

Science and creativity



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In my final column as Editor of *Preview* I thought we would look at the issue of science and creativity. This was prompted by a Letter to the Editor from Dr Phil Schmidt (see box), which was published in the *Sydney Morning Herald* on 16 April 2012. Phil clearly makes the point that creativity is vital in scientific breakthroughs – joining the dots and examining data is only part of the scientific process. It seems that for all the emphasis on science communication in recent decades, the scientific profession is still poorly understood by those outside it, and perhaps especially by many politicians.

Science education is largely based on learning a rigid set of mathematical and physical laws. School and university assessments are based on remembering and applying those facts and laws correctly. Even laboratory classes involve running an experiment for which the answer is usually already known, and everyone in the class should get similar results. If your only experience of science is a rigid set of rules and laws that need to be applied in certain ways to pass a test or exam, then perhaps it is understandable that you will not recognise the creativity required to be a practising scientist.

I wonder if you have stopped to think before that geophysicists need to be creative in order to be successful? For example, instrumentation design requires innovative ideas to minimise noise, increase measured signal, operate efficiently and safely, or make measurements over difficult terrain or in harsh environments. These drivers have seen a myriad of different geophysical

instruments developed over time to address particular exploration or environmental needs. Similarly, data interpretation constantly evolves. I remember hearing Doug Oldenburg say earlier this year, that developing data inversion methods is an iterative process of deciding what approximations are acceptable for a given problem. We can't invert real world geophysical data exactly, so algorithms are designed to do the best job possible, and these continually evolve and develop as new ideas and approaches are trialled.

Recently I have been reading a book by John D. Barrow titled *The Artful Universe Expanded*. Barrow's book examines the so-called divide between 'art' and 'science' and he makes the following observation:

While some people are skilled in the creation of interesting sights and sounds, others are trained observers. They seek out unusual sights, or register events that many of us would never notice. Some, with the help of artificial sensors, delve deeper and range farther than our unaided senses allow [surely, the perfect description of a geophysicist].

He goes on to say that:

...emphasis upon science as just another human activity, rather than a process that involves discovery, can be a subtle manifestation of opposition to the scientific enterprise by downgrading the status of what it does.

The latter point strikes a chord with Phil Schmidt's objection to Paul Keating's comments (right). Phil is keen to encourage more scientists 'to write letters to dilute the crap that passes for information/debate in our newspapers'. I think we also need to do a better job of educating our future scientists to be analytical thinkers, careful observers, and creative problem solvers. Scientific problems have become more complex over time, and the new generation of

scientists will need to be adaptive and creative thinkers to meet these challenges.

Thank you

I would like to conclude with an enormous thank you to all the *Preview* contributors and ASEG members who have supported me over the last three years. These people have been so generous with their ideas and time – *Preview* continues to thrive as a result of these myriad contributions. I would also like to thank all those at CSIRO Publishing who have made my role as Editor so much easier.

John Theodoridis will take over the reins as Editor from now on. I know that with your support he will gain as much satisfaction as I have in continuing to produce an important ASEG publication for all members.

Letter to the *Sydney Morning Herald*, 16 April 2012

Science maligned

Once again we learn just how little politicians know about science. On Thursday's **Conversations with Richard Fidler** on ABC radio, the former Prime Minister Paul Keating waxed lyrical about music and the arts, and how creative musicians and artists are, making beautiful sounds and images from where there was nothing. On the other hand science was simply observational and joining the dots.

Such a simplistic view is ignorant. Take Erwin Schroedinger's equation, for instance. That was not derived by joining the dots. It was as much a masterstroke as Handel's **Messiah**. Pure genius, as are many scientific and medical breakthroughs.

Interestingly, Einstein's 'Special Relativity' was a case of joining the dots, but not the photoelectric effect for which he won the Nobel Prize.

Phillip Schmidt North Epping