

geogram



No. 17 JULY
JUILLET / 1982

an informal branch newsletter
un bulletin interne d'information

FROM THE DIRECTOR GENERAL

Of the many innovations in the Geological Survey of Canada since 1968, when I left to take a teaching job at Queen's University, one of the most pleasant has been the introduction of an informal Branch newsletter - GEOGRAM. I particularly appreciate GEOGRAM because it provides me with a special opportunity to greet those members of the staff whom I have not met personally since my return to the GSC last autumn; and to express my gratitude for the support I have received from the staff since moving into the Director General's office in January. I am especially grateful for the support and advice I have received from John Fyles. He has carried an exceptionally heavy load while facilitating the introduction of two new Directors General in two successive years, and while serving both as Acting Director General and Chief Geologist between their terms of appointment. His stewardship, and the strong support provided by the Division Directors and the other members of the Branch management team are in the tradition of the long and distinguished history of the Geological Survey of Canada, and a basis for confidence in the future of the GSC.

The Geological Survey of Canada is in the midst of a period of thorough appraisal of all its activities, and of renewal and redirection of its efforts. The Internal Audit Branch of the Department has completed its report on the GSC; and the Branch response to that report will be submitted this month. The Advisory Committee to the Geological Survey of Canada, appointed by the Canadian Geoscience Council, has submitted its report on "An Examination of the Output of the GSC"; and the Branch Management Committee is preparing its response to this report. The A-base review of the GSC, which is underway now, will focus on an appraisal of the resources required by the Survey in carrying out the various activities for which it is responsible within the Department. The Auditor General's Office has begun an investigation of the GSC's strategic planning with respect to the requirements set out by the new policy and expenditure management system that has been adopted by the government. The Earth Sciences Sector of the Department, under the leadership of our Assistant Deputy Minister W.W. Hutchison, is preparing a document on "Earth Sciences and Resource Development Issues: Need for Renewal of Effort" for submission to the Cabinet. The GSC has played a major role in collaboration with the other parts of the Earth Sciences Sector, the Earth Physics Branch, the Surveys and Mapping Branch, and the Polar Continental Shelf Project, in the preparation of this document and in the consultations with representatives from other parts of the government, the provincial governments, the universities, and industry that are taking place before the final document is submitted to the Cabinet. These various activities have required

a good deal of time and effort on the part of the Branch Management Committee, but since the beginning of the year, the principal focus of its attention has been the very successful GSC Futures Conference which was held at the Glen House Lodge near Gananoque in early December. This has provided the basis for introducing new procedures for strategic planning in the GSC. A report on the Futures Conference and some of the Branch Management Committee actions in response to it are available through the GSC Libraries and Division offices.

The timing of all of these developments has been particularly fortunate for me because, from the very beginning of my appointment as Director General, I have had the benefit of participating in the review or development of many of these various reports and audits. My experiences with these various activities during the past five months have strengthened my conviction that the Geological Survey of Canada is in a strong position to meet the many new opportunities and challenges that will be presented to it in the immediate future, and that I am particularly fortunate to be able to participate in these activities as its Director General.

The GSC has also begun work, under the leadership of John Wheeler and in co-operation with the Canadian Geoscience Council and the Geological Society of America, on a sequel to its very popular "Geology and Economic Minerals of Canada". This sixth edition of "Geology and Economic Minerals of Canada" will appear as a set of nine separate volumes, one dealing with each of the main geological regions of Canada, one with mineral resources, one with the Quaternary geology of Canada, and one providing a summary account of the geology and economic minerals of Canada. These nine volumes, although published by the GSC, will form part of a set of 23 volumes dealing with the geological evolution of North America and the adjacent parts of the ocean basins which is being organized by the Geological Society of America to commemorate its Centennial in 1988. New geological, tectonic, magnetic anomaly, and gravity anomaly maps of North America and adjacent parts of the ocean basins, all at a scale of 1:5 million and on the same transverse mercator projection will be produced at the same time. The very innovative and ambitious venture will involve a major effort by the GSC during the 1980s.

The 1980s and 1990s promise to be a particularly exciting time in the long and distinguished history of the Geological Survey of Canada. The several independent studies of the Geological Survey and its future are focussing on its essential role in ensuring that Canada has the national geological knowledge that is required for the orderly and timely development of its mineral and energy resources. The GSC's essential role in Canada's economic development has been reaffirmed, and a strong indication of new

directions and new patterns of activity for the future. The discussions and consultations which culminated in the document "The Earth Sciences and Resource Development Issues: Need for Renewal of Effort" have identified several important thrusts for the future. These include an improved understanding of the nature and evolution of sedimentary basins, particularly with respect to the energy resources that they contain; a better understanding of the nature of Canada's mineral deposits, and the development of the new technology that will be required to find them in the future; an improved understanding of the geological hazards and constraints relating to the megaprojects that are forecast to play such a major role in our future development, particularly in frontier areas; and a better understanding of the deep structure of the continents which is essential background information for all of the other thrusts. Recent developments in both the Canadian and the international earth science community point to increasing use of multi-disciplinary teams, and of co-operative programs involving several organizations as the basic procedure for attacking the increasingly complex geoscientific problems that will present themselves in the future. These developments will provide new opportunities and new challenges for the Geological Survey of Canada. We have a long tradition of successful service to Canada and to science, and I think we can all look forward to a successful future. I, personally, am very pleased to be back with the Geological Survey, to continue a very rewarding and enjoyable association that began 30 years ago when I was a student field assistant; and I look forward to working with you in helping the Geological Survey meet the challenges and opportunities of the future.

MESSAGE DU DIRECTEUR GÉNÉRAL

Parmi les nombreuses innovations survenues à la Commission géologique du Canada depuis 1968, année où j'ai accepté un poste d'enseignant à l'université Queen, une des plus agréables a été la création d'un bulletin interne de la Direction, le GEOGRAM. J'apprécie tout particulièrement cette publication car elle me permet en quelque sorte de connaître les membres du personnel que je n'ai pas encore rencontrés personnellement depuis mon retour à la CGC l'automne dernier et d'exprimer ma reconnaissance pour l'appui que j'ai reçu du personnel depuis ma nomination en janvier au poste de directeur général. Je remercie tout particulièrement M. John Fyles de l'appui et des conseils qu'il m'a donnés. Il a accompli une tâche exceptionnellement lourde, car tout en

Canada

facilitant l'entrée en fonction des deux nouveaux directeurs généraux durant deux années consécutives, il a agi à titre de directeur général adjoint et de géologue en chef dans l'intervalle de ces nominations. Les qualités de gestionnaire de M. Fyles ainsi que le fort appui fourni par les chefs de division et les autres membres de l'équipe de gestion de la Direction semblent constituer une tradition à la Commission géologique du Canada et sont à la base de ses bonnes perspectives d'avenir.

À la Commission géologique du Canada, nous sommes en période de réévaluation complète de toutes les activités et de renouveau et de réorientation des efforts. La Direction de la vérification interne du Ministère vient de terminer son rapport sur la CGC; la Commission fera connaître sa réaction à cet égard ce mois-ci. Les membres du Comité consultatif de la Commission géologique du Canada, nommés par le Conseil canadien des sciences de la Terre, ont présenté leur rapport sur "L'étude du rendement à la CGC"; et le Comité de gestion de la Direction est en train de rédiger sa réponse au rapport. La révision du budget A de la CGC actuellement en cours sera axée sur une évaluation des ressources nécessaires à la Commission pour réaliser les diverses activités dont elle est chargée au sein du Ministère. Le Bureau du vérificateur général a entrepris une enquête sur la planification stratégique, à la CGC, en ce qui a trait aux besoins qui découlent du nouveau système de gestion des secteurs de dépenses adopté par le Gouvernement. Le Secteur des sciences de la Terre du Ministère, qui relève de notre sous-ministre adoint, M. W.W. Hutchison, prépare un document sur les "Questions relatives aux sciences de la Terre et à la mise en valeur des ressources: nécessité de renouveler les efforts" qui sera présenté au Cabinet. La CGC a joué un rôle important, de concert avec d'autres composantes du Secteur des sciences de la Terre, de la Direction de la physique du globe, de la Direction des levés et de la cartographie et de l'Étude du plateau continental polaire, lors de la préparation de ce document et lors des consultations avec les représentants des autres ministères du gouvernement, des gouvernements provinciaux, des universités et des industries qui se déroulent avant que le document final ne soit présenté au Cabinet. Ces diverses activités ont nécessité beaucoup de temps et d'efforts de la part du Comité de gestion de la Direction, mais depuis le début de l'année, l'attention a surtout été portée sur la conférence concernant les lendemains de

la CGC qui a obtenu beaucoup de succès à Glen House Lodge près de Gananoque au début de décembre. La conférence a permis l'adoption de nouvelles modalités de planification stratégique à la CGC. Un rapport sur la conférence et un aperçu de certaines des mesures que le Comité de gestion de la Direction a prises en réponse à celle-ci sont disponibles à la bibliothèque de la CGC et dans les bureaux des divisions.

Toutes ces réalisations surviennent à un moment critique pour moi car, depuis le tout début de ma nomination au poste de directeur général, j'ai eu l'avantage de pouvoir participer à la révision ou à l'élaboration d'un grand nombre de ces rapports et de ces vérifications. Le fait d'avoir participé à ces diverses activités au cours des cinq derniers mois m'a permis de croire plus fermement que la Commission géologique du Canada est dans une bonne position pour pouvoir bénéficier des nombreuses possibilités et relever les défis que lui réserve l'avenir immédiat, et j'estime avoir de la chance de pouvoir participer aux travaux à titre de directeur général.

Sous la direction de M. John Wheeler, et de concert avec le Conseil canadien des sciences de la Terre et la Geological Society of America, la CGC a également entrepris de donner une suite à sa publication très populaire intitulée "Géologie et ressources minérales du Canada". La sixième édition de cette publication paraîtra sous forme de neuf volumes distincts, un volume traitant de chacune des principales régions géologiques du Canada, un autre des ressources minérales et un autre de la géologie quaternaire au Canada. Le dernier volume donnera un compte rendu de la géologie et des ressources minérales du Canada. Ces neuf volumes, bien qu'ils soient publiés par la CGC, feront partie d'une série de 23 volumes traitant de l'évolution géologique en Amérique du Nord et dans les zones adjacentes aux bassins océaniques, qui seront publiés par la Geological Society of America pour commémorer son centenaire en 1988. Par la même occasion, de nouvelles cartes géologiques, tectoniques, d'anomalies magnétiques et d'anomalies gravimétriques de l'Amérique du Nord et des zones adjacentes aux bassins océaniques, à une échelle de 1/5 000 000 et utilisant la même projection de Mercator transversale seront publiées. Cette entreprise innovatrice et ambitieuse nécessitera de la CGC le déploiement de nombreux efforts durant les années 80.

Il semble que les années 80 et 90 constitueront une période particulièrement intéressante de la longue et remarquable histoire de la Commission géologique du Canada. Les nombreuses études indépendantes et l'avenir de la Commission géologique sont axés sur le rôle essentiel qu'elle joue pour garantir que le Canada possède les connaissances géologiques nationales nécessaires à une mise en valeur ordonnée et opportune de ses ressources minérales et énergétiques. Le rôle essentiel de la CGC au niveau du développement économique du Canada a été réaffirmé et on a décidé de la nouvelle orientation et des nouveaux modèles à donner aux activités à l'avenir. Les discussions et les consultations, qui ont atteint leur point culminant dans le document intitulé "Questions relatives aux sciences de la Terre et à la mise en valeur des ressources: nécessité de renouveler les efforts", ont permis de tracer plusieurs grandes lignes importantes pour l'avenir. Celles-ci comprennent une meilleure compréhension de la nature et de l'évolution des bassins sédimentaires, particulièrement en ce qui a trait aux ressources énergétiques qu'ils peuvent contenir; une meilleure compréhension de la nature des gisements de minéraux au Canada et l'élaboration des nouvelles techniques qui seront nécessaires à leur découverte; une meilleure compréhension des risques et des contraintes géologiques liés aux mégaprojets qui revêtent une si grande importance au niveau de la mise en valeur, plus particulièrement dans les régions pionnières; et une meilleure compréhension de la structure profonde des continents qui constitue la base essentielle de renseignements pour toute autre activité. Les événements récents survenus dans la communauté géoscientifique canadienne et internationale indiquent qu'il faudra se servir d'un nombre accru d'équipes pluridisciplinaires et réaliser des programmes coopératifs regroupant plusieurs organismes; ce sera la façon de procéder fondamentale pour résoudre les problèmes géoscientifiques de plus en plus complexes qui surviendront à l'avenir. Ainsi, de nouvelles possibilités et de nouveaux défis seront à la portée de la Commission géologique du Canada. Nous avons un long passé d'excellents services rendus au Canada et à la science et je crois que notre avenir est tout aussi reluisant. Pour ma part, je suis très heureux d'être revenu à la Commission géologique et de renouer les liens créés il y a 30 ans lorsque, étudiant, j'ai travaillé comme adjoint sur le terrain. Et c'est avec grand plaisir que je me joindrai à vous pour aider la Commission géologique à relever les défis et à profiter des possibilités que lui réserve l'avenir.

As we go to press two appointments have been announced by the Director General

Andy Okulitch is the new Co-ordinator of the GSC's 1 to 1 million Geological Atlas Program. Andy has undertaken regional geological mapping in the Cordillera, in the Precambrian Shield, and in the Innuition Province. He has co-authored 3 of the 1 to 1 million maps that have been published. Andy will be attached to the Director General's office but will continue to be based at ISPG in Calgary.

Chris Findlay is the new Director of the Economic Geology Division. Chris, a graduate of McGill University and Queen's University, joined the GSC in 1958 as a petrologist specializing in ultramafic rocks. From 1966 to 1969 he was Resident Geologist in Whitehorse. In 1970 he left the Survey to form his own consulting company, but returned to the GSC in 1974.

Jean-C. Paris, who retired from the Sample Preparation Unit in December 1979, died on April 8, 1982; he had worked 35 years in the Public Service, 23 of them in the GSC, at the time of his retirement.

This document was produced by scanning the original publication.

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

Staff News

DIRECTOR GENERAL'S OFFICE

Administrative Services

We would like to extend our congratulations to Randy Robinson of Branch Records Office and Pat Kochan of Shipping and Receiving Unit on their new appointments. Pat and Randy were term employees waiting for the proper opportunity. Welcome aboard. Murray Roodman, previously with Precambrian Division left the Geological Survey for the Department of Transport, and is now back with us in the Branch Records Office. Welcome back Murray. Joan Clark is also back from language training and Louise Thompson returned from maternity leave. We are happy to have you back. Claude Lacroix who is also a new face in the section, is working on the Branch Inventory System.

In the Word Processing Centre we once again have several new employees but first we say farewell to Debby Busby who was seconded to the editorial unit of Geological Information Division and has now permanently joined the Geological Information Division. We wish you the best in your new career. Francine Mellor who was one of our bilingual operators and came to us from the University of Ottawa has now left us to join her husband who has been posted abroad. New arrivals are Jackie Caron, Claudia Clarke and Dawna Ramsay. Jackie came to us from the Department of Veteran Affairs and is filling in a bilingual position; Claudia is from the Department of Supply and Services; and Dawna is from the Public Service Commission. Welcome Jackie, Claudia, and Dawna.

Accounts Office

Cyril Bowstead who had been seconded to the Earth Sciences Sector as Acting Financial Adviser has now been promoted to Director, Finance and Administration for the Earth Sciences Sector. We also congratulate Jeff Stapledon who is the new Branch Financial Comptroller.

Carol Lawson who was seconded as Head, Accounting Operations of GSC has returned to the Mineral Policy Section and André Levesque has returned to us as Head, Accounting Operations.

GEOLOGICAL INFORMATION DIVISION

Lorna Firth who has been the GEOGRAM co-ordinator since 1977 as well as doing technical editing and production layout resigned earlier this year to become a full time mother. We wish her all the best and in the same breath congratulate Debby Busby who was the successful candidate as Lorna's replacement.

Joe Gallace left GID after almost exactly a year with the Division to take a position with the Department of Transport working on an air-traffic control system.

Neil Burke, who had recently joined us when Canada Centre for Geoscience Data was transferred to GSC in November 1981, left on March 1, 1982 to accept an appointment with the Auditor General's Office.

Mr. Robert J. Kelly was the successful candidate of a recent competition held for a position in the photographic section. Mr. Kelly is a graduate of Algonquin College where he completed a two year training course as a photographic

technician. For several years he worked in the Ottawa area on assignments with various organizations and government Departments.

Irène Kumar joined the GSC Map Library as Map Library Clerk in March 1982. A Library Technician graduate from Algonquin College, she has worked for the Psychology and Education Library, University of Ottawa, and has held various positions in federal government libraries. Prior to her appointment to GSC Map library, she was Information Analyst for the Metric Commission Canada. Irène is looking forward to meeting and working with everyone in the GSC.

Helga Kovachic retired on March 31, 1982 after more than 20 years of drawing maps for the GSC. Many of her friends and former coworkers joined in a presentation and farewell luncheon. We wish Helga many happy years of retirement.

Mario Hudon joined the GSC as a draftsman in sub-unit B1 on April 5th. He is a CGEP de l'Outaouais graduate in Cartography and prior to coming to the GSC had worked as a term employee with Agriculture Canada. Mario is a welcome addition to our staff.

ECONOMIC GEOLOGY DIVISION

Stephanie Scully transferred to the Mineral Data Bank from Uranium Section late last year and has filled the new position of Mineral Resources Data Clerk. She will be maintaining several geological information files and looking after the flow of information through the Data Bank. Stephanie's many talents include stage acting, and she recently appeared in the smash hit "DON'T DESPAIR FONCTIONNAIRE" at the Ottawa Little Theatre.

Zou Haiqing from the People's Republic of China joined the Geomathematics Section in March 1982. As Research Scholar, Mr. Zou will work with Frits Agterberg and his colleagues on multivariate statistical analysis and geostatistics in exploration during the next two years. After graduating in 1964 from Peking College of Geology, Haiqing has been teaching at universities, most recently at Wuhan College of Geology in Hubei Province. In collaboration with Professor Zhao Pengda and others at Wuhan College, Mr. Zou has done extensive field work and published several papers dealing with iron deposits including those near Ma'an Shan, Anhui Province and the Ning Wu Basin, Jiangsu Province.

CENTRAL LABORATORIES AND TECHNICAL SERVICES DIVISION

Staff changes in the last six months include:

Romeo Forconi joined the staff of the Instrument Development Shop on a permanent basis in November 1981;

Sean Going has been seconded from the Sample Preparation Unit to the Instrument Development Shop, where he is now enrolled in the four-year Tool and Die-maker Apprenticeship Plan, leading to his Journeyman's Certificate;

Suzanne Laplante has been with the analytical chemical laboratories on a temporary basis since August 1981;

Twenty-five Year Public Service Awards were made to Serge Courville and to Ulrich ter Haar Romeny; Twenty-five Year GSC awards were made to J.M. (Moe) Larose, and Serge Courville;

G.R. Lachance was appointed Head of the Analytical Chemistry Section, effective January 1982;

Sydney Abbey and H.R. (Hal) Steacy were among those who elected to retire at the end of 1981. Both are still working, however, on a part-time basis to complete work that they had in progress prior to their decision to retire;

J.C. (Tod) Gilmour left the Sample Preparation Unit in January 1982, to take a position in CANMET.

A.L. Littlejohn resigned from the Mineralogy Section at the end of May, to accept a position with Vancouver Petrographics Ltd., Fort Langley, B.C., and to fulfill a personal desire to return to the West Coast. Al joined the Section in November 1977, to work on the curation of the Branch Rock Collection but in April 1979, he transferred to laboratory activities as a uranium mineralogist.

Yang Junhao is an analytical chemist with the Uranium Geology Research Institute, in Beijing (Peking), China.

A native of Chungming Island, Shanghai, Mr. Yang is a graduate of Fudan University in that city, in chemistry, and of Beijing University, in radiochemistry. He is married to Li Hangfei, who is a chemical engineer in the Design Institute of the Yan Shan General Chemical Company, in Beijing. They have two children; a daughter, Yang Jie, 13, and a son, Yang Shen, 9.

Yang originally applied to Sydney Abbey (since retired as Head of the Analytical Chemistry Section) for a one-to-two year study period at the GSC in modern methods for analysis of rocks and minerals and in the preparation and evaluation of standard reference materials. His past experience has been in analytical radiochemical methods for radium, in analytical methods for uranium in rocks and minerals and in the development of natural standards for radioactive elements.

Since arriving in Ottawa in February, Yang has become familiar with the staff and equipment of the Analytical Chemistry Section, not to mention the rigours of a Canadian winter. In the course of the next year or so, he expects to be working with Jean-Louis Bouvier and Richard Rousseau, the entire operation being supervised by Gerry Lachance, the new Section Head, with Sydney Abbey (now a part-time employee of GSC) lurking somewhere in the background.

TERRAIN SCIENCES DIVISION

Retirement - Bruce G. Craig

On December 18, 1981, Alice Wilson Hall was filled to capacity with friends gathered to honour the occasion of Bruce Craig's retirement from the Geological Survey. Bruce, accompanied by his charming wife June and daughter Cathy, was the recipient of tributes to his many contributions to Terrain Sciences Division and reminders of his career highlights from John Fyles and John Scott. Through the generosity of his many friends Bruce was provided with more lasting mementos of the occasion in the form of a specially designed retirement scroll drawn by master calligrapher Herb Finn and a magnificently illustrated volume on orchids - species of which just happen to take pride of place (sometimes prizes) in Bruce's greenhouse.

Bruce joined the continuing staff of the Geological Survey in 1950 and carried out Quaternary geological studies in Alberta and Saskatchewan until 1954. In the following year



Bruce with Ken Eade. Taken in 1955 on Operation Thelon.

the Survey began a series of helicopter-supported reconnaissance mapping surveys in northern Canada. Bruce was one of several Quaternary geologists assigned to these surveys and over the next 12 years he participated in operations Thelon, Mackenzie, Coppermine, Back River, Prince of Wales, Admiralty, Wager, and Winisk. The latter operation (sometimes known as "Big Swamp") may have had something to do with Bruce's subsequent career transition to administrative duties where becoming swamped, absence of landmarks, and a profusion of alligators in the form of directives are commonplace! In any case Bruce ably assisted John Fyles in the creation, in 1967, of the Quaternary Research and Geomorphology Division, later to become Terrain Sciences Division.

In his role as Assistant Division Director, Bruce contributed in many ways to the operations of the Division and he will be remembered by many who benefited from his good natured and kindly approach to administration.

We will all miss his familiar face. Best wishes, Bruce.



On his retirement Bruce was presented with a box of handy odds and ends to add to his collection.



Sandy Lowdon

On January 1, 1982 James A. (Sandy) Lowdon was assigned as Assistant to the Director, Terrain Sciences Division. To clear up a common misconception, Sandy was not born in Scotland but hails from west Vancouver. However, he spent his formative years (1937-52)

in Scotland where he attended Glasgow University for 2 years prior to his decision to come "home" to finish his education at Carleton University. Sandy started his Public Service career in 1953 at NRC where he was involved in research on the freezing points of high purity metals as precision temperature standards. He joined the Survey in December 1954 and was involved in the development of the K-Ar dating method, sulphur isotope studies, and the initial phases of the Rb-Sr dating method. In the good old days he "commuted" frequently between the Victoria Museum and the GSC Laboratory on Sussex Drive. In April 1965 Sandy took over responsibility for the operation of the Radiocarbon Dating Laboratory and in April 1978, added to those duties by being appointed as Technical Assistant to the Director of the EMR part of the Nuclear Fuel Waste Management Program. Prior to crossing the fence into a managerial role, Sandy was well known for his active role on the PC Executive, serving for 9 years as Secretary-Treasurer for the Group.

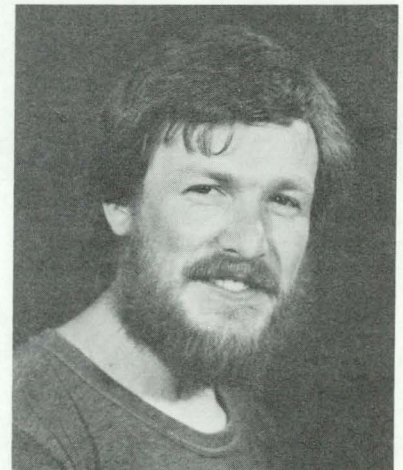
We wish Sandy good luck in his new duties.

Jan M. Bednarski joined Regional Projects Section in May 1982. While it seems many people are migrating to the west, Jan is actually a Westerner - from Edmonton - who has moved east.

Jan received a B.Sc. specializing in physics in 1974, and requalified his B.Sc. in 1976 to specialize in geography. His M.Sc. (1979) entitled "Holocene glacial and periglacial environments in the Whistlers Creek valley, Jasper National Park", involved observations on glacial and rock glacier processes and chronology based on lichenometry, rock weathering, soils, and dendrochronology. This fall Jan will defend his Ph.D which deals with "Glacier fluctuations and sea level history of Clements Markham Inlet, Ellesmere Island"; Jan did three summers field work on northern Ellesmere mapping glacial and raised marine deposits. As part of his Ph.D. program, he spent a year at the Institute of Arctic and Alpine Research at the University of Colorado and concentrated on Quaternary stratigraphy, glacial geology, and glaciomarine sedimentation. All his degrees are through the University of Alberta.

Besides being a TA at U of A for several years, Jan has had considerable northern experience and has a keen interest in arctic research. This summer he returns to the Arctic - to north-central Victoria Island - where he will be mapping surficial materials in collaboration with Terrain Sciences colleagues.

We know Jan will be an asset to us and bid him welcome.



Jan M. Bednarski

INSTITUTE OF SEDIMENTARY AND PETROLEUM GEOLOGY

Ken Nairn has returned to ISPG and is currently working as a PC5 in the Petroleum Secretariat. Gordon Taylor is also acting as a PC5 in that Subdivision.

Ward Neale joined the staff of Memorial University in St. John's, Newfoundland in January of this year. He had served as Scientific Editor of the ISPG from April 17, 1978 to January 16, 1982. The Institute loses a great golfer, cross-country skier and editor to that educational institution. During his editorship, Ward actively participated on many technical and scientific research committees related to the earth sciences and earth science writing. He edited the Canadian Journal of Earth Sciences for a number of years and contributed as associate editor to Geoscience Canada. He performed innumerable liaison functions between

university geology departments and federal agencies. For example, he served on the Grants Committee of NSERC and was an Adjunct Professor and Senator at the University of Calgary. He demonstrated his flair for chairing many university and CSPG meetings and was in great demand as chairman for geological and editorial conferences: Energy Update 1980, the National Liaison Committee of the CSPG, the Special Publications Committee of the Geological Society of America, the Association of Earth Science Editors' technical sessions, and the Committee on University Study of the Canadian Geoscience Council are some recent examples. The Survey has lost not only a prestigious scientist and editor, but a "Renaissance man" who will be remembered by industry, educational and professional research geologists for his contributions to the promotion of geological research. We wish him well in his new post as Vice-President (Academic) of Memorial University.



Ward Neale in a moment of glory during one of ISPG's past golf tournaments. Bill Vermette (of Cartography) is shown presenting Ward with a golf bag for his excellence in the game.

RESOURCE GEOPHYSICS AND GEOCHEMISTRY DIVISION

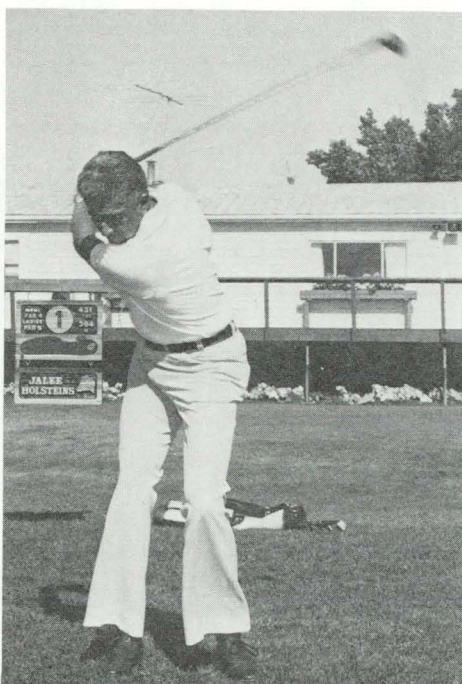
In February, Stephen Birk joined the staff of the Resource Geophysics Subdivision. Stephen is a graduate of Cambrian College, Sudbury, where he studied geological engineering. He had a diversity of geophysical experience with mining and exploration companies, and is now working with Alf Dyck on electromagnetic methods of borehole geophysics. Alf, incidentally, has recently completed his graduate work at University of Toronto and should be getting new business cards soon with a "Dr." in front of his name, or a "Ph.D." after it.

Another brand new Ph.D., from Australian National University, Susan Pullan came to work with Jim Hunter's seismic group in March. She is filling the position that was left vacant when Chi Waboso left in November to take a position with the Nigerian Government. Susan had previously spent two summers with the GSC as a student from U.W.O. During those summers she worked with the Seismic Section in the Arctic.

John Glynn, from Department of Environments' National Hydrologic Research Institute has been seconded to work with Bob Grasty's Radiation Section for a year. John has been our contact man in DOE for a number of years, co-ordinating the Skyvan snow surveys we have done for that Department. He will be working on development of radiometric data processing.

Frederic Monnier, a geochemist on a Swiss National Science Foundation scholarship, began working for Canterra Resources in January of this year. He leaves behind many Survey friends who will remember how he clouded up the hallways with the smoke from his Gitane! Pat Dobell left the Coal Subdivision in January; Dianna Campbell, a geologist in the Coal Subdivision, left ISPG in January to fill a reservoir geologist position at Trans Canada Pipelines.

Steve White, ISPG switchboard operator, left the Institute in February. Anita Oliver is presently occupying that position. Ann Ortman is a typist recently assigned to the Word Processing Centre under Pat Greener. Earlena Ijeh, a word processing operator in that unit has transferred to Parks Canada. ISPG golfers breathed a sigh of relief when Storesman Mat Hall recently accepted a position with the City of Calgary as a summons officer. Although they will miss him, the challengers to the ISPG golf trophy were appreciative of Mat's timing: the annual golf tourney is slated for June.



Mat Hall's golfing style -- a formidable challenger

John Ojo, a geophysicist on the faculty at the University of Ife, Nigeria, arrived in April to spend 6 months with the Resource Geophysics Subdivision on an International Atomic Energy Agency Fellowship.

PRECAMBRIAN GEOLOGY DIVISION

Murray Frarey and Bill Heywood retired from the GSC at the end of 1981.

Murray took his bachelors degree at University of Western Ontario in 1940 and then worked for Ontario Department of Mines in the Larder Lake area, and for Kerr Addison Gold Mine (1941-43). After three years of overseas service with the Canadian Army, he started with the GSC and worked in Manitoba. Between 1949 and 1951 he obtained educational leave from the Survey, enabling him to study at the University of

Michigan but continue field work with the Survey in the summers. Work in Saskatchewan provided the basis for a M.Sc. thesis (1951), and a study of the Labrador Trough resulted in his Ph.D. (1954). From 1955 on Murray's field investigations were undertaken in Ontario chiefly in the Southern and Grenville provinces. His comprehensive studies of the Huronian Supergroup resulted in works that are recognized classics. We wish him well in his retirement which so far seems to consist chiefly of writing GSC reports and expressing his particular philosophy on the subject of the Precambrian time-scale. Even the youngsters on the GSC hockey teams will be relieved when "Old Man Ice" is no longer playing against them!

Bill Heywood started to work for the GSC in 1949 as an assistant on a Coast Range study, and took his B.A. (1950) at University of British Columbia. The next year saw him again doing fieldwork in B.C., but in 1952, when he joined the Survey staff, and in 1953, he was on Ellef Ringnes Island, in the high Arctic, engaged chiefly in reconnaissance mapping. A detailed investigation of the diapiric Isachsen Dome on Ellef Ringnes formed the basis for a M.Sc. thesis (1955) at University of Washington. Bill next started to work on the Precambrian and between 1954 and 1956 his summers were spent on a detailed investigation of the Ledge Lake area, south of Flin Flon Mine, Manitoba and Saskatchewan. This study resulted in his Ph.D. (1959) from University of Washington. Bill was next transferred from detailed mapping to helicopter-supported reconnaissance work, and took part in, and led, many of the major operations: Fort George, Coppermine, Back River, Wager and Southampton. He was responsible for developing helicopter mapping techniques for use in complex and heavily wooded "Grenville" areas. As a Precambrian geologist he also mapped numerous other parts of the Shield at various scales, including Benjamin Lake, Caribou River, Tavani map area, Walrus and Coats islands, northern Melville Peninsula, and the Hurwitz and Amer groups. He was joint editor of the first metamorphic map of the Canadian Shield and of an accompanying symposium volume. Bill intends to spend his retirement in British Columbia, and we are all sure that this has been planned as thoroughly and efficiently as the logistics for all his numerous field projects.

On November 1st, 1981, Chris Roddick joined the Geochronology Section of the GSC, coming to us from the Department of Earth Sciences, Leeds University. Chris was involved with several fields of geochronology at Leeds, Rb-Sr, U-Pb, Nd-Sm, but specialized in $^{40}\text{Ar}/^{39}\text{Ar}$ age determination work and the development of computer programs for mass spectrometer data acquisition. Chris was born in Haverfordwest, Wales, and came to Canada at the age of 2 to live in Brantford, where he completed his secondary schooling. He attended Queen's University in Kingston, where he took his undergraduate studies in geology, followed by an M.Sc., doing his thesis work under Ed Farrar on the K-Ar systematics of the Tulameen and Hedley plutonic complexes in southern British Columbia.

He then proceeded to the Australian National University in Canberra where he took his Ph.D. in 1974, working with Bill Compston. His thesis project involved Rb-Sr isotopic studies of rocks in southeastern and western Australia, resulting in a new theory of the process of strontium isotope homogenization.

In 1975, Chris went to the Mineralogisk-Geologisk Museum in Oslo, Norway, as a research fellow and spent a year setting up the Rb-Sr dating procedure and using it to date Norwegian rocks. In 1976 he moved to Leeds University, where he remained until joining the GSC.

With the Geochronology Section, he will be setting up and supervising the $^{40}\text{Ar}/^{39}\text{Ar}$ age determination method and assisting with the development of other methods as required. His geological responsibilities within the section will include mainly the Churchill Province, with smaller projects elsewhere in Canada.

Seconded to the Tower a year ago, Fred Campbell is doing well: he is acting Director General of Co-ordination and Priorities Branch.

The secondment of Peter McGrath of Regional Geochemistry and Geophysics Division to Precambrian Geology Division was greeted with great enthusiasm. His interpretations of aeromagnetic data will be very helpful in the struggle to understand the geology of the Precambrian Shield.

ATLANTIC GEOSCIENCE CENTRE

Peta Mudie joined AGC at the beginning of 1982 to work with Quaternary pollen and dyncocysts of marine sediments. Peta is well known in AGC, especially within the Environmental Marine Geology Subdivision. While working on her Ph.D. dissertation at Dalhousie University, she has been coauthoring a number of important papers with the staff of AGC. The work has already established her as an expert on Quaternary stratigraphy on the Scotian and Labrador shelves. Peta was born in South Africa but

comes from England and the United States as a landed immigrant. We wish her all the best and many successful years with the Geological Survey of Canada.

M.A. Rashid, organic geochemist with the Environmental Marine Geology Subdivision of AGC, continues to recuperate after an open-heart surgery carried out in late December 1981. Dr. Rashid was seriously ill for several weeks after the operation but is now making steady progress toward recovery while continuing treatment at the Rehabilitation Centre of the Victoria General Hospital in Halifax.

Just before entering hospital, Dr. Rashid completed the final chapters of his book "Geochemistry of Marine Humic Compounds", which is to be published by Springer-Verlag.

* * * * * *Of General Interest* * * * * *

PRECAMBRIAN ROCK CHIPS

Bob Baragar started his field season early this year; but April in Cyprus where he looked at drill core from the ophiolite complex was probably more pleasant than July in the Ottawa Islands (Hudson Bay) where he will finish off the mapping.

A recent scintillometer survey indicates that the radioactivity level is not higher than normal in the office of Ingo Ermanovics, the Precambrian Geology Division man that oversees the Radioactive Waste Disposal Program.

In the District of Keewatin three new projects begin this summer with Tom Frisch (just back from 7 months in South Africa), Tony LeCheminant and Subhas Tella mapping large patches of the Barrens for the first time at 1:250 000. In May, John Percival started a new project compiling and synthesizing the geology of the Superior Province (Archean) of western Ontario.

In April, Tony Davidson was up in the Parry Sound area of the Grenville Province, setting up fall field trips for the Precambrian Geology Division and the Friends of the Grenville. At the same time he was giving Otto van Breemen and Simon Hanmer a taste of the fascinating geology.

As a result of spending two weeks in the vicinity of the Thelon Front tectonic zone, visiting Vancouver to hear about the wonders of the Cordillera first hand, and making a 10-day trip to see Grenville rocks, Otto has had personal contact with some of the raw material that will keep the Survey's new mass spectrometer busy. In preparation for the purchase of the new machine, he and Chris Roddick visited laboratories with state-of-the-art equipment in Britain and Germany.

Mikkel Schau returned from presenting a paper on Archean weathering (co-authored with John B. Henderson) to the IGCP Conference on the Interactions of the Biosphere, Hydrosphere, Lithosphere and Atmosphere in Mexico City, with the impression that there was a trend toward a new orthodoxy with respect to the development of the atmosphere.

Peter Thompson represented the Division at the meeting High Grade Metamorphism, Migmatites and Melting in Glasgow and on a field trip to Northwest Scotland.

Maurice Lambert was interviewed by a television crew on the subject of volcanism, while standing on a pillowed amphibolite 150 km southwest of Ottawa. Fortunately, aside from the dark glasses and the cigarette holder, Maurice is still, basically, the same person.

This spring, Paul Hoffman was elected to the Royal Society of Canada in recognition of his contributions to geology.

Prior to starting a new field project this summer, Edgar Froese initiated and organized a Special Session for the GAC Meeting in Winnipeg entitled "Metamorphism of Sulphide Deposits and Alteration Zones". Several co-operative scientific ventures with Earth Physics Branch will begin this summer with Paul Hoffman and Marc St-Onge in Wopmay Orogen and with Ron Emslie in Labrador. Ken Card's participation in a joint project involving GSC, Ontario Geological Survey, INCO, and Falconbridge that will result in the Ontario Bicentennial Volume on Sudbury Geology, is evidence of Federal-Provincial-Industry co-operation. For the next two years Jack Henderson will be mapping the Meguma Group around Ecum Secum, Nova Scotia and studying associated gold and sulphide mineralization as part of the Canada-Nova Scotia Co-operative Mineral Program. It appears that the future outlined by the Futures Conference is already happening!

Precambrian High, an informal series of talks, progress reports, and re-runs or premieres of papers presented elsewhere, ended its second year April 23. The subjects of the 19 weekly presentations ranged from the Archean to the Futures Conference, and included stratigraphy, structural geology, petrology, geochronology, gold veins, a new orthodoxy, migmatites, granites, thermal models, and summaries of scientific meetings in Mexico and Scotland. The time and effort contributed by those involved as speakers is much appreciated. Speakers this year were Bob Baragar, Ken Card,

André Ciesielski, Ken Currie, Tony Frith, Terry Gordon, Jack Henderson, Paul Hoffman, John Percival, Chris Roddick, Mikkel Schau, Marc St-Onge, Peter Thompson, Otto van Breemen, and Joe Whalen of Precambrian Geology Division, Stu Roscoe (Economic Geology Division), Charlie Blackburn (Ontario Geological Survey), Don Bowes (University of Glasgow), and Janet King (Queen's University). However, without the faithful audience, variable in composition from week to week but consistent in the way it filled the 30 available chairs, the series could not have been a success. Thank you. See you next year!

ENVIRONMENTAL ASSESSMENT DOCUMENTS

The Bedford Institute of Oceanography Library is developing a special collection of marine environmental assessment documents. This noncirculating collection will include material produced for major eastern and Arctic coastal and offshore development projects under the Federal Environmental Assessment and Review Process (EARP), such as the Arctic Pilot Project, Lancaster Sound, South Davis Strait, Sable Island and the Point Lepreau nuclear power station. These documents include applications from the proponents to the relevant federal department (usually Indian and Northern Affairs north of 60° and Energy, Mines and Resources south of 60°), Initial Environmental Evaluation (IEE), guidelines from Federal Environmental Assessment Review Office (FEARO) panels, Environmental Impact Statements (EIS) and their supporting documents, reviews, public hearing documents, and FEARO panel reports to the Minister of the Environment. Also included are the contingency plans pertaining to offshore wells.

The collection will be used by scientists and technicians from both government and industry who are involved in coastal and offshore projects, as well as interested and concerned members of the public. It will continue to grow as new projects are initiated and the reports generated by existing projects continue to appear.

GSC MONT TREMBLANT SKI TRIP

The first Annual GSC Mont Tremblant Ski Trip was held on Wednesday, February 10, 1982, organized by John Lynch, assisted by Philip Wyatt, and David Watkinson.

Thirty-five people braved the early morning cold to show up at 601 Booth Street at 7 a.m. to wait for a bus driver who had overslept. It was an enthusiastic group who enjoyed a peerless day of skiing with blue skies and fantastic snow conditions, so enthusiastic, in fact, that there were cries of "stop the bus" when we passed Mont Gabriel where night skiing was in progress. The trip home was enlivened by an incredible repertoire of songs provided by Brian Williamson.

There have been a number of suggested possibilities for next year: (i) 2 day trip to Tremblant (ii) 1 day trip to another area (iii) multiple day trips to Tremblant, Eastern Townships or Vermont.

In any case, watch for the notices giving you the opportunity to sign up next time!

CURRENT ACTIVITIES FORUM - 1982

Following the lead set by the regional offices, the Ottawa-based divisions took their message to the public last winter. Unlike the successful open houses held at AGC and in Vancouver this took the form of a 2-day combined poster and oral presentation session held at a downtown hotel on January 20 and 21. The 19 formal presentations and 34 poster sessions attracted a broadly based audience who reacted positively to both modes of presentation. Judging by the response to a questionnaire circulated during the sessions the audience was well pleased. The evening session with cash bar was well attended and was the occasion for many lively discussions. A total of 342 people registered of whom 31 per cent were from industry. More than 95 per cent of those responding to the questionnaire said they would attend future forums and this response resulted in plans being laid for similar sessions to be held January 19 and 20, 1983. Some respondents stated that more poster sessions should be included but in general the responses indicated that the balance was about right especially as the poster sessions were manned for much of the time allowing those attending to drop in on the sessions when formal presentations in areas of interest other than their own were being given. The success of the Forum was due to the Organizing Committee chaired by J.C. McGlynn, the scientists who participated and to the hard work and organizing skills of Peter Griffin, general co-ordinator, Chris Durham, poster sessions co-ordinator, Janet McManus and Mark Nixon, technical session co-ordinators, and Jane Carr, evening sessions co-ordinator.

GSC REFERENCE COLLECTION FACILITY, TUNNEY'S PASTURE

(Curatorial Services Unit, Mineralogy Section)

Did you know that there is a Geological Survey reference collection facility at Tunney's Pasture which caters to a large number of geologists, particularly those from the Precambrian and Terrain Sciences divisions and the Earth Physics Branch? The facility was established in 1979 in the Finance Annex

Building with an area of approximately 42 000 sq. ft. This provided space for all previously scattered material housed in various buildings to be finally consolidated under one roof, thereby improving the efficiency of its management, access and use.

The facility is used primarily for the storage, retrieval and curation of hundreds of tons of rock specimens and is equipped with workshops and examination rooms. These are used by the staff and individual geologists for preliminary preparation of samples for laboratory and petrographic studies. It houses the very large regional and representative rock collections and associated thin sections, as well as the large collection of sediments and geochemical samples. Core collections accrued from studies related to paleontology, stratigraphy, engineering geology, gas, oil and water well explorations, varves and sediments obtained from the Great Lakes, and the nuclear waste disposal program are all stored at the facility. In addition, there is a large collection of bulk specimens of rocks and minerals which are used in the preparation of the rock and mineral sets; Geological Information Division material such as maps, files, books and publication material; and computer cards and files on urban geology related to past and current research projects.

Under the general direction of the Curator, National Collections, the staff - Ulrich ter Haar Romeny, Steven Frewen and temporary assistants are constantly improving, reorganizing and updating the collections and services. For more information, give Ulrich or Steve a call at 5-3030.

GWA AWARD 1982

For the nineteenth year the Geological Wives Association is offering an award to a son or daughter of an employee of the Geological Survey of Canada who is preparing to enter a university, college or technical school for the first year. This year the amount of the award is \$400.

Application forms are available at Survey offices in Ottawa, Calgary, Vancouver and Dartmouth. They must be completed and in the mail, postmarked by September 15, 1982, addressed to the chairman of the Award Committee:

Mrs. Edward Hall,
679 Windermere Avenue,
Ottawa, Ontario.
K2A 2W9

APPRECIATION AND RECOGNITION

Michael Bliss writing in the July 1982 issue of Saturday Night

"Jack Gallagher came out of the Geological Survey, that little band of explorers who have done as much to map our national identity as all our writers and artists combined."

An unidentified respondent to the Canadian Geoscience Council's Advisory Committee on the Geological Survey's Output "The very concept of the national geological survey is so basic to modern mineral exploration that it is very difficult to envisage an alternative cost-effective and quality assured source of fundamental geological data."

THE ISPG AND CALGARY'S ENERGY RESEARCH PARK

Research, especially energy-related and technical research, are current priorities in Alberta. Promotion of R & D, through the vehicle of research parks, will attract high-tech industry to the province. The Calgary Research Development Authority (a consortium of the University of Calgary Research Department, the City of Calgary Planning Department, and the Chamber of Commerce), is currently developing plans for 3 separate but related research parks. Almost full is a 9 hectare site just north of the University of Calgary and designated for energy research. The University, as leaseholder of the property, will have substantial influence on what kinds of facilities will be permitted to operate on park land.

Petro-Canada, Shell Canada Research, Esso, the Canada Energy Research Institute, the Alberta Research Council, and the Petroleum Recovery Institute already occupy, or will soon occupy, space in the research park located near the University of Calgary campus. Because the ISPG is located within the general confines of Energy Research Park, the GSC can expect that certain benefits will result from proximity to R & D activities being carried out in park facilities. Brian Norford, ISPG paleontologist, and Senator of the University of Calgary, has seen the idea of research parks discussed in general terms over the past five years. ISPG geologists and geochemists have, on occasion, given courses and have lectured on aspects of the earth sciences at the University of Calgary. Generally, they teach courses as sessional lecturers and guest lecturers and foster joint research projects with students and professors at the university. For example, Lionel Jackson and Rudy Klassen (Terrain Sciences geologists located at ISPG) have taught in the Geography and Archeology Departments; Brian Ricketts taught a clastic sedimentology course to a third year geology class last winter; and Tony Foscolos maintains a research lab at the University of Calgary and teaches a geochemistry course to Archeology and Geography students. Others, like Brian Norford and Ward Neale (currently Vice-President Academic of Memorial University and formerly of the ISPG), serve on university governmental bodies. It is logical that natural liaisons with the university should increase as the research facilities of the park become operational.

Calgary is already an international centre for geological research. It has tremendous advantages as a prime location for all types of research because of ready access to sophisticated computer science technology. Planning and co-ordination of facilities and projects will become important for the future of R & D in Alberta. The long range plan of the Alberta Research Council, for example, identifies specific areas of study of interest to that body: oil sands, heavy oil sands and heavy oils; coal; frontier sciences (such as biotechnology) which have economic potential; and industrial development. Norford points out, however, that one area which might hamper future co-operation is, of course, the confidentiality issue. It is generally thought, however, that in areas of industry-wide problem-solving, e.g., the technology of sulphur use, where results of research are somewhat removed from the immediate marketplace and where there are long-term rather than short-term benefits, that co-operation will occur among research groups.

The Canadian Energy Research Institute is a good example. The economics of energy are studied by this group and position papers are published. The Institute is funded by two provincial governments, the federal government, and private corporations. Another aspect Norford sees as significant and beneficial is the economy of scale a research park offers its users: with 800 to 900 energy scientists working in one area, shared support facilities could provide high quality services at relatively low costs.

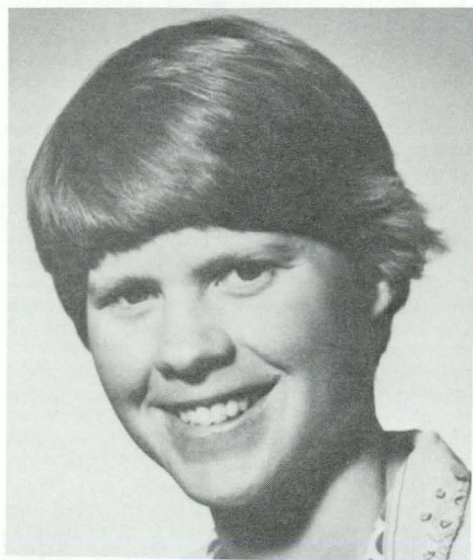
Norford feels that there is a danger in developing really large installations. There is probably an optimum size, he feels, beyond which people no longer relate to the full locality, but rather simply function within their particular part of it. It is hoped that the park will not over-expand. The Energy Research Park is the first of three planned facilities. Biomedical research and manufacturing technology are the other two major themes determined by the CRDA for future development.

Norford expects that ten years from now there will be thousands of technical and professional people working in the research parks of the Calgary area. Time will tell if co-ordinated research projects will result from bringing energy and other groups together. World class facilities will certainly be in place if plans are carried out to completion.

Lynn Machan

MARGOT McMECHAN RECEIVES BEST THESIS AWARD 1982 FROM THE CSPG

At 26, Margot McMechan joined the Regional Geology Subdivision of ISPG in July 1980, after completing her Ph.D. thesis at Queen's University. A native of Victoria, B.C., she graduated from the University of British Columbia with a B.Sc. (Honours in Geology) in 1975. An interest in glaciology was her basic reason for switching from a chemistry into a geology program. She completed her second and third years of geology in her third year at U.B.C. and, like her husband, Bob, was awarded a National Research Scholarship before entering her postgraduate program at Queen's University.



Margot McMechan

Before moving to Kingston, Margot worked briefly for the B.C. Ministry of Energy, Mines and Petroleum Resources in south-central and northeastern British Columbia. In 1977, T. Höy, of B.C. Mines, was interested in the regional stratigraphy and structure of the middle Proterozoic (~1300-1600 Ma) Purcell Supergroup exposed in the Kimberley-Fort Steele area and provided her with funding for mapping her thesis area. The Sullivan Mine, one of the world's largest stratiform lead-zinc deposits, occurs in strata of the Purcell Supergroup at Kimberley, B.C., and numerous small copper and lead-zinc deposits occur within the supergroup.

Margot began her work in the Purcell Supergroup by mapping the Mount Fisher area and structure, stratigraphy and, in a general way, the sedimentology. From the existent stratigraphic data and the information she had gathered from a critical area of the basin, she was able to put together a regional synthesis of the northern part of the Belt-Purcell basin. This kind of exercise was important because it demonstrated how the Hudsonian and other structural trends controlled the early patterns of sedimentation and because it outlined the evolution of the basin.

Study of the Purcell regional synthesis was to become the basis for part of Margot's Ph.D. thesis: STRATIGRAPHY, STRUCTURE AND TECTONIC IMPLICATIONS OF THE MIDDLE PROTEROZOIC PURCELL SUPERGROUP IN THE MOUNT FISHER AREA, SOUTHEASTERN BRITISH COLUMBIA. Her Ph.D. submission was recognized as the best thesis at the doctoral level for its year in Canada at a recent CSPG annual meeting held on February the 18th, 1982.

Why would the structural and stratigraphic interpretation of the Belt-Purcells be viewed as significant by the CSPG? Margot provides some insights on the selection of her thesis for this award. The Proterozoic East Kootenay Orogeny has, for a long time, been a "grey area": in Margot's thesis it is suggested that the original "East Kootenay Orogeny" embraces two separate tectonic events. By looking at the available potassium-argon, zircon and rubidium-strontium dates, paleomagnetic poles and intrusive and structural (particularly cleavage) relationships, she was able to distinguish two events: an earlier (~1350 Ma) compressional event, the restricted East Kootenay Orogeny, and a later (~800 Ma) block faulting (rift) event, the Goat River Orogeny. The difference in time between these two events is approximately 500 Ma a span of time equal to the entire Paleozoic. Hence, recognition of these two tectonic events is important for understanding the tectonic evolution of the Belt-Purcell Supergroup, and to our understanding of the development of the Cordillera.

When she accepted her thesis award, Margot pointed out that the awards should be shared by the student and his or her advisor. The advisor has an important influence on the work of a student and helps with the organization and presentation of the data and results. Ray Price acted as Margot's advisor and they have recently co-authored a paper about the East Kootenay and Goat River orogenies (the two events previously described as a single event) and on the structural evolution of the Mount Fisher area.

At present, Margot is working on 1:50 000 geological mapping of the Rocky Mountains and Foothills, 150 km north of Jasper, Alberta. She believes in mapping and feels that, geologically speaking, the GSC needs more of a mapping presence in the Rockies south of 60.

Lynn Machan

HIGH PERFORMANCE MASS SPECTROMETER INSTALLED AT ISPG

Mass spectrometers determine molecular weight and information about molecular structure; they act as detectors, when hooked up to gas chromatographs, so that precision mass analysis of effluent can be performed.

The MS-80RF, which should be operational this spring, includes a capillary gas chromatograph, a programmable probe, a foreground/background computer system and software package to control two mass spectrometers and process the output data.

An automatic gas inlet system offers the use of up to three reagent gases for chemical ionization. The system features an increase in sensitivity as resolution is increased, which allows complex samples to be analyzed effectively and trace components to be detected. Desorption chemical ionization is another way to obtain molecular weight information from involatile or labile materials which do not exhibit satisfactory spectral characteristics upon electron impact or under normal chemical ionization conditions.

The gas chromatograph feeds directly into the source area of the mass spectrometer. A computer system records and plots the data which come out at radio frequency (scanning at about 500 mass units per second). The data are transmitted in a set of 20 sample points and are stored on magnetic disk. Simultaneously, the data system controls the mass spectrometer, telling it when to turn on, how to set voltages, and how fast it should scan.

Data are produced at a prodigious rate. Typically, one block of data will be a range of about 500-600 mass units with 2000 scans, comprising a single gas chromatograph analysis. Cross scans of particular ions on spectra of particular scans can then be retrieved and plotted on the printer/plotter.

Mass spectrometers of this type can be used to look at biological markers, i.e. the compounds with specific structures that can be related to biological systems. Such markers tell geochemists something about the kind of organic life that became trapped in sediments and how the organic material became altered over time by biodegradation or by thermal cracking. A mass spectrometer, then, is a precision analytical tool which can give detailed information about crude oils and about the organic matter dispersed in sediments. Hopefully, the mass spectrometer at the ISPG will assist in the correlation of one crude oil with another as well as in the correlation of different source rocks of crude oil.

Lynn Machan

Tony Foscolos has recently been named Adjunct Associate Professor of the Geography/Archeology departments of the University of Calgary. He is responsible for setting up laboratory facilities for use in an advanced course (offered by both departments in alternating years) on mineralogy, clay mineralogy, and the chemistry of soils. Laboratory facilities have been expanded at the university to promote geochemical research under Dr. Foscolos. The lab has recently acquired an atomic absorption unit with flame emission mode, a carbon analyzer, a colour emitter for colorimetric analysis and various centrifuges and ovens. Techniques and procedures are developed and taught to the students. At present, Tony is compiling a 350-page manual on laboratory procedures.

RAY THORSTEINSSON RECEIVES R.J.W. DOUGLAS MEMORIAL MEDAL

Ray Thorsteinsson was awarded the R.J.W. Douglas Memorial Medal by the Canadian Society of Petroleum Geologists in April of this year. This is the second year that this medal has been awarded to recognize outstanding achievement in the field of sedimentary, structural or petroleum geology in Canada. Hank Williams, of Memorial University, was the recipient last year.

After graduating with his B.A. in Geology in 1944, Ray left his native Saskatchewan to enroll in a Master's program at the University of Toronto. He began working for the Geological Survey with Stan Duffell during the summer months while he was completing his B.A. and continued working summers with the Survey until he was granted his Ph.D. from the University of Kansas. His Master's thesis subject was on the stratigraphy and structural geology of the Grande Cache area, Alberta Foothills.

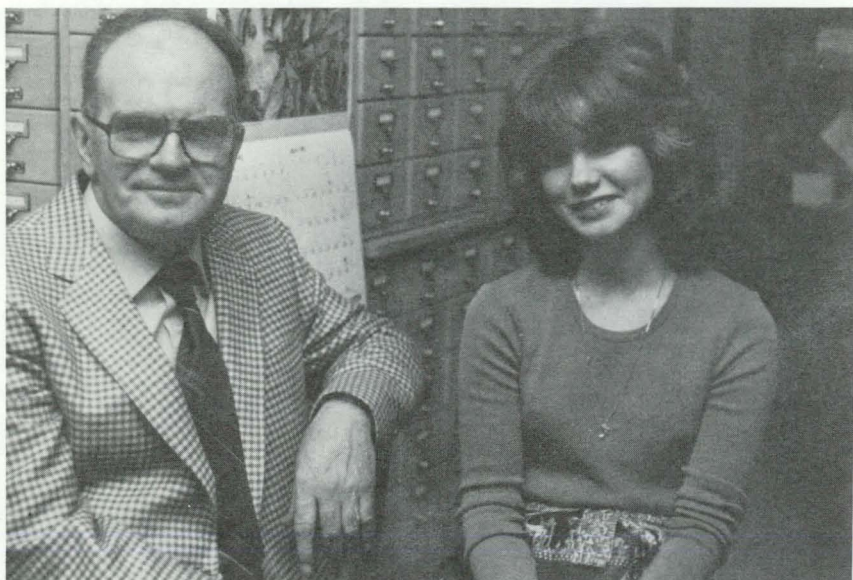
From 1947 to 1950, five joint Canadian-American weather stations were established on the Queen Elizabeth Islands (Resolute, Eureka, Mold Bay, Isaachsen, Alert), thus opening the area up for the first time to air transport. In 1949, Y.O. Fortier of the Geological Survey was charged with the responsibility of initiating a program of geological research in the Queen Elizabeth Islands. In seeking a stratigrapher to accompany him, he spoke to Bob Douglas, who recommended Ray Thorsteinsson for the project. In 1950, Trevor Harwood, of the Defence Research Board, accompanied Fortier and Thorsteinsson on their first field season, while they worked together at Resolute Bay on Cornwallis Island. Harwood had worked for some years in the Arctic with the Hudson's Bay Company and knew the country and the conditions of the Arctic. It was Harwood's idea to use canoes in that country during the ice-free summer months. From 1947 to about 1957, the only people to venture into the Cornwallis-Devon Island area were American and Canadian government workers. There were no Inuit living on the far islands until 1953.

Pioneering exploration requires and inspires a keen interest in history. Thorsteinsson has himself researched the early exploration of the Arctic. Much of the Archipelago was traversed by the searchers for Sir John Franklin at the middle of the 19th century. Other parties followed: Sverdrup led a very successful scientific expedition from 1898 to 1902; Stefansson was in the area from 1913 to 1917. Both scientists completed their geographical mapping of the Arctic Archipelago some fifty years before the Fortier-Thorsteinsson party began geological reconnaissance mapping in the area. Over a ten-year period, Thorsteinsson prepared 1:500 000 maps which would unravel the basic geological features of the region and divide it into several geological provinces. He worked with many Survey geologists during this reconnaissance phase: Bob Christie began working in the Arctic region in the early 50s, as did Tim Tozer, for example. The first maps were a product of much team work aimed at describing the salient features of the geological evolution of the Arctic area. The entire Phanerozoic system is represented in the Islands, as well as the Precambrian. Refinement of the stratigraphy is being carried out at the present time; the framework was established by Thorsteinsson's early work.

Economic development remains a prime motivation for geological research in the Far North. As Thorsteinsson points out, it is self-evident that until one understands the geological history of an area, one does not know its economic potential. Much has been learned about the geology of the Arctic, but much also remains to be discovered. The Atlantic borderlands have been studied bathymetrically, geophysically and theoretically. A very definite idea about what the stratigraphy might be like in the polar oceans or on the Polar Continental Shelf is not yet available from samples.

It is appropriate that the R.J.W. Douglas Memorial Medal is awarded to this outstanding scientist for his comprehensive research of the geology of the Arctic. Currently Ray Thorsteinsson is refining the stratigraphic geology of Devon Island and is looking forward to his twenty-ninth field season in the Archipelago.

Lynn Machan



Ray Thorsteinsson (Regional Geology Subdivision) and his daughter, Anna (Library), take a tea break in the Library of ISPG.

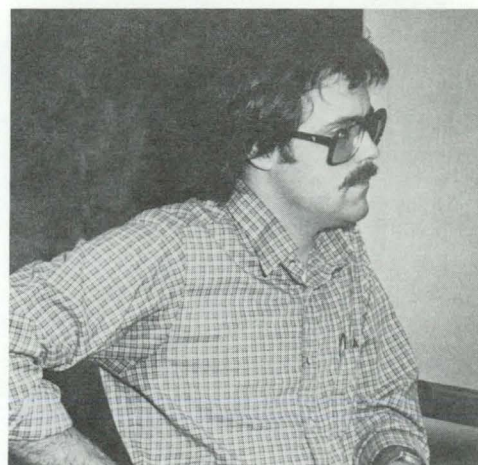
SPACE SCIENTIST ADDRESSES McCONNELL CLUB

The ISPG, in conjunction with the Physics, Geology and Geography Departments of the University of Calgary, sponsored talks by visiting comparative planetologist, Dave Pieri, from March 25 to 26th. Pieri received his Ph.D. in Geology from Cornell University in 1979. Since that time he has worked with Carl Sagan at the Jet Propulsion Lab in Pasadena, California, on a variety of projects: the Viking Mission, the COSMOS television series, and as Team Associate during the Voyager encounters.

To an audience of physics, geography and geology students and professors in the Earth Sciences Building of the University of Calgary, Pieri described the geomorphology of Mars, the subject of his doctoral thesis. In his slide presentation, Pieri described the valley network system of the Martian terrane, discussed details of seepage mechanisms on Mars, and offered quantitative analyses models of flooding patterns. Pieri also described many aspects of the Viking Orbiter program. As senior scientist of that mission, he has overseen the collection of data from the orbiters and landers; one orbiter, he predicts, will continue to function until 1992 at least. Therefore, NASA will have an active geological observatory on Mars to interpret the 4 billion years of history plastered in multiple layers on its cratered surface.

On the 26th of March, Pieri addressed the McConnell Club in the boardroom of the ISPG. His talk was about the mechanics and geomorphology of sulphur volcanism on Io. He described how sulphur changes can be observed with temperature change and current NASA experiments in which sulphur conditions on Io have been simulated in the laboratory. Allotropic forms, colours and spectral properties of sulphur both in flight (in near vacuum conditions since Io has very little atmosphere) and deposited on the surface of the satellite was also examined. The thermal dynamics and flow mechanisms of sulphur lava within the Jovian system were predicted in terms of physical models. Io is in a state of constant recycling, ISPG geologists were told. The planet has been "reworked" hundreds of times. The separation of the sulphur and basalt phases is under study at the Jet Propulsion Lab: Pieri described this and other questions of current interest to NASA scientists. He also spent an afternoon meeting with individual ISPG scientists before returning to Pasadena.

Lynn Machan



Dave Pieri

**ENGINEERING HAZARDS
IN BEAUFORT SEA EXPLORATION**

Most Canadians are now aware of the vast oil and gas potential in the geological formations lying beneath the Beaufort Sea, but few know of the hazards that face its recovery. Over this southernmost extremity of the Arctic Ocean lying adjacent to Canada is a floating canopy of sea ice. It is a formidable, inhibiting barrier in a frontier region hostile to the winning of seabed resources. Sea ice includes newly formed ice up to 2 m thick; multi-year ice 8 to 10 m thick; and flat tabular ice masses, about 50 m thick, derived from shelf ice. These latter ice islands drift erratically around the Arctic Ocean over an approximate seven-year period and exit through the archipelago after their third or fourth circuit. Pressure ridges are built when the wind drives one floe against another; the juncture is forced up as well as down so that the ridges may be 15 m high but could be twice as deep. These ridges extend as a broken and jagged network with no particular pattern and may be several hundreds of metres long in any direction.

For eight months of the year the outer portion of the ice canopy is held fast to shore to form the fast (fixed) ice for 30 or 50 km seaward. Adjacent to the land-fast ice is a shear zone generated by the interaction of the moving polar pack at the boundary of the fast ice. During summer, the land-fast ice breaks away from shore and is driven northward and westward into the polar pack by seasonal winds but can return with shifting winds. Because this ice is mobile, a potential danger exists to shipping and to engineering installations on the seabed. In August 1970 four government vessels (CSS **Hudson**, **Baffin**, **Richardson**, **Parizeau**), collectively engaged in scientific research and survey, recorded bottom features on their echo sounders. It was, however, side-scan sonar records that first gave an areal display of the features produced by moving ice dragging over the seafloor. These ice-scour marks made evident the threat that moving ice posed to seabed installations. Long keels of ice projecting below the ice canopy, and driven by winds and currents, had produced linear grooves and ridges on the seafloor (Fig. 1, 2). Some grooves are single tracks, whereas others are multiple parallel features probably formed by the dragging of several keels projecting from the bottom of a single pressure ridge.

Ice-scour grooves are a fraction of a metre to perhaps 8 or 9 m deep and several tens of metres wide; they commonly occur in water depths to 60 m and, exceptionally, to 82 m. Such features may be old – perhaps several hundreds of years.

The scours are most numerous between 40 and 50 m water depth and appear to cover the entire seabed (Fig. 2). Many of the grooves and ridges intersect, which demonstrates that the scours are of different ages and directions. The orientation of the scours generally reflects the annual wind rose. Some grooves have been infilled with mud to various thicknesses, again suggesting different ages of scours – some of the order of hundreds, if not thousands, of years. Given scour depth and rates of sedimentation, the age of the scours can be calculated. Some infilled scours found in deeper waters may have formed 12 000 to 15 000 years ago.

Scouring in the nearshore is less deep because shallow water prevents the deep-draught ice floes from penetrating shoreward, and shore-fast ice, extending to about 20 m depth, offers inshore protection from drifting ice. In open water periods, longshore currents erode and fill the ice-scour features along the coast.

With all these facts on scour depth, frequency, orientation, age of scours, and depth of water, engineers must calculate the risk factor in laying a seabed installation such as a pipeline or wellhead completion. This was brought out at a recent workshop at Montebello, Quebec sponsored by the National Research Council and Dome Petroleum Ltd. Here the noisy arguments centred around acceptable risks based on observations, probabilities, methods, and costs.

About 50 to 60 delegates spent five days thrashing out problems on ice scouring dealing with occurrences, trends, densities, scour depths, water depths, oceanography, climatology, dating, nomenclature, instrumentation, methodologies, engineering aspects, the geological framework, and mathematical and physical modelling. Iceberg scouring off the east coast of Canada was included in the discussion because some of the aspects of sea-ice scouring are similar.

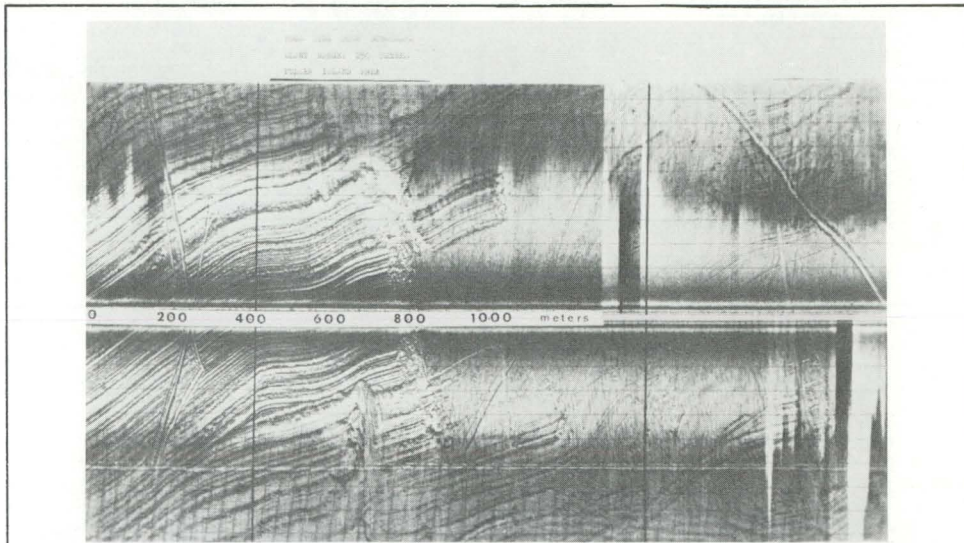


Figure 1. Side scan sonograph of ice scours in southeastern Beaufort Sea.

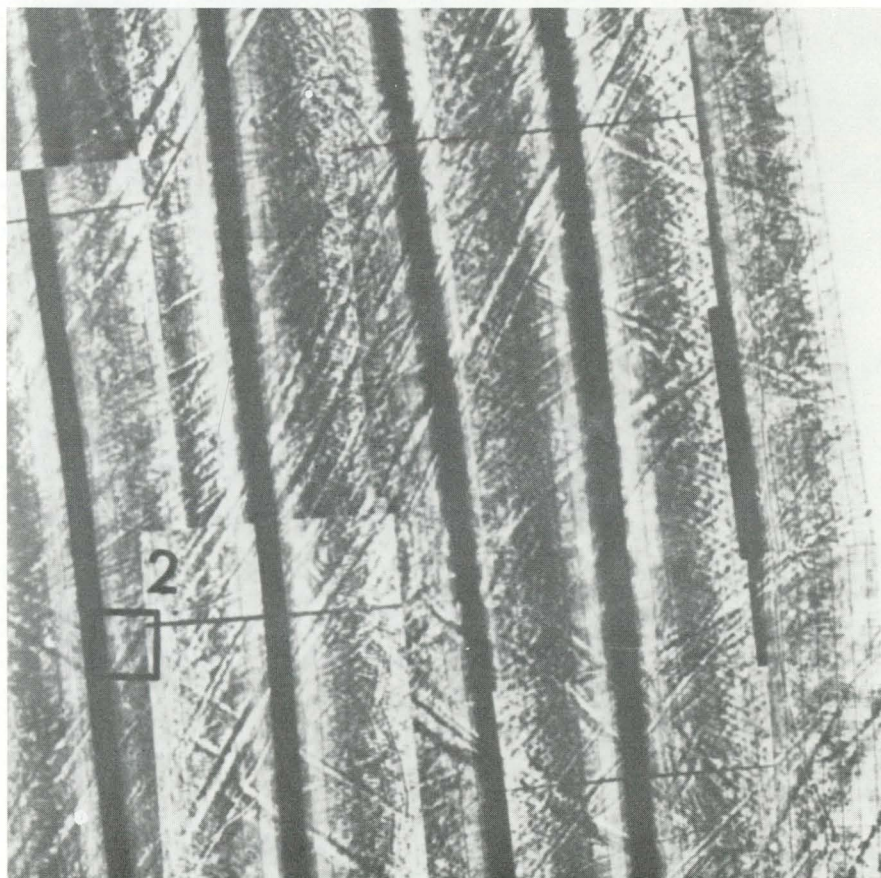


Figure 2. Side scan sonar mosaic showing ice scours in the Beaufort Sea. Relative ages of scours are indicated by the crosscutting relationships and degree of infilling. A young scour is outlined in (2).

Other hazards related to the seabed itself include pingos, thermokarst, permafrost, seabed instability, and mud volcanoes. Pingos have been studied for decades along the southern Arctic coast, particularly on the Tuktoyaktuk Peninsula and adjacent Mackenzie Delta. Pingos (meaning small hill in Inuit) are ice-cored mounds thought to have been formed by the freezing of pore water remaining in drained lake-bed sediments near the coast. They can be up to 50 m high and 300-400 m in diameter. About 1400 pingos have been mapped on the land portion of the Beaufort region, and more than 250 of a probable 400 have been charted offshore. The offshore pingos are of submarine origin because pingos formed on land would be eroded by the mechanical and thermal action of a rising sea. Also, the eastern portion of the Beaufort Shelf, upon which the submarine pingos are found, is an ancient drowned Tuktoyaktuk Peninsula which has a favourable environment for pingo formation.

The offshore pingo is usually less steep and somewhat smaller than its land counterpart, but still it escaped detection by mariners for decades. Seismic surveys carried out from **CSS Hudson** in 1970 revealed the structure of the offshore pingos (Fig. 3) and, subsequently, ice has been dredged from one of them. The danger of submarine pingos is primarily to shipping (although it would be unwise to drill them or use them as foundations because of melting ice and possible gas content), because some pingos have summits reaching a mere 10-15 m below the sea surface. Most pingos have been located in water depths between 35 and 70 m, so that the pingos occurring on the outer Beaufort Shelf lie at a safe depth for tanker traffic.

Thermokarst, which occurs on the shelf beyond the 50 m depth, is characterized by hummocky topography. The depressions appear to be caused by the melting of freshwater ice in pingos and (or) ice-contained sediments, with subsequent

collapse of several metres of seabed soil. Although thermokarst occurs in the area of oil and gas exploration, as well as possible pipelines, it is not a grave hazard and the physical aspects can be overcome by standard engineering practices.

Permafrost is almost ubiquitous in the northern mainland and Arctic islands, but occurs only as a discontinuous body about 70 to 90 m below the seabed and has an overall thickness of up to 700 m in certain parts of the Beaufort Shelf. Because the formations containing commercial oil and gas lie more than 1500 m beneath the permafrost, the frozen zone must be penetrated safely if the deposits are to come into production. With the use of proper sealants and sufficient casing, the dangers of melting ice and thawing frozen-gas pockets are considerably minimized.

Unstable seabeds are common at the outer edge of the continental shelf. In the Beaufort Sea, subsidence, slumping, and dislocation of surficial sediments on the seabed have taken place almost everywhere but at different times. These phenomena are observed on both sonic and seismic profiles. Steep scarps, up to a few tens of metres high, occur on parts of the shelf edge and shallow and discontinuous graben-like trenches at the shelf-slope break. As drilling is not imminent at such places, some time is available to assess the problem of slope stability, and is, in fact, being studied by Survey officers.

Another problem related to seabed instability is the occurrence of mud volcanoes (or diapirs) which are mostly found in the thermokarst region and the shelf-slope zone (Fig. 4); the features are related to localized movement of mud under stress - perhaps due to unequal loading caused by subsidence or collapse, or perhaps due to shock induced by natural seismic activity. Mud volcanoes in shallower water (40-50 m) occur in clusters and linear trends associated with minor seabed subsidence and may be the surficial effect of faulting at depth. As the surface expression of the faulting is only a few metres in elevation, it presents no real engineering difficulty; however, Survey field officers and oil company geologists are studying these features because of possibly related tectonism and its associated occurrences of geological discontinuities and seabed dislocations.

Our final major area of concern is the coastland, both on and offshore. Mackenzie River and Delta, Tuktoyaktuk Peninsula, and the western coastal regions comprise a fantastic life-support system considered to be one of the world's largest. Contingency plans are already laid in the event of an oil spill or other related accident that could damage the regional environment. Great marine inundations have occurred, wiping out vast tracts of delta and coastlands, but nature seems to recover quickly from such disasters - usually in a year or so. The same may not be true for inundation by oil-bearing waters, so an enormous amount of planning has been dedicated to prevention, reclamation, and restoration.

Along the coastal fringe lies a zone of wave and longshore current action, and here the double jeopardy of erosion and sedimentation must be confronted. Only a few adequate sites are available for land-sea-air bases for industry's offshore operations, and sensitive coastlands have been avoided. Protected inlets, bays, and river mouths must be dredged if they are to be used as marine operational bases. Scientific-engineering studies should indicate possible

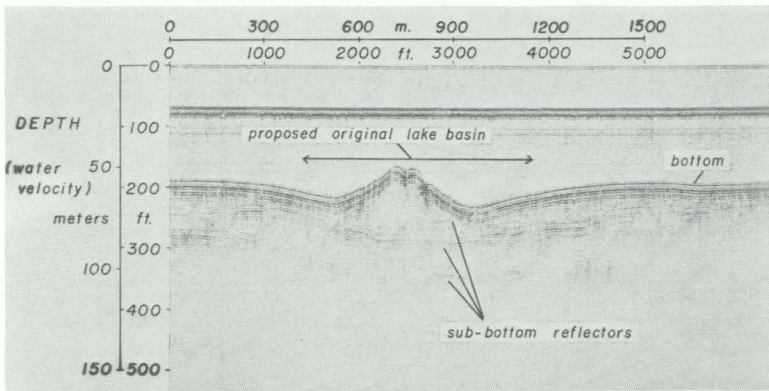


Figure 3. A submarine pingo in a former lake basin; Beaufort Shelf.

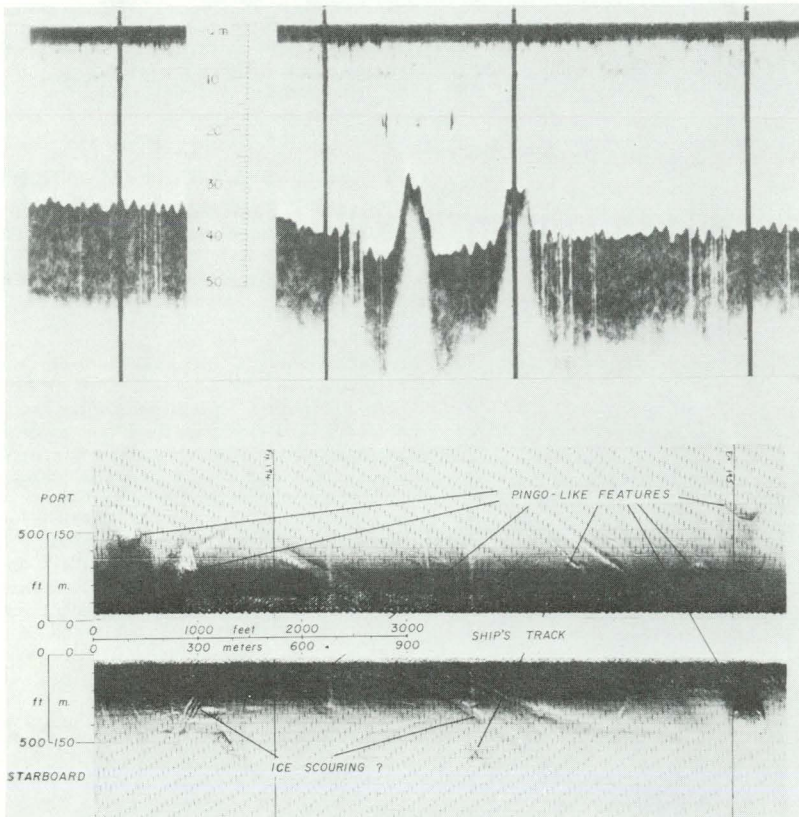


Figure 4. Diapirs (mud volcanoes), Beaufort Sea, east wall of Mackenzie Canyon.

dangers re dumping of spoils and nearby shore erosion, engendered by slumping and current action, so that potential disasters can be avoided.

This year, Survey field parties are active in the Beaufort Sea region: Jim Hunter and his crew consisting of Hugh MacAulay, Ron Good, Bob Gagné, Robbie Burns, and their newly joined associate Susan Pullen are carrying out much of the permafrost studies. They are using various seismic techniques: in winter work is done from the ice platform and in summer from the launch **J. Ross Mackay** and the government vessel **MV Nahidik**. Another group under Steve Blasco is studying a variety of geological problems and working from various commercial and government ships. Kate Moran is studying geotechnical engineering problems particularly in the shelf-slope area; Phil Hill is working on sediment dynamics on the shelf; Denise Poley and Bob Harmes, together with Steve Blasco, are engaged in sonar and seismic work for the purpose of constructing a geological model of the Beaufort Shelf; Gus Vilks and Peta Mudie are advising on biostratigraphy; Michael Lewis is helping with ice-scour data; and the writer in advising on seafloor morphology and sedimentology.

Although all the foregoing suggests scientific expertise and effort devoted to exploration and development of our resources, it is just as important to consider that every safe engineering design has a built-in rationale involving the environmental and ecological protection of the region. It is in this dual role that our field officers carry out their surveys and scientific research in support of both programs.

B.R. Pelletier

* * * * *

HELEN BELYEA DEVONIAN SYMPOSIUM

From 1979-1982, Ashton Embry of the ISPG acted as Chairman of the Sedimentology Division of the Canadian Society of Petroleum Geologists. One of his functions as Chairman of that committee was to propose a conference theme in 1982. He identified an area of interest to many western geologists: major controls on Devonian stratigraphy and sedimentology. A symposium on that theme would certainly draw a number of Devonian stratigraphers and sedimentologists together to discuss interpretations of the evolution of Canada's western sedimentary basin. Such a gathering of Devonian specialists would also provide a unique opportunity, that of honouring the significant contributions of one of them to the study of western Canadian geology. The "Helen Belyea Devonian Symposium" became a reality on March 18 and 19th of 1982 in the Glenbow Theatre of the Calgary Convention Centre.

Following WW2, Helen Belyea left the Canadian Navy to join the Geological Survey in Ottawa. In 1950, she was sent to Alberta and began her interpretative work on Devonian strata of both Alberta and the southern Territories. Over the next decade she was to lay the foundations of Devonian stratigraphic and sedimentological relationships of those areas. She was able to define the general stratigraphic relationships of Devonian reefs at a time when the Devonian was the major petroleum horizon in Alberta. Her

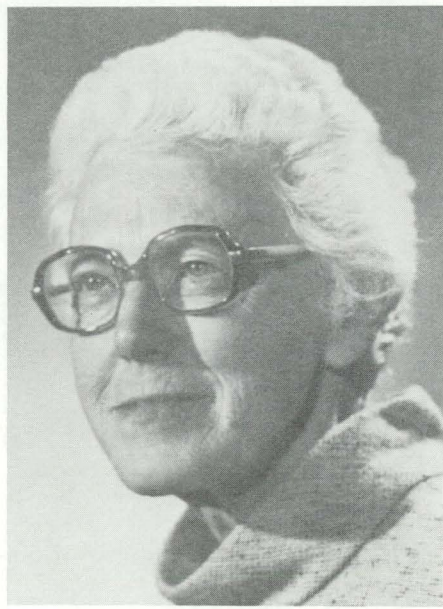
research took her from the southern Territories (a little north of Great Slave Lake) to the Alberta border. She also studied Devonian stratigraphic relationships in Saskatchewan.

Over the two-day period, eighteen papers were presented on the Devonian. Half of the speakers came from outside of the Calgary area; the other half was made up of speakers from industry, the Survey and the University of Calgary. They came from Austin, Montreal, Ann Arbor, Philadelphia and Chicago to present their work. Much refinement of the stratigraphic nomenclature of western Canadian Devonian systems has resulted from the research of many people over the last two decades. However, the greatest tribute to Helen Belyea is that the stratigraphic framework she put together in the 1950s still stands today. Using her original geology, speakers were able to show how the Devonian system had evolved, how eustatic sea levels, tectonics and sedimentation all combined to create the stratigraphic framework that she had described. In many cases, speakers presented more detailed interpretations, based on their own research, which confirmed the basic stratigraphy of the region. They applied modern concepts to the strata whose geology she had defined. The conference, therefore, had two main thrusts: it honoured the original work of Helen Belyea, begun in the 1950s, and it also called attention to the many advances in the science of stratigraphy that have taken place since that time.

This meeting was not without its lighter moments. During the Belyea Banquet, Digby McLaren took great delight in describing Helen's chicken dance technique which he witnessed on a field trip to the Rockies in southern Alberta.

A painting entitled "Ragged Falls" by William Parsons, a landscape painter, was presented to Helen at the banquet. It was a public statement of great admiration and appreciation of her work in western Canadian geology.

Lynn Machan



Helen Belyea

GEOMATH

The book "Geomathematics: Mathematical Background and Geo-Science Applications" by Frits Agterberg published by Elsevier in 1974 has recently been translated into Chinese. About 8000 copies of the Chinese edition were printed in two editions during 1980 and 1981 by Scientific Publishing House in Peking. Zhang Zhong-min was translator with Professor Zhao Pengda of Wuhan College acting as scientific advisor. Because written Chinese is more compact than English, the thickness of the book was reduced by one third.

BIO OCEAN BOTTOM INSTRUMENTS DEPLOYED IN CENTRAL NEW BRUNSWICK

A series of earthquakes centred north of Fredericton shook the Maritime Provinces beginning on Saturday, 16th January. During the following few days, Canadian scientists from the Earth Physics Branch, EMR were joined by U.S. scientists from the Massachusetts Institute of Technology, Lamont-Doherty Geological Observatory and the U.S. Geological Survey. Their instruments were reported to be having problems in coping with the extremely cold conditions of the area, so Ian Reid, associated with the Atlantic Geoscience Centre, GSC, volunteered to deploy three AGC ocean bottom seismometers as part of their array. The seismometers were designed at Bedford Institute of Oceanography for unattended operation in remote, very cold conditions on the seabed so their deployment was simple. The instruments were operating in the epicentral zone within 24 hours of the initial suggestion being made to the co-ordinator and three days of data were successfully collected, including a 4.9 magnitude event on Friday, January 22nd. Data analysis co-ordination by each group will take several months, but it appears that the earthquake will be one of the best documented of such events in eastern Canada.

PROGRAM REVIEW AND EVALUATION (PRE)

The week of January 19-21 was an essential part of the BIO calendar - "BIO Review Days 1982". In addition to the formal review of OSS Atlantic science and hydrography programs (PRE) this exercise also included a series of Atlantic Geoscience Centre (EMR) research seminars. Members of the Review Committee (comprising BIO Directors and external reviewers) received documentation of all programs prior to the formal meetings, they commented on selected projects and on the final afternoon of the three-days meetings, they had the opportunity for further questioning of individual scientists and for going deeper into the discussions about any project. The comments (both written and verbal) of the Review Committee will form the raw material of our formal PRE document. There were 15 external members on the Review Committee, including representatives from customer industries (Petro-Canada and Mobil Oil), customer departments (DOE, DINA, DOT, DND and EMR) and from the following disciplines: physical, chemical and biological oceanography (including two scientists from the USA), fisheries research and ocean instrumentation.



Mike Kiel (left) and Ed Dumbrell relax with refreshments while waiting to start the back nine.

OTTAWA GSC GOLF TOURNAMENT

The annual golf tournament was held May 20 when we challenged the Tecumseh Golf Course in Pointe Gatineau. Those responsible – Yvain Demers, Fred Quigg, Bob DiLabio, Larry Coté and Wilf Lagroix – were glad that the many hours that went into organizing the event did not go unrewarded when more than 60 people came out to brave threatening skies and very strong winds. As usual complaints were only noticeable when the wind hindered a drive but it was always the skill of the golfer and not the wind which effected that long drive.

The successful golfers walking off the hardware amidst cheers and jeers at the 19th hole were: for low gross Yvain Demers (84), Murray Frarey (89) Murray Duke (91), Wilf Lagroix (91), and Serge Courville (93). Low net scores were Doug St. Denis (54), Claude Lacroix (56), Ray Gaudreau (57) and Greg Martin (58). George Cameron won the Gerry Charlebois trophy with a handicapped score of 55. Jocelyn Watson had the lowest score (134) of the ladies entered and Louis Renaud was closest to the hole on number 12.

The organizers and participants thank the unsung heroes Louise Thompson and Irv Salter who looked after registration, the "closest to hole" contest, and the running of the tournament while the others were enjoying themselves on the course.

RGG DIVISION

Jim Hunter, Hugh MacAulay and Les Kornik have just returned from a 3 week Arctic expedition out of Resolute. They were applying geophysics to archaeology in the search for Ross's ship – the

Victory – which was lost off Boothia Peninsula in 1832. A newly designed under-ice rotary side-scan sonar worked well, located all the boulders on the seafloor of Victoria Harbour, but the ship was not there. EM and magnetometer investigations on the shore located over 150 artifacts from the ship buried at shallow depth.

Meanwhile, DINA and the Klondike Place Miners Association had invited Len Collett to Whitehorse to describe how recent developments in engineering geophysics could be applied to exploration for placer gold deposits, part of a Short Course on Placer Mining.

Other international news: Bob Grasty travelled to Rwanda at the end of the year as an advisor to CIDA for a large airborne survey of the country. He survived a near attack by an angry hippopotamus that didn't want its picture taken. Peter Holman had gone to Rwanda earlier to get the contract survey started. He didn't have any trouble with the hippopotami.

APPLE USERS GROUP

Apple Microcomputers are starting to appear in a number of EMR offices and labs. They are being used for word processing, data handling, as smart terminals to mainframes, and for monitoring and manipulating data from various instruments. The machines at EMR exist in a

number of different configurations and are used with a variety of hardware and software. In order to make it easier for those of us using Apples to deal with problems and evaluate software and hardware, I am proposing the establishment of an EMR Apple users group. Those interested please contact John Matthews (601 Booth, Ottawa) with details on their equipment and software (Note this request includes those who are using their own Apples for office related work).

The next step will depend largely on the response, but at minimum I will prepare a table, based on the information received, listing the equipment and software now being used by EMR staff.

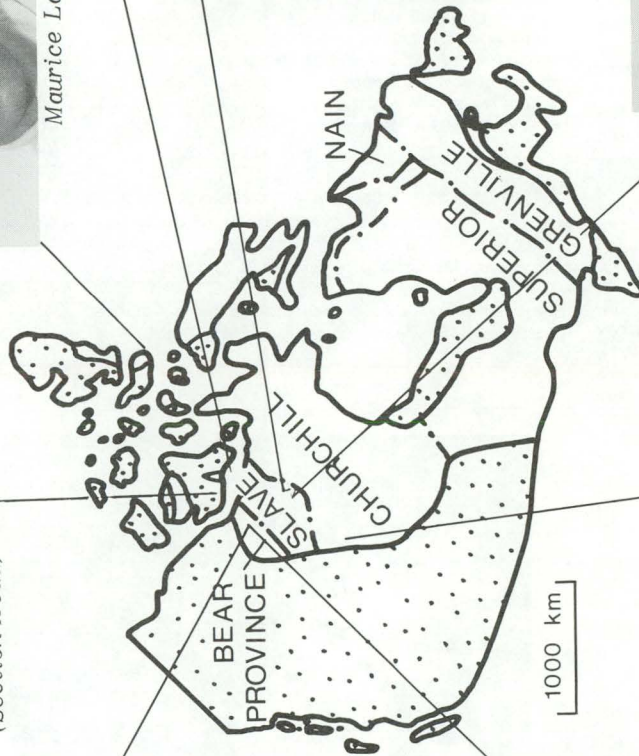
TEAM 4 WON THIS YEAR'S HOCKEY LEAGUE



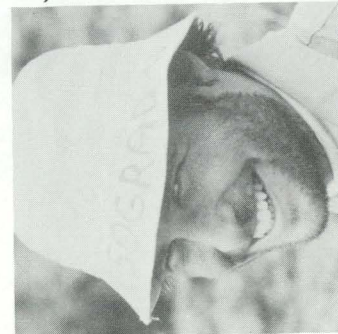
Back row, left to right: Andy Cregheur, Greg Martin, Greg Lund, Tony Frith, Tony LeCheminant, Serge Laperrière. Front row, left to right: Murray Frarey, Ken Raven, Rick Allard, Norm Grenier, Bill Hyatt. Missing Alf Dyck.

**BEAR-SLAVE SECTION OF THE
PRECAMBRIAN DIVISION**

This small band of geologists is responsible for the mapping, synthesis, and interpretation of the geology of the Bear, Slave, and parts of the Churchill Structural provinces of the Canadian Precambrian Shield, an area of approximately 350 000 km².



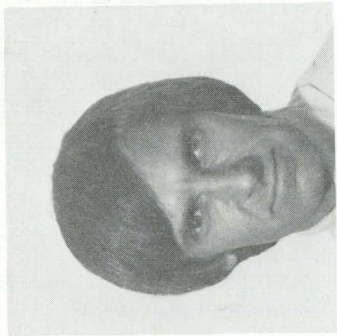
John B. Henderson
(Section Head)



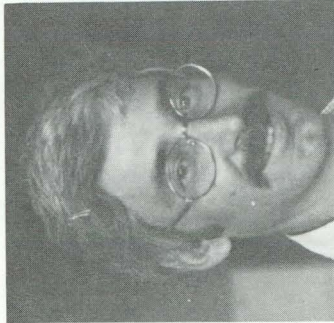
Marc St-Onge



Paul Hoffman



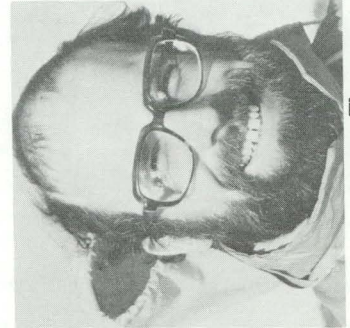
Maurice Lambert



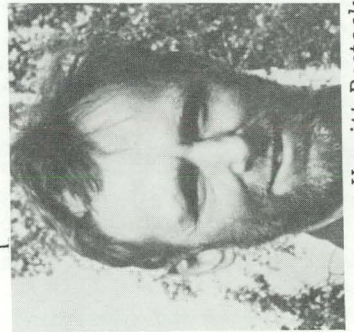
Tony Frith



Fred Campbell



Peter Thompson



Hewitt Bostock

SEVEN MONTHS IN SOUTHERN AFRICA

Bushveld Complex, Witwatersrand, Kimberley, Dwyka Tillite, Barberton Mountainland, Damaran Orogen ... few parts of the world can match the fascination that southern Africa holds for the geologist. Last year a long-held ambition was fulfilled when I received approval for a 7-month work transfer to the University of Cape Town for a first-hand look at southern African geology. Office and laboratory studies on GSC projects were to be continued at Cape Town and field excursions made to areas of geological interest, particularly the Precambrian. I was to remain on full pay but all expenses of the visit were to be borne by me.

The journey to Johannesburg, begun on July 19, was broken by a 3-day stopover in Rio de Janeiro, an exciting, lively city in a

spectacular setting of massive domes of high grade Archean augen gneiss (Sugarloaf, Corcovado).

Johannesburg has its own characteristic, if less picturesque, topography: the drab yellow tailings dumps from gold mines of the Witwatersrand, almost in the shadow of the city's high-rises.

The railway to Cape Town crosses the Karroo, a high, dry, treeless plateau, dotted with basalt-capped mesas, that forms the interior of much of South Africa. Just hours from Cape Town, the train reaches the Cape Fold Belt and descends into a wide valley dense with vineyards and flanked by massive open fields.

Cape Town and its suburbs wind around the great quartzite pile of Table Mountain. The University

of Cape Town nestles on the eastern slopes in surely one of the grandest settings of any university.

Our first major excursion, in September, took us north to the Orange River and South-West Africa. The Namaqualand desert was carpeted by brightly coloured flowers that burst into bloom in an annual spring spectacle. Clive Stowe (UCT) guided me through the contact zone between the Richtersveld and Kaapvaal cratons, where the metamorphic grade of the Grenville-age rocks ranges from subgreenschist to granulite.

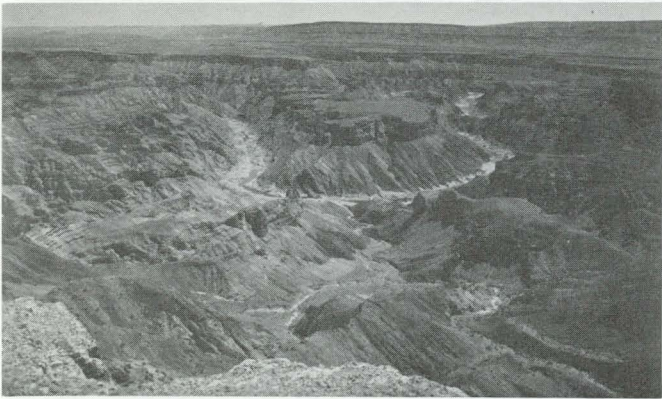
North of the Orange River lies the desert territory of "South-West" now even drier after a prolonged drought. Chris Hartnady (UCT) introduced me to the classic, late Precambrian



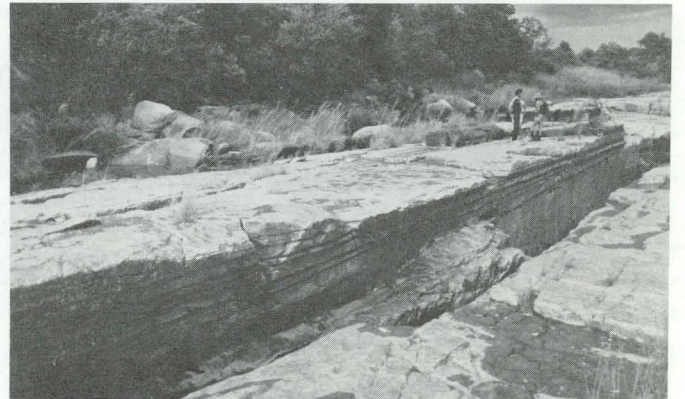
Clifton Beach, just south of Cape Town, below cliffs of Paleozoic quartzites of the Table Mountain series.



White rhino – perhaps a little too close for comfort!



The "Great Bend" of the Fish River in southern South-West Africa. Flat lying late Precambrian Nama rocks overlie basement.



Chromitite layers in anorthosite, Dwars River, Bushveld Complex.



Folded and fragmented amphibolite dyke, 3.6 Ga old, in highly deformed gneiss, ~3.8 Ga old in the bed of the Sand River, Limpopo mobile belt.



Gregory Rift Valley, northern Tanzania: Oldoinyo Lengai, a carbonatite volcano, and beyond, the south end of Lake Natron.

thrust and nappe complex of the Naukluft Mountains and the Pan-African Damara belt near the Atlantic coast, a possible collision zone between the Kalahari and Congo cratons. The German influence, from colonial days, is still strong in central SWA, attested to by the excellent beer and sausage.

November saw an excursion to the Limpopo belt, at the border with Zimbabwe, and the Barberton Mountainland, in eastern Transvaal, guided by Jay Barton (U. of Witwatersrand). In the aptly named Sand River, a bone-dry tributary of the Limpopo, 3.8 Ga gneisses cut by 3.6 Ga amphibolite dykes are magnificently exposed. Considering the influence Barberton has had on theories of granite-greenstone evolution, I was struck by the dearth of regional mapping in this large, well exposed terrane.

Most of January was spent in the field: the Archean basement of Swaziland (guide: Don Hunter, U. Of Natal); Bushveld Complex in eastern Transvaal (Grant Cawthorn, U. Wits); Vredefort Dome (Louis Nicolaysen, U. Wits.); and Kimberley, where a tour of a De Beers diamond mine below ground can be combined with a visit to Dwyka glaciated pavement and tillite exposures outside town.

After leaving South Africa in late February, we visited Zimbabwe to examine the well mapped Belingwe greenstone belt, with its classic unconformity between basement gneiss and 2.7 Ga shallow-water sediments and ultramafic lavas, and to marvel at Victoria Falls. An all-too-short week in Kenya followed, highlighted by

the Rift Valley, Lake Victoria and Mount Kenya. Last stop in Africa was Egypt, to see Cairo, Alexandria and Luxor.

Numerous pleasant memories of our stay in southern Africa remain with us: the sunshine, the friendliness and hospitality of the people, the high academic standards of schools and universities the magnificent game parks (Etosha, Kalahari, Kruger, Mkuzi), the excellent and inexpensive wine (1200 labels!) Unfortunately, while we did gain a greater appreciation of them, we found no answers to the region's monumental racial and developmental problems, beside which Canadian worries pale into insignificance.

Tom Frisch



The 75th Anniversary Logan Club Dinner in 1963. Does anyone know who took this photograph?

Many thanks to those who contributed to this issue of **Geogram**.

Material for the next issue of **Geogram** should be sent via your Division Office to GID

Les articles pour la prochaine parution de **Geogram** devront-êre dirigés au secrétariat de votre division et de là acheminés à la Division de l'information géologique.

Editor / W.C. Morgan
Rédaction /

Editorial Advisors /
Conseillers à la rédaction /

R.G. Blackadar / M.J. Copeland
P.J. Griffin / D.A. Busby

