

## MINSA Night at the Museum

MINSA has been inundated for a while with requests to make our activities more child/family friendly. As a kid, I was fortunate enough to partake in a “World Conservation” merit badge weekend for boy scouts, which involved sleeping over and performing tasks at what was then known as the Transvaal Museum of Natural History. Curious to see if the museum (now known as the Ditsong Museum of Natural History) still offered such activities, a Google search soon revealed that educational sleepovers aimed at children were still on the cards, and in fact would be easier to perform in family groups due to available chaperones. With this in mind, a MINSA family sleepover was planned for 27 – 28 November 2015.

Friday the 27<sup>th</sup> saw all participants (34 participants from 8 families: 18 adult chaperones/parents with 16 kids) make their way to the Minaar Gate entrance to set up (sleeping places, food storage, dinner, etc) inside the museum. Our guide for the evening, Sibusiso, after leading us to the outside of the museum to see replicate dinosaur fossils and the “iconic” blue whale skeleton, led us to the bird hall (of ~875 stuffed birds and other ornithological interests) to explain the proceedings of the evening.



*Sibusiso and the bird hall induction*

Firstly, each hall would be visited (barring the geological hall and activity centre, which would be seen early the next day) for educational reasons but mostly to pick the best place to sleep (softest carpeting, least intrusive stuffed animal hovering over

you so you didn’t have a heart attack when waking up the next day, etc.). It was during a palaeontology discussion that Sibusiso pointed to a large Megalodon skeleton and asked the kids what fossil it was, to which one of the young’uns replied, “Godzilla”. I cannot ever recall visiting a “National Museum of Popular Culture”, but anyway...



*A ramble outside in the evening*

Dinner was had once the educational activities had been satisfied. Thereafter, a treasure hunt took place in family groups, with the evening ending in a screening of *Night at the Museum* starring Ben Stiller. Saturday saw us enter the Ditsong Technology and Discovery centre which, similar to the Sci-Bono Discovery Centre in Newtown, is meant to encourage a hands-on approach to the appreciation of science. Thereafter, the geological exhibit (which is actually under the auspices of the Council for Geoscience) was opened to all to explore.

Overall, a fun and exhilarating sleepover was had by all and requests have already been made to repeat the event in 2016 (at around the same time). Keep a look out for MINSA notifications concerning the event. Don’t miss out! – Igor Željko Tonžetić

*MINSA is always looking for excursion ideas or leaders. If you have a great idea but are not in a position to lead an excursion let us know and we’ll try to make it happen. Contact the editor or author ([igor.zeljko@gmail.com](mailto:igor.zeljko@gmail.com), 0826402442). MINSA also has an archive of previous excursion tour/field guides that can help with logistical preparation. These are freely available to anyone who requests them.*

## Betta Sanitaryware Factory visit

From the days when the Romans introduced sewer systems to collect rainwater and sewage, indoor baths and toilets have gradually become part of everyday life. From those early days right up to the modern world, ceramics have been the material of choice for sanitaryware even though new materials (plastic and other composite materials) have been introduced over the years. On 28 November 2015 MINSAs members visited Betta Sanitaryware Factory, one of the dominant suppliers of sanitaryware in sub-Saharan Africa. The factory employs 350 permanent staff and produces over two million pieces of ceramic components a year. The company also has an acrylic bath factory in the same complex, but this tour covered the ceramic sanitaryware factory only, where ceramic toilets bowls and water tanks are made. The group was taken to the various stations of the factory by two senior technical staff members. The first area to be visited was the raw material storage facility; the raw materials used consist of granite, sand and various clay minerals. These are mixed together in well-controlled proportions to meet the required properties of the final products. The next station to be visited was the milling room, where the coarse raw material mixture is milled in large rotating mills with water and other components added. The resulting liquid mixture is stored in large underground tanks. The next area to be visited was the moulding station, which is a highly automated part of the factory. In this area, the watery material from the underground storage tanks is pumped through a series of pipes into moulds. The high pressure in the mould forces the water out leaving the solid material behind in the form of a toilet bowl or water tank. When removed from the moulds, the tanks and bowls are still wet and are left to air dry for over 10 hours before they are put in drying tunnels at temperatures as high as 65°C. The



**Liquid mixture after milling of granite, sand and clay with water and other components**

takes place in the drying room. Next we visited a station where all the surface imperfections from the tanks and bowls are manually removed by technicians using sandpaper to smoothen their surfaces. The toilet tanks and bowls are then sent to the glazing area, where a robotic arm sprays a layer of liquid glaze that will give them their final glassy look and increased strength. After the spraying process, the pieces are then put in a gas fired kiln at 1 200°C for 12 hours, where the pieces get their final look that is characterised by smooth shiny surfaces. From the kiln the toilet water tank and bowl are ready to be branded, packaged, stored and shipped around the world. The trip ended with lunch provided by the company's canteen. – Joseph Mogoru (photos courtesy Desh Chetty)



**Glazed pieces being fired in a gas kiln**

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## Quantum mechanics talk by Prof. Andrew Forbes

On 25 February 2016 Prof. Andrew Forbes from the University of Witwatersrand gave a special MINSAs talk at the University of Johannesburg. Prof Forbes is from the Department of Physics and heads up the laboratory for Structured Light. The title of his talk was “1,2,3... infinity: quantum mechanics with pictures” and covered how photons and their spatial modes, or “patterns” of light, are used to study high-dimensional quantum states. Quantum entanglement of these photons took centre stage, with Prof. Forbes explaining the instantaneous transfer of data (aka teleportation) in an easy-to-understand manner by presenting some of the experiments that have been done in his lab. There was also a special appearance (alive AND dead) by Schrödinger’s cat, which this writer now understands a bit better. The talk was extremely well presented and exposed the attendees to a broader field of science we in mineralogy know little about. MINSAs would like to thank Prof Forbes for his excellent contribution to our talks for 2016.

– Bertus Smith



**Prof. Forbes thanked by Bertus Smith (photo courtesy Igor Tonžetić)**



*The annual MINSA committee lunch (nowadays a New Year's lunch rather than a Christmas lunch) was held at the Vigour and Verve Restaurant at Silverstar Casino, Krugersdorp on 24 January 2016.*



## ***Cape Town a hotspot for process mineralogy***

Delegates representing a variety of disciplines, ages, nationalities (including 4 different continents) and experience were all recently challenged to engage with process mineralogy from a 'new perspective' on the UCT Continuing Professional Development Process Mineralogy short course from 24-27 November 2015. In the delegates' own words, they have described the course as: 'encouraging learning', 'being stretched out of my comfort zone', 'the importance of team work', 'real learning in practical applications' and 'a privilege to be part of'. This is the 10<sup>th</sup> anniversary of the course, which was first run in 2005 - and which has continuously evolved and further developed into a unique problem-based learning experience facilitated by Dr Megan Becker and Prof. Dee Bradshaw. The course includes various interactive discussions; physically identifying rocks and minerals; working with, reporting and presenting process mineralogy data; over and above traditional lectures. The course culminated in a final session facilitated by our special guest lecturer Dr Robert Schouwstra on 'Where to now, armed with process mineralogy?' which prompted responses such as 'I'm going to spend more time with the mineralogists on site (actually we share an office)', and 'I'm going to write shorter reports that give the metallurgist only the information they need to know rather than all I've done'. Due to popular demand, the course will be run again in mid-2016.



***(Left) The winning team of delegates for the 1st practical, hard at work physically characterising one of the site specific case studies (UG2 Chromitite PGMs) in the geology labs at UCT. (Right) The winning team of delegates for the 2nd practical, presenting their findings on how to interpret recovery-by-size, and recovery-by-size-by liberation process mineralogy data for a Pb-Zn concentrator.***

Opportunities for site specific process mineralogy case studies exist. For further details please contact Dr Megan Becker ([megan.becker@uct.ac.za](mailto:megan.becker@uct.ac.za)). The course is limited to 18 delegates. A special note of thanks to the MEI website, which once again has demonstrated the wide support and readership it has globally within the minerals engineering community – through which some of the European delegates found details of the course. Dr Megan Becker is the official conference consultant for Process Mineralogy '17 which will also be held in Cape Town and promises to be another exciting event from MEI. Even though the mining industry may be under pressure at present, there is still a positive indication of clear enthusiasm in recognising the valuable role which process mineralogy plays right through the minerals beneficiation flowsheet. We will be announcing the keynote speakers for Process Mineralogy '17 early next year, so watch this space... – Megan Becker



***Delegates and lecturers on the UCT CPD Process Mineralogy course***

## MSSA 2015 in Pretoria

The 53<sup>rd</sup> Annual Conference of the Microscopy Society of Southern Africa was held at the St George Hotel in Pretoria from 30 November to 03 December 2015. The Technical Forum was held on the first day and dealt predominantly with new techniques and instrumentation. The Forum is a useful indicator of current interest and popular choices in the fields of applied mineralogy, metallurgy, physics and life sciences. Some of the presentations were given by overseas visitors and a Trade Exhibition ran concurrently at the conference. The conference itself occupied three days, kicking off with two plenary and one keynote speakers, followed by seventy-nine oral and poster presentations.



**Part of the trade exhibition**

There were five sessions for discussion at this year's Technical Forum: Sample Preparation Techniques, Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Spectroscopy, and Correlative Microscopy. The main directions of micro-beam technology development at the moment are as follows: SEMs are achieving higher magnifications and operating at lower acceleration voltages. There is increased use of Cathodoluminescence (CL) and Electron Beam-Induced Current (EBIC) in the geological and semiconductor fields, and the materials being investigated are more complex. As with the Technical Forums of the last two years, there was great emphasis this year on detector development and refinement, low voltage analysis and HR-TEM. Hot topics this year included CL techniques and lithium analysis by SEM-EDS. Notably absent were XRM/XRT presentations, apart from a brief mention by one of the trade speakers.

Presentation of the conference papers followed on the days after the Technical Forum, with parallel sessions being held for Life and Materials Sciences. Highlights of the Life Sciences presentations this year included neuroscience studies on Alzheimer's disease, transient ischemic attack (TIA) and migraine. The hot news of the Materials Science sessions was nuclear power-related. Globally, there is a drive to find uses for nuclear waste; and an interesting saltwater technique that has been developed in the UK. There is still emphasis on the safety of nuclear reactor materials in South Africa but the focus has moved from the pebble-bed reactor process materials to rod coatings, such as Zr±Nb alloys.

A technique has been developed to simulate material irradiation inside a reactor. This is known as Swift Heavy Ions (SHI), with the damage or products being examined by various micro-beam techniques.

The number of geology/mineralogy-related talks increased this year and included diverse topics such as EDS-WDS microanalysis of the Earth's crust and sedimentary rocks, high voltage rock crushing, dust analysis, Atom Probe applications in geology, defects in badeleyite (ZrO<sub>2</sub>) and platelets in diamonds.

Three members of the MINSA Committee presented at the conference. Igor Tonzetic discussed autoSEM analysis of dust, Roger Dixon described the benefits of high-voltage mineral size reduction, and the author presented the applications of microanalysis in the study of Argent smelter slags.

The conference ended with the Annual General Meeting. Copies of the various reports are available. MSSA 2016 will be hosted by Nelson Mandela Metropolitan University (Port Elizabeth). – *Lesley Andrews*

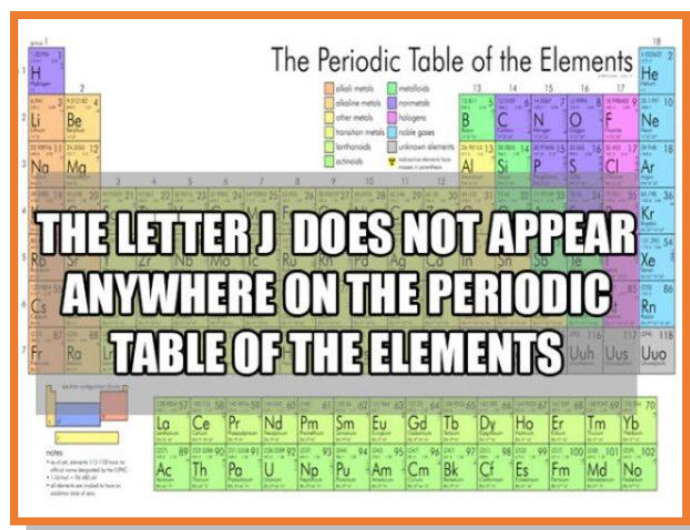


### Reminder

**Registration for the MINSA XRD round robin still open. Contact Darren Tiddy ([darren.tiddy@angloamerican.com](mailto:darren.tiddy@angloamerican.com)) to participate or for more information.**



### Did you know?



### **Upcoming events**

- ◆ *Talk by Prof. Bruce Cairncross on his book 'Minerals of the Kalahari', Tuesday 7 June 2016, University of Johannesburg Reading Room*
- ◆ *MINSAs at IGC35 – Minsas will be actively participating in the 35<sup>th</sup> International Geological Congress in Cape Town, 27 August to 4 September 2016. The MINSAs AGM will take place in Cape Town during this time, date to be*



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***If you have any news that would be of interest to the MINSAs community, contributions can be sent to Keshree Pillay ([keshree.pillay@angloamerican.com](mailto:keshree.pillay@angloamerican.com))***