



THE MINERAL VEIN

Official Newsletter of

THE MINERAL SOCIETY OF MANITOBA

APRIL 2017

MARCH PRESENTATION SUMMARY

By Jacques Bourgeois

We had the pleasure to have **Kyle Reid**, Geologist, with the Precambrian Geoscience section at the Manitoba Geological Survey as a guest speaker in March. His topic was plate tectonics and more specifically ore deposits in Manitoba associated with various tectonic events he also brought some mineral samples from various localities across the province. His talk will prove very useful for the planning of upcoming field trips.

The Earth's lithosphere is composed of seven major plates and several minor plates. The movement of the plates creates three types of active tectonic boundaries: divergent, convergent and transform or conservative. Divergent plate boundary is where plates move apart from each other such as what is happening in the Red Sea.

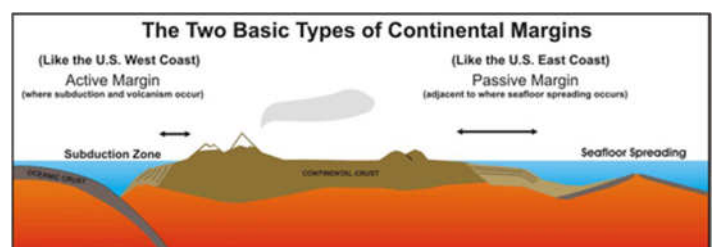
Convergent plate boundaries can be one of several types depending on what type of plates converge towards each other. For example, when an oceanic plate converge towards another oceanic plate, such as in the North Pacific region, it often creates an arc of islands as we can see with the Aleutian Islands. When an oceanic plate converges towards a continental plate it often creates deep trenches in the ocean such as what we see where the Andes meet the Pacific ocean in South America. When two continental plates move towards one another, we have the creation of large mountain ranges such as the Himalaya mountains where the Indian plate converges towards the Asian plate.

The transform or conservative plate boundary is where plates move sideways in relation to each other. A great example of this lateral movement is the San Andrea fault.



Kyle Reid from the Manitoba Geological Survey

Those three previous types of boundaries are referred as active margins. Active margins are commonly the sites of frequent tectonic activity: earthquakes, volcanoes, mountain building, and the formation of new igneous rock. There is also another type of plate margin referred to as a passive continental margin. This one is similar to what is happening on the North American eastern seaboard. The continental plates slowly drops deposits along margin, which adds extra weight and drops the oceanic crust below.



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THE MINERAL SOCIETY OF MANITOBA

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The Mineral Vein is published monthly from September to June.

Meetings are held on the first Wednesday of each month from September to May inclusive at the Manitoba Museum in room P47 on the Planetarium level. They begin at 7:30 PM and feature announcements, an invited speaker and a raffle. Members are encouraged to bring along any new, interesting specimens, or specimens appropriate to the speaker's topic.

Field Trips take place from May to September to interesting sites in Manitoba or neighbouring provinces and states.

Membership: A single membership is \$15 while a family membership is \$20. Memberships run from October to October.

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UPCOMING EVENTS

April 5, 2017: MSM regular monthly meeting begins at 7:30 p.m. at the Manitoba Museum. This will be our **Annual Mineral Auction** hosted by none other than our very own auctioneer extraordinaire, **Tony Smith**. Please bring some mineral specimens you wish to donate for the event.

May 3, 2017: MSM regular monthly meeting begins at 7:30 p.m. at the Manitoba Museum. Our guest speaker this month will be **Jim Bamburak**, Sedimentary Geologist, with the Sedimentary Geoscience section at the Manitoba Geological Survey. He will speak about the geology of Shoulderblade Island.

May 21 to 28 2016: Manitoba Mining Week

May 27 & 28 Archaeology, Rocks and Mineral Event at Oak Hammock Marsh in celebration of **Manitoba Mining Week**. Both days from 10 a.m. to 4:30 p.m.



Founded in 1971, the Mineral Society of Manitoba is dedicated to promoting the study of minerals, rocks and fossils for their scientific and recreational value.

The Mineral Society of Manitoba hosts monthly meetings covering a variety of mineral related topics. In addition, the Mineral Society organizes summer field trips to collecting localities, and hosts educational exhibits about minerals and fossils.

MARCH PRESENTATION (CONT.)

Volcanogenic massive sulfide ore deposits, also known as VMS ore deposits, are a type of metal sulfide ore deposit, mainly copper-zinc which are associated with and created by volcanic-associated hydrothermal events in submarine environments. They are found in ancient mid-ocean ridges, island arcs and continental rifts/back-arc basins. They represent a significant source of the world's copper and zinc.

Porphyry copper deposits are copper orebodies that are formed from hydrothermal fluids that originate from a voluminous magma chamber several kilometers below the deposit itself. These are associated with oceanic and continental plate boundaries where the oceanic plate is subducted under the continental plate and produce a volcanic hydrothermal system. A good example of this type of deposit is the Chuquicamata mine in northern Chile. It is the largest open pit copper mine in the world by excavated volume located. These deposits are an important source of the world's copper, molybdenum, silver and gold.



Chuquicamata mine in northern Chile.

Orogenic 'lode' gold is gold that occurs in quartz-carbonate veins. Water from the dehydration of sediments (clay, silts, etc.) carries gold and silica into faults and fractures at higher crustal levels. Those usually are formed at the junction of two continental plates during mountains formation.

Magmatic sulphide deposits are commonly associated with mafic intrusive magmatic complexes associated with early stages of continental rifting. These deposits are an important source of nickel, copper, and platinum group elements (PGE). Manitoba's favourable geology for PGE makes the province an attractive exploration target for these metals.

Diamonds are brought close to the Earth's surface through deep volcanic eruptions by magma, which cools into igneous rocks known as kimberlites. Their formation requires very high temperature and pressure. Repeated continent to continent collisions result in thick continental crust favourable to their formation. Conditions similar to what is observed in Nunavut occur in Manitoba. The possibility of finding diamonds are pretty good.



Diamonds require high pressure and temperature to form.

Ancient Manitoba plates

The Canadian Shield is a collage of Archean plates and accreted juvenile arc terranes and sedimentary basins of the Proterozoic Eon that were progressively amalgamated between 2.45 - 1.24 billions years ago. The Precambrian geology of Manitoba is the result of the Superior province colliding with Churchill province, creating the Trans-Hudson Orogen.

The original suture of the two continent, or the initial rift stage, was followed by convergent margins. Inter oceanic arcs and back arc basins were trapped between the continental crusts. Much younger plat form carbonates formed in an inland sea during a passive margin process.

The rest of the discussion focussed on where the principal ore deposits are located in Manitoba (which is illustrated on the next page), followed by questions and answers regarding lithium brine in Steinbach, lithium in Tanco and the possibility of finding gold in Manitoba.

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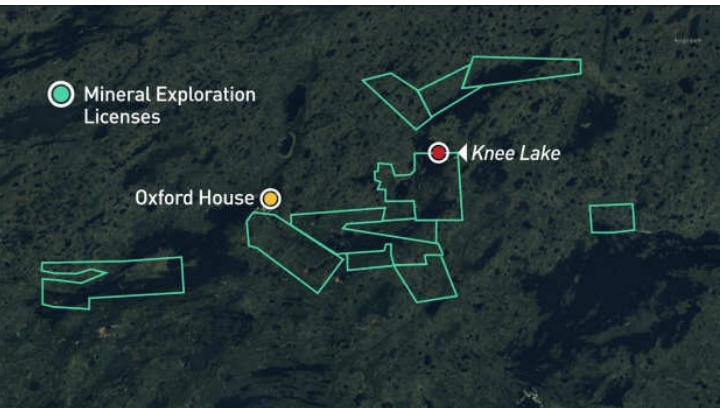
FEBRUARY PRESENTATION (CONT.)

DIAMONDS FOUND IN MANITOBA

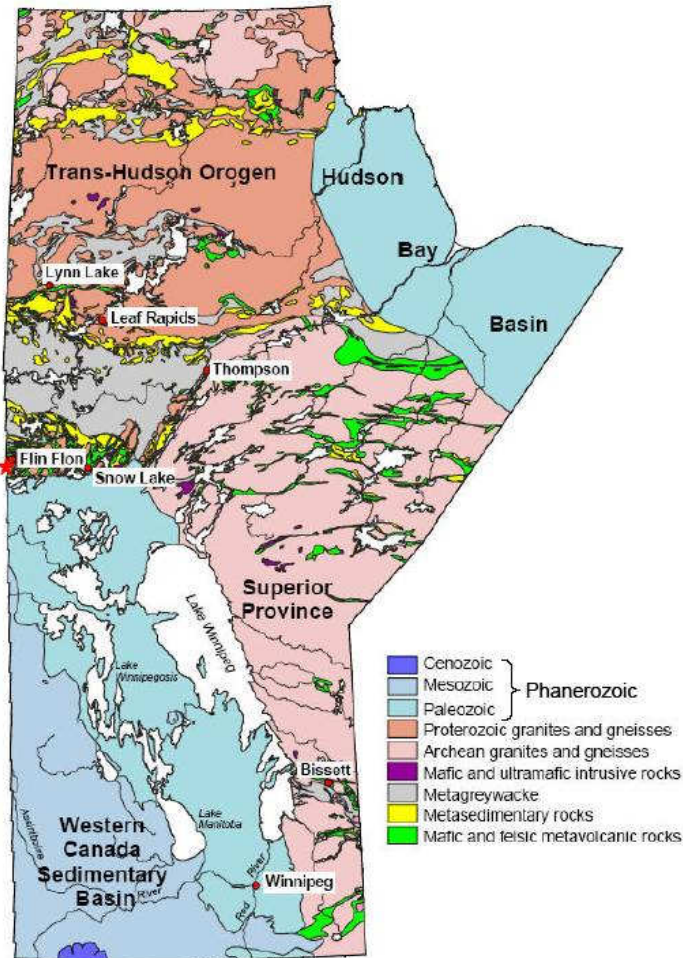
CBC NEWS Files from Meaghan Ketcheson

Very small diamonds have been discovered in Manitoba, a first for the province, says a Winnipeg geologist. Ruth Bezys, president of the Manitoba Prospectors and Developers Association based in Winnipeg, says an informal consortium made up of Manitoba and Alberta prospectors discovered the precious gemstones in the northeastern part of the province. Their discovery was announced at this year's Prospectors and Developers Association of Canada conference held in Toronto. They were found near Knee Lake and measure less than a millimetre in size.

Knee Lake is a large lake on the Hayes River, 600 kilometres northeast of Winnipeg and downstream from Bunibonibee Cree Nation and Oxford Lake.



Areas where prospectors searched for diamonds in Manitoba.



The principal ore deposits in Manitoba are located as follow:

Volcanogenic Massive Sulphide Deposits (VMS)

- Flin Flon
- Lynn Lake
- Snow Lake
- Leaf Rapids

Orogenic Ore Deposits "Lode"

- Lynn Lake
- Flin Flon
- Snow Lake
- Bissett

Magmatic Sulphide Deposits

- Thompson
- Lynn Lake

Diamonds

During the talk, Kyle suggested that diamonds were probably to be found in Manitoba but they had not been found yet. However, this changed a few days later with the discovery of diamonds in the Knee Lake area in the northeastern part of the province.

Given that diamonds have been mined in northern Ontario, Saskatchewan and the Northwest Territories, geologists have long suspected there's a deposit in Manitoba. "It's quite exciting for the province," Bezys said. "Hold onto your hats." Prospectors have been looking for diamonds in Manitoba for 16 years. International mining company Kennecott did exploratory drilling in 2001 and other major players in diamond exploration, such as De Beers and BHP Minerals, have also done aerial explorations of the region.

Lynx Consortium, the group that discovered the micro-diamonds, found them in bedrock, which could indicate the presence of a fair amount more, she said. The next phase of their work will require millions of dollars to do deeper exploration. If more diamonds are found, developers could create a mine.