

The Rock Record 2004

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**Saskatchewan
Geological Society
P.O. Box 234
Regina, SK S4P 2Z6**

SGS e-mail address:
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All advertising inquiries should be directed to **Andre Costa**

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Wednesday, April 21, 2004

Microbiology of rusticles on the Titanic: The technology, the science, and the results

Lori Johnston

Droycon Bioconcepts Inc.

Lancaster Room, Royal Canadian Legion

Cash Bar: 11:30; Lunch: 11:50

Meeting: 12:15 – 13:00

Members \$7.00, Non-members \$11.00

Contact: Andre Costa 787-9104

By NOON, Monday, April 19, 2004

Tuesday, May 18, 2004

The Hemlo gold deposit: an atypical, Archean, mesozonal-orogenic, disseminated-replacement- stockwork deposit

Tom Muir

Ontario Geological Survey

Lancaster Room, Royal Canadian Legion

Cash Bar: 11:30; Lunch: 11:50

Meeting: 12:15 – 13:00

Members \$7.00, Non-members \$11.00

Contact: Andre Costa 787-9104

By NOON, Friday, May 14, 2004

Microbiology of rusticles on the Titanic: The technology, the science, and the results

**Lori Johnston
Droycon Bioconcepts Inc**

Lori Johnston has received her Masters in Environment and Management from Royal Roads University in Victoria B.C. and is a research consultant in microbiology at Droycon Bioconcepts Inc. in Regina. Lori accompanied Dr. Roy Cullimore on the 1998 Titanic Expedition to investigate the microbiology of rusticles. In 2001, Lori participated in the James Cameron Titanic Expedition to further explore the Titanic, as well as participating in the 2002 Bismarck and Hydrothermal Vent Expeditions. Last field season, Lori participated in 3 expeditions, the first being back to Titanic, then to the HMHS Britannic in Greece, and the last expedition in the Gulf of Mexico, doing scientific experiments on the U166, a German Submarine.

For more information on Lori's Titanic research, see the Droycon website at <http://www.dbi.ca/>

The Hemlo gold deposit: an atypical, Archean, mesozonal-orogenic, disseminated-replacement-stockwork deposit

**T.L. Muir
Ontario Geological Survey**

The world-class, Archean, Hemlo lode gold deposit has been overprinted by deformation and metamorphism. The resultant, modified, complex geological characteristics have contributed to there being several proposed depositional models. No single model clearly accounts for all of the characteristics of the deposit. Most proposed models are inappropriate in terms of timing with respect to host rock, deformation, intrusion, or metamorphism, or require inappropriate geometry, metal tenors or metal ratios.

The deposit is spatially associated with a large zone of alteration, high-strain zones, a restraining bend in the Hemlo greenstone belt, and the volcanic-sedimentary contact of the Moose Lake volcanic complex. A broad zone of alteration, about 4 km long and up to 400 m wide, asymmetrically surrounds the deposit. The restraining bend correlates with changes in the style of mineralization and/or alteration; hence, the deposit is subdivided into two segments. The West Segment is west striking and consists of numerous, low-grade, erratically mineralized, west- to west-northwest-striking zones. Mineralization is locally dominantly fracture-controlled or disseminated. The Main Segment strikes approximately 290°, contains the majority of the ore and consists of two main tabular zones of dominantly disseminated mineralization: the Main Mineralized Zone, within the Lake Superior shear zone; and the Lower Mineralized Zone, within the Moose Lake fault zone.

Structural elements can be assigned to at least six stages of development (D_1 - D_6). D_2 and D_3 strain ductilely deform the deposit and are associated with sinistral and dextral transpression, respectively. The deposit was emplaced after F_2 folding of volcano-sedimentary units, synchronous with the incipient development of high-strain zones during mid- D_2 strain. There is ample evidence, at a variety of scales, of D_2 structural control on the various mineralized zones. Tabular mineralized zones of fracture-controlled and pervasive alteration are paraconcordant with lithotectonic units. These zones are parallel to the predominant fabric (S_2) in the West Segment, and a composite mylonitic fabric (S_2 - S_{2M} - S_{3C}) in the Main Segment.

The Hemlo gold deposit is interpreted as an atypical, Archean, mesozonal-orogenic, disseminated-replacement-stockwork deposit that was emplaced broadly synchronous with D_2 and "middle" stage granitoid plutonism, prior to or synchronous with peak regional metamorphism, as a product of magmatic \pm metamorphic fluids. Its emplacement is poorly constrained between 2694 and 2677 Ma, but was perhaps ca. 2685 Ma. U-Pb systematics are consistent with field evidence for a history of protracted, episodic, progressive strain, intrusive activity, and an evolving hydrothermal system. The chief emplacement controls specifically appear to have been the restraining bend, competency contrast at a major lithologic contact, and permeability in a fragmental unit, with general, more broadly developed steady-state permeability in ductile zones. Enigmatic barite associated with the deposit is considered an intrinsic product of the hydrothermal system. The orientation of the major part of the deposit is consistent with statistically preferred orientations for large gold deposits in other gold camps of the Superior Province. Although no other large gold deposits have been found in the Hemlo greenstone belt, various geological features are consistent with some exploration strategies for additional gold mineralization.

2004 S.G.S. Honour Roll Inductees

At the 2004 S.G.S. Annual General Meeting, three distinguished Saskatchewan Geologists were inducted into the S.G.S. honour roll. These were Dr. John Lewry, Dr. James Christopher, and Dr. Donald Kent. Following, is a brief biography of Dr. Christopher.

If you have any suggestions for other inductees to the Honour Roll, please make them known to the S.G.S. executive for consideration.

Dr. James E. Christopher

James Ellis Christopher characterizes many Saskatchewan citizens; he came from humble beginnings, arrived in Saskatchewan mainly out of necessity and stayed by choice to gain prominence in his field. Chris, as he is known to his friends, was born in Philadelphia, PA, but at a young age he was sent to live with his maternal grandparents in Jamaica. He received his elementary and secondary schooling there and sat the Cambridge university entrance exams, but family finances being what they were, university would have to wait.

He returned to the States and worked as a migrant farm labourer before joining the U.S. military, and he arrived in the European theatre of war in time to become a member of the U.S. Army of Occupation. After demobilization, Chris worked as a civilian employee with the U.S. Army Map Service in Washington D.C., but eventually returned to his family home in Jersey City where he took employment in the manufacturing industry. At the same time, he began university night classes at the community college level and moved on to Columbia University, graduating with a B.S.A. degree in geology. Armed with his bachelor's degree and scholarship funding, including the John Hay Whitney Fellowship, and John A. Bownocker Scholarship, he proceeded to Ohio State University to continue his geological training toward M.Sc., and Ph.D. Degrees.

Dr. Christopher graduated from Ohio State with his Ph.D. in 1959, at a time when "equal opportunity" and "affirmative action" practices were not in effect. It was also a time when the major employer of geologists, the oil industry, was in one of its depressed economic periods. After sending out two hundred resumes and receiving as many rejections, Chris eventually turned north and accepted a position as a research geologist with the Saskatchewan Department of Mineral Resources. He loaded his personal belongings, his wife Dora, and baby son John into his 1953 Dodge and began the long trek from Columbus Ohio to Regina, arriving in the summer of 1959. Thus began a long and distinguished career in the Saskatchewan public service.

Chris moved through the professional and administrative ranks of the Saskatchewan civil service, rising from senior research geologist to principle research geologist in charge of the research section and on to chief geologist of the sedimentary geology division and eventually to director of the Saskatchewan Geological Survey. During his years in the research section, he produced three landmark monographs. 1961 on the Devonian-mississippian transitional beds, in 1964 on the Middle Jurassic rocks of western Saskatchewan, and in 1974 on the Upper Jurassic and Lower Cretaceous of western Saskatchewan. Each is still widely accepted as the definitive work on the subject. In addition to the monographs he has published extensively on topics related to his research and to the petroleum geology of Saskatchewan. Even after his appointment as director, he used every spare minute of his time to continue his research on the Lower Cretaceous rocks of Saskatchewan. He also maintained a close relationship with rocks of all



Dr Kent and Dr Christopher accepting the Honour Roll plaque, AGM, 2004

ages through frequent visits to field parties in northern Saskatchewan, as well as by direct involvement in a field mapping project on the Clearwater River in north-western Saskatchewan.

Dr. Christopher has also taken an active role in the geological community. He is a former two-time president of the S.G.S. (1967, 1980), as well as being a contributor and editor of several S.G.S. special publications. He is now an emeritus member of the society. He is also an honorary member of the C.S.P.G., and has contributed to its conferences and publications. His most recent contributions will be found in three chapters of that organizations geological Atlas of Western Canada Sedimentary Basin. While carrying out his administrative duties with the geological Survey, he was an active organizer for the annual mines minister's conferences. Internationally, he served several terms as the Saskatchewan district representative to the A.A.P.G.

In 1989 his contributions to the Saskatchewan petroleum industry were recognized through his election to the Saskatchewan Oilmen's Hall of Fame, and in 1990, the Geology alumni of his alma mater honoured him with the Orton Award as a distinguished alumnus. He was a lecturer at the U of A's prestigious Banff Earth Sciences Conference, an annual state-of-the-art seminar to which eminent geologists from around the world were invited to present their views on the seminar topic for that year. He was the only Saskatchewan geologist invited as a presenter to that seminar.

Chris took early retirement in 1987 but continued to work with enthusiasm on his favourite topic, the Lower Cretaceous rocks of Saskatchewan. That work reached fruition in 2003 with the release of S.I.R. report 223 – "Jura-Cretaceous Success Formation and Lower Cretaceous rocks of Saskatchewan". Seventeen years after his retirement, he continues to act as a geological consultant to oil and potash companies, and is presently involved in two regional mapping projects, the Weyburn CO₂ Storage and Sequestration Project, and TGI. There is little doubt that Dr. James E. Christopher has made, through forty years, significant contributions to geoscience in Saskatchewan and is a fitting nominee to the S.G.S. Honour Roll.

S.G.S Annual Potash Mine Tour

This year's trip will be to IMC's K-1 mine at Esterhazy. The trip will be leaving sharply at 5AM from the S.I.R. subsurface lab on Thursday May 13. The day will consist of a tour of underground operations in the morning, followed by a lunch and mill-tour in the afternoon. We will return to Regina by approximately 6pm. For more information and to book your spot, please call John Lake at 787-2621 to book your spot in the van. Please call early to avoid disappointment as spaces are limited.

Renew Your Memberships!

Time is quickly running out, for those unpaid to remain on our mailing list. Don't hesitate any longer!

SGS Annual Summer Field Trip to Montana, August 20-24, 2004.

This year we will visit the Little Rocky Mountains and Bearspaw Mountains of North-Central Montana. The field trip will leave Regina on Friday, August 20th (AM) and return on Tuesday August 24.

Drs. Don Kent (U of R) and Ben Rostron (U of A) will co-lead the trip. We will look at everything from Paleozoic and lower Cretaceous sediments, to Tertiary volcanics and intrusives. We may even see the mummified remains of a hadrosaur in Havre.

Please call John Lake (787-2621) to book a space. Costs are \$250 per person which includes transportation, lodging, field lunches, and a field guidebook.

Book early to avoid disappointment!