NEWSLETTER
OF THE MINERALOGICAL
ASSOCIATION
OF CANADA

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NOUVELLES
DE L'ASSOCIATION
MINÉRALOGIQUE
DU CANADA

Numéro 63, décembre 2000

CANADIAN EMERALDS: THE CROWN SHOWING, SOUTHEASTERN YUKON

BY LEE A. GROAT, T. SCOTT ERCIT, DANIEL D. MARSHALL, ROBERT A. GAULT, MICHAEL A. WISE, WILLIAM WENGZYNOWSKI AND W. DOUGLAS EATON

In September 1998, Bill Wengzynowski of Archer Cathro and Associates Ltd. discovered emeralds on Expatriate Resources Ltd.'s Goal Net property, in the Finlayson Lake district of southeastern Yukon. In less than two hours, he collected approximately one kilogram of emeralds from float and outcrop on both sides of an E-W trending ridge. Detailed work on the property began in July 1999. By late August, numerous emerald-bearing float trains and six main source regions had been discovered in a 900 by 400 m area on both sides of the ridge. Washing and hand sorting of approximately 6 m^3 of material from float trains and trenches yielded more than 6 kg of emeralds. The following is a brief description of the geology and mineralogy of Canada's first significant emerald deposit.

Emerald crystals from the Crown showing. The crystal on the left is 7.5 mm long and the one on the right, 4.8 mm. Photo by B.S. Wilson of Alpine Gems Limited.

The Goal Net property is located in the central part of the Tanana Terrane, which is largely composed of Paleozoic metasedimentary and metavolcanic rocks. The emeralds occur where quartz veins cut mica-rich layers in a recessive-weathering chlorite-mica schist. The schist is well foliated and dips gently to the north. The quartz veins associated with the emerald mineralization are slightly discordant to the bedding planes. At least eight such veins have been found on the north side of the ridge. In most cases, the quartz veins are bordered by a zone of yellow sulfate mineralization and a much more extensive, overlapping mass of fine tourmaline crystals, which locally contains minor amounts of scheelite. The emeralds occur in both the sulfate and tourmaline zones and (rarely) in the quartz veins. Where quartz veins cut mica-poor chlorite schist, there are no sulfate or tourmaline zones and no emeralds (although there may be tourmaline in the quartz veins), implying that mica-poor strata are unreactive with respect to the hydrothermal system. All quartz veins seem contemporaneous, and the presence or absence of emeralds is influenced strongly by the geochemistry of the host rock.

The quartz veins seem to be genetically linked to a large granitoid pluton about 600 m east of the emerald mineralization. U-Pb age determinations of ca. 112 Ma have been reported for this and similar plutons elsewhere in the Pelly Mountains. The pluton is zoned, with a marginal zone of muscovite granite that grades (over a surprisingly small distance) to a reddish-weathering, two-mica granite, which may constitute the main mass of the pluton. A preliminary geochemical analysis of the granite shows that it is rich in W and Zr and

SUMMARY

This newsletter constitutes an insert to *The Canadian Mineralogist*, Volume 38, Part 6

EDITORIAL

THE MINERALOGICAL ASSOCIATION OF CANADA: A FOLLOWER, OR LEADER OF CHANGE

BY BRIAN FRYER, PRESIDENT

Many changes are taking place in MAC, and the world in which it operates. One of the products of these changes is the reallocation exercise taking place at NSERC (the Natural Sciences and Engineering Research Council of Canada) where research $$ move from one discipline to another, based on an evaluation of both need and the quality of the research done in each discipline. This has been a difficult process for the Earth Sciences (having lost significant resources to other research disciplines in the first two exercises) and has led to the prospect of the submission of separate documents from the two Earth Sciences grant selection committees (GSCs), Solid Earth Sciences (08) and Environmental Earth Sciences (09). MAC Council, in Calgary, requested that I write NSERC on behalf of MAC, and that letter (crafted with much help from Norman Halden) is reproduced below.

We should all be aware that the issues being raised by MAC are not unique to Canada and that the mineralogical sciences should be at, and seen to be at, the core of many lines of current fundamental and applied research and critical for many future industrial applications. Elsewhere in this newsletter we have reproduced an editorial from the European Journal of Mineralogy, by Tony Naldrett, President of the IMA, in which he addresses these same issues.

Clearly the common theme is the need to both promote our discipline and to recognize and embrace its changing faces. With the help of our membership (and hopefully their constructive suggestions and criticisms), the MAC Executive and Council are embarked on a review of MAC and its activities. We ask that you, our members, provide feedback so that we can provide the services and leadership you want.

LETTER ADDRESSED TO NSERC

The recent GeoCanada2000 summit meeting was an excellent opportunity to review and discuss the Earth Sciences. Many exciting visions were offered and many present were stimulated, in particular by the passionate debate surrounding the re-allocation exercise. While the discussion was wide-ranging it also indicated there is an intense vigour in the Earth Sciences and its practitioners.

We, at the Mineralogical Association of Canada, recognize that the debate centered on re-allocation and was not intended as a justification of the whole Earth Sciences Program. However, the character of some of the comments regarding future directions in Earth Sciences would suggest the GSCs 08 and 09 might submit separate documents. While this might point to a reasonable and defensible divergence of views and expectations, it also points towards a potentially difficult and confusing future for many Canadian researchers.

At the annual general meeting of the Mineralogical Association in Calgary, it was unanimously agreed that MAC should convey our concerns to NSERC, as I outline below.

A careful examination of many of the presentations clearly shows that much of our science depends on measuring things, in particular the chemical, isotopic and physical character of minerals. Many graphs were shown that included ordinates such as time, chemical composition and thermodynamic properties. Many hypotheses and models were presented that depended entirely on such measurements. These hypotheses and models were just as abundant in talks and posters on mineral deposits as on global change.

Minerals are the fundamental building blocks of our planet. They interact with the biosphere, the atmosphere, the hydrosphere and each other at different lengths and temporal scales. In their structure and chemistry, they record as much about global change as the whereabouts of oil and mineral deposits.

As was pointed out by Kurt Kyser, their analysis requires a special expertise. Currently it is our view that this expertise resides with scientists who regularly apply to GSC08, many of whom are members of the Mineralogical Association of Canada. As mineralogists, many of us work on minerals from the deep Earth AND surface environments. In an intellectual climate where the philosophies of GSC08 and GSC09 diverge, we risk that this important area of scientific expertise, commitment and research will fall between the mandates of GSCs 08 and 09.

NSERC and the Federal Government have much invested here in terms of equipment and human resources. The recent CFI awards should be a prime example of why it is inadvisable to contemplate a significant divergence of approach by the two GSCs. The original splitting of GSC10 was known to be artificial and was done by NSERC for purely administrative purposes. Much synergistic interaction was lost when the committee was split.

FROM THE NEWSLETTER EDITOR

Reading our editor-in-chief's account of producing *The Canadian Mineralogist* in the last Newsletter inspired me to also bring you behind the scenes of what is a much more modest operation. When I became managing editor, I asked to be given the go-ahead to change the look of the Newsletter. Council agreed provided there were no cost increases incurred.

We first had some catching-up to do, so four Newsletters (instead of two) were produced in a one-year period. We now have reached cruising speed, and already we have plans for enlarging the Newsletter and publishing it more frequently. In order that these changes will reflect what you, our members, want, do not be surprised to receive a survey in the coming year. In the meantime, your comments about the Newsletter are always welcome (see e-mail address at the end of the Newsletter).

I typically work on one issue at a time. When one issue has just gone to press, I start planning the next one. At that stage, I spend quite a bit of time staring into space, making notes and lists of potential articles in the small notebook where I keep all the details of each Newsletter. At the end of this planning stage, I flash a series of e-mails to potential contributors, to people who have promised to write but could not make it for the previous Newsletter, and to the president who is responsible for contributing an editorial or seeing to it that one gets written. I have to rely on the generosity of the Peter Burns, Lee Groats and Don Bakers of this world who take time out of their busy teaching and research schedules to write a feature article of a more general nature. This scouting for articles is the most demanding part of my job. I am delighted to see that I receive more and more unsolicited submissions.

In the meantime, I start writing the Association News and the message from the Newsletter Editor, and I assemble the submissions that come in. For a while, it is very much work in progress. I keep adding a paragraph here, a sentence there, and feel very much like a painter adding touches and layers of colour.

Then comes a point where I can no longer wait for submissions and the work in progress has to be quenched. This is typically when the editor of Can. Min. tells me he is about to send back to the typesetter the final proofs of the journal issue, with which the Newsletter is going to be mailed. I then switch to high gear and finishing the Newsletter becomes an obsession: reading the texts time and time again and having them read by proofreaders.

When the texts are ready, I meet our typesetter Jean-Claude Côté, and we discuss the possible layout of the various articles. Typically, the next morning I will have a first version of the newsletter to look at and proofread. Then back to the typesetter for the final corrections. The files are then sent to the printer who can deliver the paper copies within a week.

Dr. Freleigh Fitz Osborne – a Tribute

In the last Newsletter, there was a short notice about the passing of Professor F.F. Osborne on March 13th 2000 at the age of 96. I was gently reminded by one of our members that this was not a fitting obituary for someone who had played such a major role in Canadian Geology. I agree and I promise a proper obituary for the next Newsletter. In the meantime, here is my personal tribute to Dr. Osborne.

I had the privilege of being a student of Dr. Osborne's and to take the last courses on Petrology and Geology of the Canadian Shield he gave at Laval University, before retiring in 1971. I remember an intensely proud man – so proud that he refused to teach in French in a very French University because of his accent. He had definite ideas on everything. One teaching that I have always remembered is "Describe what you see. Interpretations might change but a good description will always stay and can be reinterpreted" He did not think much of fancy rock classifications. In his course on the Geology of the Canadian Shield, his love for Grenville rocks showed through and I think he spent a large amount of time talking about them. This is perhaps where my interest in the Grenville rocks originated.

Having spent the summer previous to taking his classes working for a mining company in the Maritimes, I had picked up enough English to converse with him so, from time to time I visited him in his office. He always had some treasure to show: a very old map, an old dictionary, etc. From these conversations, I learned that he was a very cultivated man with an amazing memory.

I will always remember one day in the petrology lab, when a potential candidate for his eventual replacement was brought to the lab during his tour of the department. Osborne went to one of the rock drawers, picked up a sample and asked him with a large smile: "What do you think this is?" This must have been a tricky rock and the poor candidate didn't have a clue. Osborne seemed satisfied with his examination.

I saw him again a few years ago, when I interviewed him for a little booklet I was working on. He was over 90. His house had recently been sold and he was in the process of emptying it to move to a retirement home near Montreal to be closer to his son. Again he had many treasures to share. Looking through old boxes of photographs, he reminisced about the summers he spent mapping on horseback in BC or working for the Québec Ministry of Mines. His memory was amazing: he could refer to every summer he had worked with such clarity, "This was in 1927, I was working with so and so." The most poignant moment was when he showed me the sample bag of rocks he was bringing with him to the residence along with his faithful microscope. These were all samples of anorthosite. He said that he had always been interested in them and never completely satisfied with the hypotheses to explain their formation, and he thought he would work on them. I hope he did.

Some Colour in our Newsletter

When Lee Groat agreed to write a feature article about the first significant Canadian emerald deposit, I started to investigate the cost of publishing some colour to enhance the pictures of the emeralds. Enjoy! Also more emphasis has been given to the feature article by putting it on the front page.

Pierrette Tremblay

ASSOCIATION NEWS

EXECUTIVE MEETING REPORT

BY NORM HALDEN,
VICE-PRESIDENT

MAC Executive landed in windy St. John's on the wings of hurricane Michael for its meeting on October 21st. The fresh air must have been invigorating because many new and exciting ideas regarding MAC's and CANMIN's future were discussed.

In general terms one thing will not change. Much in keeping with the 1955 statement from our founders, there is a continued and passionate desire to promote the mineralogical sciences. However, in the new millennium we are recognizing that there are new vehicles with which this can be done, for example, our new "CANMIN on the web". In order to continue to deliver on this statement of our mission, we will need a new operational structure to be effective and to be the best mineralogical association.

The St. John's meeting was very much a planning meeting. Visions and missions were discussed, MAC's evolution and finances were examined, future directions and opportunities saw lively debate. One thing was clear: MAC's finances are currently sound. This provides us with a window of opportunity to develop a plan for MAC's and CANMIN's future.

To do this, MAC Executive has hired Pierrette Tremblay part-time to gather and organize data and information on possible management structures and publication opportunities. Using these data and information, MAC Executive will present a plan (with options) for the future operation and development of MAC and its publications at the 2001 AGM in St John's on May 26 and 27. Although this sounds ambitious and potentially disruptive, we are confident we can do this well. Much was said about achieving any new structure through an ordered and sensitive transition that will maintain our ability to bring you CANMIN, other member services, and the best in the mineralogical sciences.

The morning was taken over by agenda items such as approving a safety plan for field trips run at annual meetings, reviewing the financial situation to the end of September, and meeting the local organizing committee of St. John's 2001. After meeting this dynamic committee, we feel confident that the next annual meeting will be a memorable one. Many members still remember the 1988 meeting held in St. John's. The variety of sessions and field trips will take advantage of Newfoundland's spectacular geology. We hope to see you there.

NOMINATIONS TO COUNCIL 2001-2004

We welcome Bruce Craig Jago, B. Ronald Frost and Jeanne Percival as incoming councilors for 2001-2004.

Bruce Craig Jago

Bruce Jago graduated from Lakehead University with an H.B.Sc. and M.Sc. in Geology in 1980 and 1982, respectively. He earned his Ph.D. from the University of Toronto in 1991. A common thread to his exploration experience has been the application of mineralogy, petrology, lithogeochemistry and mineral chemistry to exploration-related problems and the development of mineralogical and geochemical screens to distinguish between barren and fertile host-rocks, with particular reference to Porphyry Cu, VMS, SEDEX, and diamond deposits. While at Inco Exploration from 1991 to 1998, he worked as a Senior Geologist/Applied Mineralogist (Sudbury) and Exploration Manager (Brazil). After joining Lakefield Research in 1998, in Sudbury, Ontario, he worked as a Senior Mineralogist and recently became Manager of Mineralogical Services.

B. Ronald Frost

B. Ronald Frost is a professor in the department of Geology and Geophysics at the University of Wyoming, Laramee, USA. He specializes in the application of phase equilibria to the understanding of the crystallization conditions and evolution of igneous and metamorphic rocks. His main interests include the application of thermobarometry to studies of orogenesis and to problems relating to the origin of granulites. He has also worked extensively on applications of oxide-silicate equilibria to the understanding of the controls of oxygen fugacity in igneous and metamorphic rocks. This has led to the development of the QUILF equilibria (with Don Lindsley) as a way to quantify T, P, oxygen fugacity, and silica activity in rocks with assemblages involving quartz, pyroxenes, olivine, magnetite, and ilmenite. Dr. Frost is also interested in the petrologic controls on the mobility of radiogenic isotopes. This includes studies on the stability of sphene and how this affects the interpretation of ages obtained in sphene geochronometry and on how metamorphism affects the Rb-Sr and Sm-Nd isotopic systems. He has also worked on the petrologic controls on geophysical anomalies, specifically the role of oxides, graphite, and fluids in producing magnetic, conductivity, and seismic anomalies, respectively. Finally, because of his location, Dr. Frost has worked extensively on the Archean evolution of the Wyoming province and on the origin and evolution of the Proterozoic anorthosites and granites that intrude it. He has been a member of MAC since 1984.

Jeanne Percival

Jeanne Percival is a Research Scientist with the Mineral Resources Division of the Geological Survey of Canada in Ottawa, where she uses clay mineralogy and environmental geochemistry to evaluate water-rock interactions and mineral genesis at decommissioned and active mine sites, and in modern sediment and seafloor hydrothermal systems. She is currently involved in the Children's Environmental Health working group (five Natural Resource Departments of the federal government) and is secretary and newsletter editor of the Environmental Earth Sciences Division of the GAC. Dr. Percival was councillor for MAC between 1997 and 2000 and continues to be the MAC contact for undergraduate university student awards. Dr. Percival obtained her Ph.D. in Earth Sciences from Carleton University and holds an M.Sc. in Physical Geography from Queen's and a B.Sc. in geology from Concordia University.

ASSOCIATION NEWS

PINCH MEDAL AWARDED FOR THE FIRST TIME

BY PETER C. BURNS

Thousands of collectors and dealers worldwide cooperate with the scientific community, to the great benefit of mineralogy as a whole. To recognize major and sustained contributions to the advancement of mineralogy by members of the collector-dealer community, the Mineralogical Association of Canada is instituting a new award, the PINCH MEDAL. This medal is named for William Wallace Pinch of Rochester, New York, in recognition of his enormous and selfless contributions to mineralogy through the identification of ideal specimens for study and by his generosity in making them available to the academic community. Mr. Pinch will also be the recipient of the first medal, which will be awarded to him during the Tucson Gem and Mineral Show.

To a large degree, the characterization of minerals is dependent on the availability of sufficient amounts of high-quality material. As the collector-dealer community is very large compared with the academic community, they dominate in the collection of minerals and in the field characterization of minerals and their parageneses. Moreover, many collectors possess a keen eye and are extraordinarily knowledgeable, particularly in mineral identification. The result is that many new minerals are first discovered by collectors.

Another issue of growing importance in recent years concerns the solution and refinement of the crystal structures of minerals, particularly those of secondary minerals in surface or near-surface environments. In many parageneses, these minerals can be of key environmental interest (e.g., uranium oxysalts, iron sulfates), and their adequate characterization requires derivation of their crystal structures. However, these minerals often occur as tiny crystals and are generally of poor quality. Usually it is the sharp eye of an indefatigable collector that unearths the one crystal that results in solution of the crystal structure, and the derivation of the chemical formula (without which all the modeling in the world would not yield the answer to any associated problem).

The PINCH MEDAL will be awarded bi-annually by the Mineralogical Association of Canada, beginning in 2001. Nominations for the medal are to be submitted to the MAC Business Office, P.O. Box 78087, Meriline Postal Outlet, 1460 Merivale Road, Ottawa, Ontario K2E 1B1, Canada, by March 31 of the year prior to the award. Each nomination should consist of a letter describing in detail the contributions of the nominee and a list of publications resulting from the nominee's contributions (the nominee is not required to be an author of these publications); additional supporting letters are welcome. The medal will typically be awarded at the Tucson Gem and Mineral Show, following the selection of the recipient by the award committee and approval by MAC Council at the Annual Meeting of the Geological and Mineralogical Associations of Canada.

GIFTS TO THE ASSOCIATION

The Mineralogical Association of Canada gratefully acknowledges donations received from the following members in 2000.

W. Baragar	E. Grew	C. Schwab
H. Belkin	G. LeCheminant	R. Sharp
R. Boggs	B. Mackean	J. Soles
M. Carter	B. Paul	P. Tarassoff
P. Černý	A. Prince	A. Turnock
E. Chown	P. Roeder	
D. Gold	A. Sabina	

MEET MARTIN STEWART

Second Winner of the MAC Foundation Award

Martin Stewart first became interested in geology in grade one or two, during frequent visits to an avid mineral collector in his hometown of Ingersoll, Ontario. Little did he know that his modest collection of specimens would lead to a career in the geosciences. He became completely hooked during the summer of 1994 following his first year of undergraduate studies in geology at Carleton University in Ottawa. That summer he was working for the Ontario Geological Survey in the small northern Ontario community of Matachewan. He could hardly believe that someone was willing to pay him to spend his days exploring stunning wilderness territory by foot, canoe and other means necessary, Since that summer, his passion for rocks has grown through work with both the OGS and the GSC, Carleton University, University of Ottawa, several mining companies, and an 8-month stint working as a consultant on various projects. His work has provided him the opportunity to travel extensively in Canada and internationally and to meet people from all over the world.

Martin Stewart at work

His research has really taken off this year with two manuscripts now in press. The first is a detailed mineralogical study of plagioclase from the active volcano of Montserrat, and the second, a field-based comparison of pyroclastic avalanche versus cold rock deposits and its implications for hazard

(cont'd on page 8

ASSOCIATION NEWS

FINANCES

As our by-laws require, this Newsletter includes our financial statements for 1999. Please take the time to look at them.

Auditor's report

To **The Members**
The Mineralogical Association
Of Canada

I have audited the balance sheet of the General Fund and the net assets of the Treasury Reserve Fund of **The Mineralogical Association Of Canada** as at December 31, 1999 and the statements of receipts and disbursements members surplus (deficit) and changes in cash for the year then ended. These financial statements are the responsibility of the society's management. My responsibility is to express an opinion on these financial statements based on my audit.

Except as explained in the following paragraph I have conducted my audit in accordance with generally accepted auditing standards. Those standards require that I plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In common with many charitable organizations, the organization derives revenue from donations, the completeness of which are not susceptible to satisfactory audit verification. Accordingly, my verification of these revenues was limited to the amounts recorded in the records of the organization and I was not able to determine whether any adjustment might be necessary to donation revenues, excess of expenses over revenue, assets and surplus.

In my opinion, except for the effect of adjustment, if any, which I might have determined to be necessary had I been able to satisfy myself concerning the completeness of the donations referred to in the preceding paragraph, these financial statements present fairly, in all material respects, the financial position of the society as at December 31, 1999 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles, as disclosed in Note 2 to the financial statements applied on a basis consistent with that of the preceding year .

Joanne L. Dorman
Chartered Accountant
June 24, 2000
Vancouver, BC

The Mineralogical Association Of Canada
Balance Sheet
As at December 31, 1999
(with comparative figures as at December 31, 1998)

	1999	1998
Assets		
Current		
Bank *(Note 4)*	$ 305,857	$ 246,911
Short-term investments *(Note 5)*	90,919	26,556
Accounts receivable	23,246	59,297
Accrued interest receivable	4,890	4,912
Prepaid expenses	21,810	31,643
	446,722	369,319
Marketable securities *(Note 5)*	279,507	352,419
	$ 726,229	$ 721,738
Liabilities & Members' Equity		
Current		
Accounts payable and accrued liabilities	$ 48,686	$ 44,682
Deferred revenue *(Note 3)*	140,187	140,101
	188,873	184,783
Surplus		
General fund	23,338	(91,458)
Treasury reserve fund	514,018	628,413
	$ 726,229	$ 721,738

The Mineralogical Association Of Canada
Statement of Receipts and Disbursements and Surplus (Deficit)
General Fund
For the year ended December 31, 1999
(with comparative figures as at December 31, 1998)

	1999	1998
Revenue		
Annual meeting	$ 12,003	$ -
Donations	220	4,256
Special publications 1	9,233	-
Special publications 2	15,642	14,384
Special publications 3	33,926	5,289
Grants & awards	-	6,000
Membership fees	58,790	51,833
Other	75,830	1,653
Posters	2,052	2,502
Short course notes	32,459	58,221
	240,155	144,138
Expenditures		
Annual dues	1,676	1,487
Bank charges	4,847	6,071
Mineralogical Foundation	-	644
Grants & awards	300	2,971
IMA 98	-	11,158
Loss on disposal of investments	2,833	-
Loss (gain) on exchange	(1,232)	7,312
Meetings	6,494	13,024
Office expenses	29,451	18,722
Postage & shipping	15,624	12,230
Promotion	25,594	21,530
Professional fees	6,310	6,029
Special publications	28,284	63,112
Short course notes	-	63,731
Travel	5,178	5,724
	125,359	233,745
Net income (loss) for the year	114,796	(89,607)
Deficit, beginning of year	(91,458)	(1,851)
Surplus (deficit), end of year	$ 23,338	$ (91,458)

The Mineralogical Association Of Canada
Statement of Receipts and Disbursements and Surplus
Treasury Reserve Fund
For the year ended December 31, 1999
(with comparative figures as at December 31, 1998)

	1999	1998
Revenue		
Schedule A - The Canadian Mineralogist	38,914	68,672
Interest income	21,691	29,747
	60,605	98,419
Expenditures		
Endowment - Mineralogical Foundation	175,000	-
	175,000	-
Net income (loss) for the year	(114,395)	98,419
Net assets, beginning of year	628,413	529,994
Net assets, end of year	$ 514,018	$ 628,413

ASSOCIATION NEWS

The Mineralogical Association Of Canada
Statement of Cash Flows
For the year ended December 31, 1999
(with comparative figures as at December 31, 1998)

	1999	1998
Cash flows from operating activities:		
Excess revenue over expenditures		
General fund	$ 114,796	$ (89,607)
Excess expenditures over revenue		
Treasury fund	(114,395)	98,419
	401	8,812
Changes in non-cash working capital		
Marketable securities	(64,363)	64,444
Short-term investments	64,363	(64,444)
Accounts receivable	36,052	(34,582)
Accrued interest receivable	21	3,068
Prepaid expenses	9,832	(2,124)
Accounts payable and accrued liabilities	4,004	(43,431)
Deferred revenue	86	83,792
	50,396	15,535
Cash flows from financing activities:		
Disposal of marketable securities	8,550	34,300
Increase in cash	58,946	49,835
Cash at beginning of year	246,911	197,076
Cash at end of year	$ 305,857	$ 246,911

The Mineralogical Association Of Canada
Notes to the Financial Statements
As at December 31, 1999

1. Purpose of the Organization

The Association was incorporated on August 5, 1955, by Letters Patent under the Canadian Corporations Act for the purposes of advancing knowledge in crystallography, geochemistry, mineralogy, petrology, mineral deposits and allied sciences. The Association is incorporated without share capital. The Association is a registered charity under the Income Tax Act.

2. Summary of Significant Accounting Policies

The accounting policies of the society are in accordance with generally accepted accounting principles. Outlined below are the policies considered particularly significant.

Foreign Currency Translation

The Association follows the Temporal method of translation whereby:
i) balance sheet items are translated at the rate of exchange in effect at the balance sheet date;
ii) revenue and expense items are translated at the rate of exchange in effect on the dates they occur.
Any gains or losses are charged directly to income.

Marketable Securities

Marketable securities are valued at cost, unless circmstances have indicated an impairment in value which necessitates a write-down to net realizable value.

Capital Assets

Capital assets are expensed on acquisition. No capital assets were purchased during the year.

Revenue Recognition

The Association uses the accrual basis of accounting, matching revenue with expenditures. Membership fees are allocated 20% to the General Fund and 80% to the Treasury Reserve Fund.

3. Deferred Revenue

	1999	1998
Prepaid membership dues	$ 140,187	$ 140,101
	$ 140,187	$ 140,101

4. Bank

	1999	1998
Deposit on hand	$ -	$ 19,285
Operating account - Canadian dollar	120,536	97,519
Operating account - US dollar	112,179	113,880
Visa account	22,831	6,543
Mastercard account	41,636	3,438
RBC Dominion - cash account	8,675	6,246
	$ 305,857	$ 246,911

5. Marketable Securities

	1999	1998
Marketable securities	$ 279,507	$ 352,419
Short-term investments	90,919	26,556
Total marketable securities - cost	$ 370,426	$ 378,975
Total marketable securities - market	$ 367,829	$ 397,687

6. Inventories

The Association's inventories consist of short course notes, back issues and special publications which are available for future sale. Due to the nature of the inventories, the costs are expensed as incurred when preparing short courses and publications and revenue is recognized when realized. The cost of inventories on hand is estimated by management to be $725,571.

ASSOCIATION NEWS

(cont'd from page 5)

analysis at Mount Meager, British Columbia. While these are his most important scientific contributions to date, his fondest research project was a study of the mineralogical make-up of contemporary Inuit carving stones. The results formed an integral part of an exhibit of stone carvings at the McMichael Canadian Art Gallery, near Toronto, to celebrate the formation of Nunavut Territory. Martin says he derives great satisfaction from seeing that his work has a cultural impact.

Here is what he says about his Ph.D. research project at UBC on geochemical dynamics of crystallization and vesiculation processes in natural magmatic systems:

"My research project aims at developing physical-chemical models for the dynamics of crystallization and vesiculation (volatile production) processes within natural silicate magmas. To learn about these processes, I will develop computational models and compare them to natural systems. The ideal model will allow tracking of the physical conditions in a magma chamber (e.g. crystallinity, melt density, etc.).

My specific objectives are two-fold. First, I intend to develop a natural empirical model of crystal and volatile development from the deposits preserved at Mount Meager. Second I will develop theoretical algorithms based on the thermodynamic models of Ghiorso et al. (1983, Contr. to Min. and Petr.) and experimental data to predict the lines of descent of crystals, liquids, and volatiles present in a magma of a given composition. The Mount Meager model will provide the vehicle to test these theoretical algorithms which can then be applied elsewhere.

I am in the process of compiling a revised geological map and stratigraphy for the area based on field work from this past summer. Petrographic and electron microprobe analysis of textures, mineral relationships and compositions, and Nomarski differential phase interference contrast imaging will provide controls on the evolution of discrete portions of the magma over time and will elucidate the subliquidus evolution of the magma prior to eruption.

Bulk rock geochemistry, glass chemistry and determination of the volatile contents of both minerals and glass will allow analysis of the changes in the bulk magma being extruded over time. These stratigraphic changes represent the heterogeneities inherent within the magma chamber just prior to and during extrusion. Their character will depend on the nature of stratification within the magma chamber and the geochemistry of the drawup as the material is being extracted from the chamber."

CONFERENCE NEWS

THE FUTURE IN PETROLOGY

BY GREG DIPPLE, UNIVERSITY OF BRITISH COLUMBIA

Thematic session 31 of GeoCanada 2000 examined the disciplines of igneous and metamorphic petrology from internal (new directions) and external (the role of petrology within geosciences) perspectives. The session was organized by David Pattison (U. of Calgary), Dante Canil (U. of Victoria) and Greg Dipple (UBC) and co-sponsored by the Mineralogical Association of Canada and the Geological Association of Canada. Invited keynote contributions by Dugald Carmichael (Queen's U.), Ron Frost (U. of Wyoming), Larry Heaman (U. of Alberta), John Holloway (Arizona State) and Nick Oliver (James Cook U., Australia) were complemented by 19 volunteered presentations over one and a half days. The extended abstract volume on CD-ROM is available from the MAC online bookstore (www.mineralogicalassociation.ca/ storeintro.htm).

The session was an affirmation of the health and vitality of petrology. Contributions were split roughly equally between (1) the role of petrology within the geosciences, (2) new directions in petrology driven by technological innovations, and (3) new research opportunities created by conceptual advances. The relevance of petrology to geosciences was established with specific examples from the fields of tectonics, economic geology, geophysical imaging, marine geology, planetary science and archeology. In some of these fields, petrology provides the geologic underpinnings, while, in others, petrologic concepts and techniques have facilitated significant advances. Equally impressive was the diversity of technological innovations driving petrology forward: from microanalysis in elemental (trace and rare earth) and isotope (radiogenic and stable) geochemistry to x-ray tomography of mineral and melt textures to the km-scale remote sensing of mineral assemblages. Conceptual advances in the fields of melt migration, fluid-rock interaction, thermobarometry and phase equilibria, and inverse modeling are changing the way field problems are approached, data are col- lected and experiments are designed.

The session closed with a discussion of the health of the discipline. It was the first scheduled discussion session in my experience to continue far beyond the allocated time. The focus of debate was the discrepancy between the vitality of the field as evidenced by the preceding day and a half of talks, versus the perception that petrology is a discipline in decline. Particularly worrisome is the reluctance of some early- to mid-career scientists engaged in petrologic research to identify themselves as petrologists. It was recognized that the problem may be largely one of perception and it was even suggested that the label "petrology" be abandoned or modified. Thankfully, there was little support for a change in name and it was agreed that we must work harder to bring the reputation of petrology into line with the reality: that of an innovative, dynamic, and forward-looking discipline. The Future in Petrology thematic session was, it is hoped, a step in that direction.

MEMBERS ON THE MOVE

The July 2000 Expedition to the Natrocarbonatite Volcano Oldoinyo Lengai

BY ROGER H. MITCHELL, LAKEHEAD U.

Oldoinyo Lengai, meaning the Mountain of God in the Masai language, lies in the East African Rift Valley near Lake Natron in northern Tanzania. The volcano is the only active natrocarbonatite volcano in the world. Natrocarbonatite is a most unusual volcanic rock consisting of nyerereite [$Na_2Ca(CO_3)_2$], gregoryite [$(Na,K,Ca)_2CO_3$, halite, sylvite, fluorite, neighborite [$(Na,K)MgF_3$], Ba-Na,Ca-carbonates together with accessory Fe-alabandite, ternary K-Fe-sulphides and Mn-Fe-spinels. The absence of silicates, apart from xenocrysts, is a particularly notable characteristic of these rocks. For those of us who study alkaline rocks, Lengai is regarded almost as a holy site, which one must visit at least once in one's lifetime. Unfortunately, the volcano is remote and reaching its lower slopes requires a long and exceedingly uncomfortable journey from the nearest town through the dust bowl of the N'garuka Depression. Dust drifts up to a couple of feet deep are not uncommon. Until recently, visits to the area have also been regarded as dangerous because of the presence of Somali bandits. I first visited Lengai in 1995 and found it so fascinating that I vowed to return. Thus, in July 2000, I was part of a five-person expedition, which spent one week camped out in the crater of the volcano.

Oldoinyo Lengai rises as a "classical" pyroclastic cone of nephelinite from the flat floor of the rift valley adjacent to some spectacular sequences of basaltic lava exposed in the western fault scarp. The top of the mountain at 9,500 feet is reached after a 5,500-foot climb. The climb is deceptive as it is not technically difficult; its deception lies in its apparent ease when viewed from the base. In actuality the climb is a long gruelling slog up a 40-45^o slope composed of pyroclastic beds. There are lots of lapilli and progress is commonly two steps up and one back. Major problems are heat at the bottom, cold winds at the top, and the complete lack of water. The top third of the climb is on steeply dipping tuffs and rotten carbonatite between some very deep canyons. It's not recommended for those with balance problems; if you fall you will bounce all the way down to the bottom. Before climbing this mountain, one needs to drink lots and lots of water. The ascent usually commences at about 3 a.m., and follows the western slopes to avoid the morning sun. The ascent is not pleasant: you need to wear a headlamp, have a sure foot, and possess lots of stamina. If you are lucky you will arrive at the summit after about 5-6 hours. Occasionally, some brave tourists attempt the climb but many give up at the halfway point. Others succeed in reaching the summit but do not realise that getting back down on the same day is even more gruelling. Exhaustion, electrolyte imbalance, and hypothermia are common experiences for the unwary. The previous time I went up Lengai on a "day-trip", even some "hardy" geologists gave up and one person had to be practically carried down the mountain.

View of Oldoinyo Lengai

Our recent expedition planned to stay seven days in the crater. To do this, we required a significant amount of food and water to be carried up the mountain. This was achieved by hiring seventeen local people as porters. Such work is an important source of income for the inhabitants of the nearby Masai village of N'gare Sero. These people are incredibly fit and literally run up the mountain carrying heavy loads wearing sneakers or rubber-tire sandals. Makes us westerners look pretty soft! The party that stayed at the top consisted of a local cook and a guide, myself, two volcano "freaks", a geomorphologist and a student. One of the volcano "freaks" was the organiser of the expedition. His name is Fred Belton, and he is a mathematics instructor at University of Memphis. Although not a geologist, he has a passion for visiting active volcanos and has become infatuated with Lengai as he can get "really close to the action"!

Many people ask why one should go to Lengai unless one is studying carbonatite volcanism as surely there are more spectacular volcanoes with easier access. The answer lies in the nature of the volcanic activity. The lavas of Lengai are erupted at temperatures of only 550-600^{o}C, in marked contrast to typical basaltic activity. The low temperatures mean one can get really close to the lavas and vents. One can even stand on the lavas while they are flowing (if you have good boots). One does not require any cumbersome protective clothing. All one needs is a good hat, a thick shirt, and strong jeans. Eruptions are typically not violent pyroclastic events, although these do occur, but consist mainly of highly fluid lavas. These are dark black

MEMBERS ON THE MOVE

during eruption and they flow like water due to the low viscosity of the natrocarbonatite. Typically they form thin flows, which cool very quickly. Most flows are about one inch thick unless lava channels or tubes have been formed. The latter may crust over and are dangerous in that one can break through the crust and get a nasty burn, as several people have found out to their distress. However, these unfortunates were wearing sneakers and would not have been injured if they had been wearing strong leather hiking boots. The lavas cool to brown pahoehoe flows. These weather in about 1-2 days to a white material (pirssonite, trona), which decomposes into brown dust in a couple of weeks. This means that the crater is actually a large dust bowl about 1500 ft in diameter. If you can imagine yourself in a lunar-like landscape of active hornitos with blowing dust and clouds, you can get a good idea of what it is like there. At daytime it can be very hot, but at night it is near freezing, windy and damp. The major problems with respect to camping are finding a place to pitch a tent that is not on a fumarole and is not likely to be overrun by a flash flood of lava. The latter quite commonly occur when hornitos collapse, usually without warning. As there is no water for anything but cooking and drinking, one gets incredibly dirty. The fine dust penetrates everything and is really hard on cameras. After seven days of this, we decided that our environment was the very antithesis of Club Med and we decided to call our campsite Club Lengai.

Roger Mitchell and still-moving natrocarbonatite lava flow

While we camped in the crater, we were fortunate in that activity of some type occurred all of the time. This included gas venting, small amounts of spatter, a very large lava fountain, many small aa-like flows, and copious streams of very fluid lava. One of the exhilarating things about Lengai eruptions for a petrologist is the opportunity to be able to stand inside a system of braided streams of flowing lava in relative safety. At times of quiescence, one could even look down into the vents and see the magma boiling away as bubbles of carbon dioxide broke the surface. Fortunately, volcanic gases are not a great problem in this crater. The bulk of these are carbon dioxide, and sulphur dioxide is only a minor constituent. In addition the strong winds usually prevent gas to build up to dangerous levels.

View in crater

Mineralogical and petrological studies of Lengai natrocarbonatite are a major part of my current research program. This visit provided many interesting new samples and already I have found in them a couple of new minerals and several species new to Lengai. If you want to know more about Oldoinyo Lengai, visit the following web-sites:
www.people.memphis.edu/~fbelton/lengai.html;
or
www.stlawu.edu/cnya;
and if you want to go there next year contact Fred Belton by e-mail at "oldoinyolengai@hotmail.com".

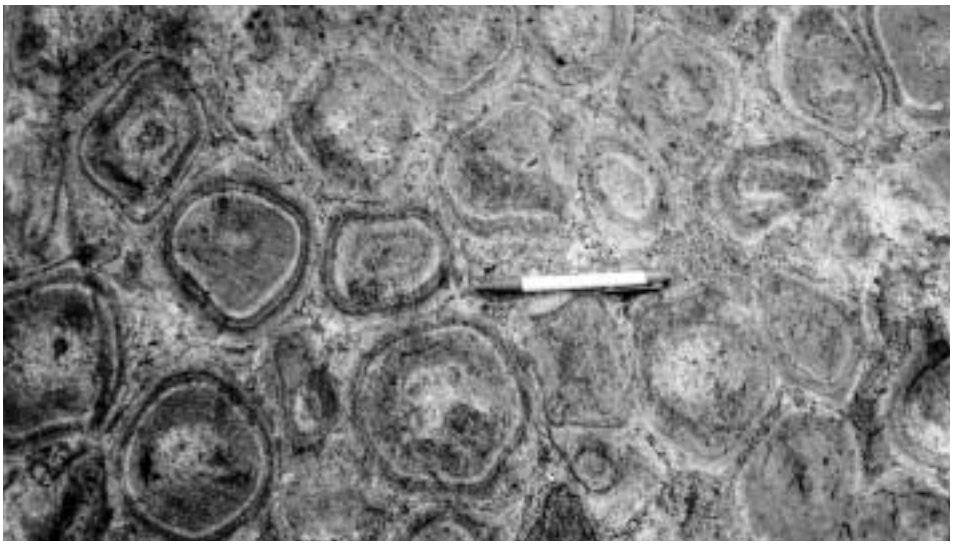
MEMBERS ON THE MOVE

ORBICULAR ROCKS AT NUUKSIO, FINLAND

BY JOHN JAMBOR, LESLIE INVESTMENTS

After successful short courses in Lisbon, Ottawa and Pretoria on Ore and Environmental Mineralogy (MAC Short-Course Volume 27), the Commission on Ore Mineralogy of the International Mineralogical Association gathered its troops for a course held in early June 2000 at Espoo, Finland. The course, well organized by Kari Kohonen of the Geological Survey of Finland, had about 70 attendees and presenters. After four days of oral and poster sessions, each followed by ore-microscopy labs, and then a day of workshops, attendees had an opportunity to visit geological sites.

Shown here is an outcrop of orbicular granitoid rock at Nuuksio, 25 km NW of Helsinki. The orbicular rock, one of 75 known occurrences in Finland, formed at the margin of a Precambrian quartz monzodioritic–dioritic intrusion contacting amphibolite. The orbicular texture is attributed by Seppo Lahti to undercooling of a quartz monzonitic magma, contaminated by crustal material, adjacent to the intrusion contact. The cores of the orbicles formed by early accumulations of plagioclase, followed by alternating crystallization of plagioclase and biotite in the shells around the cores.



The above photo, taken at one of the outcrop sites, shows two of the three Canadian lecturers for the COM course. At far left, Rolando Lastra of CANMET, Ottawa, amidst three Finnish participants, seems to be attempting to hear the impromptu tune blown by Louis Cabri of Ottawa, in the makeshift hat at far right. In the light jacket at the centre is mineralogist Alexander Genkin of Russia and to his right is Chris Stanley of the Department of Mineralogy, The Natural History Museum, London.

CANADIAN EMERALDS: THE CROWN SHOWING, SOUTHEASTERN YUKON (continued from p. 1)

Bill Wengzynowski with the Crown showing in the background

impoverished in Eu and Lu, typical of an evolved S-type granitoid. Analyses for Be and other light elements are underway.

The emeralds range in size from less than 1 mm to 4 cm in length. Some of the smaller crystals (up to approximately one-quarter carat) and sections of larger crystals are gem-quality, with excellent clarity and colour. Many of the larger crystals show a regular pattern of holes that likely represent growth features. Others appear to have grown across the foliation of the schist, as shown by layers of micaceous inclusions; these create parting planes and increase susceptibility to mechanical weathering. A total of 24 emerald crystals were examined from five of the source regions. One additional crystal was obtained from a quartz vein on the south side of the ridge, at the westernmost limit of the showing. All samples were green in hand specimen and exhibited homogeneous colour distribution when cut and polished for microprobe analysis. Preliminary investigation with a scanning electron microscope (using both backscattered electron and cathode luminescence imaging modes) showed no evidence of compositional zoning. Electron microprobe analysis of the 25 crystals showed an average Cr concentration of 3208 ppm (maximum 7816 ppm). The mean and maximum V concentrations are 171 and 333 ppm, respectively. Both Cr and V are chromophoric in emerald; however, the concentration of Cr and colour of the emeralds indicate the predominance of Cr. The Fe content is variable between relatively narrow limits (0.02 to 0.05 atoms per formula unit), particularly when compared to the Mg concentrations, which range between 0.08 and 0.18 *apfu*. Some of the emeralds contain significant concentrations of Sc (up to 499 ppm).

Investigation of polished mounts with the scanning electron microscope revealed an abundance of fluid and solid inclusions. The latter include calcite, chalcopyrite, chromite, ferberite/ferritungstate, hematite, jarosite, molybdenite, pyrite, quartz, scheelite, and zircon. The fluid inclusions were found to contain three phases at room temperature. The dominant phase is an aqueous brine occupying approximately 80% of the volume of the inclusion. The other two phases are gaseous and liquid carbonic fluids, which occupy approximately four and 16% of the volume, respectively. Preliminary microthermometric measurements indicate that these carbonic phases are dominated by CO_2 but contain minor amounts of dissolved methane with X-CH_4 in the gaseous phase ranging up to 0.15. The clathrate melting data indicate that these emeralds precipitated from a fluid with salinities of a few wt.% NaCl equivalent (the lack of experimental data in the system H_2O-CO_2-NaCl-CH_4 precludes a more accurate salinity determination). Homogenization of the carbonic phase (to the vapour) occurs at approximately 26°C with total homogenization to the liquid occurring at 288 to 294°C. These results are similar to those obtained from fluid inclusions in emeralds from the Swat district of Pakistan (precipitation from a H_2O-CO_2-NaCl-CH_4 fluid, salinities ranging from 0 to 20

An emerald "pocket". The crystals are 3 to 5 mm in diameter. Note the holes in some cristals.

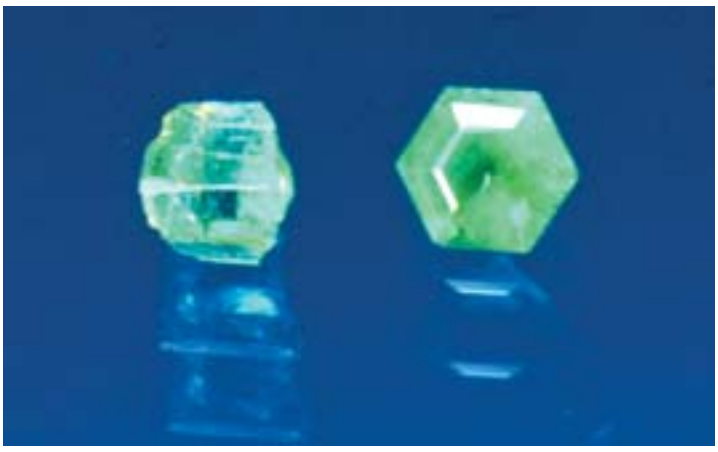
CANADIAN EMERALDS: THE CROWN SHOWING, SOUTHEASTERN YUKON

wt.% NaCl equivalent, and homogenization temperatures of the order of 300°C) and differ from those obtained from fluid inclusions in Columbian emeralds (salinities of approximately 40 wt.% NaCl equivalent).

Tourmaline is ubiquitous and common in the area of the Crown showing. It is present as dravite in the granite, in the quartz veins, as masses of fine crystals surrounding the quartz veins where they cut the mica schists, and associated with the emerald mineralization. Larger, discrete crystals of schorl occur in the chlorite-mica schist. Tourmaline needles also occur as inclusions in many of the emeralds. Electron microprobe analyses of the needles show compositions ranging from dravite to uvite, with elevated Cr concentrations (to 0.44 Cr *apfu*). The presence of tourmaline may be a key to understanding why we do not see high Fe concentrations in the beryls, which would diminish the emerald green colour. Under high B activity, tourmaline acts as a sink for Fe, Mg and Mn.

The crumbly yellow sulfate-rich material associated with the quartz veins was sieved and the resulting powder was analyzed by X-ray diffraction. The resulting spectra show a mixture of jarosite, chlorite, vermiculite, and dickite. Gypsum is commonly seen forming thin layers on rocks in the talus below Regal ridge. Where is the sulfur coming from to form the sulfate minerals? Sulfide minerals appear to be rare in these rocks, although minor amounts of pyrite and chalcopyrite (altering to malachite) have been found in the chlorite-mica schist close to the quartz veins. However, the Finlayson Lake district has been described as an emerging volcanogenic massive sulfide belt. The signature deposits are Fyre Lake (Besshi type), Ice (Cyprus type), Kudz Ze Kayah and Wolverine (Kuroko type). It is possible that there is a significant amount of syngenetic sulfide mineralization in the mafic schists, as this is presumably the same sequence that hosts the Fyre Lake deposit to the south.

Emerald in quartz matrix; the crystal is 4 mm in length.



Emerald rough (left) and cut gemstone (right). The latter is 0.25 carat and 3.3 mm in diameter. Gem cutting and photo by B.S. Wilson of Alpine Gems Limited.

As noted previously, scheelite crystals are sometimes found within the tourmaline zone around the quartz veins. The presence of scheelite rather than wolframite is probably related to the scavenging properties of tourmaline as regards Fe and Mn, and to the modestly calcic host rocks. Marble lenses have been identified in the host rocks, and pockets containing very pale beryl have been found encapsulated in secondary calcite. Geochemical surveys show a direct correlation between Be and W. The Crown showing represents an unusual type of tungsten-enriched emerald deposit, a chromian relative, as it were, of the Sherlovaya Gora aquamarine deposit in Russia and the Logtung W-Mo beryl deposit in southern Yukon. Somewhat similar examples have been found in China and Zambia.

The Crown emerald showing is one of a number of significant gem deposits discovered in northern Canada in the last decade, the most notable of which are the diamonds in the Northwest Territories. Other recent discoveries include vanadian emerald associated with the Lened batholith and gem tourmaline (elbaite) from the O'Grady batholith, both in the western Northwest Territories. It is still too soon to tell if the Crown showing will become an emerald producer. Much additional work (including bulk sampling) must be completed before the economic potential of the deposit can be assessed.

MUSEUM NEWS

In 1816, the Québec Seminary received a collection of 430 small samples from the famous French crystallographer René-Just Haüy. These formed the basis of a museum that became part of Université Laval when it was founded in 1852. Today the collection contains more that 40 000 samples from all over the world. In 2000, the name was changed to Musée de géologie René-Bureau to honour long-time curator René Bureau. Curator André Lévesque presents the history and challenges faced by the museum.

MUSÉE DE GÉOLOGIE RENÉ-BUREAU

PAR ANDRÉ LÉVESQUE, CONSERVATEUR

L'Université Laval a été fondée en 1852 et avant même sa fondation dans les locaux du Séminaire de Québec, les prêtres de cette dernière institution avaient créé un musée de sciences dans lequel la géologie et la minéralogie prenaient une place importante. La première mention d'un musée au Séminaire de Québec remonte à l'année 1816 lors de l'arrivée d'une petite collection de minéraux donnée par l'abbé René-Just Haüy, un cristallographe français reconnu aujourd'hui comme le père de la cristallographie. Cette collection de 430 petits spécimens est considérée comme la plus ancienne collection de minéraux au Canada.

Suite à la fondation de l'université, les activités des professeurs sur tous les continents insufflèrent une vitalité nouvelle au musée et le nombre de spécimens passa de 4 000 en 1858 à près de 20 000 en 1939 lors du déménagement des locaux du musée situés dans le Vieux-Québec vers ceux de la nouvelle École des Mines sur le boulevard de l'Entente. Au nombre des acquisitions de cette époque, notons des dons du Musée d'histoire naturelle de Paris en 1898, du British Museum, de l'Université Harvard, de la Commission géologique du Canada ainsi que de nombreux achats de grandes collections didactiques, faits en France, en Angleterre et aux États-Unis. Nos collections contiennent donc un grand nombre de spécimens provenant de localités classiques françaises et anglaises maintenant inaccessibles.

Vue du musée du Séminaire de Québec autour de 1860.

Les vitrines d'aujourd'hui.

C'est surtout à partir du début des années 40 que nos collections vont s'enrichir de spécimens québécois alors que la progression rapide du département de géologie et de génie géologique auquel nous avons toujours été rattaché va engendrer un grand nombre d'expéditions de recherche géologique de la part des professeurs. Plusieurs paléontologues tels l'abbé Laverdière et Franco Rasetti déposeront un nombre considérable de fossiles dans nos collections.

En 1963, la faculté des sciences déménagea dans ses locaux actuels et plus de 35 vitrines murales furent construites à l'époque selon les plans obtenus de la Smithsonian Institution de Washington. Ce sont encore ces vitrines que l'on peut observer aujourd'hui.

Monsieur René Bureau a été le conservateur du Musée de géologie de l'Université Laval de 1940 à 1979. Ses récoltes sur le terrain à Miguasha pendant plus de 35 ans contribuèrent à former à l'Université Laval une importante collection de 2 000 spécimens de cette localité reconnue pour ses spectaculaires poissons fossiles. Cette collection est régulièrement consultée aujourd'hui par plusieurs chercheurs québécois et étrangers. C'est pour marquer d'ailleurs la contribution exceptionnelle de cet homme dans le développement de notre musée pendant 39 ans que nous avons modifié le nom de ce dernier le 18 mai 2000.

La constitution de nos collections au cours des premiers 100 ans de son existence est surtout le résultat des activités d'enseignement et de recherche de l'université plutôt que le résultat de dons importants ou d'achats systématiques grâce à des budgets substantiels. On

MUSEUM NEWS

retrouve donc assez peu de spécimens minéralogiques spectaculaires québécois de cette époque mais plutôt des collections systématiques de grandes régions qui étaient alors cartographiées sérieusement pour la première fois. Notre proximité aux bureaux des géologues du Ministère des Mines de l'époque contribuera aussi à garnir nos collections de roches et de minéraux de la province.

Notre musée sert d'abord à des fins d'enseignement et de recherche à l'Université Laval et pour toute la communauté scientifique en prêtant régulièrement des spécimens de minéraux et fossiles à d'autres institutions. Nous ne pouvons ignorer toutefois notre rôle de conservation du patrimoine géologique québécois compte tenu de l'absence d'un musée « national ».

Notre position dans une grande maison d'enseignement a bien sûr des avantages. Parmi ceux-ci, les collectionneurs et donateurs éventuels ainsi que le grand public y voient un gage de pérennité et de prestige. Tous nos anciens étudiants et étudiantes sont autant d'ambassadeurs sur tous les continents et plusieurs reviennent un jour avec leur petite contribution au musée. Au nombre des avantages non négligeables, l'institution mère prend à sa charge un certain support technique et beaucoup de tâches administratives souvent fastidieuses. Aussi la présence d'étudiants du baccalauréat nous permet d'offrir des visites guidées du musée de septembre à avril ainsi que des visites géologiques au Parc de la Chute Montmorency d'avril à juin aux groupes scolaires de la grande région de Québec.

La collection Haüy : un sujet de fierté.

Rhodochrosite du mont Saint-Hilaire

Toutefois il n'y a pas que des avantages à notre situation. Même si nos collections sont importantes au Québec, l'entité Musée de géologie René-Bureau est bien petite dans cette véritable ville de 35 000 étudiants, professionnels et professeurs et parfois les priorités de l'institution passent bien avant celles du musée de géologie. Comme nos budgets de fonctionnement et d'acquisition sont très petits, nous pouvons difficilement organiser des campagnes de fouilles sur le terrain, des fouilles qui pourraient garnir nos collections d'échanges. Pour contrer cette lacune et pour se doter tout de même de collections représentatives, notamment du patrimoine minéralogique québécois, nous essayons d'entretenir des relations étroites avec les clubs de minéralogie du Québec et c'est donc pourquoi nous nous faisons un devoir d'être présent aux diverses foires minéralogiques de la région de Montréal depuis 20 ans. La progression considérable, tant en qualité qu'en nombre, de notre collection de minéraux québécois au cours de cette même période est une conséquence directe de cette étroite collaboration, de cette visibilité.

Depuis 20 ans, plus de 4 000 spécimens ont ainsi été acquis et de ce nombre, près de 1 600 provenaient des dons de la collection de Jean- Charles Sisi en 1987 et de celle de Bernard Baudin en 1994. Ces deux collections sont particulièrement riches en spécimens québécois des vingt dernières années. Autre statistique encore plus révélatrice de l'importance des collectionneurs pour nous, près de 95% de nos spécimens du mont Saint-Hilaire, de la Carrière Francon et d'Asbestos ont été obtenus de la part de collectionneurs, soit lors de dons de collections entières ou lors de dons de quelques spécimens à la fois.

DEBATING ISSUES

MINERALOGY IS ALIVE

The following text by A.J. Naldrett was an editorial in the European Journal of Mineralogy, whom we thank for granting permission to reprint it.

This communication has been written on behalf of the Council of the International Mineralogical Association (IMA). We are very grateful to the Editorial Committee for providing us with the opportunity to set out our views before the international readership of the European Journal of Mineralogy.

We are at a moment in time when decision-makers in many countries are re-evaluating the support that they give to scientific research. The general public has become increasingly interested with certain aspects of science, such as genetic engineering, computer science and "cyber space", and many of the more traditional disciplines have been taking a back seat in terms of media attention. This carries with it the possibility that, despite the continuing great importance of the research itself, this work may be hindered by a reduction in financial support, as politicians respond to short-term perceptions. The IMA Council believes that it is the responsibility of those who represent the different scientific disciplines to speak out and draw attention to important exciting developments in areas other than those currently favoured by the media. If we don't speak out, we can't complain about the results of our silence.

In this respect, our attention has been drawn to the recent remarks of certain European politicians who have indicated that mineralogy is a discipline that has completed, or nearly completed its mandate. Such remarks reveal ignorance of the latest developments in mineralogy, as can be shown through consideration of a few of the most fundamental of these. Firstly the Deep Earth as reviewed recently by Dr Hemley of the Geophysical Laboratory, "Mineralogy at a Crossroads", Science (volume 285, 1026-1027). As the new millennium dawns, mineralogy has gone far beyond the study of naturally occurring inorganic compounds on the Earth's surface. Partly this is due to the need to constrain geophysical and geochemical models of the Earth and other planets by studying the properties of materials that lie out of man's reach. Examples include the discovery that hydrogen can be locked up in dense silicates and metals (Bell and Rossman, 1992; J.R. Smyth, 1999), and the resulting implications with respect to water resources on planetary bodies. High-pressure experiments are also opening up the possible existence of minerals that may exist only in ultra-dense environments within the Earth and other bodies of the universe (e.g. brown dwarfs).

Another example of recent significant advances in mineralogy is the trapping of methane, ethane, etc. in clathrate hydrates (Hubert King, 1999), their existence along outer continental slopes and in polar regions, and the implications of this with respect to energy resources and sudden climatic changes.

Geochemists know that many of the fundamental discoveries of chemistry in the past have originated from the study of minerals. This is no less true today. The development of many new "high tech" materials, ultra-hard materials, materials with unusual electronic properties (e.g. high temperature superconductivity in perovskite-based cuprates) and optical properties (e.g. opal-like photonic crystals used in controlling the propagation of light, Willem Vos, 1999), have been inspired by an understanding of naturally occurring materials.

The surfaces of minerals, including microbial biofilms that develop on these surfaces, play fundamental roles in many aspects of the geochemical cycle, including purification of groundwater (filtering of potentially harmful microbes, viruses and chemical contaminants) and plant nutrient uptake. With the development of scanning probe microscopes, the understanding of processes happening at mineral surfaces, at their interface with the biosphere, atmosphere and oceans is developing at a great pace, and with these instruments we can observe geochemical processes occurring in situ at the atomic scale. It is probable that mineral surfaces had a catalytic role in the emergence of life on earth; it is impossible to imagine any scientific problem of greater profundity.

The next ten years will see a vast amount of information returned to us from the probes that will soon be transmitting from Mars. The intelligent digestion of this information will require knowledge of mineralogy, not just of inorganic mineralogy, but of the mineralogical interface with any possible Martian biosphere, so that we can recognise it if it exists(ed). Other space probes are due to return samples of interstellar dust to Earth; only using the most sophisticated mineralogical techniques will it be possible to characterise and therefore understand the origin of these tiny particles.

Geochemists know that the geochemical processes proceed through the medium of minerals. Reactions between minerals are so often the rate-controlling steps of these processes. Without an understanding of mineral reactions, and the crystallographic changes involved in these reactions, there can be no complete understanding of geochemistry. And without mineralogists, there can be no advancements in the understanding of mineral reactions.

Can it be that these European politicians wish to deny citizens in their countries the right to participate in these exciting endeavours, without their being forced to train and work abroad?

A.J. Naldrett,
President, International Mineralogical Association

Written on behalf of and with assistance from the IMA Council

December 8, 1999

DEBATING ISSUES

MORE ON THE ASBESTOS STORY

I noted with some despair the photograph of the empty building at the Université de Paris VI included in your editorial in the June 2000 Newsletter.

I was invited to give a lecture on the United States asbestos abatement program at Jussieu (U. Paris VI and VII) by the Director of the Institut de la Physique du Globe de Paris, Professor Vincent Courtillot. When I arrived at Jussieu on October 17, 1996, the students were in an uproar over asbestos; signs were in the building windows proclaiming its horror. I understood that the math department was behind most of the activism. At any rate I went ahead with my lecture which is summarized by the enclosed abstract (which was in French and passed out during the lecture). I received a very warm response from the approximately fifty geophysicists who attended. The lecture was well advertised throughout the university, but only two or three students and no faculty from other departments were present. I answered questions from the geophysicists for the better part of an hour; the outsiders' few questions were only to try to bait me and showed that they knew nothing about asbestos or its health effects. I had hoped that I might have brought some idea of caution to promoting asbestos abatement at Jussieu by presenting our experience in the United States.

Professor Claude Allègre, former Director of the Institute and one the world's leading geochemists, had followed the asbestos issue closely and had read some of my commentary on the issue; he was in the audience during my lecture. An article by him (Amiante: Où est le scandale?) appeared in the October 19, 1996 issue of Le Pont. I had hoped that this article and the publication of my abstract (I never knew whether it was published) would help bring some sense of proportion to the proposed abatement of asbestos in France. When Professor Allègre was appointed in the summer of 1997 as France's new Minister of National Education, Research, and Technology (Prof. Courtillot became his special advisor), I thought there would be additional influence to slow the rush to remove asbestos from French buildings. After 1997, I lost track of what was going on with regard to asbestos in France. Alas, your photograph brought me up to date.

I do not know what to say about all this effort to describe real versus perceived risks in our environment; is it all a waste of time? Perhaps when we all run out of money, we will pay attention to only real problems. Many thanks for your interesting editorial and for your assistance in bringing out the forthcoming proceedings on the Montréal conference on asbestos.

Malcolm Ross
E-mail:
mrdrr@earthlink.net

THE ASBESTOS ABATEMENT IN UNITED STATES SCHOOLS AND OTHER BUILDINGS

BY MALCOLM ROSS

The economic consequences of a misguided asbestos health policy are particularly apparent with regard to asbestos abatement in United States schools. The nearly $100 billion so far spent on asbestos removal were wasted; in most cases the asbestos was chrysotile asbestos, which has never been demonstrated to be carcinogenic at the levels that are present in schools (Ross, 1984, 1987; Mossman and others, 1990; Wilson and others, 1994). The United States Environmental Protection Agency (EPA) promoted the removal of asbestos through the publication of six advisory documents published between 1979 and 1985 (Wilson and others, 1994). However, in 1990 the EPA recognized the failure of their previous asbestos abatement policy and presented a revised policy outlined in "Green Book II" (see EPA, 1990 and Wilson et al., 1994). Among the statements presented in this 1990 publication are: (1) "Although asbestos is hazardous, the risk of asbestos-related disease depends on exposure to airborne asbestos fibers....at very low exposure levels, the risk may be negligible or zero; (2) Based upon available data, the average airborne asbestos levels in buildings seem to be very low. Accordingly, health risk to most building occupants also appears to be low; and (3) Removal is often not the building owner's best course of action to reduce asbestos exposure. In fact, an improper removal can create a dangerous situation where none previously existed." On September 7, 1990 the EPA issued a press release "that encourages school officials, building owners and abatement professionals to consider and use in-place management of asbestos as an alternative to removal."

A recent review document by the Health Effects Institute (HEI.AR, 1991; see also Wilson et al., 1994) summarized the asbestos air concentrations measured in United States and Canadian schools. In forty-eight school buildings containing asbestos, the average fiber level was 0.00051 fibers per milliliter of air. Examination of the 398 air samples showed that the highest value (0.02 f/ml) was obtained in a janitor's closet that contained a sprayed-on asbestos-containing product. Additionally, 171 school buildings containing asbestos were evaluated for litigation purposes. Within these buildings, 1,008 air samples produced a mean average fiber level of 0.00011 f/ml. In the absence of data to the contrary, it is reasonable to assume that these 219 school buildings are representative of the schools in New York and the 31,000 other nationwide schools thought to contain asbestos. The conditions of the asbestos materials in New York City schools, as described in the media, do not significantly differ from conditions in schools described elsewhere. Many of the 219 buildings studied contained surface materials in poor and damaged condition and were studied specifically for the purpose of collecting air data in situations

DEBATING ISSUES

where fiber was thought to be released into the air. Therefore the 1,406 data points may actually represent a worst-case scenario. School building air data indicate that children who continuously attend school between the ages of 5 and 18 years will be subjected to very low risk. At the average concentration value of 0.00022 f/ml, using the most pessimistic methods for calculating risk (the effect is proportional to dose with no threshold, all fiber types give the same risk for disease, and assuming everyone smokes cigarettes), the calculated risk for residing in the classroom six hours a day, five days a week for 14 years is one excess cancer death per million lifetimes. In contrast, the risk of dying from a lightening strike is 35 deaths per million lifetimes. Ambient air asbestos concentrations measured in the chrysotile asbestos mining towns of Quebec are 220 to 2200 times greater than that measured in the average schoolroom, yet the women living their entire lives in these towns show no increased cancer risk.

Unfortunately, asbestos removal continues to this day, approximately $3.1 billion was spent for this nefarious activity in 1993 (personal communication, Mr. Olin Jennings, The Jennings Group, Inc.), despite the advice given in "Green Book II". Asbestos removal initiatives have depreciated commercial building by one trillion dollars, and have **increased**, not decreased risk of injury or death, both from increased exposure to asbestos dusts and on-the-job accidents by the abatement workers. U.S. citizens are paying dearly for this failed public policy. Good regulatory practices must weigh the health risks of both action and inaction as well as the financial costs. Inaction on asbestos removal in schools would have freed up billions of dollars for purposes that would truly assist society.

EPA (1990): Managing Asbestos in Place—A Building Owner's Guide to Operations and Maintenance Programs for Asbestos-Containing Materials. Washington DC.US Environmental Protection Agency, Pub 20T-2003, July 1990, 40 pp.

HEI.AR (1991): Asbestos in public buildings and commercial buildings: a literature review and synthesis of current knowledge. Cox, A. (chairman), Health Effects Institute-Asbestos Research (HEI.AR), Cambridge, Massachusetts, p. 6-3.

Mossman, B.T., Bignon, J., Corn, M., Seaton, A., and Gee, J.B.L. (1990): Asbestos: scientific developments and implications for public policy. Science, 247, p. 294-301.

Ross, M. (1984): A survey of asbestos-related disease in trades and mining occupations and factory and mining communities as a means of predicting health risks of nonoccupational exposure to fibrous minerals. In Levadie, B. (ed.), Definitions for Asbestos and Other Health-related Silicates: ASTM STP 834, American Society for Testing Materials, Philadelphia, Pennsylvania, p. 51-104.

Ross M. (1987): Minerals and health: the asbestos problem. In Peirce HW (ed.), Proc 21st Forum Geol. Ind. Minerals, Tucson, AZ: Spec. paper 4, Arizona Bureau Geology, p. 83-89.

Wilson R., Langer A.M., Nolan R.P., Gee J.B., and Ross M. (1994): Asbestos in New York City school buildings—public policy: Is there a scientific basis? Regulatory Toxicology Pharmacology, 20, p. 61-169.

LINKS

There is an amazing array of web sites related to mineralogy. We will highlight one in every issue. We are counting on you to let us know about your favorites.

PRESENTING ALKALI-NUTS: A WEB SITE DEVOTED TO MONT SAINT-HILAIRE

This outstanding site was launched in March 1998 by Marc Fabre, an avid collector of microminerals from Mont Saint-Hilaire (MSH). It is a comprehensive site well worth a visit. If you wish to know how many minerals have been identified at MSH, or how many have been found there for the first time or what is the latest publication on any MSH mineral, you will find it there:
http://www.ssc.on.ca/mandm/mshhome.html

Here is what Marc, who maintains the site with his son, has to say:

« Je suis employé depuis 15 années dans la Recherche et Sauvetage au sein des forces canadiennes, maintenant comme opérateur en chef du centre de contrôle des missions canadiennes. Un genre de 911 pour les radio-balises de détresse personnels, aériens ou maritimes au Canada. Mon intérêt grandissant pour le Mont Saint-Hilaire prit naissance, lorsque j'ai réalisé que la collection de minéraux de plus gros formats ne remplissaient pas mes attentes. Je commençai donc par m'intéresser aux micro-minéraux qui demandaient plus qu'à être " juste " regardés. Par hasard, je suis entré en contact avec László Horváth, ai reçu de très beaux spécimens du Mont Saint-Hilaire et s'en était fait, j'étais mordu... La diversité de la minéralogie du Mont Saint-Hilaire est exigeante et pleine de défis.

Le site"ALKALI-NUTS": Mont Saint-Hilaire prend naissance lorsque je réalise la difficulté de retrouver des informations spécifiques et récentes sur le Mont Saint-Hilaire. Le site ose espérer reprendre le mouvement des "Amis du Mont Saint-Hilaire" (Friends of Mont Saint-Hilaire ou FOSH). La collaboration lors de la mise en branle du projet est extraordinaire, les Horvath, Wight, Back, McDonald, Gault ainsi que plusieurs autres personnes ont fourni beaucoup d'information et de critiques constructives pour assurer un contenu le plus précis possible. Des organismes tels le Royal Ontario Museum et des revues comme The Canadian Mineralogist, American Mineralogist et European Journal of Mineralogy ont également été très généreux en permettant l'utilisation de photos ou de résumés sur le site.

Le site fut officiellement lancé sur l'internet le premier mars 1998. Depuis ce jour, l'apport au site par les visiteurs en photos, articles et commentaires est immense. Plus de 15 000 visites ont été enregistrées provenant de plus de 80 pays. Une "alliance" de sites alcalins de divers pays est maintenant en marche.

Le site envisage toujours devenir un point central facilitant la dissémination d'information concernant le MSH. Il y a encore beaucoup de pain sur la planche et de contacts à établir. »

OUTSIDE NEWS

INTERNATIONAL UNION OF GEOLOGICAL SCIENCES

BY PETER BOBROWSKY

Did you know that since the inception of the International Union of Geological Sciences (IUGS) in 1961, three of its presidents have been Canadians, more than any other of the 110 member countries? Our most recent President and current Past President is Dr. Bill Fyfe (U of Western Ontario), but previous presidents include Dr. Jim Harrison and Dr. Bill Hutchison. But what exactly is IUGS and how does Canada fit into this organization? The IUGS is one of the largest, non-profit, apolitical, non-governmental organizations in the world dealing with Earth sciences. IUGS and its many sister organizations, such as IUGG, all belong to the International Council for Science.

Briefly, the purpose of the IUGS is to improve communication and positive action amongst the various Earth science disciplines around the world. The organization promotes and encourages the study of Earth science problems, primarily those with a global significance. To accomplish this rather broad mandate, the IUGS operates through any number of Commissions, Subcommissions, Working Groups and Joint Programs. It also relies considerably on the international activities of some three dozen affiliated bodies and organizations. The IUGS has a permanent Secretariat based at the Geological Survey of Norway in Trondheim.

Every four years, the IUGS sponsors the scientific aspect of the International Geological Congress, but it also helps in the organization of sessions, workshops, fieldtrips and other activities associated with the congress. At the congress, the Council of IUGS, which consists of representatives from various member countries, as well as adhering organizations as designated by statute, meet to maintain the business of the Union. In August 2000, the 31st International Geological Congress was held in Rio de Janeiro, Brazil. Between congresses, the IUGS sponsors and promotes numerous other international, national and regional meetings, workshops and other activities.

The IUGS is managed by an elected Executive Committee, consisting of a President, Secretary General, Treasurer and Past President as well as some six Vice Presidents. But the real yardstick of success of the IUGS is the scientific accomplishments of its members. Topics which require long-term geoscience attention are the domain of Commissions and Subcommissions. Canadian geoscientists are involved in all of the current Commissions and Subcommissions as working scientists, but several individuals are currently active in executive roles. For example, Dr. D. Francis (McGill) is on the Commission on Igneous and Metamorphic Petrogenesis, Dr. Benoit Beauchamp (GSC) is the Chair of the Commission on Global Sedimentary Geology, Dr. S.H. Williams (MUN) is Secretary of the ICS Subcommission on Ordovician Stratigraphy, Dr. A. Lenz (U of Western Ontario) is Secretary of the ICS Subcommission on Silurian Stratigraphy, Dr. F.P. Agterberg (GSC) is Chair of the ICS Committee on Quantitative Stratigraphy, and Dr. P. Bobrowsky (BCGS) is Secretary General of the Commission on Geological Sciences for Environmental Planning.

Working Groups are developed for those topics which require prompt action and less time than Commissions. Again, Canadians are involved in all of the five current Working Groups. Executive positions include Dr. A.G. Darnley (GSC) as Honorary Chair of the WG on Global Geochemical Baselines, and Dr. D.M. Cruden (U of A) Chair of the WG on Landslide Inventory.

Joint Programs are those sponsored by IUGS and other organizations such as UNESCO or IUGG. Five programs are currently active in the IUGS. The program on Mineral and Energy Deposit Modeling has as its Secretary Dr. S. Green (GSC), whereas the International Geological Correlation Program (IGCP) had Dr. N. Rutter (U of A) as one of the Executive Board Members. New Canadian candidates have been nominated to the IGCP Board to replace Rutter. IGCP is the most successful venture sponsored by the IUGS and UNESCO, and through the last few decades, hundreds of Canadian Earth scientists have participated.

A number of Advisory Boards also exist in IUGS, including one for Publications of which Dr. W.G.E. Caldwell (U of Western Ontario) is the Chair. The editorial board of the IUGS journal Episodes has Dr. R. Grieve (GSC), and Dr. V. Singhroy (CCRS) is the IUGS representative on the ICSU Committee on Space Research.

One of the most successful components of the IUGS is the participation of the Affiliated Organizations (e.g. SEG, AAPG, IAH, AGID, etc.). In this case the list of Canadian involvement appears endless. Notable examples include Dr. H. French (U of Ottawa) President of the International Permafrost Association, Dr. O. Slaymaker (UBC) President of the International Association of Geomorphologists, Dr. J. Clague (SFU), Vice President of the International Union for Quaternary Research, Dr. A. Naldrett (U of T), President of the International Mineralogical Association, Dr. G. Hall (GSC), Treasurer of the Association of Exploration Geochemists and Dr. G. Rostoker (U of A), International Secretary of the American Geophysical Union.

As noted earlier, Canada is one of some 110 countries that belong to and pay dues to the IUGS. Membership ranges from Level I to VIII depending on the financial well-being of the country. Level VIII countries such as Japan, Russia and the USA pay $28,000 US annually in

OUTSIDE NEWS

dues. Canada is a Level VII member, as is China, Germany, Italy, France and the United Kingdom. Our annual dues of $14,000 US are paid through the Canadian National Committee of IUGS (CNC-IUGS) which operates under the umbrella and sponsorship of the Canadian Geoscience Council (CGC). Level of membership dictates the weighted voting power of a member country, but membership in IUGS is essential to ensure that Canadian geoscience issues and opinions are respected in all IUGS decision-making actions. In other words, CGC is the official adhering organization of Canada in the IUGS and it is represented by CNC-IUGS.

The CNC-IUGS consists of a Chair (the current International Director of the CGC), four members appointed by the CGC in consultation with Member Societies, three members appointed by the CGC in consultation with CNC-IUGS and three ex-officio members (GSC representative, CNC-IGCP secretary and Dr. Bill Fyfe as the Canadian member of the IUGS executive). The committee holds one meeting per year (teleconference call in alternate years) to maintain momentum on international issues and act as the primary liaison to IUGS in communicating Canadian geoscience accomplishments and concerns to the IUGS. As a member of IUGS, Canada has been able to successfully sponsor a large number of international meetings often via a national body. Two recent examples of meetings held here include the Association of Exploration Geochemists which sponsored the International Geochemical Exploration Symposium in 1999 and the Canadian Geotechnical Society which cosponsored the International Association of Engineering Geology meeting in 1998.

All of the activities of the IUGS, its Commissions, Subcommissions, Working Groups, Joint Programs and Affiliated Organizations are routinely summarized in the journal Episodes. Special publications such as monographs and more recently an informative web site (www.iugs.org) are also used to communicate accomplishments and activities of the IUGS.

Since most Earth scientists in Canada belong to one or more professional organizations, we all benefit from our direct and indirect relationship with the IUGS. Those individuals that are active in IGCP, routinely read Episodes or visit the web site know that Canada's global influence and the international benefits which return back to Canada keep us on the leading edge of good geological science.

For more information regarding IUGS, CNC-IUGS or CNC-IGCP please contact Peter Bobrowsky, International Director-CGC, c/o BC Geological Survey Branch, PO Box 9320, Station Provincial Government, Victoria, BC, V8W 9N3. Tel: 250-952-0395; Fax: 250-952-0381; Email: peter.bobrowsky@gems7.gov.bc.ca

THE ICDD ANNOUNCES THE RECIPIENTS OF THE 2001 LUDO FREVEL CRYSTALLOGRAPHY SCHOLARSHIPS

The ICDD Ludo Frevel Crystallography Scholarship Committee has selected six winners for the 2001 Scholarship program. They are: James Lettieri, of The Pennsylvania State University, in University Park, Pennsylvania, with research involving *Ferroelectric Anisotropy and Integration of $SrBi_2Ta_2O_9$*; Meitian Wang, of the University of Alberta, in Edmonton, Alberta, Canada, with exploration into *Developing Structural Principles for New Ternary Metal-Rich Pnictides*; Christina DeWitt, of the Oklahoma Medical Research Foundation, in Oklahoma City, Oklahoma, with major interest in *Determining the Structures of an Fc Derived from a Human IgG1 () Antibody*"; Christine McCracken, of the University of Manitoba, in Winnipeg, Manitoba, Canada, with studies focusing on *The Crystallography and Chemistry of Tourmaline*; Maxim V. Lobanov, of the Moscow State University, in Moscow, Russia, with research concerning *Structural Studies of Low-Dimensional Magnetic Mn Oxides as Possible CMR Materials*; and Jennifer Stone, of the Oregon State University, in Corvallis, Oregon, who's investigating *Structural Studies of High-Power Optical Materials*. The ICDD will present each of these students with a check for $2,250 to help them continue their studies in their selected fields of crystallographic research.

MEMBER IN THE NEWS

LEE GROAT

Lee Groat has just been appointed Editor of *American Mineralogist*, the journal of the Mineralogical Society of America. This is the first time a non-american is appointed to this prestigious position. Lee is an Associate Professor at UBC, and was the recipient of the Young Scientist Medal of the Mineralogical Association of Canada in 1999.

Congratulations Lee!

The Mineralogical Society of America

announces the 2002

GRANT FOR RESEARCH IN CRYSTALLOGRAPHY

From the Edward H. Kraus Crystallographic Research Fund with contributions from MSA membership and friends

and the 2002

MSA GRANT FOR STUDENT RESEARCH IN MINERALOGY AND PETROLOGY

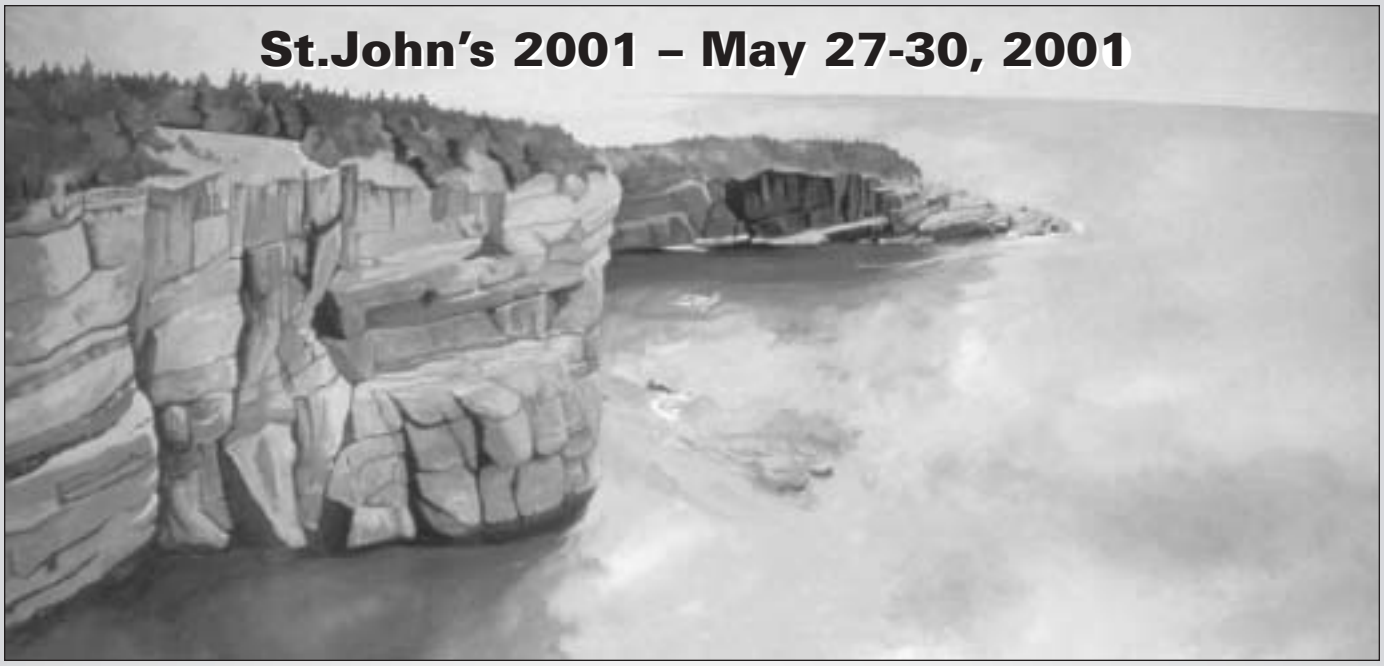
from an endowment created by contributions from the MSA membership

The Grant for Research in Crystallography is a US$5000 grant for research in crystallography. There are no restrictions on how the grant funds may be spent, as long as they are used in support of research. The only restrictions on eligibility for the grant are that the applicant must have reached his or her 25th birthday but not yet have reached his or her 36th birthday on the date the grant is given, and that the person is not a MSA Counselor.

MSA Grants for Student Research in Mineralogy and Petrology are two US$5000 grants for student research in mineralogy and petrology. Students, including graduate and undergraduate students, are encouraged to apply. There are no restrictions on how the grant funds may be spent, as long as they are used in support of research.

Selection will be based on the qualifications of the applicant, the quality, innovativeness, and scientific significance of the research, and the likelihood of success of the project. Grants will be made in January 2002. There are no restrictions on how the grant funds may be spent, as long as they are used in support of research. Application instructions and forms for the grants may be obtained from the MSA worldwide web home page, http://www.minsocam.org or Dr. J. Alex Speer, MSA Business Office, 1015 Eighteenth St NW Ste 601, Washington, DC, 20036-5274, USA (ph: 202-775-4344, fax: 202-775-0018, e-mail: j_a_speer@minsocam.org. Completed applications must be returned by June 1, 2001.

St.John's 2001 – May 27-30, 2001



GAC and MAC will launch the new millennium by holding their 2001 Joint Annual Meeting in St. John's, Newfoundland. North America's oldest city, with a population of 102,000, is a vibrant mosaic of the old and the new. It lies at the eastern extremity of the North American Craton, facing the Atlantic Ocean, where it is ideally situated to inspire learned discourse on the Earth Sciences of the North Atlantic borderlands. Visiting scientists will appreciate the St. John's trans-Atlantic link to exotic Gondwanaland and the trans-Appalachian link to the ancient Canadian Shield of Laurentia. This panoply of geology will inform our discussions, which will also include the present-day continental shelves and the Atlantic Ocean itself. So come to St. John's in May 2001, join in our eclectic mix of scientific and social programmes, and help launch an exciting geoscience exploration from that historic gateway, St. John's, Newfoundland. For more information on all field trips that will run before and after the meeting, see our web site **www.geosurv.gov.nf.ca/stjohns2001**

SYMPOSIA

North Atlantic Mineral Symposium (NAMS)
Richard Wardle and Koenraad Verbruggen

The second in a biannual series of meetings sponsored by the Newfoundland and Irish Geological surveys and held this year in conjunction with GAC/MAC. Keynote components of the symposium will be Global Trends in the Mineral Industry, and Mineral Deposits of the North Atlantic region. Break-out sessions will focus on a number of themes including mineral policy, challenges to mining, mineral economics and mineral potential estimation.

Early Proterozoic – Archean Crustal Evolution/Metallogeny
John Myers

This symposium will involve comparisons/correlations between Northern Labrador, Greenland, and that exotic portion of the North Atlantic Borderlands, AustraliaNorth

Atlantic Margin Petroleum Resources
Iain Sinclair (Hibernia management) and Judith McIntyre (CNOPB).

Global Change and Its Impact on the North Atlantic Borderlands
Moire Wadleigh, John Jacobs, and Don Forbes.

SPECIAL SESSIONS

Modern and Ancient Oceanic Ridge Processes
Jean Bédard

Tectonic Integration of circum-Superior Orogens
Marc St. Onge, David Corrigan and Toby Rivers

Quaternary Geology of Northwest Atlantic
David Liverman, Martin Batterson, Norm Catto and Trevor Bell

High Pressure Granulites and Eclogites
Aphrodite Indares

ODP Session
Matt Salisbury

Geotechnical Session
John Gale

Cosmogenic Dating Techniques and Applications
John Gosse

Geophysical applications in the marine environment
Brian Todd, Dick Pickrill and Bill Collins

New developments in LAM-ICP-MS analytical techniques
Paul Sylvester

Geochemistry of Inorganic Sedimentary Rocks
Scott McLennan, Brian Fryer, and George Jenner

Data Integration and Preservation of Geoscience Knowledge
John Broome

Late Neoproterzoic evolution of the earth and life
Jim Gehling and Guy Narbonne

Approaches to earth science education in urban settings
Nancy Chow.

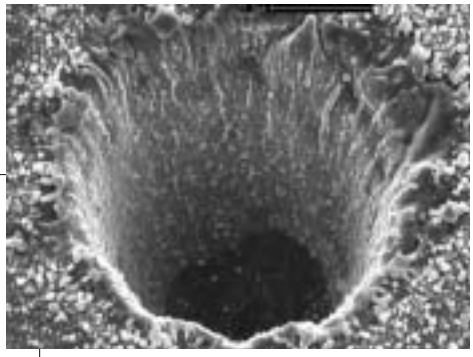
Proterozoic granitoids and anorthosites
Sandra Barr and David Corrigan

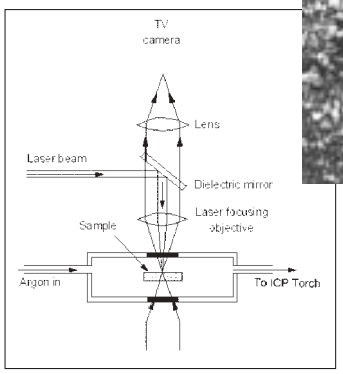
Water as commodity
Bruce Broster

The architecture, origin and evolution of the Paleozoic continental margin of Laurentia
Denis Lavoie.

MINERALOGICAL ASSOCIATION OF CANADA
SHORT COURSE

Principles and Applications of Laser Ablation-ICP-Mass Spectrometry in the Earth Sciences





ST. JOHN'S, NEWFOUNDLAND

26-27 MAY 2001

(HELD IMMEDIATELY PRECEDING THE JOINT ANNUAL MEETING OF THE GEOLOGICAL ASSOCIATION OF CANADA – MINERALOGICAL ASSOCIATION OF CANADA)

LASER ablation-ICPMS is arguably the most exciting new analytical development in geochemistry in the last decade, opening up approaches to pure and applied geologic problems that were only dreamed of before The goal of this course is to teach graduate students and post-graduate researchers how laser ablation-ICPMS works, what is being done in the Earth sciences with the method now, and what could be done in the future. It will appeal to all those Earth scientists who are interested in solving geologic problems with chemical data. Material will be presented at the level of understanding of most graduate students in the Earth sciences and will be assembled in a short-course volume.

Technical topics discussed include: Nd-YAG and excimer laser instrumentation; laser beam delivery systems; ablation cell design; quadrupole, magnetic sector and time-of-flight ICPMS instrumentation; collision cell technologies; sample preparation; data acquisition, calibration and quantification strategies; laser ablation phenomena and element fractionation.

Examples of Earth sciences applications: whole rock geochemistry using fusion disk analyses; lithophile element studies of silicate and oxide minerals in the mantle and crust; noble metal element studies of sulphides, oxides and metals in ores and rocks; experimental mineral-melt partitioning; melt inclusions and magmatic processes; fluid inclusions and ore genesis; metamorphic minerals and diffusion-rate processes; trace-element geothermometry/ geobarometry; environmental pollution tracing and monitoring; radiogenic isotope systematics of minerals; U-Pb accessory mineral geochronology.

Registration costs: CAN$250 for professionals and CAN$150 for students (includes short-course volume and two cold lunches).

To register and for other information, visit the St. John's 2001 GACMAC website at **www.geosurv.gov.nf.ca/stjohns 2001** or contact Dr Paul Sylvester at **pauls@sparky2.esd.mun.ca** for answers to specific questions. Online registration will commence on 1 March 2001.

Scheduled Lecturers

Detlef Günther, Professur für Analytische Chemie und Spurenanalytik, **ETH Zürich**, Switzerland

Simon Jackson, Lecturer, School of Earth Sciences, Macquarie University, Australia

Jan Kosler, Lecturer, Department of Geochemistry, Charles University, Czech Republic; and Research Associate, Department of Earth Sciences, Memorial University of Newfoundland

Henry Longerich, Professor Emeritus, Department of Earth Science, Memorial University of Newfoundland

Nuno Machado, Professeur associé et Agent de recherche et de planification, Sciences de la Terre, Université du Québec à Montréal

Paul Mason, Research Officer, Faculty of Earth Sciences, University of Utrecht, The Netherlands

Marc Norman, Senior Research Fellow, School of Earth Sciences, University of Tasmania, Australia

Paul Sylvester, Associate Professor, Department of Earth Sciences, Memorial University of Newfoundland

Geoff Veinott, Research Scientist, Department of Fisheries and Oceans. Environmental Sciences Division, Northwest Atlantic Fisheries Centre

Student Registration Grants

A limited number of awards is available to students to cover the registration fee. Applicants should send a brief statement outlining their interest in the short course and explaining how their attendance will enhance their academic studies or research to Dr Paul Sylvester by email at **pauls@sparky2.esd.mun.ca**. Applications must be received by 1 March 2001.

Mineralogical Association of Canada
Association minéralogique du Canada

P.O. Box 78087, Meriline Postal Outlet
1460 Merivale Road, Ottawa ON Canada, K2E 1B1
Tel. & fax : (613) 226-4651
E-mail: canmin.mac.ottawa@sympatico.ca

The Mineralogical Association of Canada was incorporated in 1955 to promote and advance the knowledge of mineralogy and the related disciplines of crystallography, petrology, geochemistry and mineral deposits.

Any person or organization engaged or interested in the fields of mineralogy, crystallography, petrology, geochemistry and mineral deposits can become a member.

Membership benefits include: six issues a year of The Canadian Mineralogist; **20% discount** on publications of the Association; special discount on registration fee at our annual meeting held jointly with the Geological Association of Canada.

Individual membership	**$90**
Institutional and corporate membership	**$340**
Sustaining membership	**$600**
Student or retired membership	**$30**

For information on membership and publications, contact our business office at

MAC
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