The LINNEAN SOCIETY of London

The Linnean

NEWSLETTER AND PROCEEDINGS OF THE LINNEAN SOCIETY OF LONDON

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Cypraeidae:
Subspecies — the case for the prosecution

Richard Spruce:
Following in his footsteps

Alfred R Wallace:
The Leicester connection

AND MORE...

A forum for natural history

The Linnean Society of London

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Articles should be emailed to the Editor in MS Word format, or sent on disc. Images should be sent as JPEGs or TIFFs at no less than 300dpi. Correct copyright information for images should accompany the article.

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The Linnean

Newsletter and Proceedings of the Linnean Society of London

Contents

Editorial

Whilst preparing this editorial we welcomed the news that the outstanding work of two of our Fellows has been recognised by the Royal Society. Professor Peter Grant FRS and Professor Rosemary Grant FRS (*RIGHT*) have each been awarded the Royal Medal 2017 for their research on the ecology and evolution of Darwin's finches on the Galápagos. In 2009, they both received the Linnean Society's Darwin-Wallace Medal.

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Dr Sarah Whild, a valued member of the Linnean Steering Group, has indicated that she wishes to stand down. The Society's Council has been asked to nominate a replacement, but in the meantime we'd like to extend our thanks to Sarah for her support over the past few years.

Thanks also to everyone who responded to the request for book reviewers: guidelines are now online (www.linnean.org/bookreviews), and a list of books awaiting review has been sent out to those interested. Some reviews appear here, and will continue to feature in future issues.

As always, we welcome your submissions and correspondence, as well as on other matters likely to be of interest to Fellows.

Gina Douglas, *Editor*
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You will have seen in the most recent issue of *PuLSe* that we have two new faces at the Society: Elisa Jones, who is overseeing management of the BioMedia Meltdown Project following the generous additional grant of £60,000 from John Lyon's Charity; and secondly our new Office Manager, Helen Shaw, who has taken up the reins from Victoria Smith. We also extend our very best wishes to our Events and Communications Manager Alicia Fernandez on her recent marriage!

Enriching Public Engagement

The funding from John Lyon's Charity, together with a generous donation from Jenny Grundy FLS, has allowed us to buy a 3D printer. Work is underway printing skulls for our Evolution loan kits; this innovative piece of equipment means that we will be able to produce replicas of some of the Society's treasures which can then be handled by students and others without putting the original objects at risk.

Our 3D printer is already being put to great use for our loan kits

We are moving ahead with enriching the Society's education and public engagement capabilities at Burlington House by beginning refurbishment of our basement room (the *Linnean Learning Lab*), and installing environmentally controlled display cases in the Reading Room of the Library and in the foyer—we are indebted to the Wolfson Foundation and Garfield Weston Foundation who have made this possible. You can look forward to enhanced displays of the Society's treasures, while the Linnean Learning team will be able to run workshops for students, teachers and the public at Burlington House.

Popular Programme

The Society's events programme continues to delight audiences, with a full house for the hugely engaging OneZoom *Tree of Life* launch, where CEO Dr James Rosindell FLS demonstrated the Earth's considerable biodiversity with sacks of grain. Professor Susan Owens gave an erudite policy lecture on the achievements over four decades of the Royal Commission on Environmental Pollution. We celebrated *Fascination of Plants Day* with a lunchtime lecture by Dr Monique Simmonds FLS on traditional and economic uses of plants and fungi, while Education Officer Rhys Grant and some dedicated volunteers, participated in a public engagement event held at the Oxford Botanic Garden, with around 400 members of the public directly engaging in various activities about science and plants.

Over 111 Fellows and their guests celebrated our illustrious medal winners at the Anniversary Meeting in May, the details of which are included later in this issue. Dr Lynn Dicks gave a fantastic lecture on pollinator decline, attracting an audience of 127. These

large audience numbers underline the need for the Society to require registration for meetings so that we can manage your experience in Burlington House more comfortably. Our lunchtime and evening lectures will of course continue to be free, and you can easily register for all events at **www.linnean.org/events**, or call our Burlington House office.

Making natural paints at the *Colours of Burlington House* event

One of our aims is to work in collaboration with the other Courtyard Societies (CS) at Burlington House and continue to build our Cultural Campus. In August we had incredible feedback after taking part in the *Courtyard Lates: Colours of Burlington House* event, where each society offered a unique programme revolving around the theme of colour. Award-winning author Professor Paul Henderson FLS gave an enriching talk on influential 18th-century botanical artist James Sowerby's use of colour, and Dr John David FLS answered questions about how the Royal Horticultural Society use their colour charts in a modern context. The audience was then invited to test Sowerby's colour theories with a prism and create their own natural paints from woad and cochineal. In September, the societies all opened for *Open House London*, with the Linnean Society welcoming a staggering audience of over 1,400 people in one day.

Our autumn events programme kicked off with a successful day meeting, organised through the Taxonomy & Systematics Committee, chaired by Professor David Cutler PPLS, on *What is the future for biological surveys: are specialists for key taxa at risk of becoming extinct?*, attracting delegates from a number of smaller specialist societies from around the UK.

Further afield, the Society continues to support regional initiatives, including the Irene Manton Lecture in Leeds (Professor Jane Hill on climate change and habitat loss) as well as the upcoming Manton Lecture in Manchester in December (Dr Anna Gilchrist on the response of organisms to environmental pressures including urban development), while closer to home we continue to hold lectures in association with other organisations such as the Royal Society of Biology and the Systematics Association.

Alicia and the Collections team have been busy on redesigning many of the website pages; we hope you will now find these more satisfying to browse, including the Fellows' area of the website.

Elizabeth Rollinson, *Executive Secretary*
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Library News

Students from Harvard University enjoy a tour of the Library and Collections

It has been a very busy few months in the Library, with many visiting groups, several of which have been unusually large. Thirty students from Malaysia visited in May, the Art Fund made two visits in June bringing groups of 30 each time, the Japanese Young Scientists group numbered 26 this year and a group of Chinese families (36 participants) visited in July with Professor Steve Jones as guest speaker. We have also hosted visits from conservation students from the University of Suffolk, staff from the Royal Anthropological Institute and Cambridge University librarians. When Ohio State students on the Darwin and Wallace trail visited the Society they enjoyed a talk on Wallace from George Beccaloni in the Reading Room. We also saw our usual American Summer School visitors from the University of Maryland, Harvard and Columbus State. New for this year were two visits from the Friends of the Victoria and Albert Museum in London.

Linnaeus's specimen of the John Dory (*Zeus faber* L.) has been returned safely to the Society after being on display in the Wellcome Trust's exhibition *Making Nature*. The curators of a proposed Wallace exhibition in Berlin have visited the Society to view some of our material for possible inclusion.

Conservation of Collections

In May, we were contacted by the great granddaughter of William C. Carruthers (1830–1922), who was President of the Society from 1886–90. She kindly offered the Society a collection of ten glass plates associated with Carruthers that were in her possession. Further research showed that these glass plates were prepared by her great grandfather to illustrate his 1889 Presidential Address on Linnaean portraiture. His obituary states: "Carruthers took a great personal interest in Linnaeus and older Fellows will remember the meticulous care with which he worked up the subject of the various portraits of the Swedish naturalist

William C. Carruthers's glass plates

for one of his presidential addresses." The plates are in need of a little conservation and will then be re-boxed.

Many of you will have seen Darwin's vasculum, which he took with him on the voyage of the *Beagle*, on display in the Reading Room. Made of tinned steel which has been painted black, some flaking of the black paint has caused concern about its state of preservation. Glenn Benson, our Curator of Artefacts, was able to put us in touch with a specialist metals conservator who examined both the vasculum and our bronze-coated replica statue of Linnaeus, and compiled a thorough condition report. While on display the vasculum will now be supported on a pillow covered in Tyvek, a material that will minimise friction and snagging of the painted surface, and it will be loosely wrapped in the same material when stored. The conservator's treatment proposal advises removal of the small patches of inactive corrosion and consolidation of the edges of the broken painted surface.

Volunteers and Partnership

In addition to our long-term Library volunteers (David Pescod, Pia Wilson, Hazel Marsden and Sheila Meredith), we have recruited Fiona Byers and Ali Ahsan to assist with adding records for the certificates of recommendation and the Society Papers to the CALM archive cataloguing system. CalmView will be installed later in the year and catalogue descriptions for these and other archives (Linnaean manuscripts and Smith correspondence) will be available to search online. The serials module within the Heritage/Cirqa cataloguing system has also been purchased and in the coming months a start will be made on making the Society's serial holdings searchable online for the first time.

The Library team at the EBHL meeting in Geneva

In June, the Library team attended a combined European Horticultural and Botanical Libraries (EBHL) and Linnaeus Link meeting in Geneva. Five potential new Partners for Linnaeus Link emerged as a result of that meeting and they are now being followed up and supported through the partnership process.

Lynda Brooks, *Librarian*
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Donations

The following people have made book donations to the Library of the Linnean Society of London. These books will now be in the process of being added to the Society's online catalogue, accompanied by the appropriate donor information.

Thank you to all those who have donated to the Society:

Rosie Atkins

Valerie Baines

Glenn Benson

British Cactus & Succulent Society

Caroline Chevallier

Dr Maarten Christenhusz

Lord Cranbrook

Dr Bettina Dietz

Gina Douglas

Dr Brent Elliott

Olle Ekstedt

Elisabeth R. Fairman

Dr Aljos Farjon

Susan Gove

Mary Gregory

Jenny Grundy

Nigel Hughes

The Humboldt-Universitat zu Berlin

Dr Stephen Jury

Colin Kilvington

Dr Mikio Kobayashii

Professor Gren Lucas

Dr Andrew Lyell

Professor Brian Morton

Giancarlo Nonnoi

Sir Stephen Oliver

Dr Elaine Robson

Gordon D. Rowley

Royal Botanic Gardens, Kew

Simone Schleper

J.R. Shepherd

Prof. Dr Tej Kumar Shrestha

Niki Simpson

Christine Simpson Stokes

Professor Hans-Jorgen Wallin Weihe

Pia Wilson

The full list of donations is also accessible as a PDF with the online version of this issue of *The Linnean* at **www.linnean.org/thelinnean**.

A printed copy of the list can be sent upon request—please contact the Library staff at **library@linnean.org**.

More on 'Marimo' and other balls

Following our 2016 paper on 'Marimo' and other plant balls (*The Linnean*, 32(2): 11–14) there has been another observation on ball formation, this time of fibrous tapir droppings (*The Linnean*, 33(1): 7); here we record other examples. A ball of the red alga *Halopithys incurva* (Hudson) Batters has been reported (Claudio Battelli pers. comm.) and spherical clusters of the barnacle, *Balanus crenatus* are discussed by Cadée (2007).

The formation of 'Marimo' was included in the BBC TV programme *Japan: Earth's Enchanted Islands*, shown earlier this year. The footage was filmed at Lake Akan and demonstrated how prevailing winds, funnelled from the surrounding mountains, churn the water causing the balls on the lakebed to spin, thus keeping them round. The commentary said that the balls are known as 'Marsh Monsters' in the local language, can be decades old and reach the size of a basketball. Apparently, very strong winds can force the larger balls on shore where they collapse and break up. The smaller fragments regrow into new balls.

There is an entry 'Moss-ball' in the *English Dialect Dictionary* (*EDD*) (Wright, 1905) with the description "A ball composed of confervae found at the bottom of a lake". *Conferva* is an old (Linnaean) name for a number of filamentous algae, especially species of *Cladophora*, so the misuse of 'moss' to describe a ball of algal origin dates back more than 100 years.

> "...the misuse of 'moss' to describe a ball of algal origin dates back more than 100 years."

A colleague, Roy Vickery, brought to our attention a recent article by J.B. Smith (2017) in the newsletter of the Folk Lore Society, where the *EDD* entry is mentioned, as well as the occurrence of *Cladophora/Larix* balls "up to the size of a football" in a Swiss lake. The balls are linked to a local legend concerning famine and fairies.

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Wright J. (Ed.) 1905. Moss-ball. *English Dialect Dictionary* 4 (M-Q): 169–170

Linnean Society Collections and Britain Nepal 200

Celebrations to mark the bicentenary of the signing of the Treaty of Segauli, which marked the start of formal links between Britain and Nepal, came to a close in spring 2017. They were launched in January 2014 by a reception at the Nepalese Embassy in London by HE Dr Suresh Chalise FLS, Nepal's Ambassador to the UK, and were concluded by a week-long series of cultural events at the embassy organised by the present Ambassador, HE Dr Durga Subedi, in March 2017. HRH Prince

Harry played a major role in the bicentenary, visiting Nepal in March 2016 and as guest of honour at a grand reception in the embassy earlier this year. The Royal Botanic Garden Edinburgh (RBGE) organised a series of events and activities to celebrate 215 years of biodiversity research. This was initiated by RBGE alumnus Dr Francis Buchanan-Hamilton in 1802 and continues with an ongoing research programme on the plants of Nepal.

Buchanan-Hamilton illustrations in Glasgow

Botanical collections of manuscripts, drawings, herbarium specimens and maps made by Buchanan-Hamilton collectively represent one of the great treasures of the Society's archives. These provide a tangible link with the past and have featured prominently in these activities. This included exhibitions of the drawings (either as originals or high-quality reproductions) of Nepalese plants, depicted by an unknown India artist commissioned by Buchanan-Hamilton, in a wide variety of venues. These exhibitions started in March 2012 at the Siddhartha Art Gallery & British Council, Kathmandu and continued over a period of five years: Glasgow Botanic Garden (as part of Black History Month, November 2012), Embassy of Nepal, London (January–February 2014), Linnean Society (February 2016), Logan Botanic Garden, near Stranraer (May 2016), RBGE (August–November 2016), Nepal Arts Council and Standard Chartered Bank Kathmandu (April 2017), concluding with an exhibition at RBGE Benmore Botanic Garden, near Dunoon (April–September 2017). Associated talks, events and performances accompanied most of these exhibitions.

***Lysionotus serrata* D.Don from the Society's Buchanan-Hamilton drawings**

The Society also preserves manuscripts and drawings relating to Buchanan-Hamilton's work in South India, and it is hoped that these may also emerge from the shadows as part of the 2017 celebrations of the 70th anniversary of Indian Independence. Regrettably no portrait is known of the great man, but Indian artists in Edinburgh have created a life-size, two-dimensional puppet, based on portraits of his mother and brother, so a hypothetical face can at long last be put to his name!

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Subspecies in Cypraeidae: The Case for the Prosecution

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It was Carl Linnaeus who in 1758 formally devised the binomial nomenclatural system we use today for naming species in the 10th edition of his *Systema naturae* (Fig 1). According to this system, each species is awarded a binomen consisting of the genus (capitalised) and the species (lowercase), and nowadays followed by the name of the author of the species and the year it was authored: e.g. *Homo sapiens* L., 1758. The same name cannot be given to more than one species, but each genus can contain several species, e.g. *Homo erectus* (Dubois 1892). The brackets indicate that Dubois originally used a different genus name (*Pithecanthropus*).[1]

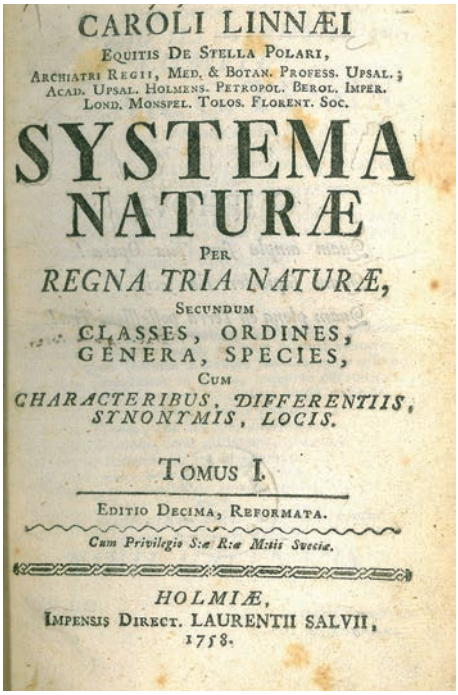
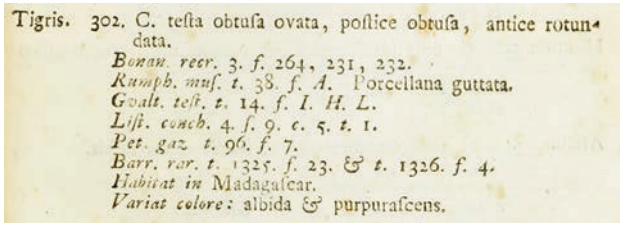

CAROLI LINNÆI
EQUITIS DE STELLA POLARI,
ARCHIATRI REGII, MED. & BOTAN. PROFESS. UPSAL.;
ACAD. UPSAL. HOLMENS. PETROPOL. BEROL. IMPER.
LOND. MONSPEL. TOLOS. FLORENT. SOC.
SYSTEMA NATURÆ
PER
REGNA TRIA NATURÆ,
SECUNDUM
CLASSES, ORDINES,
GENERA, SPECIES,
CUM
CHARACTERIBUS, DIFFERENTIIS,
SYNONYMIS, LOCIS.
TOMUS I.
EDITIO DECIMA, REFORMATA.
Cum Privilegio S.æ R.æ M.tis Suecia.
HOLMIÆ,
IMPENSIS DIRECT. LAURENTII SALVII,
1758.

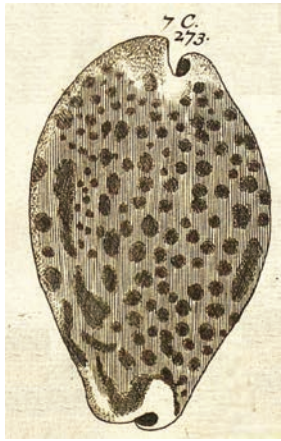
Fig 1 The title page of the 10th edition of Carl Linnaeus's *Systema naturae* (1758)

When Linnaeus introduced binomial nomenclature—used, inter alia, for naming molluscs—and thus described species (many of which were already known, but not named in accordance with his new scheme), he did not designate a 'holotype' as such. Apart from the short verbal description (Fig 2: *overleaf*), Linnaeus also referred to earlier works in which those shells were illustrated. It is clear that these old black and white illustrations are not always a very useful tool in determining exactly which shells Linnaeus had in mind (Fig 3: *overleaf*).

However, Linnaeus also had shells for reference: either in his own collection or in the collection of the Queen of Sweden. Part of his collection was sold by his widow and is kept today by the Linnean Society in London (Fig 4). The collection underwent

handling and curating over the years, notably by one of the most prominent conchologists of our time, S. Peter Dance. Other shells handled by Linnaeus are now in the Museum of Evolution, Uppsala University.


Tigris. 302. C. teſta obtuſa ovata, poſtice obtuſa, antice rotundata.
Bonan. recr. 3. *f.* 264, 231, 232.
Rumph. muſ. t. 38. *f. A.* Porcellana guttata.
Gualt. teſt. t. 14. *f. I. H. L.*
Liſt. conch. 4. *f.* 9. *c.* 5. *t.* 1.
Pet. gaz. t. 96. *f.* 7.
Barr. var. t. 1325. *f.* 23. & *t.* 1326. *f.* 4.
Habitat in Madagaſcar.
Variat colore: albida & purpuraſcens.



(Top) Fig 2 The original description of *Cypraea tigris* L., 1758; **(Right) Fig 3** An illustration of '*Cypraea tigris*' from James Petiver's *Gazophylacii naturæ & artis decas prima* (1702), referred to by Linnaeus

One of several definitions for 'species' is: a group of actually or potentially interbreeding individuals, which is reproductively isolated from other such groups. While it is possible that animals belonging to one species do copulate with those of another, their offspring will most likely be sterile. For conchologists, however, this is not a very practical tool, since it is usually impossible to test whether one group of molluscs does indeed interbreed with another and whether their offspring are fertile or not.

And so several different, more workable, definitions have been proposed—some focus on shell morphology only, while others combine additional features such as DNA sequencing, radula studies, reproductive organ examination, etc. But for most conchologists, amateurs and professionals alike, there is usually only an empty shell to contemplate. Even if the animal was properly preserved, dissecting it, mounting the radula or performing DNA tests are not feasible options (or totally impossible if the specimen belongs to an extinct species). This is why the morphological definitions come in handy, despite their limitations.

Fig 4 One of the two *Cypraea tigris* (P-Z 0010831) from the Linnaean collection in London, about 65 mm

One such definition of species states that: a group of cowries will belong to the same species, if they all share at least one characteristic which (sometimes together with oth-

er characteristics) distinguishes them from any other group. This is sometimes referred to as the Main Diagnostic Shell Character (MDSC). Thus, a toothed aperture will not be sufficient to define a group of cowries as one species (since almost all cowries have teeth) nor will the absence of teeth, since both *edentula* (Fig 5) and *teulerei* (Fig 6) lack them. On the other hand, the basal pattern of *guttata* (Fig 7) or the uniform orange dorsum of *auratium* (Fig 8: *overleaf*), for instance, are in themselves sufficient MDSCs to allocate cowries possessing them to those species. Absence of teeth together with the dorsal pattern, shape and size can serve as combined MDSCs to distinguish *edentula* from *teulerei*.

But taxonomy and nomenclature do not stop at the species level. Whereas 'species' is both a natural and taxonomic concept, 'subspecies' is not, and has little biological meaning, although recognised by Article 45 of the International Code of Zoological Nomenclature (ICZN) as a valid rank (the lowest). Its use became common during the mid-19th century. The common definition used for subspecies states that cowries within a species will constitute a subspecies, if the population they belong to is geographically (or other-

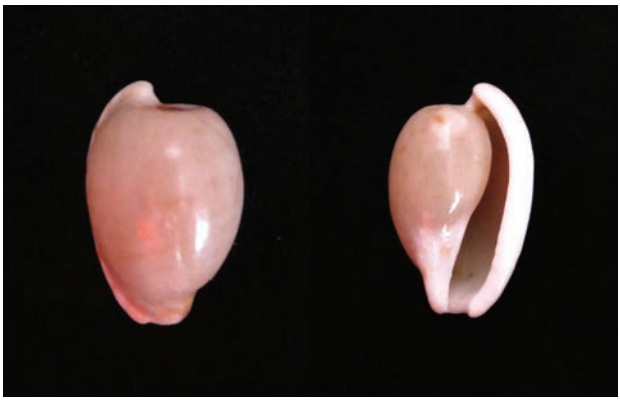


Fig 5 Toothless *Cypraeovula edentula* (Gray 1825), 22 mm

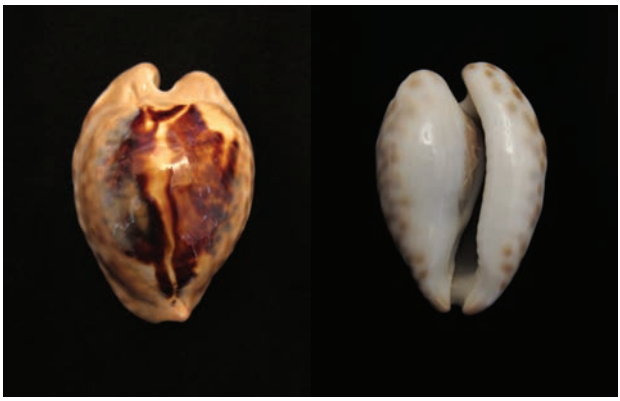


Fig 6 Toothless *Afrozoila teulerei* (Cazenavette 1845), 50 mm

Fig 7 *Perisserosa guttata* (Gmelin 1791), 62 mm

wise) separated from other populations of that species, and if the majority of the individuals of that group differ in some manner from the individuals of the other populations of that species.

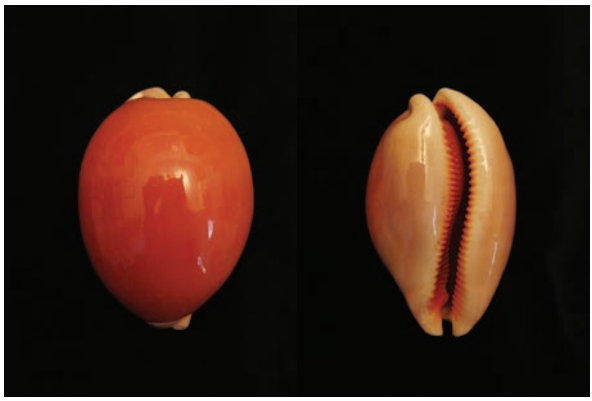


Fig 8 *Lyncina aurantium* (Gmelin 1791), 92 mm

Some believe that subspecies may be on the verge of becoming a new species at some future point in time, when the isolation and evolution change them to such an extent that they can no longer be associated with the parent species. This may have happened with the ancestors of *cervinetta* in the East Pacific and *cervus* and *zebra* in the West Atlantic after the Panamanian isthmus closed (Fig 9). Many species did, of course, evolve in this manner, but we have no way of knowing which subspecies will and which will not. Some authors do not recognise subspecies in their works at all.

So what information does the subspecific rank afford us besides locale? While there are several populations of the recognised Western Australian species *marginata*, many of those found in the Albany area have a pale, colorless dorsum, and were awarded the subspecific rank of *m. albanyensis*, although some synonymise it with *m. marginata*. While the information that is implied by the subspecific rank is indeed important (i.e. that the Albany area *marginata* population is typically colourless), a pale shell from Perth cannot be called *albanyensis* (Fig 10) but a dark shell from Albany can!

Fig 9 Left: *Macrocypraea cervinetta* (Kiener 1843), 77 mm; Middle: *Macrocypraea cervus* (Linnaeus 1771); Right: *Macrocypraea zebra* (Linnaeus 1758).

The fact that there are pale *marginata* could have also been relayed in a different manner (e.g. by describing a form, which has no taxonomic standing, but which could have a more descriptive name, such as 'albata' and would apply to all pale *marginata* regardless of origin. One can also publish a variability study of the one species *marginata*).

Another point to take into consideration is that the subspecies nomenclature is quite haphazard, depending on the type locality of the nominate species. For instance, Gmelin named *Cypraea* (now *Naria*) *acicularis* from the Western Atlantic coast. Later on, Schilder named a subspecies from St. Helena Island: *a. santahelenae*, making *a. acicularis* the nominate subspecies. But, if Gmelin had used a shell from that same island to describe his new species (instead of a coastal one), that island population would be named *a. acicularis*, and the Western Atlantic coast population would be called perhaps *a. braziliensis*.

Fig 10 Left: a typical *Zoila marginata* (Gaskoin 1849), 55 mm from Carnac Island, Western Australia; Middle: a pale *marginata* from Perth, Western Australia, which cannot be called *albanyensis*, even though this subspecies was named for its pale shells; Right: a pale *marginata 'albanyensis'* from Albany, Western Australia

Size has also been used as a parameter for naming a subspecies. *Cypraea tigris schilderiana* comes to mind (large tiger cowries from Hawaii). Another example is *Umbilia hesitata beddomei*, now viewed as a synonym of *hesitata* (perhaps a smaller female morph) (Fig 11). Then there is *Mauritia arabica immnis*, a subspecies named for the Western Pacific population of *arabica*. The name implies huge size, which produces funny (if not meaningless) statements as: "There is also a dwarf variety in southwest Africa and Mauritius." How big (or small) is a dwarf giant?

Fig 11 Left: *Umbilia hesitata (*Jousseaume 1884), 95 mm; Right: *U. h. 'beddomei'*

Cowries are the most popular group of shells collected. They are beautiful, pleasant to handle, and some, either very rare or hard to obtain, also command high prices on the shell market. Well over 1,500 names have been given over the years and about 250 species are currently recognised. Subspecies in Cypraeidae are numerous, indeed the plethora of new names attributed to geographical populations is unprecedented in any other mollusc family. Many collectors will surely pay more for a 'new species or subspecies' than for a mere 'form', and naming a 'new species or subspecies' sets

one's name down for posterity. But yet, as I have tried to demonstrate here, there are better (albeit less glamourous) ways of handling infraspecific variability.

Endnote

1. It would seem that nomenclature is as old as time itself, since the first 'taxonomist' was also the first man: "And Adam gave names to all cattle, and to the fowl of the air, and to every beast of the field." (Book of Genesis 2, 20, King James Bible)

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In the Footsteps of Richard Spruce: Strid Wood Revisited

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Richard Spruce (1817–93) was one of the great Victorian naturalists—a self-taught botanist who spent 15 years exploring the Amazon and Andes. Reliant on his own resources he survived the rigours of the climate, tropical diseases and the occasional hostile native. This year marks the bicentenary of his birth so I decided to retrace one of his earlier expeditions.

Born in 1817 in the village of Ganthorpe, near Castle Howard in Yorkshire, England, Spruce (Fig 1) showed an early interest in botany. He initially explored the areas in the Howardian hills and, only when he was appointed as a mathematics teacher at the Collegiate School in York, did he venture further afield. In 1842 he published a short account, in *The Phytologist,* of the bryophytes and lichens he had collected whilst visiting Wharfedale in the Yorkshire Dales. In December of 1841 he had spent three days exploring a three mile stretch of the River Wharfe between Bolton Abbey and Barden Tower. He recorded few details about the visit apart from the severity of the weather and the difficulties of collecting frozen plants.

Fig 1 Richard Spruce

Bolton Priory Church sits in a fabulous position on a flat open area on the west bank of the River Wharfe about six miles east of Skipton. Founded in 1154 by Augustian canons the estate was purchased by Henry Clifford after the Dissolution. Barden Tower, a hunting lodge, lies above the river to the north with two deer parks established in the vicinity. Between the two ruins is Strid Wood, the largest area of acid oak woodland and the best remnant of oak wood pasture in the Yorkshire Dales. The 30,000 acre estate passed in 1748 to the Dukes of Devonshire who developed the area further. It was the sixth duke (1790–1858) who contributed most to the landscaping along with his estate manager the Reverend William Carr. They constructed a waterfall on the side of the river opposite the ruined priory, laid out 30 miles of footpaths as well as establishing

Fig 2 When Spruce visited Bolton Abbey and Strid Wood in 1841 it was alread a well-established tourist attraction

seats and moss huts at strategic points above the river, all of which was open to the public. It is estimated that over three million trees were planted between 1809 and 1819 alone (Sheard 1999). The Revd Carr was by any standard a very energetic man. Not only was he the estate manager but also curate of Bolton Abbey and rector of a parish in Berkshire. He also bred the famous Craven Heifer and compiled a dictionary of the Craven dialect.

So when Spruce visited the area in 1841 it was already a well-established tourist attraction (Fig 2). It is also evident that the late Georgian picturesque landscape was overlaid on a much older one consisting of ancient woodland and farmland which had been managed since at least the 12th century. This, along with the exposures of Millstone Grit and Carboniferous limestone, all contributes to the biological richness of the area. In re-tracing Spruce's steps, 175 years later, I was interested to see how many of 31 bryophytes and eight lichens can still be found.

Fig 3 *Scapania aequiloba* was found by Spruce but has not been recorded in the area since 1952

In the intervening years, however, the taxonomy of these groups has changed greatly. For example the three *Hypnum* species he listed are now accepted as belonging to two species of *Brachythecium* and one of *Loeskeobryum*. In the case of the liverworts the genus *Jungermannia* on his list has since been split into another eight genera. Unfortunately a significant number on his list are no longer recognised and without the specimens it is difficult to assign an identification.

Fortunately Strid Wood and the adjoining land have been popular with naturalists for years. The National Biodiversity Network

Images: Bolton Abbey © Mark Butler; *Scapania aequiloba* © WikiCommons/HermannSchachner

database (www.nbn.org.uk) lists about 70 species of liverworts, over 240 mosses and nearly 300 lichens. *Scapania aequiloba,* a liverwort, was found by Spruce and was recorded again in 1952, but not since (Fig 3). The moss, *Rhabdoweisia fugax*, has not been found in the area since Spruce collected his specimen. The habitat of both plants is that of crags and steep ravines so I suspect any naturalist will have to have the attributes of a mountain goat to find them above the raging torrent at the Strid.

So why did Spruce collect relatively few specimens? Admittedly the weather was far from favourable but a more likely explanation may be that he was searching for plants that he had not encountered on his botanising around York and the Howardian hills. He had only recently focussed on the study of bryophytes and lichens and possibly wanted to extend the range of his collection in habitats he would not have encountered in the environs of York and to the east.

In his publication Spruce acknowledged the help of Dr Thomas Taylor FLS (of Dunkerron, County Kerry, Ireland) in identifying his specimens. The following summer Spruce was to spend two months with Taylor, one of the leading botanists of the time, searching for bryophytes in Ireland. The incessant rain did not dampen Spruce's enthusiasm. Of Cromaglown (near Killarney) he wrote "in that paradise of mosses every rock is moss clad, mosses drink of the spray of every little waterfall, and the trunk of almost every tree is so thickly begirt with mosses as to appear of double its real diameter" (Spruce 1844). In the same year Spruce published his list of bryophytes of Yorkshire in which he recorded a total of 297 mosses and 76 liverworts which at the time was the most comprehensive survey of the county.

With the closure of the Collegiate School in 1844 Spruce sought alternative employment. At the suggestion of Sir William Hooker he became a professional plant collector, supplying both public and private collections with dried specimens. The success of his first venture collecting in the Pyrenees spurred him on with more ambitious plans to explore South America. During the 15 years he spent in the Amazon and Andes he amassed large collections, much of which were new to science. He also recorded the use made of plants by the indigenous people, mapped many previously unexplored rivers and constructed vocabularies of some 21 Amazonian languages. Perhaps his greatest achievement was the collection of seeds from the red bark tree (now *Cinchona pubescens*) which were used to establish plantations in India so securing a regular supply of quinine for the colonies. Thus it is fitting that we celebrate the bicentenary of the birth of one of Yorkshire's greatest naturalists.

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Alfred Russel Wallace Notes 7: Wallace, Bates and John Plant—The Leicester Connection

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Among the many minor puzzles surrounding the life and career of Alfred Russel Wallace (1823–1913) is how he and Henry Walter Bates (1825–92) first met. The only direct evidence on this matter appears to be two passages from Wallace's autobiography *My Life*, one being: "How I was first introduced to Henry Walter Bates I do not exactly remember, but I rather think I heard him mentioned as an enthusiastic entomologist, and met him at the library" (Wallace 1905, 1: 237). A few pages earlier he had noted:

> There was in Leicester a very good town library, to which I had access on paying a small subscription, and as I had time for several hours' reading daily, I took full advantage of it. Among the works I read here, which influenced my future, were Humboldt's "Personal Narrative of Travels in South America," which was, I think, the first book that gave me a desire to visit the tropics. I also read here Prescott's "History of the Conquests of Mexico and Peru," Robertson's "History of Charles V." and his "History of America," and a number of other standard works. But perhaps the most important book I read was Malthus's "Principles of Population," which I greatly admired for its masterly summary of facts and logical induction to conclusions. (Wallace 1905, 1: 232)

Here we would like to set out the relevant facts as we have investigated them, and present what appear to be the most likely scenarios that will harmonise them (to apply a term that Wallace himself often used).

The Setting

Mid-19th century Leicester was a rapidly growing industrial and commercial centre with a population of nearly 50,000 residents when Wallace arrived around Christmas-time 1843. He had been working as an apprentice surveyor for his older brother

Image: HW Bates portrait © Wellcome Library, London

William in South Wales, but a decrease in work had forced 20-year-old Alfred out. It took Wallace only a few weeks to land a teaching position as a junior master at the Collegiate School in Leicester, and he began his duties (mostly teaching elementary subjects) there in early 1844.

Apart from the memories reported in his autobiography, little is known about Wallace's activities in Leicester over the 15-month period he was there. He left at Easter 1845 to organise his brother's affairs in Wales when William died unexpectedly. Moreover, some of his recollections as reported in *My Life* are not quite correct, at least as to date (e.g. in *My Life* he reports having seen the phrenologist-mesmerist Spencer T. Hall in 1844, but this almost certainly took place in early 1845: see Smith in press). Nevertheless, there seems little reason to question the remarks made in the two passages quoted on the previous page.

Fig 1 Henry Walter Bates

Bates, meanwhile, was a Leicester native (Fig 1). He and his siblings were the children of "Honest Henry" Bates and his wife Sarah. The older Bates ran a hosiery business and although this eventually became moderately successful, Henry's childhood years were, like Wallace's, rather lean. In his mid-teens, however, Bates began to take interest in several intellectual pursuits, including collecting insects. Sometime after 1839, when he was forced to leave school to go to work, he began to take courses at the local Mechanics' Institute. It could have been there that he first met John Plant.

John Plant

John Plant (1819–94), who originated from Leicester and was the largely forgotten first Curator and Chief Librarian of the Royal Museum and Public Library, Peel Park, Salford (now known as the Salford Museum and Art Gallery), is perhaps the unsung catalyst of the Wallace-Bates relationship. After serving in the military and in a short apprenticeship as a surgeon, he too was forced to join the local workforce: Plant's father was a stationer, and bound the books for the libraries of many of the institutions with which his son was involved (*Minutes of the Leicester Mechanics Institute* [MLMI], 2D39/2; *Minutes of the Leicester Permanent Library* [MLPL], 18D35/2). Plant became heavily involved with the renowned Leicester Mechanics' Institute (LMI), taking classes at first and then becoming an instructor himself. Drawing and ornamental design were among the courses he taught (*Leicester Chronicle*, 14 January 1843); he may

well have first met Bates in the drawing class, as Bates is known to have taken it (Crawforth 2009). Plant's brothers James and Nathaniel also became friendly with Bates, as did James Harley, an amateur ornithologist. By the early 1840s the group, along with Bates's brothers, were making regular excursions to the surrounding forests in search of insect specimens, with the result that a considerable number of their findings were published as notes in the first volumes of the new journal *The Zoologist*, edited by Edward Newman.

"By the early 1840s the group were making regular excursions to the surrounding forests in search of insect specimens."

Although Plant continued his natural history investigations, especially in geology, for most of the rest of his life, his interest in curatorial and library work began to dominate his attention. In the mid-1840s he became a senior official in several different Leicester institutions (see below), eventually using his range of experience to secure the plum position at Peel Park, Salford, in 1849. He rose to elite status among the nation's museum curators and librarians (but that is another story).

The Institutions

In considering the circumstances under which Bates and Wallace might have met, we should first identify the several institutions with which they were, or might have been, associated. Much of the material here comes from research performed at the Leicestershire and Rutland Records Office in Wigston, and the Special Collections of the University of Leicester.

1) The Leicester Mechanics' Institute

The LMI was founded on 30 December 1833 (MLMI, 2D39/1). Its purpose, like that of the many other such institutions that were springing up at that time, was to provide instruction and education to the working man. It offered lectures, and had a Library and Reading Room. Before free public libraries, Mechanics' Institutes were one of the few places working people could borrow books cheaply, and indeed at all. It ceased to function on Lady Day, 25 March 1870, the same year that a Public Library was founded in the city.

Both Bates and Plant certainly were members of the LMI. In 1842, Bates gave a lecture there on the insects of Charnwood Forest, and John Plant taught Drawing and Ornamental Design on Wednesdays and Thursdays, as mentioned above (MLMI, 2D39/2, 122). Bates also donated books and supervised the junior French class (MLMI, 2D39/2, 60), but by 2 August had resigned his committee membership. He continued to be involved in the LMI, however, partially through an investigation into the Institute's financial state.

The LMI was perhaps the most affordable of the institutions discussed here, costing members 2 shillings a quarter for the use of the Library, and attendance at lectures and

Image: General News Room building © Flcikr/Ned Trifle

classes. Initially, it seems the most likely meeting spot for Bates and Wallace, given their status in society at the time. But there is no evidence it contained the books which Wallace mentions in the paragraph quoted earlier, though the catalogue of its holdings appears to be lost. It is also known that Plant gave gifts to the library at the LMI, and that it contained a good stock of books—many of them concerning natural history (MLMI, 2D39/2; Lee 1982, 114). It therefore remains a possibility as the venue for their first encounter.

Fig 2 In 1838 the Permanent Library was moved to the same location as Leicester's General News Room, on the corner of Belvoir and Granby Street

2) The Permanent Library

The Permanent Library (PL) was founded on 31 July 1789 (Herne 1885). Though the library situation in Leicester is confusing due to the plethora of subscription libraries, commercial and otherwise, which flourished during the 19th century, the Permanent Library remained the main subscription library in the city until its closure in 1935 (Lee 1982). It required both a subscription fee, and payment for loans. During this period, becoming a shareholder cost 6 guineas—a huge sum at the time—plus an extra subscription fee of 1 guinea per year (MLPL, 18D35/2, 2). One could, however, gift or bequeath memberships. From 1838 the Library was removed to the same venue as the General News Room, to whom it paid rent.

There is very little evidence left as to who subscribed to the PL (though some think it catered to a largely upper class clientele: Linnell 1983, p. 123). We could find no evidence of Bates or Wallace ever being a member of this institution, though Plant did take up the post of Librarian there in January 1845, and may well have had links to it earlier. This was just before Wallace left Leicester at Easter 1845, but also after he and Bates are supposed to have met in 1844. Interestingly, however, all the books which Wallace mentions in *My Life* were present in its catalogue by 1844 (Herne 1885). As there is no evidence for a listing of these books in the remaining catalogues of any of the other institutions mentioned here, it seems quite possible that Bates and Wallace did meet there.

3) The General News Room

Opened in 1838, the General Newsroom attracted a mostly middle and upper class clientele (Linnell 1983). It rented some of its venue on Granby Street to the Permanent Library, and it appears that the relationship between the two institutions was somewhat complex.

4) The Leicester Literary and Philosophical Society

The Literary and Philosophical Society (LLPS), known locally as the 'Lit and Phil', was founded in Leicester in 1835. Discussions to form a Museum appear in the records in 1840 (*Leicester Literary and Philosophical Society Transactions*, June 1835–June 1879, Periodical SR2), and an initial display opened in 1841. During the 1840s the Museum experienced immense growth, including John Plant's appointment as curator on 20 February 1843. Plant left at the end of 1844 to work for the Permanent Library, though he continued to provide assistance to the LLPS. Both the Lit and Phil and the Museum, now known as New Walk Museum and Art Gallery, continue to the present day.

While we are certain of Plant's involvement, there is no evidence from the *Subscription Book* (14D55/50) that either Bates or Wallace were members for the period 1841–47. Perhaps this was because the annual membership fee was a rather steep £1, 1s.

The Wallace-Bates-Plant Relationship

We can identify the roles that Plant served in the preceding institutions, and their chronology. This has been achieved largely through examination of the electronic archives of three local newspapers from the 1840s period, the *Leicester Journal* (LJ), the *Leicester Chronicle* (LC), and the *Leicestershire Mercury* (LM), and work conducted at the Leicestershire and Rutland Records Office. Bates is also mentioned a few times in these sources as having taken part in Mechanics' Institute meetings, musical productions (Bates was a chorister and played the guitar), and lectures.

Plant is known to have given classes at the LMI at least as early as 1842 (LC, 8 January). On 20 February 1843 he was made curator of the new LLPS museum (LJ, 24 February 1843); as of 27 January 1844 he was still curator (LM), but he apparently vacated the position sometime in December 1844 (LC, 4 January 1845). About 28 December 1844 he was appointed Secretary/Librarian of the Leicester General News Room and Library (LC, 4 January 1845), and various news items and advertisements show that he was still in this position as of 26 September 1845 and, apparently 2 January 1847, 20 January 1849, and 12 May 1849. The last dates notwithstanding, in very early 1845 he was also appointed Secretary and Librarian of the Permanent ('Public') Library of Leicester (MLPL). On 17 October 1849 he resigned his positions to take over the Peel Park facility (LM, 22 September 1849).

It is evident from this chronology that Plant was intimately connected with all the institutions through which Wallace and Bates might have met, and in one fashion or another undoubtedly facilitated, or otherwise affected, their relationship. There is no clear picture at present of the exact chain of events, but several considerations seem relevant:

1) Wallace's words "town library" in *My Life*. The Town Library proper was founded in 1587 (Linnell 1983), but mostly contained theological books, so it is unlikely he meant this particular institution. There were many commercial libraries in the city by this point, but the main subscription libraries seem to have been the LMI and the PL. Note

however that in the first quoted passage from *My Life* given above, Wallace merely writes "at the library"; as no other libraries are mentioned in the text between pages 232 and 237, this implies that on the later page he was referring to this same "very good town library" to which he paid "a small subscription".

2) The particular books Wallace mentions in *My Life* appear only in records we have for the PL, the catalogue of the LMI's library being lost.

3) Fees for usage: Although we have no related evidence, perhaps less expensive arrangements for use were also in effect at some of these institutions (e.g. for reading in place, as opposed to loans), or perhaps rights to use had been gifted to the young men.

4) All of the institutions involved are within easy walking distance of one another (including the Collegiate School, where Wallace worked, and the Bates residence on Queen Street).

5) Plant's involvement in all these institutions—and, indeed, that of his father the stationer—might potentially have enabled him to facilitate entrance to the more expensive institutions. But again, this is an unknown factor.

Conclusions

Although the fee question is still unresolved, the other evidence points to a likelihood that Wallace met Bates at the PL or the LMI. How, exactly, might this have happened?

It is always possible that the two men met at the Library through happenstance, but we must remember Wallace's words that he had "heard him mentioned as an enthusiastic entomologist". By whom? Wallace already had links with mechanics institutes, so he may simply have visited the LMI one day, introduced himself, and heard Bates's name mentioned. As Wallace taught drawing at the Collegiate School, he may also have heard that Plant taught the subject over at the LMI, gone to visit him for advice, and heard mention of Bates.

Alternately, and remembering Wallace's own curatorial and library work at the Kington and Neath Mechanics' Institutes (Wallace 1845; Hughes 1989), perhaps early on he had sought out Plant in connection with the latter's curatorial work for the LLPS, and then heard of Bates there. As Wallace did have a history of attending the meetings of professional societies back in Wales (Hughes 1989), he might have attended a lecture at which he ran into Plant by accident.

Barring the emergence of unforeseen evidence, we will probably never know the full details. John Plant, as Bates's friend and mentor, must certainly have figured in the equation in one way or another. They must have been close as it is interesting to note that one of the very last things Wallace and Bates did before leaving England for South America was to attend Plant's wedding in a small town near Leicester on 18 April 1848 (LJ, 21 April 1848).

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Frederick Roger Goodenough (1927–2017): We were saddened to learn of the death of Mr Frederick Roger Goodenough. Elected to Fellowship of the Linnean Society in 1964, he was born on 21 December 1927, and died on 19 February 2017 at age 89. He usually went by his middle name of Roger and served as Treasurer on the Society's Finance Committee (1970–75). A Director of Barclays Bank between 1979 and 1989, he held the office of High Sheriff of Oxfordshire between 1987 and 1988 and was Deputy Lieutenant (D.L.) for Oxfordshire in 1989. The Society has maintained links with the Goodenough family since 1788, with Samuel Goodenough as one of our founding members; his daughter continues the link with the Goodenough family through her Fellowship.

Daniel Zohary (1926–2016): Daniel was born in Jerusalem on the 24 April 1926, and passed away on 16 December 2016. He was a Foreign Member of the Linnean Society (elected 1991) and Professor at the Hebrew University. An obituary notice can be found in *Genetic Resources and Crop Evolution An International Journal* ISSN 0925-9864 *Genet Resour Crop Evol* DOI 10.1007/s10722-017-0530-4 https://link.springer.com/article/10.1007/s10722-017-0530-4?no-access=true

Mr Basil Harley (1930–2017): One of our longest serving Fellows, elected in 1955, Basil was a renowned printer, publisher and amateur entomologist, and recipient of the Society's H.H. Bloomer award (to an amateur naturalist for an important contribution to biological knowledge) in 2008. http://www.telegraph.co.uk/obituaries/2017/05/19/basil-harley-natural-history-publisher-obituary/

Mrs Elizabeth A Platts (1937–2017): The Society was sad to learn of Elizabeth's passing on 18 May 2017, aged 79 years. She was elected to Fellowship of the Linnean Society in 1975 and served on committees of the Malacological Society, the Ray Society and the Society for the History of Natural History among others. A celebration of life event is planned for Saturday 25 November 2017; to attend please email plattsdaughters@gmail.com

Mr Andrew Sheppy (1949–2017): You may have seen in issue 34 of *PuLSe* that an accident resulted in Andrew's untimely death in May. A Fellow since 1979, Andrew was on the Society's Programmes Committee for over 21 years. He was Director of the Somerset-based Cobthorn Trust, which has been dedicated to conservation activities since 1986. Andrew was one of the founding fathers of the Rare Breeds Survival Trust (RBST) and served as a trustee for many years. More information can be found at: https://www.rbst.org.uk/News/RBST-News/Andrew-Sheppy and http://congresbury.net/andrew-sheppy-rare-breed/

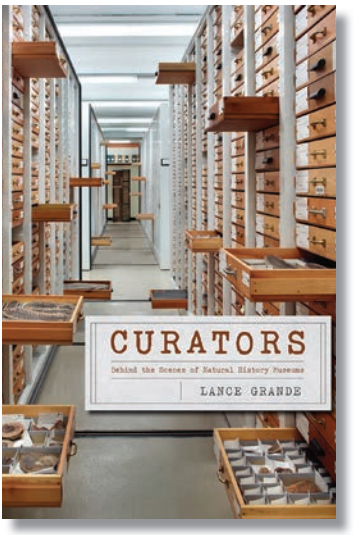
Dr Sandy Baker (1931–2017): Elected a Fellow in 2002, Sandy was Curator of the University Biology Museum at the University of Leeds, a role in which he excelled and which was well-suited to his wide-ranging knowledge. http://www.leeds.ac.uk/secretariat/obituaries/2017/baker_sandy.html

Book Review

Curators: Behind the scenes of Natural History Museums

Lance Grande

412pp, Chicago University Press, 2017, hardback.
Mono or halftone illustrations. $35 (ebook $21.50)
ISBN 978-0-226-19278-8 / ebook 978-0-226-38943-1



The role of natural history museum curators is generally perceived as one of identifying and registering specimens in museum collections, as well as making those available to researchers as required, through online databases, images and physical access. This account gives a much fuller picture, through the first-hand experience of the author and that of his colleagues at the Field Museum in Chicago. The author is a paleoichthyologist and begins by outlining his early career. This includes revealing historical insight into the debates between practitioners of cladistics and more conventional evolutionary theory in the early 1980s, with brief biographies on some of the key people involved, including Colin Patterson, Donn Rosen and Gary Nelson among others.

The role of curators in different sections of the Field Museum is described sequentially, based on past and present curatorial staff, responsible for all aspects of natural history: palaeontology, botany, zoology, mineralogy, astronomy and anthropology and include the death of a reptile curators after a snake bite and includes extracts from the diary recording the symptoms.

Apart from the personal narrative, it includes coverage of some of the added roles curators are required to take on: being an expert witness in court; responsibility for firearm licencing and drugs (current and historic weapons as well as herbarium specimens, such as *Cannabis*); commissioning of displays; public engagement; administrative duties; overseeing field work and fund raising both for acquisition of important specimens but also for expansion of collections and museum facilities.

Each chapter has its own extensive notes and additional commentary, references and picture credits at the end of the book. These provide information on the personalities featured in the text, and also include one of the clearest definitions of cladistics. The illustrations include portraits of colleagues at work, historic images and those from the Museum collections and all have extensive captions giving further information.

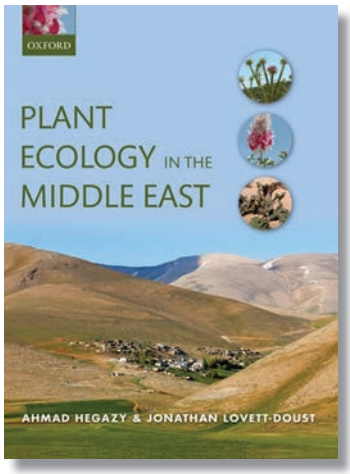
Apart from the reader ending up knowing much more about the Field Museum, this book also give unique insight into life 'behind the scenes' in a natural history museum in the USA, a somewhat different story to that presented by Richard Fortey in *Dry Store Room No. 1: The Secret Life of the Natural History Museum* (2008) but an equally accessible and enjoyable read.

Gina Douglas HonFLS

Plant Ecology in the Middle East

Ahmad Hegazy & Jon Lovett-Doust

368pp, Oxford University Press, 2016, hardback.
Illustrations, maps: some colour. £75 (ebook available)
ISBN 978-0-199-66081-0



This is an advanced graduate and undergraduate textbook giving a synthesis of current knowledge of ecosystems in an area which extends from Libya and Cyprus in the West to Iran and the Gulf of Oman in the East, and from the Black sea coast of Anatolia to South Sudan and Somalia, including Socotra. The authors are based in Cairo and Canada respectively, and their emphasis is on arid and semi-desert ecosystems in the Middle East, including past and future climatic changes, the ways in which vegetation and plants adapt and resulting evolutionary outcomes. There are comparisons with similar ecosystems elsewhere in the world, and special discussion of features found in Socotra. Most chapters include a summary and the final chapter gives conclusions.

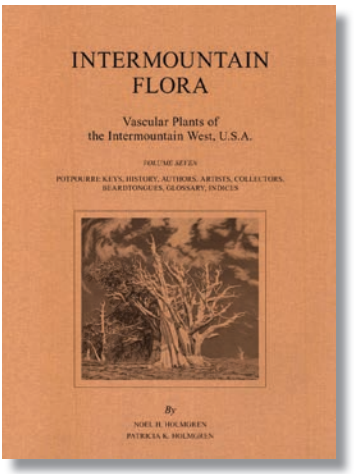
The text throughout has a scattering of italicised words, with no explanation as to why these have been selected. Appendices on plant naming and a species list are followed by a comprehensive list of references and a relatively short five page Index, giving few generic names for plants, most only being listed by family or common name (as with the 'dragon's blood trees' of Socotra). Most tables and charts are derived from existing publications, and black and white line drawings are also from published sources. Maps vary from a clear reproduction of the geomorphology of the Saudi Arabian peninsula, again from a published source, to a series of outline country maps giving minimal information in symbolic form, although with a scale. Poorly reproduced small black and white photographs grouped in blocks, are often reproduced again in a central block of colour plates. The text itself is clear and on good paper, with a robust hardback binding. It is also available as an ebook and that may resolve the poor quality of the black and white photos.

The content certainly achieves its objectives in giving a comprehensive overview of the ecological diversity found within this area, with some interesting digressions into the role of keynote species and the endemism found in Socotra. It should complement and add to information available in existing earlier publications. The conclusions touch on the continuing impact humans are having on the region and likely issues arising from lack of tree regeneration and water management, as well as continuing political instability.

Gina Douglas HonFLS

Book Review

Intermountain Flora (vol. 7): Vascular Plants of the Intermountain West, USA



Noel H. Holmgren & Patricia K. Holmgren

312pp, NYBG Press, 2017, hardback. $119
ISBN 978-0-89327-546-4

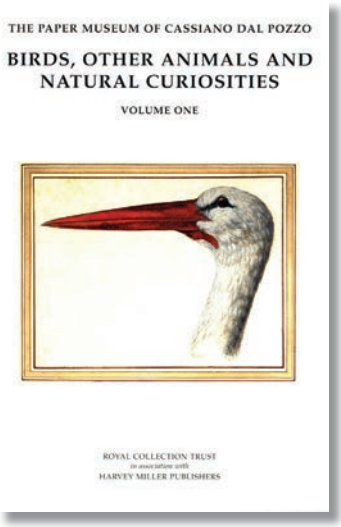
This is the seventh and final volume of a momentous Flora that has documented all the species of the Intermountain Region of the western USA. This detailed flora is based on much fieldwork and has taken 45 years from the publication of the first volume in 1972. Many authors have been involved in this Flora which was envisioned by Bassett Maguire as early as 1931 but did not begin until 1978 and soon involved Arthur Holmgren and Arthur Cronquist. The greatest contribution to this magnificent work is the long-term involvement of Patricia and Noel Holmgren, who have devoted their career to completing this project. All authors have been in the field in the region and so have a wide knowledge of the groups they covered. The seven volumes in nine parts have treated 146 families of vascular plants, 898 genera and 3,847 species with 1,571 varieties. Many species are illustrated in a remarkable series of 1,200 fine line drawings by several different artists with the majority by the talented Bobbi Angel.

This final volume brings together a useful assortment of information of interest to botanists far beyond the region covered. Noel Holmgren outlines the full history of the project in a fascinating and interesting chapter and this shows how much fieldwork has gone into the project. Most useful is a key to all the families treated also prepared by Noel Holmgren who has also provided an update to his 1982 contribution on the horticulturally important genus Penstemon. This new treatment includes an updated key, the description of 23 added or emended species and five more drawings by Bobbi Angel. Fascinating biographies of the main authors are provided including those of Bassett Maguire, Arthur Cronquist, Rupert Barneby, James Reveal, Noel Holmgren and Patricia Holmgren. The chapter on plant collectors of the Intermountain West by Patricia Holmgren includes a biography of dedicated plant collector Arnold (Jerry) Thiem and 353 photographs of participants in the field and in their offices is a wonderful picture gallery of North American botanists. This includes images of several famous botanists from the past such as John Torrey (1796–1873), Asa Gray (1810–88) and John Fremont (1813–90). Other useful features of this volume include a list of all nomenclatural novelties in the Flora, a useful 27-page glossary of botanical terms and a cumulative index.

This most excellent and thorough work should be held up as a model for future Floras. The quality and the thoroughness of this Flora demonstrate the value of long-term research projects over short term ones and the value of extensive fieldwork. Noel and Pat Holmgren have been able to devote a lifetime to complete project due to the stability of their employment at The New York Botanical Garden and their dedication and love of the Intermountain Region.

Ghillean Prance, Past President (Linnean Society)

The Paper Museum of Cassiano Dal Pozzo
Natural History: birds, other animals and natural curiosities



Henrietta McBurney, Ian Rolfe, Caterina Napoleone & Paula Findlen

944pp (2 vols.), Royal Collection Trust (in association with Harvey Miller Publishers), 2017, hardback.
Colour and mono illustrations. £150
ISBN 978-1-909400-60-3

Cassiano was born in Turin in 1588 and developed interests in both art and science. He became part of the intellectual circle around the University of Pisa and its botanic Gardens and later moved to Rome and was elected to the Accademia dei Lincei, the first scientific society in Europe. He embarked on an ambitious project to make a pictorial record of Roman antiquities and everyday artefacts. At the same time, pursuing his interest in natural history, he also began a parallel project to create a catalogue of plants and animals based on original artwork that he commissioned. This 'paper museum' was widely consulted in the 17th century by the many scholars with whom Cassiano maintained an active correspondence. When he died the collection passed down through his family and began to be dispersed to raise money. The largest part was acquired by Pope Clement and later purchased by George III. It is now in the Royal Library at Windsor. The remainder became scattered among public and private collections in Europe and America. The present publication brings together the contents of the original paper museum for the first time since its sale and dispersal centuries ago.

This project is itself a massive undertaking, even with all the benefits of modern technology and printing. Cassiano's catalogue is being published as 38 separate volumes. Those in Series A deal with antiquities and architecture, Series B covers Natural History and Series C the prints and maps. Each volume consists of introductory essays followed by catalogue entries that provide commentaries as well as descriptions of the media, provenance and related literature. There are also bibliographies, documentary appendices, watermark listings and indices providing a very detailed context.

Series B dealing with natural history represents a significant opportunity to view biological art in the 17th century with a detailed historical analysis of the background in which the drawings and watercolours were created. These include some of the earliest illustrations produced with the aid of a microscope. Arranging all the elements of the paper museum required a systematic approach, offering a small insight into taxonomic thinking in the 17th century. Volume one of the natural history series is devoted to birds; volume two includes minerals, fossil wood, molluscs and crustaceans, many of them so well drawn as to be easily recognised. A few mammals are also featured. Some of these creatures (including many of the birds) were drawn from life others like the sloth (standing upright on all fours!) were clearly very dead.

The illustrations were based on real specimens thereby excluding the imaginative monsters and fakes that appear in other early natural history accounts. They include large mammals such as the Indian elephant that arrived in Rome in 1540 and also species that could easily be acquired from the local markets (e.g. trout, grayling, flounder) various common and ornamental birds and also various rodents found locally. The purpose of the drawings was to provide visual descriptions of things that would otherwise only be described in words that leave plenty of scope for ambiguity. But the job of creating a comprehensive catalogue was so big that many groups are omitted (or were unknown at the time). Instead, some species are featured in more detail like the plates showing the greater flamingo that include the structure of the peculiar beak and tongue, but also what the birds look like in flight. The porcupine is shown with close-up details of its feet and the musk glands of the civet are illustrated along with the whole animal, because musk was deemed the most important aspect of that species.

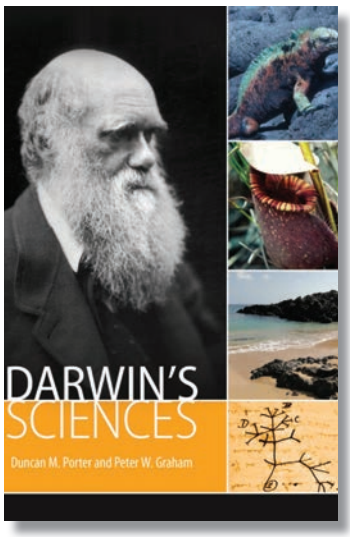
These two massive volumes (nearly 500 pages each) offer beautiful reproductions of the original illustrations, now shown in colour for widespread admiration in a way that was never possible in Cassiano's day. They, and companion volumes, are intended as a means of making his paper museum more widely accessible, especially in major reference libraries that document the history of natural history. They also make an important contribution to the history of art and ideas. Their text and commentaries are noteworthy as thorough works of scholarship that make interesting reading too.

Pat Morris FLS

Darwin's Sciences: how Charles Darwin voyaged from rocks to worms in his search for facts to explain how the earth, its geological features and its inhabitants evolved

Duncan M. Porter & Peter W. Graham

249pp, Wiley Blackwell, 2016, hardback.
Mono illustrations and photos. £24.99
ISBN 978-1-4443-3035-9



Biographies of Charles Darwin abound, most with different foci, whether the 19th-century social context in 'a defiantly social portrait' (Desmond and Moore, *Darwin* 1991); his illnesses and the 'drama of his eventful, troubled and extraordinarily productive life' (Bowlby, *Charles Darwin*, 1990); or the 'transformation … of an amiable but rather aimless young man into a scientific giant whose intellectual heights have scarcely been rivalled' (Janet Browne, *Charles Darwin: voyaging* [1995], followed by *Charles Darwin: the power of place* [2002]). There are many others, but as Browne points out, biographies tend to 'cover the last 20 years of his existence

in a few short chapters, as if after the account of the writing of the *Origin*, there were nothing more to say' (*Voyaging*, p. xi). Her comment is not relevant to the current volume, which is devoted to Darwin's work in various sciences, successively as a geologist, a zoologist, a botanist, a social scientist, culminating in a synthesis of disciplines in his final book, *Earthworms*, described in 1965 as 'the first quantitative ecological study of an animal's role in nature' (p. 216).

The book has its origins in an honours course 'Charles Darwin: Myths and Reality' at Virginia Tech. It does not, of course, ignore *Origin* and its aftermath, but the approach of taking as an almost distinct study each of the fields within which Darwin worked has the effect of making that influential book part of what can be seen as a sustained research programme beginning before the *Beagle* voyage but honed or influenced by it. The components of that extended programme 'served to generate, support and enrich his understanding of change as the great constant of the natural world' (p. 3). The approach is interesting, reflecting in many ways the professional base of each author. Porter's botanical training—including work on Darwin's plant specimens—and long involvement with the project to edit the correspondence of Charles Darwin, shines through, and Graham's literary scholarship is reflected in the way that Darwin's various works are analysed. We get a view of each of the scientific domains by careful exposition of the research products—papers as well as books—that shows the logic of Darwin's approach, as well as the rhetorical devices used to build up arguments, especially in the longer works. Their collaboration is effectively seamless, and does not disrupt the flow by changes of style.

While it is productive to have familiar stories told in a disciplinary context, the section from which I learned most was that on the social sciences, the area where I have read least comprehensively in Darwin's works. As well as successively analysing *Descent of Man* and *Expression of emotions* in the same way as in the previous chapters, the 'digression' on 'Ethics and Religion', is an important synthesis of issues. Analysis of his reactions to slavery, his professional ethics as exemplified by the reaction to the shock of Wallace's paper that prompted publication of the ideas of natural selection in *Origin,* and vivisection campaigning, demonstrate that Darwin's 'ethical vision was largely conventional, although complex' and typical of the social group 'whose values gradually but significantly shaped the evolving moral culture of the nineteenth century Britain' (p. 167).

Other than with the small print size which is difficult for my ageing eyes, my main quibble is that the index, predominantly a single level structure, is not a fully effective gateway to the riches of the book: for example, there is a heading 'Galápagos Islands', with subheads for botany, geology and zoology, but Isla Floreana, Isla Isabela, &c have their own headwords. But, surprisingly, given the content of the chapters, there is no headword for 'Islands'.

I approached the volume with two main questions: Is there room for yet another book on Darwin's life? Will this 'book of the course' suit a general reader not able to interact with peers and the authors? Both are answered with an unequivocal 'yes'. In addition, the extensive and well-chosen bibliography gives a way into a deeper analysis of most of the issues addressed here.

A. M. Lucas FLS

Fellows Elected From March 2017 to September 2017

Dr Kevin Arbuckle

Mr Henry Barnard

Dr Heather Barrett-Mold

Dr David Berry

Dr Emily Billinge

Dr Richard Billington

Professor Mark Burgman

Mr Andrew Byatt

Dr Pankaj Chandak

Dr Majeedul Chowdhury

Dr Jonathan Copnell

Mr Timothy Cullen

Dr Quentin Dawson

Dr Owen Day

Professor Liam Dolan

Professor Donald Drake

Ms Elisabeth Fairman

Mr Lars Fjeldsoe-Nielsen

Dr Maura Flannery

Professor Thomas Gillespie

Mr Ulf Gustafson

Dr Pinky Kaur

HRH Princess Michael of Kent

Dr Bartlomiej Kolodziejczyk

Dr Lady Lynne Leveson

Mr Keith Long

Professor Dame Georgina Mace

Ms Marybelle Mortera

Dr Mary O'Connell

Professor Steve O'Kane

Mr Moshe Erlendur Okon

Dr Farzana Parveen

Ms Ruqia Perveen

Professor Francesco Pezzella

Mr Peter Raines

Dr Onja Razanamaro

Mr Neil Redgate

Mr Timothy Richardson

Mrs Christina Rydegran

Mr Keith Salvesen

Professor Amita Saxena

Professor Dr Keith Seifert

Dr Efram Sera-Shriar

Mr Tolkha Shetekauri

Mr Peter Sibley

Dr Grant Stentiford

Professor Pramod Tandon

Dr Emmanuel Toussaint

Mr Michael Tucker

Dr Tathagat Waghmare

Dr Rex Walters

Mrs Alison Welsh

Associates

Mrs Susan Medway

Mr John Wallace

Students

Mr Leif Bersweden

Ms Victoria Burton

Mr Richard Kelly

Dr Yee Wen Low

Foreign Members

Dr John Albert Raven

Mr William Sykes

Honoris Causa

Dr William Friedman

Deaths Reported to Council in 2017

Mr Frederick Goodenough

Mr Basil Harley

Mr Kenneth Hill

Mr Robert Hill

Dr Richard Hughes

Dr Richard E Nye

Mrs Elizabeth A Platts

Mr Andrew Sheppy

Mr Will Smith

229th Anniversary Meeting of the Linnean Society

held at Burlington House, Piccadilly, London W1J 0BF

4.00 pm, Friday 24 May 2017

1. **The President** took the Chair and welcomed 83 Fellows and 28 guests to the meeting.
2. **Apologies** had been received from 20 Fellows.
3. **Admission of Fellows**: The following signed the Obligation in the Roll and Charter Book and were admitted Fellows: Robert BLACKHALL-MILES, Shane Campbell BURGESS, Pete CHIODINI, Marianne Jennifer DATILES, Tom GOUGH, Charlotte GREZO, David Ord KERR and Keith SALVESEN.
4. The **Minutes of the Meeting held on 20 April 2017** were accepted and signed.
5. **Third Reading of Certificates of Recommendation for FMLS and HonFLS:**

   a. **Foreign Member:** ***William Russell Sykes***

   William Russell Sykes, botanist, born in the UK, emigrated to New Zealand to join the Botany Division of the then Dept Industrial & Scientific Research (DSIR) in 1961. Publications include *Contributions to the Flora of Niue* and works on the flora of Norfolk Is and the Kermadec Is; co-author of *Flowering Plants of New Zealand* (1990) and contributing editor to *Flora of New Zealand* (2000); more recently, *Flora of the Cook Islands*, which took 20 years to write. Made an Officer of the NZ Order of Merit (ONZM) in recognition of his work. A number of species named in his honour: *Epilobium sykesii* P.H. Raven; *Pandanus sykesii* H. St. John; *Corydalis sykesii* Ludlow & Stearn.

   b. ***Fellows honoris causa:*** ***Professor William Friedman***

   William (Ned) Friedman, botanist, appointed 2011 as Director of the Arnold Arboretum of Harvard University (AAHU), Arnold Professor of Organismic & Evolutionary Biology, and Faculty Fellow of the AAHU. Professor Friedman has devoted his entire career to studying the evolutionary diversification of flowering plants. Prior to Harvard, Friedman was Professor of Ecology & Evolutionary Biology at the University of Colorado from 1995. He was acclaimed for his discovery of a new type of reproductive structure in an ancient flowering plant that may represent the link between flowering plants and their ancestors.

   c. ***Fellows honoris causa:*** ***Professor John Albert Raven***

   John Albert Raven FRS FRSE, botanist and Emeritus Professor at University of Dundee, as well as Professor at the University of Technology Sydney and Professor at the University of Western Australia. His primary research interests lie in the ecophysiology and biochemistry of marine and terrestrial primary producers such as plants and algae. He has made important contributions at

many levels, clarifying the role of dark respiration in plants, and providing an integrated view of pH regulation, as well as information on the possible phylogeny of vascular land plants.

6. **Appointment of Scrutineers**. Rosie Atkins, Susan Gove and Keith Maybury were appointed.

7. **Ballots**. Fellows voted in the ballots for Members of Council (4 of 4 nominees), the Officers (6), the President-Elect (1), FMLS (2) and Fellow *hc* (1) and for ordinary Fellows (28).

8. **Citations and Presentations of Medals and Awards.** PowerPoint presentations showing the respective medal winners and their field of interest were shown during the reading of the citations.

   a. The **2017 Linnean Medal in the field of Botany** was awarded to **Dr Charles Jarvis**. The citation was read by ***President, Professor Paul Brakefield FRS:***

   "Dr Charlie Jarvis is a world authority on the botany and botanists of the 17th- and 18th-century period. His research has been focussed on stabilising the nomenclature of Linnaean binomial plant names; over 100 publications have resulted from this research, along with the creation and maintenance of the Linnaean Plant Name Typification Project website. The latter culminated in the Society's publication, *Order out of Chaos*, which received of a number of prestigious awards. Charlie has also been instrumental in promoting the study of botanical collections by non-scientific academics, and has initiated collaborations with a wide range of academics both in the sciences and humanities. His unstinting helpfulness to fellow botanists and efforts to unite the arts and sciences have been exemplary, and unique in the botanical community. As curator of the Society's botanical collections for 25 years he served on the Collections Committee of the Society until 2015. In retirement, he continues to pursue historical botanical research, and is currently working on the collections of James Petiver. He was awarded *honoris causa* status by the Society in 2015. For his contributions, not only to the Society, but also for his services and impact on scholarly botanical research more widely, Dr Jarvis is a most worthy recipient of the Linnean Medal for 2017."

   b. The President presented the **2017 Linnean Medal in the field of Zoology** to **Dr David Rollinson**. The citation was read by ***the President:***

   "Professor David Rollinson is an outstanding world-class research scientist at the forefront of the field of Neglected Tropical Diseases, currently at the Natural History Museum, London (NHM), where he is Head of the Wolfson Wellcome Biomedical Laboratories and Director of the World Health Organization Collaborating Centre for Schistosomiasis. He is a member of the WHO expert panel on Parasitic Diseases. Around 300 peer-reviewed publications provide a deeper understanding of host parasite interactions. David's research is

characterised by a multidisciplinary approach utilising a combination of field studies and molecular analyses to implement helminth diagnosis, control and elimination strategies, especially in Africa. David has attracted significant grant funding throughout his career, and has built an internationally recognised reference collection of schistosomes and snail hosts for molecular studies by his own team and available to the wider research community. His counsel is much sought after by governments as well as academic institutions, as demonstrated through his membership of various scientific panels. He has served as President of the World Federation of Parasitologists and on the Linnean Society Council (2011–14). David has received many honours, including the Bicentenary Medal of the Linnean Society, as well as honorary membership of a number of organisations. He is thus a most worthy recipient of the Linnean Medal."

c. The President presented the **2017 Darwin-Wallace Medal** to both **Professor John Thompson**. The citation was read by ***Editorial Secretary Professor Mark Chase***:

"Professor John Thompson has put coevolution 'on the map'. He was appointed to the Jean H. Langenheim-endowed chair in Plant Ecology & Evolution at the University of California, Santa Cruz, in 2014, having previously been a Distinguished Professor and Director of the STEPS Institute for Innovation in Environmental Research there. He spent his early career at Washington State University and continues to serve regularly as a Whiteley Center Scholar there. The research in John's laboratory is developing a robust framework for the science of coevolutionary biology—over several decades his work on insect-plant interactions, and more recently with experimental evolution in microbes, has achieved more in understanding pattern and process in coevolutionary interactions among organisms than anyone else. John has received numerous awards and honours; Fellowship of the American Academy of Arts and Sciences in 2010; President of the American Society of Naturalists; Visiting Fellow Commoner of Trinity College Cambridge, and Fulbright Senior Scholar in Canberra, Australia. John has published four major books on coevolution, most recently *Relentless Evolution* (2013). He sits on various U.S. National Science Foundation and European Research Council review panels. For his significant contribution to the coevolutionary arena, John is undoubtedly a worthy winner of the Darwin-Wallace Medal 2017."

d. The President presented the **2017 Bicentenary Medal** to **Professor Claire Spottiswoode**. The citation was read by ***the President:***

"Professor Claire Spottiswoode is a behavioural ecologist, who spends much time working on host parasitic birds in Africa. She is currently a BBSRC Senior Research Fellow and Hans Gadow Lecturer in the Department of Zoology at the University of Cambridge, having joined the department in 2002 as a PhD student. Claire came to the UK from the University of Cape Town

Medal and Award Winners from Left to Right: Dr David Rollinson, Tim Douthit (*on behalf of Karin Douthit*), Dr Sonia Rowley, John Walters, Dr Lynn Dicks, Dr Steven Dodsworth, Professor John Thompson, Professor Paul Brakefield FRS PLS, Professor Claire Spottiswoode, Dr Johannes Girstmair, Dr Kwaku Aduse-Poku, Dr Charlie Jarvis and David John (*on behalf of David Williamson*)

South Africa, had research fellowships from Sidney Sussex College and The Royal Society. Since mid-2016, she has divided her time between Cambridge and the FitzPatrick Institute of African Ornithology at the University of Cape Town where she has been appointed to a Chair. Claire works on both parasitic and mutualistic interactions between species, her main focus being on coevolutionary arms races between brood-parasitic birds (such as cuckoos, honeyguides and parasitic finches) and the host species they exploit, integrating field experiments with other approaches drawn from population genetics, sensory ecology, and comparative analyses across species. A recent publication in *Science* showed that by following honeyguide birds, people

in Africa are able to locate bees' nests to harvest honey—elucidating a rare example of cooperation between humans and free-living animals. For all of these outstanding contributions in her field, Claire Spottiswoode is a most deserving recipient of the 2017 Bicentenary Medal."

e. The President presented **the 2017 Trail-Crisp Medal** to **Dr Johannes Girstmair**. The citation was read by ***Collections Secretary Dr John David***:

"The two most important achievements of Johannes Girstmair's recently awarded PhD at UCL have been the design and build of his own Selective Plane Illumination Microscope (SPIM), elaborated to include twin lasers, and the development and mastery of techniques for microinjection of fertilised eggs of *Maritigrella crozieri*. Injection of mRNAs for fluorescent proteins has allowed him to record the early events of development in 4d recordings from live embryos. These technical successes are remarkable achievements, in particular

mastering the complex software for analysis. This work is providing exciting new insights into the early development and evolution of the little studied larva of a polyclad flatworm and whether this larval stage might be homologous to the trochophore larvae of related phyla such as the annelids and molluscs. To address this question, he is working on the earliest events in the embryology of this indirectly developing flatworm, following the developmental process in detail. Johannes' talents are more than simply good lab skills; he has developed a deep understanding of the problem and a thorough knowledge of the literature going back to the 19th century. Johannes has also contributed to various microscopy courses in Germany, UK, Italy and Sweden. For his masterful contribution to microscopy, Johannes is a worthy recipient of the Trail Crisp Award 2017."

f. The President presented the **2017 Irene Manton Prize** to **Dr Steven Dodsworth**. The citation was read by ***Scientific Secretary Professor Simon Hiscock:***

"Steven Dodsworth has a deep interest in systematics and is a keen field botanist. His exceptional productivity and abilities were apparent from his undergraduate days (Double 1st, University of Cambridge, Magdalene College), when he submitted a sole author review to *Developmental Biology*, in 2009, and already has 74 citations. He also has papers published from his Biosystematics MRes which he undertook from 2009–11 at Imperial College London, the NHM and the Royal Botanic Gardens, Kew (RBGK). Steven was a dynamic PhD student at Queen Mary University of London, funded by NERC, and worked with great drive, quickly publishing a number of papers based on his PhD thesis on *Genome skimming for phylogenomics*. This involved collecting plants in Australia from the genus *Nicotiana* section Suaveolentes; leading to the discovery of new *Nicotiana* species. Steven is now Senior Researcher (Phylogenomics) in the Department of Comparative Plant and Fungal Biology at RBGK, having worked in the Herbarium in 2006 as a Digitisation and Herbarium Officer. In summary, Steven is a fast rising star, and is likely to be one of Britain's finest botanists—thus a truly deserving winner of the Irene Manton Prize 2017."

g. The President presented the **2017 John C. Marsden Medal to Dr Kwaku Aduse-Poku.** The citation was read by ***Scientific Secretary Dr Malcolm Scoble:***

"Kwaku Aduse-Poku is a butterfly evolutionary ecologist, currently working as a post-doctoral research fellow at the University of New York, where he is part of a consortium of researchers building global phylogenies of all butterflies using next-generation sequencing. He was the first Ghanaian student to take on African butterflies as a study group, and has now mentored several students. His PhD was undertaken at Cambridge University and his thesis was described as 'outstanding' by his external examiner, who added that he considered 'this impressive body of

work to be a remarkable contribution'. Kwaku produced a molecular phylogeny of the Mycalesine butterflies in the Old World Tropics that includes the genus *Bicyclus*. He used a battery of nuclear and mitochondrial genes and state-of-the-art methods of analysis, and described the parallel radiations in this tribe of some 350 species, and developed robust models of biogeography and timings of expansions. In 2015, he was awarded the Torben Larsen Memorial Tankard for his contribution to butterfly research in Africa. Kwaku's outstanding dissertation is thus a very worthy winner of the 2017 John C. Marsden Medal: it's worth noting that John Marsden expressed his enthusiasm for the possibility of using molecular methods to explore the adaptive radiation and biogeography of Indian Ocean butterflies, so we are confident that John would also have greatly appreciated this thesis. Thus, Dr Aduse-Poku truly merits the John C Marsden Medal 2017."

h. The President presented the **2017 H.H. Bloomer Award** to **John Walters**. The citation was read by ***Scientific Secretary Dr Malcolm Scoble***:

"John Walters exemplifies the great tradition of British naturalists, with a strong emphasis on observing organisms in the field. He actively seeks to share his knowledge with others for their enjoyment and for conservation. Having trained at the Truro College of Art and Design, he draws, photographs and films wildlife in the field and also writes, speaks and broadcasts on a wide range of British species. The 'Wildlife Notebook' on his website (http://johnwalters.co.uk/notebook/) contains illuminating blog-style observations, associated with numerous delightful sketches, annotated with John's pithy field notes, recording behavioural and general observations of his subjects. He has uploaded almost 100 videos on YouTube showing the behaviour of many species as varied as the display of the Rufous Grasshopper to the growth of the Octopus fungus. John has conducted important ecological research into several rare beetle species in the UK, as well as the Heath Potter Wasp, for which he has produced unprecedented field notes. His dedication to taking natural history to a wider audience has resulted in a series (16 at present, with more planned) of 'Guides to British Beetles', which he has produced with fellow natural historian Mark Telfer. For his wide-ranging contributions to natural history and novel observations, John Walters is a worthy winner of the H.H. Bloomer Award for 2017."

i. The President presented the **2017 John Spedan Lewis Medal** to **Dr Lynn Dicks**. The citation was read by ***Collections Secretary Dr John David*:**

"Dr Lynn Dicks is a leading conservation biologist specialising in bees and their roles in pollination both of native flora and crop plants. A degree from Oxford University in Biological Sciences was followed by her PhD on the ecology of flower-visiting insects in Cambridge. She has worked as a science writer and science communications adviser and has published widely. Lynn is Co-ordinating Lead Author of the IPBES Thematic assessment of pollinators,

pollination and food production (IPBES is the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) and recently moved to the University of East Anglia as a Research Fellow after a NERC Knowledge Exchange Fellowship, linked to the Insect Pollinators Initiative. She seeks to show how farmers can benefit from ecosystem services in realistic commercial contexts, and how scientific evidence can be used in policy and practice. She has developed methods to compile and synthesise ecological evidence and make it useful for decision-making. Lynn works with organisations that manage the environment, in Government, the charitable sector and the food and farming industry. All her work is focussed on insect pollinator conservation and ecosystem services in farmland, but the methods are widely applicable. For her evident dedication to insect conservation, Lynn Dicks is a worthy recipient of the John Spedan Lewis medal 2017."

j. The President presented two **2017 Jill Smythies Awards,** as the judges considered both the nominees merited the award.

The citation for **Karin Douthit** was read by ***Editorial Secretary Professor Mark Chase***:

"Karin Douthit has provided illustrations for more than 120 scientific papers and books published over 40 years. She has a unique talent for taking a herbarium specimen and making it live again. Her work is greatly admired by taxonomists and others—her artwork has helped many people identify plants. The judges' comments included 'quite outstanding', 'very fine detail' and 'excellent botanical accuracy'. Karin has also taught botanical illustration, passing on her expertise to many others. Key groups of plants illustrated include new genera from the family Malpighiaceae, as well as those from the Orchidaceae, Gramineae and Compositae (Asteraceae), many of which can be found in the *Flora Novo Galiciana*. Karin's real gift for botanical drawing makes her a truly worthy recipient for the Jill Smythies Award."

The citation for **David Williamson** was read by ***Scientific Secretary Professor Simon Hiscock***:

"David Williamson is an exceptionally gifted taxonomist and illustrator who has devoted at least 35 years to identifying and illustrating desmids, a distinctive group of microscopic green algae common and abundant in soft 'acid' water habitats that are often recognised to be endangered or vulnerable to changes in the global climate. Desmids are the second most diverse group of freshwater microalgae in the British Isles, and because of the elaborate morphology and ornamentation patterns they display, it is essential to have accurate and detailed drawings to assist interpretation of the key characters required for identification. David has produced many thousands of superb illustrations of desmids, producing very large drawings and ensuring that the fine details of ornamentation are still clearly visible on reduction for publication. David

is one of the leading world authorities on desmids and has contributed to/ written highly-illustrated chapters in four books, dealing with desmids from other parts of the world, including Canada, Chile, Sulawesi, Malaysia, New Zealand, South Orkneys and Southern Africa."

k. The President presented the **David Attenborough Fieldwork Award** to **Dr Sonia Rowley,** as the judges considered both the nominees merited the award.

"*The Attenborough Award is given for the best fieldwork project undertaken with funding from the Systematics Research Fund (SRF), jointly administered by the Linnean Society and the Systematics Association (SA). The Society contributes £24k and the SA £7k; 30 grants of around £1k are awarded annually.* Dr Sonia Rowley is a Research Affiliate at the Bishop Museum, Honolulu. She received her SRF award to support expedition research and the subsequent completion of a monograph describing the twilight reef gorgonian corals throughout the Islands of Pakin Atoll, Micronesia. These reefs are among the most diverse yet most unexplored realms on the planet, the corals being poorly described and notoriously difficult to identify, but possibly holding answers to questions about historical ocean chemistry and climate change. A total of 48 dives were conducted, using advanced mixed-gas rebreather systems, to a depth of 154m, and 284 gorgonians were collected. The opportunity was also taken to test the thermal tolerance of 24 coral colonies in a 12-month transplant experiment. This exploration of deep-reef ecosystems resulted in the discovery of three new species of fishes and elucidated ecological patterns new to science, providing a natural laboratory to address questions of diversity and resilience, as well as priority conservation. By sharing their experience and media with the local communities, Sonia's team has been asked to guide regional conservation management decisions at the governmental level, with an open invitation for ongoing research throughout the region. We are therefore delighted to present this Attenborough Award to Dr Sonia Rowley".

9. Treasurer's Report

The Treasurer presented the **Accounts for 2016**, full details of which were in the Society's *2016 Financial Statements YE2016* which are posted on the Charity Commission and Society websites (and largely reproduced in the *2016 Annual Review* which had been mailed to all Fellows in mid-April).

The Treasurer said that 2016 had been the hand-over year in May from Gren to her and she was pleased to say that, following donations from individual Fellows through *AdoptLinn* and funding from the Society, the Linnaean Herbarium Cabinet (*Herbie*) had been conserved and work was now underway to source a suitable display case. Excluding *Herbie*, the *AdoptLinn* initiative had successfully attracted donations of £8,500 for conservation work on books and manuscripts.

The Society had 2,608 Fellows and members with 58 defaulters (the list of the latter will be posted in the library in November; those present were encouraged to chase up payment by any defaulters whom they might know). As announced at the Society's Anniversary Meetings in both 2016 and 2017, the annual contribution rates for Fellows will increase from 24 May 2017. Standard Fellowship rates will rise from £50 to £55. (The rates for lower contribution countries will also change: *Lower Income* will stay at £20; *Middle Income* will increase from £20 to £25; *Upper Income* will rise from £20 to £35.)

The Treasurer thanked everyone for their donations and bequests, emphasising how grateful the Society is for their support. She reported that 2016 was the last year of the Society journals being published by Wiley. Income from the journals was up in 2016, the main drivers being foreign exchange gains from the weak pound and the receipt of monies from our new publishers Oxford University Press (OUP), as a fund for transitioning costs. The SA had increased their contribution to the SRF and were thanked. The SRF fund is attracting some good quality applications. Income from investments represented interest of around 4%. The markets had been reacting to political events globally although recovering quite quickly, and this fluctuation is likely to continue, but our investment brokers report cautious albeit rising optimism on the global outlook for tentative growth and inflation.

On the expenditure front, the Treasurer reported how the Society had invested in people in 2016. Most of the existing staff had taken up pensions, while new roles had been created, including a full time archivist, Liz McGow, a part-time Digital Assets Manager, Andrea Deneau, and after a successful BioMedia MeltDown project, Ross Ziegelmeier had been retained, moving to a role as Education Officer on Projects, currently producing public engagement videos using items in the Society's collections.

Significant expenditure had been incurred in relation to the Department for Communities and Local Government (DCLG), as the Society, along with the other Courtyard Societies (CS), had been in arbitration with the DCLG over the rents; at the end of 2016, the arbitrator gave his decision that the CS had lost their case, because of which, the rents for 2013/14 and 2014/15 became due (rents had been paid up to and including 2012/13). Setting income against expenditure, the Society had a deficit for 2016 of £103,170.

Moving on to the balance sheet, which takes all Society assets into account (heritage assets not saleable), the Treasurer reported that Society funds passed the £5m mark for the first time and stands at £5,026,222.

The Treasurer thanked all the staff and volunteers for their commitment and hard work, making special mention of the Financial Controller, Priya Nithianandan, for his support, expertise and guidance on the financial and contractual matters of

the Society. The Treasurer added a special thank you to Victoria Smith, Buildings & Office Manager, who, after almost 11 years' service, had had to step down from full-time work, however, the Society was extremely pleased that it would be retaining Victoria's immense knowledge and experience on a part-time basis.

11. Motion to Accept Accounts for 2016

Hazel Marsden FLS, a member of the **Audit Review Committee** read the following statement. "In accordance with Bye-Law 12.6, the Annual Statement of Accounts for 2016, and the report of the professional auditors, were carefully examined by the Audit Review Committee of Fellows on 13 March 2017. On behalf of the Committee, of which I was a member, I am pleased to report to the Anniversary Meeting that we concluded that the Accounts give a true and fair view of the Society's finances as at 31 December 2016. I therefore move that they be accepted." This was carried unanimously.

12. Appointment of Auditors for 2017 and Banking Arrangements

a. **The Treasurer** moved that the firm of **Knox Cropper, of 16 New Bridge Street, EC4V 6AX**, be appointed as **auditors** in accordance with Bye-Law 12.5, which was accepted unanimously.

b. **The Treasurer** moved that **Barclays PLC, PO Box 13555 Acorn House, 36–38 Park Royal Road, London NW10 7WJ** be reappointed as the Society's **bankers** and this was accepted unanimously.

13. The Presidential Address: *Butterfly Wing Patterns and the Idea of Developmental Bias*

The President explained how the African mycalesine butterfly, *Bicyclus anynana*, is a model species that has been used to help understand the processes of adaptive evolution by natural selection through applying a broad 'science of natural history'. Topics of special interest to his research group had been seasonal polyphenism, eyespot pattern evolution and the concept of developmental bias but these are all relevant to broader questions. For example, is natural selection 'all-powerful' and does how development works influence the paths of evolution? The President's research group now seeks to use the knowledge from the single species work to understand both pattern and process underlying the diversification of some 300-related species of mycalesine butterflies. Surveys of wing pattern variation across the whole phylogeny of the mycalesines are now providing evidence that this bias is reflected in patterns of evolutionary diversification. Moreover, a lineage on Madagascar appears to have broken the developmental bias to result in novel patterns of eyespot evolution.

14. The Vice-President and Scientific Secretary, Dr Malcolm Scoble, thanked the President for delivering such a wonderful address. Dr Scoble recalled a lecture

by Sir John Gurden on the organiser principle. At that time, the two strands of research—ecological genetics and evo-devo—had not really come together. But, over the last couple of decades, the relationship between genetics, developmental biology and the environment had been shown to be complex but highly revealing.

15. Results of the Ballots **58 papers returned: although not unanimous, all those standing were elected/re-elected.**

a. The following were elected to Council: Dr Colin Clubbe (conservation botanist, taxonomist), Dr Nick Crumpton (zoologist, science communicator), Dr Blanca Huertas (Lepidoptera, curator), Professor Dame Georgina Mace FRS (conservation biology, policy).

   Details of these new Council members can be found in *The Linnean Society of London Anniversary Meeting 2017 Council Agenda and Council Nominations*, circulated with *The Linnean* in April 2017. These nominations were for Fellows to replace Professor Max Telford, Professor Jeff Duckett, Dr Laura D'Arcy and Dr Francis Brearley (who resigned January 2017 for personal reasons), who have served three years on Council. The President thanked the outgoing Council members for their services to the Society.

b. The Officers duly elected were: **President, Professor Paul Brakefield FRS; President-Elect, Dr Sandra Knapp; Treasurer, Deborah Wright; Collections Secretary, Dr John David; Editorial Secretary, Dr Mark Chase FRS; Scientific Secretary, Professor Simon Hiscock; and Scientific Secretary, Dr Malcolm Scoble.**

c. The Fellows were elected as on the 24 May 2017 ballot list (28 Fellows).

d. Professor William (Ned) Friedman (USA) and Professor William Russell Sykes (New Zealand) were elected as Foreign Members, while Professor John Albert Raven was elected Fellow *honoris causa*.

16. Names of Vice-Presidents

The President, Professor Paul Brakefield, named his Vice Presidents for the coming year as **Dr Malcolm Scoble, Professor Juliet Brodie, Rosie Atkins** and **Professor Simon Hiscock.**

17. Future Events

The President noted the dates of forthcoming meetings

18. Any Other Valid Business

There being no other valid business, the President declared the meeting closed.

THE NEXT **ANNIVERSARY MEETING** WILL BE ON **THURSDAY 24 MAY 2018** AT **4PM**.

The Lord Treasurer of Botany

Tom Kennett

Winner of the 2017 John Thackray Medal from *The Society for the History of Natural History*

In *The Lord Treasurer of Botany: Sir James Edward Smith and the Linnaean Collections*, discover how James Edward Smith, the shy, diffident son of a Norwich textile merchant, took a passion for botany and forged it into a highly successful career in natural history in 1790s London, in the process becoming a focal point for the study of botany and natural history in Great Britain, Europe and beyond.

Beautifully illustrated, *The Lord Treasurer of Botany* is the definitive work on this major, and under-appreciated, player in the field of natural history.

388pp., London: The Linnean Society of London, 2016, flexibound. £25.
ISBN 976-0-9935510-0-0

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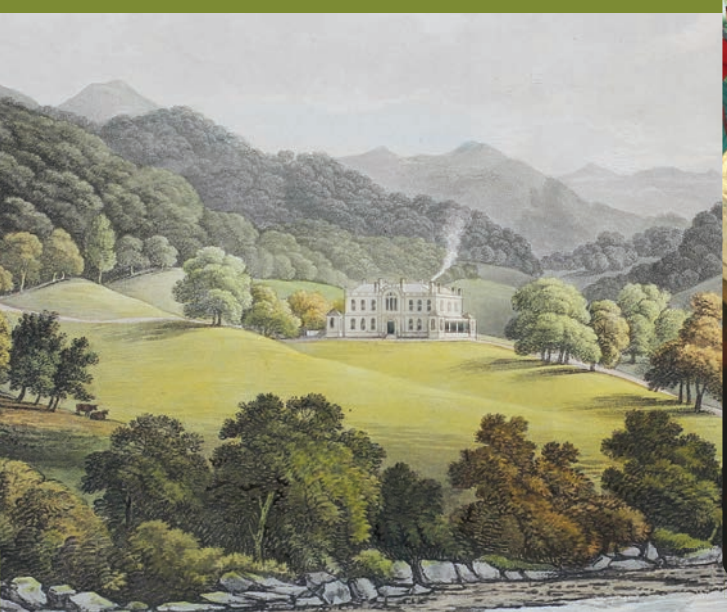

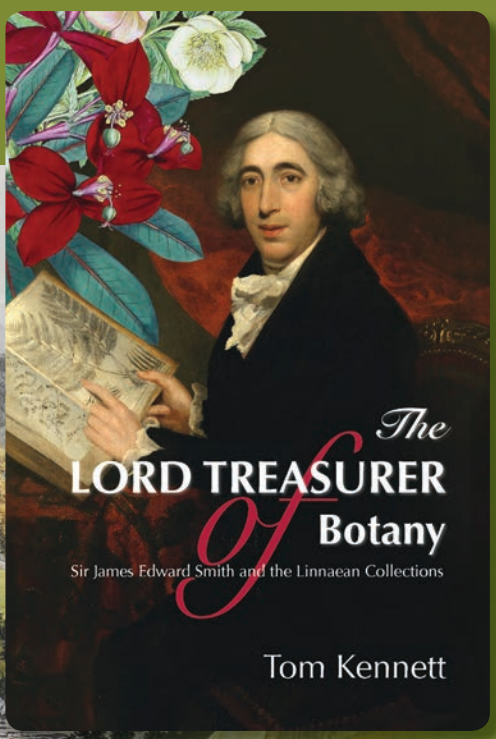

The Linnean Society of London : Programme of Events

November 2017–Jan 2018

1 Nov
12.30–13.00
What the Bat 'Saw': Hunting Insects, Hiding from Bats and Dropping Seeds around the World
Dr Elizabeth Clare FLS, *Queen Mary University of London*

2 Nov
18.00–19.00
Sir Julian Huxley Lecture 2017: Fungi in the Oceans Deep
Prof Thomas Richards, *University of Exeter*
PARTNER EVENT

7 Nov *
Field Work in the Life and Earth Sciences
DAY MEETING: Please check website for speakers and registration information

8 Nov
Palaeobotany
SPECIALIST GROUP MEETING

9 Nov
Palynology
SPECIALIST GROUP MEETING

15 Nov
18.00–19.30
Darwin Lecture: From Gene Identification to Clinical Benefit; The Example of Cystic Fibrosis
PARTNER EVENT: Taking place at the Royal Society of Medicine, London
Professor Eric Alton, *Imperial College, London*

19 Nov [A]
18.00–19.00
Annual Debate 2017: Big Data
In association with the London Evolutionary Research Network (LERN)

1 Dec [A]
18.00–19.00
A Curious Performance: Maria Sibylla Merian and the Art of Natural History
FOUNDER'S DAY LECTURE 2017: Kate Heard, *Royal Collection Trust*

6 Dec
12.30–13.00
Why Nothing Matters in Squirrel Management
Dr Craig Shuttleworth, *Red Squirrel Survival Trust*

7 Dec
16.00–18.00
I'm a Butterfly, Get Me Out of Here…
IRENE MANTON LECTURE: Taking place at the University of Manchester
Dr Anna Gilchrist, *University of Manchester*

16 Jan [A]
18.00–19.00
Reproduction in Sponges: Genes, Structures and Ecological Patterns
Dr Ana Riesgo Gil, *Natural History Museum, London*

REGISTRATION REQUIRED FOR ALL EVENTS UNLESS STATED • * Payment required • [A] Admission of Fellows

All meetings are held in the Society's Rooms unless otherwise stated.
A tea reception precedes evening meetings at 17.30.
Evening meetings begin at 18.00 and are followed by a wine reception in the Library.

To register and for other events visit **www.linnean.org/events**