

LINNEAN SOCIETY OF NEW SOUTH WALES

LINN S'O'C' NEWS

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DECEMBER 2018

NEWSLETTER EDITOR	POSTAL ADDRESS
J C Herremans Secretary	PO Box 291 Manly NSW 1655
Telephone: (02) 96 62 61 96	Mobile: 04 08 69 39 74

E-MAIL: linnsoc@inet.net.au

WEB SITE: <http://linneansocietynsw.org.au>

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NEW MEMBERS

We welcome our new members:

Mr CR Andrew-Kabilafkas ; Mr L Bailey ; Dr I Baird ; Mr R. Bicknell ; Ms J Bryant ; Mr GA Chapman ; Dr MR Donald ; Mr D Ellis ; Mrs J Judd ; Ms DE McGeeney ; Ms M Murray ; Dr AM Musser ; Mr M Nicholson ; Ms RL Palsson ; Mrs JF Hatherly ; Dr PJ Hatherly ; Mrs JA Medd ; Dr RW Medd ; Mr JR Whitehead.

IN THE NEWS

The Society's Newsletter Editor, Dr Helene Martin, has notified Council of her intention to step down and it is with regrets that her decision was accepted. Dr Helene Martin has been a driving force behind the quarterly newsletter as well as being a long-standing member of Council and serving on various scientific committees. Dr Martin was elected a member of the Society on 22 July 1970 and a Councillor on 19 June 1974 and President of the Linnean Society of NSW in 1981. A ceremony was held after the December 2018 meeting to confer on Helene the status of Honorary Membership in recognition of her years of services to the Society.

PROCEEDINGS OF THE LINNEAN SOCIETY OF NSW

All papers published in the *Proceedings* are available free of charge from <http://ojs-prod.library.usyd.edu.au/index.php/LIN>

NOTE: A CD is no longer distributed free on request.

Uploaded articles in volume 140:

Fulton, GR. *Notes on the mammals collected on the Chevert expedition to New Guinea in 1875.*

Maynard, GV, Lepschi, BJ, & Malfroy, SF. *Norfolk Island quarantine survey 2012-2014. A comprehensive assessment of an isolated subtropical island.*

Spate, A, Baker, A. & Coleborn, K. *Kart values of Kosciuszko National Park – a review of values and of recent research.*

Wright, GT, McDougall, KL & McCarthy, GJ. *Archiving the scientific legacy of Dr Alec Costin.*

Zhen, YY. *Conodonts, corals and stromatoporoids from Late Ordovician and latest Silurian allochthonous limestones in the Cuga Burga Volcanics of central western New South Wales.*

Check regularly the Society's home page for recently uploaded papers by going to "LinneanSocietyNSW" then click "Journal (Proceedings)".

2018 LINNEAN SOCIETY OF NSW NATURAL HISTORY SYMPOSIUM

The Society held a symposium in Coonabarabran on Tuesday 25 and Wednesday 26 September with a Field Trip on Thursday 27 to the Warrumbungles National Park. The symposium as well as the field trip was well attended and, as for the previous Linnean Society of NSW symposia, was very successful. Several attendees were inspired to join the Society.

APPLICATIONS FOR GRANTS FROM THE SCIENTIFIC RESEARCH FUNDS

Application forms for all Research Funds may be obtained from the Secretary or the Society's Home Page « <http://linneansociety.org.au> »

Intending applicants: Please read instructions carefully and submit your signed applications by email to « linnsoc@iinet.net.au »

The firm deadline for submission of applications for all funds is 1st March 2019.

WILLIAM MACLEAY MICROBIOLOGY RESEARCH FUND

Grants are available from the William Macleay Microbiology Research Fund to support original research in an Australian context within the field of Microbiology.

Applications will be accepted from postgraduate and Honours degree students at recognised Australian Universities who are undertaking full-time or part-time studies with a microbiological emphasis.

Applications are also encouraged from amateur or professional microbiologists, whether in employment as such or not, who can demonstrate a level of achievement in original research in Microbiology.

In awarding grants, the Council of the Society will assess:

The quality of the project

The applicant's ability to carry it out

A realistic costing and timetable

The likelihood that successful completion of the research will lead to publication.

A grant of up to \$2,300 is available to members of the Linnean Society of New South Wales and \$1,200 is available to non-members of the Society.

The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

Applications are not restricted to members, but other things being equal, members of the Society will be given preference.

As a rule, the deadline for applications will be 1st March in any year; however, in exceptional circumstances, applications for emergency support will be received at any time.

Grantees will be required to make a report at the end of the project and no later than 12 months after the receipt of the grant, and to justify their expenditure.

Any publication arising from work supported by the William Macleay Microbiology Scientific Research Fund should include an acknowledgement to that effect.

Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

Closing date is 1 March 2019. Submit your signed application by email to linnsoc@iinet.net.au

BETTY MAYNE SCIENTIFIC RESEARCH FUND FOR EARTH SCIENCES

The Betty Mayne Scientific Research Fund for Earth Sciences provides financial assistance to support short term original research projects in all aspects of the earth sciences.

Applications will be accepted from postgraduate and honours students, amateur or professional geologists who can demonstrate a level of achievement in original research in Earth Sciences.

Projects proposed for support do not have to be restricted to Australian locations or specimens, but, given the Society's interests in the natural history of Australia, they must demonstrate a strong Australian context.

In awarding grants, the Council of the Society will assess: the quality of the project; the applicant's ability to carry it out; a realistic costing and timetable; and the likelihood that the successful completion of the research will lead to publication.

Applicants need not be members of the Society, although all other things being equal, members will be given preference.

Individual grants will not normally exceed the level of equivalent awards from the Joyce W. Vickery Scientific Research Fund, i.e. \$2,500 for Members and \$1,500 for non-members. Money awarded must be used for research purposes, and field work or travel within Australasia. Requests for subsistence, travel to conferences, or thesis preparation expenses, will not be supported.

The Council will take into account other sources of research funds currently held or applied for by the applicant. While financial support from other sources will not ordinarily exclude award of a grant from the Betty Mayne Scientific Research Fund for Earth Sciences, a grant from this Fund cannot be held concurrently with one from the Joyce W. Vickery Scientific Research Fund.

Applications must be made on the form specific to the Betty Mayne Scientific Research Fund for Earth Sciences. Intending applicants are strongly urged to seek assistance from their supervisor or an appropriate colleague with experience in writing research proposals, and further, to have their application reviewed before submission.

Successful applicants are required to make a written report to the Society no later than 12 months from receipt of their grant, detailing progress of the project, briefly outlining research results, and justifying expenditure of the award money.

Any publication arising from studies supported by the Betty Mayne Scientific Research Fund for Earth Sciences must acknowledge that support. Type material, representative sample

collections, relevant analytical data, and figured or mentioned thin sections, must be lodged in a state or national museum or university collection.

The Council's decision in regard to the award or non-award of grants from the Betty Mayne Scientific Research Fund for Earth Sciences is final, and no correspondence will be entered into.

Closing date is 1 March, 2019. Submit your signed application by email to linnsoc@iinet.net.au

JOYCE W VICKERY SCIENTIFIC RESEARCH FUND

Grants from the Joyce W. Vickery Scientific Research Fund are intended to support worthy research in those fields of the Biological Sciences that fall within the range of interests of the Society, especially natural history research within Australia.

Applications will be accepted from postgraduate and Honours degree students at recognised Australian Universities who are undertaking full-time or part-time studies with a biological emphasis.

Applications are also encouraged from amateur or professional biologists, whether in employment as such or not, who can demonstrate a level of achievement in original research in Biological Sciences.

In awarding grants, the Council of the Society will assess:

- Realistic costing and timetable
- The quality of the project
- The applicant's ability to carry it out
- The likelihood that successful completion of the research will lead to publication.

Individual grants will not normally exceed \$2,500 for Members of the Linnean Society of New South Wales and \$1,500 for non-members.

The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

Applications are not restricted to members, but other things being equal, members of the Society will be given preference.

As a rule, the deadline for applications will be 1st March in any year; however, in exceptional circumstances, applications for emergency support will be received at any time.

Grantees will be required to make a report at the end of the project, and no later than 12 months after the receipt of the grant, and to justify their expenditure.

Any publication arising from work supported by the Joyce W. Vickery Scientific Research Fund should include an acknowledgement to that effect.

Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

An application form may be obtained from the website linnsoc@iinet.net.au or from the Secretary of the Society.

The Council's decision in regard to the award or non-award of grants from the Joyce W Vickery Scientific Research Fund is final, and no correspondence will be entered into.

Closing date is 1 March, 2019. Submit your signed application by email to linnsoc@iinet.net.au



SNIPPETS FROM THE PAST

22 September 1882. A fire completely destroyed the Garden Palace located in the Royal Botanic Gardens, Sydney, and the Society lost all its possessions and all official records of its first eight years of existence (early in 1881 the Society had moved to rooms in the Garden Palace from a room in Hunter Street, Sydney).

31 October 1885. The opening of the new Hall by Hon. William Macleay who presented the new Hall to the Society thus: “*The necessity for more room, and I may add less noise, has induced me to build the edifice we are now assembled in, which I beg to present, such as it is, to the society for the period of 89 years, the unexpired term of my original lease of the ground for 99 years*” and the move to the new Linnean Hall, Elizabeth Bay, took place on 2 January 1886.

BOOK REVIEW

Rocks and Trees by John Martyn (published by STEP Inc., Turramurra NSW 2074, July 2018). Hardback, 311pp. ISBN 978-0-9578390-4-5

Such a simple title for such a comprehensive book – the subtitle “*A photographic journey through the rich and varied geology, scenery and flora of the Sydney region*” elaborates on the topic of this lavishly illustrated volume. More precisely, the work focuses on the Triassic sedimentary rocks of the Sydney Basin and younger volcanic and sedimentary deposits (including Jurassic diatremes and intrusions, Paleogene and Neogene basalt flows, and Cenozoic unconsolidated sediments) and the diverse flora these lithologies support.

Not since the compilation by Herbert & Helby (1980) – now out of print – has such a useful guide to the rocks of the entire Sydney Basin been published. The two publications are entirely complementary, with only the stratigraphic nomenclature for the Triassic succession and the geology of the younger rocks being common to both.

In wanting to keep his book to a manageable size, *Rocks and Trees* barely touches on the underlying Sydney Basin Permian rocks that are covered in detail by Herbert & Helby (1980), whereas the geobotanical aspects explored in *Rocks and Trees* were never considered in the earlier publication. A further obvious distinguishing feature is the prolific use of colour throughout *Rocks and Trees*, in which almost every page carries at least one colour image, be it of rocks, trees, flowers or even a butterfly.

All photographs bear informative captions relating the landforms to the stratigraphy or intrusive unit, or the flora to the lithology. With the floral communities and the rocks they grow on being so extensively depicted in photographs taken by the author over 14 years, *Rocks and Trees* has definite appeal to anyone interested in geology or botany, or just keen on bushwalking.

John Martyn is a trained geologist, with 40 years fieldwork experience around the world. His observation of the wildflowers in Western Australia in full bloom sharpened his initial interest in the relationship between botany and geology, and after moving to Sydney his love of bushwalking developed an appreciation of the differences in distribution of flora depending on their geological substrates.

There is clearly a need for such a book; as the author points out in the Introduction (p.7), botanists (particularly those investigating the Greater Blue Mountains World Heritage Area, which was nominated for World Heritage status on the basis of its botany, not – surprisingly – its geology and geomorphology) have identified and formally named floral communities such as Blue Mountains Shale Cap Forest and Shale Sandstone Transition Forest, recognising their links to the geological substrate (but not the precise geological formation). John also mentions the unfortunate misuse (not only by botanists) of informal terms such as “Wianamatta Shale” that has crept into the literature in some popular guidebooks.

Dr Martyn opens his account of the geology of the Sydney Basin by firstly considering the geomorphology in a chapter on Landscapes and panoramas. Several panoramic images are annotated with the names of prominent geographic features to help orientate the reader, and the location and viewing direction of many of these scenes are plotted on a simplified geological map of the Sydney Basin (p.27).

Then follows a Geological Overview, including a brief discourse on the tectonic and structural history of the basin, before the main section (amounting to roughly half of the book) which progresses up-section through the Narrabeen Group, Hawkesbury Sandstone and Wianamatta Group.

The chapter on Jurassic igneous intrusions and diatremes follows, covering dykes, sills, laccoliths and various alkaline intrusions such as Mt Gibraltar, before documenting several of the better known diatremes. New distribution maps, adapted from the Sydney Basin 1:500,000 Geological Map compiled and published by the Geological Survey of NSW more than 50 years ago, accompany each of these chapters. Cenozoic volcanic activity at Mt Tomah and Mt Banks, Mt Wilson and Mt Hay, Nullo Mountain and Robertson Nature Reserve is dealt with in the subsequent chapter. The next section focuses on the Lapstone Structural Complex and its geomorphological expression, and illustrates how the monoclinical warping and associated faulting has caused the development of lakes and swamps that support their own distinctive vegetation.

Then follows a chapter (covering 40 pages) looking in some detail at Cenozoic sands, clays, gravels and laterites in the area of the Cumberland Plain (bounded by the Hawkesbury-Nepean catchment to the west and north) and extending to coastal dunes on the central coast, laterites at Long Reef and the Royal National Park south of Sydney. And if by this stage the reader craves still more examples of the close bonds between rocks and plants, the illustrated part of the book concludes with a chapter on Rock-loving plants, featuring some exquisite rock orchids. A Glossary of geological terms, listing of References and an Index provide the finishing touches.

I can thoroughly recommend this book. The text is engaging to those well-versed in geology and botany, but will also be readily understood by readers with only a rudimentary knowledge of rocks and trees. Though I have lived in the Sydney Basin for most of my life, and thought that I was reasonably well acquainted with the geology of the region, I was definitely impressed by the amount of new information that I gained in reading this volume, especially from the many photos of outcrops in places that I have not visited. Identifications of the trees, native shrubs and their flowers are an added bonus. Although the A4 page size of the volume and its weight means that it is not the sort of book that can be readily carried around in a backpack or pocket, it can certainly be taken in the car to the field.

Rocks and Trees is not a coffee table showpiece but rather a practical guide to understanding the relationship of flora to geology. It should certainly occupy a place on the bookshelf of any geologist (or botanist for that matter) living in the Sydney Basin or who visits the area regularly or occasionally.

John Martyn is an accomplished photographer and experienced author, having self-published several books previously (including Sydney's Natural World, Field Guide to the Bushland of the Lane Cove Valley, and Understanding the Weather) through STEP Inc., a local community-based group concerned with (amongst other things) environmental education and the preservation of the natural habitat of Sydney's upper North Shore. All his books are meticulously edited (by fellow members of STEP) and beautifully produced on high quality paper, and *Rocks and Trees* is no exception.

The price is another pleasant surprise: \$60 plus postage. STEP members save 30%, reducing the cost to just \$42. Order from step.org.au [Declaration: I am a member of STEP]. I understand the print run is not very large (certainly not in normal commercial quantities) so it would be worthwhile investing in this book now before it sells out.

Reference

Herbert, C. & Helby, R. (eds) 1980. *A Guide to the Sydney Basin*. Geological Survey of New South Wales Bulletin 26, 603pp.

Reviewed by Dr Ian Percival



ANNOUNCEMENTS

1. - Thanks to our webmaster and Councillor Bruce Welch, who did an excellent job of scanning the complete set of the Society's Newsletter *Linn S'O'C' News* (1 to 169), the set is now available from our webpage: www.linneansocietynsw.org.au ; click on Newsletter ; then go down the page.

2. - How do you feel about insects and spiders in your house and garden? With summer just around the corner you may start noticing more insects and spiders around your house and garden. Everybody feels differently about these creepy crawly house guests; they may not bother you or you might hate the sight of them! A team of researchers from Macquarie University and the University of Sydney want to know which insects and spiders are living in and around your home, and which products (if any) you use to control them. By taking part in their survey, you will help them develop guidelines for people to effectively and safely manage insects and spiders around their homes. You will also have the chance to win one of five \$100 Coles Myer group gift vouchers!

If you are curious about the insects and spiders living around your house, you will also have the opportunity to volunteer your household for a biodiversity survey conducted by researchers from Macquarie University.

For more information and to complete the survey please follow this link https://www.surveymonkey.com/r/insects_in_houses or contact the research leader Dr Lizzy Lowe lizzy.lowe@mq.edu.au

3. - Foundation for National Parks & Wildlife Community Conservation Grants are now open for applications. If you are working to preserve a piece of Australian cultural heritage, helping to restore a patch of habitat, connecting more people with our national parks or doing research on a threatened Australian species, you can apply for a Community Conservation Grant from the Foundation for National Parks & Wildlife. The small grants round will be open for applications from December 1, 2018 until January 31, 2019.

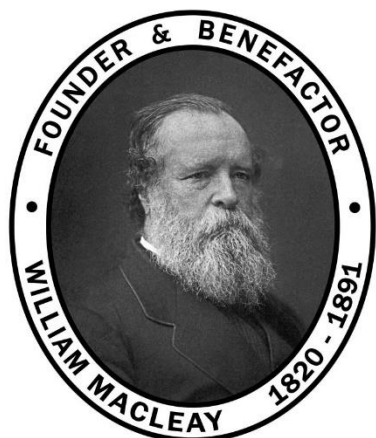
Key areas of focus for this year's grants are:

- Land and Water - Protection, restoration, rehabilitation and revegetation of degraded habitats to ensure their ability to sustain native species.
- Threatened Species - Scientific research with tangible conservation outcomes and on-ground works to conserve Australia's threatened species.
- Cultural Heritage - Conserving and celebrating Australia's cultural heritage as part of the gift we leave to future generations.
- Parks for People - Improving National Park facilities for the enjoyment of all, to foster and encourage the appreciation of nature.

Applications for the Community Conservation Grants are now online and individuals, NGOs or government departments working in these areas are all eligible to apply for funding for projects commencing in 2019.

For further information and to apply for a grant visit <https://www.fnpw.org.au/grants> or contact the Foundation for National Parks & Wildlife on grantsmanager@fnpw.org.au

For more info: Projects & Education Manager (National), Kylie Piper at: kpiper@fnpw.org.au
Ph: 1800 898 626



THE LINNEAN SOCIETY OF NEW SOUTH WALES

2019 Annual General Meeting

The 144th Annual General Meeting of the Linnean Society of NSW will be held at 18:00 on 20 March 2019 in the Charles Moore Room in Anderson Building, Royal Botanic Gardens, Mrs Macquaries Road, Sydney.

Members and guests are invited to join the Council of the Society for wine and light refreshments from 17:30.

Three members of Council are due to retire at this AGM:

Daniel Bickel, Robert King and Bruce Welch

and offer themselves for re-election.

Council recommends the election of John Barkas as President of the Society for 2019.

Council recommends the reappointment of the current Auditors, Phil Williams Carbonara.

Further nominations are invited for vacancies on Council (6), the office of President, and Auditor. Nominees must be financial Ordinary Members (a category which includes Life Members) of the Society. The nominations must be signed by at least two financial Ordinary Members of the Society and countersigned by the nominee in token of their willingness to accept such office.

Nominations must be received by the Secretary at PO Box 291 Manly NSW 1655 by 31 January 2019.

LINN S C NEWS

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APRIL 2019

NEWSLETTER EDITOR

J C Herremans
Secretary

POSTAL ADDRESS

PO Box 291
Manly NSW 1655

Telephone: (02) 9977 8075

Mobile: 0490 542 524

E-MAIL: secretary@linneansocietynsw.org.au

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NEW MEMBERS

We welcome our new members:

Mrs Yvette M Bauder ; Mr Andrew Berg ; Mr Russell D C Bicknell ; Mr James D Collison ; Dr Laetitia M Gunton ; Miss Rosalie J Harris ; Mrs Jane Judd ; Dr Espen Knutsen ; Mr Farhad Masoomi-Aladizgeh ; Mr Geoffrey Mazue ; Mr Jorge R Monter ; Mr Matthew Nicholson ; Mr Gerrut Norval ; Mr Michael Roffe ; Ms Emma E Sumner ; Mr Carl Watson ; Dr Peter H Weston ; Ms Zoë T Wyllie

AWARDS FROM THE SCIENTIFIC RESEARCH FUNDS

The current low interest rates limit funds available and the Society is unable to fund as many applications as it would like or to provide the full amount requested by the applicants. Decisions on where to make the cuts have been made difficult and disappointing because worthwhile projects go unfunded owing to the present state of the economy.

WILLIAM MACLEAY MICROBIOLOGY RESEARCH FUND

Report from the William Macleay Committee:

Ghaly, Mr Timothy (PhD candidate, Macquarie University)

Title of project: *The genesis, diversity and dynamics of integron gene cassettes.*

Synopsis. Integrons are bacterial genetic elements that promote rapid adaptation by capturing and expressing mobile genes known as gene cassettes. Recently, a subset of gene cassettes has facilitated the global spread of antibiotic resistance. However, it is clear that gene cassettes collectively encode a much broader range of traits that can confer an advantage to diverse selection pressures. Importantly, the mechanisms by which gene cassettes are generated, and

thus made available to integrons, and in which taxa this is occurring, remains completely unknown. This project will address this by using a combination of innovative experimental and computational approaches. The outcomes of this work will help solve a question that has remained unanswered since the discovery of integrons more than 30 years ago – How do gene cassettes arise? Solving this problem will add significantly to our understanding of bacterial genome evolution, and will pave the way for developing methods for controlling and manipulating integron activity. **Granted: \$1,200**

Watson, Mr Carl (BSc Student, Flinders University)

Title of project: *Captivity, translocation, and gut bacteria in the pygmy bluetongue lizard.*

Synopsis. One way in which animals can respond to climate change is by moving with the climate shift and staying within their optimal climatic range. However, habitat destruction has left many animals in fragmented populations, limiting their ability to migrate, and subsequently threatening their survival. With 7.9% of existing species predicted to become extinct due to the effects of climate change, direct human intervention is often required to limit these losses. Microbes, and specifically bacteria, are found in association with all plants and animals, and have been shown to be important for a range of functions including; nutrition, immune response, development, host behaviour and general health. The pygmy bluetongue lizard (*Tiliqua adelaidensis*) is an endangered skink endemic to the Mid-North region of South Australia. It is found exclusively in remnant grasslands dominated by native grasses, where it lives in spider burrows. The major threat to the species is habitat destruction for agricultural use, as well as for infrastructure such as roads and wind turbines. The pygmy bluetongue was thought to be extinct for 33 years, until 1992 when a specimen was discovered in the stomach of a brown snake at Burra, South Australia. Research into the suitability of the pygmy bluetongue to translocation has been continuing for more than 10 years. I will examine the composition of the gut bacterial communities of lizards both before and after release from captivity. **Granted: \$800**

BETTY MAYNE SCIENTIFIC RESEARCH FUND FOR EARTH SCIENCES

Report from the Mayne Committee:

Bauder, Mrs Yvette (MSc candidate, Macquarie University)

Title of project: *Foraminifera as indicators of anthropogenic change on the Great Barrier Reef.*

Synopsis. This project aims to determine the history of foraminiferal assemblages over the past +/- 600 years at One Tree Reef, Great Barrier Reef. Foraminifera, benthic unicellular protists, are fundamental components of reef systems that have been shown to be sensitive to the same factors threatening coral viability. Foraminifera are valuable carbon sinks, producing 25% of oceanic carbonate, and a major sediment source for coral cays. The Great Barrier Reef is the world's largest reef system, and by virtue of its size, one of the most diverse. Annual sea-surface temperatures have risen through the 1900's and land clearing commenced in the 1800's with evidence suggesting the reef has been in decline over the last 100 years. It is possible that there will be no significant change in foraminiferal assemblages over the past 600 years as One Tree Reef is quite remote, but it is also possible that even the outer reefs of the GBR have been impacted by the colonisation and industrialisation of Australia. Changes through the core may relate to taphonomic trends and/or global factors. Assemblages from the core will be compared with surficial samples. **Granted: \$380**

Bicknell, Mr Russell (PhD candidate, University of New England)

Title of project: *Origin, diversity and disparity of horseshoe crabs.*

Synopsis. One of the most iconic arthropod groups alive today are the large archaic looking taxa within Xiphosurida—the so-called horseshoe crabs. The group has interested palaeontologists over the past century with a spectacular fossil record that extends from the lower Ordovician to today. Despite the well-known status of horseshoe crabs, the extent of their more recent static morphological evolution and the origin of this successful *Bauplan* remains unquantified.

Australian fossil horseshoe crabs represent some morphological extremes and therefore stand as evidence against the conserved nature of the group. The proposed application involves a research trip to visit the four collections containing holotypes of the Australian taxa: Australian Museum, NSW Geological survey, Museums Victoria and Tasmania University Geological Collection. The ultimate outcomes of the funded research will be publications that will set the standard for explaining why horseshoe crabs have not changed dramatically since the Jurassic and highlight the uniqueness of Australia's disparate horseshoe crabs. **Granted: \$1,000**

Wyllie, Ms Zoë T (MSc candidate, Macquarie University)

Title of project: *Taphonomic study of Placodermi and Sarcopterygii of the Canowindra fauna.*

Synopsis. Canowindra in central west NSW is home to a unique death assemblage of extinct Devonian fishes, called the Canowindra Fauna. The death assemblage occurs within the Mandagery Formation, which is normally considered Late Devonian (Frasnian) in age. The Canowindra Fauna is considered a Konservat-Lagerstätten (or exceptional preservation) and whilst the taxonomy of most species has been published, there has been almost no detailed analysis of the taphonomy and depositional environment of the deposit. The surrounding geology indicates modern day Canowindra was in proximity to the Devonian east coast and was part of an extensive freshwater river/stream system, probably with interconnected billabongs and lakes. The coastal environment of the Devonian east coast of Australia was teeming with fishes including families that have since become extinct, though no fish fossils sites in the region provide the exceptional preservation of the Canowindra Fauna. The aim of this thesis is to understand the characteristics of the Canowindra Fish Fauna death assemblage. The main goal is to ascertain if the two dominant placoderm species in the fauna (~90%) represent one or more size classes. Additionally, targeted thin sections through external dermal bone will add important new histological data about the placoderms and lithological thin sections of the rocks surrounding the fish will provide the first detailed sedimentological analysis of the death assemblage.

Granted: \$460

JOYCE W VICKERY SCIENTIFIC RESEARCH FUND

Report from the Vickery Committee:

Armansin, Ms Nicolette (PhD candidate, Macquarie University)

Title of project: *Are threatened species in the catch? Genetic identification of sharks traded and consumed in Australia.*

Synopsis. Large quantities of 'flake' are consumed in Australia, and despite rising public support for sustainable seafood, there is little information on the species currently being traded under this name. We have over 4,000 'fish and chip' shops, and many more restaurants and supermarkets selling flake. Flake is thought to be comprised of two species of gummy shark (*Mustelus antarcticus* and *M. lenticulatus*), considered a sustainable fishery in Australian and New Zealand. However, the capture of gummy shark is known to carry substantial bycatch of school shark (*Galeorhinus galeus*), which have been significantly depleted by overfishing. Further, any species of shark can be traded as flake. Given the quantity of flake consumed nationally, even small proportions of threatened species bycatch can have sustainability implications. My preliminary investigations indicate that retailers are selling around 100 species as "flake" across Australia. I predict that some of these species are threatened. To test this, I aim to identify species composition of flake sold nationally using DNA barcoding. Eight hundred and fifty individual shark flesh samples have already been collected from local and national vendors across Australia. This is the first national study of species composition of flake and I aim to publish the results in a peer-reviewed scientific journal. **Granted: \$1,000**

Berg, Mr Andrew (BSc honours student, University of Sydney)

Title of project: *Evolutionary history of the now extinct Tasmanian southern elephant seals.*

Synopsis. This project is to use ancient DNA techniques to sequence DNA from now extinct putative southern elephant seal colonies from Tasmania. These charismatic marine mammals are present in the Tasmanian fossil record at several sites, including King Island, and the South Point midden. The earth's environment has been constantly changing. Despite this, there is global concern about future climate change and human contribution. At that time, the change at the Poles was extreme; the average temperature in Antarctica rose by ~10 C, whereas the temperature difference in Greenland was even greater; temperature increased by 15 C between the Younger Dryas (12,900-11,500 YBP) and the early Holocene (11,500-10,000 YBP). A multi-population Isolation-with-Migration model will be implemented in IMA to estimate effective population sizes, time of splitting, and migration rates between populations of each target taxon. This research will build on previous research by Dr Mark de Bruyn (supervising this project) that used ancient DNA methods to characterise a now extinct southern elephant seal colony from the Victoria Land Coast, Antarctica. **Granted: \$500**

Buddle, Miss Alice (PhD student 2nd year, University of Sydney)

Title of project: *The evolution of placentas in sharks: how does the shark placenta facilitate exchange of gases, water and nutrients during pregnancy?*

Synopsis. My aim is to describe and understand the mechanisms underlying major placental functions in the Australian Sharpnose shark (*Rhizoprionodon taylori*). A placenta has evolved in five families of sharks (requiem sharks, hammerhead sharks, weasel sharks, barbeled houndsharks and houndsharks). While we know that shark placental formation is critical to embryonic growth and development, placental structures that are specialised for transporting nutrients, water and respiratory gases remain unknown. The current lack of data on placental function in sharks limits our ability to predict the adaptability of sharks to anthropogenic threats such as climate change and overfishing. My project will address this lack of knowledge by using the Australian sharpnose shark as a model for shark placental function. Placental sharks gain the nutrients they require to complete embryonic development from three major sources: nutrients contained in the yolk of the egg, nutritive uterine secretions and nutrients supplied across a placental connection. Most embryonic sharks develop inside of their mother but are primarily reliant on yolk stores for embryonic nourishment and do not form a placenta. The Australian sharpnose shark is an ideal model species to investigate placental function and mechanisms for foetal nutrition during shark pregnancy because it sequentially nourishes young by yolk, uterine secretions and a placenta. **Granted: \$800**

Cutmore, Dr Scott (Research Fellow, University of Queensland)

Title of project: *Cryptic biodiversity on the reef: trematodes in butterflyfishes.*

Synopsis. Parasitic trematode flatworms are exceptionally diverse in marine systems globally, infecting an incredible range of fishes from the warm, shallow waters of the tropical coral reefs to the cold depths of the deepest oceans. As with other parasite groups, the discovery and description of trematodes has lagged substantially behind that of their more conspicuous and more charismatic hosts. However, understanding how many trematodes infect marine fishes is essential when estimating total marine biodiversity. Cryptic species are particularly a problem within the trematode family Faustulidae. The Faustulidae comprises species that infect a diverse range of freshwater and marine teleost fishes; members of the 13 marine faustulid genera infect an impressive 15 orders of fishes. A recent molecular investigation of the "*Paradiscogaster glebulae* complex" found that collections of this one species from butterflyfishes on the Great Barrier Reef actually represent six genetically distinct species. **Granted: \$800**

Gunton, Dr Laetitia (Research Fellow, Australian Museum)

Title of project: *Biogeography and phylogeny of Australian eastern abyssal ampharetids.*

Synopsis. The project will focus on the family Ampharetidae, one of the most abundant annelid families collected in the Australian eastern abyss. The proposed project will use annelid samples collected from the pioneering RV Investigator expedition 'Sampling the Abyss' in 2017, the first dedicated deep-sea cruise to sample along the eastern Australian coast, from Tasmania to

Southern Queensland. Before the cruise, there was no biological data from abyssal communities in Australian Commonwealth Marine Reserves. All annelid samples have been identified to species or operational taxonomic unit by the Principal Investigator (Laetitia Gunton) and collaborators. The funds requested from the Linnean Society of NSW will be used towards a much larger two-year project on annelid genetic connectivity throughout the eastern Australian deep sea. Funding has been secured from the Australian Museum for part of the molecular analysis (100 specimens). I am seeking further support from the Linnean Society of NSW for further molecular analysis (37 specimens) and SEM imaging (20 specimens). We aim to describe the species distribution and genetic connectivity of marine annelids within the eastern Australian deep-sea biome along a latitudinal (24-44°S) and bathymetric (300-6500 m) gradient.

Granted: \$1,500

Harris, Miss Rosalie (MSc student, Australian National University) [*Surrey Jacobs Award*]

Title of project: *Key predictors of macroalgal biodiversity within the World Heritage Ningaloo Reef*

Synopsis. Tropical coral reefs are hyper-diverse ecosystems with a dense aggregation of species that are at considerable risk due to local impacts and climate change. Three major groups of habitat-forming organisms tend to dominate these tropical coastal systems: seagrasses, corals and macroalgae. Drivers and threats to the biodiversity of corals and seagrasses have received increasing attention over recent decades, yet comparatively little has been dedicated to uncovering the wealth of diversity present within tropical macroalgal communities. As a major group of marine primary producers, macroalgal communities play an essential role as facilitators of food security, habitat and breeding grounds for an abundance of organisms. We still do not know the extent of macroalgal biodiversity let alone the key drivers that determine its structure. Therefore, our current understanding of macroalgae community structure is based upon fundamental assumptions that must be tested in order for us to fully comprehend. Only with field based testing can we start to unravel this complexity, to start to explain why these seaweed meadows occur where they are, why they change through time and the possible effects, such as their resilience to natural disturbance events. **Granted: 1,500**

Jones, Mr Braxton (Research student, Macquarie University)

Title of project: *A phylogenetic study to uncover the ecology of arid stick insects.*

Synopsis. Climate modelling predicts an expansion of arid landscapes and with it an increase in extreme temperature shifts. To gain such insight a faunal group is required that has species delineated by biomes that transition from the tropics to arid environments. A promising faunal group for such an investigation are the Phasmatodea (stick insects). My aim is to reveal the evolutionary history of two grass feeding genera and in doing so uncover their path of trait development that has led to occupying harsh environments. Despite stick insects being well known by the general public and bred by many enthusiasts, there is relatively little known about their natural ecology. A major barrier has been the poorly resolved taxonomic relationships of stick insects with many species yet to be described. Of all the known genera *Denhama* and *Hyrtacus* are possibly the most incomplete due to their striking cryptic appearance. The objective is to undertake a complete phylogenetic treatment and taxonomic revision of two, grass feeding genera of stick insects, *Denhama* and *Hyrtacus*. These genera have species occupying different biomes extending from tropical to temperate and to arid zones. Therefore, this collaboration is considered important for national significance of Australia's changing environments.

Granted: \$500

Louvard, Miss Clarisse (PhD student, University of Queensland)

Title of project: *The Mystery Hosts: Investigating the role of planktonic pelagic molluscs in parasitic transmission to large Australian pelagic fishes.*

Synopsis. Trematodes (flukes) are parasitic Platyhelminthes with complex life cycles involving multiple, often highly specific intermediate and definitive hosts. Trematodes of the superfamily Hemiuroidea are particularly prevalent in large, commercially important pelagic

fishes such as true tunas (*Thunnus* spp.). Although the life cycles of some hemiuroids infecting near shore fishes are known, I aim to comprehensively document the trematode richness in pelagic molluscs in Australian waters. Hemiuroid trematodes have complex life cycles involving 3–4 hosts. Larval hemiuroids infect a first intermediate snail host and are later transmitted along the food chain until consumed by their definitive fish host. As such, hemiuroids from the families Didymozoidae, Hirudinellidae, Sclerodistomidae and Syncoeliidae are major endoparasites of pelagic fishes such as true tunas (*Thunnus* spp.), flying fishes, marlin and mahi mahi. Despite the magnitude of hemiuroid richness in pelagic fishes, information about their life cycles is almost nonexistent. I aim to comprehensively document the trematodes infecting pelagic molluscs in Australian waters. Previous work in Australian waters shows that pelagic molluscs are widely distributed off the Queensland coast. A pilot survey conducted by myself and the University of Queensland Marine Parasitology Laboratory and me at Lizard Island in November 2018 confirmed their presence in that area. **Granted: \$700**

Masoomi-Aladizgeh, Mr Farhad (PhD candidate, Macquarie University)

Title of project: *Wild cotton (Gossypium robinsonii) from the deserts of Australia: a tool for more environmentally friendly cotton crops*

Synopsis. The wild cotton in this proposal has a genome about a third the size of a human cell but until recently, sequencing an Australian cotton would have been unthinkable. As our climates change rapidly, there is now a growing focus on resilience through broader genetics. *Gossypium hirsutum* arose from a cross between two American species, *G. arboreum* and *G. raimondii*. However, none of the genetics of Australia's seventeen wild cotton relatives has been used to build further resilience, specifically, tolerance to extremes of heat, drought and damage from excess light. The only chance of identifying the rare alleles (gene variants) in wild cotton from the Australian arid-zone is to interrogate the genomic sequences of these plants using novel sequencing methods. This project aims at assembling a preliminary sequence of an Australian wild cotton species. DNA will be extracted from *G. robinsonii* and chopped into short nucleotide fragments which can then have their base pairs sequenced by GSS. Publicly available informatics software will enable us to partially re-assemble the whole sequence of each chromosome, as though the shards of a broken vase were being reassembled by each part informing the position of a neighbouring fragment. **Granted: \$500**

Mazue, Mr Geoffrey (PhD student, University of Sydney)

Title of project: *Information transfer and social benefits in the invasive mosquitofish (Gambusia holbrooki)*

Synopsis. This research project aims to quantify information transfer within animal groups to determine how social information enhances the accuracy of group decision making during navigation and foraging in a novel environment. Like many species of insects, birds and mammals, a large proportion of fish species benefit from aggregating with conspecifics. Across a variety of contexts (e.g. anti-predation behaviour, social foraging or group navigation), the benefits of shoaling depend on a group's ability to consistently make cohesive, fast and accurate decisions, in order to minimize the risk of predation and maximize foraging success. Eastern gambusia (*Gambusia holbrooki*), often referred as mosquitofish, are native to Central America. Introduced to NSW during the 1920s in an attempt to biologically control mosquito populations, mosquitofish are known today as a well-established pest fish species, widespread throughout Australia, and several countries around the world. Although it competes with native species for food and resources, little is known about the social behaviour of mosquitofish, and in particular, what makes groups of mosquitofish so efficient at exploring and dispersing in previously uninvaded waterways. This project, although it emphasizes on the information flow, belongs to a larger research program developed by the laboratory of Professor Ashley Ward that aims to understand the underlying mechanisms of collective behaviour in the Eastern mosquitofish (*Gambusia holbrooki*). The use of high-resolution spatial data combined with the novel analytic tool, transfer entropy, offers a unique opportunity to understand the role of information transfer

in mobile groups. Furthermore, the use of a highly invasive species for this project would mark an important step towards identifying the role of sociality in the success of an invasive species.

Granted: \$600

Norval, Mr Gerrut (PhD candidate, Flinders University) [*Noble Award*]

Title of project: *Does the haemogregarine parasite, Hemolivia mariae, infect the kangaroo soft tick (Ornithodoros gurneyi) at a study site near Mt. Mary, South Australia?*

Synopsis. The sleepy lizard (*Tiliqua rugosa*) is a common large skink species in coastal heath, dry scrubland, grassland, dry woodland, dry sclerophyll forest, chenopod shrubland, mallee, *Acacia* and eucalypt scrubland, gibber plain and spinifex-dominated sandy desert habitats of most of southern Australia. Throughout its range, *T. rugosa* has been reported as a host of a variety of parasites. Apart from the research pertaining to the two ticks and the haemogregarine parasite, *Hemolivia mariae*, which they infect the lizards with, surprisingly little is known about the parasite community of this sleepy lizard population. Ticks are parasitic arthropods that feed on the blood of non-aquatic vertebrates. Through the feeding process, in addition to anaemia, they can also cause dermatosis, tick paralysis and/or otoacariasis, and are often also vectors for various pathogens. During the course of a preliminary study in 2017 I sampled immature stages of the kangaroo soft tick (*Ornithodoros gurneyi*) that were found parasitising sleepy lizards. Apart from speculations of kangaroo soft ticks as vectors for *Borrelia queenslandica* and *Coxiella burnetii*, nothing is known about their role as a vector for pathogens. The aims of this study are as follows: to determine the prevalence of infections by *H. mariae* in the lizards sampled across the ecological gradient and to determine whether the prevalence of this parasite in these ticks.

Granted: \$1,000

Rodriguez Monter, Mr Jorge (PhD candidate, Macquarie University)

Title of project: *Biodiversity of marine flatworms in south-eastern Australia*

Synopsis. Polyclad flatworms are a group of marine, free-living invertebrates found in all kinds of habitats, including coral reefs, rocky shores, soft bottoms and deep-water. Worldwide over 900 species are currently known. Marine flatworms are a conspicuous component of Australia's marine biodiversity yet less than 20 scientific articles have been published on Australian marine flatworms since 1898, of which only seven include species from south-eastern Australia. With no active researchers in the country working on this particular taxon, this project represents a great opportunity to increase our knowledge on an often overlooked but very interesting group of animals. Creating an inventory and an identification key to the polyclad species inhabiting Australian waters is crucial for understanding Australia's biodiversity and for future ecological studies. This project documents the taxonomy of south-eastern Australian flatworms through the use of a combination of morphological and molecular data sets. My goal is to establish a taxonomic key for identification and to facilitate the conservation and protection of these animals. Once the molecular part of this work is completed, I will develop interactive keys to allow easy identification for ecologists. **Granted: \$1,500**

Sumner, Ms Emma (PhD candidate, Deakin University) [*Surrey Jacobs Award*]

Title of project: *How will Australian alpine plants respond to future climate extremes?*

Synopsis. Life for alpine plants is one dominated by climate severity. There has been comparatively little research conducted on the thermal tolerances of Australian alpine plants and to date, no research has investigated heat tolerance. The objectives of this research are to (1) Provide empirical data on the upper and lower thermal tolerances of key alpine plant species; (2) Investigate how thermal tolerances vary across the landscape and across seasons; (3) Investigate how snow conditions during winter and early spring affect upper and lower thermal tolerances and growth of alpine plants. Climate in the Australian Alps encompasses both upper and lower temperature extremes: freezing events occur year-round, and heatwaves throughout the growing season. However, by 2050 precipitation is expected to reduce by 24%, drought and heatwave frequency and intensity is expected to increase with more days above 35°C and average temperatures are expected to rise by up to 2.9°C. Snow is the most important environmental

driver of species distributions and plant communities in the Australian Alps. With earlier and more variable snowmelt, it is unclear how plants will respond to exposure during winter and early spring, or how this will affect their freezing resistance and/or heat tolerances later in summer. In order to achieve my project goals, I will test the following hypotheses: (1) With elevation, heat tolerance will decrease and freezing tolerance will increase; (2) Plant thermal tolerance thresholds will adjust according to season, with greatest heat tolerance in summer and greatest freezing tolerance in spring; (3) Plants experience greatest freezing injury and reduced growth with early snow melt conditions; (4) Plants increase freezing tolerance with multiple years of early snow melt conditions. This will be the first project to encompass both ends of thermal spectrum of alpine plants in Australia and the first to investigate thermal tolerance responses across an elevation and snowmelt gradient throughout the year. Results will provide valuable information on the capacity for Australian alpine plants to respond to future climate extremes and changing snow conditions, and will identify species resilient or sensitive to ongoing climate change. **Granted: \$1,500**

Wee, Mr Nicholas (PhD student, University of Queensland)

Title of project: *The circle of life: Elucidating the life-cycles of parasitic flatworms infecting Australian bivalves and fishes*

Synopsis. Digenean trematodes are parasitic flatworms that infect all major invertebrate groups and possess complex, multi-host life-cycles. A typical digenean life-cycle involves three stages of transmission. Eggs released from the adult worm embryonate to form miracidia which seek out a first intermediate host, typically a mollusc. The miracidium develops into a sporocyst. Following asexual reproduction, cercariae, the free-living and short-lived second larval stage emerges from the mollusc and penetrates the second intermediate host which can comprise a wide range of invertebrate and vertebrates. The cercariae encyst within the second intermediate host as metacercariae and await ingestion by the definitive host for the life cycle to be completed. The Monorchiidae is a widely studied trematode family for which few larval stages, and even fewer complete life-cycles are known. The Monorchiidae is a major digenean trematode family with over 250 species infecting a wide range of marine fishes. While the group has been subjected to much research globally, much is still unknown about their life-cycles. Majority of the knowledge on monorchiid life-cycles stems from ten studies that have elucidated complete monorchiid life-cycles. The studies were mostly conducted in North America, South America, and Europe. Within Australia, however, knowledge of monorchiid life-cycles is minimal. The only available information comes from unpublished data. No monorchiid life-cycles have been elucidated in the region and it represents a significant gap in our understanding of the group. The project has primary aims of elucidating the life-cycles of monorchiids in Australia and to identify their host ranges. I propose to conduct research from Heron Island Research Station on the southern Great Barrier Reef. After collection, specimens will be processed using standard morphological techniques. A key outcome of the study is that the life-cycle will be used in analysing the parasite-host interactions, the phylogenetic relationship and the evolution of the group. This will further bolster our understanding of the interrelationships of the Monorchiidae to other digenean trematodes. **Granted: \$600**

REPORTS FROM RECIPIENTS OF RESEARCH GRANTS

It is a condition of an award that the recipient reports the results to the Society. Some have had their work published and others are preparing papers for publications.

Ms Hannah **BANNISTER** (University of Adelaide). Grant title: *Pre-European diet of the brushtail possum in the northern Flinders Ranges*. Like many other « critical weight range » mammals, the brushtail possum (*Trichosurus vulpecula*) has undergone a severe decline in the past 100-200 years, having disappeared from more than 50% of its former range, with their decline most pronounced in the arid zone. Predation by introduced foxes (*Vulpes vulpes*) and feral cats (*Felis catus*), competition with and habitat alteration by introduced herbivores and domestic stock, habitat loss, altered fire regimes and hunting are all thought

to have contributed to the « species » decline. In the *Ikara-Flinders Ranges National Park*, foxes are subject to ongoing control under the Bounceback project. This led to a trial reintroduction of brushtail possums in 2015, after their local extinction around 70 years ago. brushtail possum scats were collected from caves at Chambers Gorge, in the northern Flinders Ranges in the 1970s. The aim of this study was to analyse the contents of a subset of these scats using next generation DNA sequencing, and compare this to the diet of the reintroduced population. I am thankful to the Linnean Society of NSW Joyce W Vickery Scientific Research Fund, Field Naturalists Society of South Australia and Holsworth Wildlife Research Fund for providing funding towards this research.

Mr Yi-Yang **CHEN** (Australian National University). Grant title: *How does tropical macroalgae epifauna respond to changing sea temperature?* Epifauna are invertebrates (0.5 – 1.0 mm long) occupying the canopy of other organisms such as macroalgae and corals. As the key consumers, producers and nutrient recyclers, macroalga-associated epifaunal communities can have very high levels of secondary of secondary productivity in tropical macroalgal reefs. During 2018 I visited Coral Bay within the Ningaloo Marine Park to conduct my field assessments of *Sargassum* canopy structure, and make collections to assess patterns of biodiversity in *Sargassum* epifauna, across nine study sites during the Austral summer (Feb-Mar) and winter (Aug-Sep) seasons. Back at the ANU in Canberra, I used the sieve method to categorise the epifauna by size and functional group, from which I was able to calculate epifaunal abundance and biomass in each season. It was an amazing experience, and I am grateful to the Linnean Society of NSW for supporting my field research.

Mr Timothy **FRAUENFELDER** (University of New England). Grant title: *Exploration of the Griman Creek Formation in Bymount, southern Queensland, Australia*. The Griman Creek Formation at Lightning Ridge has one of the most abundant and diverse, yet poorly known fossil records of Cretaceous terrestrial fauna in Australia. The fauna consists of titanosauriform sauropods, megaraptoran theropods, pterosaurs, turtles, possible ankylosaurids, plesiosaurs, mammals, dipnoans and diverse freshwater invertebrates. The Griman Creek Formation at Lightning Ridge is unique on a global scale being the only locality that preserves a terrestrial fauna as natural casts in precious and non-precious opal. Given that Lightning Ridge is the main fossil-bearing locality for this formation, research on this fauna is inherently limited by mining. At the Bymount property there were at least three major finds: a juvenile plesiosaur centrum, a sauropod caudal vertebra and a possible sauropod rib. Continued fieldwork in 2019 will hopefully shed further light in the fossils that were found. A poster presentation resulted from this fieldwork and gained attention from other fellow students. A publication will be in the works after looking at already found material from previous trips not yet described.

Miss Alexandra **MURRAY** (James Cook University). Grant title: *Analysis and description of a Cretaceous ichthyosaur skull from Boulia, Queensland, Australia*. Cretaceous ichthyosaur fossils are found widely throughout western Queensland and are all assumed to be a single endemic species: *Platypterygius australis*. A specimen that has been labelled as *P. australis* but has not yet been formally described is Queensland Museum specimen QMF58949 which resides at the Stonehouse Museum at Boulia. QMF58949 consists of a near-complete skull and select appendicular skeletal elements. This funding (Betty Mayne Fund for Earth Sciences) has facilitated multiple fieldwork opportunities to Boulia to properly examine QMF58949 and produce an accurate 3D model. The results are not yet conclusive. The ultimate outcome of funded research is the publication of the formal description of QMF58949 with the aim of placing it within its taxonomic context.

PROCEEDINGS OF THE LINNEAN SOCIETY OF NSW

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List of articles published in volume 140, 2018

- Fulton, GR. *Notes on the mammals collected on the Chevert expedition to New Guinea in 1875.*
 Maynard, GV, Lepschi, BJ, & Malfroy, SF. *Norfolk Island quarantine survey 2012-2014. A comprehensive assessment of an isolated subtropical island.*
 Spate, A, Baker, A. & Coleborn, K. *Kart values of Kosciuszko National Park – a review of values and of recent research.*
 Wright, GT, McDougall, KL & McCarthy, GJ. *Archiving the scientific legacy of Dr Alec Costin.*
 Zhen, YY. *Conodonts, corals and stromatoporoids from Late Ordovician and latest Silurian allochthonous limestones in the Cuga Burga Volcanics of central western New South Wales.*

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SNIPPETS FROM THE PAST

28. March 1923. From the Presidential Address by Mr G A Waterhouse FES, President, in the Chair: *"Our animals have been sadly neglected; the number of the larger species is not great, and they are not of use for domestic purposes. Speaking of the marsupials alone – the fur can be put to commercial uses and as a result they have been shot to such an extent that many species have been well nigh exterminated. The scientific importance of our fauna is shown by the number of expeditions that have visited or propose to visit Australia and very soon it may be said that the best collections of some groups are to be found not in Australian museums, but in those outside Australia. This should not be so. It behoves this Society to ask how has this happened and can the position be rectified. In New South Wales there are two institutions that might be expected to take a keen interest in these questions – The Australian Museum and Taronga Zoological Park – neither of them government departments but governed by Trustees, and in both cases Zoologists are in a decided minority on the Trusts. The Australian Museum is working under an old act, but to-day the community contains many highly trained and qualified men whose services might readily be availed of. For instance, why should the Chief Justice, The President of the Medical Board, The Crown Solicitor, as such, be Trustees and not the Professor of Zoology at the University of Sydney or representatives elected by this Society or the Royal Zoological Society."*

Extract from *Annals of Botany*, 122(5): 747-756, 2018

Immobilised Plants

Recent research has shown that anaesthetics work on plants as well as humans and other animals. The research team chose plants that move – Venus flytrap, peas whose tendrils reach out to climb and the sensitive *Mimosa* whose leaves fold up when disturbed. When anaesthetised, the Venus flytrap does not close to capture insects and the tendrils and leaves do not move.

A diverse group of compounds are used as anaesthetics in humans and animals. It is not fully understood how each compound manages to immobilise the nervous system, physiologically speaking. The research team suggest that perhaps plants could be used for experiments instead of the usual mice.

ANNOUNCEMENTS

1. 2019 LINNEAN SOCIETY OF NSW BLUE MOUNTAINS SYMPOSIUM

The Society will hold a symposium from Thursday 7 to Saturday 9 of November 2019 on geology, botany, zoology, ecology. It will have three components:

- i) 7. November: a day long field trip.

ii) 8. November: a day long scientific session, will be held at the Blue Mountains Heritage Centre Govetts Leap, Blackheath.

iii) 9. November: a day long public lecture day at the Springwood Sports Club (the theatrette has already been secured for that day)

LINNEAN SOCIETY OF NEW SOUTH WALES

TREASURER'S REPORT TO ACCOMPANY 2018 AUDITED ACCOUNTS

Although the Society continues on a relatively sound financial footing, our income stream derived from interest on term deposits is now in steep decline. All our term deposits, which are invested for terms of 1-2 years, now only return less than half the interest payments we enjoyed a few years ago. This has impacted heavily on our ability to reign in the operating deficit which continues stubbornly at \$10096 last year, a slight increase from the 2017 deficit of \$9458. This is despite the benefit of a useful surplus (just over \$5300) from the Warrumbungles Symposium held in September 2018, as well as profit of \$1038 derived from continuing sales of the Royal National Park guidebook. Our major expenses continue to be the modest salary of our part time secretary, rental of the Society's office, and the annual audit fee. In regard to the latter I am pleased to report that we again successfully negotiated a significant discount in the cost of the audit thanks to the generosity of our long-term auditors. This year Council is adopting some significant measures, such as moving out of our rented office space at Kingsford, that should result in substantial savings, perhaps even eliminating the annual deficit.

The fall in interest income significantly affects the ability of the Society's scientific research funds – the Joyce Vickery Fund, Betty Mayne Fund, and the William Macleay Microbiology Fund – to maintain their important financial support of basic scientific research undertaken mainly by undergraduate and post-graduate students. As in past years we limited the total amount available as grants to 50% of the preceding year's income from interest. In 2018, grants dispersed from the Joyce Vickery Scientific Research Fund amounted to \$12,600 (including supplements from the JF Noble Bequest and the Surrey Jacobs Memorial award), which was marginally less than was disbursed in 2017. \$1700 was awarded from the William Macleay Microbiology Fund (compared to \$2600 in the previous year). The Betty Mayne Scientific Research Fund for Earth Sciences disbursed \$4059 in 2018 (compared with \$2818 in 2017) though this was substantially boosted due to the final supplement from the Tenison Woods Memorial fund. The capital of these research funds was increased by tax-deductible donations, for which the Society is most grateful.

The Society continues to support scientific research with a quality journal, free scientific talks throughout the year, significant grants to assist students and retired researchers, and an annual (or biannual) well-attended symposium. In regard to the latter I draw your attention to our 2019 Natural History Symposium to be held in early November, which will focus on the geology, botany, zoology and ecology of the Blue Mountains National Park and World Heritage area.

I thank the Secretary for his day-to-day handling of income and expenditure, and for providing me each month with accurate paperwork to facilitate my compilation of the accounts, and the Society's auditors for thoroughly checking all of the figures.

Ian Percival (Honorary Treasurer) 20th March, 2019

LINN S C NEWS

NEWSLETTER No: 172

JUNE 2019

NEWSLETTER EDITOR	POSTAL ADDRESS
J C Herremans Secretary Telephone: (02) 9977 8075	PO Box 291 Manly NSW 1655 Mobile: 0490 542 524

E-MAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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REPORT FROM RECIPIENT OF RESEARCH GRANTS

It is a condition of an award that the recipient reports the results to the Society. Some have had their work published and others are preparing papers for publications.

Dr Anthony **WRIGHT** (2017 Betty Mayne recipient) Title of project: The coral genus *Phillipsastrea* from the Early Devonian of eastern Australia.

As predicted in my application, I visited the School of Earth Sciences at the University of New England where I found a well curated room with a vast store of thin sections. This work is nearing the submission stage, and is intended for publication as a memoir of the Association of Australasian Palaeontologists. The MS currently runs at 198 pages double spaced, and there are 36 figures including 34 photographic plates of corals. We propose 2 new genera among the 8 genera to which our species are assigned, and 7 new species. In all there are formal descriptions of 16 new and revised species, and reviews of many other species, genera and higher taxa. The material studied is mostly from central western and the New England regions of NSW, with additional taxa from Queensland and Victoria. Illustrations of almost all of the thin sections have been prepared by using a flat-bed scanner at the University of Wollongong. Study of the Ulah coral fauna progresses slowly, with preparation of more thin sections under way. Collection of limestone samples for conodont extraction from the Ulah strata was completely foiled by very severe flooding of Panuara Rivulet and further attempts to collect these samples are yet to be organised. That time at Orange was then spent assisting Drs Percival and Zhen in collecting samples from a Silurian section) and looking in vain for more material of the coral *Trapezophyllum* east of Wellington. Due to ongoing space problems in the School of Geosciences at the University of Wollongong, very substantial amounts of my collections have been moved off campus to a safe

repository, necessitating numerous trips. I have also been very fortunate to be able to have some photography done by David Barnes at Londonderry, most of this focusing on a very unusual new stropheodontid genus from Mount Frome.

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List of articles published in volume 141, 2019

Benson, D. – Two centuries of botanical exploration along the Botanists Way, northern Blue Mountains, NSW: a regional botanical history that reflects national trends.

Hope, Geoffrey et al. – Science through time: understanding the archives at Rennix Gap Bog, a sub-alpine peatland in Kosciuszko National Park, New South Wales, Australia.

Mackay, K David & Gross, C.L. – Climate change threatens a fig-frugivore mutualism at its drier, western range margin.

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SNIPPETS FROM THE PAST

25. March 1908. From the Presidential Address by Mr A H S Lucas, President, in the Chair: "Mr David Scott Mitchell, M.A., deceased on 24th July 1907, whose association with the Society goes back to the 8th December 1874, was born in Sydney in 1836. Mr Mitchell was one of the first batch of graduates of the University of Sydney, taking his B.A. in 1856, and his M.A. in 1859. In 1858 he was admitted to the Bar, but did not practise as he had inherited considerable private means from his father. Thereafter he devoted his time and energy to the conduct of his private affairs, and to the gratification of his individual tastes as a bibliophile and collector. The results of forty-five years' discrimination and unstinted collecting of books, pamphlets, manuscripts, pictures, &c, chiefly but not exclusively relating to Australasia, henceforth, to be known as the Mitchell Library, was bequeathed to the State, together with the sum of £70,000 for endowment, upon certain conditions. The more important of these were that the individuality of the collection should be conserved, that it should be suitably housed in a separate wing of the contemplated National Library of the State, and that it should be maintained and rendered available to those who are competent to make use of it, under similar regulations to those which are in force in the British Museum Library.

The foundation stone of the Mitchell wing was laid by the Premier of the State, with appropriate ceremony in October 11th, 1906; and the edifice is now approaching completion. Mr Mitchell was a very reticent man upon the subject of the Mitchell Library, because he was an extremely modest man. Mr Mitchell did not add the pursuit of science to his accomplishments, be that as it may, the Society is honoured in having had among its Foundation Members, in the person of Mr Mitchell, another brilliant example of the private individual possessed of wealth, who made it his very special care to start a prolific enterprise and to provide for its maintenance, for the benefit of those who came after him."

ANNOUNCEMENTS

1. 2019 LINNEAN SOCIETY OF NSW BLUE MOUNTAINS SYMPOSIUM

The Society will hold a symposium from Thursday 7 to Saturday 9 of November 2019 on geology, botany, zoology, ecology. It will have three components:

- i) 7. November: a day long field trip.
 - ii) 8. November: a day long scientific session, will be held at the Blue Mountains Heritage Centre Govetts Leap, Blackheath.
 - iii) 9. November: a day long public lecture day at the Springwood Sports Club.
- No full details as yet available.

2. FORTHCOMING LINNEAN SOCIETY OF NSW LECTURES:

September 18, 2019 – Dr Patricia Hutchings will talk about coral reefs

November 20, 2019 – Prof Michael Archer will talk about keeping native animals as pets.

Details regarding above lectures not yet available.

Lectures will be held in the Gallery Room, in the original Mitchell Wing, State Library of NSW.

3. ROYAL ZOOLOGICAL SOCIETY OF NSW

a) – Wildlife Talk:

The Royal Zoological Society of NSW will have its monthly talk this Tuesday, June 18 at the Botany View Hotel, King Street, Newtown from 6:30pm. Everyone welcome.

Presenter- Dr Stephen Ambrose

Topic: *Sex, Gluttony and Death in the City: A Bird's Eye-View.*

Bird species are important and visible components of the biodiversity of our cities. They occur from our parklands and wetlands to inner city streets. But our cities are growing upwards and outwards, towards and into important bird habitats. While most bird species and populations decline in abundance when their natural habitats are impacted, a few have adapted to living in urban areas, including inner city areas. Who are the “winners” and who are the “losers”? What are the challenges for city birds, and why are some species successful while others fail? How can we manage our city environments to make them bird-friendly, but not too friendly that it favours introduced bird species at the expense of locally-native species? Stephen will draw on his extensive practical experience of bird populations in Australian cities to discuss some of these issues.

b) – RZS NSW Annual Forum 2019:

In 1999, the Royal Zoological Society of NSW ran a symposium on the dingo. The papers from the day were published by the Society in 2001 as *A symposium on the dingo* (edited by Chris Dickman and Dan Lunney). All the papers from that symposium are freely available on the website of the Royal Zoological Society of NSW. Now, 20 years after the initial symposium, we are taking the opportunity to bring together much of the large body of research and ideas that have advanced our understanding of the dingo since 1999. The day has been structured around a sequence of broad topics that both update key themes from the earlier forum and introduce new ideas. Given that there is a wide range of views on how to manage dingoes, and wild dogs, the day's program has been arranged so that the papers reflect the divergent views on this controversial carnivore. The very term “dingo” is evocative. For some people, dingoes are to be admired, but for others, they are to be feared. This creates a dilemma as to how we, as a nation, should manage the dingo. There is also the argument as to whether the dingo is a native species, and if yes, whether it qualifies for listing as threatened. Where such tensions exist, there is a pressing need to review how and why we manage dingoes. This debate requires many voices, and in our opinion, the

science of zoology has much to contribute. Hence this forum being a program of the Royal Zoological Society of NSW.

There will be ample opportunity for discussion and debate from the audience in the plenary sessions that are a key point of the structure of the day – in fact, a good proportion of the day is devoted to debate across the room. These plenary sessions will be recorded and form part of the publication that will follow the day. The day will be lively: do come and listen, and participate in the plenary sessions.

A draft program can be found on our website (www.rzsnsw.org.au)

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If you pay through a bank, it is essential that you e-mail the Society at

secretary@linneansocietynsw.org.au otherwise we will receive the money and not know who paid it.

SEND RECEIPT TO: (email address)

Name

Address

LINN S C NEWS

NEWSLETTER No: 173

JULY 2019

NEWSLETTER EDITOR	POSTAL ADDRESS
J C Herremans Secretary Telephone: (02) 9977 8075	PO Box 291 Manly NSW 1655 Mobile: 0490 542 524

E-MAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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LECTURE AT THE STATE LIBRARY

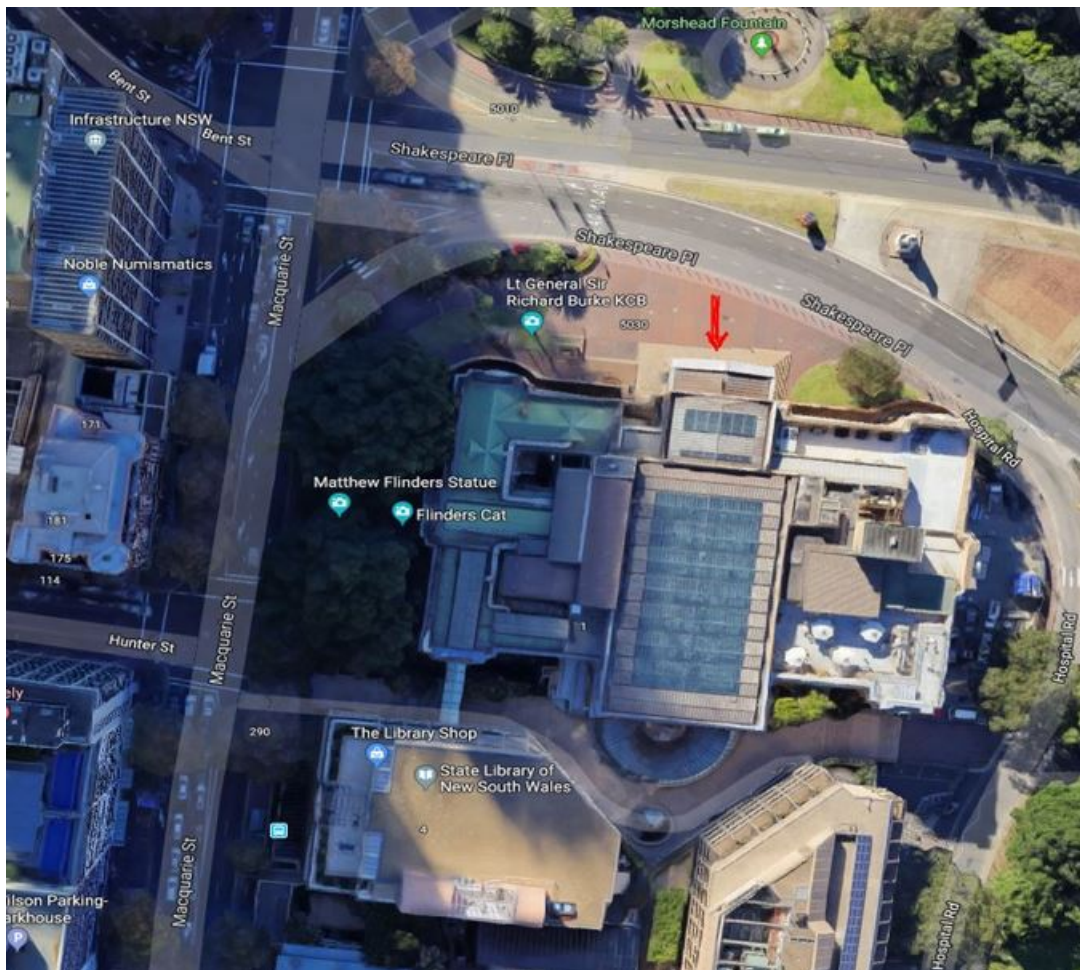
The Society will hold its first talk since relocating to the State Library on Wednesday September 18, in the Dixson Room, in the Mitchell wing from 6pm.

*Why would you want to spend ones' life studying seaworms?
All is explained*

Dr Patricia Hutchings, Senior Fellow, Australian Museum

Abstract: Seaworms are extremely abundant and diverse in all marine habitats and play a critical role in marine/estuarine ecosystem functioning. They exhibit an amazing range of feeding, reproductive strategies and morphological variation. I will attempt to convey this diversity of seaworms and explain why it is so critical to correctly identify them and where you can easily see them around Sydney. This explains why I still find them so fascinating and plan to continue working on them describing new species for many years to come.

**Everyone is welcome to attend (no charge)
Refreshments will be served from 5:30pm for the 6pm talk**



MAP SHOWING ENTRANCE TO THE MITCHELL WING AT STATE LIBRARY

IN THE NEWS

We congratulate Dr Helen Patricia Ramsay who has been awarded an AM in the recent Queen's Birthday Honours list, for significant service to plant science. She joined the Linnean Society of NSW in the late 1940's as a student member and has retained that membership ever since. Her research has benefited greatly from collaboration with overseas specialists as well as those in Australia. In research her priorities have included cytotaxonomy and chromosome studies as well as revisionary work on several families of mosses including those in the Wet Tropics. She has also contributed to the Flora of Australia for the Australian Biological Resources Study. Her long list of publications continues to the present day.

PROCEEDINGS OF THE LINNEAN SOCIETY OF NSW

All recent papers published in the *Proceedings* since Volume 132 (2012) are freely available from

<http://ojs-prod.library.usyd.edu.au/index.php/LIN>

Earlier volumes back to the Society's inception (1874) are available from www.biodiversitylibrary.org/bibliography/6525

NOTE: A CD is no longer distributed free

List of articles published in Volume 141, 2019

Benson, D. – Two centuries of botanical exploration along the Botanists Way, northern Blue Mountains, NSW: a regional botanical history that reflects national trends.

Hope, Geoffrey et al. – Science through time: understanding the archives at Rennix Gap Bog, a sub-alpine peatland in Kosciuszko National Park, New South Wales, Australia.

Mackay, K David & Gross, C.L. – Climate change threatens a fig-frugivore mutualism at its drier, western range margin.

Please check the Society's home page for recently uploaded papers by going to "LinneanSocietyNSW" then click "Journal (Proceedings)".



SNIPPETS FROM THE PAST

Presidential Address by Professor W J Stephens, in the Chair – 29th January, 1890
The following sketch of Mr Woods' life and works is taken from a biographical notice which appeared in the Adelaide Advertiser of Oct. 8, 1889, and which is attributed to the pen of a very near relative who writes with special authority.

« *The Rev. Mr. Woods the son of Mr. James Dominick Woods, of the Middle Temple and of Sydenham, Kent, who held a leading position the literary staff of the Times for 40 years. His mother was Henrietta Maria St Heloy, the daughter of the Rev. Joseph Tenison, of Donoughmore Glebe, in the County of Wicklow, Ireland. His maternal grandfather was the Bishop of Ossory, who was the nephew of the Most Rev. Thomas Tenison, Archbishop of Canterbury. Mr Woods was born at West Square, London, on November 15, 1832.* »

When his school education was completed he became associated with the Rev. Canon Oakley of Islington, whom he assisted in establishing the Catholic Schools of that suburb. After a temporary attachment to the Order of Passionists, he proceeded to France, when he became one of the Professors at the College for Naval Cadets at Toulon. Here his taste for geology and natural science received its first development. Returning to England in about four years, he made the acquaintance of Dr. Willson, Roman Catholic Bishop of Tasmania, with whom in 1855 he went to that colony to establish a system of schools for the education of Roman Catholic children.

From Tasmania he removed to South Australia, where he was ordained in 1857, and where he remained for some years, engaged both in mission work, and in the organisation of the Roman Catholic Schools of that colony. He afterwards became a missionary priest in New South Wales, with Sydney as his head quarters. In 1883, on the invitation of Sir F. A. Weld, K.C.M.G., Governor of the Strait Settlements, he proceeded to Singapore in order to explore Malacca and furnish the Government with some reliable information as to the geology and mineral resources. On his way thither he stayed for a time in Java, and was witness to one part of the eruptive outbreak of Krakatoa. He ascended two of the volcanoes while they were in eruption, and his experiences, as detailed in a private letter, were such as to determine him not to try the experiment again. His description of the scenes he encountered whilst passing through the Straits of Sunda was shocking. The sea was literally covered with corpses. However, it did not discourage him in other adventures in other parts of the East, not less hazardous than the ascent of active volcanoes.

Mr. Woods traversed the island of Java from end to end, and performed the same arduous task through Siam and Malacca, in each of which places he enriched the scientific literature of the world with his observations on the geology and botany of the regions he passed through. Sir Frederick Weld, shortly after Mr. Wood's arrival in Singapore, left the colony on leave, but before his departure he furnished Mr. Woods with credentials to the native princes, who assisted him in every way they could. Before he left Singapore the Colonial Secretary of the colony advised the British Government of the arrival of the Rev. Mr. Woods, and urged the desirableness of engaging his services to report to the Admiralty upon the coal resources of the eastern seas. The Admiralty accordingly detached from the naval squadron in the China Sea the Corvette "H.M. Pegasus," Captain Bickford, to enable Mr. Woods to make the necessary investigations. He thus visited and explored many parts of Borneo, Siam, Malacca, the Philippines Islands and other places. His reports to the Admiralty have not been made public, but their value was recognised in the munificent way in which Mr. Woods was rewarded for his investigations and descriptions. In a private letter from one of the principal naval officers on the Chinese Station the remark was made that Mr. Woods's discoveries as to the coal resources of the East has increased the strength of the British Navy in that part of the world by a force better than half-a-dozen good-sized frigates.

After a lengthened cruise Mr. Woods arrived in Hong Kong, where he was most cordially welcomed and entertained by Sir G. Bowen and the Admiral of the station. Then he went to ascend the Hoang Ho, but was compelled by the state of his health to return. He came back to Australia in "H.M.S. Flying Fish," which landed him at Port Darwin. Here Mr. J.L. Parsons, the Government Resident on the Northern Territory, engaged his services to visit and report upon the mineral districts of that portion of the country. After a short visit to Queensland he returned to Sydney after an absence of about four years.

Now, however, the continued hardships which he had undergone began to tell upon him, and his health slowly but surely gave way. *« For nearly two years he was confined to his house, and latterly he was so debilitated that he was unable to see any but his immediate attendants. He suffered greatly, but he bore his afflictions with remarkable fortitude, and he accepted his fate with resignation. His departure from life was soothed by all the ministrations of that religion to which he had devoted his life, and he left the world*

in which his career had not been barren of results with no regrets such as might disturb a mind less evenly balanced and of religious convictions less assured than his own. »

He had here many kind and considerate friends (among whom you will readily understand that Sir William Macleay held a prominent place), but he had been exposed to troubles of which he made no complaint, but which seemed to have made a lasting impression on his naturally sanguine and happy temperament. On this head I quote a few sentences selected from a brief but affectionate memoir of the departed, which appeared in the Centennial Magazine, Sydney, January 1, and was written by his friend and fellow member, the Rev. J. Milne Curran, now of Bathurst: « *Of his personal character the public knew little. He was a most genial companion and a sympathetic friend. There was a certain vein of sadness in his manner. The deep lines of care that furrowed and seamed his face were noticeable to many who knew nothing of his inner life. Even though in latter years tedious work was for him a stern necessity, he never lost that genial affability that charmed his friends. A glance through his correspondence shows that he had to bear trials that well-nigh embittered many years of his life. His sensitive nature never rallied from the hardships that induced him to leave Adelaide. He was forced to learn, too, after doing his all, in giving the best years of his life to the service of Religion, he had to face actual need, or appeal to the charity of his friends. While his name was spoken with honour and his work pointed to with pride by his co-religionists, he was himself on the very verge of want.* » Again, « *shortly before his death he was given to understand that he should comply with an exceptionally exacting Church regulation* n *“It is very hard, very hard,” I heard him say, “but I hope to practise a little of what I have been teaching”.* » n Requiescit in pace.



2019 LINNEAN SOCIETY OF NSW NATURAL HISTORY FIELD SYMPOSIUM



Photo: Henry Gold

WORLD HERITAGE ON SYDNEY'S DOORSTEP: THE NATURAL HISTORY OF THE BLUE MOUNTAINS, GEOLOGY, FLORA, FAUNA AND HUMAN IMPACTS

FIRST CIRCULAR

Scope

The Linnean Society of New South Wales has had previous field symposia in the Snowy Mountains and the Warrumbungles (last September), and now we are bringing one to the Blue Mountains, right on Sydney's doorstep. The previous symposia have included a field trip and a day or two of presented scientific papers. This time we have decided to add a session on general natural history for the public, to be held on Saturday 9 November at the Springwood Sports Club. We see this as a way of promoting the study and awareness of natural history in the region.

The symposium will take place from 7-9 November, 2019, and will comprise three sections:

- 1) a geological /botanical field trip in the western Blue Mountains on Thursday, 7 November, leaving from Katoomba.
- 2) a session of scientific papers held at the Springwood Sports Club on Friday, 8 November.
- 3) a series of lectures on general Blue Mountains natural history held at the Springwood Sports Club on Saturday 9 November.

Participants can register for any combination of the three-day sessions. However, seats are limited for the field trip.

<http://Linneansocietynsw.org.au>



"natural history in all its branches"

Costs and logistics

The Springwood Sports Club Auditorium holds 150 people and is located at 83 Macquarie Rd, Springwood NSW 2777; phone: (02) 4349 7796

Lunches and teas as well as program booklets are included in the registration fees for Springwood Sports Club sessions on Friday, 8 November and Saturday, 9 November. Participants must provide their own lunch for the field trip on Thursday, November 7.

Participants can register for any combination of the individual day sessions, or a combined three-day session. However, due to limited numbers of seats available on the field trip, preference will be given to those registering for at least one of the presentation sessions. Costs are shown in the table on the registration form.

Members of the Linnean Society of NSW will enjoy a modest discount on registration and field trip fees. Non-members are welcome to apply for membership of the Society to access these discounts.

For details of membership categories and our low subscription rates, please refer to the website: http://linneansocietynsw.org.au/menu_pages/membership.html

Cancellation policy: 50% refund will apply to cancellations notified up to September 30. No refunds will be given in October or November.

Train connections to Springwood. The Springwood Sports Club is about a ten-minute walk from Springwood train station. People may prefer to travel by train to the Friday and Saturday sessions.

Timetables with train and bus links to Springwood Station can be found here:- <https://transportnsw.info/stop?q=10101259#>

Accommodation in and around Blue Mountains : For participants requiring accommodation in the Blue Mountains, see this website:- <https://www.bluemts.com.au/accommodation>.

Publication of papers presented at the symposium

Relevant papers presented at the Scientific Session are invited to be submitted (though not mandatory) for publication in the *Proceedings of the Linnean Society of New South Wales*, subject to editorial standards and peer review. This journal, first published in 1874, is available online and is open access, and has no page charges (even for colour figures). A detailed set of Author Guidelines is available on the Linnean Society of NSW website. **Deadline for submission of manuscripts will be March 31, 2020** with publication likely in late 2020.

Contact

Linnean Society of NSW office: secretary@linneansocietynsw.org.au
or Dan.Bickel@austmus.gov.au

<http://Linneansocietynsw.org.au>



"natural history in all its branches"

PROVISIONAL PROGRAM – BLUE MOUNTAINS 2019

THURSDAY, NOVEMBER 7: Field Trip – The Geology and Vegetation of the Western Blue Mountains

- a). Tour leaders - John Pickett & Doug Benson
- b). Transport via hired buses from Katoomba – maximum group 50.
- c). Depart and return Katoomba, 9:00 am – 6:00 pm.
- d). Participants requested to bring their own lunch and drinks for the day (bring along or purchase at cafes and supermarkets in Katoomba before trip departs). Participants should also bring hats, sunscreen and wear sturdy footwear.
- e). A booklet and guide for the trip will be provided.

It is anticipated that demand may exceed the number of seats, so up to one month before the field trip we will only accept paid field trip bookings from those attending either the Scientific Session on the Friday, or the Public Lecture session on the Saturday, or both.

People who wish to participate in the field trip only will go on a waitlist. On October 8, unsold seats will be made available to those on that list.

FRIDAY, NOVEMBER 8: Scientific Session

Held at the Springwood Sports Club, 83 Macquarie Rd, Springwood, which has seating for up to 150 people and is near the train line. Registration includes lunch and teas, and abstract booklet.

The registration desk opens at 8:30 am for a 9:30 am start of session.

This session will comprise approximately 24 talks of 15 minutes duration on various technical subjects relating to Blue Mountains geology/ geomorphology, botany, zoology, anthropology and conservation science. Submissions from interested parties are welcome.

SATURDAY NOVEMBER 9: Public Lectures

Held at the Springwood Sports Club, 83 Macquarie Rd, Springwood, which has seating for up to 150 people. It is near the train line which helps people avoid the increasingly crowded Saturday Sydney traffic. Registration includes lunch and teas and abstract booklet.

The registration desk opens at 8:30 am for a 9:30 am start of lectures.

This will be a great opportunity to engage and interact with the natural history community of both metropolitan Sydney and the Blue Mtns. The lectures will comprise ten 30-minute talks on a range of topics related to general Blue Mtns natural history.



Time	Topic	Speaker
9:30	WELCOME TO COUNTRY, INTRODUCTION	
9:40	Geology, Geomorphology	John Pickett
10:30	Vegetation & Flora	Tim Hagar
11:00	MORNING TEA	
11:30	Mammals	(to be announced)
12:00	Birds	Carol Proberts
12:30	Hydrology, Invertebrates (aquatics)	Grant Hose
1:00	LUNCH	
2:00	Archaeology & Aboriginal culture	Jim Smith
2:30	Scientific exploration of Blue Mtns.	David Goldney
3:00	Conservation Issues in the Blue Mtns	Haydn Washington
3:30	Fire in the Blue Mtns	Ross Bradstock
4:00	FINISH, DISCUSSION, AFTERNOON TEA	



REGISTRATION FORM

Name (please print): _____

E-Mail (and/or postal address): _____

Affiliation: _____

Fee category (please circle):

Full member / Student member / Retired member / Associate member / Non-member

Please send completed registration form to

i) secretary@linneansocietynsw.org.au as attachment (indicate date & method of payment), or

ii) Linnean Society of New South Wales, PO Box 291, MANLY NSW 1655.

Fee Category	Field trip 7 Nov	Scientific Session 8 Nov	Public Lectures 9 Nov	All three Sessions	TOTAL
Students	\$45.00	\$25.00	\$25.00	\$95.00	
Retired, & Associate Members	\$45.00	\$25.00	\$25.00	\$95.00	
Full Members	\$50.00	\$30.00	\$30.00	\$110.00	
Non- members	\$60.00	\$40.00	\$40.00	\$140.00	

- 1) Bank transfer: St George Bank. Account name "Linnean Society of NSW"
BSB 112-879, Account # 466447867. **Please label payment 'BlueMt_yoursurname'**
If we don't know who the payment is for, we will not be able to assign you tickets.
- 2) Cheque made out to The Linnean Society of NSW, posted to the above address.

Lunches and teas are included in the registration fees for Springwood Sports Club sessions on Friday 8 November and Saturday 9 November. Participants must provide their own lunch for the field trip on Thursday November 7.

Please indicate any special dietary preferences e.g., vegetarian, gluten-free.



LINN S C NEWS

NEWSLETTER No: 174

SEPTEMBER 2019

NEWSLETTER EDITOR	POSTAL ADDRESS
J C Herremans Secretary Telephone: (02) 9977 8075	PO Box 291 Manly NSW 1655 Mobile: 0490 542 524

EMAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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NEW MEMBERS: We welcome

Ms Margaret A Beal. Fields of interest: geology, botany
Mr David Coleby. Fields of interest: botany, ecology, geology
Dr Paul Gorjan. Field of interest: geoscience
Ms Lyndal Sullivan. Fields of interest: ecology, vegetation, groundwater
Dr Peter A Watterson.

RESIGNATION: Council accepted – with regrets - the resignation from Council of Dr Michele Cotton. Michele, a member of the Society since 2001 was twice President of the Society, in 2008-09 and in 2016-17.

LINNEAN MACLEAY FELLOWSHIP

Applications are invited for the Linnean Macleay Fellowship for the year 2020. Applicants must be Members of the Society, reside in New South Wales, and have a degree in Science or Agricultural Science from the University of Sydney. Applicants are required to outline the proposed research and where it will be carried out. The Fellowship pays \$3,200 per annum, and the Fellow must engage in full time research on the project. The regulations governing the Fellowship are available on the Society's web site. These regulations were stipulated in Sir William Macleay's will and the Society is obliged to adhere to them.

Applications close 15 November 2019

REPORT FROM THE RECIPIENT OF RESEARCH GRANT

It is a condition of an award that the recipient reports the results to the Society. Some have had their work published and others are preparing papers for publication.

Mr Alex **KENINS** (University of New England; 2018 Joyce Vickery grand recipient).

Project title: Desmids from *Sphagnum* bogs of the New England Tablelands, Australia.

The awarded funds were used to undertake a survey and study of desmids from numerous sites from the New England Tableland Bioregion, as well as performing scanning electron microscopic analysis of the collected material at the University of New England. Over 70 taxa were observed with ten being newly recorded for Australia and a further twelve for the state of New South Wales. The completed thesis has descriptions and figures of these species along with more in-depth discussion on remarkable finds. Some putatively novel forms, although previously depicted and described, require further study for formal taxonomic description with some anticipated to be published as new species from this study. Over four hundred scanning electron and light microscope images, as well as numerous illustrations, are being prepared for the expected publication. In addition, microphotographs taken will also be submitted to algaebase.org. Samples taken from the project remain in the researcher's private collection, however, some may be deposited at the Armidale Herbarium pending publication along with the prepared SEM stubs that are currently housed at this institution. Two of the studied sites, Basket Swamp and Ebor Common, were also compared based on their floristic composition of desmids to assess their conservation value based on a modified transformation scheme. Basket Swamp received a higher score in comparison to Ebor Common due to greater species richness with many being regionally endemic. The study also found that the desmid community associated with *Sphagnum* in Australia is highly diverse and can differ markedly between sites with its own distinctive flora.



PROCEEDINGS OF THE LINNEAN SOCIETY OF NSW

All recent papers published in the *Proceedings* are freely available from

<http://ojs-prod.library.usyd.edu.au/index.php/LIN>

Past volumes available from

www.biodiversitylibrary.org/bibliography/6525

NOTE: A CD is no longer distributed

List of articles published in volume 141, 2019

Benson, D. – Two centuries of botanical exploration along the Botanists Way, northern Blue Mountains, NSW: a regional botanical history that reflects national trends.

Holmes, W.B.K. and Anderson, H.M. C The Middle Miocene flora of the Chalk Mountain Formation, Warrumbungle Volcano Complex, NSW, Australia.

Hope, Geoffrey et al. – Science through time: understanding the archives at Rennix Gap Bog, a sub-alpine peatland in Kosciuszko National Park, New South Wales, Australia.

Mackay, K David & Gross, C.L. – Climate change threatens a fig-frugivore mutualism at its drier, western range margin.

Please check regularly the Society's home page for recently uploaded papers by going to "LinneanSocietyNSW" then click "Journal (Proceedings)".



SNIPPETS FROM THE PAST

Presidential Address by Professor T.W. Edgeworth David, in the Chair – March 28th, 1894

Death has removed during the past year one who, though not a member of our Society, deserves special recognition by us on account of his long and useful life devoted largely to the study of Natural Science. Dr. George Bennett was born at Plymouth in 1804 and lived to the advanced age of 89. His connection with Australia dates back for nearly 70 years. At the early age of 15 he made a voyage to Ceylon, and on his return to England devoted himself to the study of medicine. After taking the degree of M.R.C.S. he gratified his desire of seeing the world by becoming surgeon of a vessel sent out on an exploring expedition.

It was during this voyage that the Doctor visited Australia and began his observations on its peculiar Mammalia. In 1832 he re-visited this country in order to investigate further the habits and anatomy of the Monotremata, as well as other features of our natural history. His travels extended to Java, Singapore and China, and on his return to England he published the results of his researches in a volume entitled "Wanderings in N.S. Wales, Batavia, Pedir Coast, Singapore and China, being a Journal of a Naturalist in these Countries during 1832-4." This volume was issued in London in 1834, and during the same year "Notes on the Natural History and Habits of the Ornithorhynchus paradoxus," was also published. Amongst other works written by Dr. Bennett may be mentioned "Gatherings of a Naturalist in Australasia" (1860); "Acclimatisation: its eminent adaptation to Australia" (1862); "A trip to Queensland in search of fossils" (1871); and a pamphlet on "The Introduction, Cultivation, and Economic Use of the Orange and Others of the Citron Tribe," published in Sydney in 1871.

In 1836 Dr. Bennett finally determined to settle in N.S. Wales, and began a successful career as a medical man. Although he soon secured a large practice, the doctor still devoted much time to his scientific work, which obtained world-wide recognition; and for fifty years he kept a constant correspondence with Sir Richard Owen, who was his college companion and intimate friend. Darwin was also among the deceased doctor's friends, and Darwin's methods of investigation were closely followed by him. In 1859 Dr. Bennett became an F.R.C.S. and an M.D. of Glasgow University.

From the time of his arrival in Sydney he took the keenest interest in our Botanic Gardens, and did much to advance them towards their present state of perfection. He was one of the chief founders of the Australian Museum; he acted for some time as its secretary, and afterwards became one of the Board of management. The now defunct Acclimatisation Society owed much to his friendly aid, and he was also one of the Vice-Presidents of the Zoological Society. During the whole of his residence in the colony he kept up an active scientific correspondence with friends at home, particularly with the Linnean Society, of which he was one of the oldest member. On the 11th of December, 1889, the Council of the Royal Society of N.S.W. awarded him the Clarke Medal for 1890, in recognition of his meritorious scientific labours, and more particularly on account of his very valuable contribution to the Natural History of N.S. Wales.

SIR WILLIAM MACLEAY MEMORIAL LECTURE

Why would you want to spend ones' life studying seaworms? All is explained. The 24th Sir William Macleay Memorial Lecture was delivered by Dr Patricia Hutchings, FRZS, Senior Fellow, Australian Museum Research Institute in the Dixson Room, Mitchell Wing.

Dr Pat Hutchings began her lecture by relating how she became involved with seaworms in her wild and carefree days in England and then had the opportunity to move to Sydney, taking up a position at the Australian Museum after completing her PhD at the University of Newcastle upon Tyne UK. For her PhD she studied the reproductive biology of a subtidal species and was able to document how this species was able to co-ordinate spawning over a single night using environmental cues and controlling the proliferation of gametes using a well developed endocrine system.

Polychaeta worms are very common marine animals and occur in a wide variety of marine and estuarine habitats, and a few live in freshwater. They are highly speciose and often occur in dense numbers. Many polychaetes are beautiful and are coloured red, pink, or green or a combination of colours; some are iridescent, owing to the presence of crossed layers of collagen fibers in the cuticle. She was able to demonstrate this using photographs of living animals mainly taken at Lizard Island Research Station on the Great Barrier Reef during an International workshop held there in 2013, which resulted in a major publication describing 91 new species.

Polychaetes can be free-moving or live in tubes attached to rocks or living in the sediment, and a few are parasitic. She then illustrated the amazing morphological diversity of polychaetes, their feeding diversity and reproductive strategies. Pat illustrated the great variety of feeding strategies which are found within the various polychaete families, including species which are carnivores, opportunistic, herbivores, surface deposit feeders, filter feeders and mud swallows, and some are even parasitic. Polychaetes reproduce both sexually and asexually and have great powers of regeneration which is useful if they get damaged by predatory fish. She explained how some species undergo mass spawning with gametes being released into the water column where fertilization occurs, and how this critical timing is achieved. This was illustrated with some species that spawn at the same time as the mass coral spawning which occurs on the reef. She stressed that polychaetes have a well-developed endocrine system which enables this high degree of co-ordination to occur.

She explained how one collects worms in the variety of habitats in which they live especially of the family Terebellidae which she has spent decades working on, not only describing many new species but the relationships of the various subfamilies which have now been elevated to families in their own right. Pat has spent a lot of time working on the Great Barrier Reef, initially at One Tree Island and later at Lizard Island where the Australian Museum has a research station and where she undertook detailed studies on polychaete recruitment and their role in bioerosion of coral substrates.

Pat then explained that while polychaetes were amazing animals in terms of their diversity they also played a critical role in the marine and estuarine ecosystem and occupied the bottom of the food chain and that many other animals relied upon them for food. This includes wading birds feeding on mud flats to many species of commercially important species such as fish and prawns. In addition they play a major role in the breakdown of organic matter, like the related worms found in compost bins. She highlighted her role in ensuring that polychaetes were considered in the recent rezoning of the Great Barrier Reef, where the inter-reefal areas were considered for the first time. She explained how the bioregions were identified and a 20% of each region zoned as a green zone.

Pat highlighted the importance of mentors in her early career and how she has taken this on board in supervising her many students and early career researchers. So while officially retired she is continuing to work on polychaetes and currently has 4 PhD students both from Australia but also from Spain and France.

Pat acknowledged the Linnean Society of NSW which published one of her first taxonomic papers on the polychaetes from Wallis Lake, NSW. She also explained how the Society published the proceedings from the 1st International Polychaete Conference which was held in Sydney in 1983 and which has continued ever 3 years since then, the most recent being held in Long Beach, USA in August 2019, and the next one will be held in July 2022 in South Africa.

She illustrated her talk with numerous illustrations and really tried to convey her enthusiasm for this diverse group of animals and explain why she has spent their working life studying them, and she was happy to answer questions from the audience.

ANNOUNCEMENTS

2019 LINNEAN SOCIETY OF NSW
BLUE MOUNTAINS SYMPOSIUM

Scope The Linnean Society of New South Wales, has had previous field symposia in the Snowy Mountains and the Warrungungles (last September), and now we are bringing one to the Blue Mountains, right on Sydney's doorstep. The previous symposia have included a field trip and a day or two of presented scientific papers. This time we have decided to add a session on general natural history for the public, to be held on Saturday 9 November at the Springwood Sports Club. We see this as a way of promoting the study and awareness of natural history in the region.

The symposium will take place from 7-9 November, 2019, and will comprise three sections:

- 1) **a geological /botanical field trip in the western Blue Mountains on Thursday, 7 November, leaving from Katoomba. FULLY BOOKED**
- 2) a session of scientific papers held at the Springwood Sports Club on Friday, 8 November.
- 3) a series of lectures on general Blue Mountains natural history held at the Springwood Sports Club on Saturday 9 November.

Costs and logistics

The Springwood Sports Club Auditorium holds 150 people and is located at 83 Macquarie Rd, Springwood NSW 2777; phone: (02) 4349 7796

Lunches and teas as well as program books are included in the registration fees for Springwood Sports Club sessions on Friday, 8 November and Saturday, 9 November.

Participants must provide their own lunch for the field trip on Thursday, November 7.

Participants can register for any combination of the individual day sessions, or a combined three-day session. However, due to limited numbers of seats available on the field trip, preference will be given to those registering for at least one of the presentation sessions. Costs are shown in the table on the registration form.

Members of the Linnean Society of NSW will enjoy a modest discount on registration and field trip fees. Non-members are welcome to apply for membership of the Society to access these discounts. For details of membership categories and our low subscription rates, please refer to the website.

Cancellation policy: 50% refund will apply to cancellations notified up to September 30.

No refunds will be given in October or November.

Train connections to Springwood. The Springwood Sports Club is about a ten-minute walk from Springwood train station. People may prefer to travel by train to the Friday and Saturday sessions.

Timetables with train and bus links to Springwood Station can be found here:

<https://transportnsw.info/stop?q=10101259#>

Accommodation in and around Blue Mountains : For participants requiring accommodation in the Blue Mountains, see this website <https://www.bluemts.com.au/accommodation>.

Publication of papers presented at the symposium

Relevant papers presented at the Scientific Session are invited to be submitted (though not mandatory) for publication in the *Proceedings of the Linnean Society of New South Wales*, subject to editorial standards and peer review. This journal, first published in 1874, is available online and is open access, and has no page charges (even for colour figures). A detailed set of Author Guidelines is available on the Linnean Society of NSW website. **Deadline for submission of manuscripts will be March 31, 2020** with publication likely in late - 2020.

Contact: Linnean Society of NSW office: secretary@linneansocietynsw.org.au or Dan.Bickel@austmus.gov.au

REGISTRATION FORM

Name:

E-Mail (and/or postal address):

Affiliation:

Fee category (please circle):

Full member / Student member / Retired member / Associate member / Non-member

Please send completed registration form to

- i) **secretary@linneansocietynsw.org.au** as attachment (indicate date & method of payment) or
- ii) **Linnean Society of New South Wales, PO Box 291, Manly NSW 1655.**

Fee category	Scientific Session 8 November	Public Lecture 9 November	TOTAL
Students	\$25.00	\$25.00	
Retired and Associate members	\$25.00	\$25.00	
Full Members	\$30.00	\$30.00	
Non-members	\$40.00	\$40.00	

1) Bank transfer: St George Bank. Account name "Linnean Society of NSW"
BSB 112879, Account # 466447867.

Please label payment 'BlueMntsyoursurname'

2) Cheque made out to The Linnean Society of NSW posted to the above address

Lunches and teas are included in the registration fees for Springwood Sports Club sessions on Friday 8 November and Saturday 9 November. Participants must provide their own lunch for the field trip on Thursday 7 November

Please indicate any special dietary preferences e.g. vegetarian, gluten-free, &c...

LINN S C NEWS

NEWSLETTER No: 175

DECEMBER 2019

NEWSLETTER EDITOR	POSTAL ADDRESS
J C Herremans	PO Box 291
Secretary	Manly NSW 1655
Telephone: (02) 9977 8075	Mobile: 0490 542 524

EMAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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NEW MEMBERS: We welcome

Mr Robert Conroy. Fields of interest: botany, geomorphology, natural history

Prof David Goldney. Fields of interest: wildlife ecology, ecological history

Mrs Wendy Grimm. Fields of interest: geology, pollination, native and rare plants

Dr Jennifer Herrick. Fields of interest: karst topography

Dr Harold Parnaby. Fields of interest: mammal taxonomy, 19th century historical zoology

Dr Qin Qi. Fields of interest: microbiology, molecular biology



DONATIONS TO THE RESEARCH FUNDS IN 2019

A total of \$11,670 in tax-deductible donations to the research funds has been received. Many thanks to our generous donors: Prof P Adam; Dr JME Anderson [2x]; Mr N Anderson; Anonymous; Mr DH Benson; Dr S Claxton; Ms MR Donald; Dr MJ Engelbretsen; Prof D Goldney; Prof A Hallengren; Mr I Hill; Dr DS Horning; Mrs B Jacobs; Dr S Johnson; Prof D Keith; Dr J Kellermann; Dr AO Nicholls; Offspring Film Ltd; Mr P Older; Dr RAL Osborne; Mr R Pogson; Prof L Selwood; Mr WS Semple[2x]; Dr JC Turner; Mr B Welch; Mrs K Wilson



PROCEEDINGS OF THE LINNEAN SOCIETY OF NSW

List of articles recently published in volume 141, 2019

- Benson, D.** – Two centuries of botanical exploration along the Botanists Way, northern Blue Mountains, NSW: a regional botanical history that reflects national trends.
- Holmes, W.B.K. and Anderson, H.M.** – The Middle Miocene flora of the Chalk Mountain Formation, Warrumbungle Volcano Complex, NSW, Australia.
- Hope, Geoffrey et al.** – Science through time: understanding the archives at Rennix Gap Bog, a sub-alpine peatland in Kosciuszko National Park, New South Wales, Australia.
- Mackay, K. David and Gross, C.L.** – Climate change threatens a fig-frugivore mutualism at its drier, western range margin.
- Murphy, M.J, et al.** Marooned on an extinct volcano : the conservation status of four endemic land snails (Gastropoda : Pulmonata) at Mount Kaputar, New South Wales.
- Spennemann, D.H.R and Pike, M.** – Rites of passages: germination of vertebrate dispersed, regurgitated or defecated *Phoenix canariensis* seeds.
- Sutherland, F. Lin.** – Miocene central volcanoes, Northwest New South Wales: genesis over a lithospheric cavity (?).
- Zhen, Y.Y. and Wells, T.J.** – Conodonts, corals and stromatoporoids from subsurface Lower Devonian in the Northparkes Porphyry District of central western New South Wales and their regional stratigraphic implications.

All recent papers published in the *Proceedings* are freely available from:

<http://ojs-prod.library.usyd.edu.au/index.php/LIN>

Past volumes available from: www.biodiversitylibrary.org/bibliography/6525

NOTE: A CD is no longer distributed

Please check regularly the Society's home page for recently uploaded papers by going to "LinneanSocietyNSW" then click "Journal (Proceedings)".



2019 LINNEAN SOCIETY OF NSW NATURAL HISTORY SYMPOSIUM

The Society held a three-day symposium in Springwood. November 7 was a full day field trip that focused on the geology and botany of the western Blue Mountains, followed by a scientific session on November 8 concentrating on the current research into the geology, geodiversity, flora and fauna of the Blue Mountains area. The last day, November 9, was a public session on the natural history in general of the Blue Mountains region. Both days were held at the Springwood Sports Club auditorium. As with previous Linnean Society of NSW symposia, this conference – with over 85 attendees - was very successful and enjoyed by all.

The next Natural History Symposium to be run by the Linnean Society of NSW is scheduled for 2021 and will be focussed on Ku-ring-gai NP and other national parks and conservation areas north of Sydney Harbour up to the central coast. Dates and logistics are yet to be determined but will be advised to members of the Society as soon as they are available.



Request for assistance with assessment of natural values of Ku-ring-gai National Park

Friends of Ku-ring-gai Environment Inc (FOKE) are undertaking a natural and cultural assessment of the landscape embracing the Ku-ring-gai Chase National Park (KCNP) and request assistance from specialists and researchers to help compile a list of references and documents relating to this area, concerning the KCNP's terrestrial environment (flora, fauna,

geology, aboriginal culture, development and built heritage etc.) and the adjacent marine habitat. So far FOKE has received helpful information from the Royal Botanic Gardens (advising of useful resources such as Atlas of Living Australia, and NSW Flora Online). They have also incorporated references cited in the KCNP Plan of Management. However, there are undoubtedly additional references and unpublished documents relevant to this assessment that are not known or readily accessible to FOKE, who would appreciate guidance from professional scientists familiar with these fields.

Ursula Bonzol (email: ubonzol@yahoo.com.au) is the local contact point to which any information can be sent.



APPLICATIONS FOR GRANTS FROM THE SCIENTIFIC RESEARCH FUNDS

Application forms for all Research Funds may be obtained from the Secretary or the Society's Home Page « <http://linneansocietynsw.org.au> »

Intending applicants: Please read instructions carefully and submit your signed applications by email to « secretary@linneansocietynsw.org.au »

The firm deadline for submission of applications for all funds is 1st March 2020.

WILLIAM MACLEAY MICROBIOLOGY RESEARCH FUND

Grants are available from the William Macleay Microbiology Research Fund to support original research in an Australian context within the field of Microbiology.

Applications will be accepted from postgraduate and Honours degree students at recognised Australian Universities who are undertaking full-time or part-time studies with a microbiological emphasis.

Applications are also encouraged from amateur or professional microbiologists, whether in employment as such or not, who can demonstrate a level of achievement in original research in Microbiology.

In awarding grants, the Council of the Society will assess: a) The quality of the project; b) The applicant's ability to carry it out; c) A realistic costing and timetable; d) The likelihood that successful completion of the research will lead to publication.

A grant of up to \$2,300 is available to members of the Linnean Society of New South Wales and \$1,200 is available to non-members of the Society.

The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

Applications are not restricted to members, but other things being equal, members of the Society will be given preference.

As a rule, the deadline for applications will be 1st March in any year; however, in exceptional circumstances, applications for emergency support will be received at any time.

Grantees will be required to make a report at the end of the project and no later than 12 months after the receipt of the grant, and to justify their expenditure.

Any publication arising from work supported by the William Macleay Microbiology Scientific Research Fund should include an acknowledgement to that effect.

Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

Closing date is 1 March 2020. Submit your signed application by email to secretary@linneansocietynsw.org.au

BETTY MAYNE SCIENTIFIC RESEARCH FUND FOR EARTH SCIENCES

The Betty Mayne Scientific Research Fund for Earth Sciences provides financial assistance to support short term original research projects in all aspects of the earth sciences.

Applications will be accepted from postgraduate and honours students, amateur or professional geologists who can demonstrate a level of achievement in original research in Earth Sciences.

Projects proposed for support do not have to be restricted to Australian locations or specimens, but, given the Society's interests in the natural history of Australia, they must demonstrate a strong Australian context.

In awarding grants, the Council of the Society will assess: the quality of the project; the applicant's ability to carry it out; a realistic costing and timetable; and the likelihood that the successful completion of the research will lead to publication.

Applicants need not be members of the Society, although all other things being equal, members will be given preference.

Individual grants will not normally exceed the level of equivalent awards from the Joyce W. Vickery Scientific Research Fund, i.e. \$2,500 for Members and \$1,500 for non-members. Money awarded must be used for research purposes, and field work or travel within Australasia. Requests for subsistence, travel to conferences, or thesis preparation expenses, will not be supported.

The Council will take into account other sources of research funds currently held or applied for by the applicant. While financial support from other sources will not ordinarily exclude award of a grant from the Betty Mayne Scientific Research Fund for Earth Sciences, a grant from this Fund cannot be held concurrently with one from the Joyce W. Vickery Scientific Research Fund.

Applications must be made on the form specific to the Betty Mayne Scientific Research Fund for Earth Sciences. Intending applicants are strongly urged to seek assistance from their supervisor or an appropriate colleague with experience in writing research proposals, and further, to have their application reviewed before submission.

Successful applicants are required to make a written report to the Society no later than 12 months from receipt of their grant, detailing progress of the project, briefly outlining research results, and justifying expenditure of the award money.

Any publication arising from studies supported by the Betty Mayne Scientific Research Fund for Earth Sciences must acknowledge that support. Type material, representative sample collections, relevant analytical data, and figured or mentioned thin sections, must be lodged in a state or national museum or university collection.

The Council's decision in regard to the award or non-award of grants from the Betty Mayne Scientific Research Fund for Earth Sciences is final, and no correspondence will be entered into.

Closing date is 1 March, 2020. Submit your signed application by email to secretary@linneansocietynsw.org.au

JOYCE W VICKERY SCIENTIFIC RESEARCH FUND

Grants from the Joyce W. Vickery Scientific Research Fund are intended to support worthy research in those fields of the Biological Sciences that fall within the range of interests of the Society, especially natural history research within Australia.

Applications will be accepted from postgraduate and Honours degree students at recognised Australian Universities who are undertaking full-time or part-time studies with a biological emphasis.

Applications are also encouraged from amateur or professional biologists, whether in employment as such or not, who can demonstrate a level of achievement in original research in Biological Sciences.

In awarding grants, the Council of the Society will assess: a) Realistic costing and timetable; b) The quality of the project; c) The applicant's ability to carry it out; d) The likelihood that successful completion of the research will lead to publication.

Individual grants will not normally exceed \$2,500 for Members of the Linnean Society of New South Wales and \$1,500 for non-members.

The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

Applications are not restricted to members, but other things being equal, members of the Society will be given preference.

As a rule, the deadline for applications will be 1st March in any year; however, in exceptional circumstances, applications for emergency support will be received at any time.

Grantees will be required to make a report at the end of the project, and no later than 12 months after the receipt of the grant, and to justify their expenditure.

Any publication arising from work supported by the Joyce W. Vickery Scientific Research Fund should include an acknowledgement to that effect.

Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

An application form may be obtained from the website linnsoc@iinet.net.au or from the Secretary of the Society.

The Council's decision in regard to the award or non-award of grants from the Joyce W Vickery Scientific Research Fund is final, and no correspondence will be entered into.

Closing date is 1 March, 2020. Submit your signed application by email to secretary@linneansocietynsw.org.au



NATIVE ANIMALS SHOULD BE ABLE TO BE HUMAN COMPANIONS, a talk given by Prof. Michael Archer to the Society, 20th November 2019.

Australia is in a widening spot of bother. Long before threats of climate change grabbed headlines, we've been flogging the living stuff out of this place, clearing forests, introducing alien horrors, cookie-cutting the land into little wire-bound boxes, sending topsoil blowing in the wind and accumulating in the process at least \$5 billion dollars in land degradation costs every year. We've done this because most of us value the introduced species more than our natives, despite the fact that our natives are nature's Olympic champions having survived millions of years of selection for skills to survive the worst that Australian climates can throw at them. Some are now exploring how to increase economic resilience by sustainably harvesting kangaroos, indigenous grasses and other natives that have been the environment-friendly foods of choice for Australians for more than 45,000 years. What about in our homes? Most of us have no choice when it comes to pets: keeping all manner of cats and dogs is legal; keeping almost all native mammals is not. Unfortunately, while we value, feed and stroke our moggies and dogs, the native mammals we haven't bonded with struggle to survive on the other side of the fence. And now, for every degree of climate change, the average animal and plant throughout the world will need to shift its range by 100 km. Most of our wildlife reserves—while absolutely vital for conservation—will be found to be too small and most in the wrong places to ensure long-term conservation.

As a PhD student researching Australian mammals, then Curator of Mammals in the Queensland Museum, Director of the Australian Museum, Dean of Science at the University of New South Wales and now a research scientist at UNSW, I have had the privilege of keeping more than 20 different species of native animals at home over the last 40 years, from marsupial quolls to possums and kangaroos. I don't now in Sydney because it's illegal.

I have been arguing passionately for formal trials to see if my own experiences and those of others who have had similar opportunities can be repeated in families all around Australia. These trials would involve strategically-managed breeding programs and placement of our selected bush creatures (e.g., quolls and sugar gliders) with interested families. If the monitored outcomes are as positive (as they have been e.g. for Sugar Gliders in the USA; Adrian Di Qual, MSc Thesis research results), we should consider relaxing laws to enable the next generation of Australian kids to bond with, treasure and commit to the well-being of endangered native species that most don't even know exist.



SNIPPETS FROM THE PAST

Presidential Address by Mr J.J. Fletcher, M.A., B.Sc., in the Chair, March 30, 1921.

IS ALL WELL WITH THE MACLEAY MUSEUM OF THE UNIVERSITY OF SYDNEY?

Sir William Macleay's scientific energy was directed into two main channels: and his efforts finally culminated in two important potentially fructifying enterprises. On the one hand, with the generous assistance of the Government, a duly constituted Macleay Museum. On the other hand, the Linnean Society of New South Wales, endowed not only for the ordinary purposes of a Scientific Society, but in an especial manner for the encouragement of research-work in Natural History. In his own characteristic way, Sir William linked up these two great enterprises in such a way, that each of the two corporate bodies to whom these enterprises were committed upon trust, in perpetuity, should have a *locus standi* for a co-ordinate, reciprocal interest in what the other was doing with the Trust.

Ever since it has been possible, the Linnean Society has given, in print, an annual report of its stewardship, and has distributed the same to all entitled to receive it. When are the University's annual reports of its stewardship in connection with the Macleay Museum ?

In 1873, Sir William offered the amalgamated collections of Alexander Macleay, W. S. Macleay, and his own, together with his scientific library, as a gift by bequest, upon trust, to the University, for the promotion of natural history, and the instruction of students, and the inhabitants of the colony in the same. The sum of £6000 was offered at the same time for the endowment of a Curatorship. At this time, the joint collections of A. and W. S. Macleay amounted to 480 drawers of insects and other Annulosa, and W. Macleay's own collection to 320 drawers of insects. At this time Sir William had not appointed a Curator. The Senate gratefully accepted the offer. The Chancellor announced the offer, and its acceptance by the Senate, at the Commemoration in March 1874. At this time too, the Linnean Society of New South Wales had not been so much as thought of, nor was its establishment anticipated.

After the offer had been made and accepted, but before the public announcement was made, Sir William decided to appoint a Curator, Mr. George Masters, and decided to convert his own entomological collection into a general collection, not only of Australian, but also of non-Australian Vertebrata, and Invertebrata; and for fifteen years, with the co-operation of Masters, he continued to carry out this intention. Why did he do this? To make the gift more worthy of acceptance by the University.

In 1885 or 1886, Sir William changed his mind about leaving his scientific library and the Macleay Collections as a bequest to the University. He withdrew his offer of the library altogether, and re-offered the now much enlarged Macleay Collections as a gift during his life-time, if and as soon as a "suitable" building — not a room in a building — was provided for them. For two reasons, because his own collection has been so enlarged, that his private museum was overcrowded, and that he naturally wished to have an opportunity of approving of the suitability of the "suitable" building offered. He also offered to transfer his experienced Curator, and an endowment-fund of £6000 to provide the Curator's salary.

The Senate, not having the money, approached the Government, and asked for its help to enable it to accept Mr. Macleay's munificent gift. The Government, knowing William Macleay, asked what he would approve of a suitable building. His reply was, that he would approve of a fire-proof hall, 212 x 70 x 58 feet, with bays and a gallery all round, the architect's estimated cost of it being £16,000. The Government said the equivalent of, Certainly, you shall have it, go ahead forthwith!

When the building was finished in about 1889 [exact date not available], and approved of by Sir William, he transferred the amalgamated Collections, now a general collection, and not merely a collection of insects and other Annulosa to the University, to be housed in the "suitable" building, presented by the Government, together with his experienced and faithful Curator, George Masters; and paid over the sum of £6000, for the endowment of the Curator's salary. When the Collections had been suitably arranged, under the direction of the Professor of Biology

with the co-operation of the Curator, as an exposition of the fauna of Australia, for which there was abundant material in the Collection, the Macleay Museum of the University of Sydney was duly constituted, in the technical sense. Thereupon, the University, ipso facto, became the Joint-Trustee of the Government and of Sir William Macleay, for the inhabitants of New South Wales, including students and others. The Joint-Trustee's duties were to administer the Trust committed to him in terms of the Trust. Among other things, therefore (1) to preserve, maintain, and safeguard the standard, agreed-upon suitability of the "suitable" building, presented by the Government solely and expressly for housing the suitably arranged Macleay Collections, and any additions that might be made to them, in perpetuity; and to abstain from tampering with it, and finally, spoiling it. (2) To preserve, maintain, and safeguard, the integrity of the Macleay Collections, in perpetuity; and under all circumstances to refrain from disrupting them, in perpetuity. (3) To keep interlopers from taking up their quarters in the Macleay Museum building, whether by the front door, or by "an over-bridge" or "a bridge-corridor", in perpetuity. (4) When the Collections had been suitably arranged, to abstain from periodically disturbing them; and finally sweeping away the exposition of the Australian fauna shown in the Jubilee photograph, with the besom of ingratitude, and thereby insulting the memories of the distinguished Macleays!

The University historian values the Macleay Collections, on a money-basis as "roughly assessed at £25,000." With the building, and the endowment fund for the Curatorship, the duly constituted Macleay Museum represented a benefaction of £47,000!

To-day, and for some time past, the Macleay Museum has been *deconstituted*, and as an exposition of the fauna of Australia spoilt, because the suitability of the "suitable" building has been so drastically interfered with, that this has involved the disruption of the Macleay Collections. One of Sir William's great enterprises, potentially so fructifying if properly managed, has become bankrupt. It has been hamstrung, paralysed, shorn of its attractiveness and inspiration.



ANNOUNCEMENTS

Fee increase from January 2020

At the November meeting, Council resolved to increase the membership fees by \$5.00 in each category with effect from January 1, 2020. This modest increase is the first since 2012. Full member rises to \$50.00 (from \$45.00 currently); Retired members and Students rises to \$25.00 (from \$20.00) and Associate Member rises to \$15.00 (from \$10.00). A discount will continue to apply for payment of renewing subscriptions prior to March 31.

OPPORTUNITY TO BECOME INVOLVED IN THE RUNNING OF THE SOCIETY

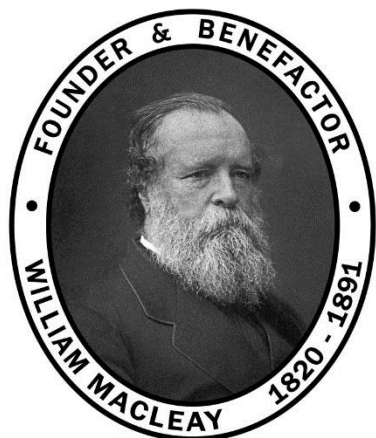
Currently several vacancies exist on Council, due to retirements and maternity leave. Commitments are not onerous and there are minimal prerequisites; you must be a financial Full or Retired member of the Society with a background in an area of natural history related to the aims of the Society, and enthusiasm – a higher degree such as a Ph.D is certainly not essential.

Council members volunteer their time in attending meetings six times per year (these are held at the State Library in Sydney and occupy about 1.5 hours). There are opportunities to serve on various committees, such as overseeing awards of grants from the Scientific Research Funds, or assisting in organizing aspects of the Symposia that are held every 1-2 years.

Anyone with a background in Zoology, Botany, Microbiology, or Geology is welcome to contact the Secretary for further details. Note that applications close on January 31 each year.



NOTICE OF ANNUAL GENERAL MEETING ON 18th MARCH 2020



THE LINNEAN SOCIETY OF NEW SOUTH WALES

2020 Annual General Meeting

The 145^h Annual General Meeting of the Society will be held at 18:00 on 18 March 2020. **Details regarding the AGM venue (in Sydney) have not yet been decided. All members will be notified in advance when this is finalized.**

Members and guests are invited to join the Council of the Society for wine and light refreshments from 17:30.

Four members of Council are due to retire at this AGM:

J.C. Herremans, D. Keith, P. Myerscough and I. Percival
and all offer themselves for re-election.

Council recommends the election of Dr Ian Percival as President of the Society for 2020.

Council recommends the reappointment of the current auditors, Phil Williams Carbonara.

Further nominations are invited for vacancies on Council (6), the office of President, and Auditor. Nominees must be financial Ordinary Members (a category which includes Life Members) of the Society. The nominations must be signed by at least two financial Ordinary Members of the Society and countersigned by the nominee in token of their willingness to accept such office.

Nominations must be received by the Secretary at PO Box 291, Manly NSW 1655 by 31 January 2020.

Following the AGM, the outgoing President (John Barkas) will give the Presidential Address for 2020.



Linnean Society of New South Wales

Minutes of the 144th Annual General Meeting, held in the Charles Moore Room, Royal Botanic Gardens, Sydney, on Wednesday, March 20, 2019, at 18:00.

CHAIRPERSON: Mr John Barkas

PRESENT: Thirty three members and friends attended (names recorded in the attendance book).

APOLOGIES: Prof. Jeremy Bruhl, Dr. Michele Cotton, Prof. Anders Hallengren, Mrs. Jane Judd, Dr. John Pickett

MINUTES:

The minutes of the one hundred and forty third Annual General Meeting, held on Wednesday, March 21, 2018, were distributed. It was moved (R. King) and seconded (I. Hill) that the minutes as circulated be accepted as a true record. CARRIED.

TREASURER'S REPORT:

The Treasurer presented the audited financial report for 2018 and distributed notes to accompany the 2018 balance sheets.

It was moved (I. Percival) and seconded (JC Herremans) that the audited accounts for 2018 and the Treasurer's report be accepted. CARRIED.

Council thanked the Treasurer, Ian Percival, for maintaining the Society's finances in a strong and healthy state of affairs.

Council also thanked the Editor, Michael Augee, assisted by Bruce Welch for managing the Society's *Proceedings* through all stages of production.

The Chairman expressed, on behalf of the Society, appreciation for the work done by all Council members.

CHAIRMAN'S REPORT:

Mr John Barkas reported on the affairs of the Society for the year 2018. It was moved (JC Herremans) and seconded (B. Welch) that the Chairman's report be accepted. CARRIED.

DECLARATION OF ELECTIONS: As the number of nominations for Council did not exceed the number of vacancies (six), no voting was necessary. Having received no other nominations for Council, the following three retiring Council members were declared by the Chairman re-elected to Council for three years: Daniel Bickel, Robert King and Bruce Welch. CARRIED.

There being no other nominations, David Keith declared the Council nominee, Mr John Barkas, be elected as President of the Society for 2019. CARRIED.

There being no other nominations for auditors, it was moved (I. Percival) and seconded (B. Welch) that the current firm, Phil Williams Carbonara, be retained for 2019. CARRIED

The Chairman thanked the Botanic Gardens Trust for providing rooms for our meetings.

As there was no further business, Mr John Barkas declared the meeting closed at 18:20.

Presidential Address by Mr John Barkas:

Depletion of global ore resources – a geological challenge or fake news?

The earth's crust contains a finite endowment of mineral resources that is continuously and inevitably depleted by mining. While the "peak oil" debate has now largely faded from public consciousness, exponential growth in world demand for metals over the last 15 years has reignited concerns, mostly dormant since the 1970s, about the quality and adequacy of available geological supplies of the mineral ores essential for modern industry and technology. In line with such concerns, the concept of "critical metals" has now developed, notably in the US and Europe. These are metals that are currently recognised as virtually irreplaceable in the construction, transport, technology, energy and electronics sectors, but where supply risk and the impact of disrupted availability are both assessed as high. The rare earth and platinum group metals are commonly cited as examples, along with indium, cobalt and (more recently) lithium. But the medium-term availabilities of such "essential" metals as copper and iron have also come under serious review. Are these and similar concerns justified? Is "sustainable growth" an oxymoron? There are deeply opposed views on such questions, but an understanding of basic geological data is essential in examining them.

Signed as true record:

Mr John Barkas, Chairperson

LINN S C NEWS

NEWSLETTER No: 176

MARCH 2020

NEWSLETTER EDITOR	POSTAL ADDRESS
J C Herremans Secretary Telephone: (02) 9977 8075	PO Box 291 Manly NSW 1655 Mobile: 0490 542 524

EMAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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IMPORTANT NOTICE: DEFERRAL OF THE LINNEAN SOCIETY'S AGM FOR 2020

After consideration of the COVID-19 contagion, the Executive Committee of the Council of the Linnean Society of NSW decided to defer the Annual General Meeting that was to have taken place at the Royal Botanic Gardens, Sydney, on Wednesday evening 18th March.

Deferral of the AGM (including the Presidential Address) is unprecedented and the decision is taken with regret, but is in the best interest of those Members, their guests and the general public who were planning to attend.

At an appropriate time later this year we will notify you as to the date of the rescheduled AGM and Presidential Address, and look forward to your attendance then.

Government directives concerning the number of people permitted to attend indoor meetings, combined with closure of State Government institutions for non-essential events will definitely impact scheduling of our future meetings this year. We will notify members by email and on the Society's website when these meetings resume.

VALE MICHELE COTTON

It is with great sadness that the Council of the Linnean Society reports the passing away of respected Councillor and former President, Michele Cotton. The last time Michele attended the Society's Council meeting was in February 2019, and late last year she informed Council of her wish to step down due to failing health. On Monday, January 13 2020 we learned that she had lost her battle with MND.

Michele had been a member of the Society since 2001, Councillor since 2003 and was twice President (2008-2009 and 2016-2017).

Michele graduated from the University of Sydney in 1973 as a Bachelor of Science (Veterinary) (BScVet) with second class honours (clinical biochemistry), and in 1974 as a Bachelor of Veterinary Science (BVSc). She remained a registered Veterinarian (NSW Board of Veterinary Surgeons) from 1974. Michele also earned the degree of Master of Veterinary Public Health Management from the University of Sydney in 2009 and a Diploma of International Animal Health from the University of Edinburgh in 2015.

In 2006 Michele was awarded the Belle Bruce Reid Medal as one of Australia's 100 most influential women veterinarians.

Michele was a woman of extraordinary energy which she applied to a surprising variety of interests. A major interest began in 1982 when she accompanied her husband to Riyadh, Kingdom of Saudi Arabia (KSA). She had a variety of jobs in KSA including: providing clinical pathology and microbiological services to support racing equine practice through the Riyadh Equestrian centre; Veterinarian to the Riyadh airport detector dog program; Veterinarian to Riyadh Municipality zoo; and at times carrying out a private home-based veterinary practice, performing medicine and surgery on pet animals including a wide variety of dogs, cats, birds and hunting falcons.

On returning to Australia, Michele held administrative (e.g. Associate Director then Director of the Post Graduate Foundation in Veterinary Science) and academic positions at the University of Sydney. However, the call of the Middle East remained strong and from 2009 to 2012 Michele was a volunteer for Australian Volunteers International as a Veterinary Adviser, Oryx Conservation Project at Wadi Rum and Aqaba, Jordan. She had wider interests in botany (studying the botany of Central Saudi Arabia for over 20 years, gaining a good grasp of the flowering plants in the region), ecology and conservation, not to overlook Arabic/Islamic art and design.

Michele made important contributions to her profession, especially as a member of the executive committee of the Australian Small Animal Veterinary Association (ASAVA), a Special Interest Group of the Australian Veterinary Association, and as a Governing Board member of Australian Veterinary Association.

Michele was an active member of organisations across a wide variety of interests, including: the Riyadh Natural History Society (editor of the Journal 1990-1993); Near Eastern Archaeological Foundation, University of Sydney (Councillor since 2003); Sancta Sophia College within University of Sydney (member of Board of Governors for three years from 2003-2006); and the Sydney Royal Agricultural Show Society (Councillor from 2002).

Michele was a very practical woman – she had advanced level diving qualifications and held a firearms licence/permit (category A for wildlife capture). Her practical approach to problems, sometimes from right “outside the box”, was of great benefit to council meetings, but most of all we will miss her unfailing good humour and enthusiasm. Her time with us was all too brief.



REPORTS FROM THE RECIPIENTS OF RESEARCH GRANTS

It is a condition of an award that the recipient reports the results to the Society. Some have had their work published and others are preparing papers for publications.

Mrs Yvette **BAUDER** (Macquarie University) studies foraminifera as indicators of anthropogenic change on the Great Barrier Reef. Mrs Bauder examined fossilized foraminifera assemblages preserved in a 1.6m sediment core from One Tree Reef on the outer Great Barrier Reef with the aim of quantifying ecological changes occurring before and after the European colonization and industrialization of Australia. This project was completed within nine months as a Master of Research degree, which limited the scope of the research. It is hoped that more

extensive research in this region and other areas of the Great Barrier Reef can be completed within a future PhD.

Ms Zoe **WYLLIE** (Macquarie University). My research is on the Fishes of Canowindra, a Late Devonian mass mortality event that resulted in thousands of placoderms and (comparatively few) sarcopterygians found on a single bedding plane. I hope by studying the taphonomic processes within this assemblage to get further clarification on the palaeoenvironment and geological setting during the Late Devonian. Preliminary thin section analysis confirms expected regional tectonism, with further analysis currently being undertaken. Together with thin sections, taphonomic analysis of the Canowindra Fauna is ongoing and will be completed by October, 2020. The Betty Mayne Scientific Research Fund in 2019 assisted this Masters thesis by covering the cost of getting some thin sections made. Thin sections were made from a small slab of Mandagery Sandstone which contained an external mould of a placoderm fish. Thin sections will hopefully confirm the expected regional tectonism and give further insight into the type of sedimentation occurring directly after this mass mortality event.



PROCEEDINGS OF THE LINNEAN SOCIETY OF NSW

Article recently published in volume 141, 2019

Coleby, D. and Druitt, R. *Eucalyptus cunninghamii* (Myrtaceae) in the Blue Mountains of New South Wales - an unexpected connection between botany and geology.

Article recently published in volume 142, 2020

Timms, B.V. and Schwentner, M. A revised description of the clam shrimp *Paralimnadia urukhai* Webb and Bell 1979 with the addition of a closely related new species (Crustacea: Branchiopoda: Spinicaudata: Limnadiidae).

All recent papers published in the *Proceedings* (from Vol. 133 in 2012) are freely available from:

<http://ojs-prod.library.usyd.edu.au/index.php/LIN>

Previous volumes are available from: www.biodiversitylibrary.org/bibliography/6525

NOTE: A CD is no longer distributed

Please check regularly the Society's home page for recently uploaded papers by going to "LinneanSocietyNSW" then click "Journal (Proceedings)".



SNIPPETS FROM THE PAST

From the *Proceedings of the Linnean Society of New South Wales*, Volume xlv, Part 1, March 26th, 1919. (Issued 27th June, 1919)

PRESENTATION TO MR FLETCHER

In moving the subjoined Resolution, Dr. T. Storie Dixon said that, as a Member of the Society since 1881, as a Member of the Council of long standing who had known Sir William

Macleay, as a guest present at the historic gathering on October 31st, 1885, and as a past President, he had had an excellent opportunity of watching the Society's development since its early days, and could speak with knowledge of Mr. Fletcher's services to the Society. At first, and during Sir William's lifetime, all went well. But just about the time that some of the latter's plans were in course of realization, the commercial crisis of 1892 so seriously affected business matters, that recovery was slow; and the Society's finances suffered in consequence. This, for a considerable period, necessitated economy in all direction, in order to save reduction in the size of the Society's annual volume of Proceedings. Mr. Fletcher, under these circumstances, did his best to economise in the matter of office and other expenses, and put up with less efficient assistance than he had previously had. The Trusts committed to the Society by Sir William Macleay for a Research-bacteriologist, and for Fellowships, partly for financial reasons, were not realized quite so simply or so soon as he expected. This involved more responsibility for the Council, and more work for the Secretary. Nevertheless, by patience, the difficulties were gradually surmounted. But soon after the trusts were in working order, and the value of securities had begun to improve, the war broke out, entailing a substantial increase in the cost of publication, and a corresponding discounting of the improvement in the financial outlook. Still, as far as circumstances had permitted, the work of the Society had been carried on as usual, and with due regard to the original aims and objects of its founders. The Society's annual volumes had continued to be regularly and interruptedly issued in Parts, in addition to the Macleay Memorial Volume. Mr. Fletcher had made the best of the difficulties in his department. He carried out his duties for the first six years in association with Sir William. His heart had been in his work. He had co-operated harmoniously with the Council, the Office-bearers, and the Members throughout his long period of service, justifying Sir William's expectations of him, and earning the appreciation and gratitude of the Society.

Mr. E. C. Andrew, on behalf of the younger Members of the Society, in seconding the Resolution, said that Mr. Fletcher had been to them a guide, philosopher, and friend: and had never made the charge against them of the unpardonable crime of being young. He had always stood to them as the symbol of fidelity to a trust; that trust being devotion to the cause of Science through the medium of the Linnean Society of New South Wales. If Mr. Fletcher's opportunities for research-work had been limited by his official duties, yet this was counterbalanced, in some degree, by his active interest in the success of a Society whose aim it was, in a special way, both directly and indirectly, to foster scientific research-work. He has sowed that others might reap, and he had been connected with the Society sufficiently long to see to see them doing so. While the younger Members would regret the absence of Mr. Fletcher's guiding hand in the old way, they looked forward to his being free, to assist in the elucidation of some interesting but often complex problems, which still confront the biologist in Australia.

On the motion of Dr. T. Storie Dixon, seconded by Mr E. C. Andrews, it was resolved — That this Society desires to place on record its appreciation of the invaluable services of Mr. J. J. Fletcher, the retiring Secretary. Through his resignation, the Society will suffer loss, in many ways irreparable, especially by reason of that complete understanding which existed between him and the founder of the Society, Sir William Macleay, on all matters concerning its policy, whether financial or administrative. Thoroughly imbued with the spirit which actuated Sir William in its relations with this Society, and gifted with an unbounded and rare loyalty to his responsibility, he untiringly, unflinchingly, and often at great self-sacrifice, steered the destinies of this his trust toward the consummation of the policy of its founder. Thus, far more than a Secretary, he has been the chief and often the only guide. He joined keenly in the inevitable struggle of its infancy, and has happily lived to see its present high position with an already honoured tradition behind it, and an ever increasing activity in scientific research of the highest standard well established, and portending a promising future, with which his name will ever be inseparably associated.



ANNOUNCEMENTS

Fee increase from January 2020

At the November meeting, Council resolved to increase the membership fees by \$5.00 in each category with effect from January 1, 2020. This modest increase is the first since 2012.

Renewals for continuing members: Full member rises to \$45.00; fee for Retired members and for Students rises to \$25.00 and Associate Member rises to \$15.00. A discount will continue to apply for payment of renewing subscriptions prior to March 31.

New members: Full member: \$50.00; Retired / Student: \$30.00; Associate member: \$15.00.

OPPORTUNITY TO BECOME INVOLVED IN THE RUNNING OF THE SOCIETY

Currently several vacancies exist on Council, due to retirements and maternity leave. Commitments are not onerous and there are minimal prerequisites; you must be a financial Full or Retired member of the Society with a background in an area of natural history related to the aims of the Society, and enthusiastic – a higher degree such as a Ph.D is certainly not essential.

Council members volunteer their time in attending meetings six times per year (these are held at the State Library in Sydney and occupy about 1.5 hours). There are opportunities to serve on various committees, such as overseeing awards of grants from the Scientific Research Funds, or assisting in organizing aspects of the Symposia that are held every 1-2 years.

Anyone with a background in Zoology, Botany, Microbiology, or Geology is welcome to contact the Secretary for further details. Applications are accepted at any time for consideration by the Council.



LINN S C NEWS

NEWSLETTER No: 177

JUNE 2020

NEWSLETTER EDITOR	POSTAL ADDRESS
J C Herremans	PO Box 291
Secretary	Manly NSW 1655
Telephone: (02) 9977 8075	Mobile: 0490 542 524

EMAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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DEFERRAL OF THE LINNEAN SOCIETY'S AGM FOR 2020 AND FUTURE MEETINGS

As previously advised, the Annual General Meeting that was to have taken place at the Royal Botanic Gardens, Sydney, on Wednesday evening 18th March, has been deferred.

As we hold our meetings in rooms kindly provided by State Government institutions, we are bound by any social distancing restrictions on the numbers of attendees. When these are lifted to a level appropriate to our audiences we will notify you as to the date of the rescheduled AGM and Presidential Address, and look forward to your attendance then. Scheduling of future meetings this year will also be notified to members by email and on the Society's website.



VALE LAWRENCE SHERWIN

We regret to inform Members of the sudden and unexpected death of Dr Lawrence (Lawrie) Sherwin in Orange, NSW at the age of 74. Dr Sherwin worked in the Geological Survey of NSW from 1967 to 2005 as a Palaeontologist and Regional Mapper. He was appointed an Honorary Research Associate with the Survey after his retirement. Dr Sherwin joined the Society in 2002 and in 2010 published (with Simone Meakin) a paper in the *Proceedings of the Linnean Society of NSW* on the Early Devonian trilobite *Craspedarges* from the Cobar Basin of western NSW.



QUEEN'S BIRTHDAY HONOURS LIST

Dr Michele Cotton, our past President and Councillor who sadly left us too soon, has been posthumously awarded an AM for service to Veterinary Science and Professional Societies.

Mr Peter Olde, Society member since 2014 was awarded an OAM for service to the Australian Flora.



SIR WILLIAM'S 200TH BIRTHDAY ANNIVERSARY

June 13, 2020 will be the 200th anniversary of the birth of the Society's benefactor Sir William Macleay. Born at Wick, County Caithness, he was the second son of Kenneth Macleay of Keiss. A commemoration to celebrate the event had been planned months ago but the current COVID-19 situation has put a stop to it.



DONATIONS TO THE SOCIETY'S RESEARCH FUNDS IN 2019

A total of \$11,670.00 to the research funds was received in the past year. Many thanks to our generous donors: Prof Paul Adam, Dr Jennifer Anderson (2x), Mr Neil Anderson, Anonymous, Mr Doug Benson, Dr Sandra Claxton, Ms Margaret Donald, Dr Michael Engelbretsen, Prof David Goldney, Prof Anders Hallengren, Mr Ian Hill, Dr Donald Horning, Mrs Betty Jacobs, Dr Stephen Johnson, Prof David Keith, Dr Jürgen Kellermann, Dr AO Nicholls, Offspring Film Ltd, Mr Peter Older, Dr RAL Osborn, Mr Ross Pogson, Prof Lyne Selwood, Mr WS Semple (2x), Dr John Turner, Mr Bruce Welch, Mrs Karen Wilson.



AWARDS FROM THE SCIENTIFIC RESEARCH FUNDS FOR 2020

The current low interest rates unfortunately limit funds available and the Society is unable to fund as many applications as it would like or to provide the full amount requested by the applicants. Decisions on where to make the cuts have been very difficult and regrettable.

W. MACLEAY MICROBIOLOGY SCIENTIFIC RESEARCH FUND

MR JONATHON **MIFSUD** (Macquarie University).

Project : Mining public plant transcriptomes to reveal a diverse plant virome.

The broad aim of this project is to provide an in-depth survey of plant virus diversity by mining publicly available sequence data from the One Thousand Plant Transcriptomes Initiative (1KP). This project represents the largest virus discovery project in terms of the number of species covered including numerous previously unsampled Australian natives (e.g. Golden Wattle, Wollemi Pine and Flooded Gum). Our research has implications in understanding the role viruses play in shaping ecosystems dynamics and in-turn how virus composition is shaped by biotic and abiotic factors. A greater understanding of what viruses are found in wild plant will aid in the surveillance and (potentially) control of viral pathogens in both wild and agricultural plants. **Awarded \$1,500**

MISS SOPHIE **PRESTON** (Curtin University).

Project : Causes and consequences of growth anomalies on *Isopora palifera* at the Cocos (Keeling) Islands.

In May 2018, during a separate coral biodiversity survey conducted at the Cocos (Keeling) Islands, growth anomalies were observed upon a high proportion of *Isopora palifera*. To successfully complete this project, funds are sought to support the extraction and tagging phase for sequencing bacterial DNA obtained from sewerage outlets and “clean” seawater sites. This data will further enhance the results from 2019 and together will help to clarify the potential causes of growth anomalies on this dominant coral species. **Awarded \$400**

BETTY MAYNE AWARD FOR SCIENTIFIC RESEARCH IN THE EARTH SCIENCES.

MR JACK C **JONES** (Macquarie University).

Project : Chronostratigraphy of the Fork Tree Limestone, South Australia.

The Fork Tree Limestone is a lower Cambrian rock succession in the Stansbury Basin, South Australia. Within the Fork Tree Limestone, Archaeocyaths and Small Shelly Fossils are abundant; this project will focus on taxonomic identification and documenting detailed biostratigraphic ranges of Small Shelly Fossils, many of which have been described from the contemporaneous Arrowie Basin to the north. Small Shelly Fossils (SSFs) are an enigmatic group of phosphatised fossils that are interpreted as stem group Lophotrochozoa, however many cannot be confidently assigned to major groups, and some are instead skeletal parts (sclerites) of more complex, larger organisms. Previously established Early Cambrian biozones using SSFs for South Australia place the Fork Tree Limestone within the *Kulparina rostrata* zone. While single occurrences of *Sunnaginia* in the lower part and *Micrina etheredgei* in the upper part have been recorded, these finds have never been corroborated. This project will attempt to resolve this stratigraphic conundrum using detailed fossil data. **Awarded \$825**

MS LEYLA E J **KABARAN** (Macquarie University).

Project : Isolating taxon specific biomarkers from fossil bilaterians.

Fossils can contain valuable information within their molecular structure. Organisms produce a whole range of molecular products, including proteins, DNA, and lipids. Identification of taxon specific biomarkers within at least one of Ecdysozoa, Lophotrochozoa, and Deutrostomia clades, would allow researchers in the field to clear up uncertain phylogenies of long extinct groups. This study’s goal is to extract and isolate taxon specific biomarkers from the three clades listed, and to assess the phylogenetic and evolutionary significance of the biomarkers. This project aims to isolate endogenous biomarkers from Ordovician aged fossils belonging to the Ecdysozoa, Lophotrochozoa, and Deutrostomia, using laser micro-pyrolysis mass spectrometry. I also aim to assess the phylogenetic and evolutionary significance of the isolated biomarkers and determine if they have any taxon specific varieties. **Awarded \$1,800**

JOHN NOBLE AWARD FOR INVERTEBRATE RESEARCH

MR JAMES **BICKERSTAFF** (Western Sydney University)

Project : Population genomics of the only eusocial beetle *Austroplatypus incompetus*, in the mesic forests of eastern Australia: do geographic populations constitute cryptic species?

Austroplatypus incompetus (Curculionidae: Platypodinae) is an ancient ambrosia beetle lineage endemic to the mesic forests of eastern Australia, recently ravaged by large bushfires. Like all ambrosia beetles, this species cultivates symbiotic fungi, recently first isolated and described by our team as *Raffaelea kentii* Mueller & de Beer, as its sole food source within the galleries. Unlike most other ambrosia beetles, it colonises healthy living trees and poses no essential threat to its host. An individual gallery system (and the queen within) is long-lived and estimated to persist for up to 40 years. The species’ distribution ranges from northern New South Wales (NSW) to

eastern Victoria. This project will resolve the taxonomic status of *A. incompertus* and broaden the current understanding of the evolution of eusociality in insects. **Awarded \$900**

SURREY JACOBS AWARD FOR SCIENTIFIC FIELDWORK

MS MOMENA **KHANDAKER** (University of New England)

Project : Testing the cross compatibility of rare blue box eucalypts.

Continuous deforestation, urbanisation and habitat fragmentation are threat for forests and woodlands. *Eucalyptus magnificata* occurs in grassy woodland habitat, which has been reduced by drought, land clearing, grazing, road works, urbanisation and eucalypt dieback in recent years. The type population of this species at Enmore, NSW, is not producing enough good quality seeds, which is a concern for the conservation of this species. In this situation, studying cross-fertility within and between populations is needed to obtain a clear understanding of why the population is not producing good quality seeds, and point to possible solutions. This study will address four hypotheses to explain low seed set, using in vitro tests and reciprocal hand pollination between populations as follows : 1) Poor pollen viability prevents successful fertilisation; 2) Poor female fertility hampers seed production; 3) Inbreeding due to small population size prevents compatible mating; 4) Inadequate pollen transfer impedes seed set.

Awarded \$1,200

MR JOSHUA D **WHITEHEAD** (University of New England)

Project : Factors affecting the post-fire responses of plants, and insect pollinators.

Bushfires have played an important role in Australia's ecosystems for at least the last 60 million years, and has promoted the evolution of various post-fire recovery strategies among many of the native flora, and fauna. Nevertheless, most species require several years between fires, especially when recovering from fires of unusual timing or intensity. With future climate projections trending toward hotter, drier conditions that will increase the length, and severity of fire seasons, species may be threatened by more frequent fires, and shorter recovery intervals between them. The aims of this project are to address the following questions, relating to post-fire recovery of plants, and insect pollinators: 1. Which factors have the greatest influence on the speed of plant post-fire recovery? 2. Does fire affect quality, or quantity of floral resources? 3. Does fire affect the abundance, diversity, or structure of insect pollinator communities? 4. Do post-fire conditions benefit, or hinder pollination and seed production? **Awarded \$1,000**

JOYCE W. VICKERY SCIENTIFIC RESEARCH FUND

MR CALLUM J **BRYANT** (Australian National University)

Project : Death follows – Processes of draught-induced tree mortality.

Global climate change predicts regional increases in drought conditions through changes in rainfall regimes, temperature increases and heat waves. Understanding the physiological responses that follow drought-induced stress and lead to mortality is crucial for improving our ability to predict forest dieback. This project aims to identify critical dehydration levels in tissues associated with mortality under drought conditions using several widely distributed Australian angiosperm species with a recent history of drought-induced mortality: two co-dominant *Eucalyptus* species, *E. pauciflora* and *E. melliodora*, and two mangrove species, *Avicennia marina* and *Rhizophora stylosa*. **Awarded \$1,000**

MISS KAYTLYN S **DAVIS** (Macquarie University)

Project : Assessing potential of environmental (e)DNA in waterbirds monitoring.

Biodiversity, a key component of ecosystem health, is being lost at an unprecedented rate and scale, in many cases before we have a thorough understanding of which species are being lost. Environmental (e)DNA metabarcoding is an emerging field that may revolutionise biodiversity assessments. Monitoring waterbird biodiversity is a crucial aspect of wetland management because many waterbirds are important indicators of wetland health. Currently, monitoring

waterbird population numbers and breeding events is carried out predominantly through annual aerial and ground-based surveys. This project will form part of a larger 3-year study investigating waterbird populations and landscape genetics in Australia and assessing the utility of eDNA in monitoring waterbird biodiversity. **Awarded \$1,000**

MRS SANGAY **DEMA** (University of New England)

Project : Systematic studies of eastern Australian *Phebalium* (Rutaceae, Boronieae).

Phebalium Vent. is an Australian endemic genus with 28 species recognized in the 'Flora of Australia' and 30 by the Australian Plant Census. There is no comprehensive phylogeny for the eastern clade, which further hampers scientific and conservation efforts. Integrating data from multiple sources is efficient, effective and theoretically grounded approach to delimiting species. I will use morphological, phytochemical and molecular data in delimiting species in the two assemblages and in elucidating the evolutionary and genetic relationship of all eastern Australian *Phebalium*. A follow-up from the research project, therefore, will be to work with relevant threatened species authorities. **Awarded \$1,500**

MR DAVID C **ELLIS** (Australian National University)

Project : Linking canopy-forming macroalgae habitat condition to the productivity of a popular grouper at Ningaloo Reef, Western Australia.

Tropical macroalgal meadows are emerging as a key habitat for supporting fish biodiversity and productivity in tropical marine ecosystems, akin to the more famous seagrass, mangrove and coral reef habitats. The target species, *Epinephelus rivulatus* is a carnivorous fish that are targeted by recreational fishers. What we do not yet understand is the impact of this habitat variability on fish productivity. We seek to address this knowledge gap, which is limiting our adaptive management of this fishery, by testing the following hypothesis: *E. rivulatus* growth will differ among macroalgae meadow sites and years according to amount of canopy-forming macroalgae in their habitat. Otoliths are structures located in the inner ear cavity of all fishes that serve as a balance organ and contain growth information presented as bands similar to tree rings. To achieve the aims stated above, this research will be conducted at Ningaloo Reef in Western Australia as there is extensive macroalgal meadows with canopy-forming macroalgae, and *E. rivulatus* is the most abundant grouper in this region. **Awarded \$1,500**

MR TOBY G L **KOVACS** (University of Sydney)

Project : Integrative systematics of the phylogenetically divergent Australian *Nocticola* cockroaches.

Although cockroaches are widely unpopular with the public, less than 1% of cockroach species are pests, with a wide diversity of native cockroach species present across the world. As with many other taxa, Australia is a hotspot for cockroach diversity, however the ancestral origins of invertebrates are often understudied in comparison to the furrier Australian organisms. One of the most phylogenetically divergent cockroach families, Nocticolidae, is believed to have separated from other cockroach families over 160 million years ago and has recently been proposed as the first cave adapted insects. Nocticolidae have a generally Gondwanan distribution, present in Australia, Sri Lanka, Madagascar and Africa, but are also found in South East Asia and are noticeably absent from South America. The description of these new species and a complete integrated phylogenetic analysis of Australia's *Nocticola* would provide a significant contribution to understanding the world's insect biodiversity, possibly highlighting Australia as important in the origins of the group. **Awarded \$1,500**

MISS NICOLE **LYNCH** (University of Sydney)

Project : Individuals matter: defining the ecological significance of behavioural differences among spotted-tailed quolls.

The natural history of a species is classically defined by its biology and ecology; such as its reproductive strategy, physiology and typical behaviour in the context of its environment. These traits can shape how individuals interact with their environment, and which individuals survive

environmental change. Yet we know very little of whether, and how, such behavioural variation affects to two keys factors underpinning success of individuals: diet and space use. I aim to test the hypothesis that individual variation in cognition and personality in a threatened species, the spotted-tailed quoll, affects individual access to resources, specifically in terms of diet and space use. This will be the first study to test the relationships between cognition, personality, diet and space use in the same individuals. By conducting this research on speed-tailed quolls, I will also address significant gaps in knowledge for this species, such as, their distribution in north-western Sydney and individual variation in ecological traits. **Awarded \$800**

MR JUSTIN M McNAB (Macquarie University)

Project : How toxic are Australian flatworms? Identification of tetrodotoxin in marine flatworms from South-Eastern Australia (Platyhelminthes, Polycladida).

Polyclad flatworms are a group of marine invertebrates found in a large range of habitats throughout Australia's waters, including intertidal and littoral areas. As carnivores, they predate on a variety of small invertebrates using a muscular pharynx to consume their prey whole. These cryptic animals form part of Australian coastal food-webs yet our current understanding of their biology and systematics is lacking as few researchers work on this group worldwide. Recently a small number of genera of polyclad flatworms have been identified to contain tetrodotoxin. Tetrodotoxin is a potent neurotoxin that naturally occurs in the marine environment and works by inhibiting depolarisation in neural cells. This chemical is noticeably present in the Australian system in the blue ringed octopus, in which it is the main component of its venom and assists in prey capture. This project will assess the role of tetrodotoxin in South-Eastern Australian marine flatworms to understand potential roles the chemical may play in Australia's coastal ecosystems. This has never been assessed in Australian waters before. **Awarded \$1,000**



PROCEEDINGS OF THE LINNEAN SOCIETY OF NSW

Article recently published in volume 141, 2019

Coleby, D. and Druitt, R. *Eucalyptus cunninghamii* (Myrtaceae) in the Blue Mountains of New South Wales - an unexpected connection between botany and geology.

Article recently published in volume 142, 2020

Strusz, D. L. Pentamerid brachiopods from the lower Silurian (Wenlock) Canberra Formation, A.C.T., Australia. **142:** 15-28.

Timms, B. V. and Schwentner, M. A revised description of the clam shrimp *Paralimnadia urukhai* Webb and Bell 1979 with the addition of a closely related new species (Crustacea: Branchiopoda: Spinicaudata: Limnadiidae). **142:** 1-14.

All recent papers published in the *Proceedings* (from Vol. 133 in 2012) are freely available from: <http://ojs-prod.library.usyd.edu.au/index.php/LIN>

Previous volumes are available from: www.biodiversitylibrary.org/bibliography/6525

NOTE: A CD is no longer distributed

Please check regularly the Society's home page for recently uploaded papers by going to "linneansocietynsw" then click "Journal (Proceedings)".



SNIPPETS FROM THE PAST

From the *Proceedings of the Linnean Society of New South Wales*, Volume xxxv, Part 1, March 30th, 1910. (Issued July 14th, 1910); Mr C Hedley, FLS, President, in the Chair.

PRESIDENTIAL ADDRESS

LADIES AND GENTLEMEN

It is the duty and privilege of your President to conclude his year of office by an Address at the Annual Meeting. Custom requires that these addresses should consist partly of a history of the Society during the past year and partly of a philosophical treatise intended for the delectation of members. To prepare an Address worthy of submission to so intellectual an audience is the heaviest responsibility of the Presidency. I crave your indulgence for an effort which falls below the high standard to which my predecessors have accustomed you.

The greeting "Ladies and Gentlemen" reminds you that at the instance of Prof. Wilson the Society early in the year resolved to break down the invidious distinction between the sexes and to extend full privileges of membership to women. As far back as 1885 women have been received by the Society as "Associates" but excluded from meetings and denied a vote. Eight lady members joined us under these restrictions, half of whom continue to the present. This enfranchisement was a natural progress and was foreseen by my predecessor, Professor Stephen, who in his Annual Address of January 27, 1886, made the following reference to the admission of women : C « This enlargement of the Society's sphere is admittedly only tentative, and may probably be increased hereafter by the admission of all Members to full rights without distinction of sex, following the improved practice of the Sydney University in this respect. » That the status of our women Members should be thus raised is also in harmony with the provisions of the Founder's will directing that women who are otherwise qualified should be eligible for election to the Linnean Macleay Fellowships.

In this reform you followed the example of our great namesake the Linnean Society of London. But whereas the English women had fairly earned their reward by several brilliant papers accepted and published by their Society, no such feminine contributions have been received from our Members. Neither have Australian ladies so far taken much advantage of the membership now open to them. Yet I anticipate that in the future we shall welcome many distinguished women of Science to our ranks and that their work will be an ornament to our Proceedings.



NEW GEOLOGICAL MAP OF WARRUMBUNGLE NATIONAL PARK

Participants in the 'Volcanoes of NW NSW' Symposium held by the Society at Coonabarabran in September 2018 will be interested to know that the new *Geology of Warrumbungle National Park* map at a scale of 1:50 000 is now available for download from the NSW Planning, Industry & Environment (DPIE) website. Printed copies of this map are available for \$11 from the Warrumbungle National Park Visitor Centre and the Geological Survey's Maitland office. Based on mapping by the GSNSW and the NSW National Parks and Wildlife Service, it presents a new and detailed look at the rocks of the Miocene-age Warrumbungle shield volcano and its eruption history. On the back of the map is an educational poster illustrating features of the volcano, together with a simplified geological map showing walking tracks in the national park.

LINN S C NEWS

NEWSLETTER No: 178

SEPTEMBER 2020

NEWSLETTER EDITOR

J C Herremans

Secretary

Telephone: (02) 9977 8075

POSTAL ADDRESS

PO Box 291

Manly NSW 1655

Mobile: 0490 542 524

EMAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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DEFERRAL OF THE LINNEAN SOCIETY'S AGM FOR 2020 AND FUTURE MEETINGS

As previously advised, the Annual General Meeting that was to have taken place at the Royal Botanic Gardens, Sydney, on Wednesday evening 18th March, has been deferred.

As we hold our meetings in rooms kindly provided by State Government institutions, we are bound by any social distancing restrictions on the numbers of attendees. When these are lifted to a level appropriate to our audiences we will notify you as to the date of the rescheduled AGM and Presidential Address, and look forward to your attendance then. Scheduling of future meetings this year will also be notified to members by email and on the Society's website.



VALE KEITH A W CROOK (1933 – 2020)

The Society has been informed of the death of Dr Keith A W Crook, a long standing Life Member of the Society, in February this year. Keith joined the Linnean Society of NSW in 1956 and remained a member until his death. His academic qualifications included: BSc Honours 1

(Geology) Sydney and University Medal (1954); MSc (Geology) Sydney (1956); PhD (Geology) New England (1959); B.A. (Political Science) ANU (1967). He held a research and teaching appointment in the Department of Geology at The Australian National University from 1961-1992, then served as Science Program Director in the Hawaii Undersea Research Laboratory at the University of Hawaii, Honolulu, from 1992-2004. He published two papers in the Society's *Proceedings*: Cross-stratification and other sedimentary features of the Narrabeen Group. 82(2): 157-166, 1957 and The structural geology of part of the Tamworth Trough. 87(3): 397-409, 1963 (for 1962).



LINNEAN MACLEAY FELLOWSHIP for 2021

Applications are invited for the Linnean Macleay Fellowship for the year 2021. Applicants must be Members of the Society, reside in New South Wales, and have a degree in Science or Agricultural Science from the University of Sydney. Applicants are required to outline the proposed research and where it will be carried out. The Fellowship pays \$3,200 per annum, and the Fellow must engage in full time research on the project. The regulations governing the Fellowship are available on the Society's web site. These regulations were stipulated in Sir William Macleay's will and the Society is obliged to adhere to them.

Applications close 15 November 2020



REPORTS FROM RECIPIENTS OF LINNEAN SOCIETY SCIENTIFIC RESEARCH GRANTS

JOYCE W VICKERY SCIENTIFIC RESEARCH FUND 2019

Norval, Gerrut (Flinders University). Project title: Does the haemogregarine parasite, *Hemolivia mariae*, infect the kangaroo soft tick *Ornithodoros gurneyi* at a study site near Mt Mary, South Australia? Mr Norval described that the fund was used to undertake field work near Mt Mary in the Mid North region of South Australia to investigate the likely roles of the kangaroo soft tick *O. gurneyi* as a parasite of sleepy lizards (*Tiliqua rugose*) and a vector for the haemogregarine parasite *H. mariae*. This study found that larvae and nymphs of kangaroo soft ticks that fed on sleepy lizards will survive and can moult, which indicates that lizards are suitable hosts for these ticks.

WILLIAM MACLEAY SCIENTIFIC RESEARCH FUND

Ghaly, Timothy (Macquarie University). Project title: The genesis, diversity and dynamics of integrin gene cassettes. This project will contribute to the first data chapter of my doctoral thesis. The DNA sequencing will be used to validate novel methodologies that I have developed and will be used for the remainder of my PhD. Integrons are bacterial genetic elements that promote rapid adaptation by capturing and expressing mobile genes known as gene cassettes. Importantly, the mechanisms by which gene cassettes are generated, and thus made available to integrons, and in which taxa this is occurring, remains completely unknown. As part of this, I have also designed a novel computational pipeline that can be used to extract integrons from sequence data and to then validate them as true integrons. This work will contribute significantly to the field of integron biology as such an approach currently does not exist.



ARTICLES RECENTLY PUBLISHED in volume 142, 2020

- Coleby, D. and Drutt, R.** Observations on average trunk diameters of *Eucalyptus cunninghamii* (Myrtaceae) in relation to elemental concentrations of their substrates.
- *Lunney, D., Sonawane, I., Wheeler, R., Tasker, E., Ellis, M., Predaves, M. and Flemming, M.** An ecological reading of the history of the koala population of Warrumbungle National Park. [* symposium supplement]
- Smith, J. and Smith, P.** Outstanding terrestrial vertebrate faunal diversity in the Greater Blue Mountains World Heritage Area, New South Wales.
- Strusz, D. L.** Pentamerid brachiopods from the lower Silurian (Wenlock) Canberra Formation, A.C.T., Australia.
- Timms, B. V. and Schwentner, M.** A revised description of the clam shrimp *Paralimnadia urukhai* Webb and Bell 1979 with the addition of a closely related new species (Crustacea: Branchiopoda: Spinicaudata: Limnadiidae).

All recent papers published in the *Proceedings* (from Vol. 133 in 2012) are freely available from: <http://ojs-prod.library.usyd.edu.au/index.php/LIN>

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NOTE: A CD is no longer distributed

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SNIPPETS FROM THE PAST

Excerpt from the *Proceedings of the Linnean Society of New South Wales*, Volume xlv, Part 1, March 31st, 1920. (issued 25th June 1920); Mr Joseph J Fletcher M.A., B.Sc., President, in the Chair.

« Another stirring event in the early part of the year, not without its lessons, was a severe epidemic of influenza of a virulent type, which, as in other countries, not only upset, from top to bottom, the home-life, the educational life, the business-life, the industrial life, and every other grade of our community life, but brought bereavement to many households and aggregates. Nevertheless, the blackness of the calamitous cloud, which overshadowed us for so long, was not without some silver streaks of lining, in the shape of the unselfishness and self-sacrifice, heroic as often as circumstances required, on the part of doctors, nurses, and volunteers of both sexes, intend on doing their utmost, at all risks, for the relief of the prostrated and the helpless, and the succour and comfort of the bereaved. »

PRESIDENTIAL ADDRESS 1926

Delivered at the Fifty-first Annual General Meeting, held at Macleay House 16 College Street, Sydney on Wednesday 31st March, 1926, Mr H. J. Carter, B.S., F.E.S., President, in the Chair, on Entomology.

Nearly 3,000 years back, the Greek poet Homer was evidently a keen natural observer, though not generally regarded as an entomologist. He notes the “glancing gad fly” attacking the herds; one kind of worm or weevil attacking the wood of Odysseus’s bow, another the corpses of cats; “Locusts flee from fire”. Flies are often mentioned as also frequently and poetically from Anzac in 1915. Old men of Troy, no longer able to fight, are “excellent talkers” like “tettixes” (?Cicadas) which in the thickets, sitting on a tree, send forth a thin clear voice. Bees are “nesting in hollow rock” apparently not yet domesticated. The popular fictions so familiar to the Australian naturalist were evidently rife among the Greeks who named the most innocuous of insects (so far as animal life is concerned) *Buprestis* (the bull-stinger), cf. the common term *horse-stinger* employed in the bush for dragon-flies.

Five hundred years later Aristotle (384-322 B.C.) in his “History of Animals” enunciates the first classification known to me of all animals into two groups, viviparous and oviparous; the first contained quadrupeds; the second birds, fishes and insects. A leap of another five hundred years brings us to the Roman Pliny, one of the Pompeian victims of Vesuvius, who wrote a famous Natural History, whose notes are quoted here from the translation by John Bostock, F.R.S. (1855), “Beetles, in one large kind” (apparently *Lucanus cervus* L.) “we find horns of a remarkable length, two pronged at the extremities and forming pincers which the animal closes when it is its intention to bite. These beetles are suspended from the neck of infants by way of a remedy against certain maladies”.

“In Lemnos there is a certain measure fixed by law, which each individual is bound to fill with locusts which he has killed, and then bring it to the magistrate”.

From another source comes another locust story: “The Acridophagi a people of Aethiopia living near the deserts. In the springtime they made provision of a large kind of locust which they salted and kept for their standing food all the year; they lived to 40 years of age, then died, as is said, of a sort of wing worms generated in their bodies”. (Oxford Encyc.)

“Flies which have been drowned in water, if they are covered with ashes will return to life”.

“The horns of an Indian ant, suspended in the temple of Hercules at Erythrae, have been looked upon as quite miraculous for their size. This ant excavates gold from holes”. “It has the colour of a cat and is in size as large as an Egyptian wolf. This gold.....is taken by the Indians during the heat of summer, while the ants are compelled by the excessive warmth to hide themselves in their holes. Still, however, on being aroused by catching the scent of the Indians, they sally forth and frequently tear them to pieces, though provided with the swiftest camels for the purpose of flight; so great is their fleetness combined with their ferocity and their passion for gold”.

“Many insects, however, are engendered in a different manner; and some more especially from dew. This dew settles upon the radish leaf in the early days of spring, but when it has been thickened by the action of the sun, it becomes reduced to the size of a grain of millet. From this a small grub arises, which at the end of three days becomes transformed into a caterpillar. For several days it increases in size, but covered with a hard husk, moves only when touched and is covered with a web like that of a spider. In this state it is called chrysalis, but after the husk is broken it flies forth in the shape of a butterfly”.

“In the copper smelting furnaces of Cyprus in the very midst of the fire there is to be seen flying about a 4-footed animal with wings, the size of a large fly. This creature is called the ‘pyrallis’ or by some the ‘pyrausta’. So long as it remains in the fire, it will live, but if it comes out and flies a little distance from it it will instantly die”.

“The life of other insects is regulated by multiples of 7. Thrice 7 days is the duration of the life of the gnat and of the maggot, while those that are viviparous live four times 7 days”.

From Pliny to Oliver Goldsmith is a natural leap, for I find in the introduction to the latter's "History of the Earth and Animated Nature" these words: "The delight which I found in reading Pliny first inspired me with the idea of a work of this nature".

Goldsmith divides the insect world thus:

(1) Wingless C ex. louse, spider. "All these, the flea and the wood louse only excepted, are produced from an egg"; (2) Winged C but wings "cased up", e.g. grasshopper, dragon-fly, ear-wig; (3) Moths and butterfly kinds; (4) winged insects which come from a worm instead of a caterpillar, e.g. gnats, beetles, bees and flies; (5) Zoophytes, e.g. polypus, earthworm and sea-nettle. It is curious to note that Goldsmith's book was published in 1774, thirty-nine years after Linnaeus's publication of "Systema Naturae", from which the modern naturalist takes his zero time. Linnaeus first divided insects into *four* orders, and subsequently into seven.

(1) Coleoptera, (2) Hemiptera, (3) Lepidoptera, (4) Neuroptera, (5) Hymenoptera, (6) Diptera and (7) Aptera, surprisingly near the modern classification.

My last historical excerpt is taken from a learned work of 1828, "The Oxford Encyclopaedia" (7 octavo volumes). Under Entomology one reads "There is not perhaps, any branch of natural history, the study of which has been so generally regarded with indifference and contempt. The insect hunter is not infrequently treated with ridicule and his pursuit branded as frivolous".

A century later sees little to subtract from this statement so far as the popular view goes, as witness the typical entomologist of the stage and literature or the narrow escape from arrest of my friend Commander J. J. Walker, R.N. This gentleman, later a member of the Council of the Entomological Society of London, of which he was President 1916-18, was pursued by the mounted police of Gosford and would have assuredly been locked up as a person of unsound mind had he not been able to refer to the local doctor as a friend who could certify that insect hunting did not necessarily imply a state of mind that was dangerous to the community.



BOOK REVIEW

Dawson, Lyndall. *Tunnels in Time. The discovery, ecology & extinction of Australia's marsupial megafauna*. 2020. 164 pages. Paperback. ISBN 978-0-646-81737-8 RRP \$A39.50

This remarkable book is the story of the rise and fall of the Australian megafauna. The story is centred on the megafauna fossils of Wellington Caves in NSW, on which Dr Dawson has devoted much of her career as a palaeontologist. Like all fossil deposits, the Wellington caves only provide a snap shot of relatively brief periods in deep time. In the case of Wellington caves that includes somewhere in the early Devonian in the limestone (lacking mammals of course); mammals including megafauna during the last geomagnetic reversal (about 780,000 years ago) in the Mitchell unit; and a mostly modern mammalian fauna in the Cathedral Cave deposit. To complete the story Dr Dawson needs to discuss other deposits of other times, and she does this very well.

Indeed, this book will be of great interest to people of all ages who may not even understand what "megafauna" means. There are good illustrations and side-stories that clearly illustrate how the study of fossils can provide "tunnels in time".

There is a side-story about the much-debated effect of the arrival of humans, which is clearly related to the side-story of climate change. These are the elements involved in the fascinating if never-ending story of the extinction of the megafauna. Dr Dawson presents the most accessible discussion of extinction of the megafauna throughout the world that I have read. It is clear and well supported by a very thorough knowledge of the massive amount of

literature and discussion of the topic. This culminates in a brief essay about the bearing studies of the megafauna might have on the present and future, perhaps not quite “light at the end of the tunnel”.

Because of the little snippets provided here and there about various fossil sites and various fossil-studiers, this book will fascinate all palaeontologists. It will also be very useful for teachers (note to Dr Dawson: I would love to use some of the excellent charts and illustrations in this book for teaching).

A final observation – the quality of illustrations and layout is excellent. That I suspect is the work of Linnean Society Councillor Bruce Welch.

Michael Augee 4 July 2020



PRELIMINARY NOTICE: The Society’s Natural History Symposium for 2021

Planning is well under way for the next Linnean Society of NSW Natural History Symposium. Here we give preliminary details to Members so that they may keep the dates (October 27-29, 2021) free in their diary. The topic is **Natural History of the North East Sydney Basin**. Focus will be principally on the geology, botany and zoology of National Parks, Conservation Areas and other Reserves, inlets (e.g. Broken Bay), central coast lakes, and sea cliff features in the area bounded by the coastline to the east, Sydney Harbour to the south, the Hunter River to the north, and the western limit of Hornsby Shire (to include Marramarra NP and Berowra Valley NP) as the western boundary. The format will follow that of our previous successful symposia held over the past decade, with two days of scientific talks (both technical and popular) scheduled on the Wednesday and Thursday, followed by a full day field trip centred on Ku-ring-gai National Park and also including nearby sites (possibly the Hornsby Quarry redevelopment, subject to access being permitted).

Venue for the talks will be Hornsby RSL club which is within easy walking distance of Hornsby Station. It may be possible to organize a special additional excursion for Symposium registrants on Saturday October 30 involving the Newcastle Coastal Geotrail (subject to availability of staff from the Geological Survey of NSW who have created this widely acclaimed tour). Further details including registration fees (Full, Retired, Student, Associate members and non-members) will be included in the December Linn Soc News. Fees will be kept to very reasonable levels and member discounts will apply.

We look forward to anyone conducting research into any aspects of the natural history of the North East Sydney Basin, be it formal studies or citizen science, offering to present their results at the Symposium. Aspects of planning and management related to environmental matters can also be covered. Papers, subject to the normal refereeing procedures of the Society, will be solicited for publication in the *Proceedings*.

You are welcome to indicate your interest by replying to the symposium secretary (Mike Augee) at fossil@well-com.net.au or by post to 89 Caves Road, Wellington NSW 2820.

Mike Augee and Ian Percival
2021 Symposium coordinators



LINN S C NEWS

NEWSLETTER No: 179

DECEMBER 2020

NEWSLETTER EDITOR

J C Herremans

Secretary

Telephone: (02) 9977 8075

POSTAL ADDRESS

PO Box 291

Manly NSW 1655

Mobile: 0490 542 524

EMAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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NEW MEMBERS: We welcome: Mr J Bickerstaff; Ms M Brownhill; Mr C Bryant; Mrs S Dema; Dr M Denny; Mr DJ Juszkiwicz; Ms LEJ Kabarun; Ms M Khandaker; Mr TGL Kovacs; Ms Brittany Laing; Miss N Lynch; Mr G McDonnell; Mr J Mifsud; Mr JM NcNab; Ms JC Ryan; Mr JD Whitehead



THE LINNEAN SOCIETY'S AGM FOR 2020 AND FUTURE MEETINGS

The deferred Annual General Meeting that was to have taken place at the Royal Botanic Gardens, Sydney, on Wednesday evening 18th March, was held via the Zoom platform on 21 October 2020 to consider the President's Report on the affairs of the Society and the Treasurer's Report for 2019, and to declare the results of the elections for President, members of Council and auditors for 2020-21. Minutes are provided in this issue of Linn Soc News. As we hold our meetings in rooms kindly provided by State Government institutions, we are bound by any social distancing restrictions on the numbers of attendees. When these are lifted to a level appropriate to our audiences, we will notify you as to the venue for the 2021 AGM and Presidential Address, and look forward to your attendance then. Scheduling of future meetings in 2021 will also be notified to members by email and on the Society's website.



VALE ALISON LEWIS (1945 – 2020)

The Society has been informed of the death on 18 June 2020 of Alison Lewis, a long-standing member of the Society. In 1965, as Miss Alison Dandie, she joined the Linnean Society of NSW. She was awarded the Linnean Macleay Fellowship in Botany for 1967. During her tenure, she continued the work begun in her B.Sc. (Hons) year in 1966 on the occurrence and importance of mycorrhizae in New South Wales, with particular reference to vesicular-arbuscular mycorrhizae. Mrs Lewis was always very deeply attached to Sydney University. As well as her B.Sc. (Hons.) degree, she also completed her Dip.Ed. there. She lived in Women's College, and served as a board member of the Sydney University Women's Union. Subsequently she worked in medical mycology research at the Kolling Institute, Royal North Shore Hospital. Later, Mrs Lewis returned to work at the School of Biological Sciences at Sydney Uni as an Associate Lecturer, specialising as a First-Year Demonstrator. In 2001, with her colleagues, she was awarded the Vice-Chancellor's Special Award for Outstanding Teaching (for 2000). The team were pioneers in developing on-line learning facilities, and put in place a virtual classroom/lab. In the current climate, with on-line learning becoming a necessity for students all over the world, we recognise just how innovative Mrs Lewis and her colleagues proved to be, 20 years ago. Despite ill health, Mrs Lewis continued to work at Sydney University for many more years. [Information kindly supplied by her daughter Ms Eleanor Lewis-Cloué]



APPLICATIONS FOR GRANTS FROM THE SCIENTIFIC RESEARCH FUNDS IN 2021

Application forms for all Research Funds may be obtained from the Secretary or from the Society's Home Page « <http://linneansocietynsw.org.au> »

Intending applicants: To avoid delay in consideration of your application, please read instructions carefully. Deadline for receipt of all applications is March 1, 2021.

§

WILLIAM MACLEAY MICROBIOLOGY SCIENTIFIC RESEARCH FUND

Grants are available from the William Macleay Microbiology Scientific Research Fund to support original research in an Australian context within the field of Microbiology.

Applications will be accepted from postgraduate and Honours degree students at recognised Australian Universities who are undertaking full-time or part-time studies with a microbiological emphasis.

Applications are also encouraged from amateur or professional microbiologists, whether in employment as such or not, who can demonstrate a level of achievement in original research in Microbiology.

In awarding grants, the Council of the Society will assess:

- a) Realistic costing and timetable
- b) The quality of the project
- c) The applicant's ability to carry it out
- d) The likelihood that successful completion of the research will lead to publication or other useful dissemination of research results.

The total amount of Fund money available for awards in any year will depend on income received by the Fund over the preceding year and thus the maximum per application may vary from year to year. The current limits are: \$2,000 for Members of the Linnean Society of New South

Wales and \$1,200 for non-members. Successful awards may be less than the amount requested when quality applications exceed money available.

The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

Applications are not restricted to members, but other things being equal, members of the Society will be given preference.

The closing date for applications is March 1 in any year. In exceptional circumstances, emergency support may be available at another times. Please contact the secretary before submitting an application.

Applications must be made on the Fund's application form. Supporting documents should be added to the end and the entire application should be submitted as a single PDF file.

The application must include a short summary (up to 200 words) about the project, to be published in the LinnSoc News if the applicant is successful.

Any publication arising from work supported by the William Macleay Microbiology Scientific Research Fund should include an acknowledgement to that effect.

Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

An application form may be obtained from the website or from the Secretary of the Society.

The Council's decision in regard to the award or non-award of grants from the William Macleay Microbiology Scientific Research Fund is final, and no correspondence will be entered into.

Submit your signed application by email to secretary@linneansocietynsw.org.au

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BETTY MAYNE SCIENTIFIC RESEARCH FUND FOR EARTH SCIENCES

The Betty Mayne Scientific Research Fund for Earth Sciences provides financial assistance to support short term original research projects in all aspects of the earth sciences.

Applications will be accepted from postgraduate and honours students, amateur or professional geologists who can demonstrate a level of achievement in original research in Earth Sciences.

Projects proposed for support do not have to be restricted to Australian locations or specimens, but, given the Society's interests in the natural history of Australia, they must demonstrate a strong Australian context.

In awarding grants, the Council of the Society will assess:

a) Realistic costing and timetable

b) The quality of the project

c) The applicant's ability to carry it out

d) The likelihood that successful completion of the research will lead to publication or other useful dissemination of research results.

The total amount of Fund money available for awards in any year will depend on income received by the Fund over the preceding year and thus the maximum per application may vary from year to year. The current limits are: \$2,000 for Members of the Linnean Society of New South Wales and \$1,200 for non-members. Successful awards may be less than the amount requested when quality applications exceed money available.

The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

Applications are not restricted to members, but other things being equal, members of the Society will be given preference.

The closing date for applications is March 1 in any year. In exceptional circumstances, emergency support may be available at another times. Please contact the secretary before submitting an application.

Applications must be made on the Fund's application form. Supporting documents should be added to the end and the entire application should be submitted as a single PDF file.

The application must include a short summary (up to 200 words) about the project, to be published in the LinnSoc News if the applicant is successful.

Any publication arising from work supported by the Betty Mayne Scientific Research Fund for Earth Sciences should include an acknowledgement to that effect.

Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

An application form may be obtained from the website or from the Secretary of the Society.

The Council's decision in regard to the award or non-award of grants from the Betty Mayne Scientific Research Fund for Earth Sciences is final, and no correspondence will be entered into.

Submit your signed application by email to secretary@linneansocietynsw.org.au

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JOYCE W VICKERY SCIENTIFIC RESEARCH FUND

Grants from the Joyce W. Vickery Scientific Research Fund are intended to support worthy research in those fields of the Biological Sciences that fall within the range of interests of the Society, especially natural history research within Australia.

Applications will be accepted from postgraduate and Honours degree students at recognised Australian Universities who are undertaking full-time or part-time studies with a biological emphasis.

Applications are also encouraged from amateur or professional biologists, whether in employment as such or not, who can demonstrate a level of achievement in original research in Biological Sciences.

In awarding grants, the Council of the Society will assess:

a) Realistic costing and timetable

b) The quality of the project

c) The applicant's ability to carry it out

d) The likelihood that successful completion of the research will lead to publication or other useful dissemination of research results.

The total amount of Fund money available for awards in any year will depend on income received by the Fund over the preceding year and thus the maximum per application may vary from year to year. The current limits are: \$2,000 for Members of the Linnean Society of New South Wales and \$1,200 for non-members. Successful awards may be less than the amount requested when quality applications exceed money available.

The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

Applications are not restricted to members, but other things being equal, members of the Society will be given preference.

The closing date for applications is March 1 in any year. In exceptional circumstances, emergency support may be available at another times. Please contact the secretary before submitting an application.

Applications must be made on the Fund's application form. Supporting documents should be added to the end and the entire application should be submitted as a single PDF file.

The application must include a short summary (up to 200 words) about the project, to be published in the LinnSoc News if the applicant is successful.

Any publication arising from work supported by the Joyce W. Vickery Scientific Research Fund should include an acknowledgement to that effect.

Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

An application form may be obtained from the website or from the Secretary of the Society.

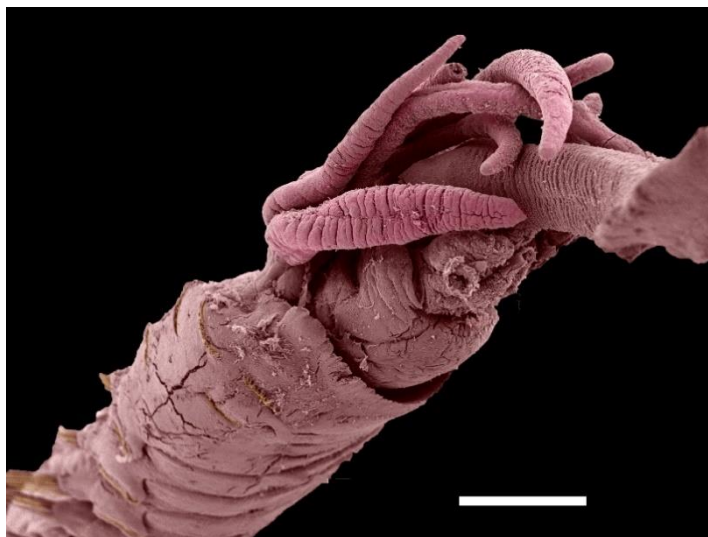
The Council's decision in regard to the award or non-award of grants from the Joyce W Vickery Scientific Research Fund is final, and no correspondence will be entered into.

Submit your signed application by email to secretary@linneansocietynsw.org.au



Report by Laetitia Gunton on project funded by Joyce W Vickery Scientific Research Fund grant of \$1,500.00 in 2019

Dr Laetitia Gunton (Australian Museum): Australia has the third largest marine territory in the world of which the abyssal environment (3501-6500 m water depth) makes up around 30%. Due to the vast size and scarce sampling of the Australian abyss we know very little about the small benthic organisms living in this abyssal environment. My research focuses on documenting and describing the biological diversity of deep-sea environments around Australia. The funds provided to me by the Joyce W Vickery Scientific Research Fund were put towards the molecular costs for sequencing three genetic markers required to describe two deep-sea worms, *Melinnopsis gardelli* and *Melinnopsis chadwicki*, from the eastern Australian abyss. This work was a collaboration between researchers at the Australian Museum and the University Museums of Bergen Norway. The results were published in September in the *Records of the Australian Museum* (Gunton et al., 2020). This study was first to describe species of *Melinnopsis* from Australia and to use molecular data to describe species from the genus. Further research into the genetic connectivity of these worms is ongoing. I am extremely grateful to the Linnean Society of New South Wales for providing the funds to support this research.



Coloured scanning electron microscope image of new species, *Melinnopsis gardelli*. Scale bar represents 1 mm.

Reference: Gunton, L.M., Kupriyanova, E. & Alvestad, T. 2020. Two new deep-water species of Ampharetidae (Annelida: Polychaeta) from the eastern Australian continental margin. *Records of the Australian Museum*, **72**: 101-121.



ARTICLES RECENTLY PUBLISHED in volumes 142 & 141 (Supplement), 2020

- Cowley, K.L., Fryirs, K.A., Cohen, T.J., Marx, S., Forbes, M. and Krogh, M.** Upland peatlands of eastern Australia as important water storage reservoirs.
- Myerscough, P.** Myall Lakes National Park, the Boolambayte Sand Ridge: its extant, vegetation, geomorphology and marks of European settlement.
- Smith, P. and Smith, J.** Future of the Greater Glider (*Petauroides volans*) in the Blue Mountains, New South Wales.
- Spennemann, D.H.R.** *Pteropus poliocephalus* dispersing seeds of the Queen Palm (*Syagrus romanzoffiana*) in Albury, NSW.
- Taylor, J.E., Ellis, M., Williams, N. and Kloecker, U.** Responses of birds and reptiles in Warrumbungle National Park after the extensive 2013 wildfire. **141 Supplement:** S155-S208.
- Tulau, M., Yang, X., McAlpine, R., Veeragathipillai, M., Zhang, M., Karunaratne, S., McInnes-Clarke, S. and Young, M.** Impacts of wildfire on soil organic carbon and nitrogen in Warrumbungle National Park, Australia. **141 Supplement:** S209-S227.

All recent papers published in the *Proceedings* (from Vol. 133) are freely available from:
<http://ojs-prod.library.usyd.edu.au/index.php/LIN>

Earlier volumes are available from: www.biodiversitylibrary.org/bibliography/6525

Please check regularly the Society's home page for recently uploaded papers by going to "linneansocietynsw" then click "Journal (Proceedings)".



UPDATE: The Society's Natural History Symposium for 2021 (October 27-29)

The topic for the next Linnean Society Symposium is **Natural History of the North East Sydney Basin**. Focus will be principally on the geology, botany and zoology of National Parks, Conservation Areas and other Reserves, inlets (e.g. Broken Bay), central coast lakes, and sea cliff features in the area bounded by the coastline to the east, Sydney Harbour to the south, the Hunter River to the north, and the western limit of Hornsby Shire (to include Marramarra NP and Berowra Valley NP) as the western boundary. The format will follow that of previous symposia held over the past decade, with two days of scientific talks (both technical and popular) scheduled on the Wednesday 27th and Thursday 28th October at the Hornsby RSL Club, which is within easy walking distance of Hornsby Station. The registration fee will include lunch, and morning and afternoon refreshments. Friday 29th will be occupied by a full day field trip by bus, centred on Ku-ring-gai National Park (visiting West Head, Elvina Track and Bobbin Head Gibberagong Boardwalk), finishing up with an inspection of the diatrema face exposed in the Hornsby Quarry redevelopment (subject to access being permitted). Lunch will be included.

Registration fees (Scientific Talks)

	Up to August 31 2021		Sept 1 2021 & after	
	Wed 27/10	Thurs 28/10	Wed 27/10	Thu 28/10
Student member	\$50	\$50	\$60	\$60
Retired/Assoc.	\$60	\$60	\$70	\$70
Ordinary Member	\$70	\$70	\$80	\$80
Non-member	\$100	\$100	\$110	\$110

Field trip fees, which are additional, have not yet been finalized, but are likely to be in the vicinity of \$45 for students, Retired and Associate Members, \$50 for Ordinary Members and \$60

for non-members. Numbers will be limited to 53 participants (one coach). A packed lunch, plus morning and afternoon refreshments, will be included. Experts in geology, botany and zoology will guide the excursion.

A special additional optional excursion (at no cost) for Symposium registrants only, will be offered on Saturday October 30th, walking the Newcastle Coastal Geotrail (guided by staff from the Geological Survey of NSW who have created this widely acclaimed tour). Intending participants will provide their own transport and food for this excursion.

The **First Circular** will be distributed by the end of January 2021. It will provide further details, including timetable, an Abstract template, and cancellation policy.

We look forward to anyone conducting research into any aspects of the natural history of the North East Sydney Basin, be it formal studies or citizen science, offering to present their results at the Symposium. Aspects of planning and management related to environmental matters can also be covered. Papers, subject to the normal refereeing procedures of the Society, will be solicited for publication in the *Proceedings*.

You are welcome to indicate your interest by replying to the symposium secretary (Mike Augee) at fossil@well-com.net.au or by post to 89 Caves Road, Wellington NSW 2820.

Mike Augee and Ian Percival
2021 Symposium coordinators



RENEWAL OF MEMBERSHIP FOR 2021

Included with this issue of Linn Soc News (as a separate attachment or form) is your Renewal of Membership for 2021.

In light of the disruption to meetings caused by the COVID-19 pandemic this year, the Council of the Linnean Society of NSW has resolved that those Members who are in good standing financially (i.e. having paid their membership fee for 2020) will not be invoiced for their fee in 2021. Instead, they will be invited to make an optional donation (that may be tax-deductible depending on your personal circumstances) in lieu to support the Society's Scientific Research Funds, including the Joyce Vickery SRF (for botany and zoology) and the Betty Mayne SRF (for earth sciences).

Those members who are currently non-financial will be required to pay only a single annual subscription at the current rates to cover the two calendar years 2020 and 2021. You are also very welcome to make a tax-deductible donation to the Society's Scientific Research Funds if you wish.



Linnean Society of New South Wales

Minutes of the 145th Annual General Meeting, held via Zoom, October 21, 2020, at 6:02pm

CHAIRPERSON: Mr John Barkas

PRESENT: Nineteen members (names recorded in the attendance book).

APOLOGIES: Mr Doug Benson, Prof. Anders Hallengren FLS, Dr Peter Myerscough, Mr. Peter Olde AO, Prof Lynne Selwood AO

MINUTES: The minutes of the one hundred and forty-four Annual General Meeting, held on Wednesday, March 20, 2019 were distributed. It was moved (R. King) and seconded (I. Percival) that the minutes as circulated be accepted as a true record. CARRIED.

TREASURER'S REPORT: The Treasurer presented the audited financial report for 2019 and distributed notes to accompany the 2019 balance sheets.

It was moved (I. Percival) and seconded (K. Wilson) that the audited accounts for 2019 and the Treasurer's report be accepted. CARRIED.

Council thanked the Treasurer, Ian Percival, for maintaining the Society's finances in a strong and healthy state of affairs.

Council also thanked the Editor, Michael Augee, competently assisted by Bruce Welch for managing the Society's *Proceedings* through all stages of production.

The Chairman expressed, on behalf of the Society, appreciation for the work done by all Council members.

CHAIRMAN'S REPORT: Mr John Barkas reported on the affairs of the Society for the year 2019. It was moved (R. King) and seconded (I. Percival) that the Chairman's report be accepted. CARRIED.

DECLARATION OF ELECTIONS:

Council

As the number of nominations for Council did not exceed the number of vacancies (six), no voting was necessary. Having received no other nominations for Council, the following four retiring Council members were declared by the Chairman re-elected to Council for three years: JC Herremans, David Keith, Peter Myerscough, and Ian Percival. CARRIED.

President

There being no other nominations, the Council nominee, Dr Ian Percival was declared by the Chairman elected as President of the Society for 2020. CARRIED.

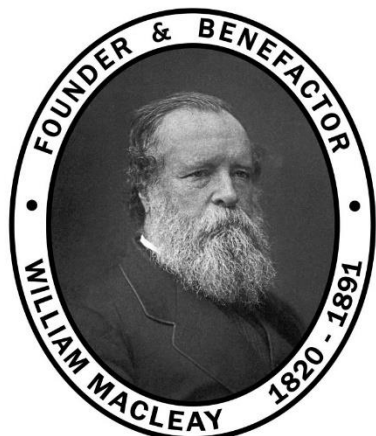
Auditor

There being no other nominations for auditors, it was moved (I. Percival, from the Chair) that the current firm, Phil Williams Carbonara, be retained for 2020. CARRIED.

A vote of appreciation from the incoming President Dr Ian Percival was expressed to the outgoing President Mr John Barkas for his acumen and expertise in handling Council meetings particularly his professionalism in conducting recent meetings via Zoom which had been of great advantage to the smooth running of the Society.

As there was no further business, Dr Ian Percival declared the meeting closed at 6:28pm.





THE LINNEAN SOCIETY OF NEW SOUTH WALES

Notice of 2021 Annual General Meeting

The 146th Annual General Meeting of the Society is scheduled to be held (subject to any Government-issued restrictions on social gatherings due to COVID-19 or other matters) at 6pm on Wednesday 24 March 2021 in the Charles Moore Room in Anderson Building, Royal Botanic Gardens, Mrs Macquaries Road, Sydney.

Members and guests are invited to join the Council of the Society for drinks and light refreshments from 5:30pm.

Presidential Address by Mr John Barkas (deferred from 2020 AGM): The Presidential Address for 2020 "***Mining, metals and the transition to a lower carbon future***" will be delivered by the previous President (Mr John Barkas) at the March 2021 AGM.

Five members of Council are due to retire at this AGM:

John Barkas, Hayley Bates, John Pickett, Helen Smith, and Karen Wilson and offer themselves for re-election.

Council recommends the election of Dr Ian Percival as President of the Society for 2021.

Council recommends the election of Mr Doug Benson as Councillor of the Society.

Council recommends the reappointment of the current auditors, Phil Williams Carbonara.

Further nominations are invited for vacancies on Council (6), the office of President, and Auditor. Nominees must be financial Ordinary Members (a category which includes Life Members) of the Society. The nominations must be signed by at least two financial Ordinary Members of the Society and countersigned by the nominee in token of their willingness to accept such office.

Nominations must be received by the Secretary at PO Box 291, Manly NSW 1655 by 31 January 2021.

LINNEAN SOCIETY OF NEW SOUTH WALES

NEED A TAX BREAK?

Donations to our scientific research funds are fully tax deductible

The Joyce W Vickery Scientific Research Fund

Is open to anyone engaged in research in natural history. Over eighty projects have been supported in the last five years

The Betty Mayne Scientific Research Fund

Supports projects in geology and other earth sciences. Sixteen awards have been made in the last five years.

SO HELP YOURSELF AND A STRUGGLING RESEARCH STUDENT

MAKE A DONATION TO A SCIENTIFIC RESEARCH FUND

To The Linnean Society of NSW
PO Box 291
Manly NSW 1655

I wish to make a donation of \$..... to the

G Joyce Vickery Scientific Research Fund

G Betty Mayne Scientific Research Fund

Please make all cheques payable to « LINNEAN SOCIETY OF NSW »

Payment through a bank:

ACCOUNT NAME: LINNEAN SOCIETY OF NSW

BSB: 112879

ACCOUNT NUMBER: 466447867

If you pay through a bank, it is essential that you e-mail the Society at secretary@linneansocietynsw.org.au and tell us about your payment, otherwise we will receive the money and not know who paid it.

SEND RECEIPT TO:(Your email address)

NAME

ADDRESS

.....

LINN S C NEWS

NEWSLETTER No: 180

APRIL 2021

NEWSLETTER EDITOR

J C Herremans

Secretary

Telephone: (02) 9977 8075

POSTAL ADDRESS

PO Box 291

Manly NSW 1655

Mobile: 0490 542 524

EMAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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NEW MEMBERS: We welcome:

Mr Jeremy K Day of Newcastle University. Fields of interest: marine ecology, marine sanctuary zones, temperate reef ecology, benthic predators, acoustic tagging.

Miss Alyssa K Fjeld of Macquarie University. Fields of interest: invertebrate marine fauna from the Palaeozoic, biostratigraphy.

Prof Ross Street and Mrs Margery Street. Field of interest: conservation



THE LINNEAN SOCIETY'S AGM FOR 2021

The 146th Annual General Meeting was held at the Royal Botanic Gardens, Sydney, on Wednesday 24 March 2021 at 6:00pm. The President reported on the affairs of the Society and the Treasurer presented his report for the year 2020. Results of the elections for President, members of Council and auditors for 2021-22 were declared. New Council members Peter Olde and Ian Hill were introduced and welcomed. The Presidential Address *Mining, metals and the transition to a lower-carbon future* was delivered by last year's President Mr John Barkas (this Address was to have been presented at last year's AGM but was held over due to COVID-19). The 16 members and friends in attendance were treated to an in-depth analysis of facts regarding the true nature of the global demand for various metals and how their processing requirements influence current and future usage of fossil fuels and new technologies.



ARTICLES RECENTLY PUBLISHED in volume 143, 2021

Timms, B. V. 2021. A new species of fairy shrimp *Branchinella* (Crustacea: Anostraca: Thamnocephalidae) from Alice Springs, Australia.

All recent papers published in the *Proceedings* (from Vol. 133) are freely available from:

<http://ojs-prod.library.usyd.edu.au/index.php/LIN>

Earlier volumes are available from: www.biodiversitylibrary.org/bibliography/6525

Please check regularly the Society's home page for recently uploaded papers by going to "linneansocietynsw" then click "Journal (Proceedings)".



AWARDS FROM THE SCIENTIFIC RESEARCH FUNDS

The current very low interest rates limit funds available and your Society is unable to fund as many applications as it would like or to provide the full amount requested by the applicants.

William Macleay Fund for Microbiology Research

Stewart, Ms Jana (University of New South Wales). Project title: *Soil microbial responses to reintroduced semi-fossorial mammals: a temporal comparison of soil biodiversity and ecosystem function.*

Soil microbes are important drivers of ecosystem function and biogeochemical processes in drylands. However, biodiversity declines in drylands due to high extinction rates and many species threatened, has disrupted the biogeochemical processes that sustain these systems. Understanding interactions between the soil microbial community and key ecosystem engineers is needed to achieve restoration. Burrowing and digging mammals have been shown to be powerful ecosystem engineers with their foraging behaviour and burrows providing many benefits such as dispersing soil nutrients, refugia for other species, and increasing landscape heterogeneity. Previous studies have compared habitat and microbial abundance with and without these engineers showing that there is variance. However, evidence of functional diversity differences is lacking. Understanding these differences may help understand how ecosystems benefit from these interactions and also how it would be impacted if one of these pieces is altered. This project aims to understand the interactions between soil microbes and burrowing mammals on a temporal and spatial scale. Utilising the Wild Deserts project site at Sturt Desert National Park we will sample soil from reintroduction enclosures and control sites adjacent to the enclosures to assess their microbial composition and functional diversity, along with soil physicochemical properties. We aim to build 16S rRNA gene libraries and co-relate them with the soil chemical variables, to assess the impact of biodiversity loss on these microbial communities and the ecosystem functions they provide. Awarded \$2,000

Betty Mayne Fund for Scientific Research in Earth Sciences

Gale, Mr Stephen (University of Sydney). Title of Project: *The age and origin of the Botany Sands of southeast Australia*

Aeolian sands are common along the eastern seaboard of Australia. Although most form coastal dunes of interglacial age, aeolian activity may also have occurred under terrestrial conditions during the dry, cool, windy and continental environments of the last glacial. These cold-stage deposits are small, however, and largely restricted to the localised reworking of existing sand

bodies. Given this, the accumulation of aeolian sand in the Botany Basin presents us with a dilemma. The sands form a terrestrial dunefield, but dating is poor and little is known of the conditions under which deposition occurred. A single date is indicative of deposition during the penultimate glacial stage (MIS 6). This is succeeded by a handful of ages from the last glacial (MIS 3-2). Yet most of the dates on the Botany Sands are of Holocene age. Despite this, stratigraphic evidence suggests that much of this recent deposition is a consequence of small-scale disturbance and reworking of the sand sheet, and that the bulk of the sand accumulation took place under terrestrial conditions during low sea-level, glacial times. To clarify the timing and environment of its deposition, therefore, this project aims to date the earliest part of the Botany Sand body. Awarded \$1,600

Joyce W Vickery Fund for Research in Biological Sciences

Davis, Miss Kaytlyn (Macquarie University). Project title: *Investigating the utility of filter feeding organisms in the collection of environmental DNA.*

The use of meta-barcoding to sequence environmentally sourced DNA (eDNA) is an emerging tool that enables wildlife managers to obtain ecosystem-wide estimates of biodiversity. However, various limitations remain that limit the application of eDNA to challenging environments, such as wetlands with high concentrations of particulates in the water column. DNA degrades quickly in aquatic environments and large quantities of water may be required to be able to detect rare species, which may not be possible for water samples that clog filter membranes. While modified sampling and DNA extraction methods improve the ability to filter large quantities of challenging water samples, novel approaches using filter-feeding organisms may provide another means of collecting eDNA from the environment. In this study, we aim to determine whether oysters retain eDNA in their filter-feeding tissues or expel eDNA back into the environment. The outcomes of this project will help assess whether native filter-feeders could be used to deploy 'biological eDNA collectors' in challenging ecosystems and improve biodiversity estimates from water samples for these environments. Awarded \$1,000

Day, Mr Jeremy (University of Wollongong). Project title: *Food web characteristics of urchin barrens habitats; Who is in control?*

Worldwide, sea urchin populations and the algae limited 'urchin barrens' habitats they are associated with have become a topic of concern among researchers. In areas of Tasmania and New Zealand where urchin populations have grown in number or undergone range extensions with warming waters, barrens formation has been effectively mitigated by ensuring populations of the lobster *Jasus edwardsii* (Southern Rock Lobster), which eats urchins regularly. However, in NSW, where urchin barrens are widespread, no similar agent of control has been identified. Previously, the common NSW lobster species *Sagmariasus verreauxi* (Eastern Rock Lobster) has been assumed to similarly control sea urchin populations, though recent work indicates that *S. verreauxi* may eat urchins with moderate frequency by comparison with the Southern species. More work is now needed to thoroughly investigate the importance of urchins in the diet of *S. verreauxi*. While a range of other species including *Achoerodus viridis* (Blue Groper), *Pagrus auratus* (Australian Snapper) and *Heterodontus portusjacksonii* (Port Jackson Shark) are also recorded to eat sea urchins, the contribution of each species to the control of urchin populations is unknown. We now propose to determine the importance of sea urchins in the diets of these four predators through Stable Isotope Analysis, in-situ feeding trials and analysis of eDNA. This work will be a continuation of our previous research in 2019/2020, where the initial assessment of *S. verreauxi* as an urchin predator was undertaken. Awarded \$2,500 in memory of the late Surrey Jacobs.

Harris, Miss Rosalie (Australian National University). Project title: *Photosynthetic thermal tolerance of widespread temperate canopy-forming macroalgae*

Loss and decline of macroalgal forests is a global phenomenon due to climate change-induced warming and extreme events. Despite the implications of loss, relatively little is known about the mechanistic underpinnings and the physiological response of macroalgae to extreme warming. Indeed, to date there has been no common and comparable metric to allow comparison and prediction in macroalgal thermal tolerance research. My PhD will address this critical knowledge gap by applying new high through-put techniques adapted from terrestrial plant ecophysiology to improve understanding of photosynthetic thermal tolerance that will be fundamental to predicting dieback events. This will allow identification of vulnerable populations and will inform effective management of these forests into the future. Awarded \$1,800 in memory of the late Surrey Jacobs.

Liang, Miss Stephanie (University of Sydney). Project title: *How are egg-laying, live bearing, and a transitional form of pregnancy maintained in one Australian lizard species?*
Viviparity (live-birth) has independently evolved more times in squamate reptiles than any other vertebrate group. In a few rare instances (<10), within a species, individuals in some locations are oviparous (egg-laying) and others are viviparous (live-bearing) – termed bimodal reproduction. *Saiphos equalis* (three-toed skink) lives in south-eastern Australia and is unusual because it has three naturally occurring reproductive forms: oviparity with long egg-incubation, oviparity with short egg-incubation (thought to be ‘transitional’ between oviparity and viviparity) and viviparity. My previous research determined that there is strong population structuring between locations with different reproductive phenotypes. I will investigate how these phenotypic differences are maintained by high resolution sampling of lizards along a single transect in northern NSW spanning both oviparous and viviparous populations. This work will reveal the drivers of population differences to understand how multiple reproductive forms are maintained within the same species. Awarded \$1,500

O'Hare, Mrs Jessica (Macquarie University). Project title: *DNA Barcoding for molecular species identification of Western Australian and New South Wales scallops*
In both New South Wales and Western Australia, bivalve farmers (rock oyster, pearl oyster and mussel farms) have reported the natural settlement of wild scallops. The observed scallops are suspected to be the doughboy scallop (*Mimachlamys asperima*), however significant levels of morphological plasticity make it impossible to conclusively classify specimens to the species level using morphological characteristics alone. This research project will use DNA barcoding of the 16S gene to conclusively identify the species of scallops observed in Western Australia and New South Wales. We will also compare the genetic relationship between east and west coast specimens and determine whether there are major difference in haplotypes between locations. Through collaboration with taxonomic experts, the morphological characteristics of each identified species will be documented, with the shells of all specimens to be retained within museum collections. The second part of this project will generate publically accessible sequence data for the 16S gene (150 scallops) and CO1 gene (100 scallops), providing reference data to support future studies on species identification, biomonitoring and phylogenetic relationships in the Australian region and beyond. This will facilitate future eDNA biomonitoring studies. Shells will be retained in Museum collections. Awarded \$1,470

Smart, Miss Hannah (University of Western Sydney). Project title: *Bringing out the big guns: The defensive weaponry of Australian termite soldiers*
Animals have evolved a multitude of defence mechanisms, ranging from morphological adaptations to extreme chemical defences. In some of these extreme defences individuals forcibly eject a defensive substance at a potential predator, in what we refer to as a ballistic defence strategy. A well-known example of this type of defence can be seen in bombardier beetles that eject a hot, noxious chemical spray in response to predator contact. Morphological and chemical aspects of ballistic defences are relatively well-studied, but the behavioural components, such as under what circumstances their guns are used, are poorly understood. Australian snouted termites, *Nasutitermes*, (Termitidae: Nasutitermitinae) employ a ballistic

defence where they eject a noxious, glue-like substance at potential enemies from a specialised weapon on their head, known as a fontanellar gun, causing irritation and immobilisation. Common in NSW and ACT, *Nasutitermes exitiosus* provide an excellent model system to understand the conditions under which the soldier fire their guns. Using behavioural assays, we will subject soldiers to 5 treatments, measuring the termite's defensive response to a variety of tactile and visual stimuli. This project will provide crucial missing data to our understanding of this defence and build *Nasutitermes* into a model system for understanding ballistic defences. Awarded \$795 from the John Noble bequest.

Smith, Ms Tessa (University of Tasmania). Project title: *The biogeography of Tasmanian leaf-litter dwelling beetles*.

Despite their importance to global biodiversity, knowledge of beetle communities remains low. To understand the effects that environmental changes will have on diversity of beetles, we need to understand the spatial distribution of biodiversity of beetles, as well as the historical and ecological factors that control those patterns of distribution. The project aims are: to determine distributions of leaf-litter beetle dwelling species in Tasmania; to analyse the genetics of a select set of species and investigate historic processes on gene flow between different populations of beetles; to identify areas of high leaf-litter diversity and its relationship with presence of other taxa (mammals and plants) and location of current protected areas; to identify impacts of climate change on leaf-litter beetle habitats, through species distribution modelling. So far, 50 sites around mainland Tasmanian wet forests and rainforests have been sampled for leaf-litter beetles yielding over 10 000 beetles. I would like to add samples from the remnant wet forest and rainforest areas of Flinders Island in the Bass Strait. Flinders Island was connected to mainland Australia and Tasmania during periods of lower sea levels. Due to its unique position as a stepping stone between the Australian mainland and Tasmania, investigating the invertebrate fauna of Flinders Island will give a context to fauna that exists in both other areas. Awarded \$1,372 in memory of the late Surrey Jacobs.



REPORT FROM PAST RECIPIENT OF RESEARCH GRANTS

It is a condition of an award that the recipient reports the results to the Society. Some have had their works published and others are preparing papers for publication.

Jorge Rodriguez Monter (Australian Museum, Ph.D. student; 2019 Joyce W Vickery recipient). Title of project: *Biodiversity of intertidal marine flatworms (Polycladida, Platyhelminthes) in southeastern Australia*.

Marine flatworms of the Order Polycladida are a conspicuous component of Australia's marine fauna yet they have received little attention. Less than 30 scientific articles have been published on Australian marine flatworms since 1855, of which only nine include species from southeastern Australia. My research focuses on studying the biodiversity and distribution of species belonging to this group inhabiting intertidal rocky beaches in New South Wales and Victoria. The funds provided to me by the Joyce W Vickery Scientific Research Fund were employed to pay for sequencing of five genetic markers required to describe a total of 20 species, six of which are new to science (e.g., *Eulatocestus australis* sp. nov.), and a new genus (*Parabolia* gen. nov.), as well as two new records for Australia (e.g., *Stylochoplana clara* Kato, 1937), increasing our knowledge of this important component of the Australian marine biota. The results have been submitted for publication in *Zootaxa* in a monograph representing the first extensive study on southeastern Australian polyclad flatworms, including morphological and molecular data. I would like to express my deep gratitude to the Linnean Society of New South Wales for their generous support towards the completion of this project.



This is a portrait shot of the polycladid species *Thysanozoon brocchii* from Inverloch, Victoria.



NATURAL HISTORY SYMPOSIUM 2021 – UPDATE

As previously advised in Linn Soc News, this year's Symposium organized by the Society on the topic Natural History of the Northeastern Sydney Basin will take place on Wednesday October 27 and Thursday October 28 at the Hornsby RSL Club, close to Hornsby Station in northern Sydney. A full-day field excursion focusing on Ku-ring-gai National Park will be held on Friday October 29. Planning is well under way and the First Circular (which has been delayed while uncertainties remained on social distancing that affected booking of rooms and bus hire) will shortly be issued.

Please start planning presentations that you can contribute to this symposium. As in our previous symposia, we anticipate a mixture of talks by established scientists on their specialities, together with presentations by students giving details of their current research. Timing of the symposium is ideal for students coming to the end of their Honours or Masters thesis projects, and we look forward to hearing their results. We also very much welcome presentations from citizen scientists and members of local environmental organisations concerned with the preservation of the region's valuable natural heritage. Talks will be approximately 20 minutes each including questions (some keynotes will be allocated a longer timeslot).

NEED A TAX BREAK?

Donations to our scientific research funds are fully tax deductible

The Joyce W Vickery Scientific Research Fund

Is open to anyone engaged in research in natural history. Over eighty projects have been supported in the last five years.

The Betty Mayne Scientific Research Fund in Earth Sciences

Supports projects in geology and other earth sciences. Sixteen awards have been made in the last five years.

SO HELP YOURSELF AND A STRUGGLING RESEARCH STUDENT MAKE A DONATION TO A SCIENTIFIC RESEARCH FUND

To The Linnean Society of NSW
PO Box 291
Manly NSW 1655

I wish to make a donation of \$..... to the

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Please make all cheques payable to « LINNEAN SOCIETY OF NSW »

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If you pay through a bank, it is essential that you e-mail the Society at secretary@linneansocietynsw.org.au and tell us about your payment, otherwise we will receive the money and not know who paid it.

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LINN S C NEWS

NEWSLETTER No: 181

JUNE 2021

NEWSLETTER EDITOR	POSTAL ADDRESS
J C Herremans	PO Box 291
Secretary	Manly NSW 1655
Telephone: (02) 9977 8075	Mobile: 0490 542 524

EMAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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NEW MEMBERS: We welcome:

Mr Brian Everingham. Fields of interest: ecology, heritage, park management
 Mr Andrew Macqueen. Fields of interest: ecology, geology, hydrology, cultural history
 Mr Jonathan Sanders. Fields of interest: geology, fire ecology, animal ecology, botany
 Mr Simon Wild. Field of interest: natural history of the Blue Mountains



ARTICLES RECENTLY PUBLISHED in Volume 143, 2021

Timms, B. V. A new species of *Branchinella* (Crustacea: Anostraca: Thamnocephalidae) from Alice Springs, Australia.

All recent papers published in the *Proceedings* (from Vol. 133) are freely available from:
<http://ojs-prod.library.usyd.edu.au/index.php/LIN>

Earlier volumes are available from: www.biodiversitylibrary.org/bibliography/6525

Please check regularly the Society's home page for recently uploaded papers by going to "linneansocietynsw" then click "Journal (Proceedings)".

2021 LINNEAN SOCIETY OF NSW NATURAL HISTORY FIELD SYMPOSIUM



NATURAL HISTORY OF THE NORTHEASTERN SYDNEY BASIN

Wednesday October 27-Thursday October 28 (oral presentations),

Friday October 29 (field trip)

FIRST CIRCULAR (updated)

Scope

Over the past decade the Linnean Society of New South Wales has been active in organising field symposia highlighting aspects of natural history in the Port Macquarie area (2010), Royal National Park (2012), Jenolan Caves (2013), Belubula Valley (2015), Snowy Mountains (2017), the Warrumbungles (2018) and Blue Mountains National Park (2019). Focus of the 2021 field symposium will be on the Ku-ring-gai Chase National Park north of Sydney and surrounding regions in the Northeastern Sydney Basin, bounded to the north by the Hunter River, the coastline to the east, Sydney Harbour to the south, and extending west as far as the Putty Road on the boundary of Yengo National Park. Much of the area lies within the distinctive lower Triassic Hawkesbury Sandstone outcrop with its spectacular geomorphology and characteristic floral communities, contrasting with those developed on the underlying lower Triassic Narrabeen Group and upper Permian rocks in the Hunter Valley. On the Central Coast large coastal lakes provide important freshwater and brackish water habitats. Two days of scientific and general interest talks and presentations on current research into the geology and geodiversity, flora and fauna, and other aspects of the

natural history of this extensive region will be followed by a day-long field trip exploring aspects of Ku-ring-gai Chase National Park and surrounding areas.

Costs and logistics

Venue for the symposium sessions will be the Hornsby RSL Club (4 High Street, Hornsby), conveniently located within 5 minutes walk of Hornsby Railway Station, which provides a hub for Sydney suburban services with good connections to the Central Coast and Newcastle area. A variety of rooms are available at the club for conferences – currently we have booked one that holds 180 people in the expectation that this will cope well with any need for social distancing. Based on previous symposia we anticipate 100-120 persons will attend the talks.

The registration fee (details shown on the attached Registration Form) will cover the venue hire, morning and afternoon refreshments and a buffet lunch (vegan & gluten-free options available) each day at the RSL Club, and the Program/Abstracts/field guide booklet.

Presentations will commence each day at 9 am (registration) with talks between 9.30 am – 4.30 pm. The field trip fee will cover transport by bus and the National Park entry fee. Those participating on the field trip are to provide their own lunch, snacks and beverages. The bus will depart from the carpark adjacent to Hornsby RSL Club no later than 8.30 am and return there between 5 – 5.30 pm. Participants can register for any combination of the three-day sessions. However, bus seats are limited (max. 50) for the field trip, and preference will be given to those also registered to attend the preceding day sessions. Early registration for the field trip is recommended.

A special additional excursion for Symposium registrants is planned for Saturday October 30 along the Newcastle Coastal Geotrail (subject to availability of staff from the Geological Survey of NSW who have created this widely acclaimed tour). Details will be provided to registrants nearer to the time of the symposium. This excursion will be at no charge. Participants must arrange their own transport and food/drink.

Members of the Linnean Society of NSW will enjoy a modest discount on registration and field trip fees. Non-members are welcome to apply for membership of the Society to access these discounts. For details of membership categories and our low subscription rates, please refer to the website of the Linnean Society of NSW.

Cancellation policy: 50% refund will apply to cancellations notified up to and including September 30. No refunds will be given for cancellations notified in October. Should it be necessary for the Society to cancel the symposium due to COVID-19 restrictions, we will return all monies paid by participants, less any administration costs imposed by the venue or bus company.

Preliminary itinerary for field trip

The field trip commences at 8.30 am on October 29, and proceeds to West Head in Ku-ring-gai Chase National Park via Mona Vale Road. First stop will be at the lookout to view Pittwater, the entrance to Broken Bay, and the Palm Beach-Barrenjoey Headland tombolo. There will be a brief diversion to the interpretation centre near West Head. The second main stop will be at the head of the Elvina Track for a short walk to inspect a spectacular

exposure of prismatic sandstone, aboriginal carvings, and a heathland plant community. We will then travel to the Ku-ring-gai Wildflower Garden at St Ives to enjoy the bush walks (both long & short to suit individual mobility) and will have our lunch there in pleasant surroundings. Our next stop will be at Bobbin Head within Ku-ring-gai Chase National Park where we will take the Mangrove Boardwalk to examine this plant community and its associated brackish water biota. Depending on the remaining time we may briefly visit an Aboriginal carving site near Berowra, or we might proceed to Hornsby Quarry Park where a superb cross section through a diatrema of Jurassic age had been exposed by quarrying. It is very likely that access into the quarry void both by bus and on foot will not be possible., but we may be able to view the quarry face in the distance. Return to Hornsby RSL should be by 5.30-6 pm. Most stops will involve walking tracks of easy to moderately easy access.



View from West Head (first stop on the field excursion) across Pittwater to Palm Beach, a tombolo (sandy isthmus) tying the island forming Barrenjoey Headland to the Northern Beaches Peninsula.



Sandstone pavement adjacent to Elvina Track in Ku-ring-gai Chase National Park, displaying cross sections of prismatic columns (second stop on the field excursion).

Call for presentations

The Linnean Society of NSW invites anyone involved in research (be it formal scientific studies or citizen science) into, or an active interest in, any aspects of the natural history of the Northeastern Sydney Basin, to present their results at the Symposium. Focus will be

principally on the geology, botany and zoology of the region's national parks, conservation areas and other reserves, inlets (e.g. Broken Bay), Central Coast lakes, and sea cliff features in the area bounded by the coastline to the east, Sydney Harbour to the south, the Hunter River to the north, stretching beyond the western limit of Hornsby Shire (including Marramarra NP and Berowra Valley NP) with Yengo NP and the Putty Road as the western boundary. Aspects of planning and management related to environmental matters will also be covered. Considerable interest in the symposium has already been expressed by the Friends of Ku-ring-gai Environment (FOKE) who will present a themed session of talks on the outstanding natural heritage of the proposed Ku-ring-gai Georegion.

Each day will comprise 20-24 talks of 15-20 minutes duration on various scientific subjects relating to geology/ geomorphology, botany, zoology, anthropology and conservation science of the northeastern Sydney Basin. Invited keynote speakers will introduce these and other topics in 30 minute talks. Powerpoint facilities are available. Submissions from researchers, citizen scientists and students interested in presenting should be advised as soon as possible. In general, a maximum of one presentation per registered speaker is permitted, although additional talks may be considered if time permits. Decision to accept a presentation will be at the discretion of the convenors of the Symposium.

Abstracts

Please use the template included in this Circular and adhere to the instructions provided. Abstracts (including illustrations) are limited to a single page and will be included in the Program/Abstracts/Field Guide booklet distributed to registrants. **Abstracts are due by September 15, 2021.**

Publication of papers presented at the symposium

Papers presented at the symposium are invited to be submitted (though this is not mandatory) for publication in the *Proceedings of the Linnean Society of New South Wales*, subject to editorial standards and peer review. This journal, first published in 1874, is available online and is open access, and has no page charges (even for colour figures). A detailed set of Author Guidelines is available on the Linnean Society of NSW website. **Deadline for submission of manuscripts will be April 30, 2022** with publication likely in mid to late 2022. Accepted papers are published as soon as they are edited and proofed.

Contacts for further information: Linnean Society of NSW office:

secretary@linneansocietynsw.org.au or Mike Augee (symposium secretary & Editor):
fossil@well-com.net.au

REGISTRATION FORM

Name (please print):

E-Mail:

Phone number:

Affiliation or address:

Fee category (please circle): Full member of the Linnean Society of NSW /
Student member / Retired member / Non-member

Up to August 31, 2021**

After August 31, 2021

Fee Category	Scientific Session Oct 27	Scientific Session Oct 28	Field trip Oct 29		Scientific Session Oct 27	Scientific Session Oct 28	TOTAL
Students	\$50.00	\$50.00	\$25.00		\$55.00	\$55.00	
Retired, & Associate Members	\$60.00	\$60.00	\$30.00		\$70.00	\$70.00	
Full Members	\$70.00	\$70.00	\$35.00		\$80.00	\$80.00	
Non-members	\$100.00	\$100.00	\$50.00		\$110.00	\$110.00	

**registration fees must be received by this date to obtain Early Bird discount.

Please send completed registration form to

- i) secretary@linneansocietynsw.org.au as attachment (indicate date & method of payment), or mail to
- ii) Linnean Society of New South Wales, PO Box 291, MANLY NSW 1655.

Payments to be made by:

- 1) Bank transfer: St George Bank. Account name "Linnean Society of NSW" BSB 112-879, Account 466447867. **Please label payment 'NESB_yoursurname'**
- 2) Cheque made out to The Linnean Society of NSW, posted to the above address

Note that the Society does not have credit card facilities.

Participants must make their own travel and accommodation arrangements. **Please notify any special dietary requirements (e.g. vegetarian, gluten-free).**

Participants must provide their own lunch (& snacks & drinks) for the field trip on Friday, October 29.

Preference for the limited seats available on the field trip will given to those attending the Scientific Sessions.

ABSTRACT TEMPLATE

Title text in bold Times New Roman 14 pt left justified

Oscar Seniorauthor^{1,2}, *Lucinda Coauthor*¹ and *John J. Juniorauthor*³

¹ Affiliation 1

² Affiliation 2

³ Affiliation 3

Abstract text here (abstract is limited to one A4 page including any figures or photographs as JPEGs). Use 12pt Times New Roman font throughout for authors, affiliations and abstract text. Multiple line spacing at 1.15. Underline name of presenting author. Check spelling prior to submission.

Submit abstract to secretary@linneansocietynsw.org.au no later than **September 15, 2021**. At least one of the authors must be registered to attend the symposium. Decision to accept any abstract is entirely at the discretion of the convenors of the Symposium.



REPORT FROM PAST RECIPIENTS OF RESEARCH GRANTS

It is a condition of an award that the recipient reports the results to the Society. Some have had their works published and others are preparing papers for publication.

Jack Jones (Macquarie University), 2020 Betty Mayne recipient. Title of project: *Chronostrati-graphy of the lower Cambrian Fork Tree Limestone, South Australia*

Background: The Fork Tree Limestone is a lower Cambrian limestone/dolomite formation in South Australia and part of the Normanville Group in the eastern Stansbury Basin. Previous work published some fossil material, but the true diversity and stratigraphic ranges of taxa remained poorly resolved. No previous chemostratigraphy had been sampled from the Fork Tree Limestone. In total, 110 rocks were collected for stable isotope $\delta^{18}O$ and $\delta^{13}C$ sampling and fossil extraction, along a 415 m transect measured through the entire Fork Tree Limestone.

Results: Discovery and formal description of the new paterinate brachiopod taxon *Askepasma blysmochlidon* sp. nov.; 12 unique taxa identified, including the first and last appearance of the globally recognised fossil taxon *Sunnaginia imbricata* Missarzhesky 1969, allowing for the discrimination of the *Sunnaginia imbricata* biozone within the eastern Stansbury Basin and for the first time anywhere in Australia. Occurrence of the globally recognised positive $\delta^{13}C$ excursion known as the II event.

Discussion: Chemostratigraphic data presented in my research enabled high resolution regional correlation of the eastern Stansbury Basin with contemporaneous rock successions in the Arrowie Basin (Flinders Ranges) to the north. The biostratigraphy and chemostratigraphy presented in this research adds new links to formations around the world with robust chemostratigraphic signatures recording the same events. The *Sunnaginia imbricata* biozone has been constrained in other formations around the globe, so being able to define the first and last appearance of this cosmopolitan taxon further enhances international biostratigraphic correlation. Data and interpretations from this thesis will be published as two separate papers, and I will be continuing my studies at Macquarie University as a PhD student focusing on the chronostratigraphy and Cambrian ocean geochemistry of the western Stansbury Basin.

Jonathon Mifsud (Macquarie University), 2020 W Macleay Microbiology recipient. Project title: *Mining public plant transcriptomes to reveal a diverse plant virome.*

Summary: Plant viruses are near-ubiquitous across natural and managed ecosystems and are known to cause significant economic damage, influence host phenotypes and modulate host-insect and microbial interactions. Metagenomic surveys of plants have recently revealed the enormous diversity of

viruses they carry. Yet, this new knowledge has predominantly come from cultivated species - a small and bias subset of the plant kingdom. Next-generation sequencing technology has led to an explosion in open-source transcriptomic data which is an untapped resource for virus discovery. Here, we surveyed the transcriptomes of 1,053 plant species to quantify the diversity and abundance of plant viruses across 422 plant families and multiple functional groupings (i.e. dispersal syndromes, fruit types, growth forms, longevity classes, and woodiness types). In total, 3,673 plant virus transcripts were found in 415 plant species across the plant kingdom. Virome composition was associated with plant growth form and phylogenetic history. Notably, high virus abundance is associated with plants with a climbing habit while ancient plant lineages (algae, gymnosperms) had significantly lower virus diversity compared to more recently evolved groups, like the basal eudicots. We identified 29 potentially novel viruses including the discovery of several single-stranded RNA virus families (i.e. Benyviridae, Tymoviridae and Secoviridae) for the first time in lower plants or algae highlighting that non-cultivated plants likely harbour a multitude of viruses, of which the vast majority are undescribed. With the knowledge generated herein, we can begin to resolve long-held questions about the origins and diversification of plant viruses.

Kaytlyn S Davis (Macquarie University), 2020 Joyce W Vickery recipient. Title of project: *Assessing the potential of environmental (e)DNA in waterbird monitoring.*

Introduction: Biodiversity, a key component of ecosystem health, is being lost at an unprecedented rate and scale, in many cases before we have a thorough understanding of which species are being lost. Obtaining accurate and large-scale estimates of biodiversity is thus an essential step in assessing ecosystem health. Environmental (e)DNA metabarcoding is an emerging field that may revolutionise biodiversity assessments. eDNA provides a cost-effective and non-invasive means of assessing the diversity of entire ecosystems. Though challenges remain, eDNA can be used to monitor invasive, rare or cryptic species that may be difficult to sample manually and has even been used to study population-level genetics.

Monitoring waterbird biodiversity is a crucial aspect of wetland management because many waterbirds are important indicators of wetland health. In Australia, water resource development, pollution and climate change have drastically altered wetland flow regimes and have been linked with similar declines in waterbird numbers across inland Australia. Our preliminary assessment of waterbird representation in the widely-used genetic database GenBank found that of 89 south-east Australian waterbirds assessed: 10% were not in the database, 40% lacked sequence information for a previously tested avian eDNA genetic marker (12S), 28% had only partial 12S sequences, and 33% lacked sequence information for a commonly used phylogenetic marker (COX1). Furthermore, 9 waterbirds listed as threatened on the IUCN Red List lacked sufficient data on GenBank.

This project utilised funding by the Linnean Society of NSW to update public genetic databases for several Australian waterbird species found throughout NSW and south-eastern Australia, as well as refine and test primers to be used in an eDNA pilot study. Specifically, this project aimed to:

- 1) Identify waterbirds to add to public genetic databases (e.g. rare or cryptic species)
- 2) Extract DNA from tissue and/or feather samples for target waterbird species and add sequences to GenBank using an eDNA-appropriate marker (e.g. 12S)
- 3) Perform an in-silica PCR (polymerase chain reaction) – a bioinformatics approach used to determine the capacity of a chosen genetic marker to identify species

Database Assessment: An initial assessment of waterbird representation in public genetic databases was performed by searching GenBank (NCBI) records for 117 waterbirds occurring throughout south-eastern Australia. Species lacking sufficient sequence information were selected as potential candidates for the database update and were checked against the COX1 barcode database BOLD. Where possible, two replicate individuals were barcoded, to assist with assessing the accuracy of sequences and improve the reliability of the data in barcoding studies. Australian painted snipe (*Rostratula australis*), Australian white ibis (*Threskiornis molucca*) and Royal spoonbill (*Platalea regia*) were also targeted but did not pass PCR quality control.

LINN S C NEWS

NEWSLETTER No: 182

SEPTEMBER 2021

NEWSLETTER EDITOR

J C Herremans

Secretary

Telephone: (02) 9977 8075

POSTAL ADDRESS

PO Box 291

Manly NSW 1655

Mobile: 0490 542 524

EMAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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NEW MEMBERS: We welcome:

Mr Brian Everingham. Fields of interest: ecology, heritage, park management

Mr Andrew Macqueen. Fields of interest: ecology, geology, hydrology, cultural history

Mr Jonathan Sanders. Fields of interest: geology, fire ecology, animal ecology, botany

Mr Simon Wild. Field of interest: natural history of the Blue Mountains



ARTICLES RECENTLY PUBLISHED in Volume 143, 2021

Kobayashi, T., Hunter, S.J., Ralph, T.J., Maguire, J. and Wolfenden, B. Trophic conditions and planktonic processes of semi-arid floodplain lakes inundated with environmental flows.

Timms, B.V. A new species of *Branchinella* (Crustacea: Anostraca: Thamnocephalidae) from Alice Springs, Australia.

Wang, G.X., Percival, I.G., Zhen, Y.Y. and Webby, B.D. Late Ordovician corals from allochthonous clasts in the Devonian Drik-Drik Formation of northeastern New South Wales, Australia.

All recent papers published in the *Proceedings* (from Vol. 133) are freely available from:

<http://ojs-prod.library.usyd.edu.au/index.php/LIN>

Earlier volumes are available from: www.biodiversitylibrary.org/bibliography/6525

Please check regularly the Society's home page for recently uploaded papers by going to "linneansocietynsw" then click "Journal (Proceedings)".

2021 Natural History Symposium - Update

In view of the continuing Covid-19 pandemic in NSW, the Council of the Linnean Society has reluctantly decided to cancel the Natural History Symposium planned for late October this year. The extension of the lockdown in Greater Sydney to the end of September, with no certainty that the outbreak will be contained by then, means that intending registrants are understandably reticent about whether to proceed with booking, and preparing talks. Travel restrictions are also of concern as these are unpredictable and may impact intending participants and registrants from regional areas and interstate.

Much planning and preparation has gone into the organisation of the Symposium to ensure it will be as successful as those the Society has previously held, and there has already been considerable interest expressed by those wishing to participate. Our intention is therefore to reschedule the Symposium to September or October 2022 (exact dates are yet to be determined) to take advantage of the spring flowering of wildflowers then. The format of the 2022 Symposium will be identical to that now postponed, involving two days of talks, and a full day field excursion to Ku-ring-gai Chase NP (West Head and Bobbin Head areas), the Ku-ring-gai Wildflower garden and other localities. A potential silver lining of the postponement is that there may be an opportunity to visit the exposure of the Hornsby Diatreme which would not have been possible this year.



REPORT FROM PAST RECIPIENTS OF RESEARCH GRANTS

It is a condition of an award that the recipient reports the results to the Society. Some have had their works published and others are preparing papers for publication.

Nicole Lynch (University of Sydney) 2020 Joyce W Vickery Scientific Research Fund recipient.

Title of project: *Individuals matter: defining the ecological significance of behavioural differences among spotted-tailed quolls.*

In the early stages of the project, funds from the Joyce W. Vickery Fund contributed to my initial surveys of field sites in Western Sydney and lower Blue Mountains for spotted-tailed quolls. During this time, detectability of quolls became a major focus of the project. To survey for quolls, I used remote cameras with raw chicken as a lure. Preliminary results from 20 quoll visits found the presence of drainage lines near cameras to be important for detecting quolls. I also found most quoll visits occurred around eight days after the chicken was deployed. I have further analysis to conduct on the data. The next phase of my project will further investigate detectability and individual behavioural differences.

Sophie Preston (Curtin University) 2020 William McLeay Microbiology Research Fund recipient. Title of project: *Causes and consequences of growth anomalies affecting Isopora palifera at the Cocos Keeling Islands.*

Background

This project aimed to characterise the bacterial associations of growth anomaly (GA) affected *Isopora palifera* at the Cocos (Keeling) Islands as part of a wider project examining the putative outbreak at an integrated ecological and molecular level. In 2018, a putative outbreak of growth anomalies was observed to be affecting the scleractinian coral *Isopora palifera* at the Cocos (Keeling) Islands (CKI). Typically the result of environmental anomalies or high anthropogenic pressure, the occurrence of this disease was unusual, in that CKI supports a low-density population (~600 people) and its coral reefs have not been affected by recent abnormal environmental events. Furthermore, this is the first occurrence of this disease on this species globally. We undertook an integrated ecological and molecular approach to characterise this disease and its distribution across the atoll. Specific aims for the ecological project were to

quantify the distribution and abundance of GA affected corals across the atoll and confirm outbreak status. Secondly, we described the effects of this disease on the host by examining changes to the biological and reproductive functioning using histology and skeletal geochemistry.

Project results

Ecological surveys revealed an outbreak of GA's to be affecting one-third of the *I. palifera* population, present at 75% of sites surveys. Histological analyses revealed reduced biological and reproductive functioning, as reported in other GA studies. Skeletal geochemistry indicated a shift in the carbonate matrix, from dense aragonite to softer calcite, potentially the result of bacterial bioerosion. 16S rRNA gene metabarcoding indicated broad similarities in bacterial communities across all control, asymptomatic and diseased coral samples, opposing the currently held conception that growth anomalies are the result of dysbiosis (or an imbalance of bacterial communities). Rather we found that the bacterial associations of *I. palifera* were affected by environmental conditions as a result of spatio-temporal variability, supporting a similar finding in GA affected *Platygyra carnososa*. The bacterial associations of corals displayed a distinct microbiome to that found in the surrounding water column, and importantly there were no bacterial associations between potential sources of aquatic pollution (West Island Dump, West Island Outfall). The water samples displayed three groupings, potentially as a result of the fine scale environmental variation across the atoll. Significantly, these findings indicate that the outbreak of GAs at the Cocos (Keeling) Islands is not likely to be the result of a bacterial agent as previously thought, and future research should investigate the role of other microbial agents, such as fungi or marine viruses, as well as determining the mode of transmission across the coral reef.



SNIPPETS FROM THE PAST

From the Transactions of the Entomological Society of New South Wales, Volume 1, Part 1, 30th January, 1863; William MacLeay, Esq., President, in the Chair

PRESIDENTIAL ADDRESS

Gentlemen,

As the first stage in our history has now been reached, it may not be amiss that I should take the opportunity of saying a few words on the objects and prospects of the Society.

The advantages which the original promoters of the Institution anticipated were of a two-fold character. They wished to give all who were interested in the Science of Entomology opportunities of social intercourse; and they also wished to be the means of assisting in the publication of such Papers connected with the Science as might be deemed worthy of their sanction.

Viewing these as the main objects of the Society, I think I am justified in saying, that it has already been as successful as its most sanguine promoter could have desired. A number of gentlemen, previously unknown to each other, have been afforded opportunities of meeting together, which, without the intervention of the Society, would, perhaps, never have existed; an impetus has been given to collecting in a degree hitherto unknown in the Colony; and from the facilities given of communicating information, an unusual amount of observation has been concentrated on the history and habits of the Insect tribes.

During the few months of the Society's existence, six Papers have been read. Mr. Schrader's Paper on the Gall-making Coccidae of Australia was the first in point of date, and, perhaps, the first also as regards the interest and originality of the subject; since the knowledge which entomologists have as yet acquired of the Insects which produce Manna may be considered as very restricted. The Rev. Mr. King has contributed a most valuable Monograph on the Pselaphidae of New Holland. The Hon. A. W. Scott, Esq., has given us an interesting account

of the habits of an Ovoviviparous Moth of the genus *Tinea*. And I have read three Papers on Coleoptera, mostly descriptive of new species.

These Papers will be immediately published, and will, along with an abridged account of the proceedings of each Monthly Meeting, the Rules of the Society and the list Original Members, form Part I of Vol. I of the Transactions of the Entomological Society of New South Wales.

As regards the Monthly proceedings, I may observe, that the Members generally, have derived much pleasure and information from the ample collections of Insects exhibited at each Meeting, and it is to be hoped that a practice which adds so much to our knowledge of species and their habits will be continued; but the Council have, while entering these exhibitions in their minutes, not thought it necessary to mention them in their published proceedings, except in those instances where some specific information has been derivable from the exhibition. The mere mention of the exhibition of a fine collection conveys no information to the reader, nor is even the recital of a list of names of any value unless accompanied by a statement of some peculiarity of habit or structure.

The chief difficulty which the Entomologist has to encounter in this country, is the impossibility of ascertaining what has already been done with respect to the nomenclature and description of its Insect Fauna. Insolated [sic] descriptions of species are to be found in the Natural History Periodicals of almost every country in Europe, but few attempts have been made to consider the Australian Fauna as a whole. Boisduval's « Faune de l'Océanie » is, I believe, the latest work of the kind published, and it is of little use as a means of investigating species; the descriptions are short, and would for the most part apply to all species of the particular genus mentioned. To obviate such difficulties should be our first endeavour. Thus, before a Student can think of arranging objects of Natural History, he must be conversant with the structure and habits of these objects. Two books are quite sufficient to enable him to attain both of these objects. The first is Kirby and Spence's Introduction to Entomology, in four Volumes; the late editions of the two first volumes are useless to the Entomologist, the last two volumes of the complete work being those that give the general history of the Science, and what is still more useful, the Orismology, or definition of those technical terms which will enable the Student to make out the name of an Insect, and to describe his new species. The other book is « Cuvier's Règne Animal ». The French editions of which, are, of course, the best, but in the event of the Student not being familiar with the French language, there are plenty of English translations procurable. I would, therefore, I repeat, recommend Kirby and Spence for analysis; and for synthesis, I would recommend Cuvier, or rather Latreille, since it was the latter eminent Naturalist who wrote the volumes on Insects, which form so bright a part of the far-famed Animal Kingdom of Cuvier.



LINN S C NEWS

NEWSLETTER No: 183

DECEMBER 2021

NEWSLETTER EDITOR	POSTAL ADDRESS
J C Herremans Secretary Telephone: (02) 9977 8075	PO Box 291 Manly NSW 1655 Mobile: 0490 542 524

EMAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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NEW MEMBERS: We welcome:

Mr John Illingsworth - Fields of interest: geomorphology, vegetation

Dr John Martyn - Fields of interest: geology, Sydney Basin geology, flora



ARTICLE RECENTLY PUBLISHED in Volume 143, 2021

Baird, I.R. and Benson, D. Population ecology of two endemic, fire-sensitive, Blue Mountains *Banksia* taxa (Proteaceae) in response to fire.

This article completes volume 143, 2021.

All recent papers published in the *Proceedings* (from Vol. 133) are freely available from:

<http://ojs-prod.library.usyd.edu.au/index.php/LIN>

Earlier volumes are available from: www.biodiversitylibrary.org/bibliography/6525

Please check regularly the Society's home page for recently uploaded papers by going to "linneansocietynsw" then click "Journal (Proceedings)".



APPLICATIONS FOR GRANTS FROM THE SCIENTIFIC RESEARCH FUNDS

Application forms for all Research Funds may be obtained from the Society's Home Page
« <http://linneansocietynsw.org.au> »

Intending applicants: Please read instructions carefully.

§

WILLIAM MACLEAY MICROBIOLOGY SCIENTIFIC RESEARCH FUND

Grants are available from the William Macleay Microbiology Scientific Research Fund to support original research in an Australian context within the field of Microbiology.

Applications will be accepted from postgraduate and Honours degree students at recognised Australian Universities who are undertaking full-time or part-time studies with a microbiological emphasis.

Applications are also encouraged from amateur or professional microbiologists, whether in employment as such or not, who can demonstrate a level of achievement in original research in Microbiology.

In awarding grants, the Council of the Society will assess:

- a) Realistic costing and timetable
- b) The quality of the project
- c) The applicant's ability to carry it out
- d) The likelihood that successful completion of the research will lead to publication or other useful dissemination of research results.

The total amount of Fund money available for awards in any year will depend on interest income received by the Fund over the preceding year and thus the maximum per application may vary from year to year. The current limits are: \$2,000 for Members of the Linnean Society of New South Wales and \$1,200 for non-members. Successful awards may be less than the amount requested when quality applications exceed money available.

The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

Applications are not restricted to members, but other things being equal, members of the Society will be given preference.

The closing date for applications is March 1 in any year. In exceptional circumstances, emergency support may be available at another times. Please contact the secretary before submitting an application.

Applications should be made on the Fund's application form. Supporting documents should be added to the end and **the entire application should be submitted as a single PDF file.**

The application must include a short summary (up to 200 words) about the project, to be published in the LinnSoc News if the applicant is successful.

Any publication arising from work supported by the William Macleay Microbiology Scientific Research Fund should include an acknowledgement to that effect.

Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

An application form may be obtained from the website or from the Secretary of the Society.

The Council's decision in regard to the award or non-award of grants from the William Macleay Microbiology Scientific Research Fund is final, and no correspondence will be entered into.

Submit your signed application by email to: secretary@linneansocietynsw.org.au

§

BETTY MAYNE SCIENTIFIC RESEARCH FUND FOR EARTH SCIENCES

The Betty Mayne Scientific Research Fund for Earth Sciences provides financial assistance to support short term original research projects in all aspects of the earth sciences.

Applications will be accepted from postgraduate and honours students, amateur or professional geologists who can demonstrate a level of achievement in original research in Earth Sciences.

Projects proposed for support do not have to be restricted to Australian locations or specimens, but, given the Society's interests in the natural history of Australia, they must demonstrate a strong Australian context.

In awarding grants, the Council of the Society will assess:

- a) Realistic costing and timetable
- b) The quality of the project
- c) The applicant's ability to carry it out
- d) The likelihood that successful completion of the research will lead to publication or other useful dissemination of research results.

The total amount of Fund money available for awards in any year will depend on interest income received by the Fund over the preceding year and thus the maximum per application may vary from year to year. The current limits are: \$2,000 for Members of the Linnean Society of New South Wales and \$1,200 for non-members. Successful awards may be less than the amount requested when quality applications exceed money available.

The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

Applications are not restricted to members, but other things being equal, members of the Society will be given preference.

The closing date for applications is March 1 in any year. In exceptional circumstances, emergency support may be available at another times. Please contact the secretary before submitting an application.

Applications should be made on the Fund's application form. Supporting documents should be added to the end and **the entire application should be submitted as a single PDF file.**

The application must include a short summary (up to 200 words) about the project, to be published in the LinnSoc News if the applicant is successful.

Any publication arising from work supported by the Betty Mayne Scientific Research Fund for Earth Sciences should include an acknowledgement to that effect.

Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

An application form may be obtained from the website or from the Secretary of the Society.

The Council's decision in regard to the award or non-award of grants from the Betty Mayne Scientific Research Fund for Earth Sciences is final, and no correspondence will be entered into.

Submit your signed application by email to secretary@linneansocietynsw.org.au

JOYCE W VICKERY SCIENTIFIC RESEARCH FUND

Grants from the Joyce W. Vickery Scientific Research Fund are intended to support worthy research in those fields of the Biological Sciences that fall within the range of interests of the Society, especially natural history research within Australia.

Applications will be accepted from postgraduate and Honours degree students at recognised Australian Universities who are undertaking full-time or part-time studies with a biological emphasis.

Applications are also encouraged from amateur or professional biologists, whether in employment as such or not, who can demonstrate a level of achievement in original research in Biological Sciences.

In awarding grants, the Council of the Society will assess:

- a) Realistic costing and timetable
- b) The quality of the project
- c) The applicant's ability to carry it out
- d) The likelihood that successful completion of the research will lead to publication or other useful dissemination of research results.

The total amount of Fund money available for awards in any year will depend on interest income received by the Fund over the preceding year and thus the maximum per application may vary from year to year. The current limits are: \$2,000 for Members of the Linnean Society of New South Wales and \$1,200 for non-members. Successful awards may be less than the amount requested when quality applications exceed money available.

The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

Applications are not restricted to members, but other things being equal, members of the Society will be given preference.

The closing date for applications is March 1 in any year. In exceptional circumstances, emergency support may be available at another times. Please contact the secretary before submitting an application.

Applications should be made on the Fund's application form. Supporting documents should be added to the end and **the entire application should be submitted as a single PDF file.**

The application must include a short summary (up to 200 words) about the project, to be published in the LinnSoc News if the applicant is successful.

Any publication arising from work supported by the Joyce W. Vickery Scientific Research Fund should include an acknowledgement to that effect.

Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

An application form may be obtained from the website or from the Secretary of the Society.

The Council's decision in regard to the award or non-award of grants from the Joyce W Vickery Scientific Research Fund is final, and no correspondence will be entered into.

Submit your signed application by email to secretary@linneansocietynsw.org.au



RENEWAL OF MEMBERSHIP FOR 2022

Included with this issue of LinnSoc News (as a separate attachment) is your Renewal of Membership for 2022. Note that a discount is given if payment is received before March 31, 2022.

Due to Covid-19 restrictions, the society was unable to conduct its usual range of activities for Members. Next year, circumstances permitting, the Society is planning several activities, including scientific lectures and a field trip to Long Reef. Members will also enjoy discounted registration fees to the Natural History Symposium on the Northeast Sydney Basin which will take place later in 2022.

Linnean Society of New South Wales

Minutes of the 146th Annual General Meeting, held in the Charles Moore Room, Royal Botanic Gardens, Sydney on Wednesday, March 24, 2021 at 6:00pm

CHAIRPERSON: Dr Ian Percival

PRESENT: Sixteen members and friends (names recorded in the attendance book).

APOLOGIES: Dr Mike Augee FRZS, Prof. Anders Hallengren FLS

MINUTES:

The minutes of the one hundred and forty-five Annual General Meeting, held on, October 21, 2020 were distributed. It was moved (R. King) and seconded (J. Pickett) that the minutes as circulated be accepted as a true record. CARRIED.

TREASURER'S REPORT:

The Treasurer Dr Ian Percival presented the audited financial report for 2020 and distributed notes to accompany the 2020 balance sheets.

It was moved (I. Percival) and seconded (R. King) that the audited accounts for 2020 and the Treasurer's report be accepted. CARRIED.

R. King thanked the Treasurer, Ian Percival, for maintaining the Society's finances in a strong and healthy state of affairs.

CHAIRMAN'S REPORT:

The Chairman reported on the affairs of the Society for the year 2021. Special thanks were given to the Editor, Michael Augee, competently assisted by Cr Bruce Welch for managing the Society's *Proceedings* through all stages of production. On behalf of the Society, the Chairman expressed appreciation for the work done by all Council members over the past year. The Chairman extended thanks to the Royal Botanic Gardens and Trust for providing room for the AGM.

It was moved (R. King) and seconded (B. Welch) that the Chairman's report be accepted. CARRIED.

DECLARATION OF ELECTIONS:

Council

As the number of nominations for Council did not exceed the number of vacancies (six), no voting was necessary. Having received no other nominations for Council, the following five retiring Council members were declared by the Chairman re-elected to Council for three years: John Barkas, Hayley Bates, John Pickett, Helen Smith and Karen Wilson. Doug Benson and Peter Olde were formally elected to Council and Ian Hill has been accepted as Casual Councillor until next year's AGM.

President

There being no other nominations, the Council nominee, Dr Ian Percival was declared elected as President of the Society for 2021. CARRIED.

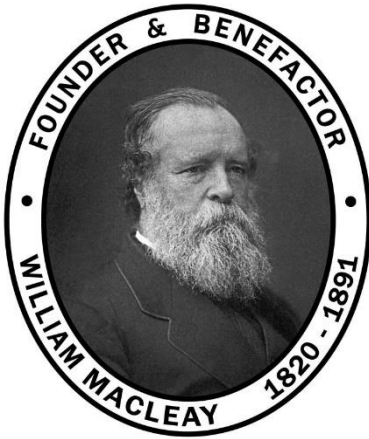
Auditor

There being no other nominations for auditors, it was moved (I. Percival, from the Chair) that the current firm, Phil Williams Carbonara, be retained for 2021. CARRIED.

A vote of appreciation from the audience was given to the President Dr Ian Percival for his leadership and his careful handling of the Society's funds (as Treasurer) during these very difficult times.

As there was no further business, Dr Ian Percival declared the meeting closed at 6:25pm.

Presidential Address. The Presidential Address for 2020 "***Mining, metals and the transition to a lower carbon future***" was delivered by the outgoing President Mr John Barkas.



THE LINNEAN SOCIETY OF NEW SOUTH WALES

Notice of 2022 Annual General Meeting

The 147th Annual General Meeting of the Society will be held at 6pm on 23 March 2021 in the Charles Moore Room in Anderson Building, Royal Botanic Gardens, Mrs Macquaries Road, Sydney.

Members and guests are invited to join the Council of the Society for wine and light refreshments from 5:30pm.

Six members of Council are due to retire at this AGM:

Daniel Bickel, Jean C Herremans, Robert King, Ian Hill, David Keith and Bruce Welch and offer themselves for re-election.

Council recommends the election of Dr Ian Percival as President of the Society for 2022.

Council recommends the election of Mr Ian Hill as Councillor of the Society.

Council recommends the reappointment of the current auditors, Phil Williams Carbonara.

Further nominations are invited for vacancies on Council (6), the office of President, and Auditor.

Nominees must be financial Ordinary Members (a category which includes Life Members) of the Society.

The nominations must be signed by at least two financial Ordinary Members of the Society and countersigned by the nominee in token of their willingness to accept such office.

Nominations must be received by the Secretary at PO Box 291, Manly NSW 1655 by 31 January 2022.

At the conclusion of the AGM, the President, Dr Ian Percival, will deliver the Presidential Address on:

Recent scientific research into the Ordovician System in Australia

Abstract

Rocks deposited during the Ordovician Period (486.9 to 443.1 million years ago) are widely distributed across Australia. In the western two-thirds of the present-day continent, Ordovician strata formed in predominantly shallow-water marine intracratonic rift basins, whereas in the eastern third, clastic sediments accumulated in deep-water marine settings, sometimes around volcanic islands with fringing limestones. In the Canning Basin of northern Western Australia, stratigraphic and petroleum exploration drilling has cored through a Tremadocian to Darriwilian carbonate and clastic succession over 1500 m thick. Conodonts from the carbonates have been extensively revised, underpinning a new biozonation constrained by radiometric ages from interspersed tuffaceous beds. These results are especially important in precisely dating the Floian–Dapingian interval. Dapingian conodonts from the Nambheet Formation in the Canning Basin closely resemble those described from the Horn Valley Siltstone in the Amadeus Basin of central Australia. Trilobites (including the largest genus known from Australia) have recently been documented from the overlying Stairway Sandstone and Stokes Siltstone in the Amadeus Basin. Ordovician research over the past decade has been most active in eastern Australia. Revision of graptolites from the classic Pacific Province in Victoria continues; there has also been renewed interest in documenting Ordovician graptolites from central and southern NSW. A detailed conodont biozonation spanning the late Tremadoc to early Sandbian has been established in deep-water cherts and siliceous siltstones from the Lachlan Orogen of central and southern NSW. The mid Katian record of corals from island-fringing carbonates of central NSW and the New England Orogen in northeast NSW has been substantially revised with updated identifications. Deeper water (Benthic Assemblage 4) lingulate brachiopods from the Lachlan Orogen of central NSW are now fully described, with several key taxa also known from allochthonous limestone in the Broken River Province of central north Queensland, associated with mid-Katian conodonts.

This talk will briefly review each of these discoveries and others made over the past decade. Fossil representatives of most major invertebrate phyla will feature, as well as early vertebrates and some of the most ancient microfloral remains known in the world. Something for everyone!

SNIPPET FROM THE PAST

ANNUAL GENERAL MEETING, WEDNESDAY, 31st JANUARY, 1883.

The President Dr. James C. Cox, F.L.S., in the Chair.

The President read the following address :

GENTLEMEN,—

In the annual address for 1881 I drew your attention to the unusually large and valuable donations and loans of books, eminently adapted to our pursuits, which the Society had received, and pointed out that this exceptional acquisition was due to the munificence of the Hon. W. Macleay. On the present occasion it again falls within my province to report the continuance by the same liberal donor of these favours to the amount of nearly £300. To the Vice-President and several others of our members, and to those foreign Societies with which we are in correspondence, we were likewise indebted for gifts of books, works of reference, journals and transactions, together presenting a marked and valuable addition to the shelves of our library. These volumes, combined with the previous copious and expensive collection of works, formed a compact library suitable and adequate to our present wants, and the members rejoiced in having at their command so valuable an auxiliary to study. I need not tell you, for you are already well aware of the sorrowful fact, that all our hopes have been disappointed, and that not a single volume of this prized collection now remains.

On the morning of the 22nd September last at a quarter to 5 o'clock I was roused from my sleep by the ringing of the large bell of the Garden Palace, and on looking out from the verandah to ascertain the cause of such an unusual disturbance, I at once perceived, to my amazement and horror, a small tongue of fire issuing from the side of the great dome, which you know was situated nearly in the centre of this spacious building, and under which the whole of our ill-fated volumes were arranged. This small tongue of flame, fanned by the wind, then blowing a gale from the westward, and fed by an abundant supply of dry and well-seasoned timber, of which the building was mainly constructed, rapidly enlarged into a huge, raging, and fiery furnace. So furious indeed was this mass of fire that I observed sheets of the corrugated galvanised iron being torn off the roofing and hurled aloft to a considerable height. Several of these, caught by the gale, were carried across the wide expanses of Elizabeth and Rushcutter Bays, while portions of others, passing over Darling Point, were even found at Glenyarrah, the grounds of the late Hon. S. D. Gordon. In less than three-quarters of an hour from the time I first saw the fire, the whole of the vast range (upwards of five acres) of the beautiful Exhibition Building and all its valuable contents were reduced to a heap of burning ashes, and thus perished within these few minutes every work on Natural History that we possessed, several hundred pounds worth of volumes of transactions, and every record of our meetings. Our pecuniary loss, irrespective of that portion which it will be difficult ever to replace, cannot be estimated at less than £3,000. Suffering under such a deplorable mishap it is soothing for us to feel that the sympathy incited by our misfortunes among our fellow labourers in science was universal and sincere, as testified by the many letters of condolence and offers of assistance which have already been received. It is a grateful task for me, as your President, to return thus publicly our hearty thanks to each and all for the kind and considerate feeling expressed for the great loss we have sustained. The President and Council of the Royal Society of New South Wales at once most liberally and thoughtfully placed at our disposal ample accommodation for the holding of our meetings, and for carrying on otherwise the business of the Society, until suitable arrangements could be made by us ; and the neighbouring Societies of Victoria, South Australia, Tasmania and New Zealand, have also greatly added to our obligations by their ready sympathy and earnest proposals of assistance.

LINN S C NEWS

NEWSLETTER No: 184

MARCH 2022

NEWSLETTER EDITOR	POSTAL ADDRESS
J C Herremans	PO Box 291
Secretary	Manly NSW 1655
Telephone: (02) 9977 8075	Mobile: 0490 542 524

EMAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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NEW MEMBERS: We welcome:

Ms Catherine E Bushell – Fields of interest: herpetology, conservation of data deficient skink species

Miss Vanessa P Gonçalves – Fields of interest: behaviour, ecology, cognition in spiders

Ms Kelsey Graham – Fields of interest: Australian ecology and conservation, herpetology

Ms Susan M Kerridge - Fields of interest: environmental science, biology, microbiology

Miss Tessa Manning – Fields of interest: ecology, animal behaviour, conservation genetics

Mr Joseph Schubert – Field of interest: spiders

Dr Megan L Williams – Fields of interest: geology, geochemistry, volcanology, mass extinctions

Ms Elisabeth M Williamson – Fields of interest: microbiology, metagenomics, entomology



The 147th Annual General Meeting was held at the Royal Botanic Gardens Sydney on Wednesday 16 March 2022 at 6:00pm. The President reported on the affairs of the Society for the preceding year and the Treasurer presented his report covering the finances of the Society for 2021 (see pages 6 and 7). Results of the elections for the Presidents, members of Council and auditor for 2022-23 were declared. Dr Ian Percival delivered his Address *“Recent scientific*

research into the Ordovician System in Australia". The 15 members and friends in attendance were treated to an extensive review of the geology and life of the Ordovician period.

The talk reviewed discoveries made over the past decade in an Australian context. Fossil representatives of most major invertebrate phyla featured, as well as early vertebrates (fish) and some of the most ancient microfloral remains known in the world.

The Presidential Address was recorded by Bruce Welch (the Society's webmaster) and is now available to Members who were unable to view the presentation in person via the following link: <https://youtu.be/HnCbKB57yZg>

The Vice-President, John Barkas, gave the Vote of Thanks to the President for his Address.

Abstract. - Rocks deposited during the Ordovician Period (486.9 to 443.1 million years ago) are widely distributed across Australia. In the western two-thirds of the present-day continent, Ordovician strata formed in predominantly shallow-water marine intracratonic rift basins, whereas in the eastern third, clastic sediments accumulated in deep-water marine settings, sometimes around volcanic islands with fringing limestones. In the Canning Basin of northern Western Australia, stratigraphic and petroleum exploration drilling has cored through a Tremadocian to Darriwilian carbonate and clastic succession over 1500 m thick. Conodonts from the carbonates have been extensively revised, underpinning a new biozonation constrained by radiometric ages from interspersed tuffaceous beds. These results are especially important in precisely dating the Floian–Dapingian interval. Dapingian conodonts from the Nambheet Formation in the Canning Basin closely resemble those described from the Horn Valley Siltstone in the Amadeus Basin of central Australia.

Trilobites (including the largest genus known from Australia) have recently been documented from the overlying Stairway Sandstone and Stokes Siltstone in the Amadeus Basin. Ordovician research over the past decade has been most active in eastern Australia. Revision of graptolites from the classic Pacific Province in Victoria continues; there has also been renewed interest in documenting Ordovician graptolites from central and southern NSW. A detailed conodont biozonation spanning the late Tremadoc to early Sandbian has been established in deep-water cherts and siliceous siltstones from the Lachlan Orogen of central and southern NSW. The mid Katian record of corals from island-fringing carbonates of central NSW and the New England Orogen in northeast NSW has been substantially revised with updated identifications. Deeper water (Benthic Assemblage 4) lingulate brachiopods from the Lachlan Orogen of central NSW are now fully described, with several key taxa also known from allochthonous limestone in the Broken River Province of central north Queensland, associated with mid-Katian conodonts.



Linnean Society of New South Wales
President's Report to Members on the Affairs of the Society
at its 147th Annual General Meeting, 16 March 2022

Though the current pandemic continued to limit the Society's operations over the past year, particularly impacting the Natural History Symposium that was scheduled for the end of October 2021. This has now been postponed to later this year. The office-bearers and members of Council have met on a regular basis (generally by Zoom). The Society has continued to publish the Proceedings, distributed our quarterly newsletter Linn Soc News to Members, and supported new and ongoing research projects with grants from the Joyce Vickery, Betty Mayne and Microbiology Research Funds.

Proceedings of the Linnean Society of New South Wales

Volume 143 of our Proceedings was published in 2021, continuing the Society's practice, since its inception, of producing a world-class journal of peer-reviewed scientific papers covering a

wide spectrum of natural history. Papers are published online progressively as they are accepted, with a complete volume available for download at the end of each calendar year. Volume 143 comprised five papers on diverse topics in zoology, botany and palaeontology, with a geographic spread including Australia and New Guinea. I wholeheartedly encourage Members to take a look at the Proceedings – links to view or freely download current and past volumes can be found on the Society’s website. The continuing high quality and standing of the Proceedings is due in large part to the efforts of the Editor, Mike Augée, who is supported in the review of submitted papers by the Editorial Committee of Council and in the production of the journal by Assistant Editor and Webmaster Bruce Welch.

Research Grants

In 2021, the Society received 13 applications for financial support of scientific research projects. Following evaluation and recommendations by the Research Committee of Council, we awarded seven grants totalling \$10,437 from the J W Vickery Scientific Research Fund, one grant of \$2,000 from the Macleay Microbiology Fund, and one grant of \$1,600 from the Betty Mayne Scientific Research Fund for Earth Sciences. Details of these awards were published in Issue 180 (April 2021) of *Linn Soc News*.

Donations to Research Funds

The Society extends its profound gratitude to the following benefactors who supported our sponsorship of natural history research with donations totalling \$6,825 to our Scientific Research Funds in 2021: Mr N. Anderson, Mrs M. Baker, Mr D. Benson, Prof J.A. Elix, Dr I. Endersby, Dr T. Grant, Dr L. Gunton, Miss R. Harris, Dr & Mrs Hatherly, Mr I. Hill, Ms J. Howell, Mr. McCormack, Dr and Mrs Medd, Dr A.O. Nicholls, Dr H. Ramsay, Mr W.S. Semple, Dr H.M. Smith, Dr S. Turner, Mrs K. Wilson, and two anonymous donors.

Membership

During 2021, we welcomed 11 new Members into the Society, including 3 students. The new Members are: Mr J.K. Day, Mr B. Everingham, Miss A.K. Fjeld, Mr J. Illingsworth, Mr A. D’A Macqueen, Mr J. Martyn, Mr J.M. Sanders, Ms J. Stewart, Mrs M. Street, Prof R. Street, Mr S. Wild. At 31 December 2021, the Society had a total membership of 146, comprising 38 Ordinary Members, 59 Ordinary Retired Members, 20 Students, 15 Honorary Members, and 14 Associate Members.

Council’s decision that a single one-year subscription fee to cover membership of the Society for the two calendar years 2020 and 2021 meant that members who had already paid for 2020 were not invoiced for 2021. We anticipate, with the continued removal of COVID-related restrictions on meetings and events that impacted our ability to hold regular lectures for Members, that we will return to a more normal schedule this current year.

Council

The current Council includes 15 members, six of whom (D. Bickel, J.C. Herremans, I. Hill, D. Keith, R. King, B. Welch) are being re-elected at tonight’s meeting. Members of Council serve in various “behind-the-scenes” roles that are essential to the continued achievement of the Society’s aims and objectives. For example, the eight members of the Research Committee are tasked with reviewing and assessing applications for grants from our Scientific Research Funds. I sincerely thank the current Vice Presidents John Barkas and Robert King and all my colleagues on Council for their support and guidance over the past year. I’m also grateful to the Society’s Secretary, Jean Claude Herremans, who is responsible for the day-to-day operations and administration of the Society, without which we would be unable to function. The Secretary also edits *Linn Soc News* and maintains our records. Several vacancies exist on Council and we are always seeking enthusiastic members who would like to join us in guiding the Society and promoting its values and interests. A Ph.D is not necessary but a commitment to Natural Science is. The time involved is quite minimal in most cases. Please contact anyone on Council if you are interested.

Finances

As Honorary Treasurer, I reported separately to this meeting on the Society's financial position. Maintaining the Society's ongoing viability through the current period of extremely low interest rates for our invested funds, which provide the overwhelming majority of income, has been very challenging. We are especially grateful for donations that help us offset the low returns on investments. Council may in the future investigate other forms of investments to see if these can maximise returns at an acceptable level of risk, in order to provide a greater pool of funds to disburse as research grants.

Concluding Comments

In all of its activities, the Society's continued success depends on the enthusiasm and commitment of its members. To all of you, I extend my thanks for your support and your forbearance during the recent restrictions on public gatherings. As you will be aware, the next Field Symposium will take place in the latter part of this year and will focus on the Natural History of the Northeastern Sydney Basin. Preliminary details have already been circulated and registration will open in the next month or two.

I. G. Percival

President

Linnean Society of New South Wales Treasurer's Report to accompany 2021 Audited Accounts

Although the Society continues on a relatively sound financial footing, our income stream derived from term deposits is in steep decline as interest rates are now less than one-tenth those we enjoyed a few years ago. This continues to impact our ability to rein in the operating deficit, which in 2021 was \$6930 (almost exactly double that for the previous year). Factors contributing to the increased deficit included a significant decrease in interest income, lower receipts from membership and subscriptions (due to the temporary halt authorised by Council), decreased copyright fees (most likely corresponding to the fact that universities were largely closed) and a decline in sales of the Royal National Park guidebook produced in 2013 (stocks of which are nearly exhausted). Our major expenses continue to be the modest salary of our part time secretary, and the annual audit fee. In regard to the latter I am pleased to report that our long-term auditors again did not increase the cost of the audit.

The fall in interest income significantly affects the ability of the Society's scientific research funds – the Joyce Vickery Fund, Betty Mayne Fund, and the William Macleay Microbiology Fund – to maintain their important financial support of basic scientific research undertaken mainly by undergraduate and post-graduate students. To counteract the loss of income that supports these grants, Council reaffirmed last year's resolution to increase the total amount available as grants to 75% (previously 50%) of the preceding year's income from interest. In 2021, grants dispersed from the Joyce Vickery Scientific Research Fund amounted to \$10,437 (including supplements from the JF Noble Bequest and the Surrey Jacobs Memorial award). \$2000 was awarded from the William Macleay Microbiology Fund. The Betty Mayne Scientific Research Fund for Earth Sciences disbursed \$1600 in 2021. The capital of these research funds was increased by tax-deductible donations, for which the Society is most grateful.

Later this year, as our term deposits mature, Council will be investigating whether other investment opportunities providing better returns (though potentially at higher risk) would be more suitable to increase the pool of funds available for grants.

Despite the disruptions to our normal meeting program due to the COVID-19 pandemic, the Society continues to support scientific research with a quality journal, significant grants to

assist students and retired researchers, and a well-attended biannual Natural History Symposium. In regard to the latter I draw your attention to our next symposium to be held in late 2022, which will focus on the geology, botany, zoology and ecology of the Northeastern Sydney Basin.

I thank the Secretary for his day-to-day handling of income and expenditure, and for providing me each month with accurate paperwork to facilitate my compilation of the accounts, and the Society's auditors for thoroughly checking all of the figures.

Ian Percival (Honorary Treasurer)

16th March, 2022



REPORT FROM RECIPIENT OF RESEARCH GRANTS

It is a condition of an award from the Scientific Research Grants that the recipient reports the results to the Society within 12 months of having received their funding.

Ms Tessa Smith (University of Tasmania), 2021 Joyce W Vickery Scientific Research Fund recipient. Project title: *Biogeography of Tasmanian leaf-litter beetles*.

For four days in February, I travelled with Lynne Forster (UTas) and my friend Pema to Flinders Island in the Furneaux Group, Tasmania to expand the collection localities for my PhD on the biogeography of Tasmanian leaf-litter beetles. My PhD project aims to identify patterns of diversity within Tasmania, compare phylogeographic patterns of several case-study litter taxa and model these patterns under future climates. I am undertaking the project at the University of Tasmania (UTas) with Prof Barry Brook, Prof Chris Johnson and Dr Nick Porch (Deakin). Flinders Island is the largest of the Furneaux Group of islands between Victoria and Tasmania (latitude -39 to -40) which during glacial periods formed a land bridge between the two larger landmasses across the Bass Strait. While areas of native vegetation have been cleared for agriculture, around half of the area consists of reserves, including the Strzelecki National Park. Previous entomological collecting on Flinders Island has been minimal, with the most recent notable events being a Bush Blitz in 2014. The insect collecting in this trip focused on Lepidoptera, Hemiptera, Odonata and some beetles (Carabidae and Chrysomelidae). As litter sifting was not a technique used on this Bush Blitz, there was an opportunity to add information on the taxa that can be collected with this method to the existing information about the biodiversity of Flinders Island.



Pharoichilus rugiceps beetle on rotting log near Sugarloaf West. Image and ID Lynne Forster. Image used with permission from Tessa Smith



Mt Strzelecki, looking south towards Mt Belstead, Image Tessa Smith. Image used with permission from Tessa Smith

This fieldtrip was predominantly funded by a grant from the Linnean Society of NSW, Joyce W Vickery Scientific Research Fund, to whom I am very grateful. Other funding came from the Centre of Excellence for Australian Biodiversity and Heritage (CABAH). We also appreciated the assistance from landholders Wendy and Alan Reid and Wayne Warren who allowed us to sample on their land, and the people of Flinders Island for all their assistance.



AWARDS FROM THE SCIENTIFIC RESEARCH FUNDS FOR 2022

The current very low interest rates limit funds available and your Society is unable to fund as many applications as it would like or to provide the full amount requested by the applicants. Decisions on where to make the cuts have been very difficult and regrettable.

William Macleay Fund for Microbiology Research

Ms Renske Jongen (Sydney University). Title of project: *Role of belowground microbes in ameliorating heat stress in seagrasses.*

Summary. - Across Australia, >275,000 ha of seagrass meadows and associated ecosystem services have been lost. Successful restoration requires detailed knowledge of the factors that foster recovery across a range of environmental conditions. To date, efforts to restore seagrass meadows have yielded limited success, possibly because they have focused solely on improving aboveground processes (e.g. water quality). In terrestrial systems, belowground microbes are known regulators of plant performance. I propose that knowledge of microbe-mediated belowground processes (i.e. plant-sediment feedbacks), is critical for enhancing seagrass restoration efforts. Importantly, the increasing frequency and intensity of marine heatwaves, puts serious stress on seagrasses. These stressors can influence belowground microbial communities, potentially affecting the relationship between these microbes and seagrass performance. So far, the few experimental studies on belowground microbial communities in seagrasses have focused on bacteria. Little is known about the role of seagrass-associated fungi, despite the widely accepted view that fungi have important beneficial effects on terrestrial plant fitness. This project will use an innovative, experimental approach to get a holistic understanding of heatwave-induced changes in belowground microbes in this unexplored ecosystem. Ultimately, this may lead to transformative restoration strategies. **Awarded \$1,000**

Miss Elisabeth Williamson (University of Tasmania). Title of project: *Acquisition & importance of gut bacteria in the Australian native bee, Megachile tosticauda.*

Summary. - Understanding the factors that influence bee health is increasingly important as we face a global decline in bee diversity and abundance. While the primary cause is habitat loss, another potential threat is exposure to agrochemicals, including antibiotics. Antibiotics used in cattle feed have been found on neighbouring flowers and wild bees, but how this might influence bee health is unknown. Gut bacteria are essential for the health and survival of social bees, such as honey bees, however more than 90% of bees are solitary, and despite contributing essential ecosystem services, the identity and source of their gut microbial communities is largely unknown. This project will focus on the gut microbiome (communities of microbes inhabiting the gut) of the widespread Australian native resin bee, *Megachile tosticauda*. Using state-of-the-art DNA tools, I aim to characterise the identity and acquisition of gut bacteria, both in the larval food and in the guts of adults and brood. This will provide novel information about the bee gut microbiome, and lay the foundation for the experimental assessment of the importance of the gut microbiome for bee development. The outcome may ultimately help improve bee conservation by identifying exogenous factors that may negatively influence these communities. **Awarded \$1,200**

Betty Mayne Fund for Scientific Research in Earth Sciences

Dr Megan L Williams (Wollongong University). Title of project: *The eruptive history of the Lord Howe Island Group: uncovering its mantle source.*

Summary. - The World Heritage listed Lord Howe Island (LHI), located in the South Pacific Ocean approximately 600km east of Australia, is part of a group of extinct basaltic intraplate volcanoes associated with the newly-identified submerged continent of Zealandia. Small-scale basaltic volcanoes such as these are of great scientific interest because they provide a wealth of information regarding the nature and complexities of the underlying mantle including enrichment and magma generation far from plate boundaries. This information is retained not only in the physical volcanology of the islands but also in the geochemistry of their rocks. The LHI Group, which includes Balls Pyramid and LHI itself, are ideally located for investigating these processes – the Group is located on the margin of Zealandia where the crust is thinner, and near the region of the South Pacific Ocean where the mantle reservoirs are believed to change type. Very few studies, however, have focussed on identifying their detailed physical volcanology or geochemistry. This project seeks to redress this lack of knowledge by undertaking targeted geochemical and petrologic examination of volcanic rocks on LHI and its subsidiaries combined with detailed geologic mapping. **Awarded \$1,000**

Joyce W Vickery Fund for Research in Biological Sciences

Miss Silvia Colombo (Melbourne University). Title of project: *Why do birds build domed nests? Evolutionary drivers and thermal consequences of nest architecture.*

Summary. - Bird nests are a fundamental structure for offspring survival. Building a structure that can protect progeny from harsh temperatures should be under strong selection. We, however, still ignore the extent to which nest architecture can help birds to cope with extreme climatic conditions, and how specific nest characteristics can affect its microclimate inside.

This project is focused on the evolutionary drivers and thermal consequences of nest shapes in Passerines. We will combine a broad comparative analysis with data from the field, to delve into which benefits domed nests provide in extreme environments, and whether changes in habitat have been followed by a transition in nest types. **Awarded \$1,000**

Miss Tessa Manning (University of Adelaide). Title of project: *Red-tailed phascogale (Phascogale calura). Reintroduction to South Australia: history, diet, habitat use and genetics.*

Summary. - Red-tailed phascogales (*Phascogale calura*) are near-threatened and have been extirpated from 99% of their original range. The species is extinct in South Australia, but two projects will reintroduce red-tailed phascogales to South Australian landscapes in the next two years. I aim to support these reintroductions with field-based and lab-based studies. I will investigate the species phylogeographic history by sampling museum specimens gathered from across their former range, and determine the diet of red-tailed phascogales using next-generation sequencing of their scats. I will conduct the first study of red-tailed phascogale breeding in the wild, aiming to understand factors that may affect reintroductions of semelparous species. I will learn about their habitat use under two different predator conditions and examine their vulnerability to predation. My results will contribute to best-practice reintroduction techniques by determining optimum habitat and key dietary items which will improve site selection for future reintroductions of red-tailed phascogales to Australian landscapes. Red-tailed phascogales will be reintroduced to Secret Rocks Nature Reserve on northern Eyre Peninsula, and to the Vulkathunha-Gammon Ranges National Park in the northern Flinders Ranges. Secret Rocks Nature Reserve is fenced and feral predator free. The Vulkathunha-Gammon Ranges National Park is protected by intensive baiting for feral predators. **Awarded \$1,400**

Mr Joseph Schubert (Sydney University). Title of project: *Integrative systematics of the Australian peacock spiders and their relatives.*

Summary. - The Australian Peacock Spiders and their relatives of the *Saitis* group (*Maratus*, *Prostheclina*, *Jotus*, and *Saitis*) represent a highly diverse and understudied lineage of iconic Australian jumping spiders. The tiny (~2-5mm), colourful males of this group perform elaborate courtship displays to attract potential mates, and their extreme sexual dimorphism suggests a key role of sexual selection in driving speciation. While some work on the phylogenomics of *Maratus* has been recently

conducted, the intra- and intergeneric phylogenetic relationships of its sister genera remain virtually unknown. Our understanding of the systematics of this group is in its infancy with approximately 90% of the species of this group having been described in the last decade and dozens of species remaining yet undescribed. Recently, an undescribed salticid of the *Saitis* group which possesses morphological characters diagnostic of both *Maratus* and *Jotus* was photographed in far-Northern Queensland, bringing its generic placement and the boundaries of these genera into question. Thus, this project aims to elucidate the relationships within and between genera of the *Saitis* group using integrative molecular and morphological data. It also aims to clarify the generic placement of and taxonomically describe the enigmatic undescribed species from far-Northern Queensland. **Awarded \$1,400**



LINN S C NEWS

NEWSLETTER No: 185

JUNE 2022

NEWSLETTER EDITOR

J C Herremans

Secretary

Telephone: (02) 9977 8075

POSTAL ADDRESS

PO Box 291

Manly NSW 1655

Mobile: 0490 542 524

EMAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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NEW MEMBERS: We welcome:

Mr Thomas H Bowden. Fields of interest: botany, marine zoology (sea sponges, algae), geology, natural history of South Australia

Mr Garry Jolley-Rogers. Fields of interest: zoology, phylogenetics, taxonomy, natural history, crustacean neuroanatomy.



REPORTS FROM RECIPIENTS OF RESEARCH GRANTS

It is a condition of an award from the Scientific Research Grants that the recipient reports the results to the Society within 12 months of having received their funding.

Mr Stephen Gale (University of Sydney), 2021 Betty Mayne Scientific Research Fund for Earth Sciences recipient. Project title: *The age and origin of the Botany Sands of southeast Australia*.

"I'm very pleased to let you know that I have just received the results of the dating work that the Society helped to fund last year. We put down two cores into the Botany Sands. One, at a site adjacent to Royal Randwick, gave an age of around 11,000 years; the other, from near Rose Bay, gave an age of around 47,000 years. These ages fit well with those from elsewhere across the basin and I've already begun compiling the dataset so I can write up the results. I apologise for the delay in contacting you about this, but covid restrictions meant, first, that development sites (amongst the few places where we can find exposures in the Basin) were either closed or allowing only restricted access and, secondly, that the dating labs stopped operating for most of the outbreak".

Mr Jeremy Day (University of Wollongong), recipient of the 2021 Joyce W Vickery Scientific Fund. Project title: *Food web characteristics of urchin barren habitats, who is in control?*

Maintaining robust food-web interpretations in non-lethal sampling of the lobster *Sagmariasus verreauxi*. Worldwide, rock lobsters are considered important predators that control sea urchins. However, it is not known whether the abundant Australian species, the eastern rock lobster (*Sagmariasus verreauxi*), occupies a similar role. Isotope analysis can be used to investigate lobster diet based on prey assimilation of nitrogen and carbon isotopes. However, since recent work has shown that tissues taken from the leg, antennae or abdomen of lobsters can give different indications of diet, work is now needed to determine whether different body parts and tissue types have different isotopic ratios or whether all body parts provide similar estimates, and can be used interchangeably. Understanding this is necessary to prevent erroneous conclusions about lobster food webs being drawn and may offer an opportunity to use novel, non-lethal sampling approaches to investigate diets since lobster appendages might be a suitable substitute for abdomen tissue, which is lethally obtained.

Our results show that *S. verreauxi* can now be sampled non-lethally via antennae or leg removal with mathematical corrections applied.



LINNEAN SOCIETY GRANTS

The first payment of grants was made in 1980. Since then, the Society, through its funds (Joyce W Vickery Scientific Research Fund, Betty Mayne Scientific Research Fund in Earth Sciences and W Macleay Microbiology Fund) has, between 1980 and 2022, disbursed \$335,337.24 to 568 students.



BOOK NEWS

“REBELS, SCHOLARS & EXPLORERS: WOMEN IN VERTEBRATE PALEONTOLOGY”

Annalisa BERTA, Professor Emerita at San Diego State University and former President of the Society of Vertebrate Paleontology and Susan TURNER, former DAAD Professor and Emeritus member SVP co-operated over three years to create a first definitive history of Women in Vertebrate Paleontology, published in October 2020 by the Johns Hopkins University Press, with supplementary material on their website. This book aims to encourage more girls and young women to enter a STEM career by offering strategies and hopeful stories from women through the last 200 years.

Although the number of women in vertebrate paleontology (VP) has increased in recent years, they remain underrepresented and change has been slow. This book looks at the work of more than 1,200 women in VP in four time periods: 18th–19th century, including pioneers such as Mary Anning and Carrie Barbour; late 19th–early 20th century, when the search for vertebrate fossils has spread out over the world and in Australia, we find just a few; a boost by mid-20th century with the founding of Society of Vertebrate Paleontology (SVP) in 1940; and late 20th century–present, with the number increasing by 70%.

The earliest women VPs (1700s–1850) studied fish and reptiles in near equal numbers. Beginning in the 19th century and continuing to the present women began studying fossil mammals. In terms of employment, the earliest women were primarily collectors and artists but a few gained academic and research positions as well as curatorship and palaeoart commissions (if not jobs) in museums throughout the early to mid-20th century. Our geographic data show that women were mainly European until 1940, when a larger proportion came from North America coinciding with a considerable increase from the former USSR (1917–1992). Beginning in the late 19th century and continuing into mid-20th century, women begin to work in Asia, Africa and South America; since 2000 there has been an increase in women from South America and a presence in Africa.

The book is listed on the Johns Hopkins website, and also available via Amazon, etc. e.g.

<https://www.press.jhu.edu/books/title/12098/rebels-scholars-explorers>

<https://muse.jhu.edu/book/77835>

<https://jhupbooks.press.jhu.edu/rebels-scholars-explorers-supplemental-materials>

2022 LINNEAN SOCIETY OF NSW NATURAL HISTORY FIELD SYMPOSIUM



NATURAL HISTORY OF THE NORTHEASTERN SYDNEY BASIN
Wednesday November 16-Thursday November 17 (oral presentations),
Friday November 18 (field trip)

FIRST CIRCULAR

Scope

Over the past decade the Linnean Society of New South Wales has been active in organising field symposia highlighting aspects of natural history in the Port Macquarie area (2010), Royal National Park (2012), Jenolan Caves (2013), Belubula Valley (2015), Snowy Mountains (2017), the Warrumbungles (2018) and Blue Mountains National Park (2019). Focus of the 2021 field symposium will be on the Ku-ring-gai Chase National Park north of Sydney and surrounding regions in the Northeastern Sydney Basin, bounded to the north by the Hunter River, the coastline to the east, Sydney Harbour to the south, and extending west as far as the Putty Road on the boundary of Yengo National Park. Much of the area lies within the distinctive lower Triassic Hawkesbury Sandstone outcrop with its spectacular geomorphology and characteristic floral communities, contrasting with those developed on the underlying lower Triassic Narrabeen Group and upper Permian rocks in the Hunter Valley. On the Central Coast large coastal lakes provide important freshwater and brackish water habitats. Two days of scientific and general interest talks and presentations on current research into the geology and geodiversity, flora and fauna, and other aspects of the natural history of this extensive region will be followed by a day-long field trip exploring aspects of Ku-ring-gai Chase National Park.

Costs and logistics

Venue for the symposium sessions will be the Hornsby RSL Club (4 High Street, Hornsby), conveniently located within 5 minutes walk of Hornsby Railway Station, which provides a hub for Sydney suburban services with good connections to the Central Coast and Newcastle area. A variety of rooms are available at the club for conferences – currently we have booked one that holds 180 people in the expectation that this will cope well with any need for social distancing. Based on previous symposia we anticipate 100-120 persons will attend the talks.

The registration fee (details shown on the attached Registration Form) will cover the venue hire, morning and afternoon refreshments and a buffet lunch (vegan & gluten-free options available) each day at the RSL Club, and the Program/Abstracts/field guide booklet. Presentations will commence each day at 9 am (registration) with talks between 9.30 am – 4.30 pm. The field trip fee will cover transport by bus and the National Park entry fee. Those participating on the field trip are to provide their own lunch, snacks and beverages. The bus will depart from the bus zone adjacent to the western side of Hornsby Station no later than 8.30 am and return there between 5 – 5.30 pm. Participants can register for any combination of the three-day sessions. However, bus seats are limited (max. 48) for the field trip, and preference will be given to those also registered to attend the preceding day sessions. Early registration for the field trip is recommended.

Members of the Linnean Society of NSW will enjoy a modest discount on registration and field trip fees. Non-members are welcome to apply for membership of the Society to access these discounts. For details of membership categories and our low subscription rates, please refer to the website of the Linnean Society of NSW.

Cancellation policy: 50% refund will apply to cancellations notified up to and including September 30. No refunds will be given for cancellations notified after that date. Should it be necessary for the Society to cancel the symposium due to COVID-19 restrictions (or any other unforeseen events), we will return all monies paid by participants, less any administration costs imposed by the venue or bus company.

Proposed itinerary for field trip

The field trip commences at Hornsby Railway Station (bus zone on west side, Station Street off Peats Ferry Rd) at 8.30 am on Friday November 18, and proceeds via Mona Vale Road, McCarrs Creek Road and West Head Rd to West Head in Ku-ring-gai Chase National Park. First stop will be at West Head lookout to view Pittwater, the entrance to Broken Bay, and the Palm Beach-Barrenjoey Headland tombolo. There will be a brief diversion to the interpretation centre near West Head. The second main stop will be at the head of the Elvina Track for a short walk to inspect a spectacular exposure of prismatic sandstone, aboriginal carvings, and a heathland plant community. We plan to arrive around 12.30 pm at the Ku-ring-gai Wildflower Garden, off Mona Vale Rd at North St Ives, for a picnic lunch (own arrangements) and a short bush walk. We then proceed through North Turrumurra along Bobbin Head Road to Bobbin Head. From the carpark we will walk along the Mangrove Boardwalk to examine that plant community and the associated brackish water biota on the rising tide. If possible the final stop of the day will be Hornsby Quarry Park just west of Hornsby where a superb cross-section through a diatrema of Jurassic age had been exposed by quarrying. Redevelopment of the old quarry site has been underway for more than a year but it is uncertain at this stage whether access (on foot) into the quarry void or to a suitable lookout will be possible, due to safety concerns. If access is not possible, then an

Aboriginal rock carving site at Mt Ku-ring-gai will be visited instead. Return to Hornsby Station by 5.30 pm. Transport will be by 48-seat luxury coach with seat belts (all passengers seated).



View from West Head (first stop on the field excursion) across Pittwater to Palm Beach, a tombolo (sandy isthmus) tying the island forming Barrenjoey Headland to the Northern Beaches Peninsula.



Sandstone pavement adjacent to Elvina Track in Ku-ring-gai Chase National Park, displaying cross sections of prismatic columns (second stop on the field excursion).

Call for presentations

The Linnean Society of NSW invites anyone involved in research (be it formal scientific studies or citizen science) into, or an active interest in, any aspects of the natural history of the Northeastern Sydney Basin, to present their results at the Symposium. Focus will be principally on the geology, botany and zoology of the region's national parks, conservation areas and other reserves, inlets (e.g. Broken Bay), Central Coast lakes, and sea cliff features in the area bounded by the coastline to the east, Sydney Harbour to the south, the Hunter River to the north, stretching beyond the western limit of Hornsby Shire (including Marramarra NP and Berowra Valley NP) with Yengo NP and the Putty Road as the western boundary. Aspects of planning and management related to environmental matters will also be covered. Considerable interest in the symposium has already been expressed by the Friends of Ku-ring-gai Environment (FOKE) and a themed session of talks on the outstanding natural heritage of Hornsby and Ku-ring-gai local government areas is scheduled.

Each day will comprise 20-24 talks of 15-20 minutes duration on various scientific subjects relating to geology/ geomorphology, botany, zoology, anthropology and conservation science of the

northeastern Sydney Basin. Invited keynote speakers will introduce these and other topics in 30 minute talks. Powerpoint facilities are available. Submissions from researchers, citizen scientists and students interested in presenting should be advised as soon as possible. In general, a maximum of one presentation per registered speaker is permitted, although additional talks may be considered if time permits. Decision to accept a presentation will be at the discretion of the convenors of the Symposium.

Abstracts

Please use the template included in this Circular and adhere to the instructions provided. Abstracts (including illustrations) are limited to a single page and will be included in the Program/Abstracts/Field Guide booklet distributed to registrants. **Abstracts are due by September 15, 2022.**

Publication of papers presented at the symposium

Papers presented at the symposium are invited to be submitted (though this is not mandatory) for publication in the *Proceedings of the Linnean Society of New South Wales*, subject to editorial standards and peer review. This journal, first published in 1874, is available online and is open access, and has no page charges (even for colour figures). A detailed set of Author Guidelines is available on the Linnean Society of NSW website. **Deadline for submission of manuscripts will be April 30, 2023** with publication likely in mid to late 2023. Accepted papers are published as soon as they are edited and proofed.

Contacts for further information

Linnean Society of NSW office: secretary@linneansocietynsw.org.au

[or Mike Augee \(symposium secretary & Editor\): fossil@well-com.net.au](mailto:fossil@well-com.net.au)



Cross section through diatreme of Jurassic age exposed in wall of the disused Hornsby quarry, currently being redeveloped by Hornsby Council as the centrepiece of the new Hornsby Park.

REGISTRATION FORM

Name (please print):

E-Mail:

Phone number:

Affiliation or address:

Fee category (please circle): Full member of the Linnean Society of NSW /
Student member / Retired member / Non-member

Up to August 31, 2022**

After August 31, 2022

Fee Category	Scientific Session Nov 16	Scientific Session Nov 17	Field trip Nov 18		Scientific Session Nov 16	Scientific Session Nov 17	TOTAL
Students	\$55.00	\$55.00	\$25.00		\$60.00	\$60.00	
Retired, & Associate Members	\$65.00	\$65.00	\$35.00		\$75.00	\$75.00	
Full Members	\$75.00	\$75.00	\$40.00		\$85.00	\$85.00	
Non-members	\$110.00	\$110.00	\$55.00		\$120.00	\$120.00	

**registration fees must be received by this date to obtain Early Bird discount.

Please send completed registration form to

- i) secretary@linneansocietynsw.org.au as attachment (indicate date & method of payment), or mail to
- ii) Linnean Society of New South Wales, PO Box 291, MANLY NSW 1655.

Payments to be made by:

- 1) Bank transfer: St George Bank. Account name "Linnean Society of NSW"
BSB 112-879, Account 466447867. **Please label payment 'NESB_yoursurname'**
- 2) Cheque made out to The Linnean Society of NSW, posted to the above address

Note that the Society does not have credit card facilities.

Participants must make their own travel and accommodation arrangements. **Please notify any special dietary requirements (e.g. vegetarian, gluten-free).**

Participants must provide their own lunch (& snacks & drinks) for the field trip on Friday, November 18.

ABSTRACT TEMPLATE**Title text in bold Times New Roman 14 pt left justified***Oscar Seniorauthor^{1,2}, Lucinda Coauthor¹ and John J. Juniorauthor³*¹ Affiliation 1² Affiliation 2³ Affiliation 3

Abstract text here (abstract is limited to one A4 page including any figures or photographs as JPEGs). Use 12pt Times New Roman font throughout for authors, affiliations and abstract text. Multiple line spacing at 1.15. Underline name of presenting author. Check spelling prior to submission.

Submit abstract to secretary@linneansocietynsw.org.au no later than **September 15, 2022**. At least one of the authors must be registered to attend the symposium. Decision to accept any abstract is entirely at the discretion of the convenors of the Symposium.



LINNEAN SOCIETY OF NEW SOUTH WALES

NEED A TAX BREAK?

Donations to our scientific research funds are fully tax deductible

The Joyce W Vickery Scientific Research Fund

Is open to anyone engaged in research in natural history. Over eighty projects have been supported in the last five years

The Betty Mayne Scientific Research Fund

Supports projects in geology and other earth sciences. Sixteen awards have been made in the last five years.

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Payment through a bank:

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BSB: 112879

ACCOUNT NUMBER: 466447867

If you pay through a bank, it is essential that you e-mail the Society at secretary@linneansocietynsw.org.au and tell us about your payment, otherwise we will receive the money and not know who paid it.

SEND RECEIPT TO:(Your email address)

NAME

ADDRESS

.....

LINN S C NEWS

NEWSLETTER No: 186

SEPTEMBER 2022

NEWSLETTER EDITOR

J C Herremans

Secretary

Telephone: (02) 9977 8075

POSTAL ADDRESS

PO Box 291

Manly NSW 1655

Mobile: 0490 542 524

EMAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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NEW MEMBERS: We welcome:

Ms Jennifer A Brown. Fields of interest: environmental conservation, history

Ms Roberta Conroy. Fields of interest: birds, wetlands, climate change, wetlands

Dr Graham Fulton. Field of interest: birds, ecology, history of Macleay family and museum

Mr Maxwell Hill. Fields of interest: geomorphology, botany, specifically Cox Basin

Mr Lachlan Hill. Fields of interest: marine biology, malacology, genetics

Ms Marita Macrae. Fields of interest: vegetation, invertebrates, birds

Ms Sally McInerney. Fields of interest: history, research

Dr Thomas Patterson. Fields of interest: evolution, comparative anatomy



LINNEAN MACLEAY FELLOWSHIP

Applications are invited for the Linnean Macleay Fellowship for the year 2023. Applicants must be Members of the Society, reside in New South Wales, and have a degree in Science or Agricultural Science from the University of Sydney. Applicants are required to outline the proposed research and where it will be carried out. The Fellowship pays \$3,200 per annum, and the Fellow must engage in full time research on the project. The regulations governing the Fellowship are available on request from the Secretary or the Society's web site. These regulations were stipulated in Sir William Macleay's will and the Society is obliged to adhere to them.

Applications close 15 November, 2022



2022 LINNEAN SOCIETY OF NSW NATURAL HISTORY FIELD SYMPOSIUM



NATURAL HISTORY OF THE NORTHEASTERN SYDNEY BASIN
Wednesday November 16-Thursday November 17 (oral presentations),
Friday November 18 (field trip)

FIRST CIRCULAR (updated)

Scope

Over the past decade the Linnean Society of New South Wales has been active in organising field symposia highlighting aspects of natural history in the Port Macquarie area (2010), Royal National Park (2012), Jenolan Caves (2013), Belubula Valley (2015), Snowy Mountains (2017), the Warrumbungles (2018) and Blue Mountains National Park (2019). Focus of the 2021 field symposium will be on the Ku-ring-gai Chase National Park north of Sydney and surrounding regions in the Northeastern Sydney Basin, bounded to the north by the Hunter River, the coastline to the east, Sydney Harbour to the south, and extending west as far as the Putty Road on the boundary of Yengo National Park. Much of the area lies within the distinctive lower Triassic Hawkesbury Sandstone outcrop with its spectacular geomorphology and characteristic floral communities, contrasting with those developed on the underlying lower Triassic Narrabeen Group and upper Permian rocks in the Hunter Valley. On the Central Coast large coastal lakes provide important freshwater and brackish water habitats. Two days of scientific and general interest talks and presentations on current research into the geology and geodiversity, flora and fauna, and other aspects of the natural history of this extensive region will be followed by a day-long field trip exploring aspects of Ku-ring-gai Chase National Park.

Costs and logistics

Venue for the symposium sessions will be the Hornsby RSL Club (4 High Street, Hornsby), conveniently located within 5 minutes walk of Hornsby Railway Station, which provides a hub for Sydney suburban services with good connections to the Central Coast and Newcastle area. A variety of rooms are available at the club for conferences – currently we have booked one that holds 180 people in the expectation that this will cope well with any need for social distancing. Based on previous symposia we anticipate 80-100 persons will attend the talks.

The registration fee (details shown on the attached Registration Form) will cover the venue hire, morning and afternoon refreshments and a buffet lunch (vegan & gluten-free options available) each day at the RSL Club, and the Program/Abstracts/field guide booklet. Presentations will commence each day at 9 am (registration) with talks between 9.30 am – 4.30 pm. The field trip fee will cover transport by bus and the National Park entry fee. Those participating on the field trip are to provide their own lunch, snacks and beverages. The bus will depart from the bus zone adjacent to the western side of Hornsby Station no later than 8.30 am and return there between 5 – 5.30 pm. Participants can register for any combination of the three-day sessions. Bus seats for the field trip are limited (max. 48), and preference will be given to those also registered to attend the preceding day sessions. Early registration for the field trip is recommended – as at 1st September, less than half the available places remain.

Members of the Linnean Society of NSW will enjoy a modest discount on registration and field trip fees. Non-members are welcome to apply for membership of the Society to access these discounts. For details of membership categories and our low subscription rates, please refer to the website of the Linnean Society of NSW.

Cancellation policy: 50% refund will apply to cancellations notified up to and including September 30. No refunds will be given for cancellations notified after that date. Should it be necessary for the Society to cancel the symposium due to COVID-19 restrictions (or any other unforeseen events), we will return all monies paid by participants, less any administration costs imposed by the venue or bus company.

Proposed itinerary for field trip

The field trip commences at Hornsby Railway Station (bus zone on west side, Station Street off Peats Ferry Rd) at 8.30 am on Friday November 18, and proceeds via Mona Vale Road, McCarrs Creek Road and West Head Rd to West Head in Ku-ring-gai Chase National Park. First stop will be at West Head lookout to view Pittwater, the entrance to Broken Bay, and the Palm Beach-Barrenjoey Headland tombolo. There will be a brief diversion to the interpretation centre near West Head. The second main stop will be at the head of the Elvina Track for a short walk to inspect a spectacular exposure of prismatic sandstone, aboriginal carvings, and a heathland plant community. We plan to arrive around 12.30 pm at the Ku-ring-gai Wildflower Garden, off Mona Vale Rd at North St Ives, for a picnic lunch (please supply your own food) and a short bush walk. We then proceed through North Turramurra along Bobbin Head Road to Bobbin Head. From the carpark we will walk along the Mangrove Boardwalk to examine that plant community and the associated brackish water biota on the rising tide. If possible the final stop of the day will be Hornsby Quarry Park just west of Hornsby where a superb cross-section through a diatrema of Jurassic age had been exposed by quarrying. Redevelopment of the old quarry site has been underway for more than a year but it is uncertain at this stage whether access (on foot) to a suitable lookout will be possible, due to safety concerns. If a visit to the quarry is not possible,

then an Aboriginal rock carving site at Mt Ku-ring-gai will be visited instead. Return to Hornsby Station by 5.30 pm. Transport will be by 48-seat luxury coach with seat belts (all passengers seated).



View from West Head (first stop on the field excursion) across Pittwater to Palm Beach, a tombolo (sandy isthmus) tying the island forming Barrenjoey Headland to the Northern Beaches Peninsula.



Sandstone pavement adjacent to Elvina Track in Ku-ring-gai Chase National Park, displaying cross sections of prismatic columns (second stop on the field excursion).

Call for presentations

The Linnean Society of NSW invites anyone involved in research (be it formal scientific studies or citizen science) into, or an active interest in, any aspects of the natural history of the Northeastern Sydney Basin, to present their results at the Symposium. Focus will be principally on the geology, botany and zoology of the region's national parks, conservation areas and other reserves, inlets (e.g. Broken Bay), Central Coast lakes, and sea cliff features in the area bounded by the coastline to the east, Sydney Harbour to the south, the Hunter River to the north, stretching beyond the western limit of Hornsby Shire (including Marramarra NP and Berowra Valley NP) with Yengo NP and the Putty Road as the western boundary. Aspects of planning and management related to environmental matters will also be covered. Considerable interest in the symposium has already been expressed by the Friends of Ku-ring-gai Environment (FOKE) and a themed session of talks on the outstanding natural heritage of Hornsby and Ku-ring-gai local government areas is scheduled.

Each day will comprise approximately 20 talks of 15-20 minutes duration on various scientific subjects relating to geology/ geomorphology, botany, zoology, anthropology and conservation science of the northeastern Sydney Basin. Invited keynote speakers will introduce these and other topics in 30 minute talks. Powerpoint facilities are available. Submissions from researchers, citizen scientists and students interested in presenting should be advised as soon as possible. In general, a maximum of one presentation per registered speaker is permitted, although additional talks may be considered if time permits. Decision to accept a presentation will be at the discretion of the convenors of the Symposium.

Abstracts

Please use the template included in this Circular and adhere to the instructions provided. Abstracts (including illustrations) are limited to a single page and will be included in the Program/Abstracts/Field Guide booklet distributed to registrants. **Abstracts are due by September 30, 2022.**

Publication of papers presented at the symposium

Papers presented at the symposium are invited to be submitted (though this is not mandatory) for publication in the *Proceedings of the Linnean Society of New South Wales*, subject to editorial standards and peer review. This journal, first published in 1874, is available online and is open access, and has no page charges (colour images and diagrams are free). A detailed set of Author Guidelines is available on the Linnean Society of NSW website. **Deadline for submission of manuscripts will be April 30, 2023** with publication likely in mid to late 2023. Accepted papers are published as soon as they are edited and proofed.

Contacts for further information

Linnean Society of NSW office: secretary@linneansocietynsw.org.au or Mike Augee (symposium Secretary and Editor): fossil@well-com.net.au



Cross section through diatreme of Jurassic age exposed in wall of the disused Hornsby quarry, currently being redeveloped by Hornsby Council as the centrepiece of the new Hornsby Park.

REGISTRATION FORM

Name (please print):

E-Mail:

Phone number:

Affiliation or address:

Fee category (please circle): Full member of the Linnean Society of NSW /
Student member / Retired member / Non-member

Up to September 30, 2022**

After September 30, 2022

Fee Category	Scientific Session Nov 16	Scientific Session Nov 17	Field trip Nov 18		Scientific Session Nov 16	Scientific Session Nov 17	TOTAL
Students	\$55.00	\$55.00	\$25.00		\$60.00	\$60.00	
Retired, & Associate Members	\$65.00	\$65.00	\$35.00		\$75.00	\$75.00	
Full Members	\$75.00	\$75.00	\$40.00		\$85.00	\$85.00	
Non-members	\$110.00	\$110.00	\$55.00		\$120.00	\$120.00	

**registration fees must be received by this date to obtain Early Bird discount.

Please send completed registration form to

- i) secretary@linneansocietynsw.org.au as attachment (indicate date & method of payment), or mail to
- ii) Linnean Society of New South Wales, PO Box 291, MANLY NSW 1655.

Payments to be made by:

- 1) Bank transfer: St George Bank. Account name "Linnean Society of NSW"
BSB 112-879, Account 466447867. **Please label payment 'NESB_yoursurname'**
- 2) Cheque made out to The Linnean Society of NSW, posted to the above address.

Note that the Society does not have credit card facilities.

Participants must make their own travel and accommodation arrangements. **Please notify any special dietary requirements (e.g. vegetarian, gluten-free).**

Participants must provide their own lunch (& snacks & drinks) for the field trip on Friday, November 18.

ABSTRACT TEMPLATE

Title text in bold Times New Roman 14 pt left justified

*Oscar Senior*author^{1,2}, *Lucinda Co*author¹ and *John J. Junior*author³

¹ Affiliation 1

² Affiliation 2

³ Affiliation 3

Abstract text here (abstract is limited to one A4 page including any figures or photographs as JPEGs). Use 12pt Times New Roman font throughout for authors, affiliations and abstract text. Multiple line spacing at 1.15. Underline name of presenting author. Check spelling prior to submission. Abstract text here (abstract is limited to one A4 page including any figures or photographs as JPEGs). Use 12pt Times New Roman font throughout for authors, affiliations and abstract text. Multiple line spacing at 1.15. Underline name of presenting author. Check spelling prior to submission.. Abstract text here (abstract is limited to one A4 page including any figures or photographs as JPEGs). Use 12pt Times New Roman font throughout for authors, affiliations and abstract text. Multiple line spacing at 1.15. Underline name of presenting author. Check spelling prior to submission. Abstract text here (abstract is limited to one A4 page including any figures or photographs as JPEGs). Use 12pt Times New Roman font throughout for authors, affiliations and abstract text. Multiple line spacing at 1.15. Underline name of presenting author. Check spelling prior to submission. Abstract text here (abstract is limited to one A4 page including any figures or photographs as JPEGs). Use 12pt Times New Roman font throughout for authors, affiliations and abstract text. Multiple line spacing at 1.15. Underline name of presenting author. Check spelling prior to submission. Abstract text here (abstract is limited to one A4 page including any figures or photographs as JPEGs). Use 12pt Times New Roman font throughout for authors, affiliations and abstract text. Multiple line spacing at 1.15. Underline name of presenting author. Check spelling prior to submission. Abstract text here (abstract is limited to one A4 page including any figures or photographs as JPEGs). Use 12pt Times New Roman font throughout for authors, affiliations and abstract text. Multiple line spacing at 1.15. Underline name of presenting author. Check spelling prior to submission. Abstract text here (abstract is limited to one A4 page including any figures or photographs as JPEGs). Use 12pt Times New Roman font throughout for authors, affiliations and abstract text. Multiple line spacing at 1.15. Underline name of presenting author. Check spelling prior to submission. Abstract text here (abstract is limited to one A4 page including any figures or photographs as JPEGs). Use 12pt Times New Roman font throughout for authors, affiliations and abstract text. Multiple line spacing at 1.15. Underline name of presenting author. Check spelling prior to submission.

Submit abstract to secretary@linneansocietynsw.org.au no later than **September 30, 2022**. At least one of the authors must be registered to attend the symposium. Decision to accept any abstract is entirely at the discretion of the convenors of the Symposium.



Public Meeting:

The Linnean Society of NSW has booked the Macquarie Room at the State Library of NSW on Wednesday 26th October 2022 at 6pm.



Speaker: Dr Peter Mitchell OAM

The title: Looking for Bennelong.

Abstract:

In the earliest years of the settlement of Warrane five Aboriginal people interacted intensively with three Britons and a cat in exploring one another's social values and the country they were beginning to share. The extraordinary life stories of Bennelong, Bungaree, Boorong, Phillip, Flinders, Bass and others are worthy of Shakespeare, but all are poorly known today and even their graves were lost or diminished with time. The grave site of Bennelong, Boorong and Nanbaree was identified in 2011, Flinders remains were found and relocated in 2019, and both Phillip and Flinders are well acknowledged with memorials. But memorials to the Aboriginal players are almost invisible. In this age of the Uluru Statement from the Heart, Dr Peter Mitchell will make a case for developing Bennelong's grave site as a symbol of reconciliation in the political process. The NSW Government funded site purchase, the Australian Government has yet to come to the party.

Please note that the Macquarie Room has a capacity of 50, so it is necessary for people wishing to attend the talk to book by email to:

secretary@linneansocietynsw.org.au

Once the capacity limit is reached, subsequent bookings will be placed on a wait list. Early booking is recommended.

**Wildlife at the Watering Hole is back !**

The Royal Zoological Society of NSW has, after a two- year absence, resumed its well-attended Wildlife at the Watering Hole talks which are held every 3rd Monday of the month at the Rose of Australia, 1 Swanston St, Erskineville. This month's talk will be on Monday 19 September from 6pm and the speaker will be Dr Pat Hutchings from the Australian Museum, who will enthrall us on the subject of «Taxonomy: the backbone of biodiversity and conservation research». Food and drinks can be purchased at the venue and enjoyed whilst listening to the talk. Future topics can be found at www.rzsnsw.org.au/events-information/wildlife-at-the-watering-hole

LINN S C NEWS

NEWSLETTER No: 187

DECEMBER 2022

NEWSLETTER EDITOR	POSTAL ADDRESS
J C Herremans Secretary Telephone: (02) 9977 8075	PO Box 291 Manly NSW 1655 Mobile: 0490 542 524

EMAIL: secretary@linneansocietynsw.org.au

WEB SITE: <http://linneansocietynsw.org.au>

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NEW MEMBERS: We welcome:

Ms. Ursula Bonzol; Mr. Richard Clezy; Mrs. Julia McLachlan; Mrs. Carolyn Murtagh;
Ms. Rachel Yeomans.



ARTICLES RECENTLY PUBLISHED IN VOLUME 144

R.J. Conroy, U.A. Bonzol, J.J. Illingsworth, J.E. Martyn, P.B. Mitchell, I.G. Percival, A.M. Robinson, D.F. Robson, and J.B. Walsh: *The Natural and Cultural History of the Ku-ring-gai GeoRegion, New South Wales*.

R.F. Warner: *An intimate history of leaderships: Sydney University's Department of Geography, 1921-1997*.

All recent papers published in the Proceedings (from vol. 133) are freely available from
<https://ojs-prod.library.usyd.edu/index.php/LIN>

Earlier volumes are available from: www.biodiversitylibrary.org/bibliography/6525

Please check regularly the Society's home page for recently uploaded papers by going to "linneansocietynsw" then click "Journal (Proceedings)".

OBITUARY – Mr John Walker

It is with regret that Council records the passing in early November, of one of its oldest continuous members, John Walker (Honorary Member), of Baulkham Hills NSW, who was elected in 1952. After completing Agricultural Science (Hons) at the University of Sydney in 1951, John spent his entire career working as a plant pathologist for the NSW Department of Agriculture. Even after his retirement in 1990, he remained highly active in his field. For more than half a century John identified specimens, provided advice, authored scientific publications, and established, managed, and protected nationally significant collections. He was a valuable colleague and mentor to those around him. He had a major impact and was a highly respected figure, both within Australia and internationally, in the field of taxonomic mycology.



Abstract of the talk “Looking for Bennelong” by Dr Peter Mitchell OAM

Held at the State Library on Wednesday 26 October 2022 at 6:00pm

In the earliest years of the settlement of Warrane five Aboriginal people interacted intensively with three Britons and a cat in exploring one another’s social values and the country they were beginning to share. The extraordinary life stories of Bennelong, Bungaree, Boorong, Phillip, Flinders, Bass and others are worthy of Shakespeare, but all are poorly known today and even their graves were lost or diminished with time. The grave site of Bennelong, Boorong and Nanbaree was identified in 2011, Flinders remains were found and relocated in 2019, and both Phillip and Flinders are well acknowledged with memorials. But memorials to the Aboriginal players are almost invisible. In this age of the Uluru Statement from the Heart, Dr Peter Mitchell will make a case for developing Bennelong’s grave site as a symbol of reconciliation in the political process. The NSW Government funded site purchase, the Australian Government has yet to come to the party.



2022 Linnean Society of NSW Natural History of the Northeastern Sydney Basin Symposium

The Linnean Society of NSW held its 2022 symposium on 17 November at the conference centre at Hornsby RSL, with 16 presentations given to an audience of 60 registrants. The field excursion on the following day (18 November) was held in perfect weather. 30 participants visited West Head and Bobbin Head areas in Ku-ring-gai Chase National Park, the Ku-ring-gai Wildflower Garden and an Aboriginal rock engraving site at Mt Ku-ring-gai. We appreciate the assistance of Clarke Bus Charters in providing comfortable transport and a very proficient driver on the day.

A 24-page booklet in full colour, containing abstracts of all presentations, together with a field guide to the excursion stops, is available for \$5 at future public lectures conducted by the Society, or can be ordered from the Secretary at \$5 + postage.



West Head, looking over Pittwater to Barranjoey Headland and the mouth of the Hawkesbury River. Dr John Pickett is explaining to field excursion participants, the significance of the Pleistocene Sea level rise that created this landscape. Photograph by David Barnes, 18th November, 2022.

APPLICATIONS FOR GRANTS FROM THE SCIENTIFIC RESEARCH FUNDS

Application forms for all Research Funds may be obtained from the Society's Home Page
« <http://linneansocietynsw.org.au> »

Intending applicants: Please read instructions carefully.

§

WILLIAM MACLEAY MICROBIOLOGY SCIENTIFIC RESEARCH FUND

Grants are available from the William Macleay Microbiology Scientific Research Fund to support original research in an Australian context within the field of Microbiology.

Applications will be accepted from postgraduate and Honours degree students at recognised Australian Universities who are undertaking full-time or part-time studies with a microbiological emphasis.

Applications are also encouraged from amateur or professional microbiologists, whether in employment as such or not, who can demonstrate a level of achievement in original research in Microbiology.

In awarding grants, the Council of the Society will assess:

- a) Realistic costing and timetable
- b) The quality of the project
- c) The applicant's ability to carry it out

d) The likelihood that successful completion of the research will lead to publication or other useful dissemination of research results.

The total amount of Fund money available for awards in any year will depend on interest income received by the Fund over the preceding year and thus the maximum per application may vary from year to year. The current limits are: \$2,000 for Members of the Linnean Society of New South Wales and \$1,200 for non-members. Successful awards may be less than the amount requested when quality applications exceed money available.

The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

Applications are not restricted to members, but other things being equal, members of the Society will be given preference.

The closing date for applications is March 1 in any year. In exceptional circumstances, emergency support may be available at another times. Please contact the secretary before submitting an application.

Applications should be made on the Fund's application form. Supporting documents should be added to the end and **the entire application should be submitted as a single PDF file.**

The application must include a short summary (up to 200 words) about the project, to be published in the LinnSoc News if the applicant is successful.

Any publication arising from work supported by the William Macleay Microbiology Scientific Research Fund should include an acknowledgement to that effect.

Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

An application form may be obtained from the website or from the Secretary of the Society.

The Council's decision regarding the award or non-award of grants from the William Macleay Microbiology Scientific Research Fund is final, and no correspondence will be entered into.

Submit your signed application by email to: secretary@linneansocietynsw.org.au

§

BETTY MAYNE SCIENTIFIC RESEARCH FUND FOR EARTH SCIENCES

The Betty Mayne Scientific Research Fund for Earth Sciences provides financial assistance to support short term original research projects in all aspects of the earth sciences.

Applications will be accepted from postgraduate and honours students, amateur or professional geologists who can demonstrate a level of achievement in original research in Earth Sciences.

Projects proposed for support do not have to be restricted to Australian locations or specimens, but, given the Society's interests in the natural history of Australia, they must demonstrate a strong Australian context.

In awarding grants, the Council of the Society will assess:

- a) Realistic costing and timetable
- b) The quality of the project
- c) The applicant's ability to carry it out
- d) The likelihood that successful completion of the research will lead to publication or other useful dissemination of research results.

The total amount of Fund money available for awards in any year will depend on interest income received by the Fund over the preceding year and thus the maximum per application may vary from year to year. The current limits are: \$2,000 for Members of the Linnean Society of New South Wales and \$1,200 for non-members. Successful awards may be less than the amount requested when quality applications exceed money available.

The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

Applications are not restricted to members, but other things being equal, members of the Society will be given preference.

The closing date for applications is March 1 in any year. In exceptional circumstances, emergency support may be available at another times. Please contact the secretary before applying.

Applications should be made on the Fund's application form. Supporting documents should be added to the end and **the entire application should be submitted as a single PDF file.**

The application must include a short summary (up to 200 words) about the project, to be published in the LinnSoc News if the applicant is successful.

Any publication arising from work supported by the Betty Mayne Scientific Research Fund for Earth Sciences should include an acknowledgement to that effect.

Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

An application form may be obtained from the website or from the Secretary of the Society.

The Council's decision regarding the award or non-award of grants from the Betty Mayne Scientific Research Fund for Earth Sciences is final, and no correspondence will be entered into.

Submit your signed application by email to secretary@linneansocietynsw.org.au

JOYCE W VICKERY SCIENTIFIC RESEARCH FUND

Grants from the Joyce W. Vickery Scientific Research Fund are intended to support worthy research in those fields of the Biological Sciences that fall within the range of interests of the Society, especially natural history research within Australia.

Applications will be accepted from postgraduate and Honours degree students at recognised Australian Universities who are undertaking full-time or part-time studies with a biological emphasis.

Applications are also encouraged from amateur or professional biologists, whether in employment as such or not, who can demonstrate a level of achievement in original research in Biological Sciences.

In awarding grants, the Council of the Society will assess:

- a) Realistic costing and timetable
- b) The quality of the project
- c) The applicant's ability to carry it out
- d) The likelihood that successful completion of the research will lead to publication or other useful dissemination of research results.

The total amount of Fund money available for awards in any year will depend on interest income received by the Fund over the preceding year and thus the maximum per application may vary from year to year. The current limits are: \$2,000 for Members of the Linnean Society of New South Wales and \$1,200 for non-members. Successful awards may be less than the amount requested when quality applications exceed money available.

The Society envisages that grants would normally be used for items such as travel within Australia, equipment, photographic and other expenses, but not for subsistence, travel to conferences, or thesis preparation.

Applications are not restricted to members, but other things being equal, members of the Society will be given preference.

The closing date for applications is March 1 in any year. In exceptional circumstances, emergency support may be available at another times. Please contact the secretary before applying.

Applications should be made on the Fund's application form. Supporting documents should be added to the end and **the entire application should be submitted as a single PDF file.**

The application must include a short summary (up to 200 words) about the project, to be published in the LinnSoc News if the applicant is successful.

Any publication arising from work supported by the Joyce W. Vickery Scientific Research Fund should include an acknowledgement to that effect.

Any type material generated by studies supported by these grants should be lodged in the collections of an appropriate scientific institution.

An application form may be obtained from the website or from the Secretary of the Society.

The Council's decision regarding the award or non-award of grants from the Joyce W Vickery Scientific Research Fund is final, and no correspondence will be entered into.

Submit your signed application by email to secretary@linneansocietynsw.org.au



Linnean Society of New South Wales

Minutes of the 147th Annual General Meeting, held in the Charles Moore Room, Royal Botanic Gardens Sydney on Wednesday, March 16, 2022 at 6:00pm

CHAIRPERSON: Dr Ian Percival

PRESENT: Fifteen members and friends (names recorded in the attendance book).

APOLOGIES: A/Prof Paul Adam, Dr Mike Augee, Dr Barbara Briggs, Prof. Anders Hallengren, Dr Helen Martin, Dr Peter Myerscough, Ms Janet Ryan

MINUTES:

The minutes of the one hundred and forty sixth Annual General Meeting, held on March 24, 2021 were distributed. It was moved (B. Welch) and seconded (R. King) that the minutes as circulated be accepted as a true record. CARRIED.

TREASURER'S REPORT:

The Treasurer presented the audited financial report for 2021 and distributed notes to accompany the 2021 balance sheets.

It was moved (I. Percival) and seconded (I. Hill) that the audited accounts for 2021 and the Treasurer's report be accepted. CARRIED.

CHAIRMAN'S REPORT:

The Chairman reported on the affairs of the Society for the year 2021. It was moved (R. King) and seconded (B. Welch) that the Chairman's report be accepted. CARRIED.

The Chairman expressed, on behalf of the Society, appreciation for the work done by all Council members.

The Chairman thanked the Editor, Michael Augee, expertly assisted by Cr Bruce Welch for managing the Society's Proceedings through all stages of production.

The Chairman expressed thanks to the Royal Botanic Gardens and Trust for providing facilities for the AGM.

DECLARATION OF ELECTIONS:

Council

As the number of nominations for Council did not exceed the number of vacancies (six), no voting was necessary. Having received no other nominations for Council, the following five retiring Council members were declared by the Chairman re-elected to Council for three years: Dan Bickel, Jean Claude Herremans, David Keith, Robert King and Bruce Welch; Ian Hill (previously filling a casual vacancy) was formally declared elected to Council.

President

There being no other nominations, the Council nominee, Dr Ian Percival was declared elected as President of the Society for 2022. CARRIED by acclamation.

Auditor

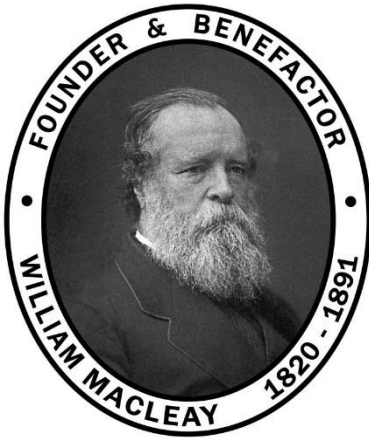
There being no other nominations for auditors, it was moved (I. Percival, from the Chair) that the current firm, Phil Williams Carbonara, be retained for 2022. CARRIED.

A vote of appreciation was moved from Robert King thanking the President Dr Ian Percival for his competence as President and his careful handling of the Society's funds as Treasurer during these very difficult times.

As there was no further business, Dr Ian Percival declared the meeting closed at 6:20pm.

Presidential Address. The Presidential Address for 2022 by Dr Ian Percival:

"Recent scientific research into the Ordovician System in Australia."



THE LINNEAN SOCIETY OF NEW SOUTH WALES

Notice of 2023 Annual General Meeting

The 148th Annual General Meeting of the Society, at which Council will report to Members on the affairs of the Society during 2022, will be held at 6pm on 22nd March 2023 in the Charles Moore Room in the Anderson Building, Royal Botanic Gardens, Mrs Macquaries Road, Sydney.

Members and guests are invited to join the Council of the Society for wine, juice, and light refreshments from 5:30pm.

Six members of Council are due to retire at this AGM: Hayley Bates, Doug Benson, Peter Olde, John Pickett, Helen Smith, and Karen Wilson and all offer themselves for re-election.

Council recommends the election of Karen Wilson as President of the Society for 2023.

Council recommends the reappointment of the current auditors, Phil Williams Carbonara.

Further nominations are invited for vacancies on Council (6), the office of President, and Auditor. Nominees must be financial Ordinary Members (which also includes Life Members and Retired Members) of the Society. The nominations must be signed by at least two financial Ordinary Members of the Society and countersigned by the nominee in token of their willingness to accept such office.

Nominations must be received by the Secretary at PO Box 291, Manly NSW 1655 by 31 January 2023.

Notice of Special General Meeting to be held immediately after the AGM

In order to change any of the Rules & By-Laws which govern the operation of the Society, a motion must be put to a Special General Meeting with at least 7 days' notice. If passed at that Special General Meeting, by a majority of $\frac{3}{4}$ of those present, the change will only come into effect once it has been ratified at a subsequent Special General Meeting and passed by a $\frac{3}{4}$ majority of Members present (Rules 31 & 34).

The Motions to be put to the Special General Meeting are as follows:

That the Rules of the Society concerning Council Meetings be amended by addition of the following clause:

20 (g). Council meetings may be held in person, or by electronic means where all attendees can be individually recognized by separate video or audio participation. Urgent Council business between Meetings may be conducted by email or other forms of electronic communication.

To regularise the electronic transfer of funds, the By-Laws need to be amended as follows:

5(b). Insert the words "or electronic transfer" after the word cheque.

LINN S C NEWS

NEWSLETTER No: 188

MARCH 2023

NEWSLETTER EDITORS	POSTAL ADDRESS
Bruce Welch (Secretary)	PO Box 291
Ian Percival (Treasurer)	Manly NSW 1655
Mobile: 0490 542 524	

EMAIL: secretary@linneansocietynsw.org.auWEB SITE: <http://linneansocietynsw.org.au>

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NEW MEMBERS: We welcome:

Mr Robert Fabian, Ms Beth Flaxman, Mr Junn Foon, Dr Diana Fusco, Ms Laurene Leclerc, Miss Shanaz Masani, Dr Juliette Tariel-Adam



The 148th Annual General Meeting was held at the Royal Botanic Gardens Sydney on Wednesday 22 March 2023 at 6:00pm. The President reported on the affairs of the Society for the preceding year and the Treasurer presented his Report covering the finances of the Society for 2022 (see pages 3 and 4). Results of the elections for the President, members of Council and auditor for 2023-24 were declared. Dr Ian Percival delivered his Presidential Address: "*Geoparks and related areas around the world, established for their natural and cultural attributes.*"



The 2023 Presidential Address "*Geoparks and related areas around the World, established for their natural and cultural attributes*" by Ian G. Percival, March 2023, is now available on YouTube.

If you were unable to attend the AGM or would like to watch this excellent lecture again, the link is: - <https://youtu.be/WG3nNPrqO8U>

The 2022 Presidential Address, also given by Ian Percival, on "*Recent scientific research into the Ordovician System in Australia*", is on YouTube at: - <https://youtu.be/HnCkKB57yZg>

Please "Subscribe" and "Like", as this will help to make our videos more widely seen.



**Linnean Society of New South Wales
President's Report to Members on the Affairs of the Society
given to its 148th Annual General Meeting, 22 March 2023**

Membership

During 2022, we welcomed 24 new Members into the Society, including 7 students. The new Members are: Mr T. Bowden, Ms J. A. Brown, Ms C. E. Bushell, Dr J. Byrnes, Mr R. Clezy, Ms R. Conroy, Dr G. R. Fulton, Miss V. P. Gonçalves, Ms K. Graham, Mr L. Hill, Mr M. Hill, Mr G. Jolley-Rogers, Mr S. Kaiser, Ms S. M. Kerridge, Ms M. Macrae, Miss T. Manning, Ms S. McInerney, Mrs J. McLachlan, Mrs C. Murtagh, Dr T. Patterson, Mr J. Schubert, Dr M.L. Williams, Ms E.M. Williamson, Mrs R. Yeomans. At 31 December 2022, the Society had a total membership of 126, comprising 32 Ordinary Members, 59 Ordinary Retired Members, 13 Students, 14 Honorary Members, and 8 Associate Members.

Obituaries

With regret, Council reports the loss of three of its members in 2022-2023.

Dr Donald S Horning, who passed away in May 2022, was twice President of the Linnean Society for 1991-1992. He also served as Vice-President of the Royal Zoological Society of NSW in 1991-1992 and was Curator of Invertebrates at the Macleay Museum from 1982-1994. His main interests were subantarctic islands, pseudoscorpions, tardigrades, and wine.

Mr John Walker, elected in 1952, passed away in November 2022. He spent his entire career as a plant pathologist for the NSW Department of Agriculture. He was an authority in the field of taxonomic mycology.

Dr Peter Valder OAM, elected in 1952, passed away in February 2023. Growing up on the family property "Nooroo" at Mt Wilson (which he retained and made into one of Australia's most famous gardens), Peter initially worked as a plant pathologist at NSW Department of Agriculture, before he joined Sydney University in 1962 as lecturer and then senior lecturer in botany and mycology; he retired in 1988 and wrote several books on wisterias and other plants. He was an Honorary Member of the Linnean Society of NSW.

Council

The office-bearers and members of Council have met on a regular basis (generally by Zoom). The current Council includes 15 members, six of whom (H. Bates, D. Benson, P. Olde, J. Pickett, H. Smith, K. Wilson) are being re-elected at tonight's meeting.

Members of Council serve in various "behind-the-scenes" roles that are essential to the continued achievement of the Society's aims and objectives. For example, the eight members of the Research Committee are tasked with reviewing and assessing applications for grants from our Scientific Research Funds. I sincerely thank the current Vice Presidents John Barkas and Robert King and all my colleagues on Council for their support and guidance over the past year.

I'm also very grateful to the Society's Secretary, Jean Claude Herremans, who is responsible for the day-to-day operations and administration of the Society, without which we would be unable to function. The Secretary also edits the Society's quarterly newsletter *Linn Soc News* and maintains our records. JC will be retiring from the Secretary's role at the end of this month, having first been appointed in May 2002. His time as Secretary (just shy of 21 years) slightly exceeds the tenure (1977-1997) of Barbara Stoddard and thus JC has been the second-longest serving secretary in the history of the Society. Congratulations JC!

Several vacancies exist on Council and we are always seeking enthusiastic members who would like to join us in guiding the Society and promoting its values and interests. A PhD is not necessary but a commitment to Natural Science is. The time involved is quite minimal in most cases. Please contact anyone on Council if you are interested.

Finances

As Honorary Treasurer, I reported separately to this meeting on the Society's financial position. Maintaining the Society's ongoing viability through the previous period of extremely low interest rates for our invested funds, which provide most of the income, has been very challenging. We are especially grateful for donations that help us offset the low returns on investments.

Donations to Research Funds

The Society extends its profound gratitude to the following benefactors who supported our sponsorship of natural history research with donations totalling \$3,380 to our Scientific Research Funds in 2022: Prof P. Adam, Dr J. Anderson, Mr D. Barnes, Dr H. Bates, Mr D. Benson, Mr D. Coleby, Mr I. Endersby, Ms E. Gower, Prof A. Hallengren, Mr G. Jolley-Rogers, Prof D. Keith, Prof R. King, Mr R. McCormack, Dr P. Mitchell, Dr R.A.L. Osborne, Dr J. Pickett, Prof L. Selwood, Dr H. Smith, A/Prof N. Tait, Dr S. Turner, Mrs K. Wilson, and two anonymous donors.

Research Grants

In 2022, the Society received 9 applications for financial support of scientific research projects. Following evaluation and recommendations by the Research Committee of Council, we awarded six grants totalling \$7,000. Three grants totalling \$3,800 from the Joyce Vickery Scientific Research Fund, two grants of \$1,000 and \$1,200 from the Macleay Microbiology Fund, and one grant of \$1,000 from the Betty Mayne Scientific Research Fund for Earth Sciences. Details of these awards were published in Issue 184 (March 2022) of *Linn Soc News*.

Proceedings of the Linnean Society of New South Wales

Volume 144 of our Proceedings was published in 2022, continuing the Society's practice, since its inception, of producing a world-class journal of peer-reviewed scientific papers covering a wide spectrum of natural history. Papers are published online progressively as they are accepted, with a complete volume available for download at the end of each calendar year. Volume 144 comprised eight papers on diverse topics in zoology, botany, and palaeontology, with a geographic spread including Australia and New Guinea. I wholeheartedly encourage Members to look at the Proceedings – links to view or freely download current and past volumes can be found on the Society's website. The continuing high quality and standing of the *Proceedings* is due in large part to the efforts of the Editor, Mike Augee, who is supported in the review of submitted papers by the Editorial Committee of Council and in the production of the journal by Assistant Editor and Webmaster Bruce Welch.

Symposium on the Natural History of the Northeastern Sydney Basin

The Symposium (originally scheduled for the end of October 2021 but deferred due to the pandemic) took place from 17-18 November 2022 with the first day of presentations at the Hornsby RSL Club enjoyed by 60 attendees. 16 speakers gave talks on a wide range of topics, from Fungi to Native Orchids, past vegetation patterns, history of the Hawkesbury River, and a video presentation on the Permo-Triassic extinction event and its record in the Sydney Basin. The afternoon session was devoted to presentations on the Ku-ring-gai GeoRegion, spanning the relationships among geology, soils, botany, fauna, and Aboriginal occupation; other talks assessed the potential of the region as an aspiring geopark with development of geotrails. Many of these presentations are now available to view on the Society's webpage.

The weather on Friday 18th November was perfect for the field trip, with 30 participants visiting West Head and Bobbin Head areas in Ku-ring-gai Chase National Park, the Ku-ring-gai Wildflower Garden and an Aboriginal rock engraving site at Mt Ku-ring-gai. The Symposium almost broke even, 6 new members joined the Society, \$170 of Royal National Park guidebooks were sold on the day, and the value of positive publicity generated was incalculable. It was an undoubted success, and preliminary planning has commenced for our next Symposium tentatively scheduled for late 2024.

Concluding Comments

In all its activities, the Society's continued success depends on the enthusiasm and commitment of its members. To all of you, I extend my thanks for your support.

I. G. Percival, President



**Linnean Society of New South Wales
Treasurer's Report to accompany 2022 Audited Accounts**

I am pleased to report that the Society continues on a relatively sound financial footing, benefitting in part from the recent rise in interest rates. Our operating deficit for the year was just over \$8037, an increase in that for 2021 (\$6930). Factors contributing to the increased deficit included a significant decrease in surplus income transferred from the Fellowships account (due to the very low interest rates prevailing in 2021), and an increase in insurance premiums. These outgoings were offset by higher receipts from membership and subscriptions (after suspension of the temporary halt authorised by Council in 2021 due to the Covid-19 pandemic) and profit on the sale of the revised edition of the Field Guide to the Royal National Park. The Symposium on the Natural History of the Northeastern Sydney Basin incurred a small loss of \$110 (on revenue of over \$6000), but this was entirely acceptable as such symposia are not run for profit but for educational purposes, and members of the Society are entitled to a discount on registration and field trip fees. Our major expenses continue to be the modest stipend of our part time secretary (who is retiring at this meeting), and the annual audit fee. In regard to the latter I note that our long-term auditors (Phil Williams Carbonara) again kept the cost of the audit at the previous year's fee. The audited accounts for 2022 are available at this Annual General Meeting and will be distributed in the Society's quarterly newsletter.

The increase in interest income directly affects the ability of the Society's scientific research funds – the Joyce Vickery Fund, Betty Mayne Fund, and the William Macleay Microbiology Fund – to maintain their important financial support of basic scientific research undertaken mainly by undergraduate and post-graduate students. For 2022 Council reaffirmed the previous year's resolution to increase the total amount available as grants to 75% (previously 50%) of the preceding year's income from interest. In 2022, grants from the Joyce Vickery Scientific Research Fund amounted to \$3800 (including a supplement from the JF Noble Bequest). \$2200 was awarded from the William Macleay Microbiology Fund. The Betty Mayne Scientific Research Fund for Earth Sciences disbursed \$1000 in 2022. The capital of these research funds was increased by tax-deductible donations (\$2980 to the Joyce Vickery Fund and \$400 to the Betty Mayne Fund), for which the Society is most grateful.

A significant amount of time over the past year has gone into revision of the Society's Rules and By-laws in order to register the Society as a charity under the provisions of the Australian Charities and Not-for-profits Commission. This will in turn confirm our long-standing Deductible Gift status with the Australian Taxation Office for donations to our Scientific Research Funds. The culmination of this effort will take place with ratification of the revised (and now compliant) Rules and By-Laws at the Special General Meetings of the Society.

I thank the Secretary for his day-to-day handling of income and expenditure, and for providing me each month with accurate paperwork to facilitate my compilation of the accounts, and the Society's auditors for thoroughly checking all of the figures.

Ian Percival (*Honorary Treasurer*)

22nd March, 2023



AWARDS FROM THE SCIENTIFIC RESEARCH FUNDS FOR 2023

Applications are assessed by a Committee of specialists whose qualifications are approved by CSIRO. Awards are made on assessment of the merits of the research project and the quality of the application, which must strictly accord with the rules for each award. In particular, we are unable to fund requests for subsistence (which includes accommodation and food). The Society derives the amount of money available for disbursement to successful applicants from a substantial proportion of interest income received the previous year from term deposits. As rates increase more funding should be available, but grants may vary in size depending also on the number of applications. For 2022, interest income for half the year was reliant on lower interest rates before these rolled over to higher rates. A higher maximum award limit is available to members of the Society. The Society was unable to fund as many applications as it would like or to provide the full amount requested by successful

applicants. Decisions on where to make the cuts have been very difficult and we wish to make it clear that any shortfall from the amount requested does not reflect negatively on the applications.

William Macleay Fund for Microbiology Research

Dr Laurene Leclerc (Sydney University). Title of project: *Gene transfer from bacterial symbionts to their tick hosts*

Summary: - Ticks are among the most important vectors for bacterial, viral and protozoan pathogens, affecting over half a million people globally. While tick-borne diseases are well described in Europe and North America, there remains a large knowledge gap in the Australian context. Lateral gene transfer (LGT) is the movement of genetic material between organisms that does not result from sexual reproduction. LGT has been observed between many prokaryotic symbionts and their eukaryotic hosts, transferring diverse new functions including immunity, courtship behaviour, metabolism, nutrition, adaptation to extreme environments, growth and development. Only one LGT event has been described from a bacterial symbiont to its tick host. However, preliminary analyses have shown that LGT events are abundant in tick genomes. Describing LGT events in ticks will additionally lead to a better understanding of tick biology and their ability to transmit diseases, potentially leading to new tick and tick-borne disease control mechanisms. This study therefore aims to identify and determine the function of LGT events from bacterial symbionts to the genomes of 15 tick species. **Awarded \$1,200**

Miss Pamela Tsoumbris (Macquarie University). Title of project: *Proteomic profile of L-form bacteria from various environments*

Summary: - Bacteria live in numerous complex environments, inhabiting various niches and microenvironments. The complexity of these environments are made more so by the various stages of growth and existence bacteria undergo (i.e. exponential growth, stationary phase and biofilm formation), as well as their co-existence with bacteriophage (phage). In particular, bacteria have been observed to lose their cell-wall, resulting in an L-form state of existence. This metabolically decreased state is observed in many clinical infections but has not been widely described in environmental samples. This project will collect various environmental samples and assess the proteomic profiles of isolated bacteria both with and without phage infection to determine differentially regulated pathways. **Awarded \$900**

Betty Mayne Fund for Scientific Research in Earth Sciences

Dr Diana Fusco (Flinders University). Title of Project: *Using the fossil record to understand how Australian mammal assemblages respond to environmental change.*

Summary: - Tracking faunal assemblages through the Quaternary provides insight into how animal communities responded to fluctuating climatic cycles. Cathedral Cave is a fossil bearing site in the historically, culturally, and scientifically significant Wellington Caves in NSW. The cave contains Australia's most diverse Pleistocene aged fossil mammal assemblage with unparalleled temporal resolution. We use assemblage turnover, biodiversity metrics and taxon specific relative abundances to characterise how this mammal assemblage was shaped by its environment. Ongoing excavations in the cave have already provided a chronology and unique faunal record that spans the last 70,000 years. This includes the poorly understood cold and dry period that was Marine Isotope Stage (MIS) 4. This earlier work is the subject of a publication in an advanced stage of preparation, aimed at a high-impact journal. I am applying for funding from the Linnean Society of NSW to support a fieldtrip to extend the excavation deeper and further back in time to include the transition between the relatively wet and warm climate of MIS 5 to the colder and drier MIS 4. **Awarded \$1,000**

Mr Liam C Kruger (Monash University). Title of Project: *Extending tide-gauge records with Late Holocene saltmarsh sediments: new data from southern Victoria, Australia*

Summary: - Global mean sea level is projected to rise beyond the year 2100 based on historical CO₂ emissions and regardless of future reductions. However, how much sea level will rise, and when, is largely unknown because our observations of sea-level and polar ice sheet change is limited to the last

<200 years at best. Geological data — in the form of coastal sediments — can extend our observational record of sea-level change and allow us to identify processes that operate over centuries and millennia. For my Honours project, I will generate a new geological sea-level reconstruction from intertidal sediments of Venus Bay, Victoria, where previous studies have identified almost two metres of saltmarsh sediments. Saltmarsh sediments are ideal for high resolution sea-level reconstructions because they accumulate exclusively within the intertidal zone. I will use established sedimentological, geochronological, and palaeontological techniques to decipher the pattern and drivers of sea-level change over the past two millennia. This project fills a key gap in our understanding of long-term sea-level change in south eastern Australia, and more broadly, the South Pacific. **Awarded \$400**

Joyce W Vickery Fund for Research in Biological Sciences

Miss Beth Flaxman (Sydney University). Title of project: *Unveiling molecular and morphological diversity of Laetmonice species complex (Aphroditidae, Annelida) from the Australian abyss.* This research project aims to investigate and characterise scale worm assemblages from different deep-sea environments around Australia, many of which have only been sampled for the first time in recent years (2015–2022). Identifying biodiversity patterns along the depth gradient and across latitudinal and longitudinal ranges will be the focus. Members of a scale worm species complex (genus *Laetmonice*) have been sampled in abundance in recent years and my preliminary results show substantial diversity even in small samples. I will use an integrative approach, combining genetic (mitochondrial DNA and genomic single-nucleotide polymorphisms) and morphological (light and electron microscopy) data, to analyse the diversity within a species complex (majority undescribed). The project will provide insights into the evolutionary history of a unique group of marine organisms that inhabit a broad geographic and bathymetric range (200–5000 m). It is expected that numerous new species will be described, each with more restricted bathymetric ranges. The genus *Laetmonice* currently has 28 described species (only two species described in the last 30 years), with genetic sequences for only six species on Genbank. Therefore, this project will significantly improve the taxonomic status of the genus *Laetmonice*. **Awarded \$1200**

Miss Ellen M Martin (Adelaide University). Title of Project: *Evolutionary Constraints and Trade-Offs in the Locomotor Morphology of Birds and Mammals.*

Summary: - In animal locomotion, different species with similar locomotor styles can show similar adaptations, such as the long, slender limbs of fast runners. Yet anatomy is never perfect, and there exist trade-offs in these adaptations. For example, fast-moving animals may reduce limb weight by reducing their number of toes, preventing them from becoming effective climbers. Biological trade-offs can therefore restrict some potential body forms from evolving. Using morphological integration theory, this study aims to investigate how morphological and species diversification are impacted by the differences in locomotor trade-offs within two separate vertebrate groups (birds and mammals). Funding for this project will support data collection in mammals, where locomotor trade-off between high-speed and high-power oriented limbs (i.e., running vs burrowing) will be evaluated by measuring the appendicular skeleton of lagomorphs (rabbits and hares) and peramelemorphs (bandicoots and bilbies). This study will reveal how the evolutionary capacity of different groups may be restricted or enhanced by locomotory specialisation. **Awarded \$800**

Miss Shanaz Masani (Sydney University). Title of Project: *Improving non-lethal predator management by understanding their use of prey odours in hunting.*

Summary: - Invasive mammalian predators have devastating impacts on biodiversity worldwide, with avian species particularly impacted. Nest predation is a major cause of population declines but lethal predator control is often impractical, ineffective, or socially unacceptable. Olfactory misinformation is an innovative method which decreases the conspicuousness of prey to predators. Pre-exposing predators to unrewarding prey odour can habituate the predators to it, resulting in improved survival of target prey because the predators stop using the prey odour to hunt. This project investigates the habituation and dishabituation rates of black rats in response to odour pre-exposure and whether these rates are influenced by an individual's behavioural, physiological and informational state. This information will increase our understanding of how predators use prey cues to hunt. This

understanding will improve the efficiency and efficacy of odour pre-exposure to protect vulnerable prey during critical life-periods, such as nesting season for ground-nesting shorebirds. **Awarded \$1,200**

Miss Kimberley H Michael (Flinders University). Title of Project: *Assessing the suitability of habitat for the endangered pygmy bluetongue* (*Tiliqua adelaidensis*)

Summary: - Anthropogenic actions have caused irreversible damage to biodiversity globally and led to the current conservation crisis, the sixth mass extinction. For some species, such as the endangered pygmy bluetongue, translocation is the only solution to mitigate against the threats of habitat loss and climate change. I aim to refine a habitat suitability survey methodology that can be used to identify and assess potential translocation sites in Adelaide. Habitat assessments may occur at the microhabitat, site, and landscape scale; and patterns of habitat use by species may be overlooked when only one habitat scale is assessed, impacting translocation success. My project assesses current pygmy bluetongue sites and potential translocation sites in Adelaide at all three habitat scales. The grant would support an extension of the microhabitat portion, allowing me to investigate more sites and investigate whether body condition of pygmy bluetongues is influenced by microhabitat. The expected results would gain insight into whether pygmy bluetongues are actively selecting spider burrows to occupy, building our current knowledge of this unique species, and inform future translocation decisions. **Awarded \$500**

Mr Dineth M Pathirana (Sydney University). Title of Project: *Cracking the case on potential reversals to oviparity: a phylogenetic analysis of the scincid lizard Saiphos equalis*

Summary: - Can oviparity 're-evolve' from viviparity? Whether such 'reversals' are possible is a major outstanding question in evolutionary biology. We aim to answer this question with this project looking at the phylogeny of *Saiphos equalis*. *Saiphos equalis* is one of few vertebrates that is bimodally reproductive: individuals are viviparous in some geographic regions, and oviparous in others. Additionally, some populations exhibit a third 'transitional' phenotype in which oviposition occurs later than 'normal' oviparous populations. Although 'reversals' are thought to be rare, they may be possible in *S. equalis* due to a recent origin of viviparity, and evidence of facultative oviparity in viviparous females. To find possible 'reversals' I will construct a robust phylogeny across the species range of *S. equalis* in order to analyse the evolutionary relationships between different parity modes. While an old phylogeny exists, many populations were unsampled and phylogenetic relationships remain unresolved. A new and more extensive phylogeny based on the tissue samples collected over three years of intensive fieldwork, plus samples provided by the Australian Museum, will determine a) the number of origins of viviparity in this species, and b) whether the 'transitional' form is a 'reversal' from viviparity to oviparity. **Awarded \$900**

Miss Duyi Zhong (Macquarie University). Title of Project: *The role of macrofauna in shaping microphytobenthic communities*

Summary: - Intertidal mudflats support ecologically important fish and shorebird populations. They also filter terrestrial pollutants, defend shorelines against erosion, and support commercial invertebrate fisheries. These functions of mudflats are underpinned by microphytobenthos (MPB) – microscopic primary producers at the base of the food web. The productivity of MPB is determined by environmental conditions as well as feedbacks with macrofauna, such as crustaceans and molluscs that live in or on the sediment. Besides directly grazing on MPB, macrofauna exhibit behaviours such as burrowing, irrigation, and surface crawling that can indirectly influence MPB by modifying sediment properties such as organic content, nutrient cycling and oxygenation. To date, studies have predominantly examined effects of environmental and biological factors on MPB independently. Using a series of aquarium experiments, I will assess how two key macrofaunal species that are common in NSW estuaries and have contrasting functions – the surface grazing mudwhelk, *Pyrazus ebeninus*, and the burrowing snapping shrimp *Trypaea dana* – interact to influence MPB under present-day scenarios, and scenarios of heatwaves and nutrient enrichment. Understanding how different functional groups of macrofauna independently and interactively influence MPB, across present-day and projected future environmental conditions, is critical to developing robust strategies of management aimed at conserving estuarine productivity. **Awarded \$900**

FIELD EXCURSION

Linnean Society and FOKE present a free guided walk on the Long Reef Geotrail at Collaroy, Part of the Ku-ring-gai GeoRegion.

Tuesday 2nd May 2023 at 10am

We are limited to **25 people**. Bookings are essential. **Priority booking** for Members open now and close on **2nd April** after this time non-members will be able to apply as well. All bookings via email to the Secretary at secretary@linneansocietynsw.org.au

Explore the geology of this outstanding headland; hear about trace fossils, the legendary copper mine, shipwrecks, and unusually complex rock structure with Dr Peter Mitchell OAM.

Meet at the heritage fisherman's hut on the beach past the Long Reef Golf Club at 10.00am. Low tide is just before mid-day so bring a water bottle, snack, sunscreen, a hat, and shoes that you don't mind getting wet.

Distance 2.5km (return) for the half walk or 3.8km for the full circuit which will take about 3 hours. Paid parking is available along the Golf Club Rd but parking is free in the surrounding streets.

Meet at the Heritage Fisherman's Hut on the beach past the Long Reef Golf Club at **10.00am**.

Pittwater Pathways has an excellent video about Long Reef, watch this before you go on the excursion.

Long Reef: special by any measure <https://www.youtube.com/watch?v=w7PsLBkxWVs>



ARTICLES RECENTLY PUBLISHED in Volume 145, 2023

O'Brien, R, (2023). Julian Tenison Woods in Japan: Two journeys. *Proceedings of the Linnean Society of New South Wales* **145**, 1-6.

Bicknell, R.D.C., Smith, P.M., Hart, L.J., Long, J.A. and Trinajstic, K.M. (2023). Evidence for placoderms from the mid-Palaeozoic Sandon beds of north-western New South Wales, Australia. *Proceedings of the Linnean Society of New South Wales* **145**, 7-24.

All recent papers published in the *Proceedings* (from Vol. 133) are freely available from:

<http://ojs-prod.library.usyd.edu.au/index.php/LIN>

Earlier volumes are available from: www.biodiversitylibrary.org/bibliography/6525

Please check regularly the Society's home page for recently uploaded papers by going to "linneansocietynsw.org.au" then click "Journal (Proceedings)".