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MC82
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No. 2 JULY/JUILLET 1975

AN INFORMAL BRANCH NEWSLETTER
UN BULLETIN INTERNE D'INFORMATION



FROM THE DEPUTY DIRECTOR GENERAL

GEOGRAM provides me with an opportunity to briefly outline the missions of the Geological Survey of Canada, the issues governing them, and the rationale by which we organize our scientific program.

The principal missions of the GSC and the related issues are:

1. Evaluation of energy and mineral resources available in Canada required for the formulation of national energy and mineral resources policy. The more obvious questions concern resource adequacy for domestic needs, surplus available for export, alternative sources in Canada for commodities that are currently largely imported, and resource conservation, etc.
2. Provision of geoscientific information and technology to facilitate the discovery of needed resources, as a means of promoting regional development to lessen regional disparities, and as an aid in establishing Canadian sovereignty in adjacent offshore areas.
3. Determination of the capability of the landmass to withstand various types of use, particularly in response to resource development, urban growth and for the disposal of waste.
4. In addition, the GSC provides advice and information to other government departments and agencies and contributes to the knowledge base used for research, education and for cultural purposes.

To carry out these missions we must first concern ourselves with the geological framework of Canada -- the storehouse of the resources whose nature, distribution and abundance we seek to determine. Accordingly, our principal and most basic task is the study, mapping description and interpretation of the geology of Canada and its adjacent offshore regions. A significant amount of data collection by a variety of methods is inherent in these studies but the bulk of our effort requires research of a high order to understand the nature of the Canadian landmass and the history and processes by which it evolved. In this regard, as our data base continues to enlarge, I expect that we shall place greater emphasis on regional compilation through our 1:1 000 000 scale map series and by regional reviews and syntheses to better develop our concepts of tectonic evolution and their relationship to metallogenesis and the formation of fossil fuels.

It should be pointed out that our regional systematic studies are highly dependent on the continuing effort to establish standards and correlations by means of control studies and analytical services in fields such as petrology, paleontology, isotopic geochronology, mineralogy, geophysics and geochemistry. For control studies, as well as for systematic work, the GSC does not have a sufficiently large staff to be informed on all aspects of earth science nor to be familiar in detail with the geology of all parts of Canada. Therefore, we augment our program by having some studies undertaken under research agreements, largely with the universities, and by influencing the standards by which data are collected under federal-provincial mineral development programs.

NOTE DU SOUS-DIRECTEUR GENERAL

Je remercie GEOGRAM d'avoir bien voulu m'ouvrir ses pages et me permettre de tracer les grandes lignes des missions de la Commission géologique du Canada, des préoccupations qui les sous-tendent et des principes selon lesquels nous organisons notre programme scientifique.

Voici donc les principales missions de la CGC et les considérations qui les inspirent.

1. L'évaluation des ressources énergétiques et minérales disponibles au Canada en vue de la formulation de la politique nationale relative à ces ressources. Les préoccupations les plus évidentes dont nous devons tenir compte sont, notamment, la disponibilité de ressources suffisantes pour répondre aux besoins du pays, les surplus que nous pouvons affecter au marché extérieur, les ressources qui nous permettraient de remplacer les produits importés actuellement en quantités importantes, la conservation des ressources.
2. L'obtention de renseignements et la mise au point de techniques dans le secteur géoscientifique afin de faciliter la découverte de ressources nécessaires, de promouvoir le développement régional pour atténuer les inégalités régionales, et d'aider à affirmer la souveraineté canadienne sur les régions marines voisines.
3. La détermination de la capacité de la masse continentale à supporter diverses utilisations, particulièrement l'exploitation des ressources, l'expansion urbaine et l'élimination des déchets.
4. De plus, la CGC donne des conseils et des renseignements aux autres ministères et aux organismes de l'Etat et participe à l'enrichissement de la masse de connaissances que requièrent la recherche, l'enseignement et la poursuite des objectifs culturels.

Afin d'accomplir ces missions, nous devons d'abord nous préoccuper de l'infrastructure géologique du Canada dépôt des ressources dont nous tentons de déterminer la nature, la répartition et l'abondance. Notre tâche principale et la plus fondamentale consiste donc à étudier, cartographier, décrire et interpréter la géologie du Canada et des régions marines voisines. Ces études nécessitent la cueillette d'une foule de données à l'aide de diverses méthodes, mais le plus gros de notre travail exige l'exécution de recherches très poussées dans le but de comprendre la nature de la masse continentale canadienne, ainsi que son histoire et ses processus d'évolution. A cet égard, à mesure que nos connaissances prendront de l'ampleur, je m'attends que nous accorderons plus d'importance à la compilation des cartes régionales de la série de cartes au 1:1 000 000 et, au moyen d'études et de synthèses régionales, que nous raffinerons les concepts qui expliquent l'évolution tectonique et leurs rapports avec la formation des gîtes métallifères et des combustibles fossiles.

Il convient de faire remarquer que nos études systématiques des régions dépendent beaucoup d'un effort suivi relativement à l'établissement de normes et de corrélations au moyen d'études de contrôle et de services d'analyse dans des domaines comme la pétrologie, la paléontologie, la datation isotopique, la minéralogie, la géophysique et la géochimie. Pour ce qui est des études de contrôle et des travaux systématiques, la CGC n'a pas un nombre suffisant d'employés pour être au courant de tous les aspects des sciences de la Terre ou pour connaître à fond la géologie de toutes les parties du Canada. Voilà pourquoi nous complétons notre programme par des études contractuelles, effectuées en grande partie par les universités; voilà pourquoi aussi nous influons sur les normes selon lesquelles les données sont recueillies dans le cadre de programmes fédéraux-provinciaux de mise en valeur de minéraux.

The basic information concerning the geological framework is presented in reports and on maps, mainly at 1:250 000 scale. They are used for many purposes: by industry for exploration and development, by government agencies as basic data for assessment of land use and projected resource development, and by universities for research and education. Within the GSC program, however, they form the essential foundation for soundly based energy, mineral and terrain inventories.

These inventories are next in order in the department's program system and involve the development of improved concepts and better technology for identifying potential energy and mineral resources and for assessing the capability of terrain for various uses by man. Some examples of how these tasks are being carried out include: studies of mineral deposits, the development of geochemical and airborne radiometric techniques now being used for the Uranium Reconnaissance Program, investigations of the sensitivity of various terrains to hazards and to man's use, and the continuing development of high resolution seismic profile techniques to determine the properties of sea bottom sediments. In the future, as our techniques and knowledge improve we will increasingly encourage the application of a variety of methods to resource identification.

Quantitative evaluation of resources and terrain are being undertaken even though related methodology is still embryonic. Nevertheless innovative research by GSC scientists has led to rapid development of methods in these fields but much remains to be done. It is clear that our ability to predict resource abundance and terrain capability depends on the correctness with which we perceive the origin of mineral and fuel resources and on the depth of our understanding of the geology of Canada and the processes involved in its evolution. In contrast to the scientific and technical nature of the information emanating from the study of the geological framework, much of the output from the resource and terrain identification and evaluation must be in a derived and generalized form, suitable for specialized customers in government and industry who may use it in making decisions on policy and development. Hence it is at this level that geological information makes its greatest impact on society. It is important, therefore, for us to determine what our customers want and to provide the information in a readily digestible form. By the same token we must advise them, where necessary, on the limitations of the nature and quality of the information.

Finally, more effort towards planning and implementing data base management is required if we are going to use effectively the ever increasing amount of information being generated. Automated data manipulation and display have been successfully applied to numerical data in many parts of the GSC. More emphasis, though, is now being placed in developing automated means of handling and displaying non-numerical geological data. Our progress in geological autocartography with the production of a very intricate and complex 1:1 000 000 scale map is most encouraging. Accordingly I look to continued progress in applying automated techniques to enhance our capability to provide timely derived and generalized information to our customers.

In summary, the GSC program is concerned essentially with describing and explaining the geology of Canada, of developing better ways of identifying and evaluating its resources, and of assessing the suitability of its terrain for use by man. It is also concerned with communicating the results of its work effectively. In view of our past record and the competence we possess I feel that we shall have every chance of achieving our goals.

Les renseignements de base concernant la structure géologique du Canada sont présentés dans des rapports et sur des cartes, habituellement au 1:250 000. On utilise ces rapports et cartes à nombre de fins: l'industrie pour l'exploration et l'exploitation, les organisations gouvernementales comme données de base pour évaluer les projets d'utilisation des terres et de mise en valeur des ressources, et les universités pour la recherche et l'enseignement. Dans le programme de la CGC, cependant, elles constituent le fondement essentiel à l'établissement d'inventaires fiables des ressources énergétiques et minérales, et des terrains.

Ces inventaires viennent en second lieu dans le système des programmes du Ministère et comportent l'élaboration de meilleurs concepts et d'une technologie plus perfectionnée pour découvrir des ressources énergétiques et minérales possibles et évaluer les diverses possibilités d'utilisation du sol. Notons, à titre d'exemple de la façon dont ces tâches sont remplies, les études de gîtes minéraux, la mise au point des techniques de géochimie et de radiométrie aéroportée utilisées actuellement dans le cadre du Programme de recherche de l'uranium, les études sur la sensibilité de divers terrains aux phénomènes naturels et à leur utilisation par l'homme, ainsi que le perfectionnement continu des techniques d'établissement de profils sismiques à haute résolution en vue de déterminer les propriétés des sédiments des fonds marins. A l'avenir, à mesure que nos techniques et connaissances s'amélioreront, nous encouragerons de plus en plus l'application de diverses méthodes à la délimitation des ressources.

L'évaluation quantitative des ressources et des terrains est en cours, même si la méthodologie utilisée est encore à l'état embryonnaire. Les chercheurs de la CGC ont eu vite fait de mettre au point des méthodes dans ces domaines, mais il reste beaucoup à faire. Il est évident que notre aptitude à prédire l'abondance des ressources et les possibilités des terrains dépend de l'exactitude avec laquelle nous établissons l'origine des ressources minérales et combustibles ainsi que de notre compréhension de la géologie du Canada et des mécanismes en cause dans son évolution. Contrairement à la nature scientifique et technique des renseignements que procure l'étude de la structure géologique, la plupart des données portant sur l'identification et l'évaluation des ressources et des terrains doivent se présenter sous forme de déductions et de généralisations qui conviennent à des clients spécialisés des secteurs public et privé, qui peuvent ainsi les utiliser pour prendre des décisions sur les politiques et le développement. C'est donc à ce niveau que l'information géologique a le plus d'effet sur la société. Il est important, par conséquent, que nous déterminions ce que désirent nos clients et que nous fournissions l'information sous une forme facile à comprendre. Nous devons en même temps les aviser, au besoin, des limites inhérentes à la nature et à la qualité de ces renseignements.

Enfin, il nous faudra accentuer nos efforts de planification et de mise en œuvre dans la gestion du capital-données, si nous voulons pouvoir utiliser efficacement la somme toujours plus importante des renseignements que nous accumulons. Dans nombre de domaines, la CGC a réussi à automatiser la manipulation et l'affichage des données numériques. A l'heure actuelle, la CGC met l'accent sur la mise au point de moyens informatiques de traitement et d'affichage des données géologiques non numériques. Nos progrès en cartographie géologique automatisée sont des plus encourageants, comme en fait foi la production d'une carte très détaillée et très complexe au 1:1 000 000. C'est pourquoi je crois que les progrès future de l'application des techniques informatiques nous permettront d'améliorer notre aptitude à fournir des renseignements déduits et généralisés qui répondent aux besoins de nos clients.

En résumé, le programme de la CGC porte essentiellement sur la description et l'explication de la géologie du Canada, la mise au point de meilleures façons de découvrir et d'évaluer les ressources du pays, et l'évaluation des terrains pour établir quels usages l'homme peut en faire. Il porte aussi sur la communication efficace des résultats des travaux de la CGC. Compte tenu de nos réalisations et des compétences à notre disposition, j'estime que nous avons toutes les chances d'atteindre nos objectifs.

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STAFF NEWS

OFFICE OF THE DIRECTOR GENERAL

Lark Hodgins is leaving to be secretary to the Assistant Deputy Minister. Mrs. Judy Smalldridge will be coming as Lark's replacement in mid-July.

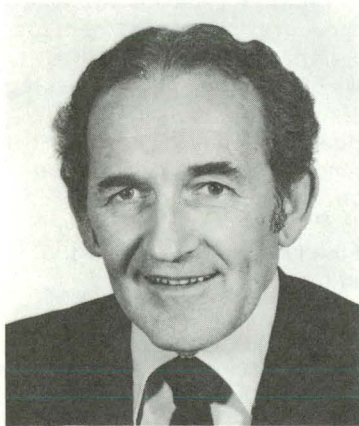
Some of you may have noticed from the directory boards that a number of new directors appeared overnight. In keeping with other branches and divisions of the Public Service the head of the Geological Survey becomes Director General and our Divisions are now headed by Directors.

ATLANTIC GEOSCIENCE CENTRE DARTMOUTH, NOVA SCOTIA

A Chief Moves On

Dr. B. R. Pelletier, one of the first marine geologists at the Institute in 1963, has been transferred to a challenging assignment in Ottawa. The effective date of his new position was April 1, but his actual move took place in early July.

It is perhaps a natural consequence that Bernie should leave the Bedford Institute of Oceanography at this time to take on new responsibilities in Ottawa in the



Terrain Sciences Division as the Branch Co-ordinator of the Arctic Archipelago Program. A quick glance at his publication record reveals his broad professional interest in some of the many challenging research problems which await enthusiastic marine geologists in the Arctic. In the early 1960's Bernie was among the first members of the department to in-

vestigate the geologic features of the outer Arctic continental shelf. These early investigations culminated in the publication of the first detailed reports describing the development of certain major submarine physiographic features in the waters of the high Arctic. During his tenure at BIO, Bernie's ever present pioneering spirit provided added momentum to a diversified and productive marine geology research program which he developed and nurtured for more than a decade. Through his guidance and leadership marine geologic investigations were extended into all Canadian waters. Concurrently, a series of international cruises was initiated which focussed on problem areas in the Atlantic, Pacific and western Arctic oceans, and the Caribbean Sea. By 1970 a well-rounded program of marine geologic investigations was established that included

studies on submarine physiographic features, surficial marine geology of continental shelves, and a host of related paleoecological and sedimentological studies. Many of these are continuing today as part of the multi-disciplinary environmental marine geology program of AGC.

As an active member of the Terrain Sciences research team Bernie will continue his investigations in the Beaufort Sea, while assisting the branch with the development of plans for offshore programs in the Arctic Archipelago and westcoast offshore. In addition he will provide technical advice to the Director General's office on marine geoscience programs that are EMR components of DOE programs.

Dr. Pelletier will be greatly missed at BIO. His rapport with colleagues, good nature and love of fun, and his empathy have made him a friend of all. With much affection we wish you "all the best" in your move to Ottawa! Your fellow cohorts suggest "Give 'em hell, Chief!"

- C. T. Schafer

Dr. P. A. (Peter) Hacquebard joined AGC in June 1975 as a research scientist. Peter who came from ISPG in Calgary will continue his work on coal petrology in Nova Scotia, the province where his career with the Geological Survey of Canada began some 27 years ago.

Steve Meroekh, a United Nations Fellow Trainee from Indonesia, is currently working with Dr. L. H. King of AGC's Regional Reconnaissance group. Steve is familiarizing himself with the tools and techniques used by Lew and colleagues to map and study offshore surficial and bedrock geology.

Gordon Joice has recently joined the Environmental Marine Geology group of AGC as a physical scientist. An M. Sc. graduate of the University of Toronto. Gordon's task will be to solve the data processing problems of the group.

Curtis Stevens is the technician recently hired to assist Drs. Willem van der Linden and 'Sherry' Srivastava to process data collected on cruises and assists in the preparation of scientific reports.

CENTRAL LABORATORIES AND ADMINISTRATIVE SERVICES DIVISION

Congratulations to Walter (Andy) Anderson who has recently been promoted to Assistant Supervisor, Secretarial Services.

We welcome Fern Casey as the new Branch Administrative Officer. Mrs. Casey came from Manpower and Immigration and was formerly a civilian member of the R. C. M. P.

John Azar has successfully completed his French Language Training and is now installed as Financial Comptroller.

Betty Lisle was welcomed by the Accounts staff after her successful appointment to her new position with the Accounts Section. Betty was previously with REG.

Dianne Hall has returned to the Accounts Section for her third consecutive year as a summer student.

Jean-Louis Bouvier visited the laboratory of the Geology Department of Laurentian University, Sudbury, at their invitation, to assist them with problems in setting up apparatus for the determination of carbon dioxide by automatic titration.

Cyril Cole and William Melanson, of Nova Scotia Technical College, Halifax, arrived for an extended visit to our spectrographic laboratories, in order to observe details of methods used there.

Ishmael Hassan, a CIDA trainee from Guyana and an honors student in chemistry and geology, is working in our chemical laboratories for the summer.

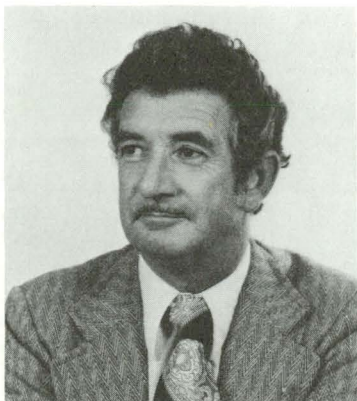
Thomas Wiles and Robert Hélie are spending their second summer working in our chemical and spectrographic laboratories, respectively.

Tom Ganim retired in June and there was a retirement ceremony in the Board Room on June 11. Les Jackson presided and presented a well filled wallet from Tom's friends. He joined the Survey in 1967 and was assigned to the Branch Registry. He was promoted to the library and then promoted back into the registry. Tom will be missed and we hope he will have a long and happy retirement.

GEOLOGICAL INFORMATION DIVISION

J. G. (Mick) Roberts joins the GSC Information Division on July 1 as Superintendent of Cartography. Mick is a native of Ottawa, educated here, in England and at various Army Technical and Survey Establishments. After his army stint, he joined Agriculture Canada in

1946. For the past 10 years he has directed the cartographic operations of the Canada Soil Survey Programs and under an interdepartmental agreement has directed, managed and co-ordinated map production for the Canada Land Inventory of DREE and DOE. He has also been involved in the operational aspects of the Canadian Geo-Information System (CGIS) of DOE and the Canadian Soil Information System (CanSIS) of Agriculture.



John Wright, who has moved to Ottawa recently, is Leona Mahoney's new editorial assistant.

Joan Christensen of the library staff retired in May after 35 years in the Public Service. We send our good wishes for her retirement.

We are pleased to see Jane Thacker again; it is Jane's third time as a summer assistant in the Library.

INSTITUTE of SEDIMENTARY and PETROLEUM GEOLOGY CALGARY, ALBERTA

Jim Broadfield has joined Regional Geology as an assistant on the curatorial staff.

T. P. (Potter) Chamney has returned to the ISPG, having completed requirements for his Ph.D. at Imperial College, University of London. His dissertation concerned Albian biostratigraphy and paleoenvironment in the Mackenzie Delta region, an area in which Potter has been working for many years.

Lloyd Snowdon has returned from his winter studies at Rice University, Houston, Texas, where he is studying for his doctoral degree in geology, in the field of organic geochemistry.

Summer Staffing, 1975

The ISPG is pleased to welcome twenty students to its summer staff. Seventeen are from geology, two from chemistry and one from Honours Arts. Most students are from western Canada but a few have come from Ontario and Quebec. Two of the students are working in Paleontology subdivision; eight are assisting in field programs with Regional Geology. Others are working in Organic and Inorganic Chemistry and in the Coal Research Section.

Maria Tomica has joined the Paleontological Subdivision as a macropaleontological technician.

REGIONAL AND ECONOMIC GEOLOGY DIVISION

A. V. (Andy) Okulitch joined the permanent staff of REG as a structural geologist in Correlation and Standards Subdivision. He has completed several years of work in the western Shuswap Metamorphic Complex following his Ph.D. at the University of British Columbia in 1969. During the current field season he will be joining Bill Morgan on Baffin Island.

R. T. (Dick) Bell is no stranger to most members of the GSC. From '59-'66 he worked on various field parties mainly in western Canada. He obtained his B. A. and M. A. from Toronto and went on to continue his graduate work at Princeton University where he obtained his Ph. D. in 1966. He joined us in 1967 and undertook studies on the Precambrian principally in the southern Keewatin district. In 1969, Dick went to Brock University as professor of sedimentation,

stratigraphy and structural geology. In May 1975 he joined Economic Geology Subdivision. He will be working in the Uranium Resource Evaluation Section.

Helmut Geldsetzer comes from South Africa to carry out sedimentological studies in the metalliferous Carboniferous strata of the Atlantic Provinces, an investigation long ago identified as priority item by Appalachian-workers. He was born in Germany but took his B. Sc. and M. Sc. at University of Washington and Ph. D. (1971) at Queen's University. His experience is broad: Cenozoic volcanics in Oregon, tectonics and sedimentation of the Middle-Paleozoic in eastern North America sedimentology of Helikian carbonates and contained base-metal sulphides in northern Baffin Island, uraniferous clastics in the western Canadian Shield, and tectonics and sedimentation of Precambrian strata in South Africa. Helmut is a welcome addition to the Appalachian Section, and one who will contribute much to the GSC.

At the annual meeting of the Canadian Institute of Mining and Metallurgy, John Jambor and D. J. T. Carson were presented with the Barlow Memorial Medal for their paper "Mineralogy, Zonal Relationships and Economic Significance of Hydrothermal Alteration of Porphyry Copper Deposits, Babine Lake Area, British Columbia" which was judged to be the best paper of the year in the CIM Bulletin.



Dr. Jambor is with the Mineral Deposit Section. Dr. Carson, who is a research geologist with Noranda Exploration Company in Toronto, was engaged in geological mapping and metallogenic studies with the Geological Survey of Canada from 1960-1964. Special congratulations go to John Jambor as it is his second Barlow award.

RESOURCE GEOPHYSICS AND GEOCHEMISTRY DIVISION

Gordon Bernius joined the Radiometrics Section of RGG on April 21. He formally worked for Geoterrex Ltd., on Airborne EM Surveys, spending several years in Wisconsin and South Africa. At present Gordon is completing his Ph. D. thesis on "Magnetic Studies of the Granulite Facies of the Archean Rocks of Northwestern Scotland", which is for submission to the University of Glasgow. His work at the GSC involves combined studies of aeromagnetism and photogeology to aid in the interpretation of airborne gamma-ray spectrometry.

Y. T. (Yvon) Maurice joined the Division in April. A native of Toronto, Ontario, Yvon completed his undergraduate studies in engineering geology at Laval University, Quebec. In 1969, he was awarded an Athlone Fellowship and went to Imperial College in London, England, where, in 1973, he obtained a Ph. D. degree in Applied Geochemistry. Before joining RGG, Yvon spent two years teaching mineralogy and geochemistry at Laval University. He is presently involved in the Uranium Reconnaissance Program and will spend his first field season with the Survey at Cape Dorset on Baffin Island.

W. B. (Bill) Coker, a native of Brandon, Manitoba, came to the Geochemistry Section of RGG from Rio Tinto Canadian Exploration Co. Ltd., Toronto. Previously he attended Carleton University obtaining B. Sc. (Hon.) 1971, and Queen's University, Ph. D. (1974). His Ph. D. research involved investigation of lake sediment geochemistry. Since April 28, when he joined the GSC Bill has been preparing for a field season doing orientation surveys and specialized studies for the geochemical part of the Uranium Reconnaissance Program.

Dean Butterfield left the Electrical and Seismic Methods Section on May 23 to return with his family to New Brunswick. He will be missed by his former co-workers and it is hoped that he will find the Maritimes still to his liking.

Claude Gauvreau, Chief Technologist in the Electrical and Seismic Methods Section was awarded the Khuring Prize at the 1975 Algonquin College Technology and Trades Graduation Ceremony held on May 10th. He was chosen for this award in recognition of his academic achievement in the Continuing Education Section of the College, and for his application of knowledge gained from his studies at the GSC. Claude has accomplished the design and construction of a computer controlled measuring system for electrical properties of rock. It is good that such an excellent worker has been recognized by both the people he works with, and those who have been responsible for his continuing education.

Ron Good of the Electrical and Seismic Methods has recovered from the effects of celebrating his recent change of status from Casual employee to permanent ESS-4. His new classification became official on April 1st.

David Elwood joined the Geochemistry Section as a Geochemical Data Manager in May. After obtaining a B. A. in geology from the University of Western Ontario in 1966, he spent six years at UWO Computing Center as a Computer Systems Programmer. From 1972 until this year he has been working as a programmer analyst with the Canadian Hydrographic Service, DOE. At present he is working on the development of Data Management, Analysis and Display Methods of Geochemical Data.

TERRAIN SCIENCES DIVISION

Dr. B. C. McDonald, who began his Career Assignment Program training with this Division, has been assigned to the Programs Branch of Treasury Board as of May 1st with responsibility for evaluation of programs within DOE.

Dr. R. A. O'Neil transferred to Canada Centre for Remote Sensing in April. Bob provided the Division with scientific expertise for the design and operation of complicated electronic equipment necessary for the analysis of the thermal and engineering properties of soils in permafrost regions.

Dr. J. E. Gale joined the Division in April after receiving his Ph. D. from the University of California. As an engineering geologist, John has studied the

stress analysis on jointed and faulted rock masses in both the field and the laboratory, and has experience in the field of deformation of rock structures and their analysis.

R. A. Klassen joined the Division in June after receiving his M. Sc. from Queen's University. Rodney's particular and somewhat unique expertise is in the field of lake geochemistry in the permafrost environment.

Dr. R. G. Skinner terminated his secondment to the Department of External Affairs on April 1st in order to assume the duties at the Sector, Branch and Division levels as liaison officer between EMR and various government departments, formerly carried out by Barry McDonald.

OF GENERAL INTEREST

Reading the Rocks

Dr. Zaslow's history of the Survey was published in June by Macmillan of Canada in co-operation with the Department. Although it is a substantial and scholarly volume, the general feeling is that it is also very readable. Considering the price of today's scientific textbooks, \$25 does not seem unreasonable for such a handsome book. It is being offered to staff members at the reduced price of \$18.75 from Laurier Touchette's office. Only one copy each at this price. Additional copies may be ordered direct from The Macmillan Company of Canada Limited, 70 Bond Street, Toronto, Ontario M5B 1X3, price \$25 post and packing included.



At a short ceremony in the Director General's office, Dr. McLaren presented copies to Roy McLeod and Mary Raddatz.

Roy was the winner of a competition for a title for the history of the Geological Survey. His title "Logan's Legacy" was chosen by Dr. Zaslow for the final chapter dealing with the achievements of the Geological Survey, a title which fits very well on the chapter. Furthermore, as the book was eventually destined to be published as a commercial venture by Macmillan of Canada in co-operation with the Department and Information Canada, it was felt that the winning title "Logan's Legacy", although it means a great deal to the geological fraternity, did not convey too much to the general public, and the title suggested by Dr. Blackadar "Reading the Rocks" was used for the book. This is now all a matter of history and does not in any way detract from the winner of the competition.

Mary was responsible for the line drawings and maps that were used to illustrate the report. Her painstaking and accurate work was a source of great satisfaction to Dr. Zaslow and it was at his special request that Mary receive a presentation copy in acknowledgment of her contribution. Although the book is not strictly a Geological Survey publication, we are very pleased that it carries some of the hand-work of our cartographic staff.

W. (Wes) Blake, Jr. successfully carried through the public defence of his thesis, entitled "Studies of glacial history in the Queen Elizabeth Islands, Canadian Arctic Archipelago", at the Department of Physical Geography, University of Stockholm, Sweden, on May 22nd. The faculty's opponent was Dr. J. Mangerud of the University of Bergen, Norway; the second opponent (chosen by Wes) was Dr. H. Hyvärinen of the University of Helsinki Finland, and the third opponent (whose business it was to make fun of the thesis) was Dr. B. Strömberg of the University of Stockholm. The thesis consisted of five

papers plus a formal summary, published between 1970 and 1975, based on Wes' field work in the Arctic since joining the GSC in 1962. These papers were presented to obtain the degree of "Filosofie doktor". Before joining the GSC Wes had worked with Swedish expeditions in Svalbard, and that glacial geological research formed the basis for his Ph.D. (in geology) at Ohio State University and for his "Filosofie licentiat" degree (physical geography) at the University of Stockholm.



The picture shows Wes speaking at the traditional dinner; Bob and Audrey Christie (indicated by arrows) and Doug Hodgson were also in attendance. Bob is spending a year in Copenhagen on exchange with the Geological Survey of Greenland.

France-Canada Scientific Exchange Program

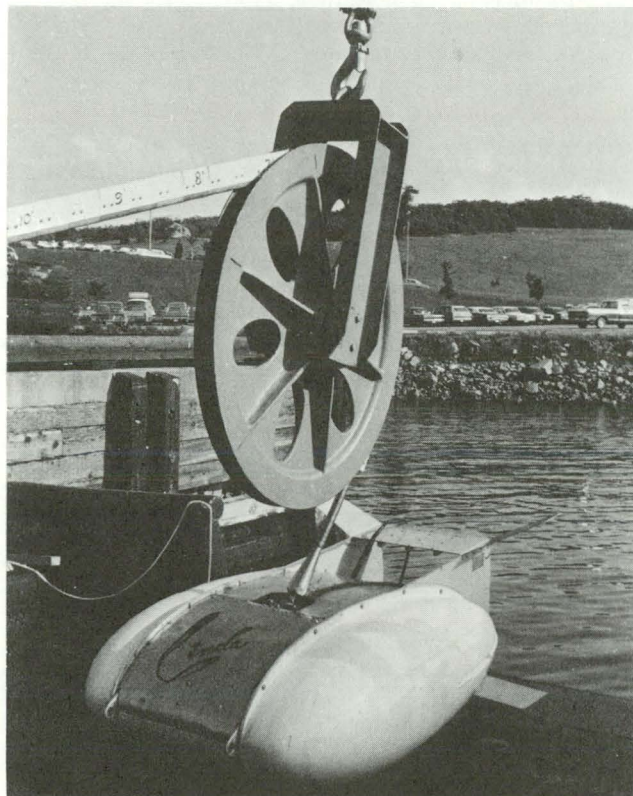
J. L. Mansy, a geology student at the University of Lille, France, began a study of the stratigraphy, sedimentation, and structure of Proterozoic rocks in the Omineca Mountains of north-central British Columbia in 1970. This work, carried out under the France-Canada scientific exchange program, has been facilitated by logistic support from GSC's Operation Finlay. The field work will be completed during 1975. With an additional summer spent in the Cariboo Mountains in 1969, the current study fulfils the requirement of six field seasons leading to a dissertation for a Doctor of Science degree. The length and continuity of the work has provided a wealth of data, documented in several published papers, and has led to correlation of stratigraphic units in Cariboo, Omineca and Cassiar Mountains. Papers currently in preparation on stratigraphy and structure of the Proterozoic strata will contribute to a much fuller understanding of these rocks than would have been possible in typical reconnaissance studies.

SEM Evaluation

After you have made up your mind whether it should be pink, blue, or green and once you have decided it matches your office furniture, isn't it nice to know the government will pick up the tab? Well, maybe not if what you are buying is a Scanning Electron Microscope (SEM) and you discover after you have bought it that it will not perform as you want it to. To avoid just such an eventuality, David A. Walker of AGC and Art D. Parsons of the Atlantic Oceanographic Laboratory (BIO) evaluated some of the SEM's available today. They tested calibration, stability, performance quality, instrument versatility, ease of operation, electronic design, and serviceability. They have collected their results and observations in a report designed for use by researchers who are potential buyers of an SEM. Copies will be available soon.

Deep Tow Seismic System

Sea trials of an exciting new oceanographic research tool, the Huntec Hydrosonde Deep Tow Seismic System have been completed and a report written by Dr. D. L. McKeown of the Bedford Institute of Oceanography. Dr. Lewis H. King of AGC played a key role in evaluating the system. The Huntec System is designed for work



on the continental shelf; it consists of a boomer type acoustic source mounted in a body that is towed near the ocean floor to depths of 300 metres. The main advantage is that the system permits the geology of the first 50 to 100 metres of ocean bottom to be defined with a resolution better than 0.3 metres.

Federal - Provincial Activities

The Non-Renewable Resource Evaluation Program (NREP)

The Non-Renewable Resource Evaluation Program is an EMR-generated plan for joint mineral resource inventory and resource estimation activities with the provinces. The program was originally presented at, and endorsed by, the Western Economic Opportunities Conference (WEOC) held in Calgary in 1973. The first of an anticipated NREP series is now underway in Manitoba.

NREP is a departmental activity with participation by GSC, Mineral Development Sector (mineral economics studies) and CANMET (mineral processing and related studies). Since the main focus of the program is on the integration of mineral deposit, metallogenic and geologic data to provide a basis for resource estimations, GSC functions as the lead agency and will co-ordinate NREP activities.

The NREP rationale is that there is a requirement - from provincial as well as national perspectives - for a systematic documentation of known mineral reserves and resources (exclusive of fossil fuels) and a concerted attempt to generate forecasts of undiscovered resources using the evolving methodologies of resource estimation. This type of resource base-data is needed for intelligent planning for resource utilization and resource management, and will be increasingly demanded in the future to aid in the assignment of priorities in resource development, particularly in cases of short-supply commodities (e. g. - uranium).

Basically, NREP will attempt to do four things:

1. inventorize known reserves and resources,
2. generate probability estimates of additional or "extended" reserves in and near known deposits or mining camps,
3. generate probability estimates of undiscovered resources (speculative resources) in unexplored or incompletely-explored favourable geological environments, and
4. apply "exploitability" factors (mineral economics, processing technology, etc.) to translate in-the-ground resource estimations into economic terms.

NREP activities are tailored to suit the requirements of participating provinces, but generally the programs will include the following components:

1. mineral inventory
2. data management and files computerization
3. mineral deposit and metallogenic studies
4. exploration history review and evaluation
5. mineral processing studies
6. mineral economics studies
7. resource estimations

The costs of the program will be in the order of \$1.5M per province, spread over four to five years and shared equally between EMR and the provinces. To date, an NREP agreement has been negotiated with Manitoba and discussions are in progress with

Saskatchewan and British Columbia. Manitoba is currently recruiting NREP staff and a limited field program will start this summer.

EMR personnel involved in various capacities in NREP include Geoff Leech, Chris Findlay, Don Sangster, Roger Eckstrand, Rod Kirkham, Jim Franklin, Ken M. Dawson, Frank Vokes, Art Soregaroli and Con Picklyk (GSC - REG), Jan Zwartendyk (MDS), and Don Harris (CANMET).

D. C. Findlay

Operation 'Takla'

In 1975 the Cordilleran Subdivision is undertaking a major study of Upper Triassic and Lower Jurassic volcanic, sedimentary and plutonic rocks that host important copper mineralization in north-central British Columbia. This project, named 'Operation Takla' is designed to focus on age, stratigraphy and paleogeography of sedimentary rocks; age, lithology, thickness, relationship to mineralization and distribution of the various volcanic facies; and the nature and relationship to the volcanic rocks of apparently coeval and comagmatic granitic and ultrabasic plutons. The project also includes completion of reconnaissance mapping in Toodoggone and Ware map-areas as part of Operation Finlay, revision of McConnell Creek E $\frac{1}{2}$ and Aiken Lake map-areas, and initiation of reconnaissance studies in McConnell Creek W $\frac{1}{2}$ map-area. The studies are greatly aided by access to geological maps resulting from detailed investigations previously carried out by several mining companies in the region and by local detailed mapping undertaken by the B. C. Department of Mines. The scope of the operation is indicated by the number of related studies outlined below. Co-ordination of data on volcanic rocks and Upper Paleozoic stratigraphy - J. W. H. Monger; biostratigraphy of Mesozoic strata - H. W. Tipper; Mesozoic stratigraphy and coordination of mapping in McConnell Creek map-area - T. A. Richards; petrology and relations of granitic rocks - G. J. Woodsworth; Proterozoic stratigraphy, structure and relation to Mesozoic and Paleozoic strata - J. L. Mansy; structure of Proterozoic strata and distribution of metamorphic facies - C. J. Dodds; co-ordination of studies in Toodoggone and Ware map-area - H. Gabrielse. This work will be supplemented by collections for age-determination studies to be coordinated by R. S. Stevens; detailed investigation of ultrabasic bodies by T. N. Irvine of the Geophysical Laboratory, Washington, D. C.; a graduate thesis on metamorphosed Proterozoic rocks by R. Parrish of U. B. C.; and a graduate thesis project by O. L. Jeletzky of Queen's University on stratigraphy, sedimentation, and paleogeography of the Bowser Lake Group in south-eastern Bowser Basin. Visits are planned by M. Lambert to study selected sections of volcanic rocks, R. Kirkham to examine occurrences of copper mineralization, S. Leaming to collect possible jade localities, and T. Poulton to collect selected Mesozoic fossil localities.

The Takla Project will form a basis for research on a similar tectonostratigraphic assemblage in the Stikine region of northwestern British Columbia in 1977.

Hugh Gabrielse

The Day They Red-circled God

The sea was calm that day but, in reality, it was only a foreboding of the dreadful events to come. Dr. Charlotte Keen stood near the starboard entrance to the forward lab, a highly intelligent though somewhat baleful figure as she observed the laying of her beloved sonobuoys. While she stared at the sea through the red haze of a slightly impaired vision, her mind raced back and forth from images of brilliant scientific achievements to physical reminders of bacchanalian bliss which only a few hours ago had been the focus of her activity. It was during this contemplative interval that the first signs of an angry sea appeared. And no one realized at the time that this was the harbinger of the cataclysm to follow.

As the wind rose and the sea swelled and the sonobuoys sent their faltering signals, technicians who had worked feverishly on the electronic assemblages, stood by to render aid to the stricken instruments. Foredeck crews who had wrestled for hours with cranes and equipment were alerted for immediate rescue. On the bridge, haggard watchkeepers, who had struggled manfully for days with problems of windage and currents, were prepared for instant maneuvering. With the situation worsening Charlotte, in pure frustration and sorrow, cried out, "Why isn't God helping us? He's supposed to be on our side!"

We all agreed and commiserated with her, and discussed the rotten luck she was having with the instrumentation. Most of it was finger trouble caused by someone back at the Institute (where else!), and this revelation was followed by a fairly good round of cursing of the Institute's inmates, its horrible politics, and its general lack of concern for its sons and daughters serving at sea. All this was par for the course.

Then the sky darkened and a voice spoke to Charlotte, and others claimed they could hear although not a sound or signal was received on the hydrophones, the echo sounders, the radar antennae or the satellite navigational receivers. But the voice we are told clearly said; "Charlotte, I do not like your attitude. I am here to command respect and to help you." To which Charlotte definitely replied, and we all heard: "I am here to get this Goddamn survey done, and you are not co-operating. Therefore I am recommending that you be red-circled in your present position until such time as the cost of living raise to your gatekeeper brings his wages up to equal your present salary."

Before the heavens truly opened, for it was God to whom she had spoken, the senior scientist cautioned her that his action would threaten and demoralize the ship. Not only that, but it would automatically jeopardize God's career prospects, and would bind Him over forever with limited possibilities of advancement. Charlotte then offered that He could transfer into other duties and work His way up again and, after passing qualifying examinations and establishing seniority, He could move past his red-circled position. And not only that - He would not lose any superannuation. We could all see that Charlotte was all heart.

As senior scientist it was part of my duties to carry out the administrative requests of the staff, but this one was somewhat unusual and the expected results of its execution left me shuddering. God did not like it either, and I found myself in an arbitrary position between Him and Charlotte. However I was frightened and began to plead with her to reconsider - she refused. I begged - she was adamant. Donny Barrett began to cry, and for some reason his eyes were as red as Charlotte's. I dismissed this comparison as merely being one of sympathetic reaction between two scientific soul mates. Still Charlotte refused. Tom Courtney, a father of seven, also implored, arguing tearfully that he was a good family man and always trod a straight and narrow path, and that this was a terrible way to reach the end. Charlotte would not budge. And then in turn the men came to her recounting the experiences of their miserable lives, and moaning how they preferred that existence rather than suffer the literal wrath of God. Again they faced a stone wall. Her lady assistants came to her hoping that the warm well-spring of feminine charity would be tapped, but this proved of no avail. I looked at the crew and the utter dejection they wore. Here they were, pawns caught in a cosmic stalemate. My heart bled for them so once more I tried. But Charlotte was firm in her purpose, resolute in her demands and impervious to my pleas. Reluctantly I put the machinery in motion that would red-circle God.

Once the recommendation was in the hands of the Bureau of Classification Revisions instructions were promptly issued to God to complete His Position Analysis Schedule. In the meantime God acted on His own initiative - a vocation which stemmed from long practice. He circulated amongst the personnel aboard HUDSON and discovered His shop steward, Bill Dobson, who immediately advised that He go through the grievance procedure.

According to regulations God approached His step-one manager, Don Locke, who quickly passed Him to the step-two manager. This could have been a serious mistake because the step-two manager, a director at the Institute and a good man, was in Ottawa fighting Treasury Board for more booze for his ships while his post was taken over by an acting director who himself was in personal competition with God - but the rules had to be followed. Fortunately nothing further developed as the director preferred to sit back and play this hand close to the vest. Meanwhile HUDSON continued her program on phase III in Baffin Bay. Time was short and God had to work fast because phase IV would soon begin and I wanted to see the matter settled quickly.

Aboard HUDSON things appeared to be peaceful. The Bingo games continued, and Don Currie continued to win. No one spoke of the almighty threat hanging over the ship. But occasionally I would see people shuffling along alleyways with prayer beads clutched in their hands, or making the sign of the cross before rounding a corner or stepping through an open doorway. Rarely was anyone seen on deck. Menacingly, an unspeakable pall of terror had descended upon the

ship, for all aboard feared the damnation of heavenly retribution.

In Ottawa, the Administration and the Union had come together on a rare course of agreement. They examined God's qualifications and noted several outstanding abilities such as creating worlds, establishing universal wisdom, conquering life, death and immortality but regrettably having no background in geophysics. Obviously He must be reassigned and the decision was made to post Him to Management.

First he had to learn the duties of a CR-1, and then was accelerated to CR-5 before coffee break. From the clerical series He was sent to Administration. Here He began as an AS3 and was promoted successively to AS 4, 5, and 6 in the next three hours. Now began the major turn in his new career. He became a candidate for the Career Assignments Program and was passed out at the Senior Executive level, SX-1, in one afternoon. This was followed by further training on government manuals, Treasury Board Guides, Hansard, sensitivity courses and group therapy. And still HUDSON sailed on, unable to dispell the invisible gloom that shrouded her.

By the end of the week, God made it to the Cabinet. He argued extensively with the Prime Minister who was then introducing a bill in the House to have his birthday changed to December 25th, as it was more in keeping with feats he thought he had accomplished as well as those he planned to achieve on a tortured budget. But here God discovered his real enemy. It was not an ardent geophysicist, it was not HUDSON, it was not even the Prime Minister nor was it Satan, Molach, Beelzebub, Lucifer, or Mammon. It was Treasury Board. They should have promoted Him but ignored his grievance. With this He smote his desk and the entire east Block of the Houses of Parliament collapsed. On His second swing the new EMR Tower building and the Peace Tower toppled simultaneously. At sea, Charlotte Keen identified a signal which bore the characteristic signature of an earth tremor, and correctly concluded; "He must have run into Treasury Board."

When the first shock waves struck the vessel, the ship's company and the cat were thrown into terrified disarray. Stalwart seamen rushed to be comforted by brave stewardesses who carefully huddled their frightened charges - Truly Florence Nightingales in aprons - a heart-warming and tear-evoking sight. In the Engine Room strong men cowered and whimpered, and sought the solace of their Chief. If they were going to go, they loyally thought, then their last wish would be to stand at his side to the bitter end - or else take the bastard with them.

The wheelhouse was pandemonium as the cat flew across the windows, over the engine telegraph and up and down the Mate's legs - an agonizing study of a possessed creature. Third officer Goodridge, peering into the radar scope, leaped a good four feet, clicked her heels together in mid-air and shrieked "Yippee" as she observed the birth of 40,000 new icebergs off the Greenland coast and simultaneously watched 200 miles of eastern Baffin Island slide into a boiling sea. On the bridge wing, the Captain was reduced from his

voluble four-word sentences (not to be confused with four-lettered words) to a single muttered word which, over the gathering horror, sounded like "ship". We assumed this was on his mind, and it was quite natural to express it in times of desperation.

Back in Ottawa, the end for Treasury Board was swift and sudden. A swath of destruction was laid across the ill-fated city, reaching into every recess, cubbyhole, office and hide-out that housed even a vestige of Treasury Board authority. Its workers were stamped to extinction, and its entire family tree exterminated, expunged, and obliterated. Nothing remained of soul or edifice, so complete was the annihilation.

From the smouldering ruins of the once proud phalanx of government power, God arose and transported Himself to HUDSON. As before, only Charlotte was in immediate conversation with His Lordship so we can only surmise what was spoken. Apparently God thanked her for changing His career and life style by sending Him into Management because he could rule all. He had acquired many certificates, diplomas and degrees, and a license to operate every department of the ship. He was adept at psychology, psychiatry, sociology, philosophy, and all the arts, sciences, and humanities as well as public relations. One of His most reasured awards was the St. John's Ambulance First Aid Certificate, with which He was prepared to board any BIO vessel afloat in order to succour mankind.

Automatically and immediately the Lord's munificence was communicated to the ship's company as an act of forgiveness. The awful terror that had besieged the ship for weeks suddenly vanished. Men and women emerged from fear-darkened retreats and walked freely once more with heads held high - a shining look of love, pride and inspiration gleaming from glistening eyes. They were forgiven and could only look forward with easy confidence to the pursuit of happiness in this greatest of great new worlds. It was truly a wondrous and beautiful sight. But it was to be short lived.

Apparently Charlotte, in a moment of recklessness, had asked God about the possibilities of a port call to Godthaab before the staff exchange at Frobisher Bay took place. To this God blanched and shook visibly we are told. He knew the stark impossibility of this task. Why would this woman not ask Him for something reasonable like an additional planet to our Solar System, or a second sun perhaps. But God was now in Management and He knew the hopelessness of persuading BIO management to deviate from its chosen course, its Olympian decision, its utter finality. Heavily He told Charlotte that her request must be denied.

Now we failed to hear what God actually said but Charlotte's words still ring loudly and clearly: "I can see that you are enjoying your work, but as far as I'm concerned all they've done is to promote you to a new level of incompetence. Therefore I am recommending that you be red-circled in you present position and that"

And then the snows came and they did not stop.

B. R. Pelletier

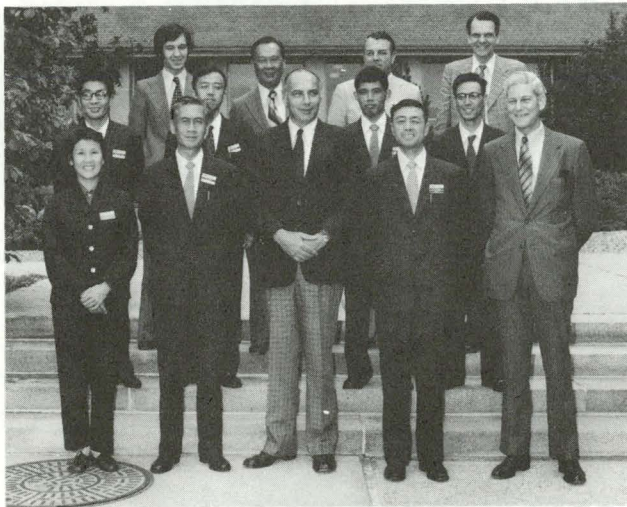
Reprinted from the "Hudsonite"
(newsletter of CSS Hudson)

Chinese Mission on Permafrost visits Geological Survey

In March the Department of External Affairs received an expression of interest from the People's Republic of China, under the terms of the Sino-Canadian Exchange Agreement, in sending to Canada a technical mission with particular interests in railroad construction in permafrost regions. Following discussions between External Affairs and interested departments (MOSST, NRC, INA, MOT, EMR) Canada agreed to receive the mission and NRC (Division of Building Research) was designated as the lead agency to organize the visit with assistance from the interested departments.

Through the highly efficient organizational efforts of Mr. S.W. Shackell, INA, and Dr. R.J.E. Brown, NRC, plus a seemingly endless exchange of cables between Ottawa and Peking, details for the visit were arranged and confirmed for the period May 30-June 17.

On June 3 the delegation, lead by Mr. Li Yu-Sheng, Vice President, Academy of Railroad Sciences, visited the Geological Survey for a briefing on work done by the Branch in permafrost regions with specific reference to the Mackenzie Valley. The program of terrain mapping, terrain sensitivity analysis, and associated studies of geomorphic processes were described by J.S. Scott. Several members of the delegation expressed great interest in our use of aerial photographs for terrain analysis as, apparently, this technique is not, as yet, widely used in China.



L. S. Collett introduced the delegation to the geophysical methodology used by the Branch for the delineation of permafrost and ground ice. A more detailed description of seismic, electrical (ground and airborne), and borehole logging methods, and a presentation of field studies made at Norman Wells, Tuktoyaktuk and sites along the Mackenzie Highway was then given by J. A. Hunter and W. J. Scott. The keen interest of the delegation in the geophysical program was evident from their technical questions during the presentation and their subsequent examination of some of the geophysical equipment in our laboratories.

The visit of the delegation to EMR concluded in the afternoon with a presentation by Earth Physics Branch on geothermal studies in northern regions.

During the remainder of their stay in Canada the delegation visited the Department of Public Works, and the Ministry of Transport in Ottawa, Canadian National Railways in Montreal, followed by visits to Thompson, Manitoba and Mackenzie and Dempster Highways in the Northwest Territories and Yukon Territory respectively. The picture shows Dr. J. S. Scott, Director, Terrain Sciences Division (front centre) with members of the Chinese delegation and other federal government departmental representatives.

Visit of Mr. R.P. St. John

Mr. R.P. St. John who was recently appointed Assistant Deputy Minister (Administration) visited the Geological Survey on Wednesday and Thursday, June 11 and 12. He met with Drs. McLaren and Wheeler for an overview of the Branch scientific program and later met the Directors and divisional Administrative Officers to briefly discuss the scientific program and divisional facilities.



Right to Left: Mr. R.P. St. John, Dr. J.A. Maxwell and Mr. K. Fracke.

Why, Why Not!

Inauguration of the travelling display portraying 19 Canadian women natural scientists took place at the National Museum of Canada on July 3. In attendance were 9 of the 14 living ladies so honoured, among them our own Helen Belyea. The contributions of Helen, Alice Wilson and Madeleine Fritz to Canadian earth science is documented in colourful fashion -- be sure to see this feature when it plays you local museum!

Don Stott sends the following quote "The main object of the investigation is, no doubt, to determine the mineral riches of the colony, and it is not unlikely that a wish may be felt by its inhabitants to know the results or the probabilities of the survey long before it can possibly be completed" - William Logan to Sir Henry de la Beche, 24 April 1843.

TRAVELS, CONFERENCES AND VISITS

Labrador Galore. Dr. Felix Gradstein a biostratigrapher with AGC, recently addressed 115 Houstonians belonging to the Gulf Coast Section of the Society of Economic Paleontologists and Mineralogists (SEPM). Felix's talk, "The Stratigraphy and Depositional History of the Canadian Atlantic Margin", attracted an audience a good deal larger than is common at SEPM lectures probably due to the current interest in U.S. eastern offshore exploration. One of the lecture's highlights was the revelation of the key to drilling success on the Labrador Shelf.

Felix has also recently been invited to participate in the last leg of the Deep Sea Drilling Project (DSDP). This leg was planned with the U.S. Geological Survey to drill approximately 20 core holes in the U.S. Atlantic shelf/slope. For various reasons drilling on the shelf in 1975 did not appear to be feasible. Chances are that Felix will participate in the alternative leg planned for south of Bermuda in August and September 1975. Future drilling under a new name - IDOP (International Phase of Ocean Drilling) - will concentrate on finding solutions to specific problems in contrast to the data collecting role played by DSDP. IPOD will be funded internationally and it is expected that there will be eventually five foreign (outside of US) participants. The first years' program in the Atlantic Ocean will try to sample crustal rocks across and along a slow-spreading ridge.

Again on the subject of DSDP, Dr. Lubomir Jansa has recently returned, tanned and fit, from Leg 41, which devoted its effort to drilling on the continental margin of NW Africa. Results from this cruise will be available in a year when the DSDP Initial Reports are published. Lubomir informs us that he found the scientists and programs were very efficiently organized. While in Malaga, Spain in late April, Lubomir presented two invited lectures at the University of Granada and carried out a reconnaissance study of the Jurassic of the Betic Cordillera area. Study of the Iberian Peninsula Jurassic rocks, he feels will greatly enhance our lithostratigraphic studies of the Grand Banks of Newfoundland.

Dale Buckley, Head of the Environmental Marine Geology group at AGC, recently visited 23 departments and laboratories at 16 different institutions in the US and Canada from Florida to Alaska and from California to Ontario. Besides the fact that he obviously likes to travel, Dale stoutly maintains that there was another and more important reason for the visits, i.e., to exchange information on research development in fields related to environmental marine geological programs in Canada, especially coastal zone studies. Other purportedly serious reasons for the trip:

- to discuss deep sea drilling programs, the implications of sedimentary cycling, and the geochemistry and mineralogical evolution of oceanic sediments
- to meet with coastal engineers at Berkeley and Menlo Park, California, Corvallis, Oregon, and Seattle, Washington

Dale returned with several 'significant' impressions from his laboratory visits. "The degree of sophistication in analysis and observation of natural processes in coastal areas" he says "is considerably improved over that of a very few years ago". There is no truth to the rumour that Dale will refine his impressions by making the trip an annual event!

Keith Manchester of AGC attended the Third World-Oceanology International Conference held in Brighton, England, March 17 to 21, 1975. Touted as "the most influential offshore exhibition in the world", the conference had as its theme *Into Deeper Waters*. The 75 invited papers were presented in five sections;

- National Reports
- Oil and Gas
- Other Minerals
- Fisheries Technology
- Science of the Environment

Keith was interested in the oil and gas, mineral, and environmental science sessions and felt that one of the most valuable aspects to him of the conference was that it had a good display of marine geoscience equipment with a European - as opposed to the more familiar North American - bias to it.

The SEPM Eastern Section held a field trip in Nova Scotia from June 10 to 14, 1975. Dr. Ian McK. Harris of AGC acted as one of the party chiefs. The theme of the trip was the influence of plate margin tectonics on sedimentation and Ian showed off the Meguma turbidites together with portions of Nova Scotia's Triassic and Carboniferous sedimentary deposits.

A meeting on Methods of Assessing Energy Resources was held on May 20-21 in Laxenburg, Austria. K. Roy (Energy Subdivision) attended and gave a paper describing the EMR methods of assessing hydrocarbon potential. The meeting was organized by the International Institute for Applied Systems Analysis to discuss methods and terminology used by various groups in assessing resources of coal, hydrocarbon and uranium. People from seventeen countries attended.

Many speakers commented favorably on the terminology scheme presented in the EMR interim document of January 30, 1975 - Departmental Terminology and Definition of Reserves and Resources. The addition of the time dimension seemed to be appealing as many of the speakers on coal and uranium wished to restrict their comments to only that material exploitable within the near future. There were a number of papers given on methods of estimating undiscovered hydrocarbon potential. It appears that the EMR approaches, as developed at ISPG, are similar in many ways to those of a number of other groups (Mobil Oil, Shell Oil, Compagnie Française des Pétroles, British Petroleum and parts of the USGS). The probabilistic approach to resource assessment and the systematic incorporation of uncertainty in decision making appears to be gaining increased acceptance by people concerned with resources, particularly those in the oil industry.

Seminar with Dennis Meadows --
"Portrait of U.S. Energy Future - Energy Brown-out"

Last month I took part in a seminar organized by the Science Council in Ottawa at which Dennis Meadows was the lead speaker. Professor Meadows is from the Thayer School of Engineering, Dartmouth College, Hanover, and is well known as a co-author of "Limits to Growth". The following notes are offered for your interest. They are prepared both from the substance of Meadows' talk and the discussion period which followed. I should emphasize that the comments were made exclusively on the US situation, but they plainly have considerable relevance to Canada.

The situation was easily summarized: the US is currently dependent on non-renewable resources for energy, i. e. resources that are used up or dissipated. In the future the only possible energy sources must be renewable or, effectively, limitless, i. e. fusion, solar tidal, wave, geothermal. There will be a gap between running out of oil and gas and the reasonable expectation of exploiting some of these alternate sources. This gap will extend from the present until fairly well on into the 21st century. What is to be done in the meanwhile?

There is need for a transition strategy to ensure supplies of energy to bridge the gap between the phasing out of petroleum and the phasing in of renewable energy sources. There are three transition sources:

1. Imports of petroleum products. This poses major political and economic problems, and is not considered a viable alternative in top level planning within the US today, although it must remain partial solution for some time to come.
2. Nuclear. (Using finite fuel resources, i. e. before fast breeders). Opinion on this peaked two years ago, and Meadows states that objections to total dependence on nuclear energy in the near future are growing. Informed sources consider it too dangerous, and not by any means demonstrably effective. (Energy accounting was discussed several times during the meeting and some doubt was expressed as to the adequacy of net energy gain of a massive nuclear program)
3. Coal. This was considered the most feasible transition source of energy. There is no coordination of attack within the US at present, but this must come and future dependence on this large but limited fuel supply could be justified.

There was a side discussion on non-conventional oil sources -- oil sands and oil shales. Meadows' point was that neither will supply enough quickly enough, even if they were economic from an energy accounting point of view and from a capital requirement point of view. He made the point that capital requirements must flow into agriculture, services, consumption, and resources, with a feedback to an industrial capital "bank". If too much money goes towards the resources the system will become unstable and collapse.

Already increased demands for capital have led to the printing of new money, the prime cause of inflation, without effectively increasing capital capacity. An energy policy must make a decision now for the future, even without complete knowledge, because there is no time left and there will not be enough capital to hedge bets.

There must be a national energy balance worked out, and energy accounting must become a routine matter. Market mechanisms cannot now deal with the requirements of the transition system. Reasons for energy shortage are social, biological, and psychological not physical. The technology exists, but the problem is to know how to apply it effectively.

Environmentalists must recognize that a certain degree of environmental and atmospheric degradation will be demanded by any energy program. Over-reaction will do more harm to the movement than reasonable compromise. (When needed on this point, Meadows expressed himself forcibly. He was an environmentalist, he said, he lives in a commune, doesn't have a car, doesn't eat meat, and walks to work. But he also said that you couldn't ask the North American population to accept a catastrophic decrease in population rather than do any damage to the environment.)

The discussion recognized that stabilization of energy demand rather than supply is not seriously being considered in most US projections. Meadows thinks that the population and GNP will stabilize in the US (both because of exogenous causes). Conservation is a necessary part of any future strategy, but cannot, in itself, effect the saving necessary without massive assistance from another energy source. He stressed again that the balance of political power is swinging against nuclear and toward coal as an obvious solution.

He questioned Canadian R&D funding of nuclear which still holds 70% of the proposed R&D budget, and the relatively insignificant amounts spent on coal R&D.

He asked for help. He wants people from Canada to take part in their discussions in regard to the problems of demand as well as supply. He made a plea for action on our part to assist in the necessary socio-political adjustment to the technological change required for our system to continue. He believed that Canada had a chance to establish an equilibrium situation more easily than practically any other country in the world.

Meadows' group is organizing the 4th Advanced Study Institute of Social System Dynamics for two weeks at the end of August in Dartmouth. He invited participation by the Geological Survey of Canada, and I have subsequently proposed to him that four of our resource geologists and planners attend.

D. J. McLaren

Latest news - We have just heard that Dr. C. H. Smith is to be Senior Assistant Deputy Minister and that Dr. Y. O. Fortier is to be Assistant Deputy Minister, Science and Technology. Both are former members of the Geological Survey and we offer our congratulations and best wishes.

Assemblée annuelle de l'"Ontario Institute of Chartered Cartographers"

Le 21 et 22 mai l'"O. I. C. C." tenait son assemblée générale annuelle au Centre de conférence à Ottawa.

Dans une étude des plus enrichissantes, le brigadier L. J. Harris prouvait sans équivoque que l'avenir de la cartographie moderne repose sur l'automatisation. Parmi les autres conférenciers, il faut mentionner spécialement le capitaine F. G. Noseworthy, responsable d'une prochaine expédition dans l'Arctique qui a su dans sa présentation, nous régaler par son humour.

Le thème principal fut les opinions émises sur l'affiliation possible de l'"O. E. C. C." à une Commission nationale pour la cartographie. L'approbation des membres est unanime; il faut faire rayonner la cartographie.

En juin prochain, les membres de la direction se rendront à Fredericton, N. B. à l'occasion du congrès de l'Association canadienne des sciences géodésiques pour travailler à établir les cadres de cette nouvelle association, tout en conservant leur autonomie provinciale.

Le nouveau président élu de l'"O. I. C. C." est M. David Monahan des Affaires marines et aquatiques. La Commission géologique est représentée par le secrétaire Robert Daugherty et un directeur Gilles Barbary.

Gilles Barbary

W. W. Brideaux attended the Eighth Palynology Short Course given May 19-23rd at Louisiana State University in Baton Rouge, Louisiana. The short course series is directed by George Hart of the LSU Geology Department. The course, "Jurassic dinoflagellates", was conducted by W. A. S. Sarjeant of the University of Saskatchewan at Saskatoon and dealt with the taxonomy, biostratigraphy and paleoecology of this biostratigraphically useful group of fossil marine algal cysts.

THE GEOLOGICAL SOCIETY OF AMERICA PENROSE CONFERENCE ON "PALEOZOIC MARGINS OF PALEO-AMERICAN AND EURAFRICAN PLATES (May 24 to 28) was attended by Bill Poole (REG), and Ian Harris and me (AGC). Since I was one of only a handful of geophysicists in the group of about 70 attendees, perhaps my view of the meeting was a little different from that of the other geoscientists. The upheaval generated by the plate tectonics theory has settled down and scientists are now examining those areas where the theory does not appear to correspond with observation. For marine geophysicists, one task is to generate all patterns of magnetic lineations according to a consistent set of finite rotations of plates. The marine geologists and geophysicists are concerned with what has happened to the ancient rifted margins. How has sediment deposition changed the morphology of those margins? Is it realistic to take the present outline of our margin, rotate it back across the Atlantic and get it to fit nearly against the Euro-African margin where it presumably

used to fit? What would happen if the Atlantic began to close again and collided with Europe? We would presumably weld the two continents together along a suture zone that would have similarities maybe to the Himalayas that resulted from the northern impact of India against Asia. In eastern North America the Appalachians are proposed to have resulted from the closure of an earlier Atlantic Ocean and the objective of the meeting was to discuss the characteristics of the Appalachians, deduce from these the character of the ancient continental margins that collided, and then infer the timing and effects of the collision. Work on this topic has been in progress for a long time (and some geoscientists spend much time trying to find the earliest reference to continental collisions or drift in the classics). However, detailed geological recognition of suture zones has only been attempted during the past 10 years. The earlier attempts, primarily by Dewey, Bird and Schenk in the northern Appalachians and Hatcher in the southern Appalachians, served to highlight the problems. These problems are beginning to be solved on a local scale. Memorial University Geology Department has perhaps been the most active in this project although there is considerable disagreement between various members of the department on the details of the continental collision model envisaged. But this is where I found the conference most interesting. As Tuzo Wilson wrote: "Geology has increasingly tended to become solely the study of continental rocks, minerals fossils and land forms rather than the study of the earth (While) most geophysicists do not appreciate the complexity of the surface rocks. What is needed is a combination of all techniques and ideas into a single science of the study of our planet. . . . Geologists were engaged in trying to improve methods of data collection, methods which. . . are not necessarily the most useful for solving the problems of the earth; many geophysicists, on the other hand, lacking an appreciation of the earth's true complexity, have spent their time interpreting data in too simple a fashion or in refining physical theories which do not apply in the least to the reality of the earth". In the discussion of the Appalachians the requirement for collaboration between geologists and geophysicists has arrived if only because one has to correlate the simplicity of plate tectonics with the complexity of local geology. In that regard, the failure of the conference was pronounced. The geophysicists had little to offer in regard to the local detail of their regional presentations, and the geologists could not agree on the regional relevance of their local interpretations. There were many interpretations of local structure in terms of tectonic movements on a scale far greater than the area studied, and there were presentations of tectonic schemes based on regional data without regard to local effects. One might categorize the former as trying to set rules on the basis of what might be single exceptions, and the latter as setting rules without considering the exceptions. However, I found these failures extremely useful because they made me aware, as I hope they did others, that a void exists. The success of the conference, therefore, still remains to be judged on the basis of the future efforts of the attendees in bridging that void.

R. T. Haworth

Ninth World Petroleum Congress Tokyo, Japan

From May 11 to 16, 1975, the writer attended the 9th World Petroleum Congress, Tokyo. The theme of the Congress, which was attended by more than 6000 registered delegates, was "Petroleum for the Welfare of Mankind". The very impressive opening ceremony, attended by some 5000 delegates and addressed by the Crown Prince, was used by the guest speakers to deliver position papers on the world petroleum situation. It was the only political interjection in five days of scientific presentations and is worth mentioning for the diversity of outlooks presented.

Dr. Frank Rossini (USA), President of the WPC, delivered the welcoming address and, stressing the theme of the Congress, pointed out their view that the world could not continue the luxury of using a non-renewable resource (petroleum) for such things as transportation and heating. He called for co-operation and research in conservation and conversion to new sources of energy, and the retention of petroleum for its most valuable use as a petrochemical feedstock.

The Japanese are in a very difficult position being a highly industrialized and petroleum dependent nation with indigenous production of only .3% of their demand and importing a full 80% from the Middle East. The Japanese Prime Minister Takeo Miki, in his address, stressed the need for conservation and more efficient use of petroleum substances. He also summarized the steps taken by Japan in recent years in environmental protection policies.

Dr. M. Eghbal, chairman of the board of the National Iranian Oil Company, pointed out (with regret) that the world had too long neglected the conservation of energy resources, including oil and coal and it was still sacrificing the long term interests to secure short term objectives. OPEC's fundamental decision is to minimize the utilization of petroleum as a fuel through international co-operation and to show discipline in its consumption so there will be adequate supplies for future generations. Iran is claiming leadership in achieving these world objectives by a stated goal of having 15% of its power generation from nuclear reactors by 1985.

V. D. Shashin, Minister of Oil Production Industry USSR, talked mainly of Russia's advancement in the field of environmental protection and called on other countries to follow suit. His emphasis on conservation and conversion to other energy sources was minimal.

The final address was by Roger Morton, US Secretary of Commerce. He pointed out the present US dependency on imported oil and then reviewed in some detail the US plan to achieve a high degree of self-sufficiency in energy by the mid 1980's. But this was not without an overall view to conservation. He stressed that the petroleum resources of the earth were finite and their value as petrochemical feedstocks was most important. The US plans, through voluntary of mandatory controls, to reduce petroleum consumption 1 million barrels per day by 1976 and 2 million b/d by the end of 1977. They will also reorient energy supply toward their vast coal deposits and shale and

nuclear sources. They will also undertake to store some 1 billion barrels of crude oil "so we will be less vulnerable to temporary interruptions of supply".

The overall impression after hearing these positions is that there will be a concerted effort to reduce petroleum consumption as fuel, especially in the next 10 to 20 years. Even holding the present rate of consumption in the face of projected population and economic growth will be a considerable per capita reduction.

J. A. Wade

Canada and USSR Emphasize Applied Geology in their Exchange Agreement

At the Fourth Meeting of the Canada/USSR Mixed Commission on Co-operation in the industrial Application of Science and Technology held in Ottawa near the end of May both countries expressed special interest in developing a closer relationship in applied geology. The present agreement between the Department of Industry, Trade and Commerce for Canada and the State Committee for Science and Technology of the USSR Council of Ministers has already provided for very useful exchanges of information and know-how, technology, joint research and development projects and economic co-operation. Joint projects are underway for developing thermal power plants, oil fields, drilling technology of several kinds, gas well and processing equipment, pulp and paper making machinery along with the sale of \$20 million worth of heavy machinery for the logging and petroleum industry.

It was agreed at the Commission meeting to establish separate groups to examine the needs for joint work and identify specific projects for mutual co-operation in the industrial application of geology, coal, ferrous and non-ferrous metals. The field of Industrial application of geology considered by this group refers to the broad score of subject material commonly referred to as Economic, Mining and Engineering Geology and the application of earth sciences to practical problems in our social and economic environment.

It is the intention under this exchange agreement to promote co-operation and joint scientific and technical projects on chosen subjects between institutions or working groups in organizations such as the Geological Survey of Canada and the Ministry of Geology of the Soviet Union or between other scientific and industrial organizations in either country where exchanges at the working level can be mutually beneficial.

The GSC is expected to be actively involved in the negotiating and developing of exchanges and joint work in applied geology and in the identification of subjects and fields of suitable mutual interest.

G. A. Gross

Volcanology Symposium

A symposium on Volcanic Regimes in Canada sponsored by the Volcanology Division of the Geological Association of Canada was held in conjunction with the Annual Meeting of the Association at Waterloo, May 16-17. Conveners were J.M. Ade-Hall, W.R.A. Baragar, and L.C. Coleman. Thirty one papers were presented in four half-day sessions which made it an exceptionally concentrated presentation. The papers were divided among six volcanic regimes representing the various tectonic settings of Canada: the Cordilleran, Appalachian, Proterozoic, and Archean mobile belts; the stable crust and the offshore oceanic regions. Each regime was introduced by a general paper and was followed by papers with a more specific focus. Souther traced the history of the Canadian Cordillera by tectonic interpretation of the various types and styles of volcanism that mark its evolution and the other papers furnished details of stratigraphy and petrology of specific units and regions: the Mesozoic Takla and Nicola Groups; the Tertiary alkaline volcanics of Quesnel Lake-Wells Grey Park Area; and volcanic units in a section across southern British Columbia. Strong interpreted the history of Appalachian volcanism in Newfoundland in terms of a single Wilson cycle with the initial opening marked by eruption of plateau basalts and subsequent spreading and contraction, by ocean floor and island arc volcanics. Some of the other papers extended the plate tectonics interpretation to the Maritime Provinces and overseas. Volcanism of the Proterozoic mobile belts was related to orogeny according to Moore's review and some, such as that of the Flin Flon-Snow Lake-Thompson and Hastings belts, can reasonably be attributed to a plate tectonic mechanism; others, such as that of the Circum-Ungava belt, cannot and the two varieties may have to be recognized as distinct regimes. In more specific papers the Grenville and Coronation orogenic volcanics were related to subduction at continental margins. Komatiites from the Circum-Ungava belt were described. Volcanism in the stable crust is related to extensional fracturing, according to Baragar, and the characteristic products are plateau basalts, alkaline intrusives, and felsic porphyries. The plateau basalts are derived from underlying mantle plumes and are analogous to oceanic islands. The Mistassini dyke swarm and Keweenawan plateau basalts are elements of the stable crust regime described in more detail in the specific papers. Goodwin visualizes the typical Archean greenstone belt as comprising a number of interfingering, lensoidal volcanic piles each showing a characteristic chemical trend which may be part of a general trend linking successive piles. A wealth of stratigraphic and chemical information on Archean greenstone belts in Superior, Slave and Churchill provinces was supplied by other papers and two brought to light new occurrences (Abitibi and Prince Albert belts) and new forms (tuffs) of komatiites in the Archean. Ade-Hall reviewed the volcanic geology off the west and east coasts where the monotony of the abyssal, sediment-covered plains are broken by steep ridges and numerous sea mounts. Other papers dealt

with the petrology of a Newfoundland sea mount and the ocean rift-related Baffin Bay basalts and the last paper examined the gravity evidence for Paleozoic, oceanic-type crust beneath Notre Dame Bay, Newfoundland.

The 14th Annual Canadian Hydrographic Conference was held in Halifax in March 1975. The three-day conference was attended by over 250 delegates from Canada, the U.S., and Europe. Papers were presented on a number of subjects including navigation and positioning systems, acoustic data logging and processing systems, marine cartography, morphology of the sea floor, and multidisciplinary hydrographic-geophysical surveys. Persons interested in the Proceedings of the Conference should contact Mr. R.G. Burke, Canadian Hydrographic Service, Bedford Institute of Oceanography, Dartmouth, N.S.

Sixteen hundred people attended Exploration Update '75, the joint CSPG - CSEG 1975 annual convention held in Calgary from 21 to 24 of May. The highlight of the convention was the panel discussion and forum "The Government Oil Company and Future Relationships between Government and Industry". Panel members included Donald S. MacDonald, Minister of Energy, Mines and Resources, J.M. Pierce, President of the Calgary-based Ranger Oil (Canada) Ltd. and John L. Stoih, Senior Vice-President of Gulf Oil Canada.

Safety First at 601 Booth Street - Keep those corridor and fire doors closed. It is only natural to open doors during hot, humid weather to increase the circulation of air but if a fire should start, this increased circulation would soon fill the halls and stairways with thick, acrid smoke. Play safe - keep those doors closed in the halls. They are part of our fire protection system.

Stealing bicycles is a simple job with a good pair of snippers and there have been several reported thefts from around the building. Get a hard steel chain and secure your bicycles. Although it is some time since we had thefts inside the building, summer days and empty offices provide more opportunities for light-fingered visitors - look after your purses and wallets

Writing for Geogram appears to have at least some rewards. In response to his article in the first issue - "Baffin Bay - Future Rubbish Dump?", Dr. Robin Falconer was asked if he would give an interview for the CBC Northern News Service. Robin was interviewed about a month after the newsletter was published.

Material for the next issue of Geogram should be sent to your Division Office or to Mary LaHam.
Les articles pour la prochaine parution de Geogram devront être dirigés au secrétariat de votre Division ou à Mary LaHam.

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