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The Royal Society of New South Wales

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July 2014

Future Events

Wednesday 6 August 2014

**1223rd Ordinary General Meeting
Saving Australia through Science
Education**

Speaker:

Emeritus Scientia Professor
Eugenie Lumbers AM FAA DistFRSN
Union, University & Schools Club
25 Bent St, Sydney
6:00 for 6:30 pm

Wednesday 3 September 2014

**1224th Ordinary General Meeting
Scientia Professor Ian Sloan**

Topic to be advised
Union, University & Schools Club
25 Bent St, Sydney
6:00 for 6:30 pm

SOUTHERN HIGHLANDS BRANCH

Thursday 14 August 2014

**Green Materials & Recycling End-of-
life Polymers in Steelmaking**

Delivered by:

Professor Veena Sahajwalla
Centre for Sustainable Materials,
Research And Technology University
NSW
*The Performing Arts Centre,
Chevalier College, Bowral*
6:30pm

For more upcoming events see website
www.royalsoc.org.au

Patron of The Royal Society of NSW

Her Excellency The Honourable Dame
Professor Marie Bashir AD CVO
Governor of NSW

Wednesday 6 August

Saving Australia through Science Education

Emeritus Scientia Professor

Eugenie Lumbers AM FAA DistFRSN

1223rd Ordinary General Meeting

Union, University & Schools Club

25 Bent St, Sydney

6:00 for 6:30 pm

At no time in human history has the demand for a highly educated highly skilled workforce been so necessary. In particular, the workforce of tomorrow needs to be educated in science and mathematics beyond high school level. Yet there has been a continuing decline in science education since the 1990s so that in 2010, only half of our school children were studying science beyond the first four years of secondary education.

The Australian Academy of Science is heavily involved in the introduction of innovative science learning programs for all levels of education, from primary to early secondary, and now to upper secondary, and there is a positive attitude in the community towards science. It has to be said that Australia is now at a cross roads in terms of its scientific and technological literacy.

A concerted effort by all educators at all levels, the community and business to promote science education and science as a valuable and satisfying profession is required if Australia is to maintain its current position in the world.



Professor Eugenie Lumbers is an internationally respected authority on foetal and maternal physiology. For many years she has worked in cardiovascular and renal physiology, with particular reference to blood

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From the President



On Wednesday 2 July, there was a complimentary cocktail party to welcome a number of new Fellows to the Society and present them with their Fellowship certificates. It was a very successful evening with over 60 people present and was followed by a most interesting presentation by Professor Graeme Stewart AM on progress in identifying causes of multiple sclerosis, particularly the role of genes in developing the disease. Over 20 people stayed for stimulating discussion over dinner.

I mentioned in my report last month that the Council is starting to plan events with a much longer future horizon. We are delighted to announce that the Liversidge Lecture 2014 will be presented by Professor Martin Banwell of the Australian National University. Professor Banwell is a distinguished organic chemist whose research focuses on the development of new strategies and methodologies for the synthesis of biologically active natural products and their analogues. These substances are important because they can be used to treat diseases such as early childhood leukaemia, bladder cancer and in the development of novel antibiotics. The exact date is yet to be confirmed but is expected to be during November. The

lecture is delivered every two years in conjunction with the University of Sydney and the Royal Australian Chemical Institute.

The Society is also pleased that we have exchanged letters of interest with a European research consortium known as the International Zeta Exawatt Science Technology (IZEST), in conjunction with ANSTO and the Centre for Ultrahigh Bandwidth Devices for Optical Systems (CUDOS) at the University of Sydney. IZEST is a research programme aimed at using ultra high energy lasers in such applications as nuclear fusion and medical diagnostics. The Society has offered its services to provide a neutral forum for sharing of progress on research initiatives of the various research groups involved in this in Australia. The Society has also offered to publish these in the Journal and Proceedings.

The Council is grateful to the Chief Scientist and Engineer of NSW, Professor Mary O’Kane for agreeing to chair the advisory panel that will work with the Society’s awards committee to identify the winners of the 2014 awards. The awards process is just getting underway – if you are aware of deserving nominees, please submit them to the chair of the awards committee, Professor Brynn Hibbert.

If there are any issues you would like to raise with me, I am easily contacted by e-mail at president@royalsoc.org.au and would like to hear from you.

Donald Hector

A note from the office

Paper copies of minutes and agendas for ordinary general meetings will no longer be distributed. Copies will be sent electronically to each member’s current email address.

In the case of the annual general meeting or any special meetings, the papers will be distributed, either electronically or by mail, according to the member’s preference that has been notified to the Society.

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pressure regulation in the renin-angiotensin system. She graduated MBBS in Adelaide in 1965 and received an MD in 1970. She was awarded a DSc at the University of NSW in 1986 where she was given a personal chair in 1988. She received the Vice Chancellor’s Award for Teaching Excellence in 1997, became Scientia Professor in 1999 and Emeritus Scientia Professor in 2003. She received the Centenary Medal of Federation, Australia in 2001 and was elected Fellow of the Australian Academy of Science in 2002. She became a Member of the Order of Australia (General Division) in 2012. She is a Distinguished Fellow of the Royal Society of NSW. In 2007 she developed new research interests at the University of Newcastle and was awarded an NHMRC grant in 2008. She further expanded her research interests in 2009 with three other NHMRC grants. She also has a conjoint professorship at the University of Queensland which extends to 2016. She has received grants from the National Heart Foundation, Kidney Health and the ARC. She has over 175 publications, including 145 refereed papers, book chapters and other writings.

What causes MS? The impact of the genetic revolution

Report of July Meeting 2014

Professor Graham Stewart AM, Director Of Clinical Immunology at Westmead Hospital, has researched the genetic influences on disease, in particular on multiple sclerosis (MS). MS is the commonest chronic neurological disorder of young and old. It usually starts with a relapsing/remitting phase (where symptoms occur and then go into remission for extended periods), usually with onset at about the age of 30. The disease can be relatively benign with periods of disability, it can present as a relapsing/remitting disease with gradual increase in disability, or in about 10-20% of patients it can present as being “primary progressive”, where disability progressively increases over time. MS is caused by the body’s immune system malfunctioning – macrophages devour the myelin sheath around nerve cells, exposing the nerve axon and thereby disrupting the flow of information along the nerve cell. The body is able to repair the damage by remyelinating the nerve cells after this initial attack however if the myelin is attacked the second time in the same place, the body is unable to repair the sheath and relapse occurs. Hence the symptoms of the disease progress.

The important question is what causes this? MS is a disease which is clearly influenced by genes and environment. Studies of the disease in identical twins show 30% concordance, whereas in fraternal twins there is 4% concordance. The background incidence rate of MS is 0.4% of the population. This suggests that genetic influences are very significant but environmental factors are also a consideration. The interesting environmental effect is that the incidence of MS is quite highly

correlated to latitude – for example, in Australia there is a 4 to 7 times hazard ratio between North Queensland and Tasmania – in the southern hemisphere, the further south you live, the more likely you are to contract MS. The most likely reason for this is the reduced exposure to UV-B light the further you are from the equator and vitamin D deficiency. Other environmental factors include smoking and exposure to the Epstein-Barr virus that causes glandular fever (almost all MS patients have been affected with Epstein-Barr virus). The fact that Epstein-Barr virus is implicated in virtually all MS cases may present an opportunity for treatment if the effect of this virus on DNA is understood.

Since the early 1970s, there has been a search for the genes implicated in MS. The first was found in 1972 but it was not until 2007 that the second gene was identified. Since then, as a consequence of the human genome project and widespread sequencing technology, together with the recent advances in computer power and statistical algorithms to handle large amounts of data, there have been

over 100 genes identified. Pursuing genetic associations is expected to give insight into the pathogenesis, in particular the interaction between genes and environment. It is hoped that this will lead to interventions to prevent the disease from progressing. In addition, identifying genetic biomarkers may provide major opportunities for new treatments, including personalised treatments based on the individual’s genetic profile.

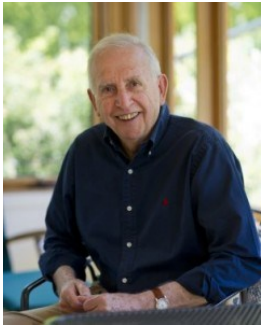
There has been substantial progress in treatments for MS, including trials of drugs to stop T cells crossing the blood-brain barrier, drugs that capture lymphocytes and hold them in the lymph nodes and early indications that drugs targeting specific proteins identified through genetic analysis might be useful. In addition, trials are underway to see whether large doses of vitamin D might have some impact and whether increased exposure to ultraviolet light might also offer some improvement.



Southern Highlands Branch

What is the 'good life'?

Report of June Meeting 2014



At the June meeting of the Royal Society Southern Highlands Branch, an audience of 105 attendees streamed into Chevalier College's Performing Arts Centre to hear **Dr Hugh Mackay** speak on his recent book, *The Good Life*.

Arguing that western society, including Australia, is in the grip of a modern neurosis he calls the "Utopia complex", Hugh Mackay presented an argument that modern obsessions with positivity, perfection, happiness and material prosperity are damaging our children and contradicting the very idea of 'the good life'. He then drew on numerous examples from ancient wisdom and from modern psychology to show how goodness – in the moral sense – could never be about 'me', but only about the quality of our personal relationships and our responses to those in need.

As a social researcher, Hugh Mackay has spent his working life listening to many thousands of people tell their personal stories. His lecture drew heavily on those stories to demon-

strate the conclusions he has reached about our Utopian fantasies, and our energetic attempts to turn them into reality. He spoke of our desires for the perfect investment vehicle, the perfect holiday, the perfect marriage, the perfect divorce, perfect offspring, perfect teeth etc. He then questioned whether these quests for perfection are truly satisfying for us, or whether they may in fact be simply fuelling our dreams while limiting our vision to the most trivial definition of 'good'.

Dr Mackay was highly critical of the common view that, according to the Utopian complex, happiness is our default position, our natural state, where all aspects of our lives should demonstrate a perpetual state of wellbeing. He asked why so many parents declare that their greatest wish for their children is that they be permanently happy. He said he is tempted to ask: Is that *all* you want for them? Do you want them to be as emotionally deprived as that? He argued that we grow through pain, and without sadness we would never realize what happiness is.

He then drew on ancient wisdom to explore what we mean by the term 'happiness'. In the fifth century BCE, Sophocles declared that wisdom was the chief element of happiness. A

century later, philosopher Aristotle taught that the ideal life was the life of *eudaimonia*, a word that has been popularly but simplistically translated as 'happiness'. Aristotle's idea of happiness included fulfilling one's sense of purpose, living virtuously and experiencing the richness of human love and friendship. In other words something that sounds very similar to the contemporary concept of 'wholeness'. Psychotherapist Carl Rogers, 1902-1987, when discussing his concept of wholeness referred to 'the fully functioning person'.

In concluding his provocative lecture, Hugh Mackay asserted that the good life is not the sum of our security, wealth, status, postcode, career success and levels of transitory happiness, as participants in the Utopian complex model would have us believe. Instead it is a life defined by our capacity for selflessness, the quality of our relationships and our willingness to connect with others in a useful and enriching way. Hugh Mackay used the old Russian proverb, 'Happiness is not a horse; you cannot harness it' to demonstrate that the pursuit of happiness for its own sake is a futile exercise. However, if you live the "good life", it will come to you.

Anne Wood

Dr Hugh Mackay is Honorary professor of Social Science, University of Wollongong and Adjunct professor, Faculty of Arts, Charles Sturt University.

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