The Royal Society of New South Wales

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Future Events 2009

Wednesday 2 December 2009
6.30pm (NB early starting time and special venue)

Studentship Awards and talks followed by

Christmas Party 2009

Venue: St Paul's College, University of Sydney

(see booking form included with this Bulletin)

Our first event for 2010 will be the Four Societies Lecture in February. Details in the next Bulletin.

Southern Highlands Branch

Meetings are held on the third Thursday of each month in the Drama Theatre at Frensham School, Mittagong (enter off Waverley Parade), at 6.30pm.

next talk

Thursday 18 February 2010, at 6.30pm

Bulletin Editor, Bruce Welch

Royal Society of NSW Studentship Awards

2 November 2009, Rogers Room, St Paul's College 6.30pm

Our next meeting affords this year's winners of our Studentship Awards the opportunity to present their work to a general audience. Come and hear what our top young researchers are doing! Our winners will be presented with their awards at the beginning of the meeting.

Danielle Sulikowski, Department of Brain, Behaviour and Evolution, Macquarie University.

Spatial cognition and foraging ecology of the noisy miner

Danielle has investigated the spatial cognitive abilities of the noisy miner bird (*Manorina melanocephala*), an omnivorous Australian honeyeater. She looked at the extent to which the cognitive mechanisms underpinning foraging behaviour were adapted to the distributions of the resources being foraged. She will present a variety of findings suggesting that apparent cognitive ability in laboratory tasks, and the strategies used to solve these tasks, depends upon the reward type used. Moreover, the natural distributions of these rewards can be used to predict the variation seen in both performance and strategy. Danielle's experiments were predicated on the assumption that cognitive mechanisms, as the proximate determinants of behaviour, have been shaped by evolution, to allow animals to behave in functionally adaptive ways.

Isa Chan, School of Chemistry, The University of New South Wales

Molecular Interactions and Chirality

If weak intermolecular attractions did not exist then neither would we, or the world we live in. All substances would be gases. Supramolecular chemistry aims to derive an understanding of intermolecular interactions and then to apply such knowledge to the design of new chemical assemblies with planned physical or chemical properties. Chirality, or 'handedness', is the structural characteristic of a molecule that cannot be superimposed on its mirror image. Without the correct handedness, the basic chiral molecules of life such as proteins, carbohydrates, and DNA, will not function. Devising more efficient methods in the generation of chirally pure compounds has been of great interest in contemporary chemistry and beneficial to many key areas of science. Isa's current research involves systematically revealing new types of weak non-covalent interactions through the study of their X-ray crystal structure. An alicyclic diol example, whose assembly is determined simply by the solvent chosen for crystallisation, will be presented.

Tamara Keeley, Faculty of Veterinary Science, University of Sydney and Taronga Conservation Society Australia

Maintaining the Genetic Diversity of the Tasmanian Devil: Development of Assisted Reproductive Technologies

Since the emergence of the fatal and contagious Devil Facial Tumour Disease over a decade ago, the Tasmanian devil has undergone an estimated population

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Clarke Memorial Lecture delivered on 30 October 2009 at the University of Sydney

Climate Change Through the Lens of the Geological Record: The Example of Sea Level

Professor Kurt Lambeck, President, Australian Academy of Science

Estimating the historical changes in sea level is a great deal more difficult than you might expect. In his 2009 Clarke Memorial Lecture, Professor Kurt Lambeck lucidly explained the complex process to an audience of over 300.

The main problem is that until satellite measurements became available in 1993, all sea levels were measured relative to the local shoreline. So if the measured sea level rose at a particular place, does that mean that the ocean volume was increasing (say by glacial melting or thermal expansion of sea water), or was the land sinking? Or were winds and currents just redistributing the water so that it piled up on one side of the ocean basin? Further, the relative contributions of these factors varies through time.

Extensive investigations have shown that the major cause of sea level change over the past millennia is the response of the solid earth to changing ice sheets. Many continental areas covered by ice in the last ice age are still rebounding and are rising steadily. However, areas of ocean crust near the edge of the massive continental glaciers were buckled upwards during the ice age, and are now slowly sinking.

In order to unravel what is happening, it is necessary to model the globe as a whole for a period of thousands of years. Despite the writings of some newspaper commentators, one can't get meaningful results by just looking at one region over a decade or two. By using sophisticated mathematical analyses, independent geodetic measurements of land uplift or subsidence, archaeological, geological and geophysical indicators of land stability, and advanced physical models, it is possible to remove 'known' processes (e.g. the isostatic response to past glacial cycles). The end result is a reliable estimate of global sea levels for the last few thousand years.

It is quite clear that sea level has been rising during the past century at an increasing rate. Over the period 1850 to 1900 it averaged 0.8 mm/year. For the 20th century the rate increased to 1.9 mm/year. And for the period from 1994 (which includes absolute sea level measurements from satellites) the rate was 3.2 ± 0.4 mm/year.

The rise over the next century depends on what action is taken to reduce greenhouse emissions. It could be as little as 500 mm, but if the Antarctic and/or Greenland icesheets slide (and recent evidence is ominous) then the rise could well be over a meter, and even larger values can not be excluded.

Does anyone want to buy some beachfront property? Get it while it is still there.

Jim Franklin,

Councillor, Activities Coordinator

A copy of Professor Lambeck's slides (2.9 MB PDF) can be found at http://nsw.royalsoc.org.au/talks_2009/talk_Oct2009_Clarke.html.

Lecture 4 November 2009, Darlington Centre at 7pm

The real signigicance of Hobbits: Hominid Biogeography in South East Asia

Professor Mike Morwood, Professor of Archaeology, School of Earth and Environmental Studies, University of Wollongong

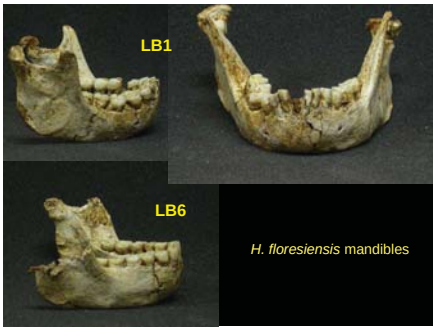
Hobbits (otherwise known as ***Homo floresiensis***) are extremely popular. Professor Mike Morwood described his co-discovery of these diminutive hominids to a packed, standing-room-only audience at the Society's 1177th OGM. But what was really interesting, were his speculations on how the hobbits got to the Indonesian island of Flores, where more might be found, and implications for the aboriginal settlement of Australia.

It has long been known that island fauna are special. When they reach a small island, big mammals tend to shrink (e.g. pigmy hippos on Malta), small mammals tend to grow (gigantic rats are common) and reptiles can become huge (think komodo dragons). So it was perhaps not too surprising that when Mike and his co-workers discovered a new hominid in Flores, it was only about 1.06 metres tall. However, what was truly unexpected is that it seems to not have been a shrunken ***Homo sapiens***. Studies of the skull and of the bones and joints of the arm, shoulder and the lower limbs, have all suggested that ***H. floresiensis*** was more similar to early humans and apes than to modern humans. The last common ancestor with modern humans was probably about two million years ago.

How did the hobbits get to Flores, and where did they come from? There is a very deep ocean trench that divides the western islands of Indonesia from the eastern islands. This trench is so deep and so wide that for the last few million years it has blocked land migration by animals from the east during periods of low sea level. The island fauna to the west of the trench are mostly standard continental species. But as Alfred Russel Wallace (co-discover of the theory of Evolution) pointed out in 1859, the fauna to the east are few in number and display the characteristic "small island effect".

The currents in the region are fierce and flow from north to south. Professor Morwood suggested that the currents are too strong for the hobbit's ancestors to have come from Java or Bali. Instead, he thinks it more likely that they drifted south from Sulawesi. The distance is further, but the trip is very much easier.

Sulawesi is a good candidate for small strange hominids. It has some unique (if not bizarre) miniaturized mammals such as anoa (a type of miniature water buffalo) and babirusa (a four tusked deer pig). Mike and his co-workers have been vigorously digging in various parts of Sulawesi including the Maros limestone region, the Walanae River and Talepu. Stone artifacts have been discovered dating back more than 800,000 years. But no hominid bones so far. We await their discovery with great interest.



As for Australia, the traditional view is that Aborigines reached Australia by island hopping from Java to Australia during a period of low sea level (the "western route").

However, Mike pointed out that the prevailing currents mean that it is very hard to get from western Indonesia to Australia. Indeed the only land mammals that have ever managed it are rats and humans (dingoes don't count as we know that they were brought by humans about 4,000 years ago). On the other hand, the prevailing currents mean that it is relatively easy to get from Borneo and the Philippines to the northern coast of Papua New Guinea and then to follow that coast east. One can then easily get to the east coast of Australia (i.e. Aboriginal settlement was by the "eastern route"). It is interesting to note that the Polynesians followed this route when they settled the Pacific Islands, and during the Second World War the Japanese attempted to use it to invade Australia. Perhaps some things never change.

Jim Franklin,

Councillor, Activities Coordinator

A copy of Prof Mike Morwood's slides (5 MB PDF) can be found at http://nsw.royalsoc.org.au/talks_2009/2009.11_Morwood_Talk.pdf .

From the President

The response to our promotion of the Clarke Memorial Lecture was very pleasing with over 300 people attending Professor Lambeck's presentation at Sydney University. I would like to thank Professor Lambeck for his comprehensive and stimulating account of the geological contributions and indicators of climate change, particularly in relation to sea level.

At the beginning of the Lecture I was able to announce the names of our seven inaugural Fellows of the Society. This is a very important step for the Society and one which will be marked by an appropriate occasion in the first part of next year.

I was pleased to be able to represent the Society at another IYA event, this time at the Clancy Auditorium at the University of NSW where many familiar faces, including the former Premier of NSW, Bob Carr, took part in a re-enactment of the trial of Galileo.

Our November meeting in Sydney surpassed expectations with over 110 people crowded into the Lecture room at the Darlington Centre to hear Prof Mike Morwood talk about his work on 'the Hobbit' from Flores and other adventures. We have been able to achieve some publicity in the 'Spectrum' section of the ***Sydney Morning Herald*** for some of our recent talks and I think this has certainly helped attract larger audiences. Thanks to Liz de Rome at the Society's office for making some of these breakthroughs. Liz has decided to pursue other opportunities and is leaving us this month. On behalf of Council I would like to wish her well in her new role.

Together with Clive Wilmot from the Southern Highlands Branch, I represented the Society at the sixth Convention of the Royal Societies of Australia held in Hobart earlier this month. Our Hon Treasurer, Marian Haire, joined part of the meeting by teleconference. The meeting confirmed the value of getting representatives from the Royal Societies across Australia together to plan for the future and to exchange information of value to all Royal Societies.

Just last week I was fortunate in being invited to attend the third meeting of Heritage Libraries and Archives held in the State Library of NSW. Together with our historian, Dr Peter Tyler, I was able to glean much about many of the

heritage collections held by state and other organisations. This was also an opportunity to talk about the Royal Society's collection and to gain insights into how we might be able to make more of it available for research.

Last week also saw the first concrete steps taken to establish a new Branch of the Society in Orange. Serving the whole of the Central West of NSW, we plan to begin operations in conjunction with Charles Sturt University in March next year with the first of several lectures and events. A former President, Professor Jak Kelly, has agreed to take a leading role in the establishment of the Branch. I wish it every success.

I would like to take this opportunity to wish everyone compliments of the season and I look forward to seeing you at our events next year.

Lastly, I would like to thank Sonia Chan in the office for coming to terms with our intricacies and making them all work.

Thanks also to our volunteers, Harry, Noel and David, for their help with the Bulletin.

John Hardie

New Members

Four new members were announced at the October meeting of the Society:

Anne Green - Full Member
Anthony Gerard Nolan - Full Member
John Marchant - Full Member
Frederick Neville Lavender - Associate Member

We welcome them into the Society.

Southern Highlands Branch

Next meeting: Thursday 18 February 2010

Drama Theatre, Frensham School, Mittagong at 6.30 pm

Inauguration of Fellows of The Royal Society of New South Wales

The President, John Hardie, has announced that the Society's Council has approved of the appointment of seven distinguished Australian scientists as Fellows of the Royal Society of NSW (FRSN). The announcement was made in conjunction with the 2009 Clarke Memorial Lecture held on 30 October at the University of Sydney.The Inaugural Fellows are:

- Professor Michael Archer AM FAA
- Professor Gavin Brown AO FAA CorrFRSE
- Professor Robert Clark FAA
- Professor David Craig AO FRS FAA
- Professor Jak Kelly DSc FInstP (London) FAIP
- Professor Richard Stanton AO FAA
- Professor Bruce Warren DSc FAIM FRCPA FRCPath

The establishment of this scholarly award is in keeping with the tradition of learned societies such as The Royal Society of NSW which has a history dating back to early Colonial times. Its forerunner was founded in 1821 by the then Governor of NSW, Sir Thomas Brisbane, the Society's first President.

The Society was involved in the establishment of Australia's first university, The University of Sydney and a number of other Australian learned societies in Science, Medicine and Engineering. Its past membership includes Charles Darwin, who wrote a letter acknowledging his appreciation of being appointed as an Honorary Member. The handwritten letter remains a treasured item of the Society's extensive collection of books, paintings and memorabilia.

The Society will be holding a special commemorative event in early 2010 at which our seven inaugural Fellows will be suitably acknowledged and presented with a certificate of Fellowship. Further information about this event will be published in subsequent Bulletins.

Congratulations to our new Fellows!

Heinrich Hora
Vice-President

RS Studentship Awards

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decline of more than 60 percent. Artificial insemination of cryopreserved spermatozoa can potentially be used to supplement the gene pool of captive breeding programs. Tamara has conducted a sperm preservation study to determine appropriate cryopreservation methods. The final trials utilising a lactose and egg yolk based diluent resulted in an increased retention of initial motility and viability post-thawing. These techniques can be used to bank samples from euthanased males. To complement Tamara's research on male reproductive physiology, she is working on a project to examine faecal reproductive and stress hormone concentrations in captive female devils. The aim of this study is to improve our understanding of the temporal relationship among reproductive hormones, pouch condition and behaviour during natural mating. This knowledge will increase our understanding of both physical and hormonal indicators of reproductive status.

Join us for our end of year celebration on Wednesday 2nd December, in the Cloisters of the historic and delightful St Paul's College at Sydney University (built by Blackett in 1856).
TIME: 8pm (following our Studentship Awards at 6.30 in the Rodgers Room upstairs at St Paul's)
The cost of $25 includes food and drinks.

(see booking form included with this Bulletin)

Contact your office bearers

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