LINNEAN SOCIETY OF NEW SOUTH WALES

# LINN S'O'C' NEWS

**NEWSLETTER NO: 140** **July 2011**

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## E-MAIL COPY OF THE NEWSLETTER

Would you prefer to receive an e-mail copy of the Newsletter, instead of the paper copy? If so, e-mail me at h.martin@unsw.edu.au and give me your e-mail address.

We will still be printing paper copies of the Newsletter, so if you prefer a paper copy, you need not do anything, and it will come, as usual.

## NEW MEMBERS

We welcome our new members:
Ms Penelope Ajani, Macquarie University. Field of interest: marine phytoplankton.
Mr, Nicolas J. Colman, University of Technology, Sydney. Fields of interest: Taxonomy, ecology, scientific writing, fossils

## AWARDS FROM THE SCIENTIFIC RESEARCH GRANTS

### Betty Mayne Scientific Research Grant

Ms Amy Claire **MACKEN**, Flinders University of South Australia
**Project**: Long term variation in small mammal communities: the impacts of late Pleistocene climate change and implications for future management of species.
Long-term baseline data is being collected on small mammal occurrences and abundances in the Naracoote region of southeastern South Australia. Turnover and extinction thresholds for small mammal communities and their resilience to past climatic and environmental change will be investigated. Sub-fossil material (~45000 to 740 yrs BP) of possums from deposits within the Wet Cave at Naracoorte Caves has been analysed to determine the relative abundance of various species over time. Five sedimentary units in the Wet Cave appear to correspond to differing climatic and environmental conditions in the past. Recently, 5 new charcoal samples have been acquired and the cost of two radiocarbon dates is requested. Awarded $1,000.

### Joyce W. Vickery Scientific Research Fund

Ms Maria G. **ASMYHR**, Macquarie University
**Project**: Exploring the unknown…Investigating subterranean biodiversity using molecular tools.
Aquifers support unique ecosystems of invertebrate fauna (stygofauna), highly adapted to life under ground and distinct from those found in surface water. There is an urgent need to identify the biodiversity and population levels, and a thorough understanding of the connectivity of the aquifers. Using molecular tools, this project will identify and quantify the stygofaunas from aquifers of different underlying geology. It will investigate the population dynamics and reproduction found among subterranean Copepods. Awarded $1000.

Dr Katherine Louise **BARRY**, Department of Biological Sciences, Macquarie University.
**Project:** Nutritional ecology of mating and sexual cannibalism in Praying Mantids.
Studies have shown that the quantity of food has an effect on the mating/cannibalistic behavior of the female praying mantiid. If the food quantity given to females is reduced to a half, the rate of cannibalism is increases from 40% to 100%. The effects of quality of the food will be tested with either a high lipid or high protein diet. Awarded $1,000.

Ms Sophia **CALLANDER**, Research School of Biology, Australian National University
**Project**: Keep your enemies close: can your neighbours affect your attractiveness?
Territorial residents often behave less aggressively to their neighbours than to intruders, a phenomenon called 'dear enemy effect'. This relationship could extend to neighbours actively helping each other to defend against intruders. Defense coalitions have been found amongst rock pipits and fiddler crabs. It is thought that the costs of helping a neighbour defend his territory are less than that of renegotiating boundaries with a successful intruder. Keeping smaller neighbors may also enhance the attractiveness of a larger individual to females. The reasons for these complex behaviour patterns will be investigated in fiddler crabs. Awarded $523.

Ms Belinda **COOKE**, Macquarie University.
**Project**: Assessing impacts of climate change adaptations on a sandy beach, NSW.

The invertebrate faunas of sandy beaches are ecologically important and support shore birds and surf fishes. These faunas are under threat from climate changes and rising sea levels. This project will (1) determine the spatio-temporal scales across which the diversity of these invertebrates naturally vary, and (2) using this information, design a study that assesses the impact of beach management on these invertebrates. Awarded $800.

Mr. Felipe M. **GAWRYSZEWSKI**, Department of Biological Sciences, Macquarie University.
**Project**: The unusual camouflage strategy of the Australian crab spider, *Stephnaopis altifrons* (Thomisidae).
This spider is thought to use bits of debris from the environment to enhance its camouflage, unique behaviour in its family. It is a 'sit and wait' predator with the ability to change colour to match the flowers they sit on and prey on the pollinators. This particular species, however, sits on tree trucks to ambush its prey. Bits of bark debris have been observed attached to hairs on the spider, but not all individuals have this form of camouflage. This whole camouflage system will be investigated. Awarded $826.

Ms Kerry L. **GIBBONS**, University of Sydney and National Herbarium of NSW
**Project**: Molecular phylogenetics and biogeography of *Mitrasacme* and related genera.
*Mitrosacme* is predominantly an Australian genus of tropical and temperate herbs in the flowering plant family Loganiaceae. The taxonomic concepts within the family are still poorly understood. Molecular studies will clarify some of the issues involved. Awarded $1,322.

Ms Judith A. **KEYSE**, University of Queensland.
**Project**: Realised population connectivity between marine protected areas in Roviana Lagoon, Solomon Islands.
The University of Queensland has been working in the Solomon Islands on a range of projects, including fostering sustainable marine resource use and assisting local people in setting up marine protected areas (MPA). This program will inform the Roviana people of how well their MPAs are working. The next stage of the program will asses how coral reefs in Roviana Lagoon may be connected by larval dispersal and make recommendations for continued conservation based on these results. Awarded $1,000.

Mr. Kurtis **LINDSAY**, Macquarie University
**Project**: The feeding behaviour of Sydney's last White-fronted Chats: Does the quantity of insect prey available determine where chats feed in their saltmarsh habitat?
The White-fronted Chat is listed as vulnerable and occurs only in saltmarsh at Towra Point Nature Reserve. Even in this restricted habitat, it is selective about where it feeds. This study of the habitat and the insects and other arthropods on which it feeds will assist wildlife managers in their conservation of the species. Awarded $400.

Ms Penelope J. **MILLS**, School of Biological Sciences, University of Queensland
**Project**: Systematics of the Australian gall-inducing scale insect group, *Apiomorpha minor*.
*Apiomorpha* with currently six species is endemic to Australia and both males and females generate galls on their *Eucalyptus* hosts. It also has one of the greatest range of chromosome variation known in animals and some of the species may in fact be crypto-species complexes. These complexes will be investigated using both mitochondrial and nuclear genomes. Awarded $1,000.

Mr. James **O'HANLON**, Macquarie University
**Project**: The chemical basis of ant attraction and its function as an egg dispersal strategy in Phasmatodea.
Some tree species provide a food reward attached to their seeds to induce ants to pick them up and take them into their nests where the seeds are safe from predation, desiccation and parasitism. This method of dispersal is called Myrmecochory. Remarkably, certain stick insects (phasmids) produce eggs with a fleshy capitulum attached that works in the same way. The chemical signals used by the phasmids to attract ants will be investigated using phylogenetic techniques. Awarded $700.

Mr. Pete **SMISSEN**, Zoology Department, University of Melbourne
**Project**: Testing processes explaining the phylogeography of the Tree Goanna (*Varanus varius*)
Goanna species are widespread over much of Australia. This project will investigate the probable reasons for distribution of the tree goanna. Being a reptile, it requires warmer temperatures to operate. How did the climatic fluctuations that accompanied the cyclic ice ages affect them? Was their distribution fragmented when they were restricted to warmer places in the ice ages? Then when warmer conditions returned, did the species expand its range? How did these possible times of isolation affect the genetics of the species? This whole topic will be investigated. Awarded $980.

## MAWSON 100 YEARS ON

The Royal Society of Tasmania plans to host a Symposium to celebrate the centenary of Dr (later Sir) Douglas Mawson sailing to Antarctica.

The Symposium will be held on 30 November/1 December 2011 in Hobart. Abstracts are required by 1 September 2011.

For more information, the registration form and instructions to authors go to info@rst.org.au.

## BOOK REVIEW

**Mistletoes of Southern Australia** by David M. Watson
CSIRO Publishing, February 2011
Paperback, 200 pages
ISBN: 9780643095939

A comprehensive treatise of Australian mistletoes has remained an empty gap among the extensive collection of botanical literature that is now available. The author, David Watson is a leader in mistletoe research with an extensive list of scientific publications. His enthusiasm for mistletoes is clearly conveyed in this book by way of text, illustrations and photos of personal artifacts. David Watson's 'Mistletoes of Southern Australia' (CSIRO publishing) is the first of its kind that would suit anyone with a botanical interest in Australia and abroad.

David Watson's mission is to bring mistletoes to a wide audience, foster an interest in mistletoes and highlight critical knowledge gaps. The content, layout and illustrations convey this message with ease. The first chapter explains the biology of mistletoes succinctly. Within a short 15 pages the reader is given a wealth of knowledge that articulates current scientific understanding in a digestible manner. However, in saying this,

it is more than a gathering of scientific information. This book is written from a natural history perspective that guides the reader visually through this fascinating group of plants.

Chapter 2 provides an account of 46 mistletoe species south of the 26th latitude. This section is excellent. Measuring in at 17 x 24.5 cm it is not really a pocket guide, however it is similar to many botanical field guides and would fit conveniently inside a small backpack, on a coffee table or in the bookshelf. It was pleasing to see the artistic work of Robyn Hulley throughout this book, and especially so in chapter 2. I think the combination of photos and botanical illustrations together will satisfy most, if not all readers of this book.

The remaining chapters give the reader something to chew on. Chapter 3 tackles ecological interactions and their importance in the ecosystem, chapter 4 looks at the cultural significance of mistletoes and chapter 5 deals with management. These chapters provoke the reader to think critically about this group of plants. Overall I commend this book as a very enjoyable and worthwhile read.

Ray A.J. Blick
University of New South Wales

**LATE QUATERNARY FIRE REGIMES OF AUATRALIA: FROM SCIENCE TO POLITICS**: a talk given to the Society by Dr. Scott Mooney.

Sediments in swamps may be thousands of years old and they are natural archives of the palaeoenvironment. There are other natural archives, e.g. ice cores and tree rings that may be used to build up a picture of the environment and any changes that might have occurred. Scott has been studying the charcoal content in sediments to build up a long-term perspective of fire activity.

With fire activity, we have ideas v. reality. The conventional wisdom was that we are a fire-prone country, but now that we have satellite images of the areas burnt, we can see that we are not very fire prone, compared with some other parts of the world. Estimating fire activity has been a problem, and short term records can be misleading. Satellite images have shown that the methods used before satellites were not very reliable.

During the wet La Nina weather pattern, there is a lot of plant growth and a build up of fuel. Then about ten months after the end of the La Nina event, greater areas are burnt. Thus a bad fire season is a La Nina event, but with a lag of about 10 months before it becomes active.

There has been an intense debate about whether Aboriginal burning caused the changes in the vegetation over the last 50 thousand years or so, or whether its cause was climatic. Scott investigated this dilemma by studying the charcoal content from sediments. If the Aborigines caused vegetation change by burning, then there should be a change in the charcoal content from before they arrived in Australia to after their arrival. There is debate about exactly when they arrived in Australia, and it may have 60 thousand years or earlier, but a change in charcoal should be apparent, if they caused all the burning some say they did. A survey of the charcoal showed remarkably little change from 70 thousand years ago until about 200 years ago, when the charcoal content increased dramatically. And 200 years ago, Europeans arrived in Australia. In recent years, however, there has been a decrease in charcoal, probably because the native vegetation has been considerably fragmented.

The low and fairly consistent charcoal content from about 70 thousand years ago is accompanied by a low and relatively consistent artifact concentration. In the Holocene (the last 10 thousand years), the concentration of artifacts increases, suggesting an increase in the

population, but the charcoal content, and hence the amount of burning, does not increase. There are differences between the tropical and subtropical charcoal records, but humans are unlikely to be the cause of that. Other environmental records as failed to show any change about the time of the arrival of the Aborigines. Less charcoal, hence burning in the glacial period is about the only noticeable change. Thus the amount of burning appears to be controlled by the climate, until Europeans arrived.

These results have upset the status quo. Some have advocated a return to Aboriginal practices of burning and some want Aboriginals involved in shaping fire practices. As happens in politics, the messenger gets the blame when the news is unwelcomed.

## ABORIGINAL ABANDONMENT OF KANGAROO ISLAND

In 2010, Floyd Howard of the University of Sydney was awarded a grant from the Joyce Vickery Scientific Fund to study the charcoal record from a lagoon on Kangaroo Island. When Europeans arrived, there were no people there and the wildlife was extraordinarily tame. The sparse artifact record suggested that the Aborigines had abandoned the island 2340 years ago. It was hoped that the charcoal record, as a proxy for past fire regimes, would establish when the island became depopulated. Floyd has recently sent in a report of his studies.

The change from a low and stable charcoal signal to a greater and more variable influx of charcoal occurred just prior to the official discovery of the island. This was interpreted as representing a shift in regime from regular and low-intensity Aboriginal burning to a high-intensity, more sporadic regime that represents European fire patterns. This date is much more recent than previously thought and suggests that Aboriginal occupation of the island was probably by seasonal, fleeting visits from the mainland rather than a permanent, remnant population. The cause of the abandonment was suggested to have been the disruption presented by the arrival of whalers and sealers in the region, prior to Kangaroo Island's official discovery.

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## PROGRAMME

**SECURITY HAS BEEN INCREASED** at the Botanic Gardens: there is now a locked gate between the carpark and the Classroom. If the gate is closed when you come to a lecture, just
wait and someone will come and let you in

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**Wednesday 21 September, at 6 pm, in the Classroom, Royal Botanic Gardens.**
**Enter through the gate to the Herbarium Carpark, on Mrs. Macquaries Rd.**

# Prof. CHRIS TURNEY

**Climate Change Research Centre and School of Biological, Earth and Environmental Sciences University of New South Wales**

## 1912: THE YEAR THE WORLD DISCOVERED ANTARCTICA

Antarctica plays an important role in our climate and Prof Turney will discuss the realization of its scientific importance. This year also marks the centenary of the departure of Dr. (later Sir) Douglas Mawson for Antarctica.

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**Wednesday19 October, at 6 pm, in the Classroom, Royal Botanic Gardens.**
**Enter through the gate to the Herbarium Carpark, on Mrs. Macquaries Rd.**

# Dr. IAN PERCIVAL

**Principle Research Scientist (Palaeontologist), Geological Survey of NSW.**

**RECONSTRUCTING THE ORDOVICIAN WORLD**

In this presentation, I review the latest research into the Ordovician System that provides insights into how the Ordovician world functioned and what it may have looked like. The past two decades has witnessed a major leap forward in our understanding of the life and times of the Ordovician Period, which extended between

491 and 443 million years ago. During this interval, the greatest expansion in biodiversity in Earth history occurred (known as the Great Ordovician Biodiversification Event, or GOBE). Towards the close of the Ordovician, one of the five big global extinction events took place, significantly depleting biodiversity. The disposition of continents and terranes was markedly different compared to the present, with pronounced faunal endemicity and provincialism the order of the day. It was a world inhabited in places by giant trilobites, with almost no land plants. Volcanoes were widely distributed, and a major meteorite shower impacted the planet. Evidence of icebergs and glaciers indicate that the southern polar icecap covered part of today's Sahara Desert. Work continues to unravel the most likely distribution of land masses. The general position of NSW was facing (as it does today) a vast Palaeo-Pacific Ocean containing scattered tropical islands, but the coastline of the Australian craton was situated between Broken Hill and White Cliffs, offshore to which were deep ocean basins and volcanic island chains.

Biostratigraphic timescales, based on graptolites, conodonts and acritarchs, are now well-established for the entire Ordovician system, and provide a framework for correlation that is amongst the most precise in the Palaeozoic. Combined with SHRIMP high resolution age dating, and isotopic techniques enabling construction of seawater temperature curves that can be precisely matched globally, we now have the ability to reconstruct the Ordovician world, its climate and biota.

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Wine and cheese will be served from 5.30 before each lecture

EVERYONE WELCOME.