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Geological Survey  
Commission Géologique



The last spike on 7 November 1885 (top) and the re-enactment on 8 August 1985 (below). See the article on the Craigellachie Cairn inside.

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Energy, Mines and  
Resources Canada

Énergie, Mines et  
Ressources Canada

No. 26 APRIL 1987  
an informal branch newsletter

Canada

## FROM THE DIRECTOR GENERAL

It is now almost one year since the merger of the Survey and the Earth Physics Branch. Looking back over the year, it has been extremely gratifying to see the quiet efficiency with which the staff of the two Branches have met the challenge of implementing the many changes involved. Although so many reporting channels and ways of doing things have changed, the overall level of service provided to the Department and the general public has been maintained without any significant interruption. I know that it has been an unsettling time for many and I would like to express my personal appreciation for the patience and support that have made this merger possible. The sight of the GSC logo on lapel pins being worn by former EPB staff convinces me that the merger has been accomplished, we are now becoming one close-knit organization, and that any residual problems will soon be solved.

Amid all the news of down-sizing and cuts to the Public Service, it is reassuring to see that the Geological Survey recently came in for some strong support in a presentation to the Parliamentary Standing Committee on Research, Science and Technology. I think all staff can take pride in the statement to the Committee by R.J. Cathro, former President of the BC-Yukon Chamber of Mines, that GSC work is recognized "around the world as being first rate" and that the Department does "a remarkable job of delivering services".

At a time of expenditure reduction and government austerity, a major event in the recognition of the importance of geoscience research to Canada, was the announcement on January 20 by Ministers Merrithew and Oberle of the funding of LITHOPROBE. In my opinion, this was a significant leap forward for geoscience in Canada. For the first time, a collaborative multi-disciplinary effort in the earth sciences has moved into the same league of "big science" as the multi-million dollar accelerators, space hardware and telescopes of our colleagues in physics, space science and astronomy. The Survey and the Earth Physics Branch played a central role in ensuring the success of the pilot Phase I of LITHOPROBE, and in keeping LITHOPROBE alive and scientifically productive while the Phase II proposal was being assessed by NSERC. The GSC is fully committed to the Project through its geophysical and geological activities within the approved Transects. The cooperation and sharing of financial resources and

expertise with the universities and the exploration industry will enable us to accomplish more with our limited resources while helping them to accomplish more with theirs.

Recently the GSC has been criticised for the low level of bilingualism and Francophone representation in its management and scientific staff. I have therefore given high priority to an increased effort aimed at raising the level of contacts between the GSC and the Francophone geoscience community, and at increasing Francophone representation and the use of French within the Survey. Although there may be historical reasons for the present situation, significant changes are necessary now. Accordingly, I have created a Francophone Action Office under Pierre Lapointe. It will have the specific task of developing strategies to achieve these changes. Pierre is working on a number of new initiatives which will, I believe, result in the greater use of French in the day to day business of the Survey, a higher level of bilingualism in staff, and a more visible presence of Francophones in the Survey. These initiatives include seminars by geoscientists from GSC in Francophone Earth Science Departments; hosting Francophone university faculty and graduate students in GSC laboratories and on GSC field projects; priority recruiting of Francophone geoscientists at all levels; and a study of the feasibility of opening a regional GSC Office in Quebec. It is important to emphasize that while we can and must improve the Francophone representation situation in the GSC, implementation of these initiatives will, I believe, add to and enhance its scientific mission.

Increased Francophone representation undoubtedly is only one of the new challenges that the Survey will have to face over the next year. Nevertheless our demonstrated ability to prevail and prosper, and the enthusiasm and resilience of all GSC staff give me full confidence that we will be successful. I believe that the work that the Survey does is absolutely essential to the well-being and prosperity of Canada. There is continuing recognition of our worth by industry, by the provinces, by the universities, by the general public, by government and by the international community. As long as this continues, we can all be confident of the future of the GSC.

R.A. Price



# Staff News

## DIRECTOR GENERAL'S OFFICE

John Maxwell who joined the GSC in 1953 retired in October 1986 from his position as Special Advisor to the Director General's Office. A geologist-analytical chemist trained at the world-famous rock analysis laboratories of the University of Minnesota, his first contribution to the Survey was to reorganize the rock and mineral analytical facilities to meet the rapidly expanding demands for service resulting from a greatly expanding field program. He continued to direct the work of the Analytical Chemistry Section until 1967 when he was appointed Assistant Chief of the newly formed Geochemistry, Mineralogy and Economic Geology Division. In the late 1960s John was designated a Principal Investigator with the Apollo Program and was on leave-of-absence for about one year to study lunar samples.

When Central Laboratories and Technical Services Division was formed in 1971 John Maxwell was appointed director, a position he held until 1984 when the functions of CLTS were assigned to other parts of the Survey.

During his career with the GSC he made many visits to European and American analytical facilities to ensure that our laboratories were kept aware of new technology. He also maintained a personal interest in rock analysis — in 1981 the second edition of his text "Rock and Mineral Analysis", first published in 1968, was released.

In addition to his direct involvement with the scientific work of the GSC John acted as liaison officer between the GSC and geoscience programs in the Federal Republic of Germany and from 1973 until his retirement was our Official Languages Co-ordinator.

In keeping with his expressed wishes no formal event marked John's retirement but his many friends, through the medium of GEOGRAM, wish John and his wife Helen all the best and know that interests such as travel, music, opera, and drama will keep them fully occupied.

## GEOSCIENCE INFORMATION DIVISION

Jeanne White who joined the Survey's Photographic Section in 1953 retired in September. Two long-time members of the Cartographic staff retired recently; Gilles Barbary who joined in 1951 retired from his position of sub-unit supervisor and Bernie Mainville who joined the same year retired from his position as cartographic checker.

James Clarke transferred from the Records Unit to the Publication Production section on 8 December 1986. Jim will be responsible for the Open File System as well as the preparation of the Monthly Information Circular. His knowledge of the Survey's structure gained in the Records Unit and his educational background concerning the graphic arts should serve him well and we wish him the best of luck in the future.



**DR. HELEN R. BELYEA**

Helen Belyea, who died in May 1986, was perhaps the best known of all geological survey geologists in the "Oil Patch". She had a full and remarkable career, which it is impossible to summarize in a short article. She came from Saint John, N.B., and received degrees from Dalhousie and Northwestern University in Chicago. She was in the navy during the war as a lieutenant in the WRCNS and joined the Geological Survey when it ended. After a short time in Ottawa, she went out to Calgary in 1950 as a sub-surface geologist with the Geological Survey and began her long and remarkable career working on the Devonian rocks, which contained so much of Alberta's oil. Although described as a sub-surface geologist, she

was in fact a field geologist of considerable ability, and looked at rocks wherever she could find them, from the tops of mountains to the bottoms of oil wells. Helen, therefore, was present at the beginning of the boom when oil was discovered in a Devonian reef at Leduc in 1947, where she grew up, geologically, and spent her life explaining and synthesizing knowledge on these important and difficult rocks over the vast region of the western sedimentary basin from the Montana border to the Mackenzie country, and from the Canadian Shield to the Rocky Mountain Trench.

Her publications were many and authoritative, and during her lifetime she received the recognition due from her fellows in the petroleum industry, and from the scientific community as a whole including Fellowship in the Royal Society of Canada. Above all Helen was a wonderful person: humorous, warm, generous, but also possessed a daunting intellect and never suffered fools gladly. She had many interests, particularly walking, skiing and climbing in the Rockies, swimming, and foreign travel; and had a range of friendships far beyond her professional colleagues. We remember her today, not only as a woman who has made it in what used to be a man's profession, but also as a charming and delightful person who, in fact beat them at their own game. We shall miss her.



Laurier Touchette, who joined the GSC in 1952, retired from his position as Head of the Publications Distribution Office on 30 December 1986. To mark this occasion, a reception was held on 16 December in the Boardroom at 601 Booth Street.



At the reception, left to right: Laurier Touchette, Bob Blackadar (Director, GID), Peter Harker (ex Director, GID) and Mrs. Touchette.

### Library

Brian Drysdale's term appointment ended on 31 March 1986. Subsequently he was hired by the Sports Information Research Centre.

Marielle Larche replaced Brian McDonald as xerox operator in July.

Jacques Bérubé our French language cataloguer joined CANMET Library as a reference librarian in July.

Tony Kopf-Johnson is acting as head of the National GEOSCAN Centre during David Reade's absence on language training.

Wendy Stark left GSC, after six years, to take the position of Head, Technical Services at Labour Canada Library.

### TERRAIN SCIENCES DIVISION

#### Lynn Ovenden

Lynn has begun a post-doctoral fellowship in the Paleocology Section. Her primary responsibility will be to identify bryophytes in Quaternary samples and so contribute to an environmental interpretation of the host deposit. She will also be compiling some of the varied Holocene proxy-climatic data which have been generated by GSC scientists but never featured in mainstream scientific literature.

Her M.Sc. and Ph.D. research at the University of Toronto (advisor: J.C. Ritchie) was on peatland development patterns in northern Yukon.



Harvey Thorleifson joined the Division in August. A native of southwestern Manitoba, Harvey obtained a B.Sc. in Biology and a B.A. Hons. in Geography at the University of Winnipeg. His Master's thesis, under the supervision of Dr. J.T. Teller at the University of Manitoba, dealt with the eastward drainage of Lake Agassiz across northwestern Ontario. He has completed non-thesis Ph.D. requirements at the University of Colorado. His thesis, under the supervision of Dr. J.T. Andrews, deals with the Quaternary of northernmost Ontario. Harvey will be working in the Beardmore/Geraldton and Timmins area of Ontario as part of the Ontario Mineral Development Agreement and will also be continuing research in the Hudson Bay and Hudson Bay Lowlands.

Adrienne Larocque, who had been working part-time in Sedimentology Research, left to continue studies at Carleton University. Adrienne is completing her B.Sc. and plans to enter a postgraduate program. We wish her well.

Karen Rolko left our geochronology group and will be taking a 6 month term with the Canada-France pipeline test facility in Caen. We wish her well.

### LITHOSPHERE AND CANADIAN SHIELD DIVISION

With the retirement in July 1986 of Allan Fraser, the GSC has lost one of the veterans of the large-scale reconnaissance mapping operations that covered much of the Canadian Shield. Al was born in Barrie, Ontario and served in the RCAF as a navigator on Halifax bombers in the latter stages of WWII. He was shot down on his sixth mission in February 1945 and finished the war as a POW in Germany. In 1953, fresh from the graduate school of the University of Minnesota, Al joined the Survey. He participated in operations Baker and Thelon and led operations Coppermine and Bathurst Inlet. Although mainly involved with the northwestern part of the Canadian Shield during his career, he also worked in Saskatchewan and



Manitoba. In concert with Bill Heywood, Al was the major force behind the preparation of the Metamorphic Map of the Canadian Shield, published in 1978.

Cees van Staal (Geogram 24), formerly a term employee, has joined the permanent staff as a Research Scientist. He and Gary Yeo are organizing the current season's "Precambrian High" lecture series.

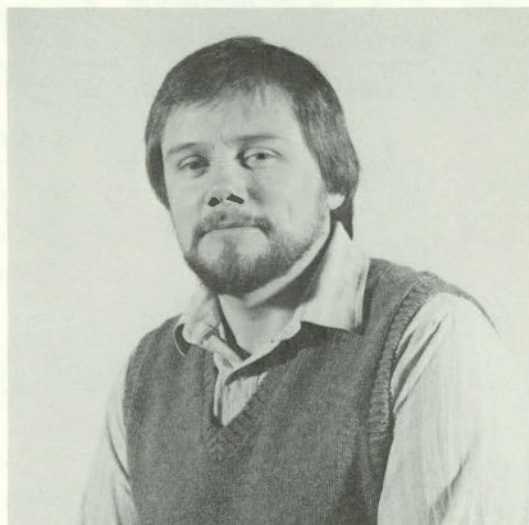
Bob Hildebrand is president of the Logan Club for 1986-87. Bruce Taylor (MRD) is secretary.

Terry Gordon has transferred to ISPG in Calgary but remains on the staff of the Petrology Section of LCSO.

The Geological Association of Canada named Tony Davidson the 1986 Howard S. Robinson Lecturer. Tony will be on the lecture circuit this winter and spring.

The Division will miss the diligent efforts and cheerful manner of Diane Wereley, administrative clerk since 1974, who has transferred to the Department of Supply and Services.

Jim Mortensen and his wife, Mary Lou Bevier, are post-doctoral fellows in the Geochronology Laboratory. Jim hails from Smithers, B.C. and holds B.A.Sc. and M.A.Sc. degrees from UBC. He did his doctoral research at the University of California, Santa Barbara, on the geology and geochronology of the Yukon-Tanana metamorphic terrane in SE Yukon. He taught economic geology at UBC in the academic years 1982-83 and 1984-85 and worked for a consulting geologist in the intervening period. A field geologist with a particular interest in geochronology, Jim is currently working on rocks from extensions of the Yukon-Tanana terrane and from the Superior Province.



Jim Mortensen



Mary Lou Bevier



Director General Ray Price presents a certificate signed by the Prime Minister to Bernie Manistre on his retirement on 19 October 1986. Bernie worked in the International Relations Unit in the Director General's Office.



Jim Tanner, Chief Geophysicist, presenting a 25 year Public Service Plaque to Dezo Nagy.



Mary Lou was born in Chicago and brought up in California. She obtained bachelor's and master's degrees from UC Santa Cruz and UBC, respectively, and a Ph.D. from UCSB, where she worked on the petrology and isotope geochemistry of the Chilcotin Group basalts of south-central B.C. Subsequently she was an assistant professor at Western State College in Gunnison, Colorado for three years. At the GSC, Mary Lou is investigating the geochronology and isotopic characteristics of New Brunswick granites and continuing work on Cenozoic volcanics from B.C.



He Shuyan

Visiting the Division for the year ending in May 1987 is He Shuyan. A native of Beijing, Mrs. He is associate professor at the Wuhan College of Geology of the Beijing Graduate School and specializes in the petrology of high grade metamorphic rocks of Hebei Province, the Qinling Mountains and elsewhere in China. During the 1986 field season in Canada, she worked with Subhas Tella in the Rankin Inlet area and visited the Parry Sound and Wawa-Timmins (Abitibi belt) regions of Ontario with Tony Davidson and Ken Card, respectively.

Thomas Frisch

#### CORDILLERAN AND PACIFIC MARGIN DIVISION, VANCOUVER OFFICE

Michael Force resigned in June to attend university full time. He was replaced as storeman by Skip Rines who transferred from DIAND.

Louise Fox was appointed to an indeterminate clerk-typist position in August replacing Elsie Gillis who resigned in February.

Dirk Tempelman-Kluit returned to Vancouver in June following his secondment to AGC during the winter.

#### ATLANTIC GEOSCIENCE CENTRE

New staff, visiting fellows and visitors. Eastern Petroleum Geology Subdivision: Mel Best, Doug Cant, and Tony Edwards. Regional Reconnaissance Subdivision: Ross Boutilier, Colin Cannon, Beatrice de Voogd, François Marillier, and Jacob Verhoef. Environmental Marine Geology Subdivision: Denis Bonifay and Jay Stravers. Program Support Subdivision: Randy Currie and Wayne Prime.

Frank Thomas, micropaleontology technician, received his M.Sc. from Dalhousie University, presenting a thesis: Lower Scotian Slope benthic faunas past and present, with taxonomic outline.

Honours, awards and appointments. G.L. Williams is GSC representative to the North American Commission for Stratigraphic Nomenclature, 1986-89. C.E. Keen was elected Fellow, American Geophysical Union. M.J. Keen received the Geological Association of Canada Logan Medal.

M.J. Keen

#### INSTITUTE OF SEDIMENTARY AND PETROLEUM GEOLOGY, CALGARY

In the spring 1986, the Petroleum Subdivision gained two recent Ph.D. graduates. Larry Lane received his doctorate in Geology from Carleton University, Ottawa, before joining ISPG as a research scientist. Martin Fowler graduated in 1984 from the University of Newcastle-upon-Tyne with a Ph.D. in Organic Geochemistry and is also a research scientist in the subdivision.

In recent months, ISPG saw two scientists leave research positions in Calgary for distant shores. Alan Higgins, Head of Paleontology for two years and a research scientist at ISPG since 1983, left the Institute at the end of May to work near London, England. This Upper Paleozoic conodont specialist is currently employed by British Petroleum. One of the "founding fathers" of ISPG, Tony Foscolos, elected to retire in September 1986, after serving as an Institute scientist for 20 years, in order to take on new challenges in Crete. A clay mineralogist in the Geochemistry Section of the Petroleum Subdivision Foscolos will now test his administrative and teaching skills by assisting in the establishment of the School of Mineral Resources Engineering at the proposed Technical University of Crete. A retirement tea was held in his honour on the 11th September.



Shirley Dorward became administrative secretary, Administration, under Keith Cameron recently. This former RCMP secretary replaced Margo Brown in August 1986. Julie Stevenson assumed a permanent position as OCE-3 operator in the Word Processing Centre of the Geological Publications Subdivision in September. Following her graduation from Seneca College in King City, Ontario, Julie had been employed by temporary office assistance agencies for the past three years. Dale McInroy became a

storeman under "Willie" Williams in September. Prior to winning that competition, Dale had worked as a temporary term employee in the Maintenance Section under Cliff Jeremy. Dale replaces Massino Novati, who enlisted in the Armed Forces in June.

Library technician, Gail Kessler, left the Institute's library in July to work in the Map Section of the McKimmie Library at the University of Calgary.

## Of General Interest

### THE CRAIGELLACHIE CAIRN

On 7 November 1885, a plain iron spike was driven at Craigellachie, B.C., to weld Canada's East to Canada's West, as the Canadian Pacific Railway was completed. Since then, a simple cairn marked the spot, on the main CPR line west of the junction of the Parry and Eagle rivers. As part of the celebrations to mark the centennial of the driving of the Last Spike, Canadian Pacific Railways undertook to rebuild and rededicate the cairn, with the emphasis on the unifying role played by the railway in Canada's history. A plan was drawn up to place the existing cairn on a new, enlarged base. Since the cairn was of stone, the plan called for the new base to be of stone, and to emphasize Canadian unity, a representative rock from each of Canada's 10 provinces and two territories was sought. Naturally, the Geological Survey of Canada was contacted, in April 1985, and thus began one of the most difficult 'simple' tasks imaginable.

Canadian Pacific was looking for large specimens, larger than normally collected by normal field geologists! The original plan called for each stone to be 18"x10"x8" (46x25x20 cm)! The task of

assembling the specimens was given to Economic Geology and Mineralogy Division (now Mineral Resources Division) because the curation of the 'hard rock' collections at the GSC rests there. Involved in the search were Chris Findlay, Roy McLeod, George Plant, Bud Cumming, Moe Larose, Yvain Demers and Richard Herd. Moe and Yvain came up with 5 specimens from the material they collect to make the prospector's sets of mineral and rock chips. Richard contributed two samples he had collected during field work, and acquired 2 other samples, from Dick Bell and Fred Chandler. By this time, the design had changed and CP no longer wanted really massive samples, but rather more naturally shaped 'stones' that could be embedded in concrete along the sides of the new cairn base. The task of the GSC personnel became easier, but they had to be sure to choose material that would resist normal weathering conditions, not be so valuable as to encourage public prospecting of the samples, and yet be sufficiently representative of the province or territory of origin. The Cordilleran Division, contacted by John Reesor, contributed a jade boulder collected by Stan Leaming. Wayne Bamber, ISPG, organized a special collecting trip to get Alberta's sample. The list was made complete when Vic Prest donated a



#### Samples for Craigellachie Cairn

1. NEWFOUNDLAND-LABRADOR — Anorthosite, Tabor Island
2. NOVA SCOTIA — Goldenville greywacke, Wine Harbour
3. PRINCE EDWARD ISLAND — Sandstone, Malpeque Bay
4. NEW BRUNSWICK — St. George Granite, Bonny River
5. QUEBEC — Hornblende syenite, Grenville
6. ONTARIO — Jasper conglomerate, Bruce Mines
7. MANITOBA — Ordovician dolostone, Tyndall
8. SASKATCHEWAN — Granitic gneiss, Wollaston Lake
9. ALBERTA — Devonian reef dolostone, Canmore
10. BRITISH COLUMBIA — Jade, Mount Ogden
11. YUKON TERRITORY — Wernecke breccia, Dempster Highway, Ogilvie Mountains
12. NORTHWEST TERRITORIES — Garnet paragneiss, Cape Isabella, Ellesmere Island



sandstone boulder from PEI that he had been using as a door stop. John Fyles contacted the relevant Provincial and Territorial government departments and obtained agreement as to the GSC's choices. The 10 samples coming from Ottawa were photographed by Gilles Lemieux and Richard Herd, and then packed by Richard, Bud Cumming, Moe Larose and Yvain Demers. A list of samples and their labels in English and French, was prepared. Each sample was labelled as to which way was up, and which way was out, so that mistakes in setting the stones in the concrete could be avoided. The samples from Vancouver and Calgary were shipped separately.

News reports indicated that the driving of the last spike was re-enacted at Craigellachie in August, 1985. Then Moe Larose and Yvain Demers visited the revised cairn on their western collecting tour, in June 1986. They were delighted to find the cairn rebuilt as planned with the carefully selected specimens provided by the GSC embedded in the base, all properly labelled. Moe reported that the cairn is in a small park, reached from a parking lot off the Trans-Canada Highway. Visitors are greeted by personnel in period costumes and can buy postcards showing the original ceremonies at Craigellachie and the re-enactment. CP has been contacted and is sending the GSC more information about the park, the cairn and the ceremonies.

R.K. Herd

#### BOREHOLE GEOPHYSICS IN AUSTRALIA

In November and December 1985 I visited Australia at the invitation of the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Melbourne, to become familiar with their latest developments in borehole assaying techniques using a downhole geophysical logging system dubbed the SIROLOG.

The SIROLOG is of particular interest because it uses the same principles of physics that we are using at the GSC to develop an assay log for use in exploration boreholes. The technique is essentially a combination of a gamma ray spectral logging method (which we pioneered at the GSC) and a density logging method often used in coal and oil well logging.

The borehole geophysics group at the CSIRO has concentrated on the application of this method to the development end of mining, rather than in the exploration end and especially in open pit mining for iron and coal.

In Adelaide I visited the Geological Survey of South Australia (GSSA) which is taking a leading role in providing calibration facilities for borehole logging, and is becoming a national centre, being used by companies from all over Australia. This is surprising, since the GSSA is a state organization, not a federal organization. The Bureau of Mineral Resources located in Canberra, the capital, does some research in logging, but evidently is not taking an active role in providing national calibration facilities.



The research logging truck used by the CSIRO, which is rumoured to be a converted ambulance. Note the "roo bars" on the front, in case of unexpected attacks by kangaroos on the highway. The power generator is mounted on the front bumper behind the "roo bars".

At the University of New South Wales in Sydney I met Ted Tyne who is working on his Ph.D. while on secondment from the Geological Survey of New South Wales. Ted's project is the development of a modern induced polarization (IP) logging system for mineral exploration. This logging system, partially funded by grants from industry through the Australian Mineral Industries Research Association, is housed in one of the largest logging trucks I have ever seen. The system is OK for outback, but certainly wouldn't do in the Canadian Shield. It has a Hewlett Packard-1000F computer on board, complete with its own temperature and humidity controlled room, as well as a 75 cm drum plotter. The operator enters information and observes data being displayed on a CRT terminal while he watches the borehole and the logging cable through a window in the back of the truck. However, for all its size and sophistication I still don't think it can beat the versatility of the digital full-wave recording IP system developed by Quentin Bristow at the GSC.

P.G. Killeen

#### GEOLOGICAL WIVES ASSOCIATION AWARDS

In celebration of its 25th Anniversary, the Geological Wives Association has presented two awards of \$250 each. The recipients of the awards are:

Diane Srivastava, daughter of S. Srivastava of the Atlantic Geoscience Centre, Dartmouth, Nova Scotia. Diane is a graduate of Prince Andrew High School, Dartmouth, and is attending Dalhousie University.

Britta Santowski, daughter of K. Santowski of the Lithosphere and Canadian Shield Division, Ottawa, Ontario. Britta is a graduate of Parkway Adult Day School, Ottawa, and is attending The University of Waterloo.



## CANADA/USSR ARCTIC SCIENCE EXCHANGE PROGRAM: THE HARD ROCK SIDE

In 1984, Canada and the USSR initiated the Geoscience and Arctic Petroleum component of a Program of Scientific and Technical Co-operation in the Arctic and the North. One of the projects in this exchange program concerns the geology of the "ancient cores of platforms" and it was under this theme that a visit to the Soviet Aldan Shield in 1985 was reciprocated by one to the Canadian Shield in 1986.

Garth Jackson and I (Lithosphere and Canadian Shield Division) spent the month of August 1985 in the USSR as guests of the Academy of Sciences. We entered the USSR at Leningrad and spent two days at the Academy's Institute of Precambrian Geology and Geochronology, where we were introduced to the geology of the Aldan Shield in eastern Siberia, the largest area of crystalline basement in the USSR. Prof. Viktor A. Glebovitsky, head of the Institute's Laboratory of Metamorphism, was a solicitous host and guide in Leningrad and for the rest of our stay in the USSR.

The next leg of the visit began with a 1 a.m. departure on an Aeroflot Tu-154 (comparable to the Boeing 727) for Yakutsk, capital of the Yakutian SSR, 6000 km east of Leningrad. We reached our destination 36 hours later, after three stops (one of which was overnight because the crew needed a rest). Aeroflot's schedules run to Moscow time, a fact which, in a country spanning 11 time zones, can be confusing to the uninitiated. Yakutsk is a city of 150 000 built on permafrost on the west bank of the immense Lena River.

From Yakutsk we were flown south to our first geological stop in the central Aldan Shield in a 10-passenger, twin-engined Mi-11 helicopter crewed by no less than 5 Aeroflot airmen (2 pilots, navigator, radio operator and loadmaster). For the next three days we examined granulite facies magnesian skarns and associated rocks of the Emeldzhak phlogopite mine and its environs, under the enthusiastic guidance of Sergei P. Murzaev.

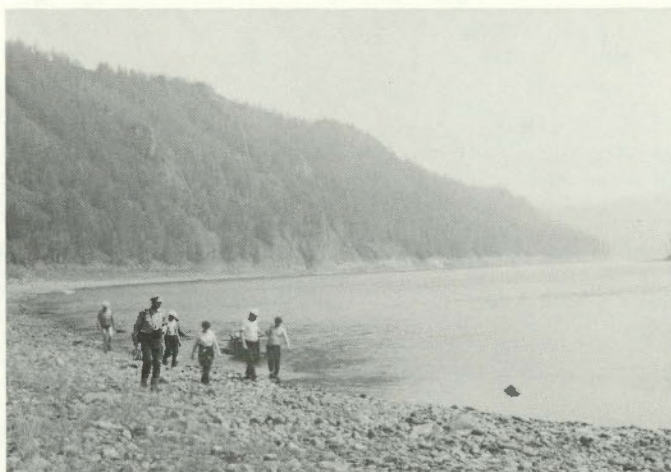
Then came the main event of the visit, a two-week sojourn at a field camp on the Aldan River, just east of its junction with the Timp-ton River, at 58°30'N, 127°30'E (approximately the longitude of Korea). The camp had been set up expressly for our visit and was occupied by 18 souls — geologists, technicians, cooks, etc. — living in large army-style tents set among the birch and larch trees of the lovely Siberian forest, rich in blueberries and edible mushrooms but not in undergrowth. We even had the services of a lapidary, who prepared thin sections for study with a simple petrographic microscope using sunlight.

Outcrop in the region is largely restricted to the river banks and we cruised a 100 km stretch of the Aldan and Timp-ton rivers in small boats more or less powered by extremely temperamental outboard motors, maintained with vast patience and good humour by Sacha Smirlov, a graduate student from Yakutsk. The days were warm and the summer had been unusually dry. Water levels were at

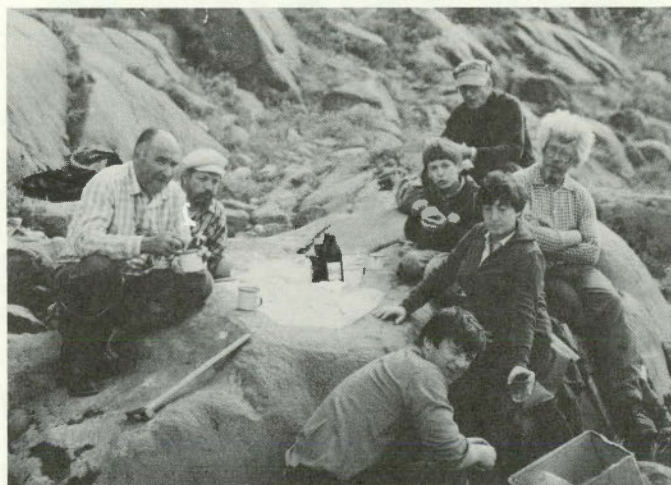
their lowest in 25 years and several larger river boats were aground in the clear, fast-flowing Aldan. Under Sacha's tutelage, Garth Jackson quickly became a master shear-pin maker.

With Prof. Vassily I. Kitsul, head of the Laboratory of Precambrian Geology at the Geological Institute in Yakutsk, as our chief guide, we saw in considerable detail strongly deformed Archean medium-pressure granulite facies rocks, most of which are supracrustal and include marble and quartzite. In their work, the Soviets emphasize the petrology and origin of the rocks.

We returned to Yakutsk by helicopter and there spent two days reviewing the geology of the Aldan Shield and giving, via our indefatigable interpreter, Nelly Medvedeva, lectures on our Canadian work.



Dragging our boat through shallows on the Timp-ton River.



Lunch stop on the Aldan River. The bottles contain Bulgarian tomato juice, not, regrettably, cold beer. Clockwise from left: Vassily Kitsul, Kirill Shmulovich (Institute of Experimental Mineralogy, Chernogolovka), Garth Jackson, Kirill's son, Anton, Viktor Glebovitsky, Nelly Medvedeva (holding out her glass for more "chai"), and Sacha Smirlov.



The return flight east was a smooth, non-stop ride in a 4-jet Il-62. Security at Soviet airports seems reasonably tight but carry-on baggage regulations are quite lax. Everyone happily stows bags and boxes in the train-style overhead luggage racks and on the westbound flight we even saw a small dog curled up in its owner's lap. We flew 6½ hours over northern Siberia — impressive in the monotony of its seemingly unending forest cover broken only by the occasional great river — the Ural Mountains, and into Moscow's domestic airport, Domodedovo, jam-packed with humanity inside and outside the terminal building.

After a weekend seeing the sights of Moscow and staying at the large and well appointed Academy of Sciences hotel (open only to employees of the Academy and their guests), we flew home on Aeroflot to Montreal.

Profs. Glebovitsky and Kitsul came to see the Canadian Shield in the summer of 1986. Their month long visit included, besides a tour of the GSC in Ottawa: 5 days with Ken Card in the Abitibi belt, Kapuskasing Structural Zone and Sudbury area; 12 days with my field party in the Arctic, examining the transitional granulites of the Boothia Uplift; and 2½ days around Yellowknife with Maurice Lambert.

Further co-operative work and exchange in regard to Precambrian Shield areas of Canada and the USSR are under active consideration.

Thomas Frisch

#### GSC ANNUAL GOLF TOURNAMENT — 15 MAY 1986

Sixty nine "golfers" attacked the Gatineau golf club on 15 May with high hopes of becoming the GSC champs for 1986, but after the dust had settled, two worthy champions walked off with low gross honours. Sandra Thompson, with a 111, won the ladies' trophy (two years out of two now) and Greg Martin (who, fortunately for the rest of us, only plays a few games a year) won the men's trophy with an 82.

Low net trophies were won by Lorraine Morency with a 79 and Larry Côté with a 72. Ron Emslie was awarded the Charlesbois Memorial Trophy.

Other contest winners were young Louis Renaud with a long drive reportedly approaching 300 yards; Bob Wilkinson won closest to the pin on hole no. 5 and Ken Daly won on hole no. 17. Most honest golfer award was quietly presented to Carmen Gougeon, again. Finally, the "cleaner" game attracted 30 donors with six cleaners sharing the pot: Marcel St. Pierre winning two of them with one each going to Brian Charbonneau, Greg Martin, Ken Ford and Mike Sigouin.

Thanks are extended to all who participated and to Brian Hearty of the former Earth Physics Branch for luring eight of their finest to join our golf tournament.

Larry Côté

#### 'VOLCANO WATCH' IN COLOMBIA

The Colombian volcano Nevado del Ruiz exploded on the night of Thursday, 13 November 1985. A mudflow ("lahar") charged by water from the volcano's snowcap, overran the town of Armero 50 km to the east killing 23 000 inhabitants. Another 2000 people lost their lives in the town of Chinchina to the west of the volcano. Seismograph stations deployed by Colombian geologists around the volcano a few months earlier to monitor its reawakening after more than a century of dormancy, were destroyed, eliminating the means for predicting future activity.

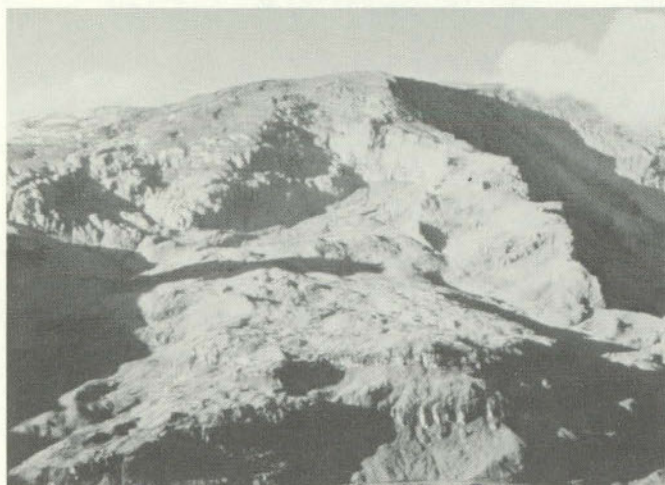
Precursory activity at Ruiz began late in 1984 and consisted of felt earthquakes and harmonic tremors. Portable seismographs were installed in July 1985, recording 10-20 events per day. A strong phreatic eruption took place on 11 September 1985. Seismic activity continued, but diminished during October. The major eruption on 13 November occurred with little warning. Messages to evacuate Armero were sent before and after the 9 p.m. explosion, but it is unclear whether they were received. Certainly, they were not heeded.

Shortly after the disaster, the Colombian government sent out requests for aid. Among the items requested from Canada were portable seismograph stations to re-establish in part the network around the volcano. Two seismologists (Frede Andersen and the writer from Geophysics Division) volunteered to go to Colombia. We hastily assembled ten seismographs from the Earth Physics Branch emergency reserve. At midnight on Friday we left for Colombia in a Canadian military Hercules aircraft carrying our equipment and Red Cross supplies. A non-stop, 12-hour flight brought



Larry Côté, Greg Martin, Ron Emslie, Lorraine Morency and Sandra Thompson.





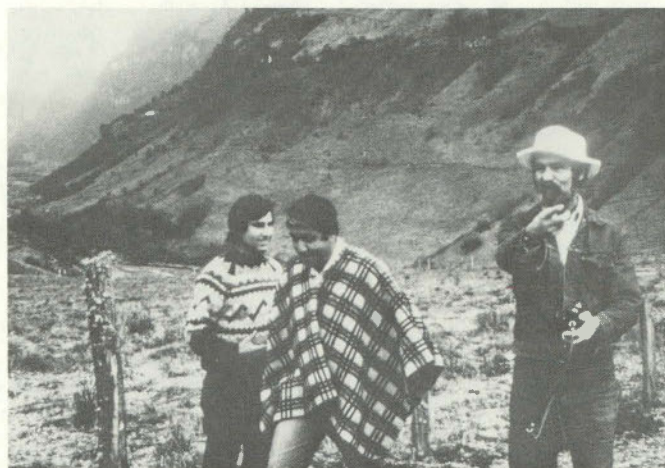
Ruiz from the helicopter 4 days after explosion.

us to the military airbase at Palanquero, 50 km west of Bogota. A helicopter took us to the city of Manizales, 25 km west of Ruiz, where the internationally constituted volcanic risk committee had established its headquarters.

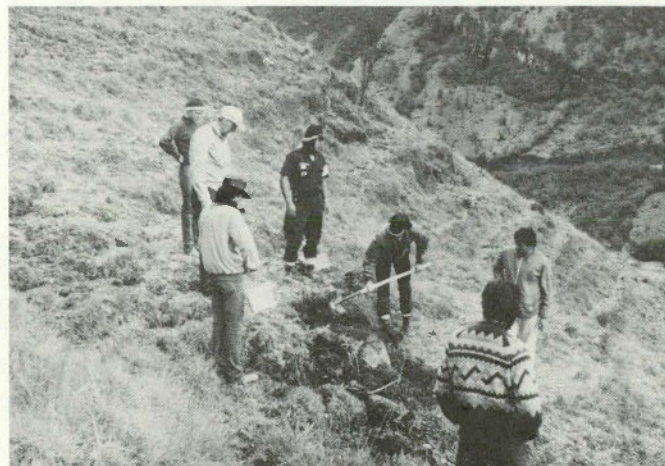
The U.S. Geological Survey had already installed several portable seismographs west of Ruiz so we took responsibility for the area to the east. It was Monday morning before a helicopter could be released from the crucial rescue missions to ferry us to Libano. This town of 25 000 lies half way between the volcano and Armero, but on high ground where risk from mudflows is minimal. Nevertheless, the eruption had deposited a 2 cm thick layer of ash on the town, and half the residents had fled. Our assigned interpreter and driver were invaluable as no one in Libano spoke either English or French and roadsigns were absent. In addition, we had great difficulty in convincing the town fathers that we were there for the sole purpose of re-establishing seismic monitoring; predictions of future eruptions and warnings for evacuation would come only from Colombian authorities at the Manizales headquarters who would evaluate data from all the scientific installations and observers in the Ruiz area.

From our base in the Libano hospital we operated 3 seismograph stations at 7, 10 and 28 km from Ruiz for the next 9 days. A number of earthquakes were recorded. Some were related directly to magma movement at depth and explosions in the crater of the volcano, but others were not associated with Ruiz at all. Our daily telephone contact with the headquarters in Manizales supplied data about earthquakes recorded by our seismographs. In return, we could be alerted to any possible danger to ourselves and our instruments based on data telemetered from other stations that were continuously monitoring the volcano's behaviour. On one occasion we were advised to postpone our daily visit to the stations because of increased seismic activity. Fortunately, the warning of another eruption proved unfulfilled.

At first our data significantly improved accuracy in the pinpointing of earthquakes under Ruiz because our stations completed the symmetry of the seismic network. With the subsequent installation of telemetered seismic stations east of Ruiz by the U.S. Geological Survey our sites became less important. Accordingly, our mission completed, we returned to Manizales and then to Bogota. We were back in Ottawa on 1 December after two hectic weeks in Colombia.



The author (white hat) near seismic station near Lagunillas River.



F. Andersen (white hat) is installing seismometer.

A proposal to establish a permanent monitoring scheme or "volcano watch" was being discussed by EMR, CIDA and External Affairs during our work in Colombia. In support of this we spent some of our time assessing the feasibility of operating a system of seismographs in remote areas of the Andes. Our recommendations were favourably received and the concept was accepted in principle by External Affairs and CIDA. As a result Frede and I returned to Colombia on 12 April 1986, as



part of a Canadian team of four scientists to visit the Volcano Observatory in Manizales, and the Universities in Bogota and Cali that are most involved in seismology, as well as to meet with Civil Defence authorities. Based on our firsthand experience, we had originally contemplated that installation of seismographs at each of the 9 southern volcanos in the Andes plus a few stations off to the sides of the volcanic chain, would provide an effective regional monitoring capability. Quite independent of our mission, the Colombian Geological Survey, INGEOMINAS, formulated plans for a more comprehensive national seismic network consisting of five regional nets. The two most important ones would monitor earthquakes and volcanos in the southern part of the country. The net east of Cali proposed by INGEOMINAS is a scaled-down version of our proposed regional network. We considered equipping this net, therefore, and the one west of Bogota, as little additional equipment would be required. The final report of the second mission proposed a Bogota-based net of half a dozen stations telemetered to the capital, and a net based at Cali, of 8-10 stations, about half of them on

volcanos. The two nets, designed to Geophysics Division specifications and built under contract by a Canadian company, would be given to INGEOMINAS. Colombian operators would be trained at the GSC in Ottawa, while a few students would be supported to obtain M.Sc. degrees in geophysics at Canadian universities. The role of INGEOMINAS would be to aid in the installation of the nets, to hire personnel to run the system properly, to disseminate data collected, and to institute a warning mechanism.

The risk of additional eruptions at Nevado del Ruiz remains high. At present the volcano is monitored by 10 seismograph stations, 4 tiltmeters and other detection equipment operated from the newly founded Volcanological Observatory in Manizales. The volcanos of Colombia will continue to rumble and erupt, possibly with devastating consequences. Volcano-watch networks and the combination of Canadian and Colombian expertise may prevent future losses of life on the scale of the Armero tragedy.

Goetz G.R. Buchbinder

#### VISITING FELLOW BRINGS NEW METEORITE

When Dr. Abdelat Ati Sadig of the Department of Geology, University of Khartoum, arrived at the GSC, Ottawa, in June, 1986, he brought with him another visitor, one that had only recently arrived on Earth. Dr. Sadig, a visiting International Atomic Energy Agency Fellow, is a geophysicist, and came to work with Bob Grasty for 2 months. His interest in gravity and plate tectonics did not prevent him from carrying along a piece of a stony meteorite that had fallen in the Sudan in January, 1983. The specimen, of some 1350 grams, had been broken from a larger mass, estimated at 40 kilograms, collected during February-March, 1986 by a field school party from the University of Khartoum. Named the KIDAIRAT, Sudan, meteorite, it comes from a small village SE of the town of Umm Badr, which is WSW of Khartoum. The rocky Precambrian exposures and desert conditions made it easy to tell that the meteorite masses were something other than pieces of bedrock. The fall was at night, and the villagers were reportedly frightened and ran off. When they returned they ascribed the larger of two masses, estimated at 60 kilograms, with healing powers, and it remains in their possession.

Notified by Brian Charbonneau and Gina LeCheminant, Richard Herd, Curator of the National Meteorite Collection of Canada, verified the nature of Dr. Sadig's specimen and had polished thin sections made. Analysis of olivine and pyroxene by Maurizio Bonardi showed the meteorite to be an olivine-bronzite chondrite (H4), a relatively uncommon type. A note on the discovery and classification of the meteorite has been prepared for submission to the Meteoritical Bulletin. Dr. Sadig and his colleagues, Dr. A. Ibrahim and Dr. A. Gumaa, University of Khartoum, have donated the specimen he brought to Canada, to the National Meteorite Collection. More detailed work on the specimen is planned.

R.K. Herd



Dr. Sadig is shown with the meteorite specimen after slicing. It is very fresh, and the hackly fracture of the metal on the freshly broken surfaces catches the skin of ones' hand. The outer surface has some of the brownish ablation crust preserved, and the chondritic nature of the matrix can be seen on both the weathered and fresh surfaces.

#### NEW WORLD BELOW

The National Film Board, in co-operation with AGC and Communications EMR, produced the movie "New World Below", a documentary on offshore eastern Canada.



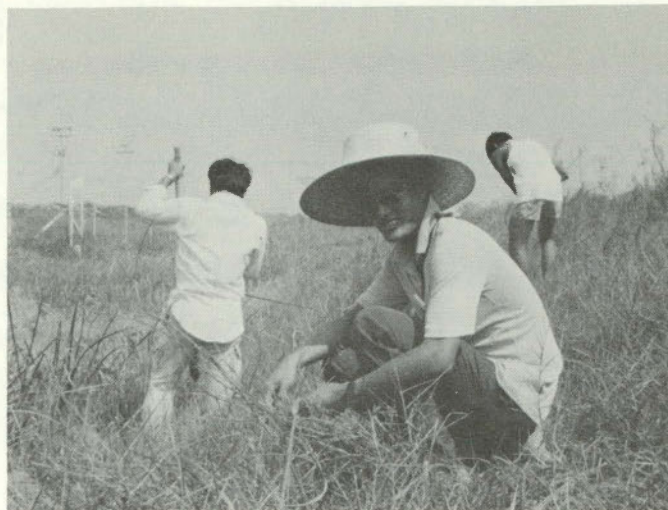
## A SINKING CITY SEISMIC STORY

During the last two winters, when snow in Canada curtails fieldwork, personnel of the Terrain Geophysics Section have found ways of acquiring an off-season tan in Southeast Asia.

At the request of the International Development Research Centre (IDRC), GSC personnel have travelled to Thailand to apply their new high resolution seismic reflection technique to help solve a pressing geotechnical problem. The city of Bangkok, built on the delta of the Chao Praya River, is sinking at an alarming rate (up to 10 cm per year in some areas). It is thought that extensive pumping from shallow aquifers during the last 30 years has dewatered the nearsurface clays and silts to precipitate the problem. Increased sinking has been correlated with the growth of industry in the suburbs. During monsoon periods, parts of Bangkok are knee-deep in water. Although elevated highways help keep commerce going during these periods, the city is being seriously affected.

Various remedial schemes have been suggested, including extensions to flood control dykes and river by-pass routes. Another suggestion is to pump the city back up to its former elevation (about 1 m above sea level). As a first step in any such remedial action, the Asian Institute of Technology (AIT) and McGill University are studying the aquifer system and the geotechnical properties of the surficial materials with funding provided by IDRC. Although there are many water wells in the Bangkok area the well log information is sparse; hence it was suggested that the "Optimum Offset" shallow seismic technique developed by GSC could be used to map coarse grained aquifers and to provide some idea of their continuity.

When the request reached us, the winter snows had just begun, so we rapidly ascertained that our method would probably have a good chance of success and Jim Hunter, Sue Pullan and Ron Good booked flights to Bangkok for a test.



A Thai seismic crew working in the noontime sun. We Englishmen were in the nearest shade.

Our seismic technique requires shot-gun shells to be detonated as the seismic source using a special seismic gun that we have built. Trying to get large quantities of ammunition into a Southeast Asian country can be very tricky, so we learned. Also providing customs with a complete description of our seismic weapons involved a fair amount of on-the-spot imagination (i.e. the Gun Smith Company model GSC 001 serial 001).

Our initial tests in January 1985 were conducted with the guidance of Prinya Nutulaya and Bob Whiteley of AIT near existing wells about 30 km north of Bangkok. Much to our surprise we found that the method worked exceedingly well in those soil conditions, with good high frequency reflections from as deep as 250 m.

Field operations in Thailand were not without their tenuous moments. First, field crews tend to be larger than our Canadian ones, and communications need careful detail, so we learned some basic Thai words for "shoot", "move", "once more", "wait" and "beer". We were somewhat disturbed when, as the first geophone spread was being laid out, a cobra was discovered and dispatched. This did not bode well for Ron Good's humour, since being in charge of the geophone crew, he was the point man on the line. (After several kilometres of seismic experience, a reliable estimate is 0.5 poisonous snakes per line-kilometre, mainly cobras.) We also found that seismic instrumentation fared better in heat and humidity than did their Canadian operators.

Since the 1985 tests proved successful, we were invited back to Thailand in February 1986 to help train a production seismic crew and also to participate in teaching a high resolution seismic course at AIT. Over 7 km of seismic line were shot while we were there, with good results — an excellent start to a program which may consist eventually of up to 200 km of line to be shot in the Bangkok suburbs.



A cobra that had run afoul of Ron Good's geophone planting crew.





Participants in the shallow seismic short course at the Asian Institute of Technology, Bangkok.

The training course attracted 16 students from Malaysia, Indonesia, Philippines, Korea, Burma, Viet Nam and Thailand. All participants were from government agencies or universities involved in geotechnical engineering and some had immediate application for our seismic technique. The course instruction was in English with some polite enquiries as to our ability to speak Russian. We sincerely believe that all students understood our seismic method, both the field and computer aspects, and that most would have the ability to carry out surveys in their own countries. In actual fact, it was a two-way flow of information with the instructors learning much of the geotechnical and geopolitical problems of the participating countries, not to mention lengthy discussions on the quality of durians (each country rep. claiming that they had the best tasting ones!). We returned from Thailand feeling that we had accomplished much more than acquiring a suntan.

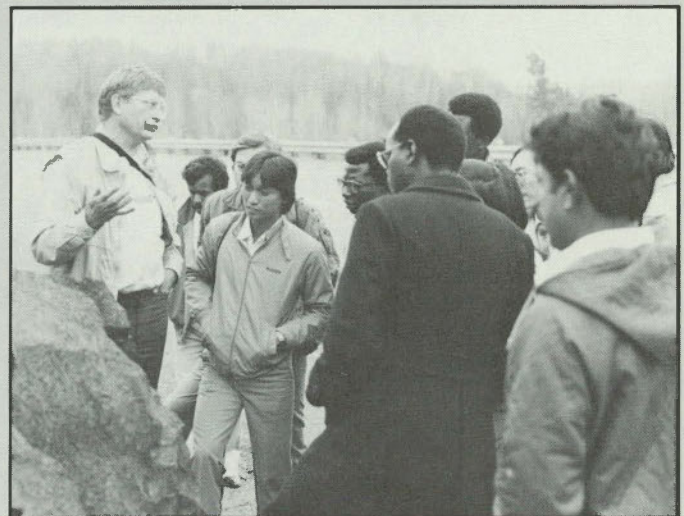
Jim Hunter

#### U.N. SEMINAR ON DATA PROCESSING METHODS IN MINERAL EXPLORATION

Robert Laramée and Dave Garson (Mineral Resources Division) recently demonstrated GSC's methodology for managing mineral deposits information to visitors from thirty-two countries during a United Nations seminar in Sudbury. The twelve-day event, organized and hosted by Laurentian University's Centre in Mining and Mineral Exploration Research, focused on the application of electronic data processing methods in mineral exploration and development. Simon Handelsman, of the United Nations department of Technical Co-operation for Development, and Tony Beswick, director of CIMMER, co-directed the sessions. Antonia Cubeiro from the U.N. and Cathy Nadjiwon of Laurentian University handled logistics.

Lectures, case history presentations and computer hardware and software demonstrations centred on applications using modern powerful microcomputers. The GSC contingent spent three days at the gathering, presented a paper on CANMINDEX and displayed quality control methods during data entry and database management on an IBM PC/XT. Mineral occurrence plots superimposed on geographic outlines were generated using data from CANMINDEX and World Data Bank II. These were viewed on the IBM PC monitor using a Tektronix graphics emulator package.

Just to keep things down-to-earth and to afford the foreign visitors a unique opportunity, a field trip on the geology of the Sudbury basin was organized for the first day of the seminar (Thanksgiving Monday!). Wilf Meyer and Rob Campbell, of the Sudbury office of the Ontario Ministry of Northern Development and Mines, led the clambering troops over the unique and intriguing Sudbury rocks. Including lunch at an Hungarian restaurant on Vermillion Lake, the informal outing allowed many people to make new friends and set the seminar off on the right foot. Other events scheduled during the two weeks included mine tours and a visit to Science North.



Wilf Meyer, geologist with the Ontario Ministry of Northern Development and Mines, explains Sudbury geology to delegates of the U.N. seminar on Electronic Data Processing Methods in Mineral Exploration and Development.

While the lectures and workshops covered all aspects of electronic data processing in mineral exploration and development, from on-site core logging using lap-top computers to mine scheduling, one central theme did emerge — the most important element in any electronic data processing application is the quality of the data. Most delegates appreciated the simple adage — "garbage in - garbage out" and realized that the quality of the decisions and conclusions which are made based upon an information base, will depend on the integrity of the data.

D.F. Garson and R.M. Laramée



## QUANTITATIVE STRATIGRAPHY

Felix Gradstein and Fritz Agterberg of the GSC with W.S. Schwarzacher of Queen's University, Belfast, have published their book: *Quantitative Stratigraphy* (Reidel Publishing Company).

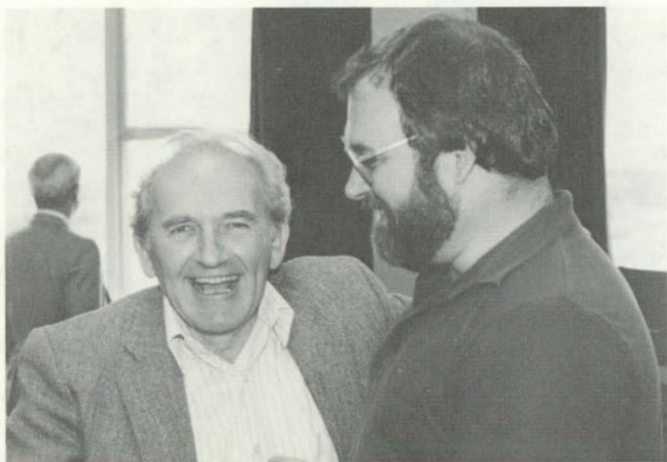
## ON-LINE LIBRARY CATALOGUE

A menu driven on-line catalogue providing access to material received in the Ottawa GSC Library since April 1979 is now available.

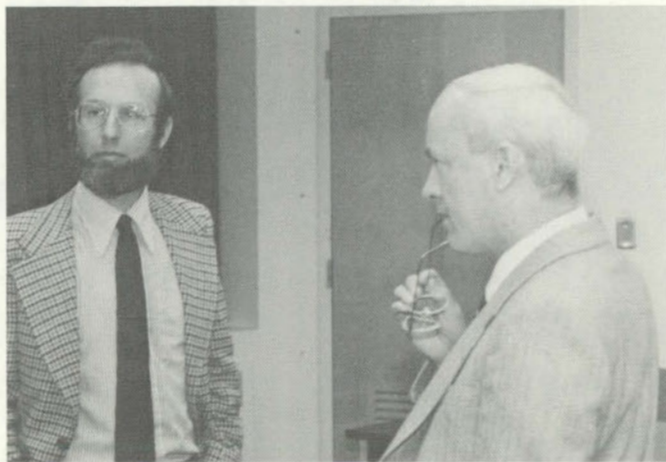
The first issue of a new internal newsletter for GSC scientific staff, *GEOBRIEFING*, was sent by R.A. Price to all Division Directors on 28 November 1986. Copies were to have been distributed to all Branch scientists. Compiled in English and French by A.R. Berger and C. Patenaude, *GEOBRIEFING* contains short items of scientific news from GSC projects and personnel as well as related management decisions. Future issues will be released on a monthly or bi-monthly basis. Further information may be obtained from A.R. Berger (613) 995-4927.

## AGC PROGRAM FORECAST

In September each year, AGC holds a "Program Forecast" to discuss the present year's scientific programs and to present plans for the following year. Each year we invite other GSC staff to attend, and this year John Fyles (Deputy Director General), Dave Forsyth (Lithosphere and Canadian Shield Division), George Cameron (Director General's Office), Adrian Camfield (Planning Officer, DGO), and Bernie Pelletier (Terrain Sciences Division) attended.



Bernie Pelletier and Steve Blasco



Adrian Camfield and George Cameron



In the foreground, Mel Best (new Head, Eastern Petroleum Geology Subdivision) talking to Sebastian Bell (old Head, EPG).



Gordon Fader, Russ Parrott, and Dave Heffler.



## ISPG SUPPORT STAFF FIELD TRIP

Two four letter words might be used to describe, in a nutshell, the 1986 ISPG Support Staff Field Trip — coal and cold. It was hoped that by scheduling the two and one half day trip a few weeks earlier than usual, some late summer (or even Indian summer) weather might be enjoyed. No such luck.

The bus left ISPG in wet snow just after lunch on Friday, 12 September. The first day was devoted to a bus window study of a geological cross-section of the Rocky Mountains. Travelling first west to Banff, and then north from Banff to Hinton via the Icefields Parkway and Jasper, we passed from the Foothills Structural Subprovince, marked by low-angle folds that merge eastward with the undeformed strata of the Plains, into the thrust-faulted strata of the Front Ranges Subprovince, and finally into the Eastern Main Ranges Subprovince, characterized by castellated peaks, relatively flat-lying beds, and broad, open folds. After one stop at the Columbia Ice Fields, we pressed on to Hinton, where we spent our first night. (It should be noted that in case any reader finds himself for some reason in Hinton, the food at the Greentree Motor Inn is definitely on a par with any first class, city restaurant.)

Day 2 dawned grey and cold, but quickly changed to greyer, colder and wet.

Our first stop was at an outcrop of the Entrance Conglomerate, a pebble conglomerate of Tertiary age. Deformed pebbles and interstitial cement resulting from tectonism characterize this conglomerate.

The main stop of the day was at the Cardinal River Coals Limited open-pit mine near Luscar. We first listened to a brief talk on the mine's history and operation, given by Fred Munn, the Senior Engineer. Then, outfitted with hardhats, we were taken on a tour of the mine.

The highly contorted anticlines and synclines, typical of the strata at the mine, showed up very clearly, contrasting with the snow. The seam being mined is known locally as the Jewel Seam, and occurs in the Gates Formation of the Lower Cretaceous Luscar Group. This seam normally measures 11 to 12 m thick stratigraphically, but is thickened to as much as 60 m in the fold axes. It is this thickening that makes the Cardinal River mine economic.

After a tour of the pit, we were allowed to examine some of the M-100 Lectra Haul trucks not in use at the time. These 100 ton trucks are truly gigantic, and even the most nonchalant among us was suitably impressed.

After a cold lunch (in all respects), we wended our way southeast, stopping to admire the burning coal seam at Coalspur (some hardy souls scrambled up the roadcut to where smoke billowed out of the ground in the hope of getting warm). We collected fossil plants in the rain from the Mynheer Coal Seam of the Tertiary Coalspur Formation on Blackstone River, and viewed the spectacular canyon at Crescent Falls. We arrived wet, tired, but undaunted at Nordegg, where we spent our second night.

Throughout day 3 of the field trip, we concentrated on structure, more specifically on the plastic deformation of Mesozoic strata resulting from the Laramide Orogeny.

The highlight of the trip (at least for some), was the Cripple Creek Crossing. According to our intrepid guide, two crossings in ankle-deep water would see us to our destination. After an hour-long hike that included six crossings in ice-cold water that in some places flowed over our knees, and a trek through a never-ending swamp in which we sank to our thighs in muskeg ("note the modern-day peat-forming process going on here!"), we were treated to the sight of a positively delightful drag fold in the Gates



Contorted syncline,  
Cardinal River Coals





Trudging back to the bus, Cardinal River Coals

Formation of the Lower Cretaceous Luscar Group. Needless to say, those who participated in this exercise felt the camaraderie of survivors upon returning to the bus.

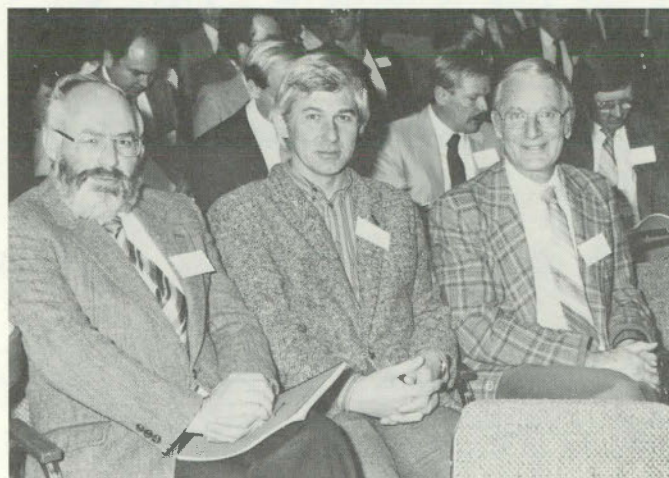
Some of the most spectacular geological scenery in Canada is found in the Ram River area of Alberta. We first visited a locality known as the Devil's Porridge, a 100 m cliff of highly contorted interbedded sandstones and siltstones of the Nikanassin Formation. After lunching at the Ram River recreational area, we walked down to the Falls. Here, the river plunges over the resistant sandstones and siltstones of the Cardium Formation in the west flank of a small, overturned anticline. Our enjoyment of this magnificent scenery was highlighted by the fact that for the brief two hours we were there, the sky cleared and the sun shone — a fitting end to our trip. In spite of the four letter words, or perhaps because of them, a good time was had by all.

Jo MacGillivray

#### WESTERN CANADA COAL GEOSCIENCE FORUM

About 150 geoscientists from across Canada attended the Western Canada Geoscience Forum, 17-19 November 1986, in Calgary. The Forum, hosted by the GSC in conjunction with the Alberta Geological Survey and British Columbia Geological Survey Branch, helped to promote the transfer of GSC-developed technologies to an audience from federal and provincial government agencies, coal exchange of information relevant to the exploration, evaluation, development and utilization of western Canadian coals.

The Forum, under the General Chairmanship of Grant Smith (ISPG Coal Geology Subdivision), included opening remarks from senior officials representing the GSC/ISPG (W.W. Nassichuk, Director ISPG), Alberta Research Council (R.W. Stewart, President), British Columbia Geological Survey Branch (V.A. Preto, Manager of Applied Programs), and The Coal Association of Canada (P.C. Roxburgh, Chairman R&D Committee).



A few key exponents of ISPG Coal Program: (L to R) Art Sweet, Tom Jerzykiewicz and Don Norris.

Social events included a wine and cheese "icebreaker" and a banquet. An entertaining and informative perspective of "The Great Canadian Coal and Coke Boom: 1898-1918", by Doug MacFarlane, was the highlight of the banquet.

National coal studies being conducted at ISPG continue GSC's long and venerable tradition in coal geoscience which began in 1842. ISPG's Coal Geology Subdivision comprises ten scientists, three support staff and one computer programmer. Research is conducted in geology of coal, organic petrology, and resource evaluation. World class capabilities have been developed to assist policy makers and planners in both the public and private sectors. Results from the coal studies constitute the National Coal Inventory.

Although Canada has a large inventory of coal resources, deposits are widely distributed within various geological environments. Composition and properties of the coals are diverse. Through its program of coal research, the GSC is playing a major role in assisting the effective development and management of the nation's coals in an increasingly competitive international coal marketplace. The Western Canada Coal Geoscience Forum resulted in a higher level of recognition of the integrity of the Coal Program being conducted at ISPG.

G. Grant Smith

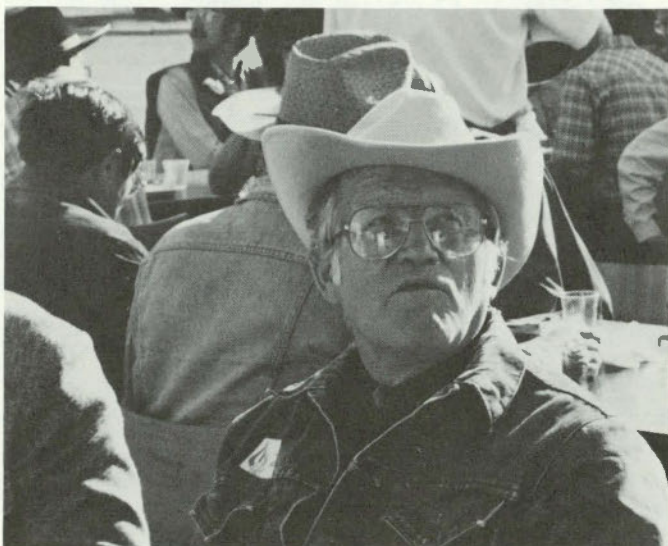
#### THE ISPG SOCIAL CALENDAR

A revitalized ISPG social club took on an ambitious schedule this year with very positive results. Dubbed the "Club Fed", the four member Executive and 6 member Committee have orchestrated several memorable social events and is currently working on a roster of new ones.





ISPG Stampede breakfast



Owen Hughes (Terrain Sciences Division, at ISPG)

Under a cloudless, clear blue sky, Institute revelers enjoyed a Stampede breakfast on July 7th. A line-up of chefs served eggs, beans, pancakes, and sausages to a crowd of ISPG cowpokes. "Hi-octane" orange juice and coffee completed the menu. It wasn't long before guitars were being strummed and the sounds of western medlies filled the air.

September was a busy month for social activity as well. A golf tournament was held on the 9th and a fall barbecue was organized. Field trips for scientific and support staff were also planned. Unfortunately, the weather was not so fine on the evening of September 4th when ISPG staff and their families came to enjoy a steak cook-out that had to be held indoors because of an untimely downpour. Spirits were not dampened, however. Again, the excellent cooking skills of Club Fed volunteers contributed to a very enjoyable evening of good times and good friends.

Upcoming events planned for the latter part of 1986 include an evening at the theatre, a Christmas party, a ski trip and the club's second volleyball season.

### 3rd INTERNATIONAL CONFERENCE ON GEOSCIENCE INFORMATION

It is June 1st and winter had arrived in Adelaide, South Australia; a group of geoscientists and information scientists have congregated here to discuss issues of concern. The conference, hosted by the Australian Mineral Foundation and sponsored by major geoscience organizations throughout the world, focused on five broad themes: geoscience data and information (nature, control and standardization), database creation and applications, information services (systems, products, evaluation), cartographic information, and expert and integrated systems and the future.

The GSC was represented by two members. Ray Price gave the keynote address "Geoscience Information - A Framework for Formulating and Implementing Policies on Resource Development". Annette Bourgeois represented both the GSC Library as a major organization in the geoscience information network, and the Geoscience Information Society, one of the co-sponsors of the conference.

The Geological Survey of Canada has agreed to host the 4th International Conference on Geoscience Information in 1990, and has been given as its mandate to increase the participation of third world countries who stand to benefit enormously from the exchange of knowledge and the development of information networks within the geoscience community.

Annette Bourgeois

### 25 YEAR AWARDS

In September, plaques signed by the Prime Minister and commemorating 25 years of public service were presented by Director General R.A. Price and Assistant Deputy Minister W.W. Hutchison to two ISPG scientists.

Following his graduation from Princeton University with a doctorate in Geology in 1961, Wayne Bamber began a career that would see him carry out detailed Carboniferous and Permian stratigraphic coral studies for some 25 years. The first years, beginning in 1961, were spent at GSC headquarters in Ottawa; in 1967, Bamber joined the Paleontology Subdivision in Calgary, where he continues his research today.

Hans Trettin was also presented with a commemorative plaque in September. Hans earned his doctorate in Geology from the University of British Columbia in 1960. He began working for the Geological Survey of Canada (Ottawa) in 1961 and moved to Calgary in 1962. During his 25 years of service, Trettin has focused his research on the stratigraphy, tectonics, regional mapping, and volcanics of Lower Paleozoic strata of the Arctic, covering an area from the Fox Basin to northern Ellesmere and Axel Heiberg islands.



## ATLANTIC GEOSCIENCE SOCIETY VIDEO PROJECT

After more than two years of blood, sweat and tears, the AGS Video Project moved into a new phase on 7 April. Shell Canada Ltd. presented the society with a grant for \$50 000 to support production of "The Appalachian Story", the first program in the four-part series on the geology of Atlantic Canada. The society has appointed Bill Skerrett of Dartmouth-based Skerrett Communications Ltd. as producer/director of the program. At almost the same time, Mr. Skerrett was awarded a contract by Energy, Mines and Resources Canada to produce the second program in the AGS series provisionally entitled "The Mineral Wealth of Atlantic Canada". This funding, to the tune of \$90 000, is provided under the Federal-Provincial Mineral Development Agreements with Nova Scotia and New Brunswick.

With taping of the two programs planned for this summer, a phase of feverish planning is already underway. Teams of government, university and industry geoscientists from the Atlantic area are being pulled together to provide the technical expertise for the programs. Scripts are expected to be ready by late July to allow taping in August and early September. Localities in Nova Scotia, New Brunswick and Newfoundland will be evaluated and shooting is anticipated in all three provinces.

The outdoor shooting will be complemented by studio work and graphics. All photography will be completed on broadcast-quality Betacam high-speed videotape. Editing, mixing and final production are anticipated to be complete before the end of the year. CBC has agreed to consider the programs for broadcast on local and possibly national TV. The programs will also be available for schools, universities and personal use through AGS and EMR.

Two other programs are planned for the series, "Offshore Oil and Gas" and "The Ice Ages". Shell has also provided a \$5 000 start-up grant for the "Offshore Oil and Gas" program. These productions are planned for 1987, but major funding still has to be realized.

Charlie Bruce of Shell Canada Ltd. and Edward Sampson of Energy, Mines and Resources Canada played major roles in bringing this project to the production stage.

Phil Hill, Atlantic Geoscience Centre, is Chairman of the AGS Video Committee.

## EARTHQUAKES IN THE OTTAWA AREA

A number of earthquakes have affected the Ottawa area during its history. This includes tremors that originated in the immediate area of Ottawa and some others, larger ones, that originated at greater distance from the Capital. The strength of an earthquake's tremor is governed by a combination of the earthquake's magnitude and the distance from the epicentre. The Canadian Earthquake Data File, maintained by the Geophysics Division, Geological Survey of Canada, is a list showing the date and time of each tremor, the co-ordinates of the epicentre, the magnitude, and the focal depth of the earthquakes.

On 11 October 1983, for example, a magnitude 4.1 earthquake occurred which was located in the North Gower-Manotick area, about 21 km south of Ottawa and it was strongly felt throughout the city. As well there is the 5 September 1944 magnitude 5.6 earthquake which was located near Cornwall and caused a tremendous amount of property damage in that city. Its tremor was also strongly felt in Ottawa, although it did not cause any damage. Similarly, the magnitude 6.3 earthquake on 1 November 1935 caused much property damage in the North Bay area and was strongly felt in Ottawa. Ottawa's most violent earthquake was the magnitude 5.0 tremor of 12 July 1861, which, because of its larger magnitude and relative closeness to the city, was strong enough to topple many chimneys in the city.

The earthquake activity around Ottawa is part of a broad region of sporadic earthquake activity across eastern Canada. Although this activity is less frequent than in other areas of the world, large, damaging earthquakes still do occur from time to time. All earthquake activity in Canada is monitored by the Geophysics Division of the Geological Survey who maintain extensive data files on past and present activity and collected detailed information from the public for any tremors widely felt. The Division is responsible for defining the seismic zoning provisions within the National Building Code of Canada which form the basis for safe, earthquake-resistant design of buildings across Canada.

M.J. Berry



## ANALYTICAL CHEMISTS SYMPOSIUM

Gwendy Hall, Mineral Resources Division, presented some of the research carried out at the GSC on ICP-MS (inductively-coupled plasma - mass spectrometry!) to an audience of analytical chemists in Bristol, England at the 3rd Biennial National Symposium in July.

The week-long conference was a real success, probably aided by the location of Bristol, in the heart of sherry (Bristol "Cream" and Bristol "Milk", on keg and drunk from huge "schooner" glasses) and cider (rough and smooth!) country. Conversation was never lacking, especially during the evening gatherings at places like the Pump Rooms in Bath, the 18th century Sheldon Manor, the elegant Victorian Supper Rooms in Clifton. Such atmospheres proved very conducive to solving many an analytical problem!

Gwendy Hall



Grouped together for the photo are the "geological types" — Gwendy Hall (kneeling), Doug Miles (British Geological Survey), Nick Walsh (King's College, London), Mike Ramsay and Mike Thompson (Imperial College, London), and Ken Jackson (University of Saskatchewan) who may be familiar to some GSC personnel.



Some of the poster sessions at the January 1987 GSC Current Activities Forum in Ottawa.



#### BB-Q TIME DURING WINTERLUDE

"The Weekend Chef" won third prize, in the Public category, of Winterlude snow sculpture contest.

The detailed work of art took over one hundred and thirty five hours to complete. The snow sculpture was made by six members of the Ottawa cartography section.



Sculpture club members in front of their prized possession: Michel Sigouin, Peter Corrigan, Louis Renaud, Mario Hudon, Ed Bélec and Mario Méthot.

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 Geological Information Division

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