

# The Gangee



## GAC - Mineral Deposits Division Newsletter

Issue 37

October 1991

### Middle Valley Sulphide Discovery!

*Data compiled from ODP news release, and  
MDRU News - UBC*

The Ocean Drilling Ship *Joides Resolution* discovered significant massive sulphides during Leg 139 of the Ocean Drilling Program (ODP), August and early September 1991. This new discovery occurred in Middle Valley, Juan de Fuca Ridge, just off the west coast of Vancouver Island, British Columbia. This leg is particularly important for economic geologists as it examined an area of hydrothermal venting and sulphide precipitation.

Preliminary research results of the drilling were presented at a post-cruise meeting held in Victoria on September 12 and 13th. Jim Franklin, GSC-Ottawa, provided a fascinating description of the geological environment of Middle Valley and its associated sulphides. Drill core examples of sulphides and sediments, intersected during Leg 139, were on display at the meeting.

Middle Valley is a sedimented ridge crest at the north end of the Juan de Fuca ridge system. It is dominated by the influx of sediments from the Queen Charlotte basin to the north and the Fraser delta to the south. Several holes were drilled on the valley margin, hills in the central part of the valley, and on a sulphide mound which has a strike length of over 200 metres.

The valley consists of a sill-sediment complex. The sills, which are up to 40 metres thick, range from primitive picrites to fractionated suites of basalt to dacite and appear to be different in each hole. The base of this complex was not reached even in the deepest hole at 950 metres below the sea floor.

A series of holes were drilled in the sulphide mound; two deep holes intersected massive sulphide throughout their length to 65 and 95 metres respectively where drilling was terminated due to drilling problems. The thickness of the sulphides were a major surprise and imply the presence of a

fault-bounded basin below the mound. The upper part of the sulphides consist of pyrrhotite containing up to 1.5 per cent copper and up to 5 per cent zinc. At greater depth sulphide character changes to pyrrhotite-pyrite with appreciable magnetite, low metal values, and local zones of colloform pyrite and white silica.

Late stage alteration has locally formed magnetite and hematite in some samples and apparently resulted in removal of some sphalerite from the upper part of the deposit. Magnetite and hematite alteration decreases with depth, resulting in increasing amounts of primary mineralization with higher zinc and copper values. Only rare fragments of altered sediment are contained in the massive sulphide, suggesting that most or all of the massive sulphide was deposited above the sea floor. The lack of minerals rich in elements such as lead, arsenic and antimony, which are typically enriched in sediment-hosted sulphide deposits, suggests the major source of metals may be the basaltic basement.

The material has a remarkable range of textures, including coarse recrystallized intergrowths normally associated with metamorphosed massive sulphide deposits. The deeper parts of the holes intersected a pyrrhotite-dominant assemblage.

Leg 139 has been an outstanding success: it documented the existence of major accumulations of base-metal bearing massive sulphides in a ridge-crest environment which has an excellent chance of preservation. The predominance of sills and their petrological variety indicate the volcanically active nature of the ridge, the introduction of magmas from several sources, and the probable presence of a fractionating magma chamber beneath the ridge.

The ODP results have already provided a new impetus for volcanogenic massive sulphide research at the Mineral Deposit Research Unit at UBC. British Columbia contains several types of VMS deposits which span an age range of at least Cambrian to Jurassic. Middle Valley adds new variety and extends the age range to the present.

Detailed descriptions of the research from Leg 139 will be forthcoming in ODP reports and other publications.

### Ghana Privatizes Diamond Industry

*Information courtesy of:  
Ontario Ministry of Development and Mines*

Ghana will privatize its diamond mining industry. Ghana Consolidated Diamond (GCD) will form a joint venture with Inco to mine, and with Lazare Kaplan of New York to polish and market stones from a concession 110 kilometres northwest of Accra. Annual diamond production currently ranges between 100 000 and 200 000 carats per year with 15 to 20 per cent gem content.

### Ternary Plots Using Lotus 1-2-3

*Dr. Jean M. Richardson  
Ontario Geological Survey*

Triangle.WK1 is a LOTUS 1-2-3 template program which recalculates the values of three elements into triangular coordinates, allowing plotting of the triangle graphs or ternary plots used in geological classification schemes. The graphing capabilities of LOTUS 1-2-3 are used to draw the diagram on which the data are plotted. The blank triangular diagram provided can be modified to include the field boundaries and apex labels of any classification scheme. Five are included: two for sandstones (Folk, 1968; Dott, 1984), one for felsic plutonic rocks (Streickeisen, 1976), one for ultramafic rocks (IUGS, 1973) and one for volcanic rocks (Jensen, 1976). This program was originally published in GEOBYTE (Mustard and Richardson, 1990; Feb. 1990, 1-7)

As a service to potential clients and the geological community, this program and a Geobyte reprint are available from the Geoscience Laboratories, Ontario Geological Survey, Ministry of Northern Development

and Mines, for either LOTUS 1-2-3 (V2.01 or 3) on submission of 5.25 or 3.5 inch, high or low density diskettes. There is no copying charge, however, the following conditions apply:

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If you would like to obtain the program, please photocopy the above conditions, sign that you agree to abide by them as written, and send the appropriate sized diskette to:

Dr. Jean M. Richardson  
Spectroscopy Subsection  
Geosciences Laboratories  
Ontario Geological Survey  
77 Grenville Street, Toronto  
Ontario, Ont., M7A 1W4  
Tel: (416) 965-1337

## Ontario's Base Metal Reserves

*Modified from information supplied by:  
Ontario Ministry of Development and Mines*

Ontario's base metal reserves may be in trouble. At current production and discovery rates some base metal reserves will be depleted by the end of this century.

It is estimated that, at the current rate of production, zinc reserves in Ontario may be completely gone by about the year 2000, and copper and nickel reserves by 2015 to 2020.

The length of time from discovery, through delineation, feasibility studies, and finally development of the deposit, can be up to eight years. Thus, an 'exploration window' can be identified by counting back eight years from the projected complete depletion of the reserves base. This means that the exploration

window for zinc is just about closed, and the window for nickel and copper exploration will close by as early as 2010.

Compare this scenario with that for gold. Due to high gold prices, and the discovery of the Hemlo gold camp, mineral exploration in Ontario during the 1980s was directed almost exclusively toward gold. As a result, Ontario tripled its gold reserves from 298 tonnes in 1981 to 1017 tonnes in 1989. This camp can still give rise to major developments and to demonstrate, Hemlo Gold Mines Inc.(60%) and Freewest Resources Inc.(40%) are expected to release the results of a feasibility study of the Lightning Zone, a 5.25 million tonne 0.24 ounce per tonne gold deposit, 60 kilometres east of Matheson. A decision to proceed to an advanced exploration project involving underground development is expected.

Falconbridge Exploration is one of the companies trying to improve base metal reserves and has commenced drilling a 1.5 kilometre diamond-drill hole to test the Wanapitei (or Temagami) geophysical anomaly located 50 kilometres northeast of Sudbury. The drilling is based on airborne geophysical and ground seismic surveys. This is the first drill investigating of the mineral potential of an anomaly similar in size and character to the anomaly associated with the Sudbury Basin.

In addition Inco recently announced (Sept. 30, *Northern Miner*) the discovery of the Victor, Ni-Cu orebody, on the east rim of the Sudbury Basin, with an inferred potential of 20 to 40 million tonnes. The initial intersections grade in the order of 1.5 to 2.6 per cent nickel and 5.1 to 7.4 per cent copper with 0.2 to 0.5 ounces per ton precious metals.

This information indicates, of course, that the Canadian mining industry, given reasonable access to the land-base, an up-to-date geoscience database, a stable political environment, equitable taxation and access to markets, can sustain acceptable metallic-mineral reserves.

## Ore Deposits Workshop '91 University of Toronto

The Department of Geology, University of Toronto, is offering a renewal of its well known and popular Ore Deposits Workshop which was held annually from 1975 to 1984. The workshop will take place at the new Earth Sciences Centre in December 1991.

Emphasis will be on the characteristics of a range of ore deposits, and new developments in exploration for which special expertise exists at the University. Sessions will include both

## The Ganguie, No. 37 October, 1991

*The Ganguie* is published quarterly by the Mineral Deposits Division, GAC, and is distributed to all members of the MDD as part of their membership fee.

### Publication Schedule:

SUBMISSION DEADLINE	PUBLICATION DATE
December 15	January
March 15	April
June 15	July
September 15	October

### Information for contributors:

The objective of this newsletter is primarily to provide a forum for members and other professionals to voice new ideas, describe interesting mineral occurrences or expound on deposit models. Articles on ore deposits, deposit models, news events, field trips, book reviews, conferences or other material which may be of interest to the economic geology community are welcomed. Reprints of presentations given to companies, mining groups or conferences are particularly welcome.

Manuscripts should be submitted on 5 1/4" or 3 1/2" IBM-formatted diskettes in any major word processor format. A printed version should be included. Illustrations should be in camera-ready format; photos should be of good quality. Short items dealing with news events or meetings should be submitted by FAX or mail.

All contributions may be edited for clarity or brevity.

Brian Grant  
Editor - *THE GANGUE*  
c/o P.O. Box 8076  
Victoria, B.C. V8W 3R7  
Tel: (604) 356-1693 FAX: (604) 356-7413

\* \* \*

*The MDD encourages all geologists to join the division and contribute to the various programs and activities.*



lectures and hands-on laboratory study.

**Program:**

- December 11 - 12th  
**Ni-Cu Sulphide and Pt Deposits**  
*A.J. Naldrett*
- December 12 - 13th  
**VMS Deposits**  
*S.D. Scott*

Registration fees for the workshop will be \$600. Further information may be obtained from:

Professor A.J. Naldrett  
Ore Deposits Workshop  
Dept. of Geology  
Earth Sciences Centre  
University of Toronto  
Toronto, Ontario, M5S 3B1  
Tel: (416) 978-3030 FAX (416) 978-3938

## MEETINGS, WORKSHOPS & FIELDTRIPS

*{Editor's Note: If you are sponsoring or are aware of a meeting or event of potential interest to economic geologists please FAX me a note at (604) 356-7413 so that it may be included in the next issue of The Gangue. Notices must include a contact address or phone number. Thanks!}*

### OCTOBER 1991

- 6 - 10 **SOCIETY OF EXPLORATION GEO-PHYSICISTS, ANNUAL MEETING.** New Orleans, LA. Contact: Convention Assistant, SEG, P.O. Box 3098, Tulsa, OK, USA 74101.
- 21 - 24 **SOCIETY OF ECONOMIC GEOLOGISTS/GEOLOGICAL SOCIETY OF AMERICA ANNUAL MEETING.** San Diego, California. Details: Michael A. McKibben, SEG Program & Fieldtrip Chairman, Dept. of Earth Sciences, 2413 Geology Bldg., University of California, Riverside, CA 92521-0423. Tel: (714) 787-3444 FAX (714) 787-4324.

### NOVEMBER 1991

- 4 - 8 **ALASKA MINERS ASSOCIATION ANNUAL CONVENTION AND TRADE SHOW.** Anchorage, Alaska. Details: AMA, 501 W. Northern Lights Blvd., Suite 203, Anchorage, AK 99503. Tel: (907) 276-0347 FAX (907) 278-7997.
- 2 - 12 **3rd SYMPOSIUM AND WORKSHOP ON RARE METAL GRANITOIDES (IGCP Project 282) and 7th REGIONAL CONGRESS ON GEOLOGY, MINERAL AND ENERGY RESOURCES OF SOUTHEAST ASIA (GEOSEA VII).** Bangkok, Thailand. Contact: Dr. S. Nakapadungrat, Symposium Secretary, Geological Survey Division, Dept. of Mineral Resources, Rama VI Road, Bangkok 10400, Thailand.
- 18 - 21 **ORE DEPOSITS AND MINERAL EXPLORATION POTENTIAL OF THE**

## 1991-1992 MDD EXECUTIVE

Following are MDD Executives and Directors for the 1991-1992 term, as of June 27, 1991. Please contact any of these individuals for enquires or to suggest initiatives for MDD.

<b>Chairperson:</b> Andy Fyon	Ministry of Northern Development and Mines OGS Advance Office 200 Brady Street, 6th Floor, Mail Bag 3000, Sudbury, Ontario, P3A 5W2 Tel. (705)675-4441 FAX (705)675-6473
<b>Past-Chairperson:</b> Ed Debicki	Inco Exploration and Technical Services, Inc. Field Exploration Building Highway 17, Copper Cliff, Ontario, P0M 1N0 Tel. (705)682-8452 FAX (705)682-8243
<b>Vice-Chairperson:</b> James Macdonald	Mineral Deposit Research Unit Department of Geological Sciences, UBC 6339 Stores Road, Vancouver, B.C., V6T 1Z4 Tel. (604)822-4563 FAX (604)822-6088
<b>Secretary:</b> Michael Gray	Falconbridge Limited (Exploration) 1977 McKenzie Rd, General Delivery, R.R.#2 Chelmsford, Ontario, P0M 1L0 Tel. (705)855-0313/0314 FAX (705) 855-0333
<b>Treasurer:</b> Robert Catbro	Cathro Exploration Corp. 450 A West 6th Street North Vancouver, B.C., V7M 1K9 Tel. (604)986-1338 FAX (604)926-0744
<b>Publications:</b> Pat Sheahan	c/o Konsult International Inc. 44 Gemini Road, Willowdale, Ont., M2K 2G6 Tel. (416)223-7750 FAX (416)223-7750
<b>Newsletter Editor</b> Brian Grant	Editor - <i>The Gangue</i> Box 8076 Victoria, British Columbia, V8W 3R7 Tel (604) 356-1693 FAX (604) 356-7413
<b>Program Chairman:</b> Wollfville '92: Al Sangster  Edmonton '93: Roger Morton (1991 - 1994)	Mineral Resources Division Geological Survey of Canada, 601 Booth Street Ottawa, Ontario, K1A 0E8 Tel. (613)992-8603 FAX (613)996-9820  Department of Geology 1 - 26 Earth Sciences Building, U of A Edmonton, Alberta, T6G 2E3 Tel. (403)492-5395/3265 FAX (403)492-2030
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<b>Roger Morton (1991 - 1994)</b>	University of Alberta, Edmonton, Alberta Tel. (403)492-5395/3265 FAX (403)492-2030
<b>Tom Schroeter (1991 - 1994)</b>	B.C. Geological Survey Branch, Vancouver, B.C. Tel. (604)660-2812 FAX (604)775-0313

SOVIET UNION. Symposium in Golden, Colorado, USA. Sponsored by SEG - Student Chapter, Colorado School of Mines. For information contact: Poul Emsbo, Symposium Chairman, Tel: (303) 273-3859, or c/o Colorado School of Mines, Golden, Colorado 80401, USA.

18 - 21 **MODERN STRUCTURAL GEOLOGY IN MINERAL EXPLORATION.** Short Course #7 - Mineral Deposit Research Unit. Presented by Dr. Ken McClay, Dr. Tom Calon & Dr. Alasdair Pope. For further information or registration contact: Dr. John Thompson, Director, MDRU, Dept. of Geological Sciences, UBC, 6339 Stores Road, Vancouver, B.C., V6T 1Z4. Tel: (604) 822-5149 FAX (604) 822-6088.

26th **CANADIAN MINERAL OUTLOOK CONFERENCE.** Westin Hotel, Ottawa, Ont., Canada. Details: Sharon Tipper, Mineral & Metal Commodities Br., EMR Canada, Rm 629, 460 O'Connor Street, Ottawa, Ontario, K1A 0E4. Tel: (613) 992-5199 FAX (613) 992-5893.

#### DECEMBER 1991

6 - 9 **NORTH WEST MINING ASSOCIATION ANNUAL MEETING.** Spokane, Washington, U.S.A. One of the year's highpoints! Details: NWMA, 414 Peyton Bldg., Spokane, WA 99201. Tel: (509) 624-1158.

9 - 11 **14th ANNUAL, ONTARIO GEOLOGICAL SURVEY GEOSCIENCE RESEARCH SEMINAR.** Toronto, Ontario. Contact: T. Chin, OGS, 11th Floor, 77 Grenville Street, Toronto, Ont. M7A 1W4. Tel: (416) 965-1546.

11 - 13 **ORE DEPOSITS WORKSHOP '91.** University of Toronto, Toronto, Ontario. Contact: Dr. A.J. Naldrett, Dept. of Geology, Earth Sciences Centre, U of T, Tel: (416) 978-3030 FAX (416) 978-3938.

## The Gangue

### New Address!

Please note the following new addresses for submitting information to *The Gangue* newsletter:

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553 Superior Street, Room 207  
Victoria, British Columbia, V8V 1X4

Telephone: (604) 356-1693  
FAX: (604) 356-7413

#### MAY 1992

25 - 27 **GAC/MAC ANNUAL MEETING, WOLFVILLE '92.** Contact: A. Fricker, Atlantic Geoscience Centre, Bedford Institute of Oceanography, P.O. Box 1006, Dartmouth, N.S. Tel: (902) 426-6759.

#### JANUARY 1992

28 - 31 **1992 CORDILLERAN ROUNDUP.** Hotel Vancouver, Vancouver, B.C. Major annual meeting of industry, government and the B.C. & Yukon Chamber of mines. For further information contact: Jack Paterson, BC & Yukon Chamber of Mines, 840 West Hastings St., Vancouver, BC, V8C 1C8. Tel: (604) 681-5328 FAX (604) 681-2363.

#### MARCH 1992

29 - April 1 **PDAC Annual Convention.** Royal York Hotel, Toronto, Ontario. For further information contact the Prospectors and Developers Association, 74 Victoria Street, Suite 1002, Toronto, Ontario, M5C 2A5.

#### MAY 1992

25 - 27 **1992 GAC/MAC ANNUAL MEETING.** Wolfville, Nova Scotia. For information contact: Aubrey Fricker, Atlantic Geoscience Centre, Bedford Institute of Oceanography, Box 1006, Dartmouth, Nova Scotia, B2Y 4A2. Tel: (902) 426-6759.

#### APRIL 1993

17 - 20 **INTEGRATED METHODS IN EXPLORATION & DISCOVERY.** 1993 conference in Denver, Colorado. sponsored by Society of Economic Geologists, Society of Exploration Geophysicists, Assoc. of Exploration Geochemists and the U.S. Geological Survey. For information contact: Richard L. Nielsen, 13741 Braun Drive, Golden, Colorado 80401, USA. Tel: (303) 279-3118, FAX (303) 674-3885.

#### MAY 1993

17 - 19 **EDMONTON 1993. GAC/MAC Annual Meeting.** Edmonton, Alberta. Scheduled for the University of Alberta.

## GEOLOGY OF AUSTRALIA 1:2 500 000-scale Digital Map

The National Resource Information Centre (NRIC) and BMR have produced a digital version of the 1:2 500 000-scale map 'Geology of Australia' (published in 1976) suitable for inclusion in your spatial information system. The creation of this dataset was facilitated by the Australian National Parks and Wildlife Service.

The dataset comprises five layers scanned directly off the printing layers used in printing the original map. These are:

- bedrock geology, stratigraphic letter symbols, coastline (topographically structured)
- Cainozoic cover (arcs only)
- faults (arc only)
- structures (arcs only)
- lakes (topologically structured)

The 9 Megabyte dataset is available in ARC/INFO format, and is made available to promote the wide and cost effective use of digital data in the analysis and presentation of natural resource information. Enquiries about other formats are welcomed.

The cost for the dataset is A\$200 plus postage & handling charges of A\$20 (overseas) or A\$15. Further information may be obtained from:

Ian McNaught  
National Resource Information Centre  
PO Box 858, Canberra  
Australia 2601

Tel: (06) 272-4688 FAX (06) 272-4687

## ESKAY CREEK, B.C. GEOCHEMISTRY & ALTERATION

By Art Ettliger & Tina Roth - MDRU/UBC  
Abstract reprinted from GSA Meeting '91

The Eskay Creek massive sulphide deposit contains a published geologic reserve of 3.95 million tonnes grading 26.40 grams per tonne gold and 998 grams per tonne silver. This resource is divided between the 21A and 21B ore zones which are contained by similar host lithologies but have differing ore mineralogies, gold grades and trace element content. The bulk of reserves are contained within the 21B zone which is being evaluated for production.

The 21A zone is hosted by bimodal volcanic and sedimentary rocks of the Lower Jurassic Hazelton Group. Intercalated andesitic to basaltic flows, hyaloclastite breccia and argillite form the hangingwall to the deposit. At the base of this formation gold-bearing semi-massive sulphide mineralization is contained in a sequence of black argillites, up to 40 metres thick. Footwall rocks are intensely altered and are host to stockwork and disseminated sulphide and gold mineralization. However, abundant devitrification features, high SiO<sub>2</sub> contents (76.8-84.4 wt%), Nb:Y versus Zr:TiO<sub>2</sub> trace element patterns, and the presence of rare quartz eyes, suggest these rocks were originally rhyolites.

Volcanic rocks in the immediate hangingwall exhibit weak propylitic alter-

**Mineral Deposits Division – Geological Association of Canada  
ANNUAL MEETING – 25 - 27 MAY 1992  
Acadia University, Wolfville, Nova Scotia**

**TOPICS OF INTEREST TO  
MINERAL DEPOSITS GEOLOGISTS**

The GAC/MAC Organizing Committee for the WOLFVILLE '92 meeting has prepared a program of oral and poster presentations, short courses and field trips that will be of interest to mineral exploration and mineral deposits geologists.

**SPECIAL EVENTS WILL INCLUDE THE MINERAL DEPOSITS  
DIVISION AWARDS LUNCHEON ON WEDNESDAY MAY 27.**

*Mineral Deposits Division sponsorship is indicated by: (MDD).*

**Special sessions:**

Abstracts Deadline: Jan.15,1992

- **Organic carbon, carbonaceous sediments, and their role in metal concentration and mineral deposit formation (MDD).**  
*Al Sangster, Geological Survey of Canada.*
- **Three sessions on mineral deposits and metallogeny of the Appalachian Orogen (MDD):**
  - **I. Base metal deposits - including recent developments in the Bathurst mining camp;**
  - **II. Precious metal deposits;**
  - **III. Granophile element deposits.**

*Al Sangster, Geological Survey of Canada; H.S. Swinden, Newfoundland Geological Surveys Branch; S.R. McCutcheon, New Brunswick Geological Surveys Branch; J. Slack, United States Geological Survey.*

**General Sessions:**

A number of general sessions on topics related to mineral deposits are anticipated for abstracts not specifically submitted to special sessions.

**Short Courses:**

- **ORGANIC PETROLOGY - its principles, methods and applications.**  
*R.M. Bustin, University of British Columbia; A.R. Cameron, W.D. Kalkreuth, Institute of Sedimentary and Petroleum Geology; M.P. Avery, Atlantic Geoscience Centre; J. Potter, Calgary.*
- **LOW-TEMPERATURE THERMOCHRONOLOGY.**  
*M. Zentilli, P. Reynolds, Dalhousie University.*
- **GEOPHYSICAL INTERPRETATION.**  
*M.E. Best, Pacific Geoscience Centre; B.D. Loncarevic, Atlantic Geoscience Centre.*

**Poster Presentations:**

The organizing committee will be enhancing the poster presentation sessions by scheduling dedicated prime time daily for viewing and discussions with authors. They hope that this will encourage the submission of posters and relieve possible pressure on oral presentation space.

**Pre-meeting Field Trips**

- **Economic geology of industrial minerals in the Windsor Group in Nova Scotia and New Brunswick (4 days).**  
*G. Adams, R.C. Boehner, D.C. Carter, J. Fowler, T. Webb.*
- **Gold mineralization in western Newfoundland (4 days).**  
*B. Dubé, H.S. Swinden, M. Wilson, K. Lauzière.*
- **Granite-related mineral deposits of Mount Pleasant and the Saint George Batholith (2 days).**  
*W.D. Sinclair, S.R. McCutcheon, M.J. McLeod.*
- **Oolitic ironstones of the northern Appalachians (2 days).**  
*G.M. Yeo.*

**Post-meeting Field Trips**

- **Carboniferous coal basins of Nova Scotia (5 days).**  
*J.H. Calder, M.R. Gibling, P. Hacquebard, R. Naylor, L. Ferguson.*
- **Granite and metasediment-hosted mineral deposits of southwest Nova Scotia (4 days).**  
*G. O'Reilly, D. Koniak, M. MacDonald, M.C. Corey.*
- **Massive sulphide deposits in northern New Brunswick (2 days).**  
*C.S. van Staal, J. Langton, W. Luff, S.R. McCutcheon.*
- **Mineral deposits of Nova Scotia (5 days).**  
*M.C. Graves.*
- **Scandinavian mineral deposits (MDD, 15 days).**  
*S. McLean.*

\* \* \* \*

A "Second Circular" with full details of the program will be sent to all GAC/MAC members in November. Non-members can get a copy by writing to Aubrey Fricker at the address below.

**Aubrey Fricker** Secretary, Organizing Committee  
c/o Atlantic Geoscience Centre  
Geological Survey of Canada  
P.O. Box 1006, Dartmouth  
Nova Scotia, B2Y 4A2  
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FAX:902-426-4465

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Nova Scotia Dept. of Nat'l Resources  
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FAX: (902) 424-0527

## CALL FOR PAPERS P&D Association of Canada

The Prospectors and Developers Association of Canada invites Papers for presentation at a special open session to be held during its 1992 Annual PDAC Convention, which will take place from Sunday, March 29 to Wednesday, April 1, at the Royal York Hotel, Toronto.

Abstracts of no more than 200 words on any aspect of mineral exploration or development should be submitted for adjudication by January 10, 1992.

Authors whose abstracts are accepted by the adjudicating committee will be required to submit an extended six-page abstract for publication by February 28, 1992. They will also be asked to make a 20-minute presentation at a session to be held on Tuesday, March 31, 1992. This session is designed to provide an opportunity for individuals in the mineral industry to report on technical matters and will run parallel to the main convention technical session.

Papers should be submitted in triplicate to:

Dr. W.E. Urquhart, Chairman,  
Convention 92 Technical Program  
Prospectors and Developers  
Association of Canada  
74 Victoria Street, Suite 1002  
Toronto, Ontario, M5C 2A5

ation. Argillite units are locally overprinted by euhedral prehnite and calcite crystals which may exhibit a spatial relationship to underlying massive sulphide mineralization. Footwall alteration is characterized by quartz + sericite (illite + muscovite) + pyrite flooding of the rhyolite. Clinocllore is also present underlying stockwork sulphide zones. Pyrobitumen is locally abundant in the 21A zone. In the hangingwall it occurs in interflow argillites and in the matrix to volcanic flow breccia. In the footwall rhyolite, pyrobitumen commonly coats sericite folia. A wide range of reflectance values ( $R_o = 0.81 - 13.98$ ) indicates a variety of hydrocarbon maturity levels.

Gold is associated with a sulphide mineral suite enriched in silver, zinc, arsenic, antimony and mercury; elements usually associated with epithermal gold deposits. Sulphides in the 21A zone exhibit a vertical zonation: cinnabar is present only in the upper portion of the sulphide zone; within and immediately below the semi-massive sulphides, stibnite, realgar and orpiment are most com-

mon. Continuing with depth in the footwall the following assemblages are observed: stibnite (realgar + orpiment absent), pyrite + sphalerite + galena, sphalerite + tetrahedrite + pyrite, and pyrite. Gold has a positive correlation with arsenic and antimony.

Origin of mineralization in the Eskay Creek 21A zone is controversial. Stratiform base metal massive sulphides, an underlying stockwork sulphide zone, and the bimodal volcanic hostrock succession suggest a volcanogenic origin. Epithermal and/or structural processes in the formation of this gold deposit are also being considered.

## Mineral Deposits in Toronto

*Contributed by Ed Freeman*

Mineral deposits emanating and worn from the earth occur in infinite variety. The products of mineral deposits bring us pleasure in such forms as amusement rides and shelter from the stormy vicissitudes of weather and life. To most of us the metals used to cook, eat and shave with, or ride within are the observable products of mineral deposits.

But, what of the slow entrapment of carbon dioxide by sea water and consequent precipitation of calcium carbonate, or the movement of grains of sand by the vagaries of wind and water to form truly immense mineral

deposits? Few people take note of the products of these deposits.

It is true that Monument Valley may remind some of sandstone and a few may connect the lime and cement industries to deposits of limestone. But very few note on their passage through the portals of government and commerce, the natural-stone building materials flanking the entrances.

A small group at the GAC/MAC/SEG meeting in Toronto has endeavoured to raise public awareness of the form, function and beauty of stone deposits. A guidebook and two tours of downtown Toronto buildings were provided during the meeting. Subsequently tours were given to the Toronto Field Naturalists and to a small but dedicated group from the Council on Monuments and Sites (the latter focusing on sandstones). The success of these tours was evident in the tribute paid to the tour leader on asking if there were any questions by those participating - he was presented with stony silence.

You may acquire one of these tour guidebooks, *Building Stone and Historic Structures in Downtown Toronto*, 63 pages plus 22 figures, in a rust-proof spiral-bound booklet. Cost is C\$18, or for international orders US\$18. Cheques should be payable to TORONTO '91.

For copies or information contact:

M. Easton  
Ontario Geological Survey  
Advance Office  
6th Floor, 200 Brady Street  
Sudbury, Ontario, P3A 5W2

## GSC - Vancouver Brown Bag Ore Deposits

*The Geological Survey of Canada in Vancouver sponsors a Brown Bag series of presentations on ore deposits held in the Boardroom, at the back of the Library on the 5th floor of the GSC building, 100 West Pender. Talks are held on Tuesdays, 12 noon, except as noted:*

**Oct. 22/91** Environmental Geology at Windy Craggy; by Bruce Downing, *Geddes Resources, Vancouver.*

**Nov 5/91** New Discoveries at Buttle Lake, B.C.; by Steve Juras, *Westmin Resources, Campbell River.*

**Nov 19/91** Opal - Gem of the Never-Never; by Ron Stokes, *SEMCO, Vancouver.*

**Dec 3/91** Working Visit to the USSR Far East on the joint USA-Canada-USSR Terrane Mapping Project.

**Jan 14/92** The Thermal, Tectonic and Hydrologic Setting of Mid-ocean Ridge Mineral Deposits; by Earl Davis, *Pacific Geoscience Centre, Victoria.*

**Feb 11/92** Hydrothermal Mounds/Altered Sediments, Middle Valley Sedimented Rift, Northern Juan de Fuca Ridge, from ALVIN push cores; by Bob Turner, *GSC, Vancouver.*

## Geological Documents

*Reprinted from Mineral Resources  
Newsletter, USGS*

The Spokane, Minerals Information Office, USGS, maintains the **Anaconda Geological Documents Collection** comprising some 1.8 million unpublished documents compiled by mining geologists, engineers, and other specialists of the Anaconda Company. The collection is housed in the International Archive of Economic Geology (IAEG) at the University of Wyoming. More than 18 000 geologic reports describe mineral exploration procedures and geologic conditions of specific mines; 5500 documents and 6500 maps have data on individual mining prospects.

All of the material is indexed on a computer data base, and can be retrieved by country, State, county, project/mine, commodity, author and date. Each Minerals Information Office of the USGS has a printout of the computer data base index through which the Anaconda Collection is searched. The Spokane MIO coordinates access to the collection for the USGS, and has information on fees and access for others. Contact any MIO to review the index, and call the Spokane MIO [(509) 353-2649] for information on fees and access.

## Saskatchewan Mineral Resource Map

The 1990 Edition is a completely updated map showing the extent of: potash, salt and carnalite resources; oil, gas and coal fields; areas of carbon dioxide, peat and base & precious metal potential. All mines (producing, past-producing, under development) are shown together with mining company names.

Mineral commodities are identified by numbered, coloured symbols which correspond to data in accompanying lists.

A total of 165 deposits are listed under the following commodity headings: uranium, copper-nickel, gold, lead-zinc, copper-zinc, iron formation, rare earths, potash & salt, sodium sulphate and gypsum, clay, coal & peat, building materials, silica sand, diamondiferous kimberlite, and miscellaneous occurrences.

The map is available in two sizes: 1:2 500 000-scale (28 by 38 cm), no charge; and, 1:1 500 000-scale (71 by 101cm), \$5.00.

For further information contact:

Saskatchewan Energy & Mines  
Marketing & Publications Office  
1914 Hamilton St., Regina, SK, S4P 4V4  
Tel: (306) 787-2528

## 1992 CORDILLERAN ROUNDUP Vancouver, British Columbia

The 1992 Cordilleran Roundup, organized by the B.C. & Yukon Chamber of Mines and supporting agencies, is the major showcase in Western Canada for the exploration industry, the British Columbia Geological Survey, the Geological Survey of Canada, the Department of Indian Affairs & Northern Development (Yukon), and the B.C. & Yukon Chamber of Mines.

### Summary schedule of the proposed sessions

#### *Tuesday, January 28th*

AM - Geological Survey of Canada and Department of Indian Affairs and Northern Development (Yukon).

PM - Service & Supply Forum, Federal Government poster displays, student poster displays, Core Shack and Prospector's Tent.

#### *Wednesday, January 29th*

AM - British Columbia Ministry of Energy, Mines and Petroleum Resources Session.

PM - B.C. & Yukon Chamber of Mines 80th Annual General Meeting, Service & Supply Forum, B.C. Geological Survey Branch poster display, Core Shack and Prospector's Tent.

#### *Thursday, January 30th*

AM - B.C. & Yukon Chamber of Mines International Session

PM - Mineral Exploration Resource Forum. Regional poster displays, Core Shack and Prospector's Tent.

#### *Friday, January 31st*

AM - B.C. & Yukon Chamber of Mines Plenary Session

PM - Mineral Exploration Resource Forum. Regional poster displays, Core Shack and Prospector's Tent.

For the most up-to-date information on mining and exploration, government research results, prospecting news and to renew old & valuable contacts in the industry plan now to attend and participate.

For further information contact:

British Columbia & Yukon Chamber of Mines  
840 West Hastings Street,  
Vancouver, British Columbia,  
V8C 1C8.  
Tel: (604) 681-5328 FAX (604) 681-2363.

## REPORT OF THE MINERAL DEPOSITS DIVISION OCTOBER, 1991, GAC COUNCIL MEETING

Submitted by Andy Fyon  
Chairperson, MDD

The following is a summary of some of the past activities and future plans of the Mineral Deposits Division of the Geological Association of Canada.

### Executive and Directors 1991-1992

- The MDD Executive and Directors for 1991-1992 are listed, with details, on page three of this issue of *The Gangue*.

Outlined below are some of the highlights of the past year and plans for the coming year:

### Financial Position

MDD remains in a strong financial position with (December 31, 1990)

BALANCE SHEET	
Balance January 1, 1990	\$81,349.92
Revenue	32,447.65
Expenses	13,735.05
Net Revenue	\$ 18,712.60
Balance Dec. 31, 1990	\$100,062.52
Assets	
Gross Endowment	32,241.58
Boldy Endowment	2,772.97
General Funds	65,047.97
Total	\$100,062.52
Liabilities	\$ 8,050.00
Surplus	\$ 92,012.52

Note: The Endowment Funds support the William Harvey Gross Medal and the Julian Boldy Certificate awards and can not be touched for general operating purposes.

### Membership Dues

- Dues were raised from \$5 to \$10 to help cover the cost of producing *The GANGUE*.

### Membership Numbers

- Between May 1990 and May 1991, membership fell from 818 to 625. The decrease in all Provinces was about the same at approximately 25 per cent. Loss may reflect the impact of the recession. {Ed. note: as of Oct. 1991, membership has climbed to 756}

### Duncan R. Derry Medal

- John Harvey, President, Noranda Exploration Company Ltd. was the recipient of the Duncan R. Derry Medal, presented at Toronto '91.
- Nominations for the 1992 award should be directed to James Macdonald, MDD Vice Chairperson, c/o Mineral Deposit Research Unit, Department of Geological Sciences, The University of British Columbia.

### William Harvey Gross Award

- Derek Wilton, Department of Earth Sciences, Centre for Earth Resources Research, Memorial University of Newfoundland, was the recipient of the William Harvey Gross Award, presented at Toronto '91.
- Nominations for the 1992 award should be sent to Robert Cathro, MDD Treasurer, Cathro Exploration Corp., 2460 Queens Avenue, Vancouver, B.C., V7V 2Y8.

### Julian Boldy Certificate Award

- T. Barrett and S. Cattalani, Department of Geological Sciences,

McGill University were the recipients of the Julian Boldy Certificate, presented for best paper at an MDD sponsored session at the Annual General Meeting. The award was announced following the Toronto '91 GAC/MAC/SEG Annual General Meeting.

### H.S. Robinson Lecturer

- Dr. Steven Gordy, Geological Survey of Canada, Vancouver, was nominated by the Mineral Deposits Division as the H.S. Robinson Lecturer 1991-1992. Steve will begin a series of lectures in January 1992 and will discuss aspects of SEDEX deposits.

### Publications

Financial support for publications remains one of the principal financial commitments made by MDD on behalf of our members and geologists outside of MDD. As MDD Publications Chairperson, Pat Sheahan has made a great contribution to MDD and continues to undertake this onerous task. As Pat will step down in May 1992 - the search is on to find our next Publications Chairperson.

- The NUNA Conference Volume, edited by Francois Robert, Pat Sheahan, and Steve Green, was released at Toronto '91;
- Revised Ore Deposits Volume, with new chapters on current topics;
- Financial support for the IAGOD Mineral Deposit Modeling Volume.

### Toronto '91

- Successful joint sessions with SEG;
- MDD provided seed money to video tape portions of sessions at Toronto '91;

### Wolfville '92

- Proposed MDD-sponsored sessions include: 1) Organic carbon, carbonaceous sediments, and their role in metal concentration and mineral deposit formation; 2) Mineral deposits and metallogeny of the Appalachian Orogen (base metal, precious metal, granophile metal deposits)
- Proposed MDD-sponsored field trip run and organized under auspices of the Organizing Committee: Scandinavian Mineral Deposits.

### The Gangue

- Newsletter continues to be successful under the direction of Brian Grant; 4 issues are planned for this year.

### Significant Issues Facing MDD

- Membership has decreased- this is a concern, particularly if MDD is not serving its members very well;
- Professional development is critical for all our members- MDD is exploring possible short courses and field trips;
- Public awareness policy- feedback will be solicited from MDD members regarding a public awareness policy and possible ways to enhance the public awareness of the mineral resource sector.
- Collaboration with GAC parent- continuous dialogue with GAC parent is desirable for both GAC and MDD; interaction to date with Ian McIlreath has been stimulating and fruitful;

### Video Tapes Of Mineral Deposits Sessions, TORONTO '91

Don't forget that parts of some mineral deposit sessions were video taped during Toronto '91. Detailed information regarding papers that were taped and purchase information is contained in *The GANGUE*, Issue 36, July 1991.

## MDD & PUBLIC EDUCATION

Periodically, the Executive of MDD receive letters from members suggesting that a certain issue may be important and relevant to the mineral resource sector and, therefore, it warrants special response from the MDD. One such letter, from Dr. Michael Cherry, urges MDD Executive and Directors to formulate a public awareness policy. A copy of this letter, published with the permission of its author, and my response are included for the consideration of all MDD members.

The background to this issue was discussed by Ed Debicki (Past Chairperson's 1990-1991 Review, *The GANGUE*, Issue 36 - July 1991). A request to support Science World, Vancouver, was considered by MDD Executives and Directors. The vote was split equally and a decision was made not to provide funds, given the lack of a clear consensus. The vote against this funding request should not be interpreted as an outright rejection of the concept of funding support for public education. Rather, the close vote illustrates, in part, the concern that support for such initiatives represent a departure from the activities normally supported by MDD.

Many of the arguments detailed by Michael Cherry were discussed by the MDD Executives and Directors before the vote was taken. MDD members are urged to read the following letters and to communicate their opinions to the MDD Executive and Directors.

Please submit your opinions of a public awareness policy for MDD. If you support establishing such a policy, please consider ways to achieve the objective of increasing the public awareness of the mineral resource industry, its economic importance to our society, and the extent to which metals and minerals are commonly used in all facets of our lives. Consider that such initiatives require the commitment of human and financial resources. If MDD is to contribute to a public awareness initiative, what creative ways can be explored to maximize the impact of any contribution.

Andy Fyon, Chairperson MDD

Dr. Andy Fyon  
Chairperson, Mineral Deposits Division, GAC

8 August, 1991

Dear Andy:

I received the July '91 issue of *The Gangue* earlier this week, and noted, in the Past-Chairperson's 1990-91 Review, that MDD Executive and Directors could not decide whether or not to provide funding support for "education initiatives that would inform the general public about mineral deposits and mining in Canada". The column states that further discussion will be held about this matter, and I wish to offer the following comments to the Executive as a member of MDD.

I consider a public education campaign to be essential if the Canadian mining industry is to survive. It takes but a vague awareness of events in the world around us to understand that mining is widely perceived as an unnecessary and malevolent industry. Special interest groups, which are acutely aware of the importance of public opinion, have decimated the Canadian fur industry, and are now starting to strongly influence the Canadian forestry industry. Pressures for more parks and wilderness reserves and aboriginal land claims translate to less and less land available for exploration and development. Concerns about pollution and land reclamation have resulted in legislation that makes it very costly to develop any mine. These are but a few examples of the public, and government, perception of our industry.

In a broader context, such a campaign is necessary for the geosciences in general. My non-geologists friends often ask why we don't have better ways to explore for minerals, or why it is necessary to remap areas that were mapped before. The general perception of an orebody is the Hollywood gold mine, where huge nuggets are picked from a river bed, or hacked from the walls of a "shaft". We must do a better job of explaining what it is we do, and why it is important. In comparison, the forestry industry has been considerably more successful in presenting its importance. The average citizen may worry about clear-cutting and preservation of primeval forests, but this story is translated into a feeling that forestry is important to Canada. And that is translated into forestry ministries in our governments. Mining, on the other hand, remains at best a junior ministry.

We cannot ignore these perceptions of mining and geology, and we certainly cannot wait for someone else to tell people that mining is good for us all. If providing funds for earth sciences education is not included in MDD's present objectives, then they should be changed.

Sincerely,  
Michael E. Cherry

Dr. Mike Cherry  
Energy, Mines and Resources Canada  
Geological Survey of Canada Sector  
Room 462, 601 Booth Street  
Ottawa, Ontario, K1S 0E8

August 12, 1991

RE: Funding for Education Initiatives

Dear Mike

Thank you for your comments regarding MDD funding of education initiatives. I add the following background to the decision taken by MDD.

1) The vote to support funding was close to an even split- Ed Debicki, as Chairman, adopted the only reasonable position which was not to support the funding request, given the lack of clear support for or against the motion. I support Ed's decision.

2) Requests for funds are always considered in the context of "benefit to MDD members" and there was much discussion on this issue. Benefit can be of an immediate and tangible nature (e.g., short course, publication) or of a less immediate and more intangible nature (e.g., public awareness). As you point out, however, public awareness will ultimately have an impact of the mining and related industries. The discussion and resulting vote should not be interpreted as outright rejection of MDD support for public awareness initiatives. Rather, the indecisive vote is an indication of the Executive and Director deliberations that are still on-going within MDD.

3) MDD is very fortunate to have a substantial cash resource. The Executive and Directors of MDD have worked very hard to generate and maintain this resource. It is the goal of MDD to operate on the revenue generated from this cash base and not to deplete the capital base. Operational expenses are considered carefully and allocated to benefit MDD members (e.g., NUNA volume, IAGOD volume, video tapes, etc.). Expenses are planned one to three years in advance and investments made accordingly to preserve the capital. However, MDD will consider exceptional requests, but always in the context of "benefit to MDD members".

Deviation from conventional funding initiatives will require some liberation. The points you raise, as a member of MDD, will be of assistance to the on-going discussion regarding a public awareness policy for MDD. A copy of your letter will be provided to all Executive and Directors to further stimulate this discussion.

Thanks for your comments.

Regards  
Andy Fyon, Chairperson, MDD

This is the Mineral Deposits Division  
find a new member month!

Circulate your copy of **THE GANGUE**  
and encourage your friends to become  
**MD** members.