PULSE

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NEWS FROM THE LINNEAN SOCIETY OF LONDON – A FORUM FOR NATURAL HISTORY

AR Wallace and the Cockatoo Conundrum

ABOVE **Wallace's hand-coloured version of the cockatoo illustration**

Fittingly, at the end of the Wallace100 year in 2013 (the 100th anniversary of the death of Alfred Russel Wallace, co-discoverer of the concept of evolution through natural selection) the library was faced with a Wallace mystery—a cockatoo drawing painted by Wallace, and pasted into his annotated copy of Lindley's *Elements of Botany*. This copy, along with other books from Wallace's library, as well as important notebooks and letters, is now held in the Linnean Society Library.

A researcher enquired about the *Elements of Botany*, and some of its annotations. The Librarians were surprised when, upon opening the book, the beautiful illustration of the cockatoo emerged, painted in watercolour on thin tracing paper. Wallace's inscription revealed that it was "*Plyctolophus leadbeteri*", a cockatoo of the interior of New South Wales (Major Mitchell's Cockatoo, now named *Lophochroa leadbeateri*). Yet, Wallace had never travelled there; was this drawn from a specimen…and for what purpose? Wallace himself provided the initial clue—it turned out that his caption "from Major Mitchell's journal" was to be taken quite literally. After a bit of investigation, the Librarians were led to the two-volume work *Three expeditions into the interior of Eastern Australia*, by Sir Thomas Livingstone Mitchell, published in 1838–39.

On page 47 of volume two, there it was—Wallace's (or rather Major Mitchell's) cockatoo! Wallace had traced it, and, with his trademark artistic skill, added colour to this superb cockatoo, of which it is said that "few birds more enliven the monotonous hues of the Australian forest than this beautiful species" (in John Gould, *Handbook to the Birds of Australia*, vol. 2, 1865). It is not clear whether Wallace owned a copy of Major Mitchell's journal, but we do know that in a letter to the Librarian of the Royal Geographical Society on 11 January 1893 he requested that Mitchell's *Three expeditions* be sent to him. Could this be an indication as to when Wallace made the drawing? Perhaps examination of the Royal Geographical Society copy might even show indents of the tracing process on the plate.

Wallace was greatly interested in stunning birds, and was intrigued by why they were so exuberantly beautiful. A letter from 28 March 1888 to Dr James Murie, the Librarian of the Linnean Society at the time, shows that he had a very different theory from Darwin as to why they were so striking, and in particular why they had crests and other ornamental plumes. Instead of this being due to sexual selection by the females as Darwin maintained, Wallace at that point thought they were simply the result of the male's "vigour". So perhaps it is no surprise that Wallace wanted to show this particular cockatoo in all its finery and vigour, which the black-and-white plate in Major Mitchell's journal clearly could not. Perhaps he was just delighting in his skills in drawing—or even painted it during the time he was working on his book *Australasia* (published in 1879, and subsequent editions up to 1894).

Yet, another mystery remains—what is the cockatoo doing in the *Elements of Botany*? One theory is that it may be one of a number of loose drawings by Wallace that were randomly pasted into books to keep them safe, perhaps by Thomas Henry Riches, who donated most of the volumes from Wallace's Library to the Linnean Society. We look forward to the next mystery in the Linnean Society Library!

Elaine Charwat,
Deputy Librarian
elainec@linnean.org

Like lichens? Enter this competition!

The British Lichen Society (BLS) is inviting all photographers, both amateur and professional, to take part in its very first photographic competition. Photographs of lichens will be entered into three different categories:

- **Lichens in the Landscape:**
  a lichen related habitat/landscape shot.
- **Lichen Portrait:**
  a lichen portrait, either singly or part of a community. (Images taken through a dissecting microscope are allowed.)
- **Abstract:**
  an artistic or expressionistic photograph—what do lichens mean to you?

Photographs may be submitted between 31 July and 30 November 2014. The winning entries will later be published in the BLS Bulletin and on the BLS website. For further details and conditions of entry visit www.britishlichensociety.org.uk/activities/bls-lichen-photography-competition

British Lichen Society

LEFT **The common yellow lichen, *Xanthoria parietina***
© Leonie Berwick

New Video
The Linnaean Manuscripts

Follow Dr Isabelle Charmantier as she introduces the manuscripts from the Linnaean Collections, and the project entitled *Re-writing the system of nature: Linnaeus's use of writing technology* in which she took part from 2009–13. Headed by Dr Staffan Müller-Wille, the project was undertaken at the University of Exeter and funded by the Wellcome Trust. Through a detailed study of Carl Linnaeus's manuscripts, Staffan and Isabelle reconstructed the ways in which Linnaeus assembled, filed, and cross-referenced information about plants and their medicinal virtues. Linnaeus's system emerged not out of the direct observation of nature, but out of his day-to-day work of revising and rearranging what he and others had written earlier.
To watch the video, please visit www.linnean.org/linnms

LEFT **The Collections Store**
© Tom Simpson

Eton's Hidden Gem EXTRA!

Further to last issue's article about the Natural History Museum at Eton College, the Linnean Society would also like to draw attention to Dr David Smith FLS for his involvement in this fantastic collection and fascinating museum. Dr Smith, after his retirement from teaching, spent 10 years (1994–2004) organising and transforming the museum into the gem we know it as today, with this work being continued by current curator and Fellow of the Society, George Fussey.
For more information about the museum, please visit www.etoncollege.com/nathistmus.aspx

FELLOWS' CONTRIBUTIONS 2014

Fellows are reminded that payment of contributions was due on 24 May 2014. Invoices were dispatched to those who requested it early in May. Contributions will have been collected on the 24 May from Fellows paying by direct debit.

‘Richard liveth yet’*

Richard III’s ‘visit’ to the Linnean Society

On Wednesday 12 March 2014 I found myself in the Library of the Linnean Society (where my cousin Janet happens to be Conservator), meeting a jeweller who specialises in reproductions of medieval items. We were discussing where precisely we should place two cabochon emeralds which had been anonymously donated to the funeral crown which I had commissioned for the reburial of King Richard III’s remains. Our meeting was also being filmed for a forthcoming Channel 4 documentary.

With regard to my work on Richard III, as a medieval historian I had long been interested in this controversial king. But my really close involvement dates back to 2003, when colleagues in Belgium—who had custody of three sets of female bones thought possibly to belong to one of Richard III’s sisters—asked whether I could find them details of the mitochondrial DNA sequence of Richard III and his siblings.

Various approaches suggested themselves. One of Richard III’s brothers—George, Duke of Clarence—had been buried at Tewkesbury Abbey, Gloucestershire, and his vault had been open since the 19th century. Could DNA be extracted from his bones? Unfortunately an examination conducted in the 1980s had concluded that the bones now in the Clarence vault were unlikely to be the Duke’s remains, so that idea seemed a non-starter.

Another brother, Edward IV, had been exhumed in the 18th century. Although that king’s body had later been reburied, locks of his hair were preserved above ground, and the Ashmolean Museum in Oxford kindly donated some strands of brown hair for sequencing—to no avail. The hair had, unfortunately, been too contaminated by 18th-century hands.

ABOVE **The burial crown**
Courtesy of John Ashdown-Hill

LEFT **John Ashdown-Hill discusses Richard III’s burial crown with a jewellery designer**
Courtesy of John Ashdown-Hill

Finally the only way forward seemed to be to seek a living all-female line descendant, and in 2004 I tracked one down in Canada. The sample she supplied produced a DNA sequence which did not match any of the female bones from Belgium. But (together with other evidence she and I had provided) it was subsequently used by Philippa Langley, secretary of the Scottish branch of the Richard III Society, to help persuade Leicester City Council (in the East Midlands, England) to allow excavation of one of its car parks in search of the body of King Richard III.

When, in 2012, Richard III’s remains were found, I was given the honour of carrying the cardboard box which held them, from the excavation site to a waiting van. I placed a copy of Richard III’s royal standard over the box of bones, but it occurred to me that something was missing, because royal coffins usually have a crown on top of them. This inspired me to commission the funeral crown for Richard III’s eventual reburial.

Shortly afterwards, when Dr Turi King of the University of Leicester was able to establish that the mtDNA of the remains matched that of the living relative I had located in Canada, Tewkesbury Abbey in Gloucester contacted *me*. Might it be possible to use the same DNA sequence to clarify the situation in respect of the dubious bones in their Clarence vault?

In April 2013, anthropologist Dr Joyce Filer and I visited Tewkesbury, and while I re-examined the vault and the evidence it contained, she re-examined the bones. It emerged that while the contents of the Clarence vault had certainly been disturbed, the bones within it comprise partial remains of at least three and possibly four persons. While some of the bones appear to belong to individuals too old to have been Richard III’s brother and sister-in-law, other bones might possibly be the royal remains. This fascinating work which links scientific and historical evidence, and which started for me in 2003, is still ongoing.

John Ashdown-Hill

*From ‘The Dialogue at the Grave of Dame Johan of Acres’, by Friar Osbern Bokenham OSA, (1456), as published in K.W. Barnadiston, *Clare Priory*, Cambridge 1962, p. 69.

RIGHT **Some questions will be eternal in biology—are these different species, or merely intraspecific variation?**
© Dr E. Clare

Taxonomy

A VITAL SCIENCE IN DANGER?

The influence of technology has always been critical to science. The development of equipment as simple as a lens opened up new worlds to both astronomers looking to the heavens and microbiologists looking into drops of rainwater, and the acceleration of technological development, and its integration with the sciences, has only increased in recent decades.

In comparison, much of the fundamentals of taxonomy have remained static. Certainly we use computers and microscopes, gene sequencing technology and other modern essentials of biology, but even allowing for developments such as DNA barcoding, much work is done in the material world with descriptions and comparisons (some of them centuries old) and real specimens. Time consuming and detailed work continues to be carried out for the 'simple' tasks of naming new species and identifying specimens and correctly assigning them to existing taxa. Such work is apparently still considered mundane and even pointless—I recall once having a paper nearly rejected by one referee who considered the act of naming a new taxon merely an act of "stamp collecting".

However, such an attitude demonstrates only the ignorance of a biologist who fails to understand the basis of much of modern biology. Just as chemists would flounder without being able to separate out different elements, so too biology requires the identification of species. Yes, species are an artificial concept—a red line drawn though an evolving lineage that cuts part of it free from its ancestry—and more work is moving towards the population level, but without this separation, biological research would be enormously more difficult. Macroevolutionary studies in particular operate at the species level, and changes over time, or examinations of diversity and extinction, very much rely on the concept of a species, and by extension, the identity of a species.

It is therefore to the chagrin of taxonomists that the field as a whole continues to be eroded. We are all aware of the tightening belts and lack of funds across the world with regard to science budgets, and many museums in particular (often the last bastion of the dedicated taxonomist) are suffering; jobs are being lost or not being replaced. The 'publish-or-perish' problem of faculty positions coupled with competition for jobs (or competition for funding, or promotion within those jobs), means there is greater pressure to produce work that will be highly cited in the short term. Many taxonomic papers accrue huge numbers of citations over decades, even centuries, but they can be laborious to produce and hardly fit the modern short-term pressures on academics. Thus, even those researchers who previously indulged in a little bit of taxonomic bookkeeping are feeling increasingly pressed, and proportionally less and less work seems to be finding its way into the literature. With a reduction in both the research carried out and the number of researchers, can we expect not only a lack of new taxonomic works, but also a slow disintegration of the skill set within the research community?

If so, it would be a rather serious problem. Even by the best estimates, taxonomists have identified perhaps 10% of living species on Earth (and there are plenty of fossils to be getting on with as well) and this has taken quite some time to assemble. DNA barcoding, and other similar techniques, look set to massively accelerate the recognition of numerous new species, especially

> "I RECALL ONCE HAVING A PAPER NEARLY REJECTED BY ONE REFEREE WHO CONSIDERED THE ACT OF NAMING A NEW TAXON MERELY AN ACT OF 'STAMP COLLECTING'."
>
> *Dr Dave Hone*

READ ON:
DAVE BLOGS FOR *THE GUARDIAN 'LOST WORLDS'*, HIS SITE *ARCHOSAUR MUSINGS* AND CREATED *ASK A BIOLOGIST*.

Blog: www.theguardian.com/science/lost-worlds
Blog: archosaurmusings.wordpress.com
Website: www.askabiologist.org.uk

ABOVE The vast diversity of insect life makes their taxonomy a daunting and complex task.

LEFT Four different species have been named from this field of over 4,000 dinosaur bones in eastern China, but how many are there really?
© Dr Dave Hone

cryptic ones, but even this cannot solve all problems. Eventually full descriptions are going to be needed and marginal results will need testing. Species may be identical genetically, but still considered as distinct species under different species concepts (such as differing greatly in behaviour or phenotype) so, eventually, each result should be examined via a more traditional approach. Those of us who work in palaeontological fields where only anatomical data is generally available will not get to grips with anything like this automation for a very long time, and here too, traditional practices cannot be ignored, even if molecules increasingly dominate elsewhere.

With the ever-growing biodiversity crisis, it seems increasingly incongruous that taxonomy is at risk of being further diminished at a time when there is more urgency to identify not only the species themselves, but what is happening to them. Identifying species at risk requires the correct identification of species in the first place, and captive breeding and reintroduction programs rely on the certainty of knowing to which species (or subspecies) any given individual may belong.

Taxonomy then, is not something that should be allowed to fade, but indeed should be regarded as necessary…perhaps even more so than before. It is always easy to decry the loss of old methods, and it seems almost trite to complain about reduced funds, changing emphasis in research, and things generally not being what they used to (and while we're at it, you kids can get off my lawn). However, it is hard not to come to the conclusion that taxonomy is suffering in particular, and that this is likely to lead to problems in the future, even if they are not currently apparent.

The lack of appreciation of the field, not just from those outside of science but even on occasion biologists and palaeontologists, is clearly problematic, and it is rather worrying that so fundamental a concept as identifying which species is which can be considered unimportant. The continued development, and even increase in the study of this field, is key to many of the foundations of biological research and understanding both the nature of biodiversity and its role. Though new species continue to be described at an impressive rate, the growing threats to this field should not be overlooked.

Dr Dave Hone
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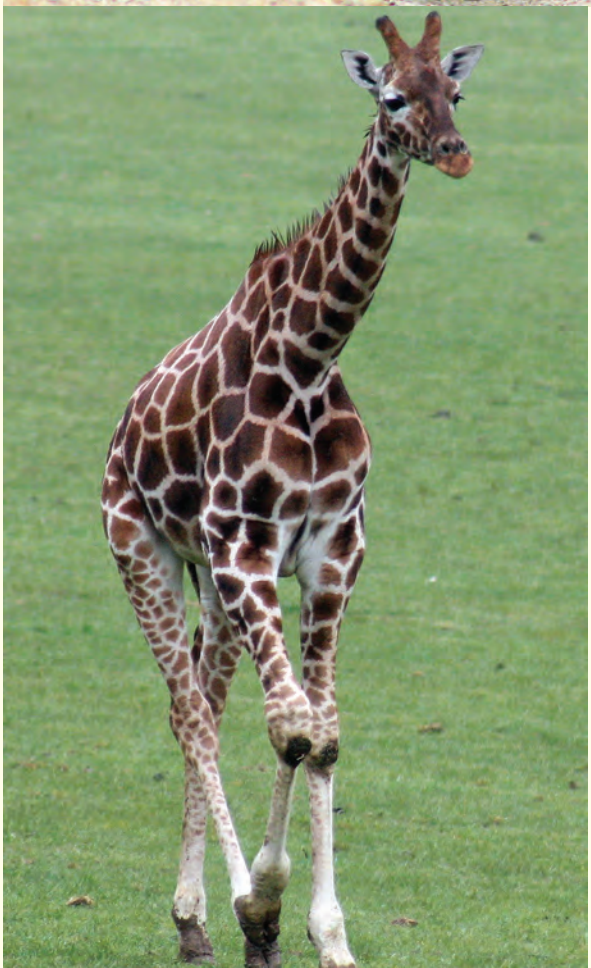

ABOVE The tuatara, a rare and unusual reptile endemic to New Zealand, has had a checkered taxonomic history–a critical issue when the populations on multiple islands are tiny and require legal protection.

LEFT Zoos are attempting to breed pure strains of giraffe subspecies after decades of hybridization–taxonomic identification of these individuals or their ancestors is key to this strategy.
© Dr Dave Hone

Plymouth Linnean Lecture
Biodiversity and Climate Change

The first Annual Plymouth Linnean Lecture took place on Wednesday 19 March 2014 at Plymouth University, held jointly by the School of Biological Sciences and the Linnean Society of London as a free public event. The lecture drew an audience of over 100 members of the public from across the South West and the University community, and from a diverse range of backgrounds and disciplines. Thanks to Rich Boden FLS for coordinating this fantastic event. Professor Camille Parmesan (National Marine Aquarium Chair in the Public Understanding of Oceans and Human Health, Plymouth University, UK and Professor in Integrative Biology, University of Texas at Austin, USA), a co-recipient of the Nobel Peace Prize in 2007, gave a lecture entitled *Biodiversity and climate change: connecting the past to the future.*

This successful talk encompassed misconceptions about climate change ('global warming' is a confusing term for the public when globally some areas are cooling down), theories from over 15 years ago ('Arctic excursions' where Arctic air moved southwards, freezing Great Britain in January 2010) and tracked Professor Parmesan's research into the effect of climate change on the range shifts of species. As an historical example, the fossil evidence shows that the Arctic beetle (*Diacheila arctica*), found throughout Great Britain over 12,000 years ago at the end of the last glacial period, moved northwards as the climate grew warmer, and is now found in the arboreal tundra.

LEFT **From left: Dr Malcolm Scoble FLS (Linnean Society), Prof Camille Parmesan, Dr Rich Boden FLS (School of Biological Sciences, Plymouth University) and Dr Mairi Knight (Head of the School of Biological Sciences, Plymouth University)** © 2014 Plymouth University

Over a four and a half year research period, Professor Parmesan studied the North American range shifts of the butterfly species Edith's checkerspot (*Euphydryas editha*), a good species to research due to its sensitivity to climate variability and wide range of habitats. This study led her around the world, checking the historical baselines for the species, stating:
"The UK is the best country in the world for having these historical baselines because you have such a rich history of amateur natural historians who, thankfully, kept good notes, or good specimens that they donated to museums."
Going on to look at the range shifts of further butterfly species and other terrestrial animals, the lecture also illustrates the accelerated shifts in marine species, and the impact these shifts have on humans.

ABOVE **The speaker's research species, *Euphydryas editha*** © Wikimedia Commons, Walter Siegmund

Ranked the second most highly cited author in the field of climate change from 1999–2009 by Thomson Reuters Web of Science, Professor Parmesan has worked with the Intergovernmental Panel on Climate Change for more than 15 years. Watch this fascinating lecture: www5.plymouth.ac.uk/schools/school-of-biological-sciences/plymouth-linnean-lecture

To learn more about Plymouth University's School of Biological Sciences visit: www5.plymouth.ac.uk/schools/school-of-biological-sciences

Explore Naturalists' Libraries with the SHNH

The Society for the History of Natural History (SHNH) will be holding a day meeting in July to celebrate and dissect the library collections of several famous naturalists—**Naturalists' Libraries: 350th Anniversary of John Goodyer (1592–1664), 17th-century botanist.** The meeting aims to celebrate 350 years since the death of this esteemed botanist who added many plants to the British flora, and after whom Robert Brown named the orchid genus *Goodyera*.

Talks will focus on the library of not only John Goodyer, but of John Nidd, Phillip Miller and Richard Richardson. The line-up of speakers includes: Professor Liam Dolan (*Magdalen College, University of Oxford*), Emeritus Professor John Edgington (*Queen Mary, University of London*), Dr Chris Preston (*Centre for Ecology and Hydrology*) and Mr William Noblett (*Cambridge University Library*).

Date: **Saturday 19 July 2014**
Time: **09.30–17.00**
Venue: **Magdalen College, High Street, Oxford, OX1 4AU**

The Special General Meeting and AGM of the SHNH will take place in the afternoon.

To find out more visit www.shnh.org.uk/meetings/2014-meetings or email Gina Douglas at meetings@shnh.org

LEFT ***Goodyera pubescens* (Willd.) R. Br. from *Illustrations of orchidaceous plants* edited by Thomas Moore (1857)** © The Linnean Society of London

What's in a Name?

New *Lepanthes* species named after Fellow

In the private rainforest reserve of Rara Avis, Costa Rica, almost 160 species of orchid have been documented. With specific reference to the genus *Lepanthes*, only 13% of the recorded species were found at elevations below 1,000m, leaving some species at lower levels still undescribed. Two new lower-altitude *Lepanthes* species were published in 2010 and 2011 (*Lepanthes vestigialis* Bogarín & Pupulin and *Lepanthes viridis* Pupulin & Bogarín), with another recently proposed as new to science in the March 2014 issue of *The Orchid Review* by Diego Bogarín and Dr Yael Kisel–*Lepanthes castilloae*.

Native to the warm, humid lowlands of Costa Rica, the epiphytic species *Lepanthes castilloae* has been named in dedication to Kath Castillo FLS, a biologist and botanical research assistant at the Natural History Museum, London (NHM). Currently a researcher on the NHM's E.J. Salisbury Project exploring environmental change in Britain via Salisbury's glass plates, in 2009 Kath was working as a field assistant for Dr Kisel, whose PhD research involved the collection of study species for a comparison of the population genetics of sister clades of Costa Rican orchids. Two species of *Lepanthes* were among the study species being collected; Kath was searching for these when she came upon a small population of *Lepanthes* sp. in Rara Avis–which actually turned out to be a new species. Diego Bogarín (orchid taxonomist at Lankester Botanic Gardens, Costa Rica University and research associate at the Chiriquí Autonomous University, Panama) and Dr Kisel (macroevolutionary biologist and Alexander von Humboldt Postdoctoral Research Fellow at Göttingen University, Germany) named this new species for Kath in response to the "enthusiasm shown for the species described and orchids in general".

ABOVE **The rainforest reserve of Rara Avis, Costa Rica**
© Kath Castillo

LEFT ***Lepanthes castilloae***
© Diego Bogarín

Read on:
The March issue of *The Orchid Review* will be uploaded to the RHS website in the future; visit the homepage for updates: http://www.rhs.org.uk/about-the-rhs/publications/magazines/The-Orchid-Review

Kath Castillo FLS has also been involved in research for the UK arm of the *Leafsnap* identification app: leafsnap.com

Sarracenia purpurea
© Leonie Berwick

The Linnean Field Trip Mystery—SOLVED!

Back in 2011, I led a Linnean Society field trip to Somerset. Before the weekend in question, my wife and I did a recce to make sure we saw as much as possible when the group joined us a couple of weeks later. Checking a wetland nature reserve, I was astonished to see a clump of pitcher plants (*Sarracenia*) growing on the peat beside a small pool. I had assumed they were tropical American plants I had only seen in botanical gardens, and sufficiently unusual that it was surprising nobody had stolen them to sell or keep in their greenhouse. So, on the field trip's last stop I planned to show the group 'a special botanical surprise'. We trekked across the marsh and found the location—but no pitcher plants. Maybe nobody believed me, maybe I dreamed them up, maybe as a mere zoologist I got the identification wrong. It was a rather ignominious end to what had been a highly successful outing. Now a friend has sent me a copy of the April 2014 edition of *The New Journal of Botany* (4: 33–41) from which it is evident that *Sarracenia* is an invasive nuisance and established in lots of places, including Westhay in Somerset. Far from being rare, at Westholme in Cumbria specifically, they have apparently removed six tonnes of them in the past decade or so, with little effect on the total population. So, mystery solved; I didn't misidentify them and they were probably rooted out by the local reserve management volunteers before the Linnean visit.

Pat Morris FLS

Welcome to **Tom Simpson**

Tom Simpson joined the Society in early March, to replace Samantha Murphy in the role of Events and Communications Manager. Tom originally trained as a maths teacher and, while teaching, volunteered at the Natural History Museum, London (NHM) and the National Maritime Museum. Eventually this led to Tom working in the Learning Department at the NHM before transferring to the Botany Department, where he worked on a project breeding a variety of tomatoes that school pupils could grow in order to help understand Mendelian genetics. He then moved to the more public side of the museum to be part of *Nature Live*, the museum's program of live discussions with scientists. During his three years working in *Nature Live*, Tom hosted over 300 events with over 150 different scientists, and was lucky enough to take part in two museum field trips to Costa Rica and to the Isles of Scilly.

One area which Tom is keen to be a part of is the development of the programme of events at the Society, bringing in new speakers while maintaining the high standard of events that already exists. His previous prowess and expertise will be an asset to how the Society communicates with our Fellows and the science community in general.

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FORTHCOMING EVENTS 2014

19 June
Evening Meeting
18.00–19.00

Shifting Baselines: why we so readily accept the progressive decline of the natural world
Speaker: ***Prof Callum Roberts (University of York)***
Visit www.linnean .org/events for more details

2 July
Lunchtime Lecture
12.30–13.30

The Price of the Pouch: the evolutionary ramifications of mammalian reproductive strategies
Speaker: ***Dr Anjali Goswami (University College London)***
No registration required

3 July
14.00–17.00

Conversazione
Taking place at the Linnean Society of London
Registration essential www.linnean.org/events

12–19 July
Field Week

Ecology and Conservation Studies Society: Field Week in Cumbria
Leaders: ***Dr Brian Ferry and Dr Stephen Waters***
Visit www.linnean .org/events for more details

6 August
Lunchtime Lecture
12.30–13.30

Having the stomach for it: a contribution to Neanderthal diets?
Speaker: ***Laura Buck (Natural History Museum, London)***
No registration required

Please check our website for other events not listed here

Conversazione 2014
3 July, 14.00–17.00

Fellows of the Linnean Society are invited to join the Linnean Society team to find out more about our collections, up-coming projects and on-going conservation work, and meet other Fellows of the Society.

Refreshments and a buffet lunch (including wine) will be served throughout the afternoon, with plenty of opportunity to relax with other Fellows and staff and explore the building.The Conversazione is open to Fellows of the Linnean Society and their guests only, registration is essential and is £25 per person. Visit www.linnean.org/events to register

Medals and Prizes 2015

With huge congratulations from all at the Linnean Society to this year's medal and prize recipients, the Society would like to call on Fellows to start nominating candidates for 2015. As a reminder of our medal and prize categories:

- **The Linnean Medal** awarded to a botanist or a zoologist for service to science
- **The Bicentenary Medal** awarded to a biologist under the age of 40 years in recognition of excellent work
- **The Darwin-Wallace Medal** awarded to persons who have made major advances in evolutionary biology
- **The HH Bloomer Award** awarded to an amateur naturalist for an important contribution to biological knowledge
- **The Irene Manton Prize** a prize of £1,000 to a PhD student for the best botany thesis in an academic year
- **The Jill Smythies Award** a prize of £1,000 to a botanical artist for outstanding illustrations
- **The John C Marsden Medal** awarded for the best doctoral thesis in biology

To nominate candidates, visit www.linnean.org/medals and complete the appropriate form online. All nominations should be entered no later than **30 November 2014**. We look forward to hearing from you!

PULSE

All articles welcome – please submit news, reviews, events and articles in MS Word format to the Editor at pulseeditor@linnean.org. Accompanying images must be a high resolution JPEG or TIFF with appropriate permission and copyright.