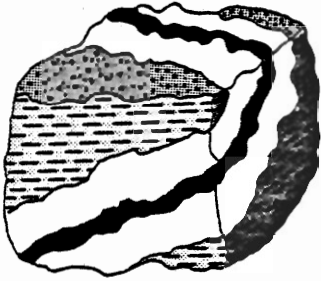


# THE DUNCAN

## Mineral Deposits Division Geological Association of Canada No. 20 December 1984



### DUNCAN R. DERRY MEDAL AWARDED TO JOE BRUMMER

The annual award of the Duncan R. Derry Medal was presented to J.J. (Joe) Brummer at the Annual GAC Luncheon in London in May, 1984. MDD Chairman John McDonald (left) made the presentation with the following citation:

"It is a pleasure to announce that the Mineral Deposits Division of the GAC has selected Dr. J.J. (Joe) Brummer as recipient of the 1984 Duncan R. Derry medal.

Let me refresh your memory as to the criteria applied in making this award. Candidates must be outstanding economic geologists who have made major contributions to economic geology in Canada. In addition, they must be recognized for their skill and stature as economic geologists and also by their public contribution to the science.

I would like to take a minute or so to touch briefly on some highlights of Joe's career to indicate why this gentleman is held in such high esteem

Joe formally entered our profession after graduation from University of Witwatersrand in 1945 with a B.Sc. in mining geology having already attained a B.Sc. in mining engineering from the same University two years previously. After early experiences on the Rand goldfields, Joe moved to the Rhodesian copperbelt in 1947 as mine geologist. He became chief geologist at the Mufulira Mine in 1949 and then chief geologist of Rhodesian Selection Trust in 1951.

During this period, the intimate relation between the copper-cobalt ores and sedimentary features captured his imagination and, in characteristic fashion, he did something about it. He returned to university where the object of his Master's thesis was "The Geology of the Roan Antelope Orebody." His published results contained what were then radically new ideas on ore genesis which helped set the stage for subsequent development of prospecting methods that lead to the later discovery by others of two new orebodies, both well removed from the established part of the then-known Copperbelt.

Joe's next move was to Canada in 1953 where he undertook a study of the Gaspé Copper Mine which he completed as a Ph.D. degree from McGill University in 1955.

Joining Kennco later that year, he helped pioneer stream sediment geochemistry in Labrador, and subsequently, in the western Cordillera using methods and techniques he had utilized and helped evolve in Rhodesia.

During the period 1961-1970, Joe was Exploration Manager for Falconbridge Nickel in central Canada during which time the Company found three deposits in the Manitoba nickel belt, a fourth in the Snow Lake district as well as the sediment-hosted George Lake zinc deposit in Saskatchewan.

From 1970 until earlier this year, Joe was exploration manager of Canadian Occidental. Again, his group was responsible for significant mineral discovery - this time, within the Athabaska Basin where the uranium deposits of the JEB and McClean Lake North and South were discovered.

To me, four characteristics distinguish Joe's background:

- a) His scientific integrity and curiosity,
- b) His unbridled energy which, together with the above, has permitted him to understand and to explore successfully a wide range of geological environments,
- c) His ability to transmit his knowledge directly, and in combination with others into an enviable series of discoveries with which he has been directly or indirectly associated, and finally,
- d) His sense of responsibility to economic geologists at large in communicating his ideas, techniques, and results through twenty-six publications that he has either written or co-authored with others.

For these reasons, it is with a great deal of pleasure that I present the Duncan R. Derry medal to Dr. J.J. (Joe) Brummer - Economic Geologist - par excellence."

## MESSAGE FROM THE CHAIRMAN

The Mineral Deposits Division has passed through another year, one that has been successful in offering increased activities for our membership. Many people have contributed time and effort to MDD and to these people I would like to express the thanks of the MDD membership.

We are planning to continue a similar venue during the coming years and now have plans for field trips to Japan, California, Mexico and Spain-Portugal, a workshop on computers (Vancouver '84), a structural geology course for exploration geologists (Vancouver '85), Special Session of Gold in Turbidities (Fredericton '85), a Symposium on Sedimentary Copper Deposits (Ottawa '86), an international meeting on gold deposits (Gold '86 in Toronto), and publication of Field Manuals and Guidebooks for mining camps beginning soon with Highland Valley. The list shows the extent of MDD involvement. We are always soliciting new topics, new ideas, new formats.

Membership in MDD has fluctuated over the past years but support for MDD activities has grown considerably. MDD executive would like to thank you, the members, for making our undertakings so successful and hope that you will continue to participate in the years to come.

The following sections describe a number of fields of activity of MDD. Details of specific courses, trips, symposia, etc., are omitted as they have been and will be given elsewhere in The Gangue.

### MDD Luncheon-GAC/MAC Annual Meeting - London '84

The MDD luncheon was attended by approximately 70 people who were updated regarding MDD activities. John A. McDonald reviewed the Treasurer's Report, showing a balance in MDD accounts of approximately \$22,000 and the Secretary's Report, both of which are published in The Gangue.

Nominees received by the Nominating Committee were elected by acclamation continuing the long standing MDD custom of no elections.

John A. McDonald expressed gratitude to R. Hodder for his efforts in organizing London '84 and particularly for ensuring MDD representation. The audience responded with a long round of applause.

Denis A. St.-Onge addressed the luncheon in his first duty as President, GAC. He congratulated MDD for their enthusiastic activities during the year and encouraged MDD to continue to support other branches of GAC, especially those without the resources of MDD.

Robert S. Hewton as incoming MDD Chairman, was given the stand. He thanked J.A. Coope for his many years of support and contribution to MDD and asked him for continued guidance. Dr. Coope has moved to Vice President, GAC, a position MDD executive know he will handle with great competence.

Before closing the meeting Hewton expressed special thanks to John McDonald for leading MDD through many accomplishments during the year. As a momento for his efforts and to remind John of MDD appreciation, John was given a carving of a bird (sandpiper) with an engraved brass plaque.

### Field Trips

Field trips have been both a valuable and financially successful venture for MDD. The trips often are organized to visit areas where individuals may not be able to visit because of costs and logistics. The reduced costs because of the number of participants still generate profits for MDD to

carry out other activities. As is obvious from previous publications of The Gangue the trips are well received by membership. Interested persons for any trip should contact organizers immediately to be placed on mailing lists.

Attendance on previous field trips has been on a "first come-first served" basis but MDD executive are considering a priority so that MDD members may be given preference. Persons anxious to participate in future MDD field trips should join MDD.

Some persons have declined to indicate interest in particular trips because they have assumed the trip is overbooked. They should sign on anyway. As we all know, geologists are mobile and frequently by the date of the trip a number of pre-registrants find themselves sitting on a drill or in the middle of budget meetings. On most trips to date there has been a high turnover of participants prior to departure.

A number of MDD executive and members have now participated in organizing field trips. If other members have suggestions for future field trips, or would be interested in helping to organize a field trip, please contact us.

### Workshops

Over the past year MDD has been involved as a co-organizer of the computer workshop in Toronto and in planning a computer workshop and structural geology course in Vancouver. We feel that this format, either workshops or courses, allows geologists to continue their education or broaden their knowledge in various fields of geology. MDD executive would appreciate any comments on format and suggestions for upcoming topics. What would you like to learn about? Let us know!

### Publications

A number of publications have been "in the works" for a number of years but for a variety of reasons have not yet been printed. Key among this is a Field Manual and Guidebook for Highland Valley being assembled by W.J. McMillan of B.C. Ministry of Energy, Mines and Petroleum Resources. Work by Bill has been virtually completed and the MDD is finalizing format, advertising, handling, sales, etc. We hope to have the manual published during 1984 but as it is first in a series, unforeseen complications have a habit of cropping up. Other Field Manuals are planned for the coming years.

The MDD also has undertaken an Ore Deposit Models Series for Geoscience Canada. A number of excellent papers were quickly published but production quickly waned and we have had difficulty procuring additional papers.

Geologists involved in the study of mineral deposits generate voluminous new data but pressures of work and lack of encouragement to publish within industry prevents much of this data from being made public. Efforts to coerce publication have not always been successful. Government and university geologists have contributed enthusiastically but frequently lack the detailed information available to industry geologists on many deposits.

MDD sincerely encourages industry geologists to publish in Geoscience Canada, Canadian Journal of Earth Sciences or Special Papers, and will be willing to assist potential authors complete their work.

R.S. Hewton

SECRETARY'S REPORT 1983-1984: J.P. Franzen

Membership

Membership to April 24, 1984 totalled 719. This is an increase of 29 from one year ago.

Executive Meetings

Your executive held meetings on October 25, November 15, December 20, 1983; February 28, April 16, 1984. These meetings resulted in MDD sponsoring, co-sponsoring and planning various activities. 1983-1984 activities are described below:

Technical Meetings/Special Sessions

'Tin-Tungsten Deposits of the Canadian Cordillera', GAC Annual Meeting, May 1983, Victoria.

'Gold Deposits of the Canadian Cordillera', GAC Annual Meeting, May 1983, Victoria.

Mineral Deposits of Northern Cordillera, December 1983, Whitehorse.

'Computer Applications in Mineral Exploration', January 1984, Toronto.

'The Role of Organisms and Organic Matter in Ore Deposition', GAC Annual Meeting, May 1984, London.

'Gold in Iron Formation Sequences', GAC Annual Meeting, May 1984, London.

Field Trips

Nevada Gold Deposits, October 1983.  
Hemlo Gold Deposits, September 1983.  
California Epithermal and Massive Sulphide Deposits, October 1984.

A further five field trips are in the planning stage:

Mexico Skarn and Replacement Deposits, February 1985  
Japan Massive Sulphide Deposits, April 1985.  
Spain-Portugal Mining Districts, April 1986.  
Chile Porphyry Copper and Gold Deposits.  
Brazil Mineral Deposits.

Lectures

Dr. R. Woodall, Western Mining Corp., described Western's philosophy for successful exploration at two lectures in Vancouver, March 1984.

Dr. J. Edmonds, Massachusetts Institute of Technology, spoke on deep sea floor hydrothermal systems in St. John's and Halifax, April 1984.

Publications

Highland Valley Guidebook by W.J. McMillan (in press). A special issue of Economic Geology devoted to Canadian Mineral Deposits.

Your executive encouraged scientists to consider The Canadian Journal of Earth Sciences for the publication of mineral deposits-related research.

Three editions of The Gangue were published during the year. The Gangue continued to keep members fully informed on MDD activities.

Advisory Services

MDD was invited to nominate an appointee to the Technical Liaison Committee of the Geological Branch of the B.C. Ministry of Energy, Mines and Petroleum Resources. This committee will provide the Geological Branch with outside guidance and support.

The Canadian Journal of Earth Sciences requested MDD to supply a number of members to review mineral deposits-related papers. Five members were nominated.

Courses

A structural geology field school for exploration geologists is planned for September 1985.

Duncan Derry Medal

The 1983 medal was presented to Dr. R.W. Hutchinson, University of Western Ontario.

SLATE OF OFFICERS 1984-1985, ELECTED MAY 1984  
Executive Committee

Chairman	Robert S. Hewton Brinco Mining Ltd. 704 - 602 W. Hastings Street Vancouver, B.C. V6B 1P2 (604) 687-2557
Past Chairman	John A. McDonald Esso Resources Canada Ltd. 600 - 1281 W. Georgia Street Vancouver, B.C. V6E 3N6 (604) 664-4023
Vice Chairman	Terence J. Bottrill 192 Weldon Avenue Oakville, Ontario L6K 2H8 (416) 842-2893
Secretary	Jeff P. Franzen Billiton Canada Ltd. 460 - 601 W. Cordova Street Vancouver, B.C. V6B 1G1 (604) 669-5535
Treasurer	Alistair J. Sinclair Dept. of Geosciences University of British Columbia Vancouver, B.C. V6T 2B4 (604) 228-3763
Program Chairman	Donald J. Bachinski Dept. of Geology University of New Brunswick Fredericton, N.B. E3B 5A3 (506) 453-4995
Publications Chairman	A. Lee Barker Lacana Mining Corp. P.O. Box 354, Royal Trust Tower Toronto Dominion Centre Toronto, Ontario M5K 1K7 (416) 367-0840
Editor, The Gangue	Kenneth M. Dawson Geological Survey of Canada 100 West Pender Street, 8 Floor Vancouver, B.C. V6B 1R8 (604) 666-0260
<u>Directors</u>	
1984-87	Ronald H. McMillan Westmin Resources Ltd. 1400 - 25 Adelaide Street East Toronto, Ontario M5C 1Y2 (416) 364-8116
	Richard L. Moore Kidd Creek Mines Ltd. 357 Bay Street, Suite 300 Toronto, Ontario M5H 2T7 (416) 860-6542

Trygve Hoy  
 B.C. Ministry of Energy, Mines  
 and Petroleum Mineral Resources  
 Parliament Buildings  
 Victoria, B.C. V8V 1X4  
 (604) 387-5068

EXPENSES

Gangue-reproduction/mailling	521.21	
Office supplies	903.88	
R. Woodall Lecture	245.00	
bank charges-est'd for April	5.50	1,675.59

Balance, April 30, 1984 \$24,074.25

DUNCAN R. DERRY MEDAL FOR 1985

Tony Naldrett, Don Sangster, Julian Boldy, Dick Hutchinson, Joe Brummer ..... who will be the next recipient of what has become one of the most prestigious awards in economic geology - the Duncan R. Derry medal of the MDD? Now is the time to forward suggestions and specifically nominations for your favourite candidates. However, for them to be considered for the 1985 medal their names and supporting information must reach the Selection Committee before January 31st, 1985.

To assist you in preparing your nomination we have reproduced below the guidelines for awarding the medal. Your nomination should include an introduction to the candidate, a summary of the candidate's accomplishments in economic geology, a curriculum vitae, and any other information at attachments that you think will supplement and enhance the presentation.

**ACT NOW.** Please do not wait until January to contact your fellow members, and do not leave your nomination until the last minute. **START TODAY.**

Nominations for 1985 should be sent to the Chairman of the Selection Committee, Terence J. Bottrill, at 192 Weldon Avenue, Oakville, Ontario, L6K 2H8.

The guidelines are:-

1. The medal may be awarded annually to an outstanding economic geologist who has made major contributions to the science of economic geology in Canada. Nominees should preferably be members of the GAC, and preferably but not necessarily members of the Mineral Deposits Division (MDD).
2. Nominations for the medal are to be made by three members of the MDD, either jointly or by independent submissions. Nominations must be supported by relevant data, such as a curriculum vitae or a letter outlining the nominee's accomplishments, et cetera.
3. Candidates should be recognized for their skill and stature as professional economic geologists, and also by their public contributions to the science. It is acknowledged that publication is the prime but not the only method of spreading scientific information in any discipline.
4. Unsuccessful nominees will be automatically submitted for review in the subsequent two years, and will then be dropped unless renominated.
5. Nominations for the medal may be proposed at any time, but to be considered for a particular year, they must be received by the Chairman of the Selection Committee no later than January 31st. The Chairman of the Selection Committee is normally the Vice-Chairman of the MDD.

CONFERENCE REPORT

Archaean Gold Deposits in Australia; Toronto, May 10, 1984

The Toronto Geological Discussion Group and the University of Toronto's Department of Geology

1984-86

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TREASURER'S REPORT FOR FISCAL YEAR ENDING DECEMBER 31, 1983: A.J. Sinclair

Bank Balance January 1, 1983 \$ 6,388.75

INCOME

Annual Dues	3,082.15
Field Trip, Mexico	4,537.15
Gold Workshop, Calgary	3,200.33
	<u>17,208.38</u>

EXPENDITURES

'The Gangue' Newsletter	\$985.17
Office Supplies	266.90
Advance to T. Bottrill re	500.00
'Computer Applications in Mineral Exploration'	
Duncan Derry Award	95.00
Bank Charges	12.00
Miscellaneous	12.00
	<u>1,866.07</u>

Bank Balance December 31, 1983 \$15,342.31

INTERIM FINANCIAL REPORT JAN. 1-APR. 30, 1984

Bank Balance, January 1, 1984 \$15,342.31

INCOME

Nevada Field Trip	\$5,769.38
Hemlo Field Trip	2,783.58
CAME 1984	1,854.57
	<u>10,407.53</u>

jointly held a seminar on the gold deposits of Western Australia. Organized by James Macdonald of the Ontario Geological Survey, it featured presentations primarily by Neil Phillips of the Department of Geology, University of Witwatersrand and Megan Clark, a graduate student at Queen's University, who studied two Western Australian deposits as a mine geologist for Western Mining. Phillips' visit to Canada included seminars in Timmins and the MDD-sponsored special session 'Gold in Iron Formation Sequences' at the London '84. Ray Goldie, James Macdonald and Neil Phillips are all thanked for their review of the initial draft of this report.

The majority of Australian gold production has come from the gold fields of the Western Australian Archaean shields, starting with Kalgoorlie in 1893.

Two major Archaean blocks are exposed in Western Australia: in the south the 3.8-2.8 Ga Yilgarn Block, and in the north the 3.5-3.1 Ga Pilbara Block. These two blocks are separated by the Proterozoic Hammersley Basin, whose enormous iron formations are totally devoid of gold. Of these two blocks, virtually all of Western Australia's gold production has come from the Yilgarn. Geologists divide the Yilgarn into four provinces: the Western Gneiss (3.8-3.0 Ga), the Murchison (2.9 Ga), the Southern Cross (3.0-2.9 Ga), and the Eastern Goldfields (2.8 Ga). Each province is characterized by a different proportion of iron-formation. For example, iron-formations are abundant in the Murchison and Southern Cross, and the eastern part of the Eastern Goldfields Provinces.

The majority of significant gold deposits are located in the greenstone belts of the Eastern Goldfields, particularly in the Norseman-Wiluna belt. None have yet been found in the Western Gneiss Province.

90% of the Norseman-Wiluna gold production was from deposits in greenschist facies, mafic to ultramafic rocks in the lower part of the stratigraphic sequence. These deposits are associated with regional structural highs and/or anticlinal zones in a rift-environment (Phillips' "rift-phase"), rather than within a volcanic platform environment with greater associated iron-formation.

#### The Kambalda District

The Kambalda district, in the Norseman-Wiluna greenstone belt of the Eastern Goldfields Province, is famous for the nickel sulphide deposits discovered in the 1960's but gold has been mined in the district since the turn of the century.

The Hunt Mine is a typical stratabound nickel sulphide deposit, but with gold veins developed en echelon in tholeiitic basalt stratigraphically underlying the ultramafic host rock to nickel deposits. The veins terminate abruptly at the top of the basalt whether overlain by sulphide or by ultramafic rocks. The basalts are altered to a biotite schist rich in K, Ba and carbonate. Alteration comprises zones of hornblende plus plagioclase, chlorite plus calcite, ankerite, biotite, and closest to the veins, narrow, pyritic selvages. Gold is associated with the biotite, in the quartz veins, and with the pyrite, but is confined to the general zone containing pyritic alteration and associated with the replacement of calcite by ankerite.

The Victory Mine, described by Megan Clark, was discovered in 1981 following a program of diamond drilling beneath old shafts. Initial reserves were one million tonnes of 3 g/t Au. Many different rock types are mineralized, each with a distinctive form and alteration assemblage. The gold is within

tension-gash quartz veins, low angle shears and flat quartz veins hosted by either a relatively thin sedimentary unit within the host volcanic rocks, or a granophyric phase of a differentiated tholeiitic sill. Veins are also developed within a magnetite-albite-quartz rock, and adjacent to porphyritic units which are intensely quartz veined, with grades of about 30 g/t. The veins in the sediment average 8-10 g/t, and do not pass into the enclosing basalt. The low angle shear zones are locally very high grade (60 g/t) and consist of pyrite-carbonate-silica.

#### The Kalgoorlie District

The Kalgoorlie district, also within the Norseman-Wiluna belt, is most famous for the historic Golden Mile deposits and the more recently discovered Mt. Charlotte mine.

The Golden Mile consists of hundreds of old workings over an area of about one mile square, including such famous names as Lakeview and Perseverance. Individual lodes form a series of discrete structures, reminiscent of vein copper districts such as Butte, Montana.

The mineralization is hosted in the Golden Mile Dolerite, a differentiated, tholeiitic layered sill, also in the Paringa Basalt in the footwall of the sill, and the hanging wall carbonaceous sediments known as the Black Flag Beds. The major ore structures are grossly parallel to individual layered units of the sill in plan. The sill is folded into a tight syncline.

The principal alteration is one of widespread and intense carbonatization. A separate style of alteration, consisting of zones of chlorite and carbonate, progressively encloses zones of intense foliation, which host the quartz-vein lodes. The individual lodes cross-cut the granophyre and are ore-bearing across the entire sill and its wall-rocks. Very rich telluride ores, of mineralogical fame, are closely associated with fault slices of Black Flag carbonaceous sediments within the axial zone of the folded sill. Phillips concluded that the alteration was post-folding and shearing, and not related to "seafloor-metasomatism".

Mt. Charlotte Mine. Megan Clark's description noted that the deposit also is hosted by the Golden Mile Dolerite, but is restricted to the granophyric unit bounded within the ophitic units of the dolerite. The mineralization is a series of tension-gash veins preferentially developed within the granophyre as a reflection of its higher competency, between two major boundary shear zones. The deposit is a vein stockwork, grading up to 4 g/t Au, and is mined by open-stopping.

Three phases of veining, early albite-ankerite; main phase quartz-pyrite-pyrrhotite-scheelite; and late, very minor, chlorite are enclosed by a pervasive carbonate-rich alteration assemblage of ankerite-white mica-quartz.

#### The Murchison Province

Mt. Magnet area of the Murchison Province is an example of a district with gold mineralization hosted in banded iron formations. Phillips demonstrated that a similar structural control was evident for gold deposits hosted by banded iron formation as well as many different styles of mineralization. A number of examples were shown of replacement of magnetite beds by pyrite, adjacent to cross stratal veins, fractures and faults. Various epigenetic features were emphasized in the presentation, primarily the substantial similarities seen between deposits in banded iron formations and those seen in other host rocks.

The Big Bell deposit of the Murchison Province was the last to be described and at last brought some satisfaction, if only for a short while, to those in the audience with a distinctly syngenetic bias. This deposit is located within a narrow and isolated greenstone belt, and is at a higher metamorphic grade than the other areas described. The mineralization is a body of pyrite, muscovite, potassium-feldspar and quartz schist high in Sb, Mo and Zn; about 20 m wide, 1500 m deep, and developed along strike for several hundred metres. Inferred alteration consists of the addition of Ba, K, B, S and Au, and loss of Na, with no net loss or gain in Ca and Mg. The altered rocks, like the wall rocks, have been metamorphosed. Presumably, therefore, the Au mineralization is premetamorphic. Previous production was of about 20 tonnes of gold, at a grade of 5 g/t, with an indicated reserve of about 120 tonnes of gold at a similar grade.

The stratabound nature of the deposit, its wall-rock mineralogy, metamorphic grade and trace element association are all similar to those of the recently discovered deposits at Hemlo, Ontario. Although a relatively simple Hemlo-type model of a syngenetic, sea-floor precipitate within felsic volcanics and sediments has been proposed, Phillips suggested that a number of features of the deposit, including mafic rather than felsic host rock composition would indicate that this is perhaps a highly oversimplified concept.

#### Conclusions

With the possible exception of Big Bell, two main features were characteristic of all the gold deposits described: (1) association with major structural zones related to hydraulic fracturing or to regional shear zones; locally controlled by contrasts in the mechanical competency of the host; and (2) the common association of gold deposits with iron-rich particularly high original magnetite, host rocks.

There were a number of points raised in the discussion, particularly regarding some of the arguments for an epigenetic rather than a syngenetic origin for the deposits hosted in banded iron formations and for deposits such as Big Bell and Hemlo.

The meeting concluded with considerable appreciation for the excellent work done and presentations made by both speakers, and a clearer realization of the similarities and differences between the deposits and their settings in the Canadian and Australian Shields.

T.J. Bottrill

#### Computers In Exploration, Vancouver, Nov. 15, 1984

The MDD and the GAC Cordilleran Section jointly sponsored a one-day workshop aimed at informing both exploration managers and personnel on the role of computers in exploration. The Holiday Inn Harbourside provided good meeting facilities for the 190 registered attendees plus 50-60 exhibitors and their employees.

Organizer, B.W. Downing of Newmont provided a wide-ranging technical program that covered hardware, management, geochemistry, drill logging, geophysics, mining, information data files, and practical case histories. Exhibition booths offered hands-on demonstrations and information. A directory was distributed that listed known local commercial computing facilities and systems, and hardware in use by local exploration and mining companies.

Favourable comments on a circulated questionnaire attested to the success of the workshop, and indicated the high probability of its repetition in the near future.

Ken Dawson

#### FIELD TRIPS

##### MDD Field Trip to Skarn and Replacement Deposits of Mexico: February 18-28, 1985 - Second Announcement

The GAC Mineral Deposits Division has organized an eleven-day trip to seven mineral deposits in northern and central Mexico. The deposits exemplify chimney and manto replacement in a limestone host. The predominantly Ag-Pb-Zn deposits show mineralogical and morphological zonation from skarn through replacement to vein assemblages.

The itinerary includes a connecting flight from Mexico, D.F. to Chihuahua, and a chartered bus to transport about forty participants southward through the following mines, back to Mexico, D.F. on Wed., Feb. 27: Santa Eulalia PbZnAg(SnV) and Naica PbZnAg(AuCu); in Chihuahua; Velardena PbZnAg(AuCu) in Durango; San Martin AgPbZn(AuCu) in Zacatecas; Charcas PbZnAg(AuCu) in San Luis Potosi; Zimapan PbZnAg in Hidalgo and La Negra PbZnAg in Queretaro.

The cost, including local transport, accommodation, breakfasts and most lunches, is \$CAN 600.00 excluding Canada-Mexico airfare. Participants from Western Canada are advised to reserve as soon as possible with:

Canada World Travel  
Bob Gallacher, Agent  
3499 Cambie Street  
Vancouver, B.C., V5Z 2W7  
(604) 872-0355

Reservations at Apex rates (\$CAN 399 return) are being made on JAL flight 12, departing Vancouver Feb. 18 at 10:45 AM and arriving non-stop in Mexico, D.F. at 17:40. Reduced add-on rates are available from Air Canada and PWA flights originating in Victoria, Calgary, Edmonton, Regina, Saskatoon and Winnipeg. Participants from elsewhere should connect with Aeromexico Mexico -Chihuahua flight Feb. 18 at 19:40.

Trip reservations will be taken on a first come basis upon receipt of \$CAN 100.00 deposit, cheques payable to GAC Mineral Deposits Division, sent to:

K.M. Dawson  
Geological Survey of Canada  
100 W. Pender Street, 8th Floor  
Vancouver, B.C., V6B 1R8  
(604) 666-0260 or 666-0529

Balance payable by Jan. 23, 1985. Cutoff date for cancellation refunds Jan. 23, 1985. The organizing committee includes Fred Felder (UMEX) and Wim Groeneweg (CANICO) in Vancouver, and Dave Coolbaugh (consultant) and Mark Romoff (Canadian Embassy) in Mexico, D.F.

#### Japan Mineral Deposits Field Trip

The Mineral Deposits Division of Canada has organized a field trip to Japan, April 13-27, 1985. The tour schedule calls for visits to 10 mineral deposits - KUROKO, SKARN, BESSHI, EPITHERMAL GOLD AND HOT SPRING.

Any one person will see 7 deposits plus 2 different recent volcanoes and their associated geothermal fields. Stops at important outcrops in some of the mining areas are also included.

Trip leaders are Dr. Steve Scott, University of Toronto and Dr. Tetsuro Urabe, University of Tokyo. The trip is limited to 30 participants; several seats are still available.

A total trip cost, which includes transport, accommodation and meals, is \$C3400.00 round trip from Vancouver. Participants from elsewhere in North America and those wishing to extend their visit to other points in the Far East could take advantage of low-cost group add-on fares.

J.P. Franzen

Mineral Deposit Field Trip Across Southern British Columbia: April 24 - May 8, 1984

The Department of Geological Sciences, The University of British Columbia, ran their second 5000 km field trip on mineral deposits across southern British Columbia under the direction of Colin Godwin, and assisted by Tryg Hoy and Bill McMillan, BCMMEPR. What a successful trip it was! Our itinerary in 1984 is tabulated below for general information and for those that might wish to join a similar trip in 1986.

DATE	DEPOSIT	DEPOSIT TYPE	TERRANE
Tue Apr 24	Copper Mtn (Hedley)	Alk porp CuAu Skarn Au	Intermont Belt
	Dusty Mac	Epithermal Au	"
Wed Apr 25	Beaverdell	Vein AgAu	Purcell Suprgp
Thr Apr 26	Spar Lake	Clastic CuAg	"
Fri Apr 27	Sullivan	SEDEX PbZnAg Sn	"
Sat Apr 28	St. Eugene	Vein AgPbZn	"
	Midway	Vein Au	"
	Bluebell	Carbonate PbZn	Kootenay Arc
Sun Apr 29	Reeves	Carbonate PbZn	"
	McDonald	PbZn	"
	Sheep Creek (Ymir)	Vein gold	"
Mon Apr 30	Kootenay-Florence	Carbonate PbZn	"
	Dickenson	Vein AgPbZn	"
Tue May 1	Nakusp hot springs	Epithermal S	Omineca Belt
	Thanks-giving	Skarn W	"
Wed Apr 2	Goldstream	Besshi vol Cu	"
Thr May 3	Magnet	Magmatic MG-AP	Intermont Belt
	Afton	Supergene p Cu	"
	Iron Mask	Magmatic SX(?)	"
	Ford	Basalt Flow Cu	"
Fri May 4	Lornex	Calk-alk p CuMo	"
	Valley Copper	Calk-alk p CuMo	"
Sat May 5	BREAK IN VANCOUVER		
Sun May 6	Iron Hill, Argonaut	Skarn Fe	Insular Belt
Mon May 7	Island	High p CuMoRh	"
Tue May 8	Western Mines	Kuroko v PbZnAg	"

Trygve Hoy and Bill McMillan of the BCMEMPR provided excellent framework geology, and Colin Godwin conducted summary discussions on the many mineral deposits that were visited. The trip was particularly exciting because the mineral deposits across this transect of the Canadian Cordillera provide examples of almost all deposit types in a wide range of tectono-stratigraphic settings. It is doubtful if there is a geologic setting anywhere in the world that offers such diversity so conveniently.

The trip is successful not only from a geological point of view. It is also an important forum for discussion and exchange of ideas between the mining industry, the exploration industry, the university, and the provincial government. Some claim it is also a good party!

C.I. Godwin

MDD Field Trip to California Mineral Deposits, October 20-26, 1984

Noting the current interest and involvement in California by Canadian explorationists, the MDD conceived a tour of typical mineral deposits of the central California area. The main objective of the trip, occupying the first four days, was to examine representative Au-quartz vein deposits in the historic Mother Lode belt in the Sierra Nevada foothills. Next to be visited were two massive sulphide deposits in the Foothills Cu-Zn belt, an exhalative Au deposit in the Sierra Nevada west gold belt, and a large placer Au prospect. The final two days included visits to hot spring-related Hg-Au deposits in the Clear Lake (Geysers) geothermal district.

Under the watchful eye of trip organizer Paul Wojdak of Westmin Resources Ltd., Vancouver, the thirty-four participants assembled in San Francisco at a hotel strategically distant from San Francisco's renowned nightclub district. On October 21, the clear headed crew bussed eastward across the Great Valley to the first stops in the southern Mother Lode district, under the guidance of Leslie Landefeld, a graduate student at the University of Western Ontario. Stops included the Melones Spillway - an excellent exposure of Mother Lode stratigraphy; roadcut exposures of host rocks, veins and alteration typical to the Jacksonville district; and a mariposite - altered serpentinite at the mineral type locality in Mariposa County.

Evening talks at Sonora by both Leslie Landefeld and Ralph Lloyd of the California Division of Mines and Geology reviewed the regional geology and mineral deposits, respectively. Mother Lode subterranean, tectonically juxtaposed by convergent plate tectonism in late Paleozoic to middle Jurassic time, include Paleozoic metavolcaniclastics, flows and dykes, and Mesozoic basic and ultrabasic plutons. Most Mother Lode Au-quartz veins are concentrated in a belt one to four miles wide and one hundred and twenty miles long coincident with the Melones fault zone. The belt is the locus of elongate serpentinite bodies, pervasive shearing and cataclasis, and extensive Fe-Mg carbonate-quartz alteration. Mariposite, albite and pyrite commonly accompany Au mineralization.

The tour of the Jamestown district was expertly guided by Peter Dohms of Condor Minerals Management, who also contributed his expertise to subsequent visits. Historic mines visited October 22 included the Harvard, presently undergoing development for open-pit production at 5000t.p.d. in mid-1985 by Vancouver-based Sonora Gold Corp. and ABM Mining Group. Reserves are given at 24.8 million tons averaging 0.065 oz/t Au. Similar geology was noted at the nearby Dutch App mine. The large Carson Hill camp is currently being developed by another Vancouver-based company, Grandview Resources. The Harvard mine, discovered in 1850, is notable for the occurrence of a dense pyritic carbonate - Au ore termed 'ankerite' by Knopf. Recent discovery of gold nuggets in a Jamestown sewer excavation initiated a mini-gold rush in the downtown area.

On October 23, the tour moved north to the Gold Cliff deposit at Angels Camp, an old open pit Au-quartz deposit under exploration for bulk tonnage potential by Northair Mines Ltd. of Vancouver and North Cal. Developments. Our next visit was the old Penn Mine at Campo Seco, west of the Mother Lode belt, in the Cu-Zn belt of the Sierra foothills, a small (1 million ton) Kuroko-type Zn Cu Pb Ag massive sulphide deposit hosted by the upper Jurassic Amador bimodal calcalkalic volcanics. The last visit of the day was the Big Canyon gold deposit of Gold Fields Mining Corp. near Shingle Springs, in the Sierra Nevada west gold belt. An exhalative origin is proposed for the large, low grade deposit (20-30 million tons of 0.1 oz/t Au) hosted by Paleozoic ferruginous chert and tholeiitic basalt.

After a pleasant stay in the antique National Hotel in the restored mining town of Nevada City, the tour visited the large San Juan Ridge placer gold deposit being caisson-drilled by Placer Services Corp. (St. Joe Minerals). Three thick gold-bearing gravel horizons of the Eocene Yuba River rest on weathered Mesozoic granite. A luncheon visit to Empire Mine State Park at Grass Valley allowed participants to view Newmont's intricate mine model of this extensive camp that produced \$130 million in Au between 1850 and 1956. Several systems of quartz-carbonate veins occur within a Mesozoic sequence of greenstone, serpentinite and granodiorite.

In the afternoon of Oct. 24, the tour moved 20 miles west to the Western World massive sulphide deposit of Nevcan (Corp. Falconbridge Copper) at the northern end of the Foothills Cu-Zn belt. Hosted by mafic basalt flows of the upper Jurassic Smartville Complex, the two ore lenses total 1,533,000 tons averaging 2.81% Cu, 0.95% Zn and 0.013 oz/t Au.

Participants were given an evening lecture by Carl Nelson of Cimarron Exploration, Lakewood Colorado on the geology and origin of the Clear Lake district geothermally related Hg-Au deposits, particularly Homestake's McLaughlin Ridge open pit Au deposit. On October 25, the group visited Sulphur Bank, the world's largest mineral deposit directly related to hot springs: 4.7 million kg of recovered Hg plus 2 million tons of sulphur mined before 1900. Quaternary andesites and lacustrine sediments and underlying Franciscan clastics are impregnated with cinnabar below the ambient water table, down to a depth of 100m (and 120°C.) below which HgS does not form. Carbon dioxide bubbles actively in the adjacent lake (pH3.5), while pyrite and native S sublimate from gas vents along the shoreline.

A midday visit to the old Manzanita Hg(Au) mine at Wilbur Springs allowed examination of a fossil hot spring deposit in NW-trending fault zones cutting upper Jurassic Knoxville sandstone and shale adjacent to serpentinite bodies. Cinnabar, metacinnabar, marcasite, pyrite and minor gold are associated with siliceous sinter (opal chalcedony and quartz) calcite, magnesite, native S, petroleum and hydrocarbon gases. Some recent hot spring activity of another kind was observed at Wilbur Springs Resort where those brave enough to soak in the mercury-charged waters were rewarded by the delightful company of several California nymphs.

The defunct Hg mines of the large Oat Hill district were visited by a rejuvenated group in the afternoon. Cinnabar, pyrite and minor gold with quartz, calcite, manganosiderite and hydrocarbons fill fractures in kaolinized Franciscan sandstone.

On the morning of the last day, October 26, the tour stopped at a roadfill locality adjacent to Homestake's McLaughlin Au mine, since a visit to the deposit could not be arranged. Reserves are estimated to be greater than 20 million tons averaging 0.16 oz/t Au. The open pit will commence mining in 1985 at 3000 t.p.d.. Located in the Knoxville Hg district, the Au deposits occur in sediments of the Great Valley sequence, altered to silica-carbonate along contacts with serpentinite; and in basalts and tuffites of Late Tertiary to Quaternary age, where the host rock was explosively brecciated at geothermal vent sites.

The field trip wound up with a tour of the Sterling winery in Napa Valley enroute to San Francisco, capped by a gourmet lunch with ample supplies of the local product. All present expressed their sincere thanks to the hard working organizers, expert guides and cooperative mining company personnel who combined to make the trip an outstanding success.

Ken Dawson

Planned MDD Field Trips  
Mining Districts of Spain-Portugal, mid-April, 1986

A 16-day trip is currently being organized to visit the following districts: Panasqueira W, Rubiales Zn-Pb, Pyrite Belt Cu-Zn-Au, Almaden Hg and Salave porphyry Au.

Those interested should contact either:

H. Scott Swinden  
Dept. of Mines and Energy,  
P.O. Box 4750  
St. John's, Newfoundland A1C 5T7  
(709) 737-2769

-Or-

I.A. Paterson,  
Cominco Ltd.  
700-409 Granville St.  
Vancouver, B.C. V6C 1T2  
(604) 682-0611

Mineral Deposits of Brazil, November, 1986

An 11-day trip to deposits hosted by Archean to Proterozoic rocks of the Brazilian Shield is in the early planning stage. Proposed visits include deposits of Au, Cu and Cr in the north near Salvador, and Au, Fe and P in central Brazil near Belohorizonte. For additional information contact:

Luca Riccio,  
Anaconda Canada Exploration Ltd.  
1600-1500 West Georgia St.  
Vancouver, B.C. V6G 2Z6  
(604) 688-4474

SYMPOSIA

GAC/MAC/CGU Ottawa'86: Symposium on Sediment - Hosted Stratiform Copper Deposits

The MDD is sponsoring a symposium to be held prior to the technical sessions of the Annual Meeting, on May 17-19, 1986. Field trips are planned to Spar Lake - White Pine and Poland - Germany. Technical sessions will include papers on copper deposits in North America, Europe, Australia, Africa, USSR and China. Contributions on tectonic settings, fluid migration and genetic models are being sought. Proceedings will be published as a GAC Special Paper.

Inquiries should be addressed to the MDD representative on the Organizing Committee:

Dr. Giles R. Peatfield  
Kidd Creek Mines Ltd.  
300-357 Bay Street  
Toronto, Canada M5H 2T7  
(416) 860-6534

Ottawa'86: Special Session on the Hemlo Gold Deposit

The MDD is sponsoring a symposium on Hemlo which will include presentations on the regional geology and metallogeny, deposit setting, geophysics, geochemistry, mineralogy and isotope geology. The objective is a comprehensive documentation of deposit data to assist exploration for the deposit type in other greenstone belts, and to evaluate existing genetic models.

About two-thirds of the program will be by invitation. Authors are requested to submit manuscripts after the meeting for a planned Special Volume. Those interested should contact session organizer Dr. Keiko Hattori, Department of Geology, University of Ottawa, Ottawa Ontario K1N 6N5 Tel: (613) 231-2921.

CIM Geology Division; Conference on Granite-Related Mineral Deposits: Geology, Petrogenesis and Tectonic Setting, Halifax, Sept., 1985

This international symposium scheduled for Halifax, N.S. September 14-22, 1985 will highlight recent advances in the genesis of granite-hosted mineral deposits by bringing together a diverse international group of economic geologists, petrologists and volcanologists. Invited papers will focus on the interrelationships of felsic plutonic and volcanic environments, crystallization mechanisms, volatile complexing and the origin, concentration, transportation and precipitation of lithophile metals such as Sn, W, Mo, Ta, REE etc. Individual descriptions will include examples of major endocontact Sn-W deposits, Climax-type Mo deposits, topaz rhyolites, vein-type Sn-W deposits, skarns and deposits associated with alkalic complexes.

Field excursions tentatively include visits to the East Kemptville tin mine, the South Mountain Batholith in Nova Scotia, the Mount Pleasant W-Mo mine and the Lake George Sb mine in New Brunswick.

In addition to the invited papers, other contributions are welcomed subject to critical review. Provisional titles should be submitted to R.P. Taylor by Dec. 15, 1984. Conference proceedings will be published in a special conference volume.

For further information concerning this symposium, please contact:

Dr. R.P. Taylor  
Department of Geology  
University De Montreal  
CP 6128 Succ.A  
Montreal, Quebec, Canada  
H3C 3J7  
514-343-7542

-Or-

J.M.G. Richardson  
Department of Geology  
Ottawa Carleton Geoscience Ctr.  
Carleton University  
Ottawa, Ontario, Canada  
K1V 5B6  
613-231-2630

CIM Geology Division Symposium "Gold in the Western Shield, Saskatoon, Sept. 1985

The symposium organized by the Saskatoon section, CIM Geology Division, will be held September 9 & 10, 1985 at the Ramada Renaissance Hotel, Saskatoon, Saskatchewan.

Technical sessions will include:

geological settings and exploration signatures of gold deposits in the region, gold exploration techniques, and theoretical aspects of gold deposit genesis.

Field Trips are proposed to:

Northwest Territories: (Cullaton, Lupin, Salmita) deposits September 7 & 8, and Saskatchewan: La Ronge gold belt, September 11 & 12.

Call for Papers:

All interested authors should submit subject area and title to:

Lloyd A. Clark  
Technical Chairman  
c/o SMDC  
122 - 3rd Ave. N.  
Saskatoon, Sask.  
S7K 2H6  
(or Phone: 306-664-6843)

To receive future mailings regarding the symposium and excursions, contact:

Brian Larrivee  
c/o Claude Resources Inc.  
P.O. Box 7380  
Saskatoon, Sask.  
S7K 4E4  
(or Phone: 306-665-7505)

## ANNOUNCEMENTS

### THE CHARLIE NEY VISITING LECTURESHIP

The purpose of the Ney Lectureship, which is sponsored by the Cordilleran Section of the Geological Association of Canada, is to bring prominent earth scientists to Vancouver's large geological community made up of exploration, government and university geologists. The lectureship is aimed at, but is not restricted to, those on sabbatical leave and is aimed at, but is not restricted to, those on sabbatical leave and is tenable for 3 months beginning at any time from September, 1985 to February, 1986. It will carry an honorarium of \$8,000 and office facilities will be available at the University of British Columbia and the Geological Survey of Canada. The Ney Lecturer will be expected to contribute lectures to a pertinent course or courses at the University and to conduct a short course or series of lectures for the downtown mineral exploration community. Applications or nominations should be received by Paul L. Smith (President of the Cordilleran Section, Geological Association of Canada, P.O. Box 398-Station A, Vancouver, B.C., V6C 2N2 before March 30th, 1985.

### ACKNOWLEDGEMENT

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