Report on CONASTA 63, University of Adelaide (July 7-9, 2014)

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Everyone is different – different things excite different people. Some are switched on by music, some by art, others enjoy reading fiction, and others follow sport. While I enjoy a number of these pursuits, the thing that excites me most is Science. It’s not just a professional interest; I enjoy reading it, watching it, doing it and especially teaching others about it. So an opportunity to be immersed in Science, and opportunities to enhance my teaching of it, seemed like an ideal way to spend three days of my July break. And the fact that the Teachers Registration Board was paying for me to get my “fix” was an added bonus!

My three day Science experience was CONASTA 63, the 63rd annual National Science Educators’ Conference convened by the Australian Science Teachers Association at the University of Adelaide. Over those three days I heard from/spoke to people engaged in the joy of Science at all levels, from sales people to laboratory technicians, professors to teachers, and curriculum designers to researchers. The breadth of Science covered was extensive as I learned about fibres and photons, molecules and mass spectrometers, parasites and pooters, and even how to use a pair of socks to model homologous chromosomes. I got to chat with others teachers and find out how they “do it”, got to see and try new teaching resources and engage in what has to be one of a teacher’s favourite conference activities – “collecting stuff”.

The theme of CONASTA 63 was “The Human Faces of Science”. This theme was designed to connect with the Australian Curriculum Strand, “Science as a Human Endeavour”. The Keynotes, the Science Cutting Edge sessions and the Science Snapshots featured an array of presenters who described not only the fruits of their research but also the processes involved and a bit of their personal story. This “human face of Science” gave me an opportunity to learn a little of the journey that has brought individual scientists to their particular point in their career. This is a message I have been able to share with my students – Science can take you to these places and give you these experiences.

The personal highlights of the conference were not necessarily directly related to my teaching but did enrich my understanding of Science and hence provided a breadth of knowledge that I can take into the classroom. As I mentioned above, my interest in Science is not purely professional. I enjoy learning and having my mind stretched by hearing about current research and new frontiers in Science. The conference provided numerous opportunities to be stretched.

It was disappointing that both Nobel Laureate Professor Brian Schmidt and Australia’s Chief Scientist Professor Ian Chubb were unable to attend the conference as was originally scheduled. However, there was still an impressive line-up of scientists at the fore-front of their areas of research beginning with Professor Bob Hill. Prof Hill presented fossil evidence of the plants that used to occupy southern Australia millions of years ago and compared them to the extant flora to highlight the dramatic climate change that has occurred over this time. His team’s research into the shift from rainforest species to arid-adapted, fire prone vegetation gives us an insight into what can be done to limit the risk of bushfires into the future.

Professor Joe Shapter’s session on Clean Energy provided a plethora of interesting facts about current and potential sources of energy for Australia. I did not know, for example, that 25% of the electricity generated in the world does nothing but heat up wires, resulting in considerable transmission loss. He presented a
balanced discussion of energy sources, looking at the pros and cons of each source and posed the question, “Is there any such thing as “clean energy”?

Professor Tanya Monro introduced us to photonics –the science of the photon. The University of Adelaide’s Institute for Photonics and Advanced Sensing is a world leader in this field which brings together physics, biology and chemistry to create new discovery, diagnostic and measuring tools. Some of the applications Prof Monro spoke of are the things that are a science fiction writer’s dream: optical materials which bend light to make objects invisible and micro-scale sensors to obtain real-time studies of what is happening inside cells. New materials and new ways of sensing have applications in defence, environmental monitoring, health, food and mining. This is exciting Science and it’s happening right here in Adelaide!

I was interested to hear Prof Monro talk about how lasers, which are now used in so many devices, were invented back in the 1960’s by scientists just “exploring something interesting”. This is a strong argument for the importance of “pure Science”, scientists given free rein to just explore, and how it can eventually have some very real and practical benefits. This is opposed to today’s model of scientific research funding which favours “applied Science” where the goal is to produce an instantly marketable product.

Other speakers provided equally stimulating brain fodder from Professor Chris Daniel’s entertaining tales of the Citizen Science studies of urban wildlife, to Dr Tara Pukala’s explanation of how the chemical methods of X-ray crystallography, NMR spectroscopy and mass spectrometry are being used to study protein misfolding diseases. As I wrote earlier in this report, such presentations may not directly influence or inform my teaching but they have enhanced my understanding of Science and therefore allowed me to enrich my lessons. I have already spoken to my classes on a number of occasions about titbits gained from the conference.

A brief but informative session of the conference was the ASTA Forum. During this forum, teachers from each of the states gathered informally to discuss issues which impact on the teaching of Science. It provided a good opportunity to share experiences and problems, and to compare similarities and differences across urban/rural schools and private/public schools.

In the section above I have highlighted some of the conference experiences that were not necessarily directly related to my teaching. However, there were aspects of the conference and sessions which did provide practical ideas/experiences that I have brought back to my class and school.

Two sessions provided support for developing students’ Science Inquiry Skills. CREST (conducted by CSIRO Education) is a program that guides students through carrying out their own open-ended investigations. This program encourages creativity and perseverance and has the ability to challenge and motivate students to take control of their own learning. A comprehensive booklet guides students (and teachers) through the steps involved in the scientific inquiry process. Another session run by Harry Kanasa also provided strategies to support higher-order thinking and science experiment planning. It discussed data types and looked at a process to help students create their own data tables and graphs. I have since shared the information gained through these two sessions with the Science KLA staff at my school and used some of the processes in my Year 9 Science classes.

Merrin Evergreen (teacher) ran a session on the use of modelling in the classroom to make learning of difficult concepts in Biology more accessible. Merrin provided a number of hands-on props that teachers can use with students to visualise abstract scientific phenomena. Colour flashcards, wordlists, pipe cleaners, soft toys and even socks can be employed to help students understand the language and concepts involved in Science.
One inspirational session was conducted by Sarah Chapman, a teacher from Townsville. She demonstrated creative and innovative ideas to enthuse and engage students in Science. Since returning to school I have used her “Molecular Gastronomy – a tasty look at Science” ideas during our school’s National Science Week activities.

A program out of WA known as SPICE provides a range of multimedia learning packages for the Australian Curriculum Years 7-10. These resources include movies, interactive learning objects, podcasts, IWB presentations and text-based materials to cover a range of topics such as electricity, cosmology, soft drink science, wetland chemistry and many more. All of these may be downloaded for free!

One exciting program I learned of was Earthwatch’s Climate Watch. This was particularly relevant for me because at my school we have been looking at a way for students to make meaningful observations and records of flora and fauna on the school campus. The Climate Watch program provides a way of developing a nature trail through the property and making seasonal observations of certain species. Over time this builds into a spatial picture of change in the area. The trail and accompanying data sheets gives a focus for these observations. I have shared this program with colleagues. We have signed up with Climate Watch and are currently developing our nature trail.

Overall, the three days of CONASTA provided a wealth of knowledge and experiences that have served to sate my appetite for Science, informing me both personally and professionally. I have come away from the conference with increased knowledge that will enrich my teaching, and a variety of “new tricks” that I can and have used to help improve my students’ understanding of, engagement with, and enthusiasm for, Science. I have, and will continue to, share my knowledge and experiences with colleagues in my KLA. All in all, three days well spent.

Thank you to the Teachers Registration Board for sponsoring my attendance at this event.