

The Royal Society of NSW Forum 2011

Wednesday 6 April 2011

Belief and science: the belief/ knowledge dilemma

A discussion between Barry Jones AO and David Malouf AO

Have scientists become polarised into the believers and non-believers? Barry Jones posed this question to David Malouf and members of the Society at The Royal Society of NSW Forum 2011 on Wednesday, 6 April 2011. Reflecting upon this, Barry referred to the scientific paradigm that has emerged over the last several hundred years: scientists gather information in order to try to make sense of observed phenomena using rational analysis. Science has evolved to become not so much a matter of belief but rather of acceptance of the most sensible explanation based on the accumulation of evidence. Nonetheless, when major paradigm shifts in scientific thinking take place, there are often eminent experts who disagree and refuse to accept the new theory. This slows down the acceptance of a new paradigm but ultimately in most cases rational thought prevails.

David Malouf pointed out that non-scientists have to rely on what they are told in order to evaluate scientific theories. He pointed out the significant shift since the 18th century when early scientists put their theories to learned academies (such as the Royal Society, London) for expert examination and they determined what was accepted as scientific knowledge and what was rejected. Today, however, with the highly complex issues that society faces there are significant public policy implications that need to be resolved based on expert advice. But what do we do when the experts disagree? We are largely dependent on the media to inform us. This is further complicated because important issues

are usually not just scientific in their nature but often have economic and social imperatives that commercial groups, governments and other interests seek to manipulate. Barrie commented that the sheer complexity of science has forced scientists to increasing specialisation. Furthermore, scientists are heavily reliant on research grants from government and private enterprise and this has discouraged them from entering into controversies. This is quite different to the year of only 50 or 70 years ago when renowned scientists were not afraid to comment outside their area of specific expertise.

David referred to the great advances that were made in the 17th, 18th and 19th centuries, for example, by Kepler, Newton, and Darwin. Darwin's book, *On the Origin of Species*, was very readable but most science in the 20th century has become so complex that it is not able to be so readily accessible to the layman. Furthermore, whereas once scientific advances were often made by one person, nowadays it is far more likely for the work to be attributable to a team of scientists and it is often the "front man" who gets the Nobel Prize! Science is often seen to be different from other subjects but that is not really the case – just requires a different mindset. Barry referred to the mindset underlying creationism in the US, pointing out that often a deep-seated belief cannot be shaken by debate and discourse. Nonetheless, articles on science and the relationship between science and belief in popular magazines and

newspapers are important. Writers like Richard Dawkins and Stephen Hawking had not only popularised science but through their lucid writing had brought important arguments to a large public audience.

In their final comments, they concluded that the task of a scientist is to analyse inconceivably complex data and make sense

of them but the public policy imperatives are driven by a media outcomes and necessarily requires the debate to be simplistic. The more we know about the complexities of nature, of the human body, the weather and so on, the more complex the questions. Science has been enormously successful and exciting in bringing an understanding in a world that we know so little about.



The Dirac Lecture

Friday, 29 April 2011

Beauty and truth: their intersection in mathematics and science

Robert Lord May of Oxford AC FRSN



On 29 April 2011, Robert Lord May of Oxford, perhaps the greatest mathematician that Australia has produced, was invested as a Fellow of the Royal Society of NSW by the Society's Patron, the Governor of NSW. Earlier that day, Lord May presented the

Dirac Lecture at the University of New South Wales, jointly sponsored by the Society. The topic of Lord May's lecture was "Beauty and truth: their intersection in mathematics and science". He took us on interesting exploration of some of the important concepts of mathematics, from Euclidean geometry via the concept of imaginary numbers to the mathematics of fractals and chaos theory and the extraordinary power of mathematics to describe observed real-world phenomena. Updating the observation by Galileo, "this grand book is written in the language of mathematics, and its characters are triangles, circles and other geometric objects", Lord May pointed out that rather than triangles and circles, today the mathematical objects are more likely to be fractals and "strange attractors".