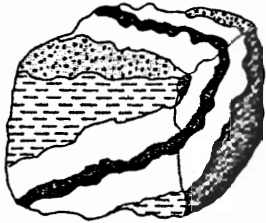


THE ORE MINERALS



Newsletter of the Mineral Deposits Division

Geological Association of Canada

No. 6

June 1980

Greetings from your new Chairman, Steve Scott



At the annual business meeting of the MDD held in Halifax on May 21 the chief executive position of our fledgling organization was passed from Hugh Morris to me. Hugh was our founding President and to him must accrue much of the credit for launching and giving substance to MDD. Hugh's act will be hard to follow but I have had some baptism under fire as our founding Vice President and am backed up by a first rate executive and board of directors. Due to an oversight, the executive position of Past President does not exist in MDD. This will be corrected by a formal constitutional change but, in the meantime, Hugh has agreed to lend his advice on an informal basis.

For those of you who may be asking "Who is Steve Scott?", I was born and raised in Fort Frances, Ontario receiving my early education there and at Stratford, Ontario. Armed with B.Sc. and M.Sc. degrees from the University of Western Ontario and a Ph.D. from Penn State, I went to the Department of Geology at the University of Toronto in 1969 as an Assistant Professor. I have now risen to the rank of Professor and on July 1 will be our department's Associate Chairman. As is typical of active academics I am a member of this and that, serve on various national and international committees and editorial boards

and publish papers. My research interests are quite varied ranging from somewhat esoteric studies on sulphide minerals and meteorites to more pragmatic investigations of ore deposits. My main interest at the moment is in volcanogenic massive sulphide deposits, in particular the Kuroko ores of Japan (where I have spent five months) and similar deposits in Canada.

At the Halifax meeting, I outlined some of the projects in which the MDD expects to be involved over the next year or so. As was reported earlier, the series on ore deposits models in *Geoscience Canada* will begin soon and has a good line-up of papers under Jim Allen's (COMINCO) control. A guidebook series on important mining camps in Canada is being planned under the editorship of Dave Strong (Memorial University). The first of this series, on Noranda, will likely be by Léopold Gélinas and Jean Lajoie (École Polytechnique). Your division has under active discussion the possibility of assisting Alex Brown (École Polytechnique) in the writing and production of an authoritative reference volume on ore deposits. This and some other publication efforts by MDD are under the guiding hand of Gwilym Roberts (Waterloo). Can MDD influence the direction of research in ore deposits in Canada? Don Sangster (GSC Ottawa) thinks so and is formulating ideas for future debate by the rest of the MDD executive. Your MDD is also very busy planning and organizing short courses, symposia and field trips most of which will be held in conjunction with important national meetings. The full impact of these efforts will be felt for the first time at the Calgary Annual GAC Meeting May 11-13, 1981 where MDD is sponsoring two symposia: "New Exploration Guides for Kuroko-type Massive Sulphide Deposits" (see separate item) and "Metallogeny and Tectonics of the North American Cordillera." In 1982, your division expects to have input into meetings of the CIM in New Brunswick, AEG in Saskatoon and GAC in Winnipeg.

Finally, let me pass on the exhortation that you become involved in your MDD. If you have some good ideas or complaints, let's hear about them. Because we are a new organization most of the programmes have originated from your elected executive but the membership pool

represents a wealth of ideas and talents for which MDD can act as a focal point. One way you can help now is to think seriously about candidates for the second Duncan R. Derry Medal given annually by your division for outstanding achievement in economic geology. If you have a person in mind get two seconders and send your citation to Vic Hollister (Vancouver) who, as your new Vice President, will chair this year's selection committee.

Have a good and successful summer!

Duncan R. Derry Medal

The first recipient of the MDD's Duncan R. Derry Medal for outstanding achievement in economic geology is Anthony J. Naldrett of the University of Toronto. The formal citation reads as follows:

"Dr. A.J. Naldrett has achieved world recognition for the remarkable blend of field, petrologic, geochemical and experimental techniques which he has applied to magmatic Ni-Cu sulphide deposits and, more recently, to natural concentrations of the platinum group elements. His record is remarkable for the careful attention which he has paid to both the applied and theoretical aspects of mineral deposits geology. The benefit to both has been obvious.

His outstanding achievements in economic geology include early work which clarified the mode of occurrence and origin of the Ni-Cu sulphide deposits at Sudbury, very important work on the unusual and poorly understood Ni-Cu deposits in Precambrian ultramafic, submarine lava flows (komatiites), the development of a detailed classification scheme relating nickel deposits to geological environment in an innovative plate tectonic context, and recent work on the factors which affect the levels of the platinum group elements in magmatic sulphide deposits. Dr. Naldrett has authored or co-authored 63 refereed scientific papers, a formidable achievement, is involved in the activities of many learned societies, has recently edited a 514-page volume entitled "Nickel-sulphide and platinum-group-element deposits" (Canadian Mineralogist, vol. 17, part 2, 1979) and was the Thayer Lindsley Distinguished Lecturer of the Society of Economic Geologists in 1977. Such a record has been rarely equalled, let alone surpassed.

When Dr. Naldrett started research at Queen's University in 1959, after working as a mine geologist for Falconbridge Nickel Mines Ltd. for two years, magmatic Ni-Cu deposits were well described and understood at a basic level. Dr. Naldrett has been a world leader in bringing the scientific knowledge of these ore deposit types to a level which equals or exceeds that of many other ore deposit types. He has achieved much for economic geology in general, quite apart from his more specific contributions, and this may well be his greatest single, broad achievement."

The medal was presented by Hugh Morris on behalf of the MDD at the annual luncheon of the GAC on May 19 in Halifax. Dr. Naldrett was unavoidably absent so the medal was accepted on his behalf by Chris Cowan of Falconbridge, the company for whom Naldrett first worked in Canada. The following is a statement from Naldrett as read by Cowan:

"Mr. President, Ladies and Gentlemen,

I am very sorry that I cannot be with you today to receive the Duncan Derry medal. Unfortunately I am committed to presenting a short course here in South Africa which was arranged several months ago and which exactly coincides with this meeting.

I am most honoured and delighted to have been chosen as the first recipient of this award by the Mineral Deposits Division. Honoured because of their appreciation of my work and that of the students and colleagues who have worked with me, and delighted because the medal bears the name of Duncan Derry.

As must be true of all Canadian geologists involved with mineral deposits, I have always had an enormous respect for Duncan. His common sense advice always constantly given, his helpfulness to young geologists starting out on their careers, and his dedication to Canadian geoscience, in particular the Geological Association of Canada, are models for us all. The Mineral Deposits Division could have chosen no finer Canadian to name this medal after and much of my pleasure in receiving it is that my name will be linked in this way with his.

Thank you."

A replica of the Duncan R. Derry Medal, rhodium ("silver") instead of gold plated, and inscribed "in appreciation" was presented to Duncan Derry himself at the annual luncheon of the MDD in Halifax.

MDD Luncheon, Halifax, May 20, 1980

The first of what we expect will become an annual luncheon of MDD members was held at the Faculty Club in Halifax during the GAC annual meetings. Unfortunately, due to space limitations, only 30 people could be crammed into the tiny room. However, after a few drinks

the lucky few diners didn't really care about the accommodation as they were, by then, well used to gross overcrowding in the economic geology technical sessions. Next year in Calgary (where they do things big) we anticipate having room for at least 100 of our members at our luncheon and 500+ at our technical sessions and symposia. A highlight of this year's luncheon was the saying of grace by that well known ecclesiastic Father P.M. Kavanaghski who sometimes roams among his followers disguised as a geologist from Riocanex.

The main feature of the proceedings this year was the presentation of a replica of the Duncan R. Derry Medal to the man after whom the award is named (see separate report). Unfortunately, the official photographer failed to show up to record the historic occasion so an unsuspecting camera-toting student, Mario Coniglio from the University of Manitoba, was highjacked from the main campus square and pressed into service.

Geoscience Canada Ore Deposits Model Series

At the MDD Executive meeting at Halifax '80, R.H. McNutt, editor of Geoscience Canada explained his requirements as editor of the series. He wishes to receive reviewed papers in final form two months before the printing deadline; to obtain two reviews of each paper-- one expert and one general; and to call upon an additional review if warranted.

A paper on porphyry deposits by McMillan and Panteleyev is in press and papers by Morganti (shale-hosted PbZn) and Tilsley (U deposits) are in the final stages of preparation.

Publication Chairman Jim Allen is preparing a statement of guidelines to authors which will be ready in the near future. A submission will be sent to Paul Kavanagh for consideration of Robinson Fund financing for the series. Responsibility for the series will remain with Jim Allen who will keep the incoming Publications Chairman J. Gwilym Roberts informed of progress.

The ultimate scope of the series is yet to be decided by MDD executive and directors. A total of fifteen models was suggested, of which the following nine are either in preparation or committed.

McMillan and Panteleyev	Porphyry Model	In Press
Morganti	Shale Hosted Base Metals	Near Completion
Tilsley	U Ore Model	Near Completion
Pretorius	Rand Type Gold Model	September?
Roberts	Vein Type Gold Model	September
Dick	Skarn Related Deposits	September
Scott	Cobalt Ag Model	September
Scott	Volcanogenic Massive Sulphides	?
Strong	Ore Deposits Related to Granitoid Rocks	November

Kuroko Spring 1981

Next spring the GAC Annual Meeting in Calgary will feature a symposium on "New Exploration Guides for Kuroko-type Massive Sulphide Deposits" organized on behalf of the MDD by Steven Scott (Canada), Hiroshi Ohmoto (U.S.A.) and Ei Horikoshi (Japan). The symposium will present the practical results of an intensive three-year investigation of the Hokuroku district of Japan by members of the "U.S.-Japan-Canada Co-operative Research Project on the Genesis of Volcanogenic Massive Sulfide Deposits." This is probably the largest integrated geological-geophysical-geochemical study every undertaken on ore deposits by an international group and has enjoyed admirable co-operation from the local mining companies.

Altogether about 45 people are actively involved from universities (primarily Penn State, Harvard, Toyama, Tsukuba, Tokyo, Akita and Toronto), geological surveys (USGS and GSJ) and industry (Dowa, Shakanai, Mitsubishi and Metal Mining Agency of Japan). Besides the national leaders, the project includes several people who are well known from their publications such as Yoshio Kajiwara, Takeo Sato and Akira Sasaki from Japan and Paul Barton, Jr., Larry Cathles, Bruce Doe, Dick Holland and Ulrich Petersen from the U.S. The project is being funded by grants to the national leaders from the National Science Foundation (Ohmoto), Japan Society for the Promotion of Science (Horikoshi) and Natural Sciences and Engineering Research Council (Scott). Ohmoto is the overall director of the project. Horikoshi serves as co-director and organizer in Japan. (Incidentally, he has been a member of MDD since its inception.) Scott is Canadian national leader.

The Hokuroku district was chosen for the study because it is the type locality of volcanogenic massive sulphide deposits in island arcs. The findings have implications in many places of the world, most particularly in Canada, and for this reason it is appropriate that those aspects of the project which may have direct benefit to exploration are being singled out for presentation at Calgary. It is anticipated that 7 or 8 papers will be presented with lots of time available for discussion after each talk. Most of the papers will be multi-authored so as to integrate related concepts. Emphasis of the symposium will be on exploration guides which are truly new although some background information will be presented in order to provide as complete a picture as possible of the Hokuroku district.

The final paper of the session, to be given by George Mannard of Texasgulf, will be a critical appraisal of the usefulness to industry of the new ideas for exploration outside of Japan. The papers of the symposium will not be published directly. Instead, all of the research results of the project will be gathered into one issue of a major international journal and will likely appear in 1982.

Preceding the Calgary meeting, there will be a field trip in the Noranda and Timmins area organized by Scott for twenty members of the Kuroko research team and sponsored by the MDD. The purpose of the trip is to familiarize the group with Archean volcanogenic massive sulphides prior to the symposium so that they can carry on more meaningful and enlightened discussions during the question periods. It is hoped that the trip may also lead to some research on Canadian massive sulphides by this very knowledgeable international group and perhaps be a good beginning for exchange trips between MDD and foreign societies for the benefit of all of us. It is hoped that you, as a member of MDD, will understand the importance of the field trip for our foreign visitors and will not object to your Division organizing a trip from which you will be excluded because of the limited number of places that are available.

Mark Calgary, May 11-13, 1981 on your calendar. With Kuroko deposits, Cordilleran tectonics and metallogeny, and general sessions on ore deposits, Calgary '81 promises to be a great meeting for economic geologists. See you there!

S. D. Scott

Field Trip Report: Porphyry Copper Deposits of South Central B.C., May 6-8, 1980

The resounding success of this field trip, the first independent trip sponsored by the MDD, was due mainly to the hard work and expertise of the organizers and chief guides, Bill McMillan and Vic Preto of the Ministry of Energy, Mines and Petroleum Resources, Victoria. High interest in the trip was indicated by the number of participants (46) and the necessity to turn away many late registrants. The response contrasted to considerably lower interest in the trip when first scheduled in September of last year, indicating that a spring tour is more appropriate to most participants. Another factor is the renaissance of exploration activity for porphyry deposits, led by strong Mo prices, and more recently increases in Cu prices. Economic interest is also focussed upon the precious metal content of these big deposits which, in some cases should no longer be considered as a by-product. In fact, some porphyry Cu(Au) deposits would be more correctly classified as porphyry gold deposits with recoverable copper!

Participants were given a slide presentation overview of the deposits and their regional setting by McMillan and Preto in Kamloops the first evening. An interesting tour of the Afton deposit the following morning introduced visitors to supergene copper mineralization in alkalic phases of the Iron Mask batholith. Native copper specimens were actively sought in the pit, and a side trip to the copper smelter further satisfied those seeking exotic specimens. Pit mineable reserves of 21 million tons of 1.0% Cu, 0.12 oz/T Ag and 0.016 oz/T Au assure production for another seven years.

The next deposit to be visited, Bethlehem is the oldest producing porphyry deposit in B.C., having started up in 1962. Located within the relatively young, felsic core of the calc-alkalic Guichon Creek batholith, the Bethlehem deposits represent a high level of mineralization in the district, with Cu Mo deposition controlled by fractures, faults and porphyry dyke swarms. Visits to the East Jersey and Iona pits also afforded a spectacular view of the adjacent orebodies in the district: JA, Valley, Lornex and Highmont which together constitute some two billion tons of CuMo ore.

Tour members were impressed by the scale of operations at Lornex, the largest deposit on the tour, and the biggest non-ferrous open pit in Canada. Approximate reserves of 450 million tons of 0.40% Cu and 0.014% Mo are currently mined at 48,000 TPD, a rate that will be increased to 75,000 TPD when the present expansion project is complete. Geologic studies are closely integrated with production, as witnessed by the necessity to blend ore relative to its intensity of hydrothermal alteration to attain an optimum grinding rate. However, the critical question as to the location of the part of the orebody offset by the Lornex fault remains, alas, unanswered.

The last stop of the tour at the Ingerbelle pit of Similkameen Mining Company afforded visitors a look at a second example of a porphyry deposit of the alkalic type that, unlike Afton, occurs entirely within a septum of Nicola volcanic rock. Contact effects of adjacent alkalic stocks have superimposed a local skarn mineral assemblage upon the silica deficient, albite-rich porphyry assemblage. Although only two years reserves remain at Ingerbelle, operations will continue at the new Pits 1, 2 and 3 starting in September. These operations, which constitute 140 million tons of 0.41% Cu are located on old Granby workings on adjacent Copper Mountain.

The mine visits were enhanced by well prepared talks and guided pit tours by the geological mine personnel. The hospitality of the host mining companies Teck, Bethlehem, Lornex and Newmont was appreciated by all. Particular thanks are due Bill McMillan and Vic Preto for their running commentary on regional geology and welcome addition of local colour throughout the tour.

Ken Dawson

Announcements

Geology Division, CIM: Gold Symposium - September 22-23, 1980

The Geology Division and the Harricana Branch, CIM, will run a two-day symposium on gold deposits on September 22 and 23, 1980. The symposium will be followed (and preceded if demand warrants) by a three-day field trip to the gold mines in the Val d'Or-Kirkland Lake-Timmins area.

Papers will be presented on ore genesis and mineralogy of gold deposits, on exploration for gold, on gold metallurgy, and on regional geology of the Val d'Or-Kirkland Lake-Timmins and Red Lake areas.

For information contact: Dr. W. Petruk, Symposium Chairman, CANMET, EMR, 555 Booth Street, Ottawa, Ontario, Canada K1A 0G1.

AEG-GAC Symposium: Precious Metals in Geochemical Exploration - Northern Cordillera, Vancouver, April 13-15, 1981 First Announcement - Call for Papers

General - The Association of Exploration Geochemists is co-sponsoring a three-day Regional Symposium with the Cordilleran Section of the Geological Association of Canada. A two-day technical session will cover various aspects of exploration geochemistry of precious metals in the Cordillera. One day will be devoted to the geology and genesis of gold deposits, and an evening poster session will be held.

Abstracts of about 500 words should be submitted by November 15, 1980 to:

Precious Metals, Regional Symposium
Association of Exploration Geochemists
#102 - 1550 Alberni Street, Vancouver, B.C. V6G 1A5 Canada (604) 684-9264

9th International Geochemical Exploration Symposium, Saskatoon, Canada, May 12-14, 1982

The Association of Exploration Geochemists is sponsoring a three-day program of technical sessions on the theme 'Geochemical Exploration for Energy Sources', that will immediately precede the GAC-MAC Annual Meeting in Winnipeg (May 16-19, 1982).

Field trips are planned to unconformity and vein-type U deposits, Pine Point PbZn deposits, Yellowknife Au deposits, Flin Flon-Snow Lake massive sulphide deposits, Thompson nickel belt, Stillwater complex and Yellowstone Park, Fort McMurray tar sands project, and potash mines near Saskatoon.

For information contact: Dr. V.J. Sopuck
Organizing Committee
9th International Geochemical Exploration Symposium
Box 432, Sub P.O. 6
Saskatoon, Saskatchewan S7N 0W0 Canada

University of Toronto-Princeton Precambrian Field Trip, September 8-18 (approx.), 1980

Introduction: An 11-day field trip is planned to three classical Archean-Proterozoic field areas in the eastern Canadian Shield: Grenville Province, Sudbury-Elliott Lake Huronian area, and Timmins-Kirkland Lake-Noranda region of the western Abitibi greenstone belt. Topics to be covered include: lithology, structure, age and paleomagnetism of Grenville rocks; nature and origin of the Sudbury structure; Huronian sedimentation, stratigraphy and mineralization; nature and origin of Archean gneiss; Archean volcanism and mineralization. A half-day conference during the trip will provide opportunity to discuss some basic problems of development of Precambrian crust, hydrosphere and atmosphere.

Responsibilities: Grenville - W.M. Schwerdtner (University of Toronto)
Sudbury-Huronian - K.D. Card (Geological Survey of Canada)
Abitibi - A.M. Goodwin (University of Toronto).

A limit of 25 participants exists. Cost estimate for food, lodging and transportation to non-students of U. of T. or Princeton is \$500.

For further information contact either Goodwin or Schwerdtner at:

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