Mineralogical Society of Western Australia Inc. September 2014 Newsletter

Editorial

The door prize at the General Meeting on the 16th July of a tumbled agate from Agate Creek was presented by Stewart Cole and won by Susan Koepke.

The door prize at the meeting held on the 20th August was a polished slab of Kiruna magnetite ore presented by Mark Thompson and was won by Barbara Donati.

The policy that members may submit short adverts free of charge will remain. Additionally, it was agreed that other commercial advertisements would be accepted for a nominal charge.

Contents

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Recent Activities

The General Meetings of the Mineralogical Society of Western Australia Incorporated are currently held at 7.30 pm on the third Wednesday of every second month at the WA Lapidary Club rooms located at 31, Gladstone Road, Rivervale (corner of Newey St).

General Meeting on 21st May 2014.

After the General Meeting, Dr. Yulia Uvarova (CSIRO) spoke about the "Kola Superdeep Borehole, Kola Peninsula".

The talk gave a flavour of what the Kola Superdeep Borehole, the deepest drill hole ever drilled into the Earth's crust, revealed about mineralogy, petrology and fluid evolution of the upper to middle crust.

Yulia graduated from the Faculty of Geology, Moscow State University with a BSc (Hons) in Geology in 2001, and from the Department of Geological Sciences, University of Manitoba with a PhD degree in 2008.

Her dissertation work was in the field of mineralogy, petrology and geochemistry of rocks from the Kola Superdeep Borehole. The Kola Superdeep Borehole (KSDB), located in the north-western part of Kola Peninsula, Russia, is the deepest hole drilled into the Earth's crust. Its depth is 12.2 km, and thus the KSDB provides an opportunity to study the upper and middle crust.

Yulia examined the crystal chemistry of amphiboles and related their chemical composition and crystal chemistry to lithology and metamorphic grade of Kola Precambrian rocks. The results of her work contributed to the fields of mineralogy and metamorphic petrology. While working on her dissertation, Yulia was very fortunate to be also involved in a number of projects on identification of new mineral species, and described 8 new minerals.

Drilling of the Kola Superdeep Borehole commenced on 24 May 1970 and ceased in 1989. Higher than expected temperatures at the bottom of the hole partly contributed to its cessation.

The rock at that depth was fractured, contained abundant water and, surprisingly, there was a large quantity of hydrogen gas.

Photograph reproduced from Wikipedia.

Mineral Workshop on 29th June, 2014.

Nine participants attended a very enjoyable and instructive workshop focussing on mineral inclusions.

Ted discussing mineral inclusions at the recent mineral workshop. *Photo. Sue Koepke*

Visit to WA Museum on 30th June, 2014

Six members participated in another interesting visit to Welshpool. The following summary was compiled by Juan Fernandez Buelga.

For every collector to see a museum is a pleasure, but to see the heart of one is just a fantastic opportunity that any serious collector cannot miss.

A few members of the society visited the Western Australian Museum Collections and Research Facility, a brilliant activity to finalize the month of June. The Curator of Minerals and Meteorites, Dr Peter Downes, guided us through the endless corridors of the building, on the way admiring many large objects of the history of Western Australia. After a few minutes walking, we arrived to our destination: the area dedicated to the mineral collection.

Compared to other areas of the facility, this area is rather limited and seems to get more crowded each time new minerals arrive from different localities. Some museum size specimens were on the floor waiting for a permanent location. It seems that we, humble collectors, are not unique needing more and more space for our beloved crystals. Peter commented that a new museum is underway and I am confident that mineral specimens will be given the importance that they deserve in this country and especially in the resources-rich state of Western Australia.

Our devoted secretary Sue Koepke had asked Peter in advance for mineral specimens from Speewah, Western Australia. So, when we arrived, a good selection of them was out of the cabinets for us to look at. Also laid out were mineral specimens from the classic locality at Northampton. One of the specimens that impressed me most from this locality was a cabinet size pyromorphite with an olive green colour and crystal rosettes reaching almost one inch.

Its crystallization reminded me of the famous mimetites and pyromorphites from the Dry Gill Mine, UK.

After carefully reviewing each specimen, Peter asked if we would like to see other mineral species, localities, etc. The writer gladly accepted the proposition and asked about fluorite and pyromorphite specimens. Yes, more pyromorphite please!

Between cabinets we had time to meet Dr Alex Bevan, Head of the Department of Earth and Planetary Sciences, and Curator of Mineralogy and Meteorites. In Sue's words: "A living mineralogical legend!".

In other cabinets, we saw some tourmalines and beryls from different Western Australian localities. Peter opened cabinet after cabinet looking for the specimens of our interest. For Sue, one of the highlights was the type specimen of the recently described paratacamite-Ni. We also admired many historical specimens from the collection of the late Edward Sydney Simpson (1875-1939). To finalize the visit, Peter showed us a fantastic, large cabinet size wulfenite specimen from the classic locality of Whim Creek, Western Australia.

The majority of the minerals were stored in large metal cabinets of the well-known brand SAC Systems, definitely out of budget for the average mineral collector.

It was a fantastic activity and I look forward to our more than likely next visit.

Peter Downes and Minsocwa members at recent museum visit. *Photo Sue Koepke*

Specimen of wulfenite WA museum. *Photo Juan Fernandez Buelga*

General Meeting on 16th July, 2014.

After the General Meeting Dr. Steve Barnes, CSIRO spoke on "Nickel sulphide ores: new insights from new (and old) research techniques".

In his superbly illustrated talk, Steve introduced us to the world of microtextures and how they can be used as evidence for the origin of magmatic nickel sulphide ores. New analytical techniques include:

- Desktop XRF micromapping
- QEMSCAN SEM mineralogy
- Synchrotron XRF micromapping
- X-ray microtomography

Much of the recent work focussed on komatiite-hosted nickel deposits especially in the Mount Keith, Black Swan, Kambalda and Forrestania regions of the Western Australian Yilgarn. The, predominantly Archaean-aged, komatiites are ultramafic lavas with >18% MgO in the liquid and crystallize with the characteristic 'spinifex" texture.

Komatiites have extremely low viscosities and are extruded as amoeboid-like bodies containing several lobes, each fed by a lava conduit. By physical processes, disseminated and massive sulphide deposits accumulate within these conduits.

We were shown a series of nickel sulphide and gold microtextures from Kambalda, Mount Keith, Black Swan, Flying Fox and Honeymoon Well amongst others. These were used to illustrate such problems as whether the composition of the disseminated Black Swan ores were a product of alteration control on primary mineralogy and the mechanism of the formation of the Mount Keith pentlandite-rich ores.

Other discussions included the mechanism of formation of disseminated sulphides in komatiitic olivine cumulates at Mount Keith and Black Swan and the origin of chromite rims in the Silver Swan massive ore shoot.

Steve's presentation introduced us to the fascinating work that is being completed by the CSIRO.

Monthly Meeting on 20th August, 2014.

Mark Thompson, Managing Director of Talga Resources Ltd., treated us to a two part talk: the first on the remarkable metal deposits of the Fennoscandian shield with focus on Sweden and the second on graphite and graphene.

The larger deposits in the Fennoscandian Shield include:

- ***KIRUNA***

Giant apatite iron ore (magnetite) deposit. Largest iron producer in Europe for 100 years and one of most sophisticated underground mine worldwide. Current resources are in excess of 2 000 Mt at ~45% Fe. Compare this to the Western Australian banded iron formation magnetite deposits that contain around 30% Fe.

- ***AITIK***

Giant porphyry overprinted IOCG copper-gold deposit. Largest copper-gold iron producer in Europe and largest open cut metal mine in Europe. Mineralization comprises disseminated chalcopyrite, pyrite and pyrrhotite within a porphyry. The current resource is 22,760 Mt @ 0.17%Cu and 0.1g/t Au.

- ***KISKAMA***

More 'classic' IOCG copper-gold-cobalt deposit with direct similarities with Ernest Henry in Australia. Mineralization consists of magnetite (minor hematite), chalcopyrite and pyrite hosted in a breccia.

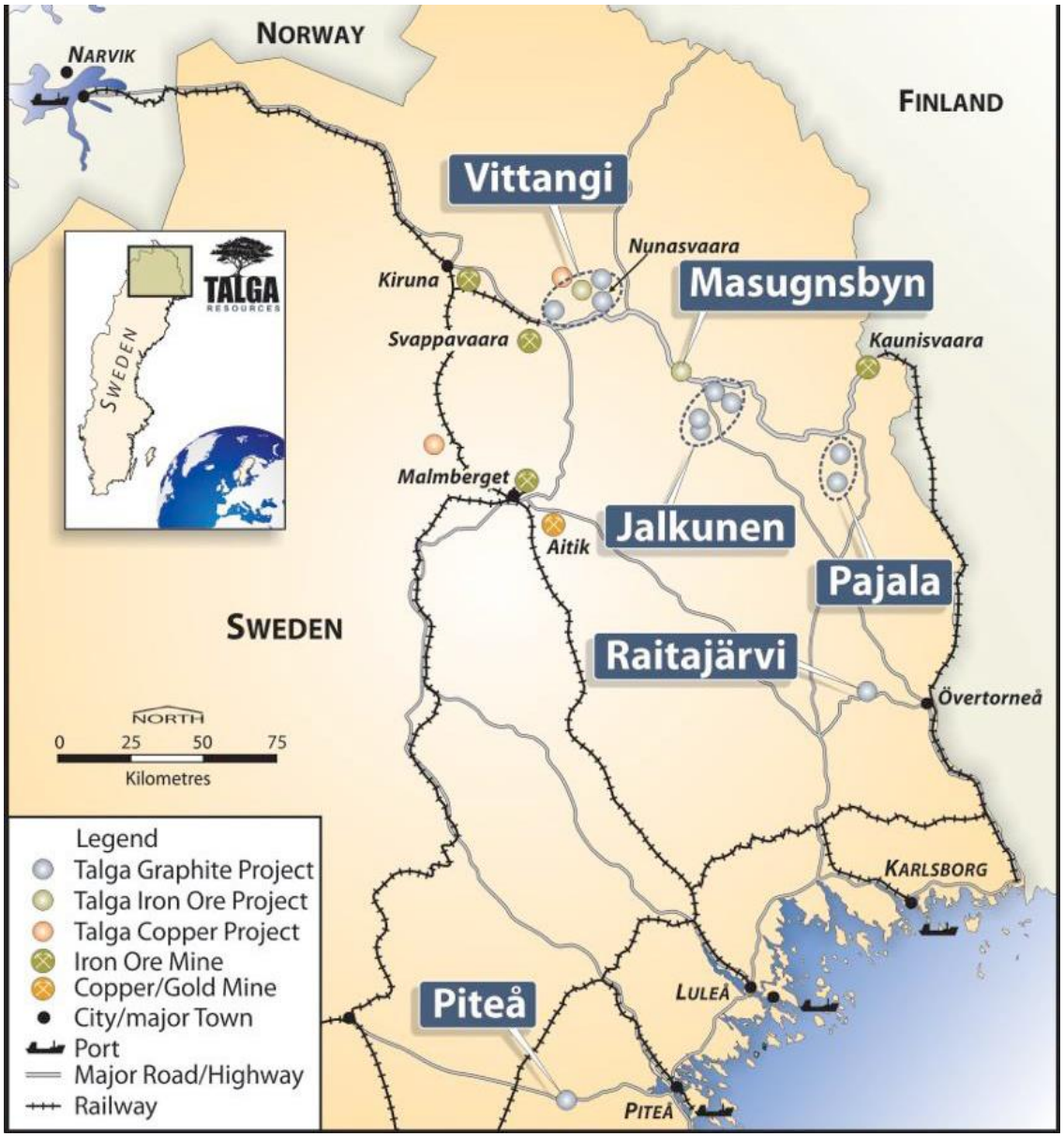
- ***SAKATTI***

Recent giant copper-nickel discovery with magmatic source affinities similar to Nebo-Babel deposit in Musgrave region. Future significant mine. Pentlandite and chalcopyrite occur as disseminations, veins, semi-massive and massive forms.

The second part of the talk focussed on graphite and graphene. Talga Resources Ltd. has 100% ownership of five graphite deposits in northern Sweden. Two of these, Nunasvaara (Vittangi) and Raitajarvi, are advanced stage projects with JORC Indicated Resources and are undergoing economic studies (see map below). The Pitea project is in the early stages of drilling.

Graphite is a crystalline form of carbon that forms in nature when carbon-rich rocks undergo metamorphism (pressure/temperature induced change). It can be synthesised but at very high cost. It has remarkable properties of electrical and thermal conductivity that make it useful for a large range of applications.

Consumption is diverse with significant markets in steel production and refractories (>50%), automotive parts, lubricants and batteries. Graphite is a significant component of many types of battery, particularly Li-ion which contain 10x more graphite than lithium in battery anodes. Electric vehicles can use up to 100kg graphite per vehicle in batteries. Natural graphite demand is about 1.1Mt/yr with China and Brazil supplying >80% worlds production.



Map taken from Talga Resources investor presentation.

Graphite (the mineral) consists of parallel sheets of carbon atoms in a hexagonal lattice, which, when one or few atoms in thickness, are called graphene. Graphene is being produced today, but only in limited quantities and at high cost. When this material can be mass

produced cost-effectively, its impact could be quite disruptive. However, the pace of graphene commercialization is hampered by current limitations of production scale and cost.

Graphite ore-to-graphene requires multi-stage expensive processes but the unique characteristics of the graphite in Talga Resources' Nunasvaara ore deposit means that both graphite and graphene platelets can be liberated from the ore in a single step process.

Whilst there is considerable interest in the 'hi-tech' applications, and graphene-enhanced products are such as tennis racquets and riding helmets are becoming available, the main driver of near term graphene consumption may well be as additives to materials such as concrete, aluminium, steel and plastics. Small amounts of graphene can impart exponential increases in strength and promote anti-corrosion properties. Plastics can become conductive.

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Future Meetings

Annual General Meeting on 17th September, 2014

This meeting will be followed by a presentation by Susan and Vernon Stocklmayer on "A geotourist in Nambia".

Susan and Vernon have made numerous visits to Namibia over the last 15 years and have put together a light-hearted scenic tour through Namibia, discussing the geology, geomorphology and mineralogy of this fascinating country.

General Meeting on 19th November, 2014

After the General Meeting Kirsten Rempel from the Department of Applied Geology, Curtin University, will discuss "Gold Transport in Hydrothermal Fluids".

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Future Events

Combined Mineralogical Societies of Australasia Seminar and NZ Micro-mineral Symposium in New Zealand, 2014.

Final notice.

The 37th Combined Mineralogical Societies of Australasia Seminar will be held on Fri 31st of Oct and Sat 1st of Nov once more at Te Rau Aroha, Waihi Beach on the NZ's North Island. This Seminar is the main annual meeting for amateurs and professionals interested in minerals and is rotated annually around Australia with a meeting every 7th year in NZ.

Waihi beach can be reached using Auckland City to Tauranga buses (http://nakedbus.com/nz/bus/ 4 buses/day, www.intercity.co.nz/ 3 buses /day).

There are still some speaker slots available and speakers receive free Seminar registration and free Seminar dinner. Please contact the organiser ASAP if you are interested in presenting a talk. All speaker abstracts are required by 15th Sept please.

The Seminar is hosted in NZ by the NZ Micro-Mineral Group and is run immediately after the NZ Micromineral Symposium which will be held from Fri 24th Oct to Tues 28th of Oct.

All attendees are also invited to attend the Symposium which costs $100 for the Symposium with all food and basic accommodation from Fri through to Tues morning. An auction of donated material will be held on the morning of Mon 27th. The auction is used to raise funds to subsidise future Symposiums and this year will include a number of desirable and rare items including a number of NZGS Bulletins.

A series of fieldtrips will be held on the days between the 2 meetings as detailed below:

Tuesday October 28th Practical mineral photography day including equipment and photo stacking (Venue charge for those not staying at Te Rau Aroha)
Wednesday October 29th Field trip to White Island
Thursday October 30th Field trip to Lake Rotokawa or another thermal area (may be a venue charge)

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The Seminar consists of a day and a half of mineral talks (30 mins each) and half a day of mineral sales.

Friday October 31st 9.00 am - 9.30 am Registration
9.30 am - 5.00 pm Sessions 1,2,3 & 4
7 pm Seminar dinner
Saturday November 1st 9.30 am - 12.30 pm Sessions 5 & 6
1.30 pm – 4.30 pm Micromounting, Minerals sales and displays

All of the Seminar talks are amateur friendly and the meeting is an excellent opportunity to meet with like minded people from all over NZ and Australia as well as several guests from further afield. Basic accommodation is available at Te Rau Aroha at $20/night for both the field trips and the Seminar but you will need a pillow and sleeping bag. There is plenty of other accommodation options available in the immediate area.

For further information contact:
Rod Martin
pincha@ihug.co.nz
09 4445-463

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New Members

Emma Haymes, Max Taylor and Mumazil Shah had their membership applications approved at the Committee Meeting held on Saturday 26th July 2014.

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Field Trips

Western Australia Lapidary and Rockhunting Club Inc.

By arrangement, members of the Mineralogical Society are able to go on field trips organized by the Western Australia Lapidary and Rockhunting Club Inc. If you are interested in attending these field trips please put your name on the notice board at the Lapidary and Rockhunting Club for the relevant field trip.

Please register with Minsocwa Field Trip organizers prior to attending any of the field trips to confirm event details.

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Committee Members

The following are the committee members.

Committee Members	
Stewart Cole - President ph 0414 904 169	Nimal Perera - Social Officer/Field Trips Leader
Sue Koepke - Secretary ph 0417 990 688	Vernon Stocklmayer-Newsletter Editor ph 92919043
John Mill – Treasurer ph 0411420921, 92934664.	Ida Newton
Geert Buters - Vice President	
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