanic rocks associated with Archean massive sulphide deposits and gold deposits
Piper, D.J.W. 07827 2120	Geology Dalhousie	Quaternary history and sedimentology of the eastern Canadian continental margin	Robin, P.Y.F. 08833 5358	Geology Toronto	Structures, phase changes and physical properties in the Earth's crust and upper mantle
Platt, B.G. 09079 2126	Geology Lakehead	Petrogenetic studies of alkaline and related rocks	Rochester, M.G. 03481 2279	Physics Memorial	Theoretical solid-earth geophysics and planetary physics
Pond, G.S. 07527 5234	Inst. Oceanography British Columbia	Inlet and coastal circulation, dynamics and mixing	Roeder, P. 03487 2286	Geological Sciences Queen's	Electron probe and experimental studies of basaltic rocks
Pouliot, G. 03272 5238	Génie minéral Ecole Polytech.	Minéralogie et géochimie des principaux gîtes de fer titané dans les complexes anorthositiques du Québec	Rogerson, R.J. 08697 5376	Geology/Geography Memorial	Temperate glacier sedimentation
Pounder, E.R. 03273 5240	Physics McGill	Physical oceanography in the Arctic	Ross, J.V. 03512 2305	Geological Sciences British Columbia	A) Structural stratigraphic and metamorphic studies in south central British Columbia. B) Structural and mechanical properties of common silicate minerals
Price, A.G. 10094 5255	Geography Toronto	Snowmelt and runoff in a forest	Rouse, G.E. 03528 6274	Botany British Columbia	Palynology, stratigraphy and correlation of two tertiary coal basins of British Columbia
Price, R.A. 03288 5256	Geological Sciences Queen's	Cordilleran tectonics, and the nature and significance of variations in tectonic style	Rouse, W.R. 03529 2315	Geography McMaster	Energy and water budget studies in the tundra and subarctic
Pride, C.R. 10717 6491	Geology Cttawa	Rare earth element geochemistry applied to the study of migmatites	Roy, M. 06432 5401	Génie civil Laval	1) Pieux flottants dans les argiles sensibles 2) Développement des techniques de mesure in-situ
Protz, E. 03294 5263	Land Resource Sc Guelph	1) Genesis of Northern Ontario gleysolic, podzolic, cryosolic and organic soils 2) Quantification of chemical and physical changes on individual mineral grains during soil genesis 3) Quantification of soil structure			

List of grant awards in the earth sciences for 1979/80
Liste des subventions attribuées aux sciences de la Terre en 1979-80

Rucklidge, J.C. 03550 5406	Geology Toronto	Geological studies using X-ray and ultrasensitive analysis	Shoemaker, E.M. 03766 5543	Mathematics Simon Fraser	Applications of plasticity and viscoelasticity
Russell, D.J. 10721 8336	Earth Sciences Waterloo	Detection of mineralogical, geotechnical and geophysical changes during weathering of shales	Silvestri, V. 10888 5554	Génie civil Ecole Polytech.	Résistance au cisaillement à long terme et anisotropie des argiles sensibles de la mer Champlain
Russell, D.J. 10721 5413	Geology Windsor	Detection of mineralogical, geotechnical and geophysical changes during weathering of shales	Simony, P.S. 03790 6279	Geology Calgary	Structure of Mackie and Bonnington plutons
Russell, L.S. 03566 5415	Geology Toronto	The Cretaceous-Tertiary transition in central Alberta	Simpson, F. 09175 2485	Geology Windsor	Cratonic-interior sedimentation and related tectonic controls
Russell, R.D. 03567 5417	Geophys./Astron. British Columbia	1) Isotopic studies of the early history of the earth 2) Geophysical instrumentation	Sinclair, A.J. 03796 5562	Geological Sciences British Columbia	Mineral deposits of the Canadian Cordillera--rock geochemistry, geostatistics and genetic models
Rust, B.R. 03569 5419	Geology Ottawa	Depositional models for alluvial sedimentation	Singh, B. 11362 7890	Géographie Montréal	L'hydrométéorologie de la région de Radisson, du complexe La Grande - 2, de la Baie James
Rutherford, G.K. 03571 6275	Geography Queen's	Properties and distribution of soils of the Canadian Shield	Skevington, D. 10108 2497	Geology Memorial	Graptolite faunas and biostratigraphy of the North Atlantic region with emphasis on Western Newfoundland
Rutter, N.W. 09576 2344	Geology Alberta	Quaternary history of parts of Alberta, British Columbia and Yukon and development of amino acid racemization dating techniques	Skippen, G.B. 03814 2498	Geology Carleton	A field and experimental study of the metamorphism of pelitic and calc-silicate rocks
Sarjeant, W.A.S. 07855 5449	Geological Sciences Saskatchewan	Dinoflagellates and acritarchs of the Mesozoic: stratigraphical application in Western and Arctic Canada and use in intercontinental correlation	Sklash, M.G. 10727 5575	Geology Windsor	Environmental isotope and hydrometric investigation of the role of groundwater in storm runoff
Saunderson, H.C. 09838 5459	Geography Wilfrid Laurier	Sedimentology of the Damascus Esker, Ontario and experiments on the tunnel transformation of antidunes in gravel	Slawson, W.F. 03818 5581	Geophys./Astron. British Columbia	1) Oxygen isotopes in hydrological studies 2) Emanation of Radon-222 from the earth
Scarfe, C.H. 07858 5468	Geology Alberta	Physical properties and structure of silicate melts of geological interest	Slaymaker, H.O. 03819 5582	Geography British Columbia	Theoretical and applied significance of solute and sediment production, transport and yield in southern coast mountains
Schenk, P.E. 03660 2392	Geology Dalhousie	Sedimentologic-stratigraphic studies of the early through late Paleozoic sedimentary rock of Nova Scotia	Smith, D.G. 09649 5592	Geography Calgary	Field and lab work on fluvial processes, deposits, and sedimentology of the William River and Delta, N.W. Saskatchewan
Schloessin, H.H. 03667 2397	Geophysics Western Ontario	Physical properties of earth materials at mantle conditions	Smith, D.G.W. 03832 2510	Geology Alberta	Applications of the electron microprobe in mineralogy, petrology, economic geology and meteoritics
Schwarcz, H.P. 03683 2412	Geology McMaster	Isotopic geochemistry and Pleistocene geochronology	Smith, T.E. 04862 2526	Geology Windsor	Archean magmatism and tectonics: a geochemical study of the evolution of granitic rocks in the Superior Province and subsidiary projects
Schwartz, F.W. 08362 2414	Geology Alberta	Dispersion and mass transport in groundwater systems	Smylie, D.E. 03866 2530	Physics York	Dynamics of the earth
Schwartz, E.J. 11361 7889	Génie minéral Ecole Polytech.	Magnetic properties of sulphide ore deposits and their significance in magnetic prospecting (Noranda - Normetal)	Sonnenfeld, P. 03878 2547	Geology Windsor	Evaporite formation
Schwerdtner, W.M. 03688 5490	Geology Toronto	Paleostratigraphic analysis in the Canadian Shield	Spang, J.H. 08376 2550	Geology Calgary	Mechanical behavior of the thrust plates in the foothills and front ranges of the Canadian Rocky Mountains
Scott, S.D. 03336 2421	Geology Toronto	Petrology and geochemistry of sulfide ores and minerals	Spooner, E.T.C. 10729 5631	Geology Toronto	Geochemical and geological studies of economic mineral deposits
Seguin, M.K. 03707 5501	Géologie Laval	Paléomagnétisme des intrusifs dévoniens des Appalaches du sud du Québec	St-Julien, P. 04865 2569	Géol./minéralogie Laval	Contexte structural des complexes ophiolitiques des Appalaches du Québec
Salvadorai, A.P.S. 09580 5504	Civil Engineering Carleton	1) Soil-foundation interaction - plane strain and 3D tests 2) In-situ screw plate testing and laboratory vane testing	Starkey, J. 03930 2578	Geology Western Ontario	The petrofabric analysis of deformed rocks of known geological history by optical microscopy, X-ray diffraction and electron microscopy. The determination of deformation mechanisms, attendant geochemical changes and the structures of deformed crystals
Shaw, D.M. 03736 5524	Geology McMaster	Geochemical studies of minerals and rocks			
Shaw, J. 06784 2451	Geography Alberta	Sedimentology in lakes, rivers and by glaciers			
Shegelski, R.J. 10886 5529	Geology Lakehead	Precambrian sedimentation studies, N.W. Ontario			

List of grant awards in the earth sciences for 1979/80
 Liste des subventions attribuées aux sciences de la Terre en 1979-80

Stauffer, M.R. 03932 Geological Sciences 5655 Saskatchewan	Structures in rocks	Trzcienski, W.E. 08400 Génie minéral 2749 Ecole Polytech.	Etudes minéralogiques et pétrologiques à l'aide de la microsonde
Stearn, C.W. 03934 Geological Sciences 5656 McGill	Paleoecology of reefs	Turek, A. 07573 Geology 5831 Windsor	Geochronology of Lake Superior region
Steiner, J. 07276 Geology 5664 Alberta	Rb/Sr dating of Pre-Pleistocene tillites	Turnock, A.C. 04212 Earth Sciences 2765 Manitoba	Experimental mineralogy of pyroxene and oxides
Stesky, R.M. 09740 Geology 5669 Toronto	Seismic and mechanical properties of rocks at high pressure, temperature, and differential stress	Ulrych, T.J. 04219 Geophys./Astron. 2770 British Columbia	1) Application of communication theory to geophysics and astronomy 2) Interpretation and reduction of potential field data
Stevens, R.K. 07878 Geology 2594 Memorial	Paleozoic evolution of Newfoundland	Vaid, Y.P. 10331 Civil Engineering 5849 British Columbia	Stress-strain and strength properties (including time effects) and cyclic loading behavior of natural soils
Stewart, I.C.F. 09234 Physics 5672 Memorial	Seismotectonic studies of Newfoundland	Van de Poll, H.W. 08663 Geology 2789 New Brunswick	1) Palaeoclimatic influence on the economic geology and lithostratigraphy of the carboniferous succession of eastern Canada. 2) Sedimentation in the shallow marine coastal environment of the Northumberland Strait
Stimpson, B. 09847 Mineral Eng. 5679 Alberta	Fracture and strength of simulated rock masses with particular reference to mine pillars	Veizer, J. 08973 Geology 2804 Ottawa	1) Chemical evolution of sediments during the Precambrian 2) Geochemical facies indicators in carbonates 3) Recycling processes and their simulation
Stockey, R.A. 11072 Botany 6125 Alberta	Paleobotanical investigations in Canada	Walker, R.G. 04329 Geology 2845 McMaster	Development of clastic facies models
Strangway, D.W. 03989 Geology 5688 Toronto	Magnetic and electrical studies of geological significance	Wangersky, P.J. 04351 Oceanography 2862 Dalhousie	The carbon cycle in the open ocean
Stringer, P. 06797 Geology 5690 New Brunswick	Relation of cleavage to folding in the Caledonian-Appalachian orogenic belt	Wardlaw, N.C. 04358 Geology 5923 Calgary	Reservoir properties of sedimentary rocks
Strong, D.F. 07280 Geology 2614 Memorial	Metallogenic, geochemical, petrological and tectonic studies of the Appalachian-Caledonian Orogen	Warren, H.V. 04366 Geological Sciences 5928 British Columbia	Further uses for neutron activation in biogeochemical mineral exploration
Suckling, P.W. 11073 Geography 6126 Brandon	The thermal and radiation climatology of a small prairie city	Watkinson, D.H. 04375 Geology 5935 Carleton	Genesis of ore deposits
Symons, D.T.A. 06800 Geology 5723 Windsor	Paleomagnetic studies on the pre-Jurassic Geotectonic evolution of the Cordillera	Weaver, J.T. 04389 Physics 2886 Victoria	Electromagnetic induction in the earth and oceans
Syvitski, J.P.M. 11074 Geology 6127 Calgary	Sedimentological study of large-grained "megaflocs"	Webber, G.R. 04392 Geological Sciences 2888 McGill	Investigations in applied geochemistry
Tavenas, F.A. 06496 Génie civil 2662 Laval	1) Etude du comportement des argiles sensibles en état d'élasticité et de fluage 2) Application des concepts d'état limite aux calculs des ouvrages dans les argiles sensibles	Welsted, J.E. 05486 Geography 5962 Brandon	Rate of formation, migration, and abandonment of meanders
Taylor, C.H. 09236 Geography 2663 Trent	1) Runoff production in an inter-drumlin swale 2) Effects of urbanization on streamflow of a small basin in Peterborough, Ontario	West, G.P. 04429 Physics 2910 Toronto	Regional and applied geophysics
Teller, J.T. 06805 Earth Sciences 5758 Manitoba	Late Wisconsinan and Holocene sedimentary history of the Lake Manitoba basin	Westermann, G.E.G. 04432 Geology 2912 McMaster	Jurassic ammonites and cephalopod shell function
Terasmae, J. 04092 Geological Sciences 5761 Brock	Correlation of radiocarbon chronology and palynostratigraphy of postglacial lake sediments and peat	Westgate, J.A. 04433 Geology 5967 Toronto	Quaternary tephrochronology of western Canada and adjacent parts of Alaska
Thomson, S. 04125 Civil Engineering 2704 Alberta	A study of in-situ properties of stiff clay (tills) and clay shales and their application to engineering problems (tunnels)	Whitehead, R.E.S. 08974 Geology 6980 Laurentian	* Principal investigator J.F. Davies (Laurentian)
Trenbath, L.T. 04183 Geology 5816 New Brunswick	Factors affecting the crystallization of feldspar in synthetic and natural systems	Williams, H. 04475 Geology 5986 Memorial	Anatomy of an orogen
Tremblay, M. 10634 Génie minéral 5819 Ecole Polytech.	1) Recherche des métalloctes de la sous-région de Duval Québec 2) Minéralogie des minéraux indicateurs d'environnements	Williams-Jones, A.E. 10645 Geological Sciences 5991 McGill	An investigation of porphyry-type copper mineralization in the Gaspé region, Quebec
Trenhaile, A.S. 08398 Geography 2739 Windsor	Weathering and shore platform development in eastern Canada		

List of grant awards in the earth sciences for 1979/80
 Liste des subventions attribuées aux sciences de la Terre en 1979-80

Wilson, H.D.B. 04492 Earth Sciences 5996 Manitoba	1) The development of high grade metamorphic terrane and the associated orebodies 2) Continuation of work on gold and rare earth distribution in Archean volcanic rocks, and on the environments of nickel sulphide ore deposits	Yong, R. 04569 Civ Eng/App Mech 6047 McGill	Stability of soil structural units relative to transient and natural environmental stresses
Wilson, M.V.H. 09035 Zoology 2949 Alberta	Late Cretaceous and early Tertiary fishes of western North America	York, D. 04571 Physics 6049 Toronto	Isotope studies and age determinations
Woo, M.K. 08032 Geography 2963 McMaster	Hydrology of nival-regime basins in the high Arctic	Young, G.M. 04576 Geology 2995 Western Ontario	Studies of Precambrian supracrustal rocks
Wright, J.A. 06557 Physics 6030 Memorial	Geothermal and geomagnetic measurements in Newfoundland & Labrador	Zentilli, M. 08820 Geology 3009 Dalhousie	1) Metallogenic studies in Nova Scotia. 2) Metallogenic studies in Central Andes
Wynne-Edwards, H.B. 04551 Geological Sciences 2984 British Columbia	Geological evolution of Canadian Continental Crust	Zodrow, E.L. 08667 Geology 6079 St. F. Xavier	Hydrated sulfates in coal of Sydney Coalfield

RESEARCHER INDEX/INDEX DES CHERCHEURS

A

Aaltonen, R.A., 851
 Abbey, S., 125, 126
 Achab, A., 712, 713, 957
 Adshed, J.D., 988
 Agterberg, F.P., 244, 245
 Aitken, J.D., 1027, 1048
 Allard, G.O., 835
 Allen, J.M., 754
 Alley, D.W., 852
 Alt, B., 399
 Amajor, L.C., 559
 Aming, A.J., 332
 Amos, C.L., 989, 990
 Amukun, S.E., 45
 Anderson, G.M., 189, 190, 798, 808, 829
 Anderson, J.C., 108, 362
 Anderson, T., 966
 Anderson, T.W., 853
 Andriashek, L.D., 854, 855, 881, 882
 Appleyard, E.C., 193a, 194, 195, 502
 Arbour, G., 954
 Arima, M., 757-760
 Armstrong, R.L., 72, 216-222, 239, 1179
 Arndt, N.T., 194a, 766, 767
 Arnold, J., 325
 Arnold, L.D., 439
 Artein, P.C., 354
 Artzner, D., 714
 Ascoli, P., 1087
 Aspler, L., 956
 Au, D., 321
 Ayres, L.D., 508, 770, 775, 1175, 1177
 Aziz, K., 357

B

Baadsgaard, H., 223-226, 831
 Bachinski, D.J., 526, 534, 572
 Bachinski, S.W., 227, 768, 812
 Baer, A.J., 769, 795, 1141, 1147
 Bailes, A.H., 16, 17
 Bailey, R.C., 265
 Bainey, S.J., 486
 Baker, C.L., 856
 Baker, T.H.W., 359
 Balakrishna, T.S., 438
 Bald, R.C., 770
 Ballivy, G., 387
 Bamber, E.W., 632
 Bambrick, J., 285, 286
 Bannatyne, B.B., 479
 Banner, J.A., 435
 Baragar, W.R.A., 195a, 819
 Barker, J.F., 403, 560
 Barlow, R.B., 268
 Barnes, C.R., 560, 633-636, 720, 1049
 Barnes, M.A., 130, 131
 Barnes, S.J., 503
 Barnes, W.C., 131, 1018
 Barnett, P.J., 857, 858
 Barr, S.M., 771-773, 778
 Bars, M.S., 715
 Bartholomew, P.W., 755
 Bassett, M.G., 636
 Baxter, A., 843
 Beaumier, M.B., 196
 Bedard, J., 206
 Beerwald, A.R.S., 437
 Béland, J., 734, 1148
 Belanger, J.R., 953
 Bell, K.A., 378
 Bell, K.E., 480
 Bell, R.T., 504
 Bellamy, K., 404
 Bennion, D.W., 561
 Berger, G.W., 234
 Bergeron, M., 179
 Bergstrom, S.M., 636
 Berndt, K., 774
 Bertrand, R., 132, 146, 957
 Biczok, J., 775
 Blackburn, C.E., 46, 1044
 Blackwell, B., 230
 Blackwood, R.F., 24
 Blais, R.A., 246
 Blake, W., Jr., 859
 Blasco, S.M., 443, 860
 Blusson, S.L., 64
 Bode, A., 861
 Boily, M., 133
 Boissonnault, P., 262
 Bolton, T.E., 637, 1050, 1051
 Bond, W.D., 47
 Booth, G.W., 776
 Borneuf, D.M., 405, 406, 428
 Bornhold, B.D., 991, 992
 Borradaile, G.J., 1162

Bostock, H.H., 85, 777
 Both, R.A., 626
 Bouchard, M.A., 744, 862-864, 942
 Bouchard, M.F., 1149
 Bourbonniere, R.A., 134
 Bourque, P.A., 1052
 Bower, M.E., 287
 Bowman, W.S., 129
 Bowyer-Beaudoin, A., 1024
 Boyle, D.R., 157
 Boyle, R.W., 271
 Bozozuk, M., 381
 Brar, N.S., 344
 Braun, W.K., 638
 Breck, W.G., 119
 Bright, E.G., 48
 Bristol, C.C., 505
 Brooke, M.M., 638
 Brookes, I., 716
 Brookes, L.A., 865
 Brookes, L.A., 909
 Brooks, C., 133, 135-138, 140, 143-145, 149, 150, 152, 422
 Broster, B.E., 866, 867, 875
 Broughton, P., 456
 Brown, E.H., 218
 Brown, H.M., 139
 Brown, R.J.E., 360
 Brown, R.L., 219
 Brown, T.D., 457
 Brun, J., 600, 1053
 Bryan, R.B., 261
 Bryan, W.B., 845
 Bryndzia, T., 184
 Buchanan, R.M., 480
 Buckley, D.E., 993
 Bujak, J., 717
 Burke, K.B.S., 272-274
 Bursnall, J.T., 1166
 Burton, D.M., 506
 Burwash, R.A., 774, 820
 Bustin, M., 458
 Bustin, R.M., 474
 Butler, A.J., 158
 Butt, K.A., 807
 Byrne, W., 868

C

Cabri, L.J., 597, 598
 Calon, T.J., 1125, 1126, 1130
 Cameron, A.R., 459-461
 Cameron, B.E.B., 639
 Cameron, E.M., 159
 Campbell, F.H.A., 86, 1028
 Campbell, R.B., 65, 1115
 Campbell, R.M., 778
 Campbell, S.W., 587
 Card, K.D., 102
 Carignan, J., 160
 Carroll, R.L., 706, 707
 Carson, D.M., 633, 1083
 Carson, M.A., 249
 Carter, M.W., 49
 Carter, N.C., 10
 Carter, T.P., 507
 Casey, J.J., 928
 Catto, N.R., 868
 Caty, J-L., 57
 Cawker, K.B., 1024
 Cecile, M.P., 1054
 Cermignani, C., 190
 Cerny, P., 599, 615, 630, 779, 780, 793
 Cerroici, W.J., 407-409
 Chagnon, A., 146, 600, 601, 957
 Chagnon, J-Y., 345, 346, 389
 Champigny, N., 588
 Chance, P., 781
 Chandler, F.W., 958, 959, 1029
 Chandra, J., 274
 Chaplin, C., 224
 Charbonneau, B.W., 275
 Charbonneau, J.-M., 56, 58
 Charbonneau, R., 140
 Charlesworth, H.A.K., 1113
 Chase, R.L., 444
 Chatterton, B.D.E., 640
 Chauvin, S.C., 361, 869
 Chauvin, L., 870
 Chen, T.T., 602
 Cherry, J., 412
 Cherry, M.E., 603, 756, 782, 783, 807
 Cheshire, S.G., 960
 Chew, H.A.M., 397
 Chorlton, L.B., 1055
 Chouinard, N., 174
 Christie, K.W., 288, 289
 Christie, R.L., 481, 961, 1056

Christopher, P.A., 8
 Church, B.N., 462, 1176
 Chute, M.E., 508
 Ciavaglia, L., 476, 567-569
 Ciezielski, A., 87
 Cimon, J., 511, 529, 1033, 1154
 Clague, J.J., 871, 1158
 Clark, G.S., 770
 Clark, P.U., 872
 Clark, T., 57
 Clarkson, J.W., 398
 Clavet, D., 250
 Clovine, A.C., 507
 Clowes, R.M., 321, 322, 330
 Cockburn, D., 346
 Cocker, J., 211
 Coker, W.B., 161
 Coleman, L.C., 194a, 767
 Colman-Sadd, S.P., 25
 Colvine, A.C., 550, 579
 Colwell, J.A., 546, 571, 778, 784
 Coniglio, M., 1002
 Cook, D.G., 35, 1159
 Cook, R., 444
 Coombe, W., 509
 Cooper, B.J., 636
 Copeland, M.J., 641
 Corkery, M.T., 79
 Cormier, R.F., 807
 Costa, U.R., 510
 Cousineau, P., 511
 Crawford, R.J., 922, 940
 Creaney, S., 141, 463, 464, 562
 Crevier, M., 173
 Crosbie, M.L.T., 873
 Crossley, D.J., 334
 Crowder, A., 119
 Crowe, G.G., 1116
 Cruden, D.M., 367, 368, 371
 Culshaw, N., 1142
 Cumming, G.L., 225
 Currie, J.B., 563, 564, 1163
 Currier, K.L., 31, 785, 786
 Currie, P., 747
 Currie, R.G., 290

D

Dagbert, M., 512, 573
 Dalal, G.P., 437
 Daniels, D.L., 316, 319
 Danner, W.L., 1117
 Daoud, M., 230
 Daoust, G., 573
 Darling, R., 160, 162, 181, 182
 Davenport, P.H., 158, 163, 176
 David, M., 160
 David, P., 994
 Davidson, A., 787, 788
 Davies, J.B., 127
 Davies, J.L., 537
 Davies, L., 582
 Davis, A.M., 718
 Davis, G., 219
 Davis, J.L., 276
 Davison, C.C., 410, 411
 Davison, W.L., 62
 Dawson, K.M., 574
 Dawson, K.R., 513, 514
 Day, T.J., 995
 Dean, R.S., 480
 de Cserna, Z., 216
 Delabio, R.N., 613
 Delandro, W., 332
 Delisle, C.E., 862
 Delorme, L.D., 109
 Demers, B., 347
 Dennell, R.W., 909
 Denton, D.D., 744, 864
 Desjardins, M., 132, 978
 Desmarais, G., 251
 Dey, S., 314
 Dick, H.B.J., 845
 Dickson, W.L., 164
 DiLabio, R.N.W., 515
 Dillon-Leitch, H., 1135
 Dimma, D., 119
 Dion, D.-J., 323, 382, 383
 Dixon, J., 1088
 Dixon, O.A., 642, 670, 675, 834, 1071, 1076
 Dobell, P., 737, 738
 Donaldson, J.A., 719, 956, 962, 963
 Donnelly, J.K., 561
 Dosso, H.W., 265
 Dostal, J., 772
 Douville, S., 348
 Downes, M.J., 1030
 Doyle, P.J., 202
 Dredge, L.A., 874
 Dreimanis, A., 228, 851, 866, 867, 875, 876, 891, 892, 898, 910, 938

Dressler, B.O., 836
 Druce, E., 636
 Dubé, C., 58
 Dubois, J.M.M., 251-256
 Dudley, J.S., 821
 Duff, P. McL. D., 1089
 Duffield, S.L., 634, 720
 Duke, J.M., 604
 Duke, N., 558
 Dumitriu, M., 246
 Dunn, C.E., 142, 197
 Dunning, G.R., 177
 Dunsmore, H.E., 516
 Dusanowskyj, T.H., 318
 Dusseault, M.B., 384
 Dyck, A.V., 266
 Dyck, A., 198
 Dyke, A.S., 877
 Dyke, L.D., 369

E

Eade, K.E., 36, 88
 Eastwood, G.E.P., 9
 Eaton, D., 520
 Eden, W.J., 381
 Edgar, A.D., 199, 757-760, 781, 792, 796, 799, 827
 Edlund, S.A., 721, 878
 Edmund, A.G., 696-701
 Edwards, G.R., 200
 Edwards, T.W.D., 996
 Edwards, W.A.D., 482-485
 Egboka, B.C.E., 412
 Egginton, P.A., 110, 349
 Eisbacher, G.H., 370, 1031, 1032
 Edkstrand, O.R., 517
 Elias, P., 25
 Elias, R.J., 643
 Ellis, R.M., 322
 Ellwood, D.J., 201
 Elson, J.A., 863
 Embry, A.F., 1090, 1091, 1138
 Ermslie, R.F., 789-791
 Engi, M., 761
 Eriks, S., 206
 Ermanovics, I., 80
 Ernst, R., 291
 Esquevin, J.S., 601
 Esterby, S.E., 109
 Evans, L.J., 865
 Evans, F., 202
 Evans, M., 226
 Evans, S., 371
 Ewing, T.G., 72

F

Fabbri, A.G., 247
 Fähræus, L.E., 634
 Fahrig, W.F., 292, 293
 Fairbairn, D.M., 68-70
 Falconer, R.K.H., 1136
 Farkos, A., 626
 Farquhar, R.M., 229
 Farr, B., 184
 Farvolden, R.N., 412, 413
 Fasola, A., 722
 Fawcett, J.J., 507, 754, 776, 818, 833
 Feenstra, B.H., 879
 Fensome, R.A., 746
 Fenton, M., 855
 Fenton, M.M., 880-882
 Ferguson, R.B., 607
 Ferguson, L.A., 644
 Ferreira, W.S., 1177
 Fillon, R.H., 883, 884, 997
 Finn, G., 792
 Fisher, D.A., 399
 Fitzgerald, W.D., 885
 Flach, P.D., 964
 Fiavelle, P.A., 410, 411
 Fleet, M.E., 539
 Fletcher, I.R., 229
 Fletcher, W.K., 202-204
 Fogarasi, S., 414
 Foland, K.A., 227
 Foley, S., 177
 Folinsbee, R.A., 277
 Fong, C., 967
 Ford, D.C., 230, 257, 415
 Forester, R.W., 194a, 205
 Fortey, R.A., 679
 Foscolos, A.E., 165, 605
 Fournier, D., 280
 Fowler, S.P., 638
 Fox, J.C., 484, 485
 Francis, D.M., 206

Franconi, A., 56, 58, 59
 Franklin, J.M., 575
 Frarey, M.J., 231
 Fraser, J.A., 822
 Frederking, R.M.W., 391
 Freeze, R.A., 416, 417
 Frind, E.O., 413
 Frisch, T., 89, 823
 Frith, R.A., 90, 91
 Fritz, P., 215, 412, 560
 Fritz, W.H., 1057
 Froese, E., 824
 Fryer, B.J., 1181
 Fuh, Tsu-Min, 240
 Fulton, R.J., 256, 886, 887
 Fumerton, S.L., 50
 Furimsky, E.E., 154
 Fyfe, W.S., 166
 Fyffe, L.R., 807, 1166
 Fyson, W.K., 759, 1135, 1142, 1156, 1164

G

Gabert, G.M., 418
 Gaboury, B., 558
 Gabrielse, H., 73, 74
 Gadd, N.R., 350, 888
 Gait, R., 631
 Gagnon, G., 616
 Gagnon, Y., 1033
 Gale, G.H., 576
 Galopin, C., 280
 Gandhi, S.S., 518
 Gangloff, P., 238
 Gannon, E.M., 727, 751
 Gariepy, C., 143, 144, 150, 844, 1058
 Garven, G., 416
 Gascoyne, M., 230
 Gauthier, C., 889
 Gauthier, G., 145
 Gauthier, M., 519
 Gauthier, N., 800
 Gauthier, R., 258, 745
 Gauthier, R.C., 890
 Geddes, R.S., 891
 Geissman, J., 294
 Geldsetzer, H.H.J., 1059, 1060
 Gélinas, L., 160, 181, 800, 803, 844
 Gell, A.W., 108, 362
 Geller, L., 372
 Gendzwill, D.J., 267, 324, 325, 1006, 1157
 George, A.E., 154
 Getsinger, J.S., 825
 Ghent, E.D., 821, 832, 1042
 Gibbard, P.L., 875, 892
 Gibson, D.W., 1092, 1093
 Gilbert, H.P., 21, 1178
 Gilbert, R., 998
 Gilboj, C.F., 104
 Gilchrist, R.D., 1089, 1094
 Gill, J.F., 364
 Gillespie, R.T., 45
 Giraud, P., 59
 Glaister, R.P., 965, 977
 Globensky, Y., 60
 Goad, B.E., 780, 793
 Goble, R., 192
 Godfrey, J.D., 1-6, 295, 826, 831
 Godfrey, S., 1127
 Godwin, C.I., 167, 221, 232, 233, 520-522
 Goff, S.P., 211
 Goldsmith, L.B., 598
 Goodfellow, W.D., 207, 208
 Goodrich, L.E., 363, 365
 Gordey, S.P., 92
 Gordon, J.B., 538, 557
 Gordon, T.M., 794
 Gorman, B.E., 827
 Gorman, W.A., 893
 Gorton, M.P., 191, 776
 Gorzynski, C., 521
 Gosson, C.M.C., 68
 Gould, C.E.G., 596
 Gower, C.F., 81
 Gradstein, F.M., 645, 646
 Graham, B.W., 419
 Graham, P.S.W., 465
 Gransden, J.F., 457
 Grant, A.C., 565
 Grant, D.R., 894-897
 Grastey, R.L., 278
 Gray, J.T., 258, 259
 Greenhouse, J.P., 265, 338, 904
 Greenwood, B., 260, 261, 445, 999-1001
 Greenwood, H.J., 528, 755, 761-763, 825, 1119
 Grice, R.H., 351

Grieve, D.A., 477
 Griffin, W.L., 838
 Griffiths, J.R., 577, 1165
 Grill, E.V., 444
 Grisak, G.E., 410, 411, 429
 Groom, H., 497
 Gross, G.A., 578
 Gross, H., 395
 Grunsky, E.C., 241
 Gunter, W.D., 806
 Gupta, V.K., 318
 Gwyn, Q.H.J., 255, 262

H

Habib, M.K., 795
 Hackbarth, D.A., 420
 Hacquebard, P.A., 466
 Hadjitofi, M., 561
 Haince, S., 525
 Hajnal, Z., 325
 Hale, W.E., 556
 Hall, D.H., 296, 297, 326
 Hall, J.M., 446, 451
 Hall, R.L., 647
 Halls, H.C., 291, 298, 299, 654
 Hamilton, R., 922
 Hamilton, T.S., 928
 Hamilton, W.N., 242, 486, 523
 Hancock, R.V.G., 192
 Hann, B., 907
 Hanna, J.C., 648
 Hansen, K., 444
 Harakal, J.E., 217
 Harper, C.T., 524
 Harrison, R.S., 1002
 Hart, S.R., 149
 Harvey, L.D.D., 263
 Hattori, K., 168-170
 Haworth, R.T., 316, 319, 327
 Hawthorne, F.C., 606, 607
 Hayatsu, A., 300
 Hebda, R.J., 905, 906
 Hebert, R., 525
 Heginbottom, J.A., 352
 Henderson, J.B., 37, 38, 93
 Henderson, J.R., 1034
 Henderson, P.H., 768
 Hendrie, L.K., 111
 Herd, R.K., 18, 26
 Herget, G., 373
 Heroux, Y., 146, 957
 Hesse, R.F., 966-968, 1003, 1004
 Hétu, B., 258
 Heywood, W.W., 39, 94
 Hibbard, J.P., 27
 Hibbs, D.C., 1126
 Hicock, R.P., 875
 Hicock, S.R., 898
 Hill, J., 796
 Hill, J.D., 82
 Hill, K.C., 1113
 Hills, L.V., 728
 Hocq, M., 1150
 Hodder, R.W., 172, 200, 539, 1181
 Hodgson, C.B.P., 500
 Hodgson, D.A., 40, 899
 Hodyck, J.P., 300
 Hoffman, P.F., 41, 95, 1035
 Hofmann, H., 1036, 1061
 Hogarth, D.D., 837-839
 Holdsworth, G., 396
 Holland, K., 1024
 Holmes, G., 203
 Hopkins, W.S., Jr., 723, 724
 Hora, Z.D., 462, 487, 488
 Horodyski, R.J., 719
 Horsky, S., 596
 Houghton, R.L., 211
 Houle, A., 512
 Howie, R.D., 1082
 Hoy, T., 1037, 1118
 Hsu, D., 301
 Hubert, C., 734, 1058, 1148, 1166
 Hubregtsi, J.J.M.W., 828
 Hudec, P.P., 374-376
 Hughes, J.D., 467
 Hughes, O.L., 385, 900, 901
 Hughson, M.R., 621
 Humbert, L., 957
 Hunter, J.A.M., 328
 Huntley, D.J., 234
 Hutcheon, I.E., 147
 Hutchinson, R.W., 172, 186, 510, 539, 555
 Hutchison, M.W., 626
 Hutt, G., 228
 Hyde, R.S., 28
 Hynes, A.J., 206

I

Imreh, L., 525
 Inch, K.J., 421
 Innes, D.G., 579
 Innis, J., 1063
 Ioannides, N.S., 725
 Gross, G.A., 578
 Irving, E., 581
 Islam, S., 967
 Iwuagwu, J.C., 566

J

Jackson, G.D., 96, 97, 1038
 Jackson, L.E., Jr., 112, 113, 903
 Jackson, R.E., 421
 Jackson, T.A., 797
 Jagdat, R., 344
 Jambor, J.L., 608
 James, D.P., 977
 Jamieson, H., 765
 Jansa, L.F., 1005, 1095
 Jansonius, J., 762-728
 Jarrett, P.M., 358
 Jayasinghe, N.R., 29
 Jeletzky, J.A., 1096, 1097
 Jensen, L.S., 1039
 Jetté, H., 745
 Johari, G.P., 397
 Johnson, M.D., 500
 Johnson, W.M., 127
 Johnston, G.H., 363-365
 Johnston, P.F., 638
 Johnston, W.G.Q., 105
 Jonasson, I.R., 148, 171
 Jones, B., 248, 649, 834
 Jones, S.J., 397
 Jopling, A.V., 263, 404, 1010, 1011
 Jorgensen, J.C., 457
 Jull, R.K., 637
 Juras, S.J., 526

K

Kalogeropoulos, S., 184, 185
 Kamenka, L.A., 114
 Karakostanoglou, J.K., 230
 Karrow, P.F., 215, 413, 872, 885, 904-907, 925, 926, 950
 Karst, R.H., 468, 1089, 1098
 Kato, T., 612
 Kean, B.F., 29
 Kearney, M.S., 1024
 Keen, C.E., 329
 Kelly, S.A., 69, 70
 Kemp, R., 1026
 Kennedy, D., 1128
 Keppie, J.D., 784, 1166
 Kerans, C., 719, 962
 Kerr, J.W., 42, 43
 Kerrich, R., 166, 172, 186, 209, 539
 Khan, S., 297
 Kilby, W.E., 1113
 Kilius, L.C., 191
 Killeen, P.G., 339
 Kim, C., 351
 King, L.H., 1167
 King, M.S., 340, 380
 King, R.H., 1023, 1024
 Kingston, M.S., 1023
 Kirby, F., 496
 Kirkham, R.V., 527
 Kish, L., 173
 Kissin, S.A., 580, 609
 Klassen, R.A., 908
 Klassen, R.A., 908
 Klassen, R.W., 66
 Klein, K.P., 637, 1064
 Klepachi, D.W., 1119
 Knapp, D., 1129
 Knight, D., 558
 Knight, I., 30
 Knox, A.W., 210
 Kobiuk, D.R., 650-654
 Koerner, R.M., 399
 Kopf-Johnson, A., 242
 Koster, E.H., 1006, 1007
 Krag, P., 798
 Kramers, J.W., 969
 Kretschmar, U., 840
 Kubler, B., 132
 Kuehner, S., 799
 Kukulova-Peck, J., 655
 Kumarapeli, S., 1168
 Kupsch, W.O., 702, 756, 852, 912, 929
 Kwong, Y.T.J., 528
 Kybett, B.D., 849

L

Labelle, C., 258
 Lajoie, J., 800
 Lajtai, E.Z., 377
 Lalonde, J.P., 174, 196
 Lambert, M.B., 801, 802
 Lambert, R. St. J., 225
 Lamothe, D., 841
 Lamothe, M., 876
 Landing, E., 633, 657, 679
 Langdon, G.S., 177
 Langenberg, C.W., 5, 6, 295, 826, 831, 1114
 Langford, F.F., 1039
 Langham, E.J., 395
 Laplante, R., 617
 Large, P., 497
 LaSalle, P., 914
 Last, W., 1020
 Last, W.M., 970
 Latham, A.G., 230
 LaTour, T.E., 175
 Laurin, A.F., 59
 Laurin, J., 525
 Lauriol, B., 259
 Laverdure, L., 280
 Law, K.T., 381
 Lawton, D.C., 320
 Lebus, J., 388, 389
 LeCheminant, A.N., 98, 99, 776
 Leduc, A., 525
 Leduc, M., 529
 Lefebvre, G., 347, 348, 353, 355
 Legall, G., 560
 Legault, J.A., 634, 720, 729-731
 Legun, A.S., 971
 Lesters, M., 829
 Lenton, P., 79
 Lenz, A.C., 656, 662
 Lerbekmo, J.F., 226, 302, 559, 566
 Lespérance, P.J., 734, 1065, 1148
 Letros, S., 285, 286
 Levine, L.D., 909
 Levinson, A.A., 210
 Levy, S., 330
 Lewis, A.J., 203
 Lewis, C.F.M., 447
 Lewis, E.O., 118
 Li, R., 426
 Lichti-Federovich, S., 732
 Litherland, A.E., 191
 Liu, K.B., 718
 Liverman, D., 1013
 Locat, J., 353
 Logan, A., 448
 Loncarevic, B.D., 1169
 Long, D.G.F., 469
 Longiaru, S., 1170
 Longstaffe, F., 225
 Lorsche, J.A., 972
 Luckman, B.H., 1024
 Ludden, J.N., 144, 150, 152, 182, 803, 842-845
 Ludvigsen, R., 657-661, 678, 687, 694, 695
 Luk, S.H., 264
 Lupien, C., 354
 Luternauer, J.L., 1008, 1009
 Lydon, J.W., 530
 Lynas, C.M.T., 1130
 Lynch, K., 1010
 Lytviak, A.T., 422-424

M

McAllister, A.L., 506, 537, 556, 582
 McAndrews, J.H., 716, 865
 McArthur, G., 243
 McCabe, H.R., 1066
 McCann, J., 618
 McCarter, P., 550
 McCung, D.M., 393
 McConnell, J.W., 176
 McCourt, G., 911
 McCracken, A.D., 634, 662
 MacDonald, A.S., 546, 772
 MacDonald, C.A., 592
 MacDonald, D.E., 489, 490
 MacDonald, H.G., 701
 MacDonald, J.A., 221
 MacDonald, M.M.A., 909
 MacDonald, R., 279
 Macek, J.J., 19
 McGillivray, D.G., 260
 McGlynn, J.C., 100, 303, 1040, 1041
 McGregor, D.C., 733
 McGugan, A., 663
 Machado, N., 149, 150
 MacIntosh, D., 613
 MacIntyre, D.G., 531

- Mackasey, W.O., 45, 52
 McLaren, G.P., 1121
 McLaren, P., 1014
 McLaughlin, B., 119
 McLaws, I.J., 491
 MacLean, A., 426
 MacLean, B., 449
 MacLean, J.R., 470
 MacLellan, E.H., 764
 McMillan, R.K., 341
 McMillan, W.J., 10, 221
 McNamara, S.J., 912
 McNeil, D.H., 664
 MacNeill, R.H., 913
 MacPhee, J.A., 475, 476
 MacQuarrie, R.R., 846
 MacTaggart, K.C., 72
 Macy, T., 425, 426
 Malpas, J.G., 177
 Mamet, B., 734
 Marchioni, D.L., 471-473
 Martignole, J., 1151-1153
 Martineau, G., 914
 Martineau, Y., 1131
 Masran, T.C., 741
 Massé, P., 1011
 Matheson, A., 462
 Mathews, W.H., 72, 235, 474
 Mathison, E.J., 638
 Matile, G., 497
 Matsueda, H., 612
 Matthews, J.V., Jr., 665
 Maurice, O.D., 57
 Maurice, Y.T., 178
 May, R.W., 248, 910, 911, 1012, 1013
 Mayr, U., 1067
 Mellinger, M., 610
 Merrill, G.K., 688
 Meyn, H.D., 532, 533
 Miall, A.D., 973, 974, 1068, 1111
 Millar, T., 296, 297
 Miller, B.B., 906
 Miller, R.F., 915
 Mills, P.M., 257
 Milne, V.G., 836, 1039, 1143
 Milner, C.W.D., 151
 Mirkovich, V.V., 356, 378
 Misch, P., 218
 Missan, H., 243
 Mitchell, P., 708
 Mitchell, R.H., 804
 Mittler, P.R., 1000, 1001
 Miura, Y., 611, 612, 625
 Mohammed, S.K., 273
 Mokievsky-Zubok, O., 414
 Monger, J.W.H., 1069, 1099
 Montgomery, D.S., 154
 Montgomery, W.J., 457
 Moon, W., 331, 332
 Moore, J.M., 839
 Moore, R.G., 561, 990
 Moore, T.R., 1025
 Moran, S.R., 71, 425, 426, 882, 917
 Morgan, A., 666, 907
 Morgan, A.V., 666, 915
 Morgan, J., 1172
 Morgan, W.C., 101
 Morin, R.M., 354
 Morogan, T., 967
 Morrow, D.W., 1070
 Morton, R.D., 490
 Mossman, D.J., 610, 613, 614, 747
 Mossop, G.D., 964, 975
 Mott, R.J., 735
 Muehlenbachs, K., 169, 170, 211, 427, 450
 Muggridge, W.W., 27
 Muir, I., 976
 Muller, J.E., 11, 222
 Munro, D.S., 115
 Murray, J.W., 444
- N**
- Nahnybida, C., 147
 Nakawo, M., 391
 Naldrett, A.J., 183, 503, 552, 847
 Nambudiri, E.M.V., 1020
 Nandi, B.N., 475, 476, 567-569
 Nantel, S., 1151
 Narbonne, G.M., 834, 1071
 Nassichuk, W.W., 1072, 1073
 Nastasa, N., 420
 Nelson, G.E., 534
 Nelson, H.W., 963, 977
 Nicholls, J., 805
 Nielsen, E., 497
 Nielsen, P.A., 830, 831
 Niewaber, W., 265
 Nixon, G.T., 1179
- Noble, J.P.A., 667
 Nord, G., 635
 Norford, B.S., 1049, 1074
 Norris, A.W., 668
 Norris, D.K., 67, 1160
 Norris, G., 714, 722, 736-738, 743
 North, F.K., 581
 Nowlan, G.S., 634, 669
 Nunes, P.D., 1181
- O**
- O'Beirne, A.M., 773
 Ogunyomi, O., 967
 Okulitch, A.V., 1075, 1137
 Ollerenshaw, N.C., 7, 1120
 Olson, D.G., 304
 Ommann, C.S.L., 398
 O'Reilly, G.A., 773
 Osadetz, K.G., 1138
 Overton, A., 533
 Owsiacski, L., 582
 Ozoray, G., 406, 423, 424, 428
 Ozoray, J., 206
- P**
- Packard, J.J., 1076
 Page, R.O., 51
 Pajari, G.E., Jr., 31, 782, 783, 806, 807
 Palmer, H.C., 299
 Palmer, J.H.L., 317, 379
 Pandit, B.I., 267, 340
 Panteleyev, A., 535
 Parameswaran, V.R., 366
 Parent, M., 876
 Parkins, W.G., 670
 Parnandi, M., 399
 Parrish, R.R., 219, 220
 Parry, S.J., 768
 Paterson, W.S.B., 399
 Patterson, J.G., 1042
 Patterson, R.J., 421
 Paul, B.J., 615, 780
 Pearson, D.E., 477
 Pearson, J.G., 536
 Pedder, A.E.H., 671, 1077
 Pelletier, B.R., 916, 1015
 Penner, E., 363, 386
 Perla, R.I., 400
 Perrault, G., 616-619
 Pesonen, L.J., 299
 Peterson, B.N., 492-495
 Petruk, W., 620, 621
 Phiubert, A.P., 355
 Pickens, J.F., 410, 411, 429
 Pickerill, R.K., 31, 672
 Pigeon, Y., 152
 Pitcher, D.H., 268
 Plant, A.G., 614, 622
 Platt, R.G., 804
 Plint-Geberl, H.A., 673, 689
 Pocock, S.A.J., 739-742, 751
 Polan, K., 1081
 Poplawski, S., 743, 907
 Potter, D., 584
 Potter, J., 849
 Pouliot, G., 179
 Poulton, T.P., 1100, 1101
 Pourks, M., 242
 Powell, T.G., 153, 570
 Power, J.M., 392
 Prasad, S., 1003
 Prescott, J., 206
 Present, R., 905
 Preto, V.A., 180, 221, 1121
 Price, A.G., 111, 261
 Price, J.T., 457
 Price, L.L., 1102
 Price, M.J., 444
 Proudfoot, D.N., 917, 918
 Provencal, J., 387
 Pugh, D.C., 1139
 Pyke, D., 49, 187
 Pyke, D.R., 809, 1039, 1143
- Q**
- Quick, A., 315
- R**
- Raeside, R., 832
 Rafoek, M.B., 674
 Rahmani, R.A., 478
 Ralph, P.F., 127, 128
 Ramaekers, P., 63, 1043
- Ramani, N., 318
 Rankin, L.D., 537
 Rao, K.-V., 309
 Rashid, M.A., 1016
 Raudsepp, M., 629
 Raukas, A., 228
 Ray, G.E., 106
 Read, P., 219
 Redman, J.D., 301, 305
 Reed, I., 451
 Reesor, J.E., 75
 Reid, J., 979
 Reinson, G.E., 978, 1017
 Renaud, J.R., 978
 Reynolds, P.H., 446
 Richard, P., 864
 Richard, P.H.J., 258, 744, 745
 Richard, S.H., 919, 920
 Richards, B.C., 1078
 Ricketts, B.D., 963
 Ricketts, R., 496
 Rigby, J.K., 675
 Rimsaite, J.Y.H., 623, 624
 Ringrose, S.M., 479
 Rissmann, P., 388, 389
 Riva, J.R., 676
 Rivers, T., 32
 Robert, F., 181
 Robert, M., 616
 Roberts, M., 453
 Robertson, J.A., 538
 Robinson, D.J., 539
 Rochester, M.G., 306, 334
 Roddick, J.A., 76
 Roeder, P.L., 765
 Rogers, N.W., 768
 Rohan, K., 348
 Roots, C., 963
 Roscoe, S.M., 540
 Rose, E.R., 541, 542
 Ross, G., 905, 962
 Ross, J.V., 825, 1119
 Rottenfusser, B.A., 980
 Rouse, G.E., 1018
 Roy, C., 182
 Rucklidge, J.C., 191, 611, 612, 625
 Rudkin, D.M., 677, 678
 Ruitenber, A.A., 1166
 Rukavina, N.A., 116-118
 Rulon, J., 417
 Ruppel, S., 967
 Russell, D.J., 376
 Rust, B.R., 971, 976, 981, 987, 1006
 Rutherford, G.K., 119, 1026
 Rutter, N.W., 114, 361, 855, 861, 868, 882, 917, 918, 921, 922, 940, 941, 946, 952
- Ruzicka, V., 543
 Ryall, P.J.C., 451
 Ryan, B., 83
 Ryan, B.D., 233
- S**
- Sabag, C., 808
 Sabourin, R.G., 549
 Sado, E.V., 923-926
 St-Julien, P., 1053, 1155, 1166, 1171
 St-Onge, D.A., 256, 927
 Sage, R.P., 809
 Sanford, B.V., 1079
 Sangster, D.F., 544
 Sanschagrin, Y., 1154
 Sarjeant, W.A.S., 746, 747
 Sass, D.B., 635
 Savage, J.C., 342
 Sawatzky, H., 154
 Sawatzky, P., 307
 Sawyer, S.J., 183
 Scafe, D., 426
 Scafe, D.W., 384, 498
 Scarfe, C.M., 211, 213, 450, 928
 Schaerer, P.A., 393
 Schafer, C.T., 452
 Schau, M., 810, 811
 Schenk, P.E., 1080
 Schiarizza, P.A., 1121
 Schillereff, S., 1132
 Schledewitz, D.C.P., 20
 Schreiner, B.T., 929
 Schroeter, T.G., 545
 Schwarcz, H.P., 230
 Schwartz, F.W., 427
 Schwarz, E.C., 280
 Schwarz, E.J., 308
 Schweger, C.E., 868, 911
 Schwerdtner, W.M., 1138, 1144-1146, 1172
 Scoates, R.F.J., 19
 Scott, B.P., 107
 Scott, K.L., 222
 Scott, P.M., 546
- Scott, R.W., 847
 Scott, S.D., 184, 185, 192, 626
 Scott, W.J., 269
 Scratch, R.B., 186
 Seguin, M.K., 309
 Sharpe, D.R., 930
 Shepperd, J., 1018
 Sherman, D., 1001
 Sherstone, D.A., 394
 Shetsen, I.P., 499
 Shilts, W.W., 931-933, 982
 Shore, P.J., 220
 Sibbald, T.I.L., 585
 Siddiqui, S., 954
 Sills, T.K., 210
 Simard, A., 818
 Simony, P.S., 219, 1116, 1122
 Simpson, E.L., 812
 Simpson, F., 1064, 1103, 1104
 Sinclair, A.J., 204, 233, 586-589, 593
 Sinclair, W.D., 547
 Singh, C., 748-750
 Sinha, A.K., 281
 Sinha, N.K., 391
 Siragusa, G.M., 187
 Sironas, J., 185
 Sisi, J.-C., 1152
 Sitar, N., 390
 Skevington, D., 679, 1049
 Skinner, R., 22, 23
 Sklash, M.G., 430
 Skwara Woolf, T., 702
 Slawson, W.F., 335, 342, 431
 Sly, P.G., 934
 Smart, C.C., 415
 Smee, B.W., 548
 Smith, G.P., 1081
 Smith, P., 237
 Smith, T.E., 797, 813
 Smylie, D.E., 334
 Smyth, W.R., 84, 164
 Snowdon, L.R., 155, 156
 Soles, J.A., 120, 356, 378
 Solman, S., 413
 Soonawala, N.M., 343
 Soutter, J.C., 217, 590, 814, 1173
 Sparkes, B.G., 935
 Spreke, K., 295
 Springer, J.S., 591, 592
 Spry, P., 626
 Srivastava, S.P., 1174
 Stalker, A. MacS., 936, 937
 Stander, E.J., 1133
 Stangl, C.A., 242
 Stankowski, A., 910
 Staplin, F.L., 751
 Stauffer, M.E., 767
 Stauffer, M.R., 1170
 Steam, C.W., 453, 680, 1081
 Steger, H.F., 129, 549
 Stein, R., 432, 433
 Steiner, J., 236
 Steisky, R.M., 344
 Stevens, G.R., 344, 571, 990
 Stevenson, L.S., 817
 Stevenson, J.S., 815-817
 Stewart, R.A., 938
 Stolz, H., 282, 283
 Storek, P., 681
 Storer, J.E., 703, 704
 Stott, D.F., 1105, 1106
 Stott, G.M., 1146
 Stouge, S., 1082
 Stout, M.Z., 805
 Strangway, D.W., 270, 285, 286, 294, 301, 305, 310-312
- Stringer, P., 582, 747, 1124
 Strome, M.M., 398
 Stronach, N., 647
 Strong, D.F., 25
 Studemeister, P., 550
 Stupak, W.A., 806
 Stupavsky, M., 315
 Sugijara, N., 310-312
 Sulek, J.A., 682
 Suryam, J.V., 336
 Sutarno, R., 129
 Sutcliffe, R.H., 52, 818
 Sutherland, I.G., 550
 Sutherland Brown, A., 593
 Svab, M., 377
 Svec, O.J., 317
 Sweet, A.R., 752-754
 Swinden, H.S., 551
 Syme, E.C., 17, 21
 Symons, D.T.A., 313-315
 Syvitski, J.P., 1019
 Szeicz, G., 111

T

Talkington, R.W., 177
 Tanguay, M.G., 954
 Tanou, S.K., 344
 Tasillo, A., 294
 Tassé, N., 800, 968
 Taylor, F.C., 103
 Taylor, G.C., 12, 13
 Taylor, R.B., 121, 122
 Telford, P.G., 500, 683, 1083
 Teller, J.T., 1020
 Tempelman-Kluit, D.J., 1107, 1161
 Terroux, A.C.D., 401, 955
 Theyer, P., 594
 Thibault, J., 1021
 Thomas, A., 33
 Thomas, R.D., 44
 Thompson, G., 845
 Thompson, I., 188
 Thompson, J.F.H., 552
 Thompson, R.I., 1084, 1123
 Thorpe, R.I., 214, 553
 Thorstad, L.E., 522
 Thorsteinsson, R., 1085
 Thurston, P.C., 193, 1180, 1181
 Tiffin, D.L., 337
 Tilley, B.J., 970
 Tipper, H.W., 14, 15, 1108
 Tодоschuck, J.P., 306
 Tomono, T., 184
 Toth, J., 409, 434
 Tozer, E.T., 684
 Traill, R.J., 627, 628
 Trembath, L.T., 603, 756, 764, 783, 807
 Tremblay, L.P., 554
 Tremblay, R., 174
 Trowell, N.F., 53-55, 1044
 Troyer, R., 501
 Trudeau, M., 619
 Trueman, D.L., 780
 Tucker, C.M., 939
 Turek, A., 237
 Turnbull, H.M., 965
 Tuner, J., 215
 Turnock, A.C., 629
 Twyman, T.R., 833

U

Ucakuwun, E.K., 630
 Ullamos-Finn, C.K., 940
 Umpleby, D.C., 454
 Unkauf, J.C., 941
 Urabe, T., 184, 192, 626
 Uyeno, T.T., 634, 636, 685, 686

V

Valade, V., 942
 Valliant, R.I., 555
 Vallieres, A., 1155
 van de Poll, H.W., 983, 1021
 van der Heyden, P., 220
 van der Leeden, J., 1156
 Vanderveer, D.G., 496, 935, 943
 van Everdingen, R.O., 435
 Vasanthy, G., 742
 Veillette, J.J., 61
 Veldhuyzen, H., 1004
 Verpaelt, P., 800, 1045
 Vigraso, L.W., 849
 Vilks, V.V., 127
 Vilks, G., 455, 1022
 Vincent, J-S., 944, 945
 Vogwill, R.I.J., 436, 437
 von Bitter, P.H., 631, 657, 673, 681,
 687-689, 716, 865
 Vos, M.A., 188, 840, 850

W

Waddington, J., 690, 691
 Wade, J.A., 1109
 Wade, R.P., 357
 Walker, E.R., 1007
 Wall, J.H., 692, 693
 Wallace, H., 1046
 Walley, D., 315
 Wallick, E.L., 425, 426, 428, 438, 439
 Wallis, P.F., 380
 Wankiewicz, A.C., 440
 Wanless, R.K., 238
 Wardlaw, N.C., 960, 979, 984
 Wardle, R.J., 34

Warren, H.V., 595, 596

Waters, P.L., 946
 Watson, G.P., 556
 Watson, P., 167
 Watts, S.H., 947
 Weber, W., 20, 828
 Weirick, F., 441
 Wellstead, C.F., 705-707
 Wendte, J.C., 985
 Westgate, J.A., 907, 948-951
 Westrop, S., 694, 695
 Weyer, K.U., 442
 Wheeler, J.O., 77
 Wheeler, J.W., 746
 Whippey, P.W., 228
 White, G.V., 468
 White, O.L., 926
 Whitford, D., 220
 Wightman, D.M., 986
 Wighton, D.C., 708
 Wilcock, P., 249
 Wilhelm, S., 1153
 Wilkinson, S.J., 557
 Williams, D., 951
 Williams, G.K., 1140
 Williams, G.L., 755, 1110
 Williams, H., 316, 319, 1127-1129, 1131,
 1132, 1134, 1166, 1171
 Williams, N., 951
 Wilson, B., 430
 Wilson, C., 525
 Wilson, H.D.B., 558
 Wilson, M., 439
 Wilson, M.A., 756
 Wilson, M.V.H., 708-711
 Winder, C.G., 1086
 Wintle, A.G., 234
 Withers, D.W., 418
 Wong, J., 270
 Wood, J., 1047
 Woods, D.V., 284
 Woodsworth, G., 220
 Woodsworth, G.J., 78
 Wright, J.A., 265
 Wrightson, C.B., 1113

Y

Yaychuk, D.D., 638
 Yonge, C.S., 230
 Yorath, C.J., 1112
 Younge, D., 952
 Young, G.F., 402

Z

Zaitlin, B., 987
 Zeman, A.J., 123, 124
 Zentilli, M.Z., 446, 451
 Zhou, X., 222, 239
 Ziehlke, D., 780
 Zietz, I., 316, 319
 Zwanzig, H.V., 21, 1178