The Bulletin 387

The Royal Society of New South Wales

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Tuesday 5 May 2015
Annual Black-Tie Dinner
(visitors welcome)

Members and Fellows are invited to attend the Annual Black-Tie Dinner of the Society to be held on Tuesday 5 May at the Union University and Schools Club 25 Bent Street, Sydney at 6:30 for 7:00 pm, at which the Society's 2014 awards will be presented.

The Society is delighted that our former Patron, The Hon Dame Marie Bashir AD CVO Dist FRSN will be the guest of honour at the dinner. Dame Marie will deliver the 2015 Distinguished Fellows Lecture and will be presented with the 2014 Royal Society of NSW Medal.

Other awards to be presented at the dinner are:

Clarke Medal (Botany) Professor Robert F. Park
James Cook Medal Scientia Professor Martin GreenAM
Edgeworth David Medal Ass. Professor Richard Payne
Clarke Medal (Geology) (2013) Distinguished Professor Bill Griffin

Future Events

Tuesday 5 May 2015
Annual Dinner
1232nd Ordinary General Meeting, Royal Society of NSW
2015 Distinguished Fellows Lecture
and presentation of Awards
Union, University & Schools Club
25 Bent St, Sydney
Please note dress: Black tie
6:30 pm for 7:00pm
(Book for the annual dinner: $95 per head)

Wednesday 3 June 2015
1233rd. Ordinary General Meeting
The Science of Spontaneity: Fred Astaire as Consummate Craftsman
Delivered by:
Dr. Kathleen Riley
Writer, Classical Scholar and Theatre Historian
Union, University & Schools Club
25 Bent St, Sydney
6.00 pm for 6:30 pm
Enjoy a welcome drink from 6:00pm. (Book for dinner after the meeting: $75 per head)
Please note dress code: jacket and tie

Wednesday 1 July 2015
1234th Ordinary General Meeting
Science in Literature
Delivered by :
Dr. David Ley
Editor, Sydney Review of Books
Union, University & Schools Club
25 Bent St, Sydney
6.00 pm for 6:30 pm
Enjoy a welcome drink from 6:00 pm. (Book for dinner after the meeting: $75 per head)
Please note dress code: jacket and tie

Patron of The Royal Society of NSW
His Excellency General The Honourable David Hurley AC DSC (Ret'd)
Governor of New South Wales

From the President

A great deal has happened since my March report. We had an excellent discussion of the Green Paper on the future direction of the Society for about 45 minutes prior to the AGM. A large number of members gave a good deal of thought to the discussion paper and I received many emails and phone calls with very valuable suggestions. We anticipate having the final document ready for circulation within the next few weeks.

At the AGM, some changes to the Rules of the Society were passed and membership was notified of some changes to the Bylaws. The most important Bylaw change was to introduce a succession plan for the presidency of the Society. The President is now expected to serve for two two-year terms and in the year prior to the last year of the presidential term one of the Vice Presidents is expected to become President-elect.

It was very pleasing that Professor Brynn Hibbert accepted nomination as Vice President and President-elect of the Society. He will assume the presidency at the AGM in April 2016. Brynn has been instrumental in the revitalisation of the Society and will be able to continue this momentum when he becomes President next year.

I would like to thank the outgoing Council for the great contribution that they have made this year. Over the last 12 months, there were a number of difficult changes that needed to be made and the Council was certainly up to the task. We have made a lot of progress in re-establishing the Society in its position of pre-eminence but there is a lot more to do. Hence, it was particularly pleasing to see such a strong group of Members and Fellows wanting to serve on the Council. A very warm welcome to the new office-bearers.

The Society's annual black-tie dinner will take place on Tuesday 5 May. We are delighted that the Hon Dame Marie Bashir Dist FRSN has accepted our invitation to be guest of honour at the dinner and to deliver the 2015 Distinguished Fellows lecture. We will also be presenting the Society's 2014 awards that evening to a very accomplished group of thought-leaders. We expect the attendance at this year's dinner to be even stronger than last year – be sure to book early.

As always, I am easily contacted by email at president@royalsoc.org.au and would like to hear from you.

Donald Hector

(Continued from page 3)

and, from the differences conclude the function of various aspects of the human brain. One of the main investigator techniques in studying brain tissue is to use a technique known as histology. In this approach, tissue is cut it into very fine slices that are then stained to be observed under a microscope. About 40 years ago, a major breakthrough was made when it was realised that staining brain tissue using a variety of stains gave a much richer understanding of neurones structure – the stains were able to differentiate between different types of tissue.

More recently, magnetic resonance imaging (MRI) has been used to map brains, in particular mouse brains. This enables construction of three-dimensional images with different stains revealing different details. These can be then synthesised into many different types of image. Combining the histological approach with MRI has enabled highly detailed maps of brain structure to be synthesised using data from many sources. Professor Paxinos's group is now looking at the "ontology" of the brain (borrowing the term from philosophy) to better understand the way in which the structure of the brain relates to human thought. Of particular interest is the nature of thought processes, such as belief. All human belief derives from brain function.

Professor George Paxinos AO (right)

So is the brain right size? If it was smaller it would not have allowed us to have achieved the quite extraordinary advances in human thought over the last several thousand years. We would not have been able to go to the moon or puzzle over challenges of quantum mechanics. But the brain is by no means infallible and indeed it may be the wrong size to enable us to come to terms with some of the highly complex issues such as climate change that challenge the very future of humanity.

Wednesday 3 June

The Science of Spontaneity: Fred Astaire as Consummate Craftsman

Dr. Kathleen Riley

Union, Universities & Schools Club, 25 Bent St., Sydney. 6:00 for 6:30 p.m.

Please note dress code: jacket and tie

This talk will focus in detail on the science behind Fred Astaire's apparent effortlessness, his ability to make something that was technically complex and endlessly rehearsed look easy and spontaneous. The lighter-than-air grace, the pluperfect precision and the sheer joyfulness of his dancing were the products of a dogged perfectionism, an astonishing musicianship and an imagination at once whimsical and methodical. It will be seen how, in the more technical aspects of his artistry, Astaire was part of an ancient tradition (that of Roman pantomime) and, at the same time, revolutionary. The first half of the talk will concentrate on Astaire the eloquent dance stylist and specifically his *symmetria*, the perfect 'commensurability' of all parts of his body to one another and to the whole, and his *eurythmia*, his interpretive games with the shape and logic of music, his inventive use of the off-beat and experiments with broken rhythm, and his syncopated language which impressed Bertolt Brecht as the sound of the modern environment. The second half will consider Astaire the cinematic craftsman, his instinctive understanding of how best to present dance on film, his pioneering use of special effects (e.g. slow motion and split screens), and his role in improving sound synchronization. (Film clips will be shown.)

Kathleen Riley is a former British Academy Postdoctoral Fellow in Classics at Corpus Christi College, Oxford and now a freelance writer, theatre historian and critic. She is the author of *Nigel Hawthorne on Stage* (University of Hertfordshire Press, 2004); *The Reception and Performance of Euripides'* Herakles: *Reasoning Madness* (Oxford University Press, 2008); and *The Astaires: Fred and Adele* (Oxford University Press, US, 2012). The last was included in the *Wall Street Journal*'s Best Non-Fiction 2012 and described by legendary singer Tony Bennett as 'a magnificent book about the trials and tribulations of show business'. In 2008, she convened at Oriel College, Oxford the first international conference on the art and legacy of Fred Astaire. She was Script Consultant on the critically acclaimed stage production *My Perfect Mind* which had its London premiere at the Young Vic in 2013. Her current projects include a monograph exploring the ancient Greek concept of *Nostos* (homecoming) and an edited volume of essays on Oscar Wilde and Classical Antiquity. She continues to have an association with the Archive of Performances of Greek and Roman Drama (APGRD) in Oxford.

Report of the Society's 1231st Ordinary General Meeting
held on Wednesday 1 April 2015

Is the Brain the Right Size?

Scienta Professor George Paxinos AO

NHMRC Australia Fellow, NeuRA Visiting/Conjoint Professor of Psychology and Medical Sciences, UNSW

At the 1231st OGM Scientia Professor George Paxinos describe the outstanding body of research that he has conducted over many years on mapping the structure of the brain. Professor Paxinos' work is some of the most cited research in the scientific literature. Virtually every map of the human brain found in hospital operating theatres, doctors surgeries and medical practices is based on his work.

Plato believed in the primacy of the human brain. Aristotle thought that it called the blood – not one of his finest assertions. It seems that Plato was on the right track – Valentine's Day should not have the heart as its symbol; it should be the brain. Descartes famously made the distinction between mind and brain but, Professor Paxinos argues, there is no ghost in the brain. The mind is a function of brain activity brain, nothing more.

One of the primary differences between the brain and other organs is the extraordinary number of neurones that it contains. The human brain has many more neurones than the size of its body suggests.

Professor Paxinos described the approach taken to understand the structure of the brain. Mostly this revolves around looking at other animals, such as rats and research monkeys to determine the difference in brain structure

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Southern Highlands Branch

Report of 16 April 2015 Meeting

Welcome to the age of the Plastic – Sea

Professor Richard Banati

Biomedical Scientist, ANSTO Life sciences

ANSTO scientists have used groundbreaking nuclear research techniques to measure the elemental composition of plastics at the atomic level as they degrade in the environment. Professor Richard Bananti delivered an exciting lecture on the research he has been conducting on this subject in conjunction with scientists from Monash University and the University of Tasmania.

To demonstrate the sensitivity and sophistication of these new nuclear research techniques, Banati chose the analogy of tipping a 150ml glass of wine into the 500,000,000,000 litres of Sydney Harbour, and subsequently accurately determining the type of wine from a small sample of the Harbour water! The 52 person audience instantly had an appreciation of the ability of the new techniques to identify traces and fingerprints of certain plastics in ocean going birds and marine life. The analyses that Banati and his team used to trace the molecular composition of various plastics were conducted at the Synchrotron in Melbourne.

The seabird that the team used for their study was the flesh footed shearwater. It was found that the chicks can have substantial amounts of plastics in their stomachs, in some cases up to 10% of their body weight. The chicks are fed by their parents with coloured plastics that they have mistaken for prey. ANSTO scientists have studied the trace elements that are typically found in plastic and in the stomachs of the birds. In an astonishing breakthrough, they have also found the same elements in the feathers of the shearwater, demonstrated by patterns in the growth of chicks' feathers, not unlike the patterns seen in the annual growth rings in a tree. This data is a clear indication of the effects of degrading plastics on the food chain.

Quite a deal of Banati's lecture concentrated on the plastics themselves, and the possibilities of identifying their sources of manufacture, and the contamination they cause, using the latest nuclear research techniques. Estimates suggest that the planet could have another 33 billion tonnes of plastic by 2050. This amount of plastic, 33 billion tonnes, is equivalent to filling 2.75 billion garbage trucks, enough to wrap around our planet 800 times if lined up end to end.

Banati posed the question of whether in the future, manufacturers/distributors could be required to place certain atomic markers in their plastics, so that the fingerprint of the plastic and hence its origin, could be readily identified using the latest nuclear analysis methods. A simple example could involve the manufacturer introducing only 10mg of gold to 1000kg of plastic at the manufacture stage to allow the whole issue of product life cycle analysis to be fully examined.

It was made clear to the audience that, despite the discussion that had just been presented, the great benefits of plastic should never be underestimated. However, there is still much work to be done in the field of plastics. It is complicated by factors such as lightweight packaging plastics that cannot be recyled being compared with heavyweight ones that can, sustainability issues, biodegradability effects, and general ignorance in the industry about what to do with packaging materials when they become waste.

Policies for managing plastic debris are clearly outdated, but it must be hoped that change will soon be in the air, now that Banati and his team have such exquisite analytical tools at their fingertips.

Anne Wood

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