THE GEOSCIENCES IN CANADA, 1990

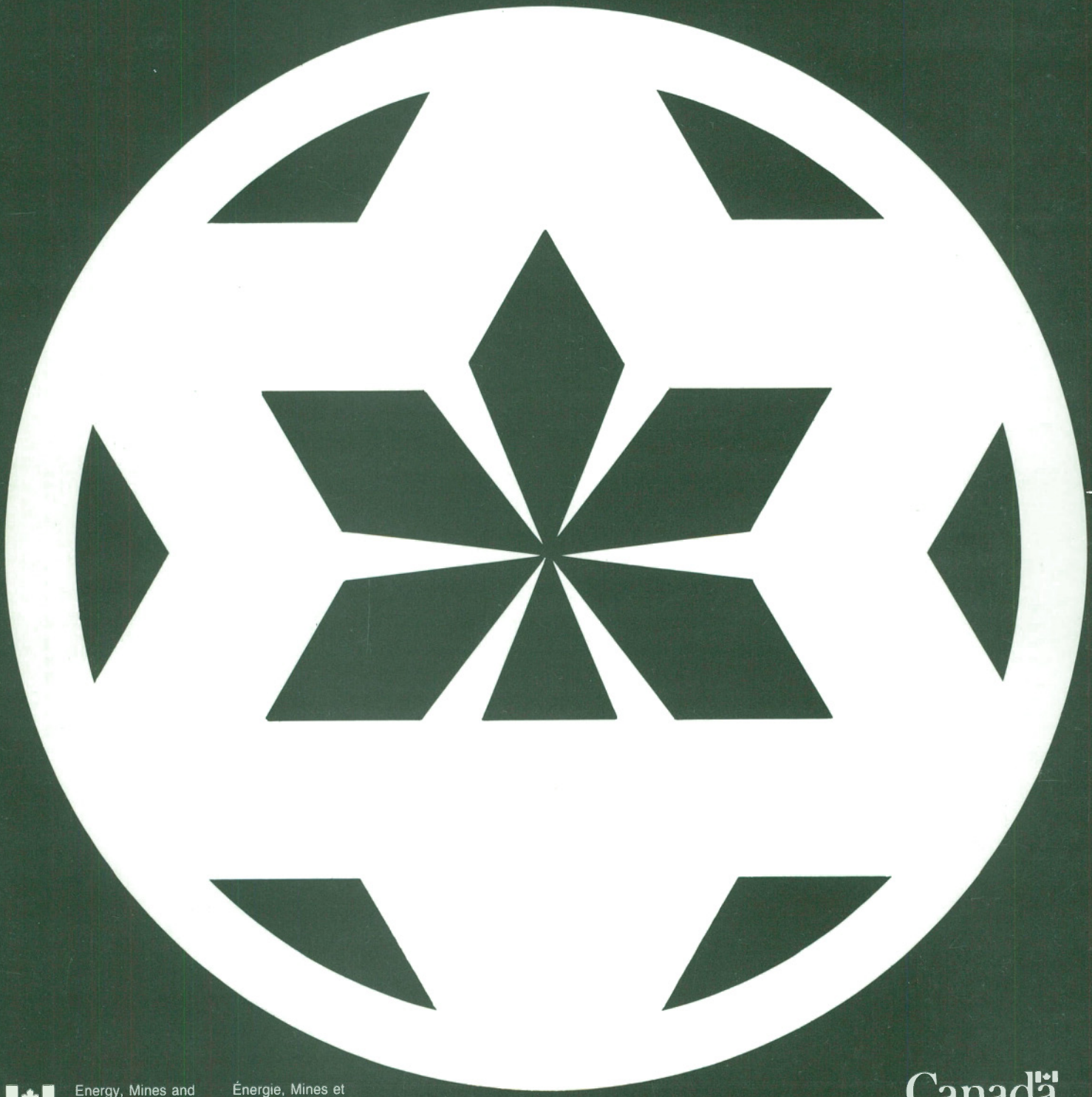
ANNUAL REPORT

Prepared by
The Canadian Geoscience Council

Edited by Alan V. Morgan

Published for the Council by the Geological Survey of Canada as Paper 90-6

CANADIAN GEOSCIENCE COUNCIL



Energy, Mines and Resources Canada
Énergie, Mines et Ressources Canada

Canada

ACRONYMS COMMONLY USED IN THIS REPORT

AECL	Atomic Energy Canada Limited
AEG	Association of Exploration Geochemists
AGID	Association of Geoscientists for International Developments
APEGGA	Association of Professional Engineers, Geologists and Geophysicists of Alberta
APEGN	Association of Professional Engineers and Geologists of Newfoundland
CANQUA	Canadian Quaternary Association
CCCESD	Council of Chairmen of Canadian Earth Sciences Departments
CCPE	Canadian Council of Professional Engineers
CGC	Canadian Geoscience Council
CGS	Canadian Geotechnical Society
CGU	Canadian Geophysical Union
CIDA	Canadian International Development Agency
CIM	Canadian Institute of Mining and Metallurgy
CSEG	Canadian Society of Exploration Geophysicists
CSPG	Canadian Society of Petroleum Geologists
EMR	Department of Energy, Mines and Resources (Canada)
GAC	Geological Association of Canada
GSA	Geological Society of America
GSC	Geological Survey of Canada
ICSU	International council of Scientific Unions
IGC	International Geological Congress
IGCP	International Geological Correlation Program
IGU	International Geographical Union
IMA	International Mineralogical Association
INQUA	International Union for Quaternary Research
IUGG	International Union for Geodesy and Geophysics
IUGS	International Union of Geological Sciences
MAC	Mineralogical Association of Canada
NGSC	National Geological Surveys Committee
NSERC	Natural Sciences and Engineering Research Council of Canada
ODP	Ocean Drilling Program
UNESCO	United Nations Educational, Scientific and Cultural Organization

PRESIDENTS OF THE CANADIAN GEOSCIENCE COUNCIL

1972	R.A. Blais
1973	R.O. Lindseth
1974	H.R. Wynne-Edwards
1975	R.L. Slavin
1976	E.R.W. Neale
1977	P.J. Savage
1978	G. Mannard
1979	C.R. Barnes
1980	D.W. Strangway
1981	J.O. Wheeler
1982	A. Sutherland Brown
1983	N.R. Morgenstern
1984	C.H. Smith
1985	D.W. Organ
1986	A.F. Laurin
1987	G.D. Garland
1988	I. Thomson
1989	G.D. Mossop

EXECUTIVE DIRECTORS OF THE CANADIAN GEOSCIENCE COUNCIL

1972-1979	E.C. Appleyard
1980-1985	J.P. Greenhouse
1986-1987	B.D. Chatterton
1988-	A.V. Morgan

GEOLOGICAL SURVEY OF CANADA
PAPER 90-6

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100 West Pender Street
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REPORT OF THE PRESIDENT

Introduction

The Canadian Geoscience Council (CGC) is the focal point for communication and co-operation amongst the organizations and institutions that have a direct interest in the progress of geoscience in Canada. The heart of the CGC comprises thirteen national earth science societies, which in turn embody some 15 000 individual geoscientists in industry, government and academia. Representatives from these Member Societies, together with the Directors of Council, collectively determine the activities of the CGC through the exercising of voting rights. Representatives of Associate Members and Council Committees participate fully in CGC deliberations and in consensus-building, but (quite purposefully) do not take part in voting. The overall structure of the Canadian Geoscience Council is set out in Table 1 below.

The objectives of the Canadian Geoscience Council focus on:

1) the provision of advice to federal and provincial governments on science policy and its implementation with respect to the earth sciences;

2) the fostering of science education in Canada, particularly for the geosciences; and

3) the monitoring and periodic in-depth review of Canada's major earth science institutions and geoscientific programs.

During 1989, the CGC perpetuated and diversified its pursuit of these objectives through a host of initiatives that are accounted for in some detail in the CGC Annual Report for 1989 (GSC Paper 90-6). In particular, the Directors of Council worked to further strengthen CGC contacts with decision makers at both national and provincial levels.

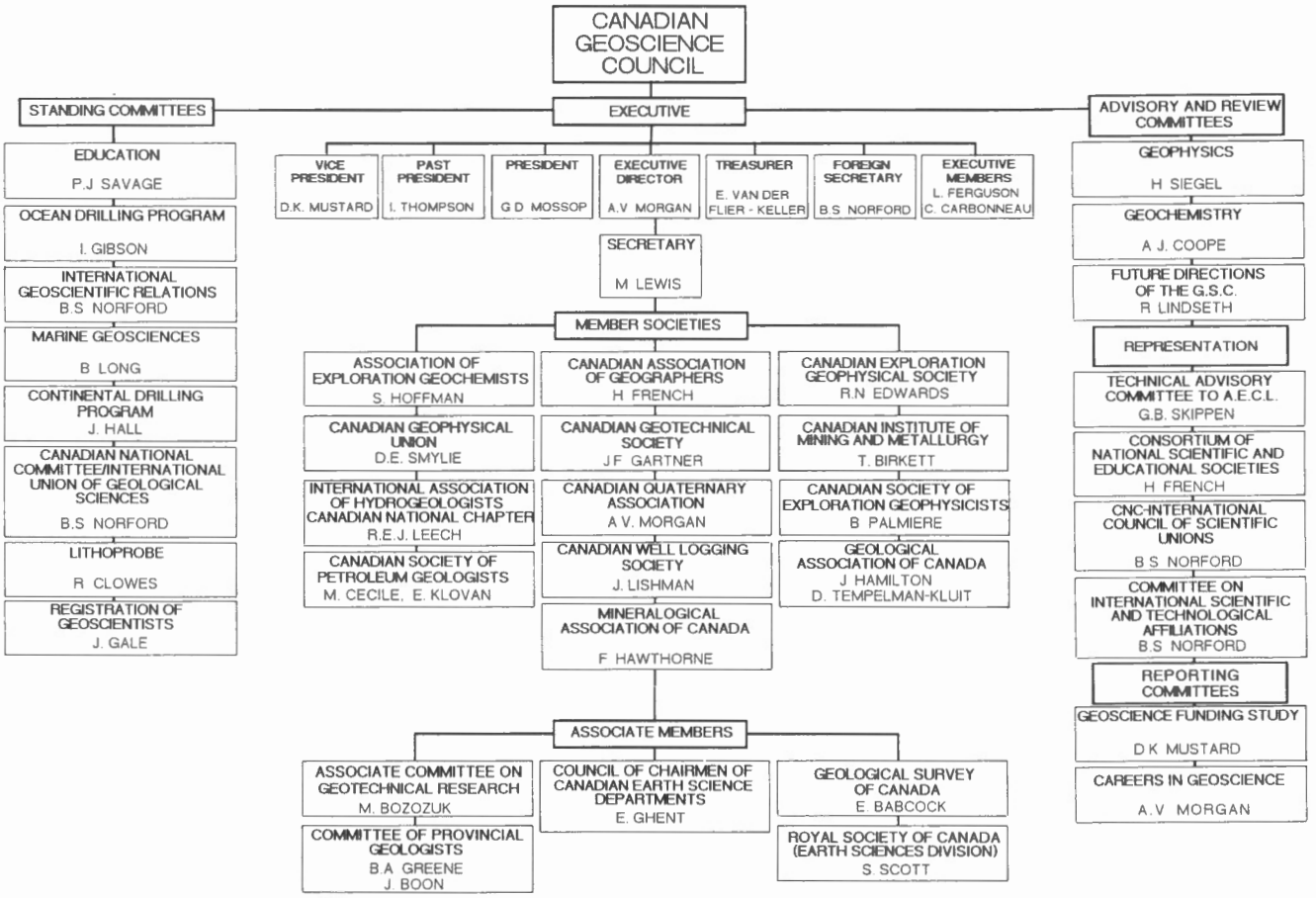

Table 1. Organization Chart and CGC representatives 1989.

Council met four times in 1989: March 9 in Toronto, following the Prospectors and Developers convention; May 18 in Montreal, in conjunction with the Annual Meeting of the Geological Association of Canada and the Mineralogical Association of Canada; September 18 in Banff, with an associated field trip through the Canadian Rockies; and December 7 and 8 in Ottawa, incorporating the Annual General Meeting of the CGC and meetings with senior officials of Energy, Mines and Resources Canada.

Co-operative Interaction with Federal Ministries

The Canadian Geoscience Council has a long and productive tradition of cooperative interaction with various federal jurisdictions. If these were once dominated by "reactive" activities, in which CGC responded to requests for advice on specific matters, or to requests to conduct a study of a particular arm of government, then in the last few years there has been a marked trend toward "pro-active" activities, spawned at the Council table and carried forward to government decision makers by direct representation from CGC officials. This trend was upheld in 1989.

Energy, Mines and Resources Canada

In addition to continuing representation on the National Industrial Advisory Committee to the Geological Survey of Canada, CGC was preoccupied with three major studies of the GSC in 1989.

The first study, funded jointly by CGC and EMR, was designed to examine the role and future directions of the Geological Survey of Canada in the final decade of the 20th century. Unlike most previous CGC studies of the GSC, which were targeted to critically review one or other of the operational "arms" of the Survey, this study was set up to analyze the "soul" of the GSC - how its mandated mission is seen as requiring adaptation to projected changes in national and global priorities in the coming ten years or more. Ten distinguished Canadian earth scientists served on the Committee, under chairman Dr. Roy Lindseth and co-chairman Dr. Robert Lamarche. Their independent report, entitled *Earth Sciences in the Service of the Nation*, was tabled for Council consideration in May 1989 and ratified by Council in September 1989. By year end the report was published (GSC Paper 89-25), in anticipation of widespread distribution and further discussion in the community at large.

Part of the rationale for commissioning the study at this time was the fact that most of the leadership of the Geological Survey of Canada had changed hands in the previous year and the forging of some kind of national consensus regarding new directions was therefore deemed timely. Council was mindful of the challenging nature of the task faced by the Committee, particularly in light of the very limited time frame it was allowed, but there was agreement upon ratification of the report that the Committee had "met the challenge with insight, imagination and integrity".

At a July meeting in Yellowknife with the Honorable Jake Epp, Minister of Energy, Mines and Resources, the results and recommendations of the report were highlighted and elucidated. The substance of the report also was considered at length in the December 1989 meeting of the National Industrial Advisory Committee to the Geological Survey of Canada. That the Minister took such a direct and personal interest in the results of the study was a source of considerable gratification both to the Committee and to the CGC.

The second major GSC study, set up in 1987 under the chairmanship of Dr. Harold Seigel, was designed to review the scope and effectiveness of GSC activities in geophysics. The Committee report was first tabled for Council consideration in May 1989 and a revised version was discussed at length in the September 1989 meetings of Council. Entitled the *Report of the External Advisory Committee to the Geological Survey of Canada for Geophysics*, the final document proved to contain a number of points of contention. At its December meetings in Ottawa, Council nonetheless voted to accept this report.

The CGC Advisory Committee Review of Geochemistry Activities at the Geological Survey of Canada, under the chairmanship of Dr. Alan Coope, was the third major GSC study active in 1989. The Committee finalized most of its findings in May of 1989, but the matter of completion of the final written report was delayed through the fall of the year. The final results of the Committee's work are projected to be completed by February 1990, for Council ratification in March 1990.

Environment Canada

It is perhaps indicative of a general trend in the earth sciences that more and more of the activities of CGC are devoted to global scientific issues and to what generally falls into the category of "environmental geoscience".

In 1989, Council pursued a number of important issues in this area, two of which involved direct and ongoing co-operation with Environment Canada.

The first centred around the matter of subterranean disposal of high-level radioactive nuclear waste in Canada. Early in 1989, CGC made recommendations to the Atomic Energy Control Board (AECB) and the Federal Environmental Assessment Review Office (FEARO) regarding the mechanism by which the best possible geoscientific counsel could be brought to bear on the assessment of the disposal "concept". The recommendations were favourably received and in October 1989 the Honorable Lucien Bouchard, Minister of Environment, announced that he had appointed an "Environment Assessment Panel to review the concept of deep geological disposal of nuclear fuel wastes in Canada". Included amongst the seven named panelists was Dr. William S. Fyfe of the University of Western Ontario, one of Canada's most distinguished earth scientists. CGC also was instrumental in supplying FEARO with a list of geoscientific disciplines and sub-disciplines that should be embodied in the Scientific Review Group that will be appointed to support the work of the Panel. CGC recognizes that the impending public debate about nuclear waste disposal will encompass a very broad range of social, economic, political and scientific issues, but it is nonetheless resolved to ensure that sound geoscientific advice is brought to bear on the decision-making process.

A second area of co-operation with officials of Environment Canada centred around the CGC initiative to establish a "Canada Prize in Earth and Environmental Science". This was conceived as a mechanism to recognize, in a truly international forum, the importance of earth and environmental science in addressing some of humankind's most pressing concerns. CGC officials conducted dozens of meetings with decision makers in both the public and private sectors, to garner goodwill and support for the creation and appropriate endowment of the prize. Foremost amongst the avenues of representation to the Government of Canada was that achieved through co-operation with officials of Environment Canada, along with officials with other key ministries, and the offices of the Governor General and the Speaker of the House of Commons. At the close of 1989, the Canada Prize concept was still under consideration, both in government and in industry.

Other Federal Jurisdictions

Advocacy and representation activities during 1989 were not limited to ministries that are customarily considered to relate strongly to earth science. Meetings were conducted with the Minister of Regional Industrial Expansion, the Honorable Harvie Andre, and the Minister of State for Science and Technology, the Honorable William Winegard, regarding a wide range of cross-jurisdictional issues, including the imperative that the Government of Canada maintains a very high level of support for the fostering of public awareness in science. Co-ordinated representation on behalf of Canadian earth scientists was made to External Affairs Canada and the Ministry for International Trade to ensure redress of the fact that geologists are not specifically included in the list of professionals accorded special access status under the terms of the Canada/US Free Trade Agreement. Correspondence was exchanged with officials of the Department of Fisheries and Oceans regarding the availability of ship time for Canadian geoscientists. Contact also was established with the Canadian Space Agency regarding the role of geoscience in the emerging research and development strategy for Canada's space program.

Co-operative interaction with Provincial jurisdictions

The member Societies of the Canadian Geoscience Council are all national associations, or Canadian chapters of international associations. The CGC is concerned predominantly with national and international geoscientific issues. But the activities undertaken in Canada's provincial departments and agencies commonly transcend provincial boundaries, particularly where science is concerned. Vital contact with provincial governments is maintained on CGC Council by representation from the Committee of Provincial Geologists. In 1989, the CGC committed itself to a number of undertakings in direct co-operation with provincial jurisdictions.

At the request of the Ministry of Energy, Mines and Petroleum Resources of British Columbia, the CGC established a six-person committee to conduct a review of the Ministry's Geological Survey Branch. The Committee is under the chairmanship of Dr. Chris Barnes and is scheduled to deliver its report in the spring of 1990.

The matter of professional registration of earth scientists is one that clearly falls within the purview of provincial governments, although there are larger issues involved, relating for example to the transferability of professional status. The Province of Ontario is currently considering new legislation to regulate the professional practice of earth science in the province. A Committee for the Professional Registration of Geoscientists in Ontario, and under the chairmanship of Dr. W.N. Pearson, has been convened to ensure that

the voice of practising earth scientists is appropriately represented in discussions and negotiations. CGC's Committee on Professional Registration has provided support and guidance to the Ontario Committee and CGC funds have been allocated to help underwrite committee expenses. It was through a similar co-operative liaison mechanism that the Province of Newfoundland and Labrador recently implemented its regulations for the professional practice of geoscience.

Funding study published

There is considerable misunderstanding and misinformation in our country about the comparative levels of earth science funding, relative to various resource sectors in Canada and relative to the national earth science effort in comparably developed countries. Three years ago the Canadian Geoscience Council recognized this and commissioned an independent study on Research and Development in the Earth Sciences. The study was contracted to the Centre for Resource Studies (CRS) at Queen's University, under the direction of Margot Wojciechowski. Her report, with accompanying Executive Summary, was published in 1989. One of the most valuable outcomes of the study was that, for the first time, relatively comprehensive statistical data on earth science research and development were amassed in a single source reference — using consistent definitions, set in a well-established framework, allowing for clear definition of trends.

At the 1989 Mines Ministers' Conference in Sudbury, the Canadian Geoscience Council brief was devoted almost entirely to the results of the CRS study. Release of the report was particularly timely in this regard, given that the theme for this year's Mines Ministers' Conference was "Mining and Exploration Research: Maintaining the Competitive Edge".

Scientific programs

There are three geoscientific mega-projects in Canada - Lithoprobe, the Ocean Drilling Program, and the Canadian Continental Drilling Program - and a fourth is looming on the horizon - the Canadian program in Global Change. These are the flagships of Canadian geoscientific endeavor. They command expenditure of very considerable resources. Their scientific integrity must be watchfully nurtured and their accountability must be ensured.

The funding agencies for these programs exercise primary control over management and operations, and rightly so. The Canadian Geoscience Council nonetheless plays a number of vital roles in co-ordination, communication to the whole of the geoscientific community in Canada and to facilitate co-ordination of effort. CGC is also charged with responsibility for the nomination of individuals to serve on the various boards and councils that steer the scientific effort and provide advice and direction in the development of program strategy. None of these programs would be viable without underpinnings of communication and co-operation, and it is through the CGC that many of the most important of these functions are focussed.

Still, it must be said that ultimate success in these mega-projects is overwhelmingly predicated upon the industry and dedication of the Canadian geoscientists who are vitally involved in the scientific work. The two most established programs — Lithoprobe and the Ocean Drilling Program — have both achieved absolutely remarkable results, giving rise to insights and interpretations that would be impossible for scientists working individually or in small teams. Scientific integrity and ingenuity, coupled with goodwill and co-operation, are clearly very potent ingredients for success in mega-scientific endeavor.

The Canadian Continental Drilling Program made very considerable advancements in 1989, consolidating its infrastructure, conducting productive workshops to engender the development of first class proposals, and generally placing itself on a sound footing for the solicitation of appropriate funding.

One other scientific initiative demands highlighting in this report - the 1989 publication of the Proceedings of Exploration '87, edited by Dr. George Garland. This handsome 900-page volume, published by the Ontario Ministry of Northern Development and Mines, embodies a great body of innovative science, first reported at the Toronto conference in 1987. Exploration '87 was planned and organized by a committee of the Canadian Geoscience Council under the chairmanship of Dr. Harold Seigel. All involved in the conference and in the compilation of the proceedings volume deserve our thanks and commendation.

International programs

There are upwards of 25 international geoscientific programs involving Canada. Through the offices of the Foreign Secretary, the Canadian Geoscience Council takes responsibility for co-ordinating Canada's input into the non-governmental organizations that oversee these programs. This function is discharged through the

Standing Committee on International Geoscientific Relations and the Canadian National Committee for the International Union of Geological Sciences, both of which are chaired by the Foreign Secretary. Developments in these various programs in 1989 are reviewed elsewhere in this Annual Report.

The year 1989 was highlighted by the convening of the International Geological Congress in Washington, D.C. Canada's seven-person delegation was led by Dr. E.A. Babcock. Canada was accorded prominent recognition at the Washington IGC for its history of leadership in the International Union of Geological Sciences (IUGS). It is perhaps not inappropriate in this report to pay tribute to the many dedicated Canadian earth scientists who distinguished themselves in the service of the IUGS during the 1980s - particularly the late Dr. W.W. Hutchison, former president of the IUGS, and Dr. A.R. Berger, longtime Editor of the internationally acclaimed IUGS newsmagazine *Episodes*.

Two emerging international scientific programs figured prominently in CGC deliberations in 1989 - the International Geosphere-Biosphere Program and the International Decade for Natural Disaster Reduction. It is anticipated that both of these programs will command global prominence in the 1990s and it is clear that priority must be given to mobilizing Canadian expertise to support them.

Outreach

Beyond its inherent mission to serve the needs of the geoscientific community in Canada, the CGC has a responsibility to foster outreach and education amongst the public at large. A number of developments in this area warrant emphasis in this report.

Historically, one of CGC's most successful publications has been its booklet entitled Careers in Geoscience, designed for use by high school students and junior undergraduates in assessing education and career options. The last version of the booklet, published in 1981, has been out of print for a number of years, and CGC has been repeatedly stymied in its recent efforts to produce a new edition. It is gratifying to report here that, thanks to the sterling efforts of CGC Executive Director Dr. Alan Morgan, a new draft version of the careers booklet has been completed, for publication and distribution in 1990.

CGC's single most successful program of outreach to Canada's young people is the EdGEO program. EdGEO workshop sessions for school teachers were again successfully conducted in a number of centres in Canada during 1989. Still, the program is under-funded and efforts in 1989 to establish an endowment fund for EdGEO were not successful.

On the other hand, it was very encouraging to note that other initiatives relating to public awareness of science achieved considerable advancement in 1989, particularly those co-ordinated by the Royal Society of Canada. CGC representatives participated in a number of workshops and related initiatives to try to focus the attention of Canadian geoscientists on their ongoing responsibility to deep the public informed of developments.

Operations

The CGC headquarters at the University of Waterloo are ably managed by Dr. Alan Morgan, and his accounting of 1989 activities is set out elsewhere in this Annual Report. Amongst the numerous achievements of Headquarters this year where the publication of a new pamphlet on the nature and scope of CGC activities and the preparation and deployment of a CGC display for use at conferences and workshops.

Other highlights of operational activity for 1989 included the preliminary formulation of a policy on bilingualism for CGC publications, and the formalization of proceedings for the CGC Annual General Meeting, conducted December 7, 1989 in Ottawa.

Finance

A number of achievements were made in the financial area in 1989: procedures for budgeting and expenditure control were modernized; a recognized firm of accountants was appointed to audit CGC accounts; dues for Member Societies were again increased, in the order of 25 per cent, and there was a corresponding increase in grants from provincial departments, all in support of achieving equal tripartite funding for CGC operations from Member Societies, the federal government and the provincial governments; and agreement was reached with the Canadian Geological Foundation on the administration of trust funds for the CGC.

Membership

There was no augmentation of the 13 Member Societies of CGC during the reporting period, but initiatives were undertaken to encourage the participation of the Prospectors and Developers Association of Canada and the Canadian Association of Palynologists. The Natural Sciences and Engineering Research Council of Canada (NSERC) was invited to consider participation in CGC as an Associate Member. Although there is no inclination to become directly affiliated with the American Geological Institute, there was an exchange of meeting representatives and a general strengthening of ties with our sister organization in the United States.

Commentary

For a majority of earth scientists in Canada, the first working preoccupation continues to be in the area of enlightened exploration and development in the minerals and petroleum industries. Canada's resource endowment is vast, and if our country is to continue to enjoy the economic benefits of resource development, and compete successfully in international markets then Canada's geoscientists must be ever more inventive in finding new deposits and facilitating their sustainable exploitation.

That said, it is my view that there are at least three new and challenging realities facing us as we broach the final decade of the twentieth century.

First, in the current atmosphere of healthy and enlivening public concern for the environment, geoscientists must prepare themselves to adapt their sensibilities to the concept of sustainable development and indeed to lead the way in providing a sound geoscientific framework for doing so. If career patterns are to shift markedly for individuals, towards more emphasis on "environmental geology", then it is also true that our geoscientific institutions must develop farsighted strategies for facilitating same. Earth science expertise in Canadian universities and in geological surveys is second to none in the world. That expertise can be favourably redeployed only if our institutions pro-actively engender partnerships with non-traditional constituencies - health and safety, water management, waste engineering, oceanography, and a host of others.

Second, it is apparent that many of the geoscientifically-rooted problems facing humankind demand global rather than parochial solutions. Canadian scientists have an enviable reputation for unselfish sharing of data and ideas in international arenas, both on the scale of self-initiated co-operation amongst small groups and on the level of major international programs. If anything, this strength must be further emphasized in the future and diversified to permit direct and practical outreach to other nations, particularly in the third world. We cannot afford to shrink from the global stage.

Finally, I believe that all of us must begin to take more seriously our responsibilities in the area of public information and education. In an era in which the electorate faces wrenching choices, many of which have complex scientific and technological underpinnings, we must not be content with simply doing good science. We must be tireless in helping to communicate that science to the public at large.

The Canadian Geoscience Council is well placed to continue to foster the progress of the earth sciences in these various areas, and to ensure that societal sensibilities are well served by that science.

Acknowledgments

Dozens, hundreds, of individuals are involved in making the CGC work, and my admiration for their care, their dedication, and their hard work has done nothing but grow during my year as president of the CGC. I would like to express my sincere gratitude and commendation to all who have toiled in support of the Council this year.

On a personal level, I would like particularly to thank my closest working colleagues on the Executive, for their thoughtful and supportive counsel and for their hard work. As well, I wish to acknowledge the magnanimity of my employer, the Alberta Research Council, for allowing me time and resources to participate in the work of the Canadian Geoscience Council.

Grant D. Mossop

REPORT OF THE EXECUTIVE DIRECTOR

The office of the Canadian Geoscience Council was housed at the Department of Earth Sciences at the University of Waterloo during 1989. Because of debilitating back problems, the resident Secretary, Sandra Fogarty, was replaced by Margaret Lewis from the late summer to year end.

Most of the office work consisted of communications with the Member Societies and Associate Members and Standing Committees of Council (see Table 1). There was also a lot of correspondence concerning matters related to the Careers Booklet. Late in 1989, the Executive Director agreed to attempt a new version of this successful booklet, with an anticipated completion date for late 1990. A new CGC promotional flyer was produced early in the year.

A separate task involved the renewal of the old CGC display to encompass many of the varied activities of Council, and of the Member Societies. A section indicating important areas of earth sciences research in Canada was also produced.

Council discussions covered many topics during the course of the year at meetings which were held in Toronto (68th), Montreal (69th), Banff (70th) and Ottawa (71st). Topics included reports from the Directors of CGC, from the GSC, from the Provincial Surveys, from the Member Societies and from a variety of Associate and Standing Committees. Council was kept well-informed of initiatives in Lithoprobe, in ODP, in Canadian Continental Drilling Program and in the on-going activities of the Royal Society of Canada in respect to the earth sciences. Copies of the Minutes may be obtained from the Executive Director.

In closing I would like to thank my fellow Directors on CGC, and particularly Sandra Fogarty and Margaret Lewis for their able assistance throughout the year.

Alan V. Morgan

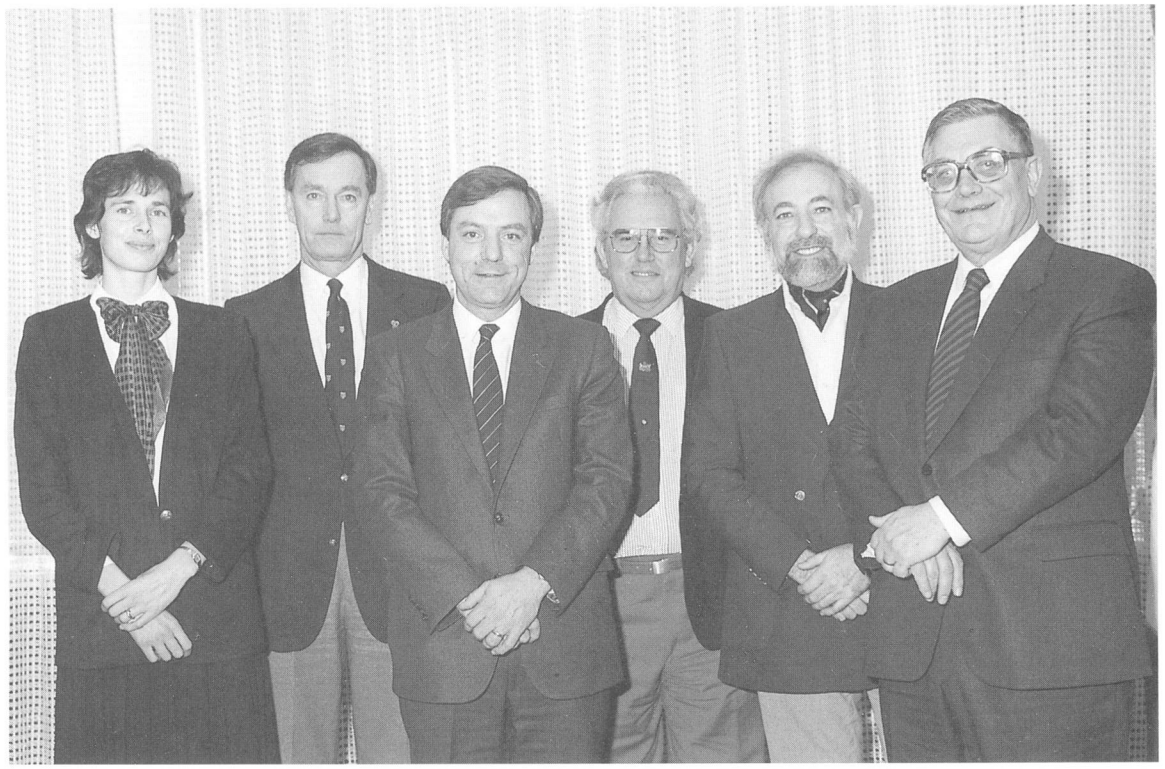

Plate 1.

Canadian Geoscience Council Executive, 1989

(From left to right): E Van der Flier-Keller (Treasurer), B.S. Norford (Foreign Secretary), G.D. Mossop (President), L. Ferguson (Executive Member), A.V. Morgan (Executive Director), D.K. Mustard (Vice President). Missing: I. Thomson (Past President) and C. Carbonneau (Executive Member).

REPORT OF THE TREASURER

CANADIAN GEOSCIENCE COUNCIL

A Non-Profit Organization Chartered under the Provisions
of Part II of the Canada Corporation Act

Table 2. Approved budget for 1 October 1988 to 30 September 1989 (Approved at the December 1988 council meeting).

1. OPERATING ACCOUNT	**Approved 88-89**
Revenue	
EMR: Operating Grant	$11,000.00
: CNC/IUGS	3,000.00
: Inter. Geol. Congress Grant	3,000.00
Future of GSC	15,000.00
Provincial Grants	6,000.00
Society Dues	6,250.00
Publications	2,500.00
Interest	6,000.00
EdGEO Grants	2,000.00
Total revenue	$54,750.00
Expenses	
CNC/IUGS	$3,000.00
Inter. Geol. Congress	3,000.00
Future of GSC	25,000.00
Quaternary Research Study	1,500.00
Marine Geoscience Ctte.	5,000.00
Registration Ctte.	2,000.00
Continental Drilling Ctte.	2,000.00
EdGEO	10,750.00
Office Expenses	5,000.00
Secretarial/Bookkeeper	6,000.00
Office Moving	1,000.00
Printing CGC-Flyers	2,000.00
Printing Careers Booklet	19,426.09
Executive Travel	15,000.00
Council Meetings	3,000.00
Memberships	200.00
Miscellaneous	500.00
Total Expenses	$103,976.09
Revenue less expenses	($49,226.09)
2. GEOSCIENCE FUNDING STUDY - TRUST ACCOUNT	
Revenue	
Grants	$20,500.00
Interest	1,000.00
Total revenue	$21,500.00
Expenses	
Queen's Centre for Resource Studies	$46,000.00
D.K. Mustard Travel	1,600.00
Miscellaneous	5,000.00
Total expenses	$52,600.00
$ Not yet allocated	($31,100.00)

Eileen Van der Flier-Keller
Treasurer, Canadian Geoscience Council
06 November 1989

CANADIAN GEOSCIENCE COUNCIL

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Table 3. Statement of Revenue and Expenses 1 October 1988 to 30 September 1989

REVENUE	**88-89**	**87-88**
Energy, Mines and Resources	$11,000.00	$11,000.00
Operating Grant	3,000.00	3,000.00
Inter. Geol. Congress Grant	3,000.00	3,000.00
CNC/IUGS Grant	15,000.00	--
Future of GSC Grant	12,000.00	8,000.00
Provincial Grants	6,222.85	5,037.43
Membership Fees	6,445.58	6,868.39
Interest	--	--
EdGEO Grants		
Total revenue	$56,668.43	$36,905.82
EXPENSES		
Inter. Geological Congress	$3,000.00	$3,000.00
CNC/IUGS	3,000.00	3,000.00
EdGEO Workshops	10,262.05	10,000.00
Future of GSC	17,997.42	--
Marine Geoscience Committee	7,380.58	2,239.30
Cont. Drilling Committee	--	438.72
Office Expenses and Services	10,453.81	10,112.61
Office Move	--	1,053.82
Printing of Flyers and Booklets	2,038.20	--
Printing of Career Booklets	300.00	--
Council Meetings	2,697.85	2,021.34
Executive Travel	19,165.51	15,974.11
Convention Booth	316.83	--
YSF, AGID and AASC Memberships	301.73	200.00
Miscellaneous	117.83	293.43
Total expenses	$77,031.81	$48,333.33
Excess of revenue over expenses	($20,363.38)	($11,427.51)

CANADIAN GEOSCIENCE COUNCIL

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Table 4. Balance Sheet, 30 September 1989

ASSETS	**88-89**	**87-88**
Victoria	($7,555.96)	($ 911.91)
Current Account	270.58	1,418.88
Savings Account	83,530.08	92,044.57
Term Deposits		
University of Waterloo	(5.62)	1,322.38
Operating Account	--	--
Accounts Receivable		
Total assets	$76,239.08	$93,873.92
LIABILITIES		
Accounts Payable	$8,573.91	$5,845.37
Total liabilities	$8,573.91	$5,845.37
Funds not yet allocated	$67,665.17	$88,028.55

CANADIAN GEOSCIENCE COUNCIL

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Table 5. Accounts held in trust by the Foreign Secretary, 30 September 1989

CNC/IUGS ACCOUNT -- STATEMENT OF ACCOUNTS		
Funds not yet allocated (1 October 1988)		$11,575.75
Revenue	$3,957.79	
Expenses	$3,373.84	
Excess of revenue over expenses		583.95
Funds not yet allocated (30 September 1989)		$11,575.75
INTERNATIONAL GEOLOGICAL CONGRESS ACCOUNT STATEMENT OF ACCOUNTS		
Funds not yet allocated (1 October 1988)		$12,940.00
Revenue	$4,208.91	
Expenses	$11,236.81	
Excess of revenue over expenses		($7,027.90)
Funds not yet allocated (30 September 1989)		$5,912.10

CANADIAN GEOSCIENCE COUNCIL

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Table 6A. Statement of Revenue and Expenses, Global Sedimentary Geology Program, 1 October 1988 to 30 September 1989

REVENUE	**88-89**	**87-88**
EMR Grant	$12,000.00	$ --
Interest	--	--
Total revenue	$12,000.00	$ --
EXPENSES		
Executive Travel	$1,867.92	--
Miscellaneous	29.00	--
Total expenses	$1,896.92	
Funds not yet allocated	$10,103.08	$ --

Table 6B. Balance Sheet, 30 September 1989

ASSETS	**88-89**	**87-88**
Victoria		
Current Account	$10,103.08	$ --
Total assets	$10,103.08	$ --
LIABILITIES		
Accounts payable	$ --	$ --
Total liabilities	$ --	$ --
Funds not yet allocated	$10,103.08	$ --

E. Van der Flier-Keller
Treasurer, Canadian Geoscience Council
06 November 1989

CANADIAN GEOSCIENCE COUNCIL

A Non-Profit Organization Chartered under the Provisions
of Part II of the Canada Corporation Act

Table 7A. Geoscience Funding Study (funds held in trust), Statement of revenue and expenses 1 October 1988 to 30 September 1989

REVENUE	**88-89**	**87-88**
Grants	$ --	$16,500.00
Interest	67.67	617.27
Total revenue	$67.67	$17,117.27
EXPENSES		
Queen's Centre for Resource Studies	$ --	$40,621.46
D.K. Mustard Expenses	--	705.25
General Office Expenses	121.99	
Total expenses	$129.99	$41,338.71
Funds not yet allocated	($ 54.32)	($24,221.44)

Table 7B. Balance sheet 30 September 1989

ASSETS	**88-89**	**87-88**
Victoria		
Current Account (Trust)	$ --	$ 539.42
Term Deposits	--	4,056.71
Accounts Receivable	--	--
Total assets	$ --	$4,596.13
LIABILITIES		
Accounts payable	$ --	$4,541.81
Total liabilities	$ --	$4,541.81
Funds not yet allocated	$ --	$ 54.32

E. Van der Flier-Keller
Treasurer, Canadian Geoscience Council
06 November 1989

16 November 1989

TO: MEMBERS OF THE CANADIAN GEOSCIENCE COUNCIL

Re: Examination of 1988-1989 fiscal year end statements of the Canadian Geoscience Council

We have examined the financial records of the Council (Treasurer's ledger, records, cancelled cheques, bank statements, etc.) for the year ending 30 September 1989.

All records are in order and we believe the financial standing of the Canadian Geoscience Council to be correctly represented on the accompanying financial statement sheets and balance sheets dated 06 November 1989.

This report is not to be considered an audit but rather an examination of its records by the undersigned as directed by the Council.

C.J. Yorath,
Member GSC, CSPG

G. Rogers,
Member GAC, CGU

REPORT OF THE FOREIGN SECRETARY

The Foreign Secretary acts as a link between the Canadian Geoscience Council and international non-governmental organizations with geoscientific activities that involve Canada. This liaison is achieved primarily through the Standing Committee on International Geoscientific Relations (SCIGR) and the Canadian National Committee for the International Union of Geological Sciences (CNC/IUGS) both chaired by the Foreign Secretary. The SCIGR held its annual meeting in Ottawa, on December 6, 1989 and this was followed on the same day by the annual meeting of the CNC/IUGS. Minutes of both meetings are available from the Foreign Secretary or the CGC Executive Director. The reports which follow are based on these minutes and incorporate some subsequent developments.

Standing Committee on International Geoscientific Relations

The Standing Committee is an advisory body on international geoscientific activities distinct from those of the IUGS and the International Geological Congress (IGC). SCIGR acts as a reporting forum to the CGC from Canadian organizations involved in such activities, provides for discussion of common problems and opportunities, and recommends to the CGC responses to international initiatives.

The 1989 meeting was attended by 24 representatives from most of the relevant earth science associations. Others sent written submissions.

1. Association of Exploration Geochemists (C.E. Dunn)

Canadians comprise about 30% of the membership of the Association. The proceedings of three important international meetings were published in 1989 with the following themes: Geochemical exploration and methods of prospecting (Orleans, France, 1987); Geochemical prospecting in China (Guilin, 1986); Exploration geochemistry in southern Africa (Pretoria, 1987). The 13th International Geochemical Exploration Symposium was held in Brazil in 1989, others are scheduled in Czechoslovakia (Prague, 1990), the United States (Reno, 1991) and China (Beijing, 1992 or 1993).

2. Association of Geoscientists for International Development (S.M. Barr)

Sandra Barr (Acadia University) continues as AGID's Vice-President for Developed Countries. AGID's priorities include small-scale mining (a pilot project is underway in India), groundwater development and management, natural hazard reduction, geoscience education, and collection and distribution of donated scientific books and journals. A centre for AGID's contributions to natural hazard reduction is being established in Beijing; a column on the topic should appear regularly within AGID's newsletter. AGID now has fairly formal liaisons with the geological societies of America, China and London and is seeking similar relationships with other countries. Such networking is a priority for AGID and it now has a system of national correspondents in third world countries to improve communication.

3. Decade of North American Geology (J.O. Wheeler)

Canada is responsible for nine volumes. Publication of two now is expected in 1990 (The Quaternary Geology of Canada and Greenland, and The Geology of the Continental Margin of Eastern Canada) and three in 1991 (The Innuitian Orogen and Arctic Platform of Canada and Greenland; The Cordilleran Orogen in Canada; The Sedimentary Cover of the Craton in Canada). Delays have affected progress for the other volumes (The Appalachian Orogen in Canada and Greenland; The Mineral Deposits of Canada; The Geology of the Precambrian Craton in Canada and Greenland; Summary volume for Canada).

4. International Association on the Genesis of Ore Deposits (L.M. Cumming)

The 8th Symposium of The International Association on the Genesis of Ore Deposits (IAGOD) will be held at Carleton University, Ottawa, August 12-18, 1990. Drs. Bob Boyle (GSC emeritus, Ottawa) and Ian Jonasson (GSC, Ottawa) head an organizing committee with members from the Geological Survey of Canada, Carleton and Ottawa Universities. It is anticipated that 500 - 800 geologists will attend. Circular No. 2 was distributed to 2200 scientists early in 1989 and included details of 14 field trips to mineral belts throughout Canada. Bob Boyle continues as Chairman of IAGOD.

5. International Association of Hydrologists (R. Leech)

The Canadian Chapter of IAH now has a membership of about 300, including 15 foreign members. An international conference will be held in Calgary, April 1990, on the topic "Subsurface Contamination by Immiscible Fluids".

6. International Federation of Palynological Societies (D.C. McGregor)

IFPS is a federation of 24 palynological societies representing some 4000 scientists. Only a quarter of IFPS's palynologists are geologists, others include scientists in agriculture, medicine and archaeology.

Canadians on the 28-person Council are Colin McGregor, (GSC, Ottawa) Past-President and David Jarzen (National Museum, Ottawa) Councillor representing the Canadian Association of Palynologists. A working group on terminology is well advanced in the compilation of a glossary for publication in 1992.

The 8th International Palynological Congress will be held in 1992 in Aix-en-Provence, France.

7. International Geographical Union (H.M. French)

A meeting in Germany in September 1989 had established an International Geomorphology Association and Dr. Olav Slaymaker (UBC) had been appointed to its executive. The question of formal affiliation of the Association has not yet been resolved; it may seek direct affiliation with ICSU or with one of ICSU's component unions. Plans were going ahead to hold an international meeting of the Association in 1993 in Canada at McMaster University, to be organized by Derek Ford and Brian McCann.

8. International Geological Correlation Program (A.J. Naldrett)

CNC-IGCP acts as a peer review group whose actions serve to stimulate participation in international geoscience and whose grants serve largely as seed money for new and ongoing projects. Requests for funding totalling $30,250 were received for the projects with active Canadian participation. Grants totalling $20,900 were awarded, mainly toward travel costs for Canadians to attend foreign meetings and to help defray costs of Canadian meetings and workshops. P.A. Bourque retired from CNC-IGCP and was succeeded by Aicha Achab (INRS & GSC, Quebec).

CNC-IGCP Newsletter 16 (January 1990) provides full details, including the following projects of special interest to Canadian geoscientists:

158 Paleohydrology of the Temperate Zone (six Canadian reports published in the September issue of Canadian Journal of Earth Sciences)

199 Rare Events in Geology (project terminated in 1989; H. Geldsetzer, GSC Calgary, participated in a proposal to IGCP for a successor project)

216 Global Biological Events in Earth History (major invited paper on Ordovician events presented to an IGC symposium by C.R. Barnes, U. Victoria)

217 Proterozoic Geochemistry (a Canadian participated in meetings in Zimbabwe on Archean-Proterozoic transitions)

219 Comparative Lacustrine Sedimentology in Space and Time (some ten Canadian contributions are in press within a major publication on the geological records of lake basins; a field seminar is planned on modern saline lacustrine environments in western Canada for August 1990 and a related international symposium "Salt Lake Palaeolimnology" is scheduled in Saskatoon in August 1991)

233 Terranes in the Circum-Atlantic Orogens (Canadians presented seven papers in a special symposium at the IGC that accompanied the publication of a tectonic map of pre-Mesozoic terranes in circum-Atlantic Phanerozoic orogens; Canadians also participated in a conference on terranes in the southern Appalachians)

247 Precambrian Ore Deposits Related to Tectonics Styles (several Canadians participated in a symposium and field trips in Finland on Precambrian granitoids).

250 Regional Crustal Stability and Geological Hazards (a Canadian attended a workshop and field meeting in Greece; the final meeting of the project tentatively is scheduled in southern Ontario, October 1990)

254 Metalliferous Black Shales (Canadians continue to be very prominent: participating in meetings and field trips in Poland and Nevada, field studies of an unusual stratiform deposit in Upper Paleozoic shales in the Yukon, and offshore studies of modern mineralization on the Juan de Fuca and Gorda ridges)

257 Precambrian Dyke Swarms (four papers were presented by Canadians at a meeting of the Project in New Mexico in July 1989; future meetings are scheduled in Australia, September 1990 and Toronto, May 1991).
259 International Geochemical Mapping (a special session at the IGC, Washington, included Canadian presentations, two were made at a meeting in Brazil; regional meetings are scheduled on several continents in 1990 with an international workshop in Czechoslovakia in August)
260 The Earth's Glacial History (Canadians participated in a symposium within the IGC, Washington, and a field excursion to study the late Cenozoic glacial sequences of Washington State and southeast Alaska)
261 Stromatolites
264 Remote Sensing Spectral Properties (Canadians participated in a symposium within the Washington IGC, including a presentation on the progress of the Geobotany Committee; an international meeting is scheduled in the USSR in September 1990)
267 Paleozoic Terranes in Circum-Pacific Orogens
274 Coastal Evolution in the Quaternary
277 Phanerozoic Oolitic Ironstones (eight working groups were established on various topics at a meeting within the IGC, Washington; G.M. Yeo, Acadia U., chairs the one on Precambrian-Phanerozoic comparisons)
280 The Oldest Rocks on Earth (a Canadian participated in a field workshop in the Aldon Shield, eastern USSR; in Canada, Acosta Gneiss from the apparent basement of the Slave Province has been dated at 3.96 billion years old and rocks near Sugluk, Labrador, as 3.5 billion years)
282 Rare Metal Granitoids (meetings will be held in Winnipeg and Ottawa in August 1990 associated with the IAGOD Symposium)
291 Metamorphic Fluids and Mineral Deposits
294 Very Low Grade Metamorphism
296 The Quaternary in the Asia-Pacific Area
297 Geocryology of the Americas

Tony Naldrett (U. Toronto) was elected as Chairman of the Board of IGCP in February. The Board consists of 15 people and receives recommendations from its Scientific Committee; both are supported by a UNESCO Secretariat. Funds available to IGCP at the international level amounted to US $277,500 in 1988, only marginally greater than the $260,500 in 1987 and more than 40% of these working funds came directly from the United Kingdom and the United States, outside the allocation made from UNESCO funds. Such funding is minimal and averaged $5,500 per project.

9. International Mineralogical Association (D.G.W. Smith)

IMA Council conducted an extensive review of arrangements for the 15th General Meeting, scheduled for Beijing, June 1990, because of the unfortunate events that took place in Beijing in Spring 1989. By majority vote, Council decided that the meeting should go ahead, reflecting the widespread feeling that international scientific organizations should not be involved with political statements and that cancellation of the General Meeting would not be in the best interests of the many mineralogists working in China.

The major problem faced by IMA continues to be financial. The history of inadequate support through IUGS culminated this year in a zero allotment of funds. The IMA is actively seeking other ways of generating operating revenues and continues to explore the possibilities for other scientific alignments which would allow it better to serve the international community of mineralogists.

Commissions and working groups of IMA have continued to be active and none more so than the Commission on New Minerals and Mineral Names which has been kept busy with the usual crop of new mineral names and some proposals for discreditation. This Commission is chaired by a Canadian (J.A. Mandarino, Royal Ontario Museum) as is the Commission on Applied Mineralogy (Tony Naldrett, U. Toronto).

10. International Palaeontological Association (T.E. Bolton, B.D.E. Chatterton)

IPA has sponsored nine symposia during 1988 and 1989 on diverse topics from ostracodes to deep structure of the Pacific Ocean and its margins, usually in association with other sponsors. IPA will cohost a symposium in England, September 1990 that will focus on biological processes that are connected with bioevents and is expected to cover late Precambrian, early Paleozoic and Mesozoic bioevents.

Planning continues for the next North American Paleontological Convention (Chicago, 1993). Tom Bolton (GSC, Ottawa) was elected President of the Paleontological Society (North America) for 1991.

11. International Association of Engineering Geology, International Society of Rock Mechanics and International Society for Soil Mechanics and Foundation Engineering, Canadian Geotechnical Society (J.F. Gartner)

Norbert Morgenstern (U. Alberta) was elected President of ISSMFE for 1989-1994. Canadians also head ISRM (John Franklin, Franklin Geotechnical, Ontario) and IAEG (Owen White, Ontario Geological Survey). At the ISSMFE meeting in Rio de Janeiro, Canada's delegation urged stronger support for communication between young geotechnologists and more consultation between ISSMFE and national societies in the nomination of membership of ISSMFE committees. The next meeting of the Council of ISSMFE will be in 1991 in Italy (Florence). IAEG sponsored a conference in Scotland in September 1989 and has similarly sponsored conferences scheduled in Holland (1990), Ivory Coast (1990), Brazil (1990), Israel (1991), USSR (1992), Bulgaria (1992) and Portugal (1994).

CGS continues its strong involvement in the Canadian contributions to the International Decade for Reduction of Natural Hazards (1990-2000) sponsored by the United Nations.

12. International Union of Geodesy and Geophysics (D. McDiarmid)

Gordon McBean (U.B.C.) serves on the Bureau of IUGG until the 1991 General Assembly in Vienna. IUGG has a very active Working Group on Global Change, with input from a number of Canadians who also contribute to the Canadian component of the International Geosphere-Biosphere Program, co-ordinated by the Royal Society of Canada.

13. International Union of Geological Sciences

13a. IUGS Commission for Comparative Planetology (R.A.F. Grieve)

Richard Grieve (GSC, Ottawa) continues as Secretary of the Commission and the Geological Survey of Canada aids with the expenses of the Secretariat. The Commission cosponsored the 20th Lunar and Planetary Science Conference, which was attended by scientists from over 20 countries; and organized microsymposia on comparative planetology in the U.S. and U.S.S.R. The Commission was also very much involved in activities at the 28th IGC (Washington) including organizing an All-Congress Colloquium on the Twentieth Anniversary of Apollo 11 and cosponsoring eight symposia on various facets of comparative planetology and earth evolution. Future activities will include cosponsorship of the Meteoritical Society Meeting, of the 21st Lunar and Planetary Science conference (with a special session focusing on Venus), of a workshop on impacts in the Precambrian, and production of a special issue of *Episodes* devoted to comparative planetology.

13b. IUGS Commission on Igneous and Metamorphic Petrogenesis (A.J. Naldrett)

Tony Naldrett's term as Chairman ended in July. Two very successful symposia were held during the IGC meetings in Washington: on Physical and Chemical Processes in Layered Intrusions and on Ultrametamorphism.

13c. IUGS Commission for the Global Sedimentary Geology Program (D.A. St. Onge)

The first major project of the Commission, Cretaceous Resources Events and Rhythms, is well underway with substantial Canadian involvement. A second is being planned, the Pangea Project, dealing with the Permian-Triassic coalescence of a supercontinent and related climatic, sedimentological and biotic changes. GSGP will jointly sponsor two international meetings in August 1990: the Congress of the International Association of Sedimentologists in Nottingham, England; and a meeting of the Cretaceous Resources, Events and Rhythms Project in Denver, U.S.A. The Canadian Committee for GSGP plans a 1991 Canadian symposia on non-marine Cretaceous correlation and high resolution sequence stratigraphy.

14. International Union for Quaternary Research (N.W. Rutter)

Nat Rutter (U. Alberta) continues as President of INQUA. INQUA is contributing to the planning of ICSU's International Geosphere-Biosphere Program, emphasizing the importance of understanding past global

changes in order to predict changes in the future. INQUA has expressed concerns about the scheduled 1991 INQUA Congress in Beijing in view of the events there in Spring 1989, but has received assurances from the Chinese authorities that the Congress can take place as planned.

In June 1990 the Canadian Quaternary Association will meet jointly with the American Quaternary Association at Waterloo with the prime theme "Rapid Change in the Quaternary Record".

15. Inter-Union Commission on the Lithosphere, International Lithosphere Program, and Canadian National Committee for the Dynamics and Evolution of the Lithosphere (CANDEL) (W.E. Davitt)

CANDEL has an advisory role in Canadian geoscience, it initiates new activities, fosters existing research projects and research by individuals, and advises decision-making bodies. It has a strong interest in several major projects: Lithoprobe, the Ocean Drilling Program, the Continental Drilling Program (a series of planning workshops have been jointly sponsored by CANDEL), the Global Change Program, and the Decade of Natural Hazard Reduction.

16. National Research Council's Committee for International Scientific and Technological Affiliations and the International Council of Scientific Unions (R.A. Price)

CISTA did not meet in 1989, a matter of considerable concern to the Standing Committee. The 23rd General Assembly of the International Council of Scientific Unions met in October in Lisbon, Portugal and included discussions of development of a strategy for the implementation of the International Geosphere-Biosphere Program. Parallel to these discussions, IUGS launched an initiative to assist ICSU in implementing the goals of IGBP by supplementing the earth science aspects. This initiative developed from recommendations from an IUGS task force on global change and is in accord with conclusions reached by a joint workshop between IUGS, UNESCO and the Swiss Academy of Natural Sciences. The initiative applies records of the past to assist in interpretation of the present and prediction of the future, strives for maximum geographic coverage with special emphasis on the Third World and will foster international co-operation at all levels. The Executive of IUGS has appointed a Steering Committee (including Ray Price, Queen's University, Kingston) to develop a program on earth processes and global changes for joint adoption by IUGS and UNESCO.

17. United Nations Educational, Scientific and Cultural Organization (A.J. Naldrett)

The Canadian Delegation to the UNESCO General Conference in October and November participated in the drafting of the Natural Science components of UNESCO's Third Medium-Term Plan. Canada has particular interests in the International Geosphere-Biosphere Program, the Decade for Natural Hazard Reduction as well as in programs in environment and natural resource management and concerning the places of science and technology in society. Tony Naldrett chairs IGCP, one of UNESCO's major scientific programs, another Canadian, Gordon Young (Wilfred Laurier U.) chairs the Intergovernmental Council of UNESCO's International Hydrological Program.

18. Canadian National Committee for the International Union of Geological Sciences (B.S. Norford)

CNC/IUGS is a committee of the Canadian Geoscience Council which is the adhering body for Canada to the International Union of Geological Sciences and to the quadrennial International Geological Congress. CNC/IUGS was very active in 1989. Acting with delegated authority from CGC, it appointed the formal delegation to represent Canada at the 1989 International Geological Congress held in Washington and to the concomitant meetings of the Council of the International Union of Geological Sciences. E.A. Babcock (GSC, Ottawa) headed the delegation. The Committee and the Delegation participated in the nomination process and election of the Executive Committee of IUGS to serve 1989 to 1992; a Canadian, W.G.E. Caldwell (Western Ontario U.) was elected as one of the eight Vice-Presidents of IUGS.

1989 saw the transfer of the editing and production of IUGS's quarterly newsmagazine, *Episodes*, to the United States after eleven years as a Canadian initiative. *Episodes* was started by W.W. Hutchison when he was Secretary-General of IUGS and under his editorship and those of Vera Lafferty and A.R. Berger, the magazine set high standards of effective scientific journalism.

At the Washington meetings of the Council of IUGS, an additional secretariat office was established in Trondheim, with generous financial support from the Norwegian Government. Pakistan and Vietnam were admitted as new members of IUGS and Costa Rica and Nicaragua were provisionally admitted; fees were raised in an attempt to counter financial constraints; and concern was expressed that there may be inadequate

input from the geological record to the International Geosphere-Biosphere Program concerning prehistoric global changes. A new steering committee on global change was appointed. IUGS Council will next meet in 1992 in Japan. Also in Washington, the winners of the first Hutchison Awards were presented, three talented young scientists from Argentina, Nigeria and Poland, whose participation in the International Geological Congress was made possible by grants from this fund.

Much of the activity of IUGS takes place within its many commissions, subcommissions, working-groups and collaborative projects; most of these had meetings at Washington. The International Geological Correlation Program (joint with UNESCO) is a prominent and very effective mechanism to co-ordinate international co-operation on global and regional geoscientific problems. A Canadian, A.J. Naldrett (University of Toronto) was appointed as Chairman of the Board of IGCP in 1989, as he concluded a term as Chairman of IUGS's Commission on Igneous and Metamorphic Petrogenesis. R.A.F. Grieve (GSC, Ottawa) continues as Secretary of the Commission on Comparative Planetology. GSC scientists chair the Subcommission on Devonian Stratigraphy (A.E.H. Pedder, Calgary), the Working-Groups on Cambrian-Ordovician Boundary (B.S. Norford, Calgary) and on the Permian-Triassic Boundary (E.T. Tozer, Ottawa), and the Committee on Quantitative Stratigraphy (F.M. Gradstein, Dartmouth). IUGS is also considering establishing a Commission on the Environment. Tony Berger (GSC, Ottawa) has been on a steering committee for this purpose. IUGS, with the Geoscience Information Society and GSC, will sponsor the 4th International Conference on Geoscience Information in Ottawa in late June 1990 with Tony Berger as General Chairman.

CNC/IUGS commented on formal recommendations for the formal subdivision of Proterozoic time and on global stratotypes for the Devonian-Carboniferous Boundary and for the Ordovician-Silurian Boundary. The Subcommission on Silurian Stratigraphy considered CNC/IUGS's criticism of the latter stratotype at its 1989 meeting and decided to postpone complete discussion to its 1992 meeting, meanwhile encouraging its members to assess the problem by scientific studies in the interim.

The 28th International Geological Congress held in Washington in July attracted nearly 6000 delegates, but this attendance was significantly smaller than was anticipated. Costs were high for scientists from overseas but special programs provided financial subsidy for some 76 scientists from less developed countries, largely with aid from UNESCO. Formal meetings of the IGC Council recognized the continuing need for such financial support, accepted an invitation from the Japanese Delegation that the 29th IGC be held in Kyoto in 1992, tabled an invitation from the Chinese Delegation that the 30th IGC be held in Beijing in 1996, and received a preliminary proposal from the Brazilian Delegation that the 31st IGC be held in South America in 2000, jointly sponsored by a consortium of Latin American nations.

B.S. Norford

REPORTS OF THE MEMBER SOCIETIES

1. Association of Exploration Geochemists (AEG)

Membership

Membership in the association has remained at the same level as for 1988, with just over 1000 fully paid members from over 50 countries. Canadian residents comprise about 30% of the membership.

Publications

The Journal of Geochemical Exploration is the official journal for the association. In addition to the publication of papers submitted to the Editor, three Special issues have been published this year:

1) Proceedings of the 12th International Geochemical Exploration Symposium and the 4th Symposium on Methods of Geochemical Prospecting. This meeting took place in Orleans, France (April 1987) and was co-sponsored by the AEG and the IAGC.

2) Geochemical Exploration in China - Proceedings of the 3rd Chinese Exploration Geochemistry Symposium held in Guilin (September 1986).

3) Exploration Geochemistry in Southern Africa - Proceedings of a symposium held in Pretoria (May 1987).

The AEG also publishes special issues on topical themes. For example a forthcoming issue will be devoted to epithermal gold deposits.

Symposia

The 13th International Geochemical Exploration Symposium was held in conjunction with the 2nd Symposium of the Brazilian Geochemical Society in Rio de Janeiro, Oct. 1-6, 1989. The meeting was followed by field trips to distant corners of Brazil to visit deposits ranging from iron ores to emeralds. This is the first meeting in South America that the AEG has sponsored, and it proved to be a technical and financial success. Of approximately 500 registrants, about one third were from outside of South America.

Forthcoming International Symposia are scheduled for Prague (1990); Reno (1991); and in Beijing in 1992 or 1993.

General developments

As with most scientific organizations, there is a continued drive to increase membership. For the AEG particular emphasis is placed on increasing international membership, and to this end, the AEG is investigating procedures to donate the Journal to worthy recipients in Third World countries. Letters have been sent, recently, to institutions with geoscientific interests in 37 countries to determine their interest in geochemical exploration. If a positive response is received they will receive the Journal free of cost.

New Regional Councillors

Eric Grunsky (CSIRO, Floreat Park) has recently filled a new position as second Regional Councillor for Australia, to represent members in Western Australia. A new AEG Australasian newsletter is being produced by the other Australian Councillor, Graham Taylor.

The new South African Councillor is Cecil Begley (Johannesburg). At this time the position of European Councillor is vacant.

Colin E.Dunn

2. Canadian Association of Geographers (CAG)

The CAG held its 1989 Annual Conference in Chicoutimi, May 29-June 2. This was attended by over 250 members and a number of field excursions complemented numerous paper sessions. The new Executive of the CAG consists of :

T. McGee President (University of British Columbia)
P. Villeneuve Vice President (Université Laval)
J.R. Wolforth Secretary - Treasurer (McGill University)

In addition, there are six Councillors, each of whom is responsible for a given subdiscipline in Geography. M-K. Woo (McMaster University) is responsible for physical geography and geoscientific activities of the CAG.

The 1990 Annual Meeting of the CAG will be held at the University of Edmonton, May 31-June 2. Issues of concern to physical geographers in 1989 continue to be centred upon (1) NSERC grants which continue to be approximately $5-7000.00 lower on average than to colleagues in Geology and Geophysics; (2) the accreditation of professional geoscientists and the fear that many geoscientists in the geographical and atmospheric scierices might be excluded; and (3) the creation of an International Geomorphology Association in Frankfurt, FRG in September, and the need for Canadian geomorphologists to have a national adhering body. With regard to (3) above, CANQUA, the Canadian Geoscience Council, or a separate Canadian National Committee have all been suggested as possible ways by which Canadian geomorphologists can be accommodated, recognizing that geomorphology is relevant not only to physical geography but also to the various Quaternary sciences, geotechnical engineering and sedimentology.

The CAG continues to publish *The Canadian Geographer* as well as *The Operational Geographer* four times a year. A decision taken at the 1989 annual meeting means that one issue per year of *The Canadian Geographer* will be devoted exclusively to topics of a physical geography or geoscientific interest.

The first CAG monograph, entitled "*Canada's Northern Environment*" and edited by H.M. French and O. Slaymaker, is in the final stages of preparation and will be published by McGill-Queens University Press in 1990.

H.M. French

3. Canadian Exploration Geophysical Society (KEGS)

The Canadian Exploration Geophysical Society (KEGS) wishes to report that 1989 was, overall, a successful year for KEGS and its members.

KEGS held nine monthly meetings during the year, breaking, as is customary, for the summer field season. The highlight of our speaker schedule was having Dr. Ken Babcock, Assistant Deputy Minister responsible for the GSC, address our annual "Eye Opener" Breakfast during the Prospectors and Developers' Meeting in March. Dr. Babcock spoke of the changes on-going at the GSC, due in part to the agency's expanding responsibilities in environmental monitoring.

KEGS has been very concerned about some of the changes made during the last five years and the effects these changes have had on the services provided to the mining geophysical community. As an expression of our concern, KEGS has sent several delegations to Ottawa to discuss concerns with GSC management and staff. While our people have been well received and our opinions duly noted, we feel that the Survey can't maneuver a great deal. KEGS sincerely hopes that the GSC will be successful in the 1990s at meeting all of the challenges it faces, including the strong support of the Survey's historical constituents.

R.N. Edwards

4. Canadian Geophysical Union (CGU)

The Canadian Geophysical Union, in its second year as an independent scientific society, experienced a rapid growth of membership from 300 to over 500. It is Canada's only national geophysical organization and as such has been active in bringing together and promoting all of the geophysical sciences.

To this end we have been involved in the advocacy of a stronger role in space measurement techniques and space geodynamics in Canada, in forging closer relations with sister societies representing aeronomy, oceanography, meteorology and geodesy and precise surveying, as well as nurturing our traditional strengths in crustal geophysics and physics of the Earth's interior. In recognition of our national role, we are also engaged in discussions of how to forge relations with francophone geophysicists and in making our society fully bilingual in both theory and practice.

Our major new initiative for this year was the launching of our Distinguished Lecturers Programme. Professor Ernest R. Kanasewich was nominated as our 1990 Distinguished Lecturer and has already made one leg of a cross Canada tour. We are planning a second eastern Canadian tour in the fall of 1990.

The 1989 CGU Annual Meeting took place in Montreal, May 17-19. A total of 179 papers were presented with Professor Tuzo Wilson delivering a major Public Lecture on "Mountains, Their Why and Wherefore". Special sessions in exploration geophysics were organized by IREM-MERI, and in honour of Professor Murray Telford. The Tuzo Wilson medal was awarded to Leonard S. Collett for a lifetime of distinguished work in exploration geophysics and in instrumentation. The Best Student Paper Award was made to Thomas A. Vandall of the Department of Geophysics at the University of Western Ontario. This prize, which is funded by an anonymous donor, has greatly increased the quality of presentations at CGU Annual Meetings as students engage in healthy competition for the award.

Our next Annual Meeting will be held in conjunction with the Canadian Institute of Surveying and Mapping at the Château-Laurier hotel in Ottawa, May 22-25, 1990.

D.E. Smylie

5. Canadian Geotechnical Society (CGS)

The Canadian Geotechnical Society represents some 1300 Geotechnical Engineers, Engineering Geologists, Rock Mechanics Engineers and Cold Regions Geotechnologists in Canada.

During 1989, the Society saw the finalization of its restructuring into four Divisions under the leadership of its new President, Dr. N.R. Morgenstern. These four Divisions and their chairmen are as follows:

Soil Mechanics and Foundations Division	G. Lefebvre
Engineering Geology Division	J.F. Gartner
Rock Mechanics Division	D.R. McCreath
Cold Regions Geotechnology Division	D.W. Hayley

In addition, the Society has the following Executive:

Vice President-Technical	B.E.W. Dowse
Vice President-Finance	M.S. Devata
Director General	A.G. Stermac

The annual Board of Directors meeting was held in Winnipeg on October 22, 1989, during the 42nd Annual Conference, that attracted about 175 delegates.

The Divisions will have increased responsibilities in the daily activities of the Society and in the annual conferences.

The Society has four standing committees:

Consulting Practices Committee	W.A. Trow, Chairman
Foundation Construction and Ground Improvement Committee	D. McCarthy, Chairman
Communications Committee	J.L. Seychuk, Chairman
Geosynthetics Committee	G.P. Raymond, Chairman

The Society has a permanent Secretariat situated in Rexdale, Ontario, comprising a full time Director General and a Secretary. From this central office, the activities of the four Divisional Chairman, ten Regional Directors, the Vice Presidents and the President - all of which are spread out across Canada - are co-ordinated by the Secretariat.

The real strength of the Society lies in the network of Local Sections which stretch from Vancouver Island to Newfoundland. These Sections are co-ordinated by the Vice President-Technical, and during 1989, they held more than 100 separate technical meetings in their respective centres.

The Society organizes and supports Cross Canada Lecturers. In the Fall of 1988, Dr. Roger Frank of France toured the country, speaking to the Local Sections, and in the Spring of 1989, Mr. Charles Ripley of British Columbia made the tour. Also, in the Spring of 1989, the Southern Ontario Section sponsored a seminar on Limit States Design which was well attended, and recommendations resulting from the seminar were forwarded to the National Research Council.

A highlight of the Winnipeg Conference was the presentation of the Society's awards. The prestigious R.F. Legget Award was presented to Dr. K.Y. Lo of Western University for his past and continuing contributions to geotechnique in Canada. The Engineering Geology Division presented the Thomas Roy Award to Mr. John McClung and Dr. Jack Mollard, and the Cold Regions Geotechnology Division presented the Roger Brown Award to Dr. Hugh French.

Plans were made for many activities in 1990 and beyond:

1990 - 43rd Annual Geotechnical Conference in Quebec City
- Cross Canada Lecture Tour for the Spring
1991 - 44th Annual Geotechnical Conference in Calgary
- 1st Canadian Conference on Environmental Geotechniques in Montreal
1992 - 45th Annual Geotechnical Conference in Toronto

The Society, through its Divisions, represents Canada on international associations and it is interesting to note that the Presidents of three international societies are Canadians and members of the Canadian Geotechnical Society.

International Society of Soil Mechanics and Foundation Engineers - President, Dr. N.R. Morgenstern, Alberta.
International Association of Engineering Geology - President, Dr. O. White, Ontario.
International Association of Rock Mechanics - President, Dr. J. Franklin, Ontario.

The Canadian Geotechnical Society is a learned society that represents its members in both a technical and social role on the national and international scene. This is done through its affiliations with the Canadian Geoscience Council, the Associate Committee on Geotechnical Research of the National Research Council, the International Society of Soil Mechanics and Foundation Engineers, the International Association of Engineering Geology, the International Association of Rock Mechanics, the International Permafrost Association, the International Association of Hydraulic Research and the International Symposium on Ground Freezing.

John F. Gartner

6. Canadian Institute of Mining and Metallurgy (CIMM)

The CIM continued its program of activities in 1989. The Institute publishes the *CIMM Bulletin* monthly; the *Journal of Canadian Petroleum Technology* bimonthly; the *Canadian Metallurgical Quarterly* and the *CIM Reporter* quarterly. The Institute awards a number of medals each year to recognize the contributions of individuals to the Canadian mining community through service, leadership or the publication of outstanding papers in selected scientific fields in the Bulletin.

The CIM held its 91st Annual General Meeting at Quebec City from April 30 to May 4, 1989. The theme of the meeting was "Minerals for the benefit of Canadians". Technical sessions, symposia, and field excursions were organized around the theme.

Tyson C. Birkett

7. International Association of Hydrogeologists: Canadian National Chapter (IAH-CNC)

The Canadian National Chapter of the International Association of Hydrogeologists has had an active year in 1989. Membership has continued to grow over the past year and is now about 300 strong. The membership

represents all areas of the country as follows: British Columbia 20, Alberta 40, Saskatchewan 10, Manitoba 10, Ontario 135, Quebec 40, New Brunswick 8, PEI 2, Nova Scotia 30, Newfoundland 2, and 15 foreign members.

A number of meetings have been held across the country on a variety of interesting hydrogeological topics. For example, Mr. J. Fox spoke to the Manitoba region on "Well Completion Techniques and Sampling Methodology" and Mr. I. Lorant presented an interesting paper to the Ontario section on "The Role of Hydrologists in Urban Drainage; Dilettantes, Dictators, Dedicators". Planning is also at the advanced stage for our next international conference in Calgary (April 1990) on "Subsurface Contamination by Immiscible Fluids".

A concern facing many geoscientists today is that of professional registration, this is particularly true for hydrogeologists. For the most part this has been brought about by poor practice associated with some individuals not recognized in the profession. Although professional registration is beyond the constitution of CNC-IAH, some of its members, particularly in British Columbia, Ontario and Newfoundland have been working with various groups to pursue registration with other provincial associations. This work is ongoing and the CNC-IAH fully supports the efforts of CGC in this regard.

R. Leech

8. Canadian Quaternary Association (CANQUA)

1989 was a busy year for CANQUA. The President, Alan V. Morgan, concluded his term of office with the eighth meeting of the Association held in late August in Edmonton. The new President (1989-1991) is Dr. Bruce Broster of the Department of Geology, University of New Brunswick, Fredericton. Some of the activities of the Association are highlighted below.

Global Change

CANQUA has been involved in the Proxy Data Resource Group, of the Royal Society of Canada, and is now attempting to complete a number of objectives.

One has been to create a master directory of Canadian researchers (or non-Canadians working in Canada) who are capable of contributing to the reconstruction of past climatic regimes. To this end a form letter was circulated with the April 1989 issue of the *CANQUA Newsletter/Bulletin.*

Another task of the Proxy Data Resource Group has been to propose different methods of involvement in the Programme for Canadian Quaternary workers. Proxy data research will concentrate on three different time frames to help resolve past climate change. The first of these will be the last one to two thousand years, probably on an annual to decade basis. The second will be the Holocene, and the third will be the last interglacial (presumably Isotope Stage 5e), although it may encompass all of Stage 5. The predominant activity of the Proxy Data Resource Group is to provide liaison with other Resource and Working Groups so that co-ordinated projects can be undertaken within the main Canadian Programme. Members of the Proxy Data Resource Group met December 1988, and again in November 1989, to try to resolve specific tasks and objectives for input to the main Canadian Programme. A major meeting on the Canadian Global Change Programme is planned for April 1990.

CNC-INQUA activities

The Canadian National Committee for INQUA, which consists of CANQUA members, has the responsibility for organizing the Canadian contribution to the XIIIth Congress which, despite recent events, will be held in Beijing, The People's Republic of China, in August 1991. Following the tragic events in Tiananmen Square in June 1989, the President of CANQUA wrote to Nat Rutter, President of INQUA, asking that INQUA Executive carefully examine the implications of supporting the locale of the XIIIth Congress. A letter from Rutter was received on August 9, 1989, stating that INQUA Executive had considered the question, and had "...unanimously agreed that the Beijing Congress should proceed as scheduled."

Given the decision that the Chinese Congress will continue, Canadian researchers will have to prepare for the 1991 Meeting. Research workers and departments will be contacted by CNC-INQUA during 1990 to see what they are planning for the Congress, and to offer assistance in expediting display materials to Beijing.

The Eighth Meeting of CANQUA

The Eighth Meeting of CANQUA was held in Edmonton, August 26 and 27, with a post-Meeting excursion until August 30. The theme of the Meeting was *"Late-Glacial and Post-Glacial Processes and Environments in Montane and Adjacent Areas"*. A report on this meeting is planned for *Geoscience Canada*.

Johnston Medal

The winner of the 1989 W.A. Johnston Medal, the Association's most meritorious award, is Dr. Aleksis Dreimanis, Professor Emeritus of the University of Western Ontario. I am sure that all Quaternary workers will be delighted to hear of this award. Prof. W. F. Mahaney presented the medal at the Annual Business Meeting of the Association held in Edmonton on August 26. A full report on the presentation will appear in *Géographie physique et Quaternaire*, and also in *Geolog*.

I am also pleased to announce that Aleksis was the winner of the German Quaternary Association's Albrecht Penck Medal for outstanding achievements in Quaternary Science. Aleksis is the first Canadian to win this award, and, coupled with the Johnston Medal award, it emphasizes his considerable contributions to Quaternary research on both sides of the Atlantic.

Membership numbers

Membership of CANQUA was at 107 following the INQUA Congress in Ottawa. During the last two years membership has gradually grown to 257. The Secretary-Treasurer, Ed Sado, has compiled a new Directory of Members which was distributed with the Fall *CANQUA Newsletter/Bulletin*.

Professional Registration

Whilst recognizing that many scientists involved in Quaternary research are usually "different" from most others, because we are often involved with more than one pure discipline, it must be recognized that some Quaternary workers are traditionally inclined, and must be allowed to register as professional earth scientists. Many of these are employed in the area of applied Quaternary research, and are involved with the consulting industry, or government, usually in the tasks of aggregate evaluation, foundation work in construction, hydrogeology, and other such fields. In the very near future these professional earth scientists will need to be registered in order to practise in many parts of Canada. This should not be perceived as a threat to those Quaternary researchers who will not be able to fulfil the criteria for professional registration.

The question of accreditation and the concerns expressed by CANQUA at the sixth (Lethbridge) meeting have been passed to the CGC Professional Registration Committee and to the Committee for Professional Registration of Geoscientists in Ontario. I hope to be in a position to keep Canadian Quaternary workers informed of the progress of the Committee's activities through the *CANQUA Newsletter/Bulletin*.

Alan V. Morgan

9. Canadian Society of Exploration Geophysicists (CSEG)

The CSEG had a very active year in 1989 in spite of the restructuring and downsizing experienced in so many Petroleum Companies. Membership is over 2000 and growing.

In addition to a monthly *Recorder* magazine, two technical Journals and an updated Photo-directory were published. The CSEG also played the lead role in publishing, in conjunction with the CSPG, the *"Geophysical Atlas of Western Canadian Hydrocarbon Pools"*. Approximately 1000 copies have been sold since June.

In 1989, as is the case every 5 years, an Annual Convention under the general theme "Exploration Update" was held in Calgary with the Canadian Society of Petroleum Geologists. Attendance was over 3200 and the affair was a Technical and financial success.

Monthly Technical Luncheons are the core of CSEG activities. Again this year, attendance averaged in excess of 600 for these Luncheon Presentations.

The Society has also continued to fund Geophysics Scholarships across Canada: approximately 30 were awarded. At the University of Calgary, an industry-funded consortium into elastic wave research is being supported and monitored by the CSEG.

Our 1990 National convention will be held in Calgary from May 15-17 at the Convention Centre.

Al Ferworn

10. Canadian Society of Petroleum Geologists (CSPG)

The Canadian Society of Petroleum Geologists, a national society, has as its major objective the promotion of sedimentary and petroleum geology. Despite the economic difficulties facing the petroleum industry in 1989, overall enrollment of the society rose by 2% to 3867 members.

Dissemination of knowledge and information continued to be the focus of much society activity. Four issues of the CSPG Bulletin and 11 issues of the newsletter, *Reservoir*, were published. Other publications include the *Geophysical Atlas of Western Canadian Hydrocarbon Pools* (published jointly with CSEG), Memoir 13 (*Reefs - Canada and Adjacent Areas*), Memoir 14 (*Devonian of the World*), and several short course notes, Core Conference guide books and Field Guidebooks. Additionally, the society co-sponsored publication of the *Palaeontographica Canadiana* series.

In 1989, the CSPG co-sponsored two major conferences: Exploration Update 1989, with CSEG, drew 3250 attendees; and Symposium on Clastic Tidal Deposits, with SEPM, drew 200. The annual conference had 520 participants. The Technical Program Committee organized 20 luncheon meetings with average attendance of 850. Seven courses were put on by the Continuing Education Committee while the National Conference on Earth Sciences, an annual specialist symposium jointly sponsored with the University of Alberta, was a huge success.

The society has ten technical divisions which held numerous meetings throughout the year.

The society continued its promotion of science and technology by sponsoring Youth Science Fairs, making awards at university student conferences and for best theses in petroleum and sedimentary geology, providing graduate student scholarships, national circulation of scientific displays, and sponsoring several national lecture tours. Dr. Kenneth Hare presented the annual Honorary address to an audience of 1000 scientists and lay persons. The Student Industry Field Trip Program annually brings a third year geology student from every university across Canada to Calgary for a week-long experience in oil company offices and in the field.

The society maintained numerous committees which liaised with other geoscience societies and organizations. Other committees ran very successful social events including an awards and dinner dance, golf and squash tournaments and newly-organized 10 km. road race.

The 1989 major CSPG award winners include: John Masters - Stanley Slipper Award for significant contributions to petroleum exploration in Canada; R. J. Hubbard - Medal of Merit for the best Canadian petroleum geology paper (honorable mention went to I. K. Sinclair); J. Allan and S. Creany of Esso - Link Award for the best luncheon speaker (honorable mention went to C. Campbell and G. Hassler); J. Dixon, D. Gardner and C. Keeping - President's award for outstanding service to the society; Best Ph.D. Thesis Award - Dr. H. Abercrombie (U of Calgary); Honorary Membership - Dr. Chuck Newmarch.

Finally, 1989 was a very successful year from a financial point of view with revenues exceeding expenses by some $160 000.

J. E. Klovan

11. Canadian Well Logging Society (CWLS)

The society was adversely affected by conditions in the petroleum industry, where attention was focussed more on cut backs and mergers than on exploration. Individual membership is down to 538, and corporate membership was reduced to 45 companies.

Despite this depressing scenario, the society remained active. The 12th Formation Evaluation Symposium was held successfully in September. The society also met ten times during the year for eight technical presentations and two talks of 'general interest'. Though the standard of presentations remained high, much of the technology is imported, and publishable material for the Journal is almost non existent.

The CWLS committee for standardization of Floppy Disk Format for Well Data has published its recommendations, and made available a specification package which includes hard copy and software. The format is called 'LAS' (Log ASCII standard). Service companies are already starting to make abridged floppy

disk data sets available at the well site in LAS format. The industry has been dogged by problems in recording and transmission of complete digital log suites on tape - caused partly by the volume and diversity of the measurements. The floppy disk procedure makes critical measurements over zones of interest available in much more timely fashion. This activity has attracted world-wide attention.

The CWLS is also moving to publish its formation water resistivity data in floppy disk format.

Ross Crain

12. Geological Association of Canada (GAC)

It has been a steady but successful year for the Geological Association of Canada. The Association's many Committees, Sections and Divisions continued to implement initiatives and plan for future events, all promoting geoscience in Canada. Evaluation of GAC activities, and policy formulation for committees and staff were carried out at joint meetings of Executive and Council held at Vancouver (twice) and Montreal; separate Executive meetings were held in Winnipeg and Ottawa.

The generally successful year for GAC was marred by the tragic death of Maureen Penney, the Association's Associate Secretary-Treasurer. She had served GAC faithfully and well over the past seven years, and will be missed by all who knew her. Headquarters staff and Maureen's family are grateful for the many expressions of sympathy.

There has been some reassignment and consolidation of duties for Headquarters staff in St. John's. Personnel and their GAC classifications are as follows: Karen Johnston, Associate Secretary (office manager); Yvonne Snow, Associate Treasurer; Arlene Kelly, Assistant Secretary-Treasurer; Celeste Andrews, Advertising Manager (part-time).

Membership in the Geological Association of Canada, including all categories, stood at 3015 as of December 31, 1989.

During the Annual Meeting in Montreal, D.J. Tempelman Kluit replaced J.M. Hamilton as President, J.M. Franklin became Vice-President and R.F. Blackwood continued as Secretary, John G. Malpas, who had been Secretary-Treasurer for the period 1983-1987 and Treasurer since 1987, stepped down from Executive and Council. His significant contribution to Canadian geoscience through GAC is well known within the Association and the community-at-large. H.G. Miller of Memorial University is the new Treasurer.

The GAC-MAC Joint Annual Meeting was held in Montreal in May. It was an extremely successful geoscience forum that was very well attended. General Chairman Colin Stearn and his Local Organizing Committee are to be commended for a job well done. At the Montreal meeting, GAC honoured several geoscientists with the presentation of the Association's medals. Receiving the awards for 1989 were: Thomas E. Krogh, Logan Medalist; John G. Malpas, Past President's Medalist; W. Glen E. Caldwell, J. Willis Ambrose Medalist; Gillis O. Allard, Duncan R. Derry Medalist (selected by GAC's Mineral Deposits Division); and E. Timothy Tozer, Elkanah Billings Medalist (selected by GAC's Paleontology Division).

Several GAC publications were released at the Annual Meeting in Montreal. Special Paper 35, *The Late Quaternary Development of the Champlain Sea Basin*, was edited by N.R. Gadd. The three volumes of Short Course Notes made available were: Number 5, *Microcomputer Graphics for Geoscientists*, edited by M.J. Reeves; Number 6, *Mineralization and Shear Zones*, edited by J.T. Bursnall; and Number 7, X-Ray *Fluorescence Analysis in the Geological Sciences: Advances in Methodology*, edited by S.T. Ahmedali. It was necessary to reprint Short course Notes Number 3, *Coal Petrology: its Principles, Methods and Applications*, edited by R.M. Bustin, A.R. Cameron, D.A. Grieve and W.D. Kalkreuth, and short Course Notes Number 6. Council also decided to reprint the popular Geoscience Canada Reprint Series Number 1, *Facies Models*, edited by R.G. Walker, and Number 3, *Ore Deposit Models*, edited by R.G. Roberts and P.A. Sheahan. One issue of the GAC-CSPG-sponsored *Palaeontographica Canadiana* was published in 1989; Number 6 in the series, *Sunwaptan (Upper Cambrian) Trilobites of the Cow Head Group, Western Newfoundland, Canada*, was written by R. Ludvigsen, S.R. Westrop and C.H. Kindle. Finally, production work on two other publications was completed in 1989 with printing expected in early 1990: Special Paper 36, *Sediment-Hosted Stratiform Copper Deposits*, edited by R.W. Boyle, A.C. Brown, C.W. Jefferson, E.C. Jowett and R.W. Kirkham; and Number 4 in the Geoscience Canada Reprint Series, *Diagenesis*, edited by I. McIlreath and D.W. Morrow.

One of GAC's most popular publications is the quarterly journal *Geoscience Canada*. The first three issues of 1989 were edited by Andrew Miall, who stepped down from the post late in the year after serving the journal and GAC for six years. His scientific and editorial leadership contributed significantly to the current eminence

of *Geoscience Canada*. Replacing Andrew is Dr. Michael E. Cherry of the Ontario Geological Survey. Monica Gaiswinkler Easton continues as the Managing Editor; her office is also at the Ontario Geological Survey. GAC's newsmagazine, *GEOLOG*, is edited by Michael Easton and Monica Gaiswinkler Easton; it continues to be much appreciated by members. Five issues of *GEOLOG* were published in 1989, instead of the usual four, to allow for better scheduling of news items and announcements over the year.

Much progress was made during the year on preparations for the GAC NUNA Research Conference on *"Late Proterozoic Rifting, Glaciation and Eustasy"*, to be held at Invermere in September 1990. Approval was also given during the year for a GAC NUNA Research Conference on *"Greenstone Gold and Crustal Evolution"*, to be held at Val d'Or in May 1990. The Val d'Or conference will be co-sponsored by the Society of Economic Geologists. And, of course, the Vancouver '90 Local Organizing Committee has been busy throughout the year preparing for the GAC-MAC Annual Meeting in May 1990.

GAC has a new Geophysics Division as the result of a founding meeting held on May 17, 1989, in Montreal. This will ensure that geophysics remains a vibrant part of GAC's program, particularly as a result of co-operative ventures with the Canadian Geophysical Union.

A significant initiative taken during 1989 was the opening of negotiations with L'Association professionelle des géologues et des géophysiciens du Québec (APGGQ) concerning closer involvement between this group and GAC. As a result, both Associations have agreed to associated-society status, which hopefully will improve geoscience communications within Québec and the rest of Canada.

Frank Blackwood

13. Mineralogical Association of Canada (MAC)

The Mineralogical Association of Canada has had an active and successful year, and continues to maintain a reasonably sound financial situation while engaging in an extensive scientific program. The *Canadian Mineralogist* is the quarterly journal of the Association, and continues to expand its coverage of all scientific fields to which mineralogy contributes.

The 34th Annual Meeting of MAC was held in May 1989, in Montreal, in conjunction with the Annual Meeting of the Geological Association of Canada. MAC sponsored two Short Courses, one before and one after the Meeting. Ian Hutcheon and Reinhardt Hesse put on a course on *Burial Diagenesis*, focusing on recent advances in rock-water-organic matter interaction; this provided an overview of organic diagenesis, inorganic-organic interactions, prediction of porosity loss, diagenetic mineral reactions, and modeling of fluid and mass transfer. Bill Petruk put on a course on *Image Analysis as applied to Mineral and Earth Sciences*; this focused on both recent advances in instrumentation (in particular, interfacing image analysis systems with SEMs and electron microprobes) and on applications, primarily in applied mineralogy. The material from both Short Courses is published as part of the MAC Short Course Notes series. In conjunction with ICAM (International Council on Applied Mineralogy) and CAMIMA (Commission on Applied Mineralogy of the International Mineralogical Association), MAC sponsored a Symposium on Applied Mineralogy. This ran in continuous session for most of the meeting, covering such topics as mineral beneficiation, mineral liberation analysis, coal, industrial minerals and metallurgy; MAC also sponsored a Special Session: 'Advances in the Study of the Platinum-Group Elements', organized by Murray Duke and Sarah-Jane Barnes, which focused on the diversity of environments recently targeted for PGE exploration, together with advances in analytical techniques. In addition, a Special Session on 'Burial Diagenesis: Closed versus Open Systems', organized by Ian Hutcheon and Reinhardt Hesse, followed on from the MAC Short Course, acting as a forum for recent advances in burial diagenesis.

Following the MAC Luncheon, the Association awards were presented. The Past-President's Medal was presented to Rob Kerrich, University of Saskatchewan. The Leonard G. Berry Medal, to recognize distinguished service to the Association, was awarded to Guy Perrault of L'École Polytechnique. The Hawley Medal is awarded each year to the author(s) of the paper judged to be the best of those published in the preceding year's volume of the Canadian Mineralogist. This year, it was won by Cecil Schneer of the University of New Hampshire for his paper on the 'Symmetry and Morphology of Snowflakes and Related Forms'.

Frank C. Hawthorne

REPORTS OF THE ASSOCIATE MEMBERS

1. Associate Committee on Geotechnical Research (ACGR-NRC)

The Associate Committee on Geotechnical Research, National Research Council of Canada (ACGR-NRCC) was established in 1945 to co-ordinate and stimulate research on the engineering and physical aspects of the terrain of Canada. Its objectives are carried out through Subcommittees on Marine Geotechnical Engineering, Permafrost, Snow and Ice, and Urban Engineering Terrain Problems, and Task Forces on Natural Hazard Reduction, and Earthquake Resistant Design. These are achieved through sponsorship of workshops, seminars, and the production of manuals, handbooks and other publications.

Following are highlights of activities during the past year:

- Workshop entitled "Performance Study of Molikpaq" in Vancouver, August 1988.
- Co-sponsored workshop with U.S. Committee on Permafrost on "Climatic Change and on permafrost; Significance to Science and Engineering", February 1989.
- Preparation of statement on research needs related to climate change and saline permafrost.
- Publishing a Bulletin on *Urban Terrain Problems*.
- Published the Proceedings of a Workshop on Ice Properties held in St. John's Newfoundland, June 21-22, 1988.
- Preparing 5-year Action Plan.
- Printed TM 125, *Peat Testing Manual* in French.
- Made submission on Cold Climate Technology to the Science Council of Canada.
- Made presentations to NRC's Task force on Global Warming.
- Co-sponsored Cross-Canada Lecture Tours with Canadian Geotechnical Society.
- Supported Conference on Limit States Design, Toronto, May 26 & 27, 1989, organized by Canadian Geotechnical Society.
- Co-sponsored a Workshop on Saline Permafrost, October 26, 1989 in Winnipeg.
- Authorized transfer of Canadian Geotechnical Fund to Geo-Contributions, to support future "Geotechnical" awards, scholarships and research.

M. Bozozuk

2. The Committee of Provincial Geologists (CPG)

The Committee of Provincial Geologists met twice during 1989: on March 5 in Toronto, at the annual convention of the Prospectors and Developers Association of Canada (PDAC), and on August 29 in Sudbury, during the Mines Ministers Conference.

Major activities of the Committee during the past year include publication of the *Provincial Geologists Journal*, organization of the Provincial Activities Session at the PDAC, and refinement, through the National Geological Surveys Committee, of procedures to coordinate development and implementation of Geoscience Information Systems.

Volume six of the *Provincial Geologists Journal* was published in March. The Journal continues to provide a ready source of information on provincial and territorial geoscience organizations, including geological survey expenditures, geological program highlights, mineral development agreements, hard rock drill core storage programs, and other provincial geoscience information. Volume six includes an article on the preparation of the geological atlas of the western Canada sedimentary basin, a multi institutional, multi-disciplinary compilation. It also initiates an annual review of discovery methods of mines that opened in Canada during the year preceding publication.

The Committee continued its liaison with the Prospectors and Developers Association, organizing the Provincial Activities Session and the provincial displays at the PDAC. Seven papers were presented at the Provincial Activities Session, as listed below:

- Gold Deposits of the Stewart-Iskut River Gold Belt, British Columbia;
  D.V. Lefebvre, British Columbia Geological Survey Branch
- Mineral Exploration Directed Activities of the Geological Services Branch, Manitoba;
  G.H. Gale, Manitoba Energy and Mines
- Geographic Information System (GIS) at the Ministère de l'Énergie et des Resources du Québec, MER-Mines;
  Luc Chauvin and Jean Louis Caty*, Ministère de l'Énergie et des Resources
- The Wawa Gold Camp: The Golden Goose;
  K.B. Heather, Ontario Geological Survey

- Geological Survey Impact on Mineral Discoveries: the Saskatchewan Experience;
  R. Macdonald*, L.S. Beck and T.I. Sibbald, Saskatchewan Energy and Mines
- Industrial Mineral Mining Activities and Development Opportunities in Nova Scotia;
  J. Fowler, Nova Scotia Department of Mines and Energy
- New Exploration Targets for Gold in Newfoundland and Labrador from Lake Sediment Geochemistry;
  P.H. Davenport, J.W. McConnell, A.J. Butler and L.W. Nolan, Newfoundland Geological Survey Branch

All provinces and territories, except Prince Edward Island, displayed results of their work in the "provincial room" during the three day convention. Discussions were continued with the PDA on a number of topics of mutual interest, including the public image of the mining industry, the availability of land for exploration, and the importance of establishing national standards in geoscience.

The Committee also continued its liaison with the Geological Survey of Canada through the National Geological Surveys Committee. These discussions have led to the formation of three separate subcommittees that will:

(1) facilitate co-operation and standardization in the development and implementation of Geoscience Information Systems

(2) develop standards for aeromagnetic surveys

(3) review geological map symbols in use in Canada

The recommendations of these subcommittees will be published in the *Provincial Geologists Journal*. The initial report of the subcommittee reviewing map symbols will appear in volume seven.

The brief of the Committee of Provincial Geologists to the Mines Ministers this year stressed the importance of federal-provincial/territorial co-operation in the geosciences. The brief recommends that the Mines Ministers endorse discussions by the Committee with the Geological Survey of Canada, which could lead to establishment of planning and operational co-operation.

Dr. L.S. Beck, who was one of the founding members of the Committee and who represented Saskatchewan on the Committee for many years, resigned in 1989. The Committee thanks Dr. Beck for his very significant contributions over the years and wishes him well in the future. The Committee welcomed two new members in 1989; Dr. Bob MacDonald, replacing Dr. Beck as Saskatchewan's representative, and Diana Purdy, representing the Alberta Department of Energy and Natural Resources.

B.A. Greene

3. Council of Chairmen of Canadian Earth Science Departments (CCCESD)

The data for Earth Science Departments are presented in Tables 8-13 and are plotted in Figures 1 and 2. The departments which responded to the questionnaire are listed in Table 20. Data from Geography Departments have been collected by P.G. Johnson and are presented in Tables 14-19. The departments which responded to the questionnaire are listed in Table 21. Data from Geography Departments are not included in Figures 1 and 2.

Methods of reporting and calculation are presented as footnotes to the tables. Because some departments did not report and some reports were ambiguous, a number of judgments had to be made.

There was a significant drop in registered B. Sc. students (years 2-4) and a smaller drop in students registered in M.Sc. programmes (763 to 736). There was a slight increase in Ph.D. registrations (480 to 512, see Table 1, Fig. 1).

Faculty and technical staff both increased in 1988-89 but administrative staff and PDF and Research Fellows show little change (Table 1, Fig. 2).

There were 51 M.Sc./41 Ph.D. visa students graduated in 1986-87 whereas the number graduated last year (1987-88) was 39 M.Sc./14 Ph.D., which represents a significant drop. The number of visa students enrolled in 1988-89 is 147 M.Sc./198 Ph.D., which compares to 115 M.Sc./157 Ph.D. enrolled in 1987-88.

The largest number of graduate students (M.Sc. and Ph.D.) enrolled in a single discipline is 171 students in Economic Geology. By contrast, sedimentology, stratigraphy and petroleum geology had a total enrollment of 165 students.

We wish to thank Mr. Scott Digel for his assistance in compiling these figures.

B.J. Fryer

E.D. Ghent

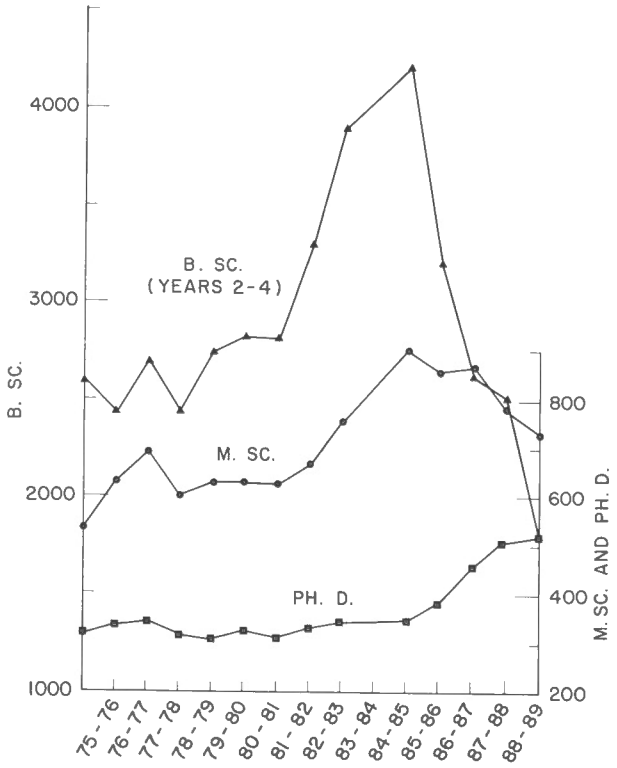

Figure 1. Student registration in Canadian Earth Science Departments.

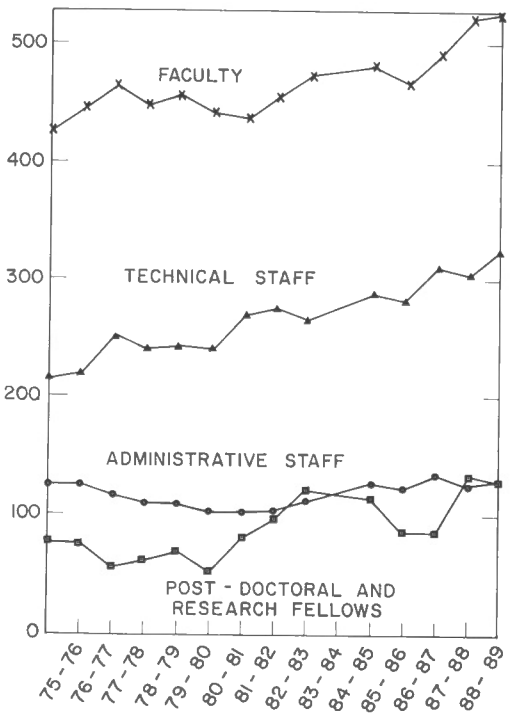

Figure 2. Staff numbers in Canadian Earth Science Departments.

Table 8. Student and Staff numbers in Canadian Earth Science Departments, 1986-1989.

Group	Year	Atlantic		Quebec		Ontario		Western		Total	
All students taking 1st	86-87	1291		66?		3171		2476		7004	
year and service	87-88	909	%F	300	%F	2946	%F	2360	%F	6516	%F
courses	88-89	910	25%	468	30%	3521	32%	2454	26%	7353	29%
2nd year majors:	86-87	92	20%	156	23%	282	23%	253	22%	783	23%
Arts & Science and	87-88	111	22%	141	28%	209	26%	190	%	651	33%
Engineering	88-89	94	17%	115	27%	189	23%	138	27%	536	24%
3rd year majors:	86-87	100	21%	130	33%	321	22%	288	17%	839	21%
Arts & Science and		*8	0%	*94	26%	*38	26%	*1	0%	*141	24%
Engineering	87-88	84	31%	62	29%	224	23%	319	24%	689	24%
		*0	0%	*133	16%	*18	5%	*2	0%	*153	15%
	88-89	82	18%	82	20%	200	24%	200	24%	564	23%
		*5	20%	*79	25%	*17	12%	*17	18%	*118	22%
4th year majors:	86-87	112	20%	70	16%	313	26%	380	17%	875	21%
Arts & Science and	87-88	107	14%	75	19%	262	18%	219	13%	663	16%
Engineering	88-89	82	18%	90	18%	205	24%	266	20%	643	21%
M.Sc.	86-87	103	30%	195	24%	333	24%	234	24%	865	25%
(full and part-time)	87-88	121	29%	188	22%	318	21%	136	24%	763	23%
	88-89	110	27%	128	30%	318	19%	180	24%	736	23%
Ph.D.	86-87	50	26%	76	14%	198	19%	134	9%	458	16%
(full and part-time)	87-88	87	18%	76	12%	208	18%	109	13%	480	16%
	88-89	85	16%	58	31%	225	19%	144	11%	512	18%
PDF and Research	86-87	1/17		5/15		2/31		4/15		12/78	
Associates**	87-88	16/20		10/13		3/45		6/20		35/98	
	88-89	4/27		1/14		16/28		14/28		35/97	
Faculty, full-time**	86-87	82/3		85/0		190/1		143/4		501/7	
	87-88	83/2		82/0		201/17		127/0		503/28	
	88-89	97/3		71/0		208/12		146/1		522/16	
URF's**	86-87	3/0		5/0		5/0		3/0		16/0	
	87-88	4/0		1/5		3/4		1/1		9/10	
	88-89	1/3		0/2		4/0		1/2		6/7	
NSERC Support***	88-89	106/139		21/79		166/264		133/197		426/679	
Adjuncts**	86-87	8/0		13/0		55/0		24/0		100/0	
	87-88	5/6		7/9		44/3		21/8		77/26	
	88-89	12/5		13/12		28/29		14/14		67/70	
Secretaries and	86-87	17/3		26/3		34/10		39/5		116/21	
Administrative	87-88	17/3		28/1		39/11		28/3		112/18	
Assistants**	88-89	13/1		22/6		39/9		32/10		106/26	
Technicians**	86-87	35/26		27/24		68/43		59/32		189/125	
	87-88	37/27		29/6		82/34		45/36		193/117	
	88-89	18/24		31/18		82/58		58/37		189/137	
Instructors and	86-87	4/0		10/0		22/0		13/0		49/0	
Demonstrators**	87-88	10/0		11/0		9/2		8/0		38/2	
	88-89	3/0		8/0		8/0		6/0		25/0	

* Three year B.Sc. - Final year

** Divided into University funded and non-university funded positions, respectively

*** Faculty eligible for NSERC grants.

%F Second figure for majors and graduate students is % female. Each year one or more departments fail to report, but it is rarely the same department from year to year; therefore, when this occurs, the figure from the previous year are used in the totals currently at the university (but not for graduations) to allow a more realistic assessment of trends.

When majors and graduate students are not separated into male and female, an average value of 23% from across Canada was used.

Table 9. Summary of student data for 1988-89 by program, gender, region, and visa or non-visa

Region	B.Sc.*		M.Sc.		Ph.D.		M.Sc. + Ph.D.		
(a) Enrolled (1988-89)	All	%F	All	%F	All	%F	All	%F	%Visa**
Atlantic Region	263	18	110	27	85	16	195	22	40
Quebec	366	23	128	30	58	31	186	30	25
Ontario	611	23	318	30	225	19	543	19	24
Western Canada	621	23	180	24	144	11	324	18	27
Total	1861	22	736	23	512	18	1248	21	27
(b) Graduated (1987-88)									
Atlantic Region	98	18	14	36	9	33	23	35	17
Quebec	107	25	36	14	9	11	45	13	13
Ontario	225	21	68	24	40	18	108	21	28
Western Canada	267	20	86	24	21	14	107	22	19
Total	697	21	204	23	79	18	273	22	22

* Years 2-4 only for B.Sc. enrollments
** Graduate students only

Where graduate students were not separated into visa and non-visa, an average Canadian value of 21% visa was used.

Table 10. Summary of B.Sc. registrations (years 2-4) and graduations for 1988 by discipline area, region, and gender

Discipline Area	Atlantic		Quebec		Ontario		Western		Total	
(a) Registered (1988-89)	All	%F	All	%F	All	%F	All	%F	All	%F
Geology	199	23	247	22	416	25	402	26	1264	24
Geophysics	17	6	4	20	69	13	112	11	202	11
Geological Engineer	44	2	66	30	127	13	108	15	245	22
Other	2	0	20	30	9	56	31	39	62	34
Total	262	18	337	24	621	22	653	22	1773	23
(b) Graduated (1986-87)										
Geology	84	18	77	26	156	26	158	19	475	22
Geophysics	7	14	0	0	31	6	71	24	109	18
Geological Engineer	7	28	22	18	35	9	30	20	94	16
Other	0	0	4	0	1	100	13	8	18	11
Total	98	18	103	23	223	21	272	20	696	18

Table 11. Graduate students graduated 1988-89 by subdiscipline

Subdiscipline	Atlantic				Quebec				Ontario				Western				Total			
	M.Sc.		Ph.D.		M.Sc.		Ph.D.		M.Sc.		Ph.D.		M.Sc.		Ph.D.		M.Sc.		Ph.D.	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Biogeography																				
Climatology																				
Coal Geology													1							
Economic Geology	1				4	1	1		12	6	5		5	2	3		22	9	9	
Exploration Geophysics			1				1				2		2	1			2	1	4	
General & Regional Geology					2								2				4			
Geochemistry-Exploration	1	1			3				1		1		1				6	1	1	
Geochemistry-Physical					1	1			4	1	1			2	1		5	4	2	
Geochemistry-Organic										1			1				1	1		
Geochemistry-Other					3					1	1				1		3	1	2	
Geochronology					1					1	1	1					1	1	1	1
Geodesy																				
Geodynamics									1								1			
Geological Engineering					1	1	1		3				3				7	1	1	
Geomagnetism & Paleomagnetism											1		2	1			2	1	1	
Geomathematics					1				4		2		2				7		2	
Geomorphology					1	1							1				2	1		
Geothermics										1								1		
Glaciology													1					1		
Gravity																	1			
Hydrogeology									4	2	1		3	2	1		7	4	2	
Hydrology																				
Limnology																				
Marine Geochemistry															2				2	
Marine Geology			1										3				3		1	
Marine Geophysics																				
Mineralogy & Crystallography						1				1		1	1		1		1	1	1	2
Paleontology									5		1		5	1	1		10	1	2	
Palynology			1						1	1							1	1	1	
Pedology																				
Petroleum Geology									1				8	2			9	2		
Petrology	3	2	2	1	3				3				1	2	1		10	4	3	1
Physical Oceanography				1									5		3	1	5		3	2
Quaternary Geology					1				1				1	2	1		3	2	1	
Remote Sensing													1				1			
Sedimentology	1		1		2		1		7		1		2	2			12	2	3	
Seismology									2				8		2	1	10		2	1
Stratigraphy	1				1				2				2				6			
Structural Geology & Tectonics				1	4		3	1	3	1	5	1	4	1			11	2	8	3
Volcanology	1				1					1	1						2	1	1	
Other		1							9	3	2			2		1	9	6	2	1
Total Canadian Students	6	5	8	3	26	5	8		46	18	21	2	51	18	12	2	129	46	49	7
Total Visa Students	1	1	2		5			1	13	2	4		15	2	6	1	34	5	12	2
TOTAL NUMBER STUDENTS	7	6	10	3	31	5	8	1	59	20	25	2	66	20	18	3	163	51	61	9
Where graduate students were not broken down into subdisciplines, their numbers are only accounted for in the total number of students.																				

Table 12. Graduate students currently enrolled by subdiscipline 1988-89

Subdiscipline	Atlantic				Quebec				Ontario				Western				Total			
	M.Sc.		Ph.D.		M.Sc.		Ph.D.		M.Sc.		Ph.D.		M.Sc.		Ph.D.		M.Sc.		Ph.D.	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Biogeography																				
Climatology																				
Coal Geology			1										3	1	2		3	1	3	
Economic Geology	15	2	6	1	26	11	10	1	39	2	36	4	12	2	4		92	17	56	6
Exploration Geophysics	6		5	2	9	2	2	1	11	1	1		10	1	6	1	36	4	14	4
General & Regional Geology					3		2		2			1	4			1	9		2	2
Geochemistry-Exploration	1				5		1		5	2	6		5		2	1	16	2	9	1
Geochemistry-Physical			3		3	2	4		15	12	10	5	2	1			20	15	17	5
Geochemistry-Organic	5	2		1					4	4	2	1		1			9	7	2	2
Geochemistry-Other					1	1		1	1	1	1	4	2		5	3	4	2	6	8
Geochronology	1	1			5	1	1		6	1	2	1	1		1		13	3	4	1
Geodesy																				
Geodynamics	1	1			1				6		4		1				9	1	4	
Geological Engineering	3	1	2		9	2	3		11		9		2	1	4		25	4	18	
Geomagnetism & Paleomagnetism					1	1	1		5		4		5		3	1	11	1	8	1
Geomathematics							2		5		3				1		5		6	
Geomorphology					1	1	2	1	1		3	2	1				3	1	5	3
Geothermics													1				1			
Glaciology													2	1	1		2	1	1	
Gravity													1				1			
Hydrogeology					4		4		19	9	8	5	1	1	3	1	24	10	15	6
Hydrology					3	2	1								4		3	2	5	
Limnology																				
Marine Geochemistry					1						3		6	2	1	2	7	2	4	2
Marine Geology	7	3	3		1	1	2	1					3	1			11	5	5	1
Marine Geophysics											2			1	4			1	6	
Mineralogy & Crystallography									5	3	6	1		1			5	4	6	1
Paleontology	3	2	6	1		1	1		10		6	2	7	4	8	1	20	7	21	4
Palynology	4							1			1		1		1		5		2	1
Pedology					2	1												2	1	
Petroleum Geology									2	1			7	3	6		9	4	6	
Petrology	15	8	2	1	7	6	5	3	18	4	10	2	5	3	6		45	21	23	6
Physical Oceanography	5		11										10	3	14	1	15	3	25	1
Quaternary Geology					17	4	1		9	2	2		4	2	5		30	8	8	
Remote Sensing									1		1				2		1		3	
Sedimentology	9	3	6	3	4		2	4	25	4	17	3	14	7	5		52	14	30	10
Seismology		1			1		2		8		7	2	9	2	18	1	18	3	27	3
Stratigraphy					5		4		3				6		2		14		6	
Structural Geology & Tectonics	7	1	10		16	6	10	2	15	3	17	8	8	5	9	1	46	15	46	11
Volcanology	1	1							2	1	2	1	1		1	1	4	2	3	2
Other	3	3	16	5					38	1	15		9	1	6		50	5	37	5
Total Canadian Students	65	22	34	2	113	35	41	11	214	54	123	26	106	39	67	11	498	150	265	50
Total Visa Students	21	8	37	12	20	6	18	2	49	5	49	16	34	4	59	5	124	23	163	35
TOTAL NUMBER STUDENTS	86	30	71	14	133	41	59	13	263	59	172	42	140	43	126	16	622	173	428	85
Where graduate students were not broken down into subdisciplines, their numbers are only accounted for in the total number of students.																				

Table 13. Summary of support staff/faculty ratios for two years

A. 1988-1989

(a) University Funded Region	Tech/Fac		Clerical/Fac		All/Fac*	
Atlantic Region	0.19	0.18	0.13	0.13	0.35	0.34
Quebec	0.43	0.43	0.31	0.31	0.86	0.86
Ontario	0.39	0.36	0.19	0.17	0.62	0.57
Western Canada	0.40	0.36	0.22	0.20	0.66	0.60
National	0.36	0.34	0.20	0.19	0.61	0.57
(b) All Sources Region						
Atlantic Region	0.42	0.31	0.14	0.10	0.59	0.44
Quebec	0.69	0.56	0.39	0.32	1.20	0.97
Ontario	0.67	0.52	0.22	0.18	0.94	0.73
Western Canada	0.65	0.49	0.29	0.22	0.97	0.74
National	0.62	0.48	0.25	0.19	0.90	0.71

B. 1987-1988

(a) University Funded Region	Tech/Fac		Clerical/Fac		All/Fac*	
Atlantic Region	0.50	0.39	0.19	0.15	0.68	0.53
Quebec	0.39	0.32	0.32	0.26	0.79	0.64
Ontario	0.46	0.38	0.20	0.16	0.66	0.54
Western Canada	0.38	0.32	0.22	0.19	0.60	0.50
National	0.43	0.35	0.22	0.18	0.66	0.54
(b) All Sources Region						
Atlantic Region	0.76	0.46	0.22	0.13	0.97	0.59
Quebec	0.63	0.50	0.43	0.34	1.01	0.79
Ontario	0.75	0.61	0.21	0.18	0.98	0.80
Western Canada	0.75	0.50	0.27	0.18	1.01	0.67
National	0.73	0.53	0.24	0.18	0.99	0.72

First value for faculty only. Second value includes Faculty, URF's, and Research Associates. All* = Technical + Clerical + Demonstrators.

Table 14. Student and staff numbers in Canadian Geography Departments, 1989

Group	Quebec		Ontario		Western		Total	
		%F		%F		%F		%F
All students taking 1st year & service courses	132	44	318	43	858	49	1308	47
Second year majors	22	27	364	26	39	33	425	27
Third year majors	43	26	334	24	14	14	391	24
			*130	27	*95	24	*280	33
Fourth year majors	-		109	32	12	8	121	30
M.Sc. (Part & Full-time)	-		56	38	29	17	85	31
Ph.D. (Part & Full-time)	-		11	55	17	24	28	36
PDF and Research Associates**	-		-		22/0		22/0	
Faculty, Full-time**	6/0		57/0		58/18		121/18	
NSERC Support**	-		13		19		32	
URF's**	-		7/12		-		7/12	
Adjuncts**	-		-		3/0		3/0	
Secretaries and Admin Assistants**	-		9/0		8/0		17/0	
Technicians**	1		7/0		13/0		20/0	
Instructors and Demonstrators**	-		2/0		-		2/0	

* Three year B.Sc. - final year
** Divided into University funded/non-university funded respectively
%F Percent female

Where students were not divided into male and female, an average value of 42% female from Geography departments from across Canada was used.

Table 15. Summary of student data from Canadian Geography Departments by program gender, region, and visa or non-visa

Region	B.Sc*		M.Sc.		Ph.D.		M.Sc. + Ph.D.		
(a) Enrolled (1988-89)	All	%F	All	%F	All	%F	All	%F	%Visa**
Quebec	197	38							
Ontario	809	34	57	35	11	55	58	37	5
Western Canada	1807	53	38	16	20	20	58	17	33
Total	2813	46	95	27	31	32	117	27	19
(b) Graduated (1987-88)									
Quebec									
Ontario	700	47	10	30			4	25	
Western Canada	133	26	12	8	6	17	18	11	61
Total	833	44	22	18	6	17	22	14	50

* Years 2-4 only for B.Sc. enrollments
** Graduate students only

Where graduate students were not separated into visa and non-visa, an average Canadian value of 21% visa was used.

Table 16. Summary of B.Sc. registrations (years 2-4) and graduations for 1988 by discipline area, region, and gender

Discipline Area	Quebec		Ontario		Western		Total	
(a) Registered (1988-89)	All	%F	All	%F	All	%F	All	%F
Geomorphology	19	26	269	32	163	31	451	31
Pedology	12	25	109	39			121	37
Climatology	19	26	167	49	153	29	339	38
Other	15	27	206	34	1428	33	1649	33
Total	65	26	751	37	1744	32	2560	34
(b) Graduated (1986-87)*								
Geomorphology			20	45	25	36	45	40
Pedology			6	50			6	50
Climatology			10	40	17	41	27	41
Other			109	46	97	32	206	39
Total			145	45	139	34	284	40

%F Percent Female

Table 17. Geography graduate students enrolled by subdiscipline, 1988-1989

Subdiscipline	Quebec				Ontario				Western				Total			
	M.Sc.		Ph.D.		M.Sc.		Ph.D.		M.Sc.		Ph.D.		M.Sc.		Ph.D.	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Biogeography					3	3					1		3	3	1	
Climatology					5	3	2		3		8	2	8	3	10	2
Geomorphology					11	5	3	4	9	3	6	1	20	8	9	5
Glaciology																
Hydrology					1	5		1	13	1	1		14	6	1	1
Limnology					1								1			
Meteorology																
Paleontology																
Palynology																
Pedology					5	3		1	1				6	3		1
Remote Sensing					1				3	1			4	1		
Other					3	1			3			1	6	1		1
Canadian Students					36	20	5	4	23	5	11		59	25	16	4
Visa Students					1			2	9	1	5	4	10	1	5	6
Total					37	20	5	6	32	6	16	4	69	26	21	10

Table 18. Geography graduate students graduated by subdiscipline, 1987-1988

Subdiscipline	Quebec				Ontario				Western				Total			
	M.Sc.		Ph.D.		M.Sc.		Ph.D.		M.Sc.		Ph.D.		M.Sc.		Ph.D.	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Biogeography					1					1			1	1		
Climatology									2		1		2		1	
Geomorphology					4	3			4		4	1	8	3		1
Glaciology																
Hydrology									3				3			
Limnology																
Meteorology																
Paleontology																
Palynology																
Pedology					2								2			
Remote Sensing									2				2			
Other									1				1			
Canadian Students					7	3			4		3		11	3	3	
Visa Students									7	1	2	1	7	1	2	1
Total					7	3			11	1	5	1	18	4	5	1

Table 19. Summary of support staff/faculty ratios for Geography Departments, 1988-1989

(a) University Funded Region	Technical/Fac		Clerical/Fac		All/Fac	
Quebec	0.17	0.17			0.17	0.17
Ontario	0.12	0.11	0.16	0.14	0.28	0.25
Western Canada	0.22	0.16	0.14	0.10	0.36	0.26
National	0.18	0.15	0.14	0.11	0.32	0.26
(b) All Sources Region						
Quebec	0.17	0.17			0.17	0.17
Ontario	0.12	0.09	0.16	0.11	0.28	0.20
Western Canada	0.17	0.13	0.11	0.08	0.28	0.21
National	0.16	0.12	0.12	0.09	0.28	0.21

First value is for faculty only. Second value includes Faculty, URF's and Research Associates. All* = Technical + Clerical + Demonstrators.

Table 20. University Earth Science Departments responding to poll

Atlantic Canada	Ontario	
Acadia	Brock	Toronto
Dalhousie	Carleton	Western Ontario
Memorial	Guelph	Windsor
Mount Allison	Lakehead	Waterloo
New Brunswick (Fredericton)	Laurentian	Queen's
New Brunswick (St. John)	McMaster	York
St. Francis Xavier	Ottawa	
St. Mary's		
Quebec	**Western Canada**	
Concordia	Alberta	
École Polytechnique	Brandon	
Laval	British Columbia	
McGill	Calgary	
Montréal	Manitoba	
Québec à Montréal	Regina	
Québec à Chicoutimi	Saskatchewan	
	Victoria	

Table 21. University Geography Departments responding to poll

Quebec	Western Canada
Université du Québec à Rimouski	Simon Fraser University
Université du Québec à Trois-Rivières	University of British Columbia
	University of Victoria
	Brandon University
Ontario	
Trent University	
McMaster University	
Guelph University	
Queen's University	
Wilfrid Laurier University	
University of Western Ontario	

4. Geological Survey of Canada

As the largest single geoscientific agency in Canada, the Survey must play a strong role in the co-ordination of geoscientific activities in Canada, in the setting of standards, and in the promotion of Canadian geoscience and geoscientists. As a federal agency it carries the further responsibility of supporting Canada's international geoscientific profile and its place in the larger world scientific community.

To carry out these responsibilities, the Survey works in six major program areas: **geoscience surveys, energy, minerals, environment, information, and Arctic logistics**. The highlights of the 1989 research program are as follows.

Geoscience Surveys

Consultation with provincial counterparts, industry and universities was used to define the scope and objectives of an important new initiative called the National Geoscience Mapping Program (NATMAP). NATMAP will be a co-operative, multidisciplinary program to improve the quality, relevance and completeness of bedrock and surficial geological database coverage. An interim steering committee has been set up to establish guidelines and procedures required to implement NATMAP.

New multichannel seismic reflection profiles gathered by the GSC across the Juan de Fuca Ridge, off Canada's West Coast, are providing insight into this very active seafloor spreading centre and its fascinating associated seafloor sulphide deposits. The profiles will help guide the final siting of holes that are to be drilled into the seafloor in this area in 1991 by the Ocean Drilling Program.

Other new multichannel seismic reflection profiles off Vancouver Island allowed GSC scientists to "see" to depths of 25 km into the Cascadia Subduction Zone. The principal fault contact between the crust of the Pacific Ocean and the overriding North American continent lies just off Vancouver Island, and is remarkably well imaged by the new data. It is along this fault that large magnitude earthquakes may occasionally occur.

In the Appalachian region of Quebec and Newfoundland, work from the new Quebec Geoscience Centre focused initially on structural and sedimentological investigations with a view to establishing a framework for metallogenic studies. Work in the Grenville Province was begun to identify critical geological units and tectonostratigraphic packages in Laurentide Park between Quebec City and Chicoutimi. Two other new projects will involve collaboration with the ministère de l'énergie et des ressources du Québec - one will investigate the tectonic significance of the Bostonnais Complex in Mauricie Region; the other will study geological relationships between parts of the Grenville metasedimentary belt in Western Quebec (Mont Laurier region) and Ontario. Surficial geological surveys were also conducted in previously unmapped areas of northern Canada, in several areas of high mineral potential in Quebec, and in the St. Lawrence Lowlands; these all will provide a basis for future environmental and engineering geological studies.

GSC continued its commitment to the national Lithoprobe program which aims to "map" the third dimension beneath the Canadian landmass and its surrounding oceans - of particular note: a seismic reflection survey in Newfoundland that provided new insight into the structure of the Appalachians, and a seismic refraction survey in British Columbia in collaboration with the United States Geological Survey and Canadian universities. Lithoprobe's success has also stimulated joint ventures with industry. For example, during the Newfoundland survey, BP-Selco partially funded and provided logistic support for work across Buchans Mine; interpretation of the survey results shows great potential for a better understanding of the geology of the region that will be of benefit to both parties.

Some 5600 line-kilometres of gravity and bathymetry data were collected in a marine survey of Lake Huron and Georgian Bay, and along seismic profiles in lakes Michigan and Huron in a co-operative project with the United States Geological Survey, Canadian Hydrographic Service and Canada Centre for Inland Waters. A preliminary Bouguer gravity anomaly map has been produced.

In the Yukon, the Glenlyon map sheet was completed. Field investigations in the Carmacks area led to the documentation of a large 1850 earthquake (the oldest historic earthquake in the Yukon) and provided evidence for the eruption of Volcano Mountain between 100 and 300 years ago. Understanding of these catastrophic geological events is critical to resolving planning and safety issues.

The world's oldest terrestrial rocks were discovered in the Northwest Territories. Their age of about 4 billion years old makes the rocks just a bit younger than the moon which is 4.6 billion years old.

As part of the Canada-Ontario Mineral Development Agreement (COMDA), GSC and the Ontario Geological Survey worked together to produce a surficial geology map of the Beardmore-Geraldton area, to be published by GSC shortly. The collaboration also resulted in the publication of high resolution aeromagnetic total field and gradiometer maps for the same region.

Energy

GSC and six major oil companies (Amoco Canada, Canadian Hunter, Esso Resources, Mobil Oil, Pan Canadian Petroleum, Petro-Canada) put the finishing touches to an agreement to undertake a high resolution aeromagnetic survey of southern Alberta. The survey will provide data about the energy-rich Western Canada Sedimentary Basin to all participants at very moderate cost. The survey work is expected to be carried out over the next three or four years. Under the proposed agreement, GSC will make the data public after five years.

Preparations for a quantitative assessment of the Western Canada Sedimentary Basin's natural gas resources is well underway: the delineation of Devonian gas plays in the western and northern segments of the basin are nearing completion, with work proceeding toward completing Devonian plays throughout the entire basin in 1990.

GSC scientists are also involved in a major collaborative venture with over 150 scientists from industry, government, and universities to produce the "Geological Atlas of the Western Canada Sedimentary Basin".

Natural geological stress is a factor in understanding the setting of sedimentary basins and the implications of certain exploitation or enhanced recovery schemes for petroleum. In 1989, GSC helped develop maps showing the distribution and magnitude of stress in Canadian sedimentary basins. There is growing interest in this topic for the Western Canada Basin, particularly as it relates to the design and implementation of suitable enhanced recovery techniques.

In the western Arctic, modeling of seismic refraction data recorded during previous surveys conducted from the Ice Island indicated the presence of hitherto unknown major sedimentary basins containing at least 12 km of sedimentary strata along the northwest coast of Ellesmere Island. Initial studies suggest that the basins may be similar to Beaufort Sea basins, with the implication that they too could be sources of oil and gas. GSC research also resulted in a new understanding of the hydrocarbon potential of the Bowser Basin, in northwestern B.C., and the Chilcotin-Nechako Basin.

GSC scientists collaborated with colleagues at the Institut Français du Petrole on applying the computer-based THEMIS model of basin evolution and hydrocarbon maturation and migration to the Williston Basin in southern Saskatchewan, North Dakota and Montana.

The GSC's unique capabilities in borehole logging were employed to assist in the development of a groundwater heat pump system for Carleton University. The system is now in operation, and it is anticipated that it will result in annual savings of $450,000 in the university's fuel bills.

Minerals

An integrated, multidisciplinary project to improve concepts and technologies applicable to exploration for massive base metal sulphide deposits was initiated in the Snow Lake area of Manitoba. The EXTECH (Exploration Science and Technology) project will develop integrated deposit models, enhanced airborne, ground and borehole geophysical techniques, surficial geochemical methods and GIS (Geographic Information System)-based data integration techniques. An important initial result of the Snow Lake studies was the identification of a zinc-rich stratigraphic marker capping the Chisel Lake orebody.

Borehole logging investigations were conducted in close co-operation with mining companies in Bathurst, New Brunswick; Kemptville and Moose River, Nova Scotia; and Timmins, Ontario. At Timmins, demonstration of an innovative "mise-à-la-masse" method resulted in a significant increase in estimated reserves of the Redstone Nickel Deposit.

Work in the Northwest Territories yielded important information on mineral potential. Two greenstone belts in the Whitehills - Tebek Lake area north of Baker Lake and near Rankin Inlet, respectively, are considered to have good potential for gold. Geological mapping has improved knowledge of the structure and stratigraphy of the two belts; both factors are considered important in the control of gold mineralization.

Seafloor minerals research continued to build momentum with the announcement that submarine massive sulphide deposits on the Juan de Fuca Ridge will be drilled in 1991 as part of the international Ocean Drilling Program. A major accomplishment this year was the successful sampling and analysis of sediment pore waters around seafloor hydrothermal vents. The chemical gradients observed in these fluids have important implications for the interpretation of geochemical anomalies associated with ancient deposits.

In Quebec, detailed mapping of sulphide deposits of the Upton and Acton Vale areas in the Eastern Townships was carried out. Work on exhalites and sulphide mineralization associated with black shales of this region is continuing. In the Grenville Province studies of the extension of Archean greenstone belt rocks (Abitibi Belt) into the Grenville have begun, with the objective of identifying favourable zones for base metals exploration.

As part of its ongoing program to revise obsolete geological maps, GSC scientists discovered that gold bearing strata associated with the rich Eskay Creek gold prospect in British Columbia extend at least 50 km north and south of the discovery. This horizon was previously unrecognized as having any economic potential for precious metal mineral deposits.

In a joint, one-year co-operative mapping project in the Yukon, GSC and DIAND geologists made two important mineral discoveries of base metal deposits (lead and zinc sulphides). Logistics co-ordination with a geological consulting company working in the region, allowed field work for three 1:50 000 map areas to be completed in just three months.

Environment

GSC started a new environmental geochemistry project; its four themes are baseline geochemical data, natural radioactivity, natural acidity, and hydrogeology. Examples of work underway include: an evaluation with the Saskatchewan Department of the Environment and Public Safety of a potential problem associated with the decommissioning of open pit uranium mines; airborne and ground radioactivity mapping to determine the potential radon hazard in buildings on various soil types in southern Manitoba; a study with Health and Welfare

Canada to evaluate potential radon hazards on Indian reserves across Canada; and analyses to determine the extent of contamination from arsenic used in wood preservatives on childrens' play structures.

The GSC operates a national network of seismological observatories to monitor seismicity and assess earthquake hazard. Of particular note, Eastern Canada's largest earthquake in 65 years took place Christmas Day, 1989, in the unpopulated interior of the Ungava peninsula of northernmost Quebec; it was felt quite strongly in the isolated coastal communities but no damage was reported.

GSC, Fisheries and Oceans, and Environment Canada released a joint report on the marine environmental quality of Halifax Harbour. The results show that the degree of heavy metal contamination in the harbour is greater than that of others in Eastern Canada. It also indicates, however, that most of the metals are bound in the sediments and are quite insoluble under these conditions. Research continues to determine the extent to which these metals may be remobilized by the implementation of a proposed sewage treatment system.

Recent volcanological studies and geological mapping in western North America suggest that a volcanic eruption can be expected somewhere within the Canadian Cordillera within the next 100 years. GSC has started work on an appropriate response plan.

The geological record is a crucial baseline of past environmental change from which we can reconstruct past global change, monitor contemporary change, and predict future impacts. The GSC, therefore, has an important contribution to make to the international Global Change initiative. During 1989, GSC set up a second Global Change "observatory" in the Mackenzie Valley to complement the one at Hot Weather Creek on Ellesmere Island; in both areas environmental variables affecting vegetation distribution, ground ice conditions and permafrost, and rates of geomorphic processes are monitored, recorded, and analyzed.

Data compilation and interpretation have begun for a series of paleoenvironmental maps (of selected time intervals) for northern North America depicting oceanographic data and the distribution of glacial ice, seas, major lakes, vegetation, and permafrost zones. The maps, which are based on an extensive paleoecological database, will be a useful guide to evaluating future changes in regional environmental conditions. Another series of maps will depict the possible effects of environmental changes on geological processes and the potential impact on the Canadian landmass.

A GSC/university/industry team has made a discovery that may have important archeological implications. While studying a sediment core from the continental shelf seafloor just north of Vancouver Island, they found the first incontrovertible evidence that the sea level in this area was at least 95 m lower relative to land 10 500 years ago; the results also indicate that when the sea level rose it did so with unusual rapidity. If humans were present on the West Coast 10 000 to 11 000 years ago, as seems likely, they may have occupied large areas of the continental shelf that are now covered by the sea.

Information

The GSC's annual Current Activities Forum, held in Ottawa, January 1989, took the environment and public safety as its theme; it attracted over 700 participants. The 1989 Western Canada Coal Geoscience Forum, which was co-sponsored by GSC, Alberta Geological Survey, and B.C. Geological Survey, was another major venue for information exchange.

GSC scientists participated in a popular series of public lectures on "Geological Hazards in British Columbia", sponsored by the Vancouver Natural History Society and the Geological Association of Canada. The talks covered earthquakes, volcanoes, landslides, and the potential effects of global warming on coastal stability and mountain floods.

A special issue of GEOS, based on papers written by GSC scientists, provided an overview of the GSC's contribution to Global Change research. It has been enthusiastically received by the scientific community and the public, and will be part of the information package for Environment Canada's Green Plan.

Over 6 200 pages of new scientific text were published, and 10 864 pages of GSC open file reports. Co-operation between GSC, provincial geological surveys and the National Geological Surveys Committee resulted in the new Canadian Geoscience Data Directory. This useful compilation is a significant addition to computer-based literature.

Important new publications

The first volume of the "Geology of Canada" series, *Quaternary Geology of Canada and Greenland,* neared publication, with a deadline of January 1990 for both the English and French versions. Representing the work

of 63 researchers from federal and provincial governments, universities, and industry, it will stand for decades as the definitive text on the Quaternary of Canada. Work on the next two volumes - *"Geology of the Continental Margin of Eastern Canada"* and *"Geology of the Innuitan Orogen and Arctic Platform of Canada and Greenland "* - also nears completion.

A unique *Circum-Arctic geological map* (at the 1.6 million scale) was the result of collaboration between GSC scientists and their Soviet colleagues under the Canada/USSR Arctic Exchange Agreement. It was presented to the Soviets during the Prime Minister's visit to the USSR in the fall of 1989.

Coal Resources of Canada, published in April 1989, was acclaimed by the Canadian coal industry as "the finest, most complete assessment of this resource ever available in Canada"

The *Labrador Sea Basin Atlas*, the first in a series of East Coast Basin Atlases, was published, and work on subsequent atlases proceeded: the Scotian Shelf Atlas is expected by June 1990; data for the Grand Banks Atlas should be ready for scientific review in the fall of 1990.

The first seven maps in the new *Canadian Geophysical Atlas Series* were published. At a scale of 1:10 million, the maps portray various aspects of the gravitational field over Canada. Future issues will cover aeromagnetic and geomagnetic fields, seismicity and seismic risk.

A comprehensive investigation of minerals present in the Hemlo gold deposits culminated with the publication *The Mineralogy and Geochemistry of the Hemlo Gold Deposit, Ontario* (Economic Geology Report 38).

Arctic

The Polar Continental Shelf Project (PCSP) runs a sophisticated logistics network that allows scientists to conduct research safely and efficiently in the Canadian Arctic. PCSP experienced one of its busiest field seasons in 1989. It provided logistics support to 220 science research groups from federal and territorial agencies and Canadian universities, and to 13 artists working under the joint PCSP-Canada Council Arctic Awareness Program.

With the completion of a major two-year renovation and reconstruction of its base facilities at Resolute and Tuktoyaktuk this year, PCSP is now well placed to meet the growing challenges of supporting science in the Canadian Arctic beyond the turn of the century.

The Ice Island Research Station was also upgraded. A co-operative National Research Council-Memorial University ice structure study was conducted from this unique research platform, adrift in the Arctic Ocean.

Other major projects supported by PCSP included a climatology-vegetation-soil hydrology study at GSC's High Arctic Global Change Observatory at Hot Weather Creek on Ellesmere Island; completion of a GSC/Fisheries and Oceans reconnaissance bathymetry survey north of Parry Channel; wildlife studies by the Yukon and Northwest Territories governments and the Canadian Museum of Natural Sciences; and the Canada-China Dinosaur Project.

PCSP, Atmospheric Environment Service and Parks Canada initiated a long term cleanup project in the Arctic, with the removal of 4800 empty oil drums from Eureka on Ellesmere Island; these were returned south for recycling.

International co-operation

The very successful Canada/USSR Arctic Science Exchange Programme was extended for another two years with the negotiation of a new Protocol in September 1989 in Leningrad. Jointly produced paleogeographic maps and correlation charts of the Arctic circum-polar region neared completion; these will provide a valuable resource for interpretation of the development of the Arctic Ocean Basin. Another achievement was a Quaternary map of the land portion of North America; this will be integrated into a Quaternary map of the Arctic to be published jointly with the Soviets.

GSC provided scientific supervision to Canadian International Development Agency (CIDA)-funded airborne geophysical surveys in Thailand and Zimbabwe; Both projects were successfully completed during the year, and resulted in substantial contract revenues for the Canadian geophysical service industry.

Working with the Pan American Institute of Geography and History (PAIGH), the GSC is involved in a series of informal bilateral agreements with various Latin American countries to help produce their national gravity maps. The gravity map of Venezuela, published recently by the Universidad Simon Bolivar (USB)

and the Direccion de Cartographia Nacional (DCN), is the first of this series. The second, for Bolivia, is in production.

New Services, facilities and programs

Minister Epp opened the newly refurbished **Yellowknife Seismic Array** in September 1989; the ceremony was attended by delegates from 21 countries concerned with the detection and discrimination of underground nuclear explosions. The new facility, which was the result of a three-year, $3.5 million upgrade, has already made an outstanding contribution to an international data exchange experiment which started in January 1990. Of the 30 stations worldwide which contributed data during this initial phase of the experiment, the Yellowknife array was consistently amongst the top three in its capability to detect seismic events worldwide.

The GSC's **geomagnetic activity forecasting service** has been upgraded to a seven-day-per-week operation to provide more timely forecasts and data for users such as Hydro-Quebec and Ontario Hydro. Geomagnetic storms disrupted power, communications and navigation systems on a number of occasions during the year.

The new **Canadian Superconducting Gravimeter Installation** at Cantley, Quebec is a joint project involving seven Canadian universities and the GSC. The equipment is one of the principal tools of modern geodynamics. It will be used in the search for oscillations of the Earth's liquid core and the origin of the Earth's magnetic field, to support tidal analysis and space research (Very Long Baseline Interferometry) (VLBI) and for studies of earthquake precursors. GSC provides the site and monitors the gravimeter's performance.

GSC's new **Communications and Marketing Service** ensured that the results and implications of GSC's research program were more widely publicized. Activities of particular note included a major GSC display at the International Geological Congress (Washington, D.C. - July 1989), the publication of a "new look" annual review of research results, and more agressive marketing of GSC publications.

Research grants

Funds available to the EMR Research Agreements Program increased by 50% (to $2 million) following the successful negotiation of a co-operative financial arrangement with the Natural Sciences and Engineering Research Council. As a result, the program, which GSC administers on behalf of EMR, was able to award 209 grants for 1990 to recipients in 39 research centres across Canada - a significant increase from the 178 grants in 1989.

Christy Vodden

5. Academy of Sciences of the Royal Society of Canada (RSC)

The Earth Sciences Section of the Academy of Sciences represents areas within the Royal Society of Canada of broad interest to the CGC. Newly elected earth science Fellows for 1989 were Gary Clarke (University of British Columbia), Roy Hyndman (Pacific Geoscience Centre) and Noel James (Queen's University). Steve Scott from the University of Toronto has moved up from Rapporteur to Convenor, taking over from Michael Rochester of Memorial University. Charlotte Keen of the Atlantic Geoscience Centre is the new Rapporteur. Their terms of office will be shorter than usual because of a planned reorganization of the Academy of Sciences which is to take effect in 1990.

A Committee to Reorganize the Academy of Sciences (CORAS), chaired by Chris Barnes, Vice President of the Academy, late of the Geological Survey of Canada and now at the University of Victoria, has proposed sweeping changes aimed at streamlining the venerable Academy by removing artificial discipline barriers and making the Academy more responsive to Canada's needs. There are presently 10 subject divisions within the Academy of Sciences of which Earth Sciences with 105 Fellows is the largest and is out of proportion to the numbers of earth scientists in Canada relative to other disciplines. Through CORAS, Earth Science Fellows will be joined by others primarily from the present Interdisciplinary Section to form a new Division of Earth and Space Sciences. The other three divisions are Life Sciences (the largest), Applied Science and Engineering, and Physical and Mathematical Sciences.

Reorganization of the Academy of Sciences is only one of a number of initiatives that the Royal Society is undertaking in response to $5 million in arms-length funding over a five year period from the federal government which will enable the Society to fulfill its role, without interference from governments, as an

independent national academy for the sciences, arts and humanities in Canada. The Society has published both a corporate plan, which will be the blueprint for its activities, and a plan of affirmative action to involve more women, Francophones and minorities. It has accepted the federal government's request to assess research in Canada beginning with universities, which is presently underway under the chairmanship of Peter Larkin from UBC. Paul LeBlond, also of UBC, is chairing a committee looking into Canada's involvement in the International Council of Scientific Unions (ICSU) which is currently handled through NRC.

Of the many research studies underway with participation by the Royal Society of Canada, those of interest to CGC include the International Decade for Natural Disaster Reduction and the International Geosphere/Biosphere Program (Global Change). Ward Neale's Advisory Committee on the Public Awareness of Science is making strong inroads and has produced an informative newsletter, *OYEZ*[3]. The Society is actively pursuing exchange programs with the national academies of other countries and, at home, is developing links with the fledgling National Academy of Engineering and the proposed National Society of Academic Physicians.

Earth Science Fellows play leading roles in the affairs of the Royal Society of Canada. Special mention is made of the contributions by Digby McLaren (President of the Society) who will be succeeded in June 1990 by His Honour Jules Deschenes, Michael Dence (Executive Director), Chris Barnes (Chairman of the CORAS Committee Academy Program Chairman and newly elected Vice President of Academy III), Charlie Smith (Society Foreign Secretary, CISTA, Canadian Commission for UNESCO, RSC/Academy of Engineering Committee on the International Decade for Natural Disaster Reduction), Denis Shaw (Chairman of the Society Awards and Medals Committee), Bob Folinsbee (Financial Control Committee), Ward Neale (Chairman of the Advisory Committee on Public Appreciation of the Sciences), Dick Peltier (Chairman of the Canadian National Committee for the International Geosphere/Biosphere Program) and Norbert Morgenstern (RSC/Academy of Engineering Committee on the International Decade for Natural Disaster Reduction).

Steven Scott

REPORTS OF THE STANDING COMMITTEES

1. Education Committee Report (EdGEO)

1989 was an active year for EdGeo. Five workshops were held across Canada. In Alberta the Tyrrell Museum of Palaeontology hosted 25 attendees in a five day workshop. In Edmonton 16 teachers attended a one day workshop on May 26. The activity was entitled *"Changes of the Earth"* and was developed specifically for the Grade 7 curriculum unit.

The Winnipeg group of EdGEO hosted 29 teachers from High and Junior-High schools on the last weekend of May. The catchment was from all over Manitoba. The same weekend saw 14 southern Ontario High school teachers and four instructors from Science North participating in a field trip to Manitoulin Island and Whitefish Falls. This group was hosted by Peter Russell and Mario Coniglio of the Department of Earth Sciences at the University of Waterloo. The Field Guide of the excursion was published in the Waterloo newsletter *Wat On Earth*.

A workshop on Global Change, and an associated field trip was hosted by the New Brunswick Museum in late September. Fifteen teachers from across New Brunswick were introduced to the theme by Kim Saunders (Natural Sciences Education Co-ordinator at the Museum), Randall Miller (Head, Natural Sciences Division) and Dianne Buhay. The lectures on Global Change and teaching activities were given by Alan Morgan (University of Waterloo). The activities of the day were published in *Geoscience Canada*, (v. 16 (4)).

P.J. Savage

2. Marine Geosciences Committee

Report not submitted.

3. Professional Registration Committee

The Professional Registration Committee of the CGC had a very active year in 1989. The CGC has continued to expand the Committee to provide both discipline and regional representation. Current committee membership includes Bill Brisbin (Geology) of University of Manitoba, John Gale (Engineering Geology) of Memorial University as Chairman, John Maher (Petroleum Geology) of Polaris Petroleum, Calgary, Ron McMillan (Economic Geology) of Westmin Minerals, Toronto, Hugh Miller (Geophysics) of Memorial University, St. John's, Nfld, Neil O'Donnell (Quaternary) of Syncrude Canada, Fort McMurray, Bill Pearson (Mining) of Derry, Michener, Booth and Wahl, Toronto, and Al Sinclair (Economic Geology) of UBC, Vancouver. We plan to add representatives and liaison members from Yukon and Northwest Territories, Saskatchewan, Quebec, New Brunswick, Nova Scotia and Prince Edward Island, APEGGA, APEGN and the CGC member societies during the early part of 1990.

We are attempting to have the full committee in place by early March 1990. This will include representatives from across the country, covering the different specialities and interest groups. We envision a main committee of about 12 to 15 members, with a larger committee including liaison members from CGC member societies and the provincial/territorial registration bodies. Our preference is that each provincial/territorial committee that is investigating professional registration of geoscientists be affiliated with the national committee and in turn designate someone as a liaison member to the national committee. The CGC national committee will only assist with the definition of general goals for the affiliated committees to ensure that as much as possible similar registration structures will emerge in each jurisdiction.

The CGC Professional Registration Committee's agenda was outlined in the last annual report and consists of:

1. Providing an updated report on the current status and plans for registration of geoscientists by province and territory by May of 1989.

2. Developing a vehicle for transferring registered status from one province to another,

3. Evaluating the different models that could be used if nationwide accreditation becomes a reality, and

4. Organizing and preparing material to support a lobby effort for registration of geoscientists in other provinces.

Item one was completed on schedule with the help of the GAC Professional Affairs Committee chaired by Ron Smyth. The committee continues to work on the remaining three agenda items. The CGC Professional Registration Committee members assisted with the formation of an ad-hoc committee in Ontario in order to determine the need for and interest in professional registration within the Ontario geoscience community. The Ontario committee chaired by Bill Pearson circulated a questionnaire and obtained a strong mandate to proceed with the registration of geoscientists in Ontario. The Ontario committee is organized and financially supported as an affiliated committee of the CGC Professional Registration Committee.

At the December/1989 meeting of the CGC in Ottawa the member societies approved a motion stating that "the CGC urges that the CGC member societies agree to designate the Canadian Geoscience Council and hence the Professional Registration Committee of the Canadian Geoscience Council as the co-ordinator of any actions regarding professional registration". The CGC will ask each member society to provide a letter acknowledging its agreement with this motion and formally designating the CGC as the co-ordinator. This is an important step in ensuring that geoscientists will speak with one voice on the registration issue, especially when we discuss issues with the CCPE, APEGGA and APEGN and other bodies with jurisdiction in this area. The main agenda items in these meetings with CCPE, APEGGA and APEGN will be the structure of a national coordinating body for Professional Geoscientists and whether a parallel but interlinked structure with the CCPE is an option for geoscientists and the availability of funds to the CGC Professional Registration Committee that are currently being collected from geoscientists by the professional bodies.

J. Gale

4. Lithoprobe

Lithoprobe is the largest earth science research project ever undertaken in Canada. It is a network of centres of excellence involving a collaborative, multidisciplinary investigation of the nature and evalution of the Earth's lithosphere beneath the Canadian landmass and surrounding oceans. Lithoprobe was funded in 1984-85 for a 1-year Phase I preliminary program. This led to full establishment of the project in 1987 with a 5-year Phase II scientific program, subject to review during the third year with the possibility of preparing another 5-year program. 1989-90 was the third year and Lithoprobe's response to the opportunity has been the preparation of a continuing 5-year program presented to the funding agencies, NSERC and GSC, in early January 1990 as *"Lithoprobe Phase III Proposal - The Evolution of a Continent"*. This represented the major activity of the Secretariat during 1989. Significant input to the document was received from the Board of Directors at a meeting in September and from the Scientific committee, Transect Leaders, standing Subcommittees and individual scientists through written comments.

The process was initiated in August 1988 with a national call for new transect proposals to be incorporated into the continuing project. Seven such proposals were submitted; evaluation was coordinated through the ad hoc New Transects Evaluation Subcommittee and consisted of extensive national and international peer review. Following this input, the Board of Directors and Scientific Committee at meetings in March 1989 recommended 3 new transects — Trans-Hudson Orogen, Eastern Canadian Shield Onshore-Offshore and Alberta Basement — to be included as part of the Phase III proposal. these complement the studies in the existing 5 active transects: Kapuskasing Structural Zone, Southern Cordillera, Lithoprobe East, Abitibi-Grenville, and the Great Lakes International Multidisciplinary Program on Crustal Evolution. Together, the 8 transects represent a concerted and co-ordinated multidisciplinary study of the evolution of the continent.

While the new proposal was being prepared, scientific activities continued on the 5 original transects. The unique and highly successful Lithoprobe University Supporting Geoscience Projects program focussed scientific activities on all transects but GLIMPCE. Fifty-seven applications requesting $1376 K were evaluated in March by the NSERC-approved evaluation Subcommittee, 40 awards totalling $600 K were made while 5 continuing awards amounting to $90 K were approved. Lithoprobe East was the site of the 1989 seismic reflection program: 676 km of regional data were acquired along 3 lines crossing the major geological structures of the Newfoundland Appalachians and 16 km of high resolution data were recorded in the Buchans mining camp in central Newfoundland with the financial participation of BP Selco. Both data sets are of high quality.

The other two major field programs were carried out in the southern Cordillera Transect. SCORE 89 was the first Lithoprobe refraction survey: 10 000 seismograms of mostly reversed in-line and broadside seismic data were acquired. A triangular array of shot points and receivers was employed to obtain 3-D coverage of the crust and upper mantle interior to the triangle and 2-D coverage along each leg of the triangle. The array was centred over the boundary between the Coast Plutonic Complex and Intermontane Belt in the southwestern

Cordillera. A notable feature was collaboration with scientists of the U.S. Geological Survey and return collaboration with them on a survey in Arizona. The first contracted Lithoprobe magnetotelluric survey also was carried out: 80 sites were occupied along the positions of the reflection lines recorded in 1988. Both experiments proceeded well and resulted in high quality data.

In summary, 1989 was a banner year for Lithoprobe. Through the dedicated efforts and enthusiasm of the more than 300 participating scientists, great progress has been made. We look forward to 1990 and beyond with eager anticipation.

Ron Clowes

5. Ocean Drilling Program

This report outlines the activities of the Canadian Secretariat and the Canada/Australia Consortium for the calendar year 1989. At the beginning of 1989, we set two chief goals for ODP Canada. The first was to increase the awareness of the Program to professionals and non-professionals. The second was to enhance the organization of our information exchange policy. One of the most important functions of ODP Canada is to facilitate the exchange of information between the ODP operation, from the drilling to publication of results, and Canadian scientists interested in the program. We sought to improve the efficiency of this portion of our operations to show the Canadian community that involvement in the program can enhance individuals' scientific agendas. We believe these goals have been met with a reasonable measure of success.

Canadian Representation on JOIDES Panels

As part of Canada's commitment to the Canada/Australia Consortium, and ultimately to the program as a whole, we sponsor representation on the various ODP panels. Table 22 is a list of Canadian representatives who attended a total of 23 meetings throughout 1989. An asterisk indicates Secretariat funded travel.

Table 22. ODP panel representation in 1989

January	Downhole Measurements Panel (DMP)	Roy Hyndman*
February	Shipboard Measurements Panel (SMP)	Kate Moran
	Shipboard Measurements Panel (SMP)	Ian Gibson
March	Lithosphere Panel (LITHP)	Jim Franklin
	Ocean History Panel (OHP)	Larry Mayer*
	Information Handling Panel (IHP)	Ian Gibson*
	Sedimentary and Geochemistry Processes Panel (SGPP)	Tom Pedersen*
April	Central and Eastern Pacific Detailed Planning Group	Earl Davis
	Shipboard Measurements Panel (SMP)	Kate Moran
		Ian Gibson*
	Site Survey Panel (SSP)	Keith Louden*
	Technology and Engineering Development Com. (TEDCOM)	Keith Manchester
May	International Council	Ken Babcock
	Executive Committee (EXCOM)	Chris Barnes
June	Sedimented Ridges, Detailed Planning Group	Earl Davis
		Jim Franklin
July	Central and Eastern Pacific Detailed Planning Group	Earl Davis
	Pollution, Prevention and Safety Panel (PPSP)	David Mosher*
August	Planning Committee (PCOM)	John Malpas*
September	Lithosphere Panel (LITHP)	Jim Franklin
		John Malpas*
October	Shipboard Measurements Panel (SMP)	Kate Moran
	SMP	Ian Gibson*
November	Ocean History Panel (OHP)	Larry Mayer*
	Site Survey Panel (SSP)	Keith Louden*
	Panel Chairman	Earl Davis

In addition to ensuring Canadian representation at these meetings, the Secretariat collated and distributed summaries of all meetings to all members of the Canadian National Committee, the Canadian Council and Canadian panel members. Reports were distributed to Australian members through the Australian Secretariat.

ODP Canada Management Committee

In addition to the international meetings, ODP Canada co-ordinated meetings of the Canadian National Committee (CNC) and the Canadian Council (CC) for the Ocean Drilling Program. Table 23 is a listing of the CNC and CC meetings for 1989. The asterisk shows ODP Canada funded travel.

There have been two significant changes to the structure of the Canadian Management meetings in 1989. The first change was the structure of the Canadian National Committee meeting. The CNC meeting can be divided into two sections: "Housekeeping duties" (eg. budget, panel membership) and scientific topics. It was felt that previous meetings did not allow sufficient time for the scientific portion of the agenda. To rectify this, we increased the length of the meeting from 1 1/2 to 2 days with the second day completely devoted to the presentation of scientific results. The first of these ODP Science Days was held in November in St. John's with a total of 9 speakers.

A significant change has been made to the Canadian Council meetings agenda. "Housekeeping reports" (eg. Secretariat Report, budget) were distributed prior to the meeting along with the agenda and background material. The Council then discussed matters pertaining to policy and the direction of the program in Canada. This change in format produced favourable results with the Council addressing strategic planning for the future of the program in Canada.

Canada/Australia (CanAus) Consortium Board

Two Board meetings were held in 1989. Table 24 shows the attendance with an asterisk indicating ODP Canada funded travel. In addition to the management of the CanAus ODP Consortium, the Board actively pursued other avenues of scientific cooperation.

Table 23. Canadian management committee meetings

Canadian National Committee	S. Scott	J. Malpas*
Montreal	C. Barnes	K. Manchester
	J. Franklin	K. Moran
	F. Gradstein	M. Taylor
	J. Hamilton	B. Collins
	R. Hyndman	N. Fagan*
Canadian Council	K. Babcock	R. Ludgate
Vancouver	C. Barnes	G. Mossop
	G. Caldwell	O. Owens
	J. Halliwell	S. Scott*
	J. Malpas*	B. Collins*
Canadian National Committee	I. Gibson*	J. Malpas
St. John's	R. Hyndman	B. Collins
	F. Gradstein	N. Fagan
	L. Mayer*	K. Louden*
	S. Macko*	T. Pedersen*
	M. Berry	J. Franklin
	R. Smyth	K. Manchester
	R. Riddihough	C. Mason
	P. Robinson*	R. Turner*
	M. Keen*	
Canadian Council	R. Riddihough	J. Malpas
St. John's	J. Halliwell	B. Collins
	I. Gibson*	L. Taylor
	G. Caldwell	H. Carlyle*
	C. Barnes	M. Berry
	G. Mossop	N. Fagan

Table 24. Canada/Australia management board meetings

CanAus Board - April 89	K. Babcock	J. Malpas*
Tasmania	S. Scott*	D. Falvey
	K. Stark	R. Varne
CanAus Board - November 89	R. Riddihough	J. Malpas
St. John's	T. Crawford	I. Gibson*
	R. Vernon	B. Collins
	N. Fagan	

Publications

Three issues of the *Resolution Report* were distributed in 1989. The success of the newsletter has caused an increase of 20% in our mailing list. A large portion increase originates from outside Canada.

The Secretariat is responsible for the distribution of the volumes of Initial Reports and the Scientific Results of ODP. There are approximately 60 organizations on our mailing list. In 1989 we distributed 10 volumes to this mailing list. Further to the recommendation of the 1988 Evaluation Committee Report, we have submitted articles on ODP for other publications. One issue of *Geoscience Canada* contained an article on Serpentine Seamounts written by Mike Keen. Also, Bill Collins has written an article for *Geolog* on ODP Canada activities. Over the next few months, ODP articles and meeting notices will appear in *Geolog* and the *CSPG Reservoir*. An advertisement for the Evaluation Committee Report and the newsletter appeared, free of charge, in the June issue of the *Canadian Journal of Earth Sciences*.

In 1989 we distributed a publication request form to advertise the availability of our publications. We have received over 100 responses to this from individuals wishing to receive publications.

Conferences

ODP Canada has been represented at four conferences in 1989. In May we presented a booth at the Joint Annual Meeting of the GAC/MAC in Montreal. The usual publications and information were distributed. In addition to the booth, ODP Canada sponsored a Logging School attended by 8 people. The course was presented by Roger Anderson from the Borehole Research Group at Lamont-Doherty. Notices of the school were distributed to most geoscience institutions as well as to our mailing list via the newsletter.

This past summer, ODP presented a booth at the CSPG/CSEG conference in Calgary. As part of our booth, we focussed on two topics. The first was drilling and logging technology with posters showing tools and techniques utilized on the JOIDES Resolution. Secondly, we distributed an article written by Sebastian Bell on the *"Benefits of ODP to the Oil Industry"*.

For the second year, we have presented an ODP display at the Newfoundland Offshore Conference in St. John's. This is a commercial meeting and therefore very expensive, even though our booth was cost-shared with MUN Earth Sciences. Although some oil interest was displayed, we do not recommend attendance at this meeting in the future. We also showed our display at the local meeting of the CIMM. Plenty of enthusiasm was shown by the mining sector, particularly as related to the proposed hydrothermal system drilling. We see the mining sector as very interested participants of ODP, and we should target these types of meetings as soon as we can.

Workshops

Atlantic proposals workshop

In June, a two-day workshop was held to discuss the status of Canadian sponsored Atlantic drilling proposals. The workshop was well attended with the majority of participants coming from the Halifax-Dartmouth area. Four of the proposals were published in the *Resolution* Report. Since that time, at least one proposal has been submitted to JOIDES. It is hoped that the publication of the proposals will generate constructive discussion for the NOSOD II (Second Canadian Workshop on proposals for ODP) meeting in February.

Table 25. ODP Financial report - as of December 31, 1989

Item	Grant	Balance November	December Expenses	Balance
Salaries:				
Collins	29 489.00	9 599.00	2 210.00	7 389.00
Fagan	18 446.00	4 184.82	2 656.61	1 528.21
Subtotal	47 935.00	13 783.82	4 866.61	8 917.21
Operations:				
Telephone	5 500.00	2 275.03	364.72	1 910.31
Telecom	2 500.00	192.29	65.26	127.03
Post/Fre	4 000.00	2 108.77	1 946.85	161.92
Initial Rpt.	2 500.00	1 497.19	0	1 497.19
Printing	9 500.00	5 843.21	4 935.84	907.37
Xerox	2 500.00	1 700.05	107.50	1 592.55
Office Supplies	4 500.00	2 407.86	281.21	2 126.65
Audio/Visual	3 000.00	911.08	0	911.08
Subtotal	34 000.00	16 935.48	7 701.38	9 234.10
Equipment	4 946.54	451.86	0	451.86
Travel	72 500.00	23 913.34	6 078.58	17 834.76
Total	159 381.54	54 180.78	18 646.57	35 534.21

I. Gibson

Electronic communications

In an effort to effectively distribute the mass of ODP information in a timely fashion, ODP Canada has encouraged the use of the various e-mail networks. Numerous meeting schedules, drilling site summaries and ship schedules are now sent directly from Texas A&M University, the Science Operator of ODP, to Canadian scientists. In addition, ODP Canada has its own e-mail distribution list for the distribution of notices to CanAus scientists.

Budget

The budget (Table 25) is for FY 1989-90 as of December 31, 1989. Based on anticipated spending for the last quarter of this fiscal year, we estimate a budget short-fall of approximately $2000. This is due in part to expenses incurred to date for the NOSOD II workshop. It should also be noted that we have reached an agreement with the Australians to pay $3000 to ODP Canada to cover CanAus Secretariat costs.

Outlook for 1990

The next 12 months will be a busy time for ODP in Canada. The second Canadian proposals workshop, NOSOD II, will take place at the end of February. It will involve over 50 scientists from across Canada. The purpose of the workshop is to prepare Canadian drilling proposals for the next phase of drilling expected to start in 1992. In May, during the joint annual of the GAC/MAC, ODP Canada is sponsoring a special poster session to present the results of recent drilling. Approximately 20 abstracts have been submitted for this session.

The year 1990 will be an important year for ODP as a whole. A Long Range Plan has been formulated and submitted to the National Science Foundation to justify continued funding of this International Program past 1993. As Canada seeks renewal of its membership funding, we too will be formulating a Canadian Long Range Plan to be completed in the Fall of 1990. The results of next year's initiatives will guide Canada's scientific participation in the Ocean Drilling Program through the mid-1990s

I. Gibson

6. Canadian Continental Drilling Program

CCDP was involved in two main activities during this period.

The first activity was the completion of the proposal for the Pilot Project "Seismic reflectors in high-grade metamorphic rocks of the Kapuskasing uplift". Completion involved site survey work, carried out during summer 1989, and preparation of the proposal to NSERC for part-funding, carried out during the fall 1989.

The second activity was completion of the five-year plan of continuing operations, designed to follow directly after the Pilot Project. The main activity in this area was the holding of a National Discussion Meeting, at the University of Toronto, on August 28th and 29th, 1989. A draft 5-year plan and constituent proposals were presented for discussion at this meeting, together with reports on the U.K., Japanese, U.S., and other national programs. Fall 1989 was occupied with gathering updated proposals and preparing the package for submission to NSERC for direction on how to procede with an application for funding.

J.M. Hall

7. International Geoscientific Relations

(See Report of the Foreign Secretary)

8. Canadian National Committee for the International Union of Geological Sciences

(See Report of the Foreign Secretary)

REPORTS OF THE REPORT COMMITTEE

1. Comparative Study on Funding of Earth Sciences in Canada

The Final Report *"Research and Development in the Earth Sciences"* prepared for the Canadian Geoscience Council by Margot Wojciechowski of the Centre for Resource Studies at Queens University was published in April 1989 together with two volumes of statistical data.

The study was designed to examine funding trends in research and development (R&D) in earth science in Canada. The activities of federal and provincial governments, industry and universities were included. A wide variety of data was used, from published data sources as far as possible, and supplemented by interviews, on-site visits, and correspondence on a limited basis. The reliability and consistency of much published R & D data was considered to be questionable.

The report concludes that Canada has good economic justification for maintaining and increasing its expenditure levels in earth science R & D. Unfortunately, R & D expenditures are losing ground in the public sector and they are extremely low and probably declining as well, in the private sector.

The report was presented to the 1989 Mines Ministers Conference in Sudbury, Ontario accompanied by a brief from the Canadian Geoscience Council and was well received by the Provincial Mines Ministers and by the Honorable Jake Epp, Minister of Energy, Mines and Resources Canada.

Provincial and Federal agencies had each contributed one third of the cost of the study; the remainder being provided by industry and industry associations.

The data derived from the study and contained within the report and in the background documents are a uniquely complete compilation of information that was previously unreported, unrecorded or lost in broad statistical compilations. The study is a significant contribution to our appreciation of the status of a sector of Canadian activity that will become increasingly important to the nation in the decades ahead.

Copies of the report and background studies are available from the Centre for Resource Studies, Queens University, Kingston, Ontario.

D.K. Mustard

2. Careers in Geoscience Booklet

Requests still continue to arrive at the Waterloo Office for the now out of print *Careers in Geoscience* booklet. Late in 1988 the Executive Director undertook to complete a new version of the booklet. It is hoped that it will be available in late 1990.

Alan V. Morgan

REPORTS OF THE ADVISORY AND REVIEW COMMITTEES

1. Advisory Committee to the Geological Survey of Canada on Geophysics

Report not submitted.

2. Advisory Committee to the Geological Survey of Canada on Geochemistry

Report not submitted.