

The Linnean

Communicating nature since 1788

Vol 40 | No 2 | September 2024

Putting down roots

Botanical illustration in focus

Panama

*From jungle
to lab*

SIZE MATTERS

*Mammal dwarfs and giants
under the microscope*

The
LINNEAN
SOCIETY
of London



Still LIFE

An exhibition
depicting nature,
from woodcuts
to x-rays



FREE ENTRY

10.00–17.00 Tues–Fri

13 September 2024–28 February 2025

The
LINNEAN
SOCIETY
of London



About us

The Linnean Society of London is the world's oldest active society devoted to natural history. Founded in 1788 by botanist Sir James Edward Smith (1759–1828), the Society takes its name from the Swedish naturalist Carl Linnaeus (1707–1778), whose botanical, zoological and library collections have been in our keeping since 1829. These collections, awarded Designated status by Arts Council England, are of fundamental importance as a primary reference for the naming of plants and animals. They are enhanced by the Society's own rich library which provides key resources for scientific and cultural research.

Our vision is a world where nature is understood, valued and protected. To do this we aim to inform, involve and inspire people about nature and its significance through our collections, events and publications. Thanks to the wide-ranging expertise of our membership and our unique collections, we are a hub for science communication through interdisciplinary learning and engagement.

Cover image: *Protea* © Maria Alice de Rezende

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Dear Fellows,

We're approaching the end of the summer in the UK, and our autumn is looking bright. We have some incredible events coming up, both online and onsite, and our new exhibition, *Still Life*, opens on 13 September. We have events lined up to coincide with the exhibition, like curator-led tours and cyanotype printing, so don't miss them. (See the back cover for details.)



In this issue of *The Linnean*, we investigate the biodiversity of Panama on a project supported by our LinnéSys: Systematics Research Fund with the Systematics Association. It revealed a lack of genetic knowledge of Panamanian invertebrate species, and outlines how this can be tackled going forward.

I also had the absolute pleasure of sitting down with two winners of our Jill Smythies Award, Christabel King and Maria Alice de Rezende, to find out about their processes and inspirations in botanical illustration, and what they think the future holds for it.

And our Trail-Crisp Medal recipient Justyna Miskiewicz explores just how much size matters in the success of island mammals, as she puts them under the microscope.

With medals in mind, please do nominate for the 2025 round of our awards before 30 September. Your input is fundamental.

Leonie

Leonie Berwick

Editor, *The Linnean* & Publications Manager (leonie@linnean.org)

You can also find the online interactive version of this issue in the Members' Area.

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Publish

The Linnean is published three times a year, in spring, summer and winter (UK). All contributions are welcome, but please contact the Editor or see the *Guidelines for Contributors* document on our website before writing and submitting articles (www.linnean.org/thelinnean).

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Image: Maria Alice de Rezende

What's on



PRESIDENT'S LECTURE: ARTIFICIAL INTELLIGENCE MEETS THE NATURAL WORLD

Speaker: President Anjali Goswami FRS

19 Sept | 18.00 BST (MEMBERS-ONLY EVENT)

Artificial Intelligence, or AI, has exploded in recent years, and is now embedded in countless aspects of our daily lives. The rapid expansion of AI tools presents numerous opportunities and challenges for the understanding, appreciation, and protection of the natural world. In this lecture, Anjali will discuss how AI is rapidly transforming the study of past, present, and future biodiversity, including her own research on the evolution of organismal form. **(ONSITE AND ONLINE.)**



THE VOICES OF NATURE: HOW AND WHY ANIMALS COMMUNICATE

Speaker: Nicolas Mathevon

20 Sept | 18.00 BST

Many animals communicate through sound, but what do they say to each other? Through recordings and experiments carried out in some of the most remote places on our planet, researchers in bioacoustics are exploring animal sound signals. Nicolas Mathevon will explore the diversity of these worlds, from the cries of young crocodiles to the sonic fights of elephant seals. Join us to investigate the complexity of animal communication, shedding new light on the origins of our own language. **(ONSITE OR WATCH A RECORDING.)**



GETTING 'BATTY' AT BATTERSEA: AN EVENING BAT ADVENTURE

Guided by the Linnean Society team

11, 25 Sept | 19.30–20.50 BST

Join us at dusk to discover the hidden world of nocturnal mammals! We will be discussing some of their mysterious behaviours and wonderful adaptations which have helped them become some of the most successful mammals around the globe. Learn how to use bat detectors to spot their squeaky echolocation calls and how to identify different species. **(BATTERSEA PARK, LONDON.)**

To book for these and other events not shown, visit linnean.org/whatson



BOTANICAL ARCHITECTURE: PLANTS, BUILDINGS AND US

Speaker: Paul Dobraszczyk

17 Oct | 18.00 BST

How might our buildings be more like trees—structures that live and grow rather than ones that require the depletion of the natural world? Using his new book *Botanical Architecture* as a guide, Paul Dobraszczyk asks what plants might teach us about building and explores how plants themselves are a type of architecture. How can we design with plants and become more attuned to vegetal life in our structures? Can we build as much for plants as for ourselves, understanding that our lives are always totally dependent on theirs?

(ONSITE OR WATCH A RECORDING)

THE RETURN OF THE SIAMESE CROCODILE

Speaker: Pablo Sinovas

27 Nov | 12.30 GMT

Thought to be extinct in the wild by the turn of the century, the extraordinary conservation story of the Siamese crocodile began with the discovery of a small remnant population in Cambodia's remote Cardamom Mountains. In this talk, Pablo Sinovas will discuss how a unique conservation programme by the NGO Fauna & Flora is turning the tables on extinction for this wetland predator by leveraging traditional beliefs, local collaboration and the latest technologies. (ONLINE ONLY.)



Images: Luc Schuitjen; Dianne Bos; Pablo Sinovas; The Linnean Society of London



EXPLORING CHLOROPHYLL PRINTING: AN HERBARIUM PHOTO(SYNTHESIS) ALBUM

Speaker: Dianne Bos

13 Nov | 18.00 GMT

Join Dianne Bos as she explains how she turned her own herbarium (collection of dried plants) into chlorophyll prints, using the natural chemistry of living plants. The images Bos has chosen to print onto the leaves reflect the many worlds that plants sustain—the ultimate sustainable photographic process. In this lecture, Bos discusses the discoveries and reflections prompted by this photographic collaboration with nature.

IN COLLABORATION WITH THE LONDON ALTERNATIVE PHOTOGRAPHY COLLECTIVE. (ONLINE ONLY.)

TREASURES TOURS

Guides: Our fantastic Collections Team

3 Oct (BST), 7 Nov, 4 Dec (GMT) | 14.00–15.30

Join our expert staff on one of our sought after Treasures Tours, an in-depth, behind-the-scenes journey around our unique home at Burlington House in central London. And don't forget, tours are also a wonderful pre-Christmas treat for family and friends. **Book your place!**



News

AGM 2024: ELECTION RESULTS, NEW TRUSTEES AND WELCOMING *HONORIS CAUSAE* AND MEDAL RECIPIENTS

On 24 May 2024, the Linnean Society held its 236th Annual General Meeting (AGM) and Anniversary Meeting, with members joining from around the world in-person or online to play their part in the running of the Society and to reflect on the progress of the past year.

On 24 May 2024, the Linnean Society held its 236th Annual General Meeting (AGM) and Anniversary Meeting, with members joining from around the world in-person or online to play their part in the running of the Society and to reflect on the progress of the past year.

Four vacancies were available on Council. From a field of 10 candidates, Subhadra Das, Dr Amy Dickman, Dr Mark Watson and Dr Heather White were elected as Trustees of the Society. The Fellowship approved its sitting Officers, and additionally elected Dr Mark Watson as President-elect for the coming year, after which he will assume the Presidency of the Society in May 2025. Thanks went to Professor Justin Dillon, Dr Neil Gostling and Dr Sandy Knapp who had acted as voting scrutineers for the AGM. We were also hugely indebted to the Trustees departing Council, namely Robbie Blackhall-Miles, Dr Rich Boden, Brycchan Carey, Dr Blanca Huertas and Philip Sadler.

Professor Emeritus John Allen and Professor David Cutler PPLS were unanimously elected as Fellows *honoris causae* for their dedicated work for the Society and their achievements in advancing the biological sciences over many years. Fellows also voted to accept the minutes of the 2023 AGM, the Society's Accounts for 2023 and the auditors and banking arrangements proposed for 2024, which will continue to be Knox Cropper LLP and Barclays, respectively. Representing the Fellowship, Dr Natasha De Vere reported that the Audit Committee found that the Accounts gave a true and fair view of the Society's finances as of the 31 December 2023.

During the Q&A, and in the context of the successful conclusion of the Burlington House lease negotiation, it was confirmed that collaborations with the Courtyard Societies were deepening, the extent of much-needed repair works to



the building were being assessed and plans for events beyond London were underway.

The Anniversary Meeting took place after the AGM, where all recipients of our medals and awards were presented with their prizes, both onsite and online. We were incredibly grateful to Trail-Crisp Medal winner Dr Justyna for joining us online at 3am from Australia! You can read more about all of the recipients in the previous issue of *The Linnean* (40(1): 12–17).

Fellows who were unable to join us can download the Annual Report 2023 (linnean.org/annualreport), which contains full reports from the President and Treasurer.

Andrew Swan, Governance Manager (andrew@linnean.org)

The Home Stretch: An update on our Charter



You will have read in the last issue of *The Linnean* (40(1): 8) that we have made significant progress with the revision and approval of our Bye-Laws and Charter.

Since then, we have received more news on the Society's new Charter, which reached a significant milestone at a meeting of the Privy Council on 22 May.

His Majesty King Charles III considered the report of the Privy Council and approved the granting of this Supplementary Charter. The King ordered that the Rt Hon. Lord High Chancellor prepare the Charter for signature under the Great Seal by the Crown Office, and the Society duly received proofs in mid-June. We are now into the final stages where it will be printed onto modern vellum (essentially paper) and the Great Seal affixed at the House of Lords. Once this has transpired, the terms of the Supplementary Charter will come into legal effect, which we anticipate will be in the early autumn.

Mark Watson HonFLS (Bye-Laws Revision Group)

International botanists vote on name changes at IBC Madrid

Taking place every six years, the International Botanical Congress (IBC) is 'an integrated forum for knowledge on the plant and mycological world'. The conference also invites botanists to discuss changes to the International Code of Nomenclature for algae, fungi and plants. At this year's IBC in Madrid, Spain, nomenclatural sessions were conducted from 15–19 July 2024, with the session to discuss and vote on these changes being chaired by Past President of the Linnean Society, Dr Sandy Knapp FRS.

One vote up for consideration addressed the replacement of *caffra* or *cafra*, which appear in over 300 plant, fungal and algal names and is considered derogatory, with the words *afra*, *afrosum* and *afrum*, to denote their African origins. Botanists passed this vote, and the Linnean Society's response, and that of our President Professor Anjali Goswami FRS, can be found on our website. The vote was proposed by Gideon Smith and Estrela Figueiro, who recently published an opinion piece in the *Zoological Journal of the Linnean Society* as part of a collection of papers on the ethics of zoological nomenclature. Our President-elect Dr Mark Watson held the Linnean Society's vote, to be used in the case of a 'card vote' requiring institutions to cast an anonymous ballot. However, this particular motion did not result in a card vote.



ABOVE: *Protea caffra* is now *Protea afra*

Elsewhere around the conference, our Editorial Board of the *Botanical Journal of the Linnean Society*, led by Dr Steven Dodsworth FLS, was on the lookout for interesting research for our journal, while our Honorary Curator of Botany, Dr Mark Spencer FLS, organised a symposium on 'New directions in early modern botany collections and archives'.

As seen...in our Members' Area

The news feed in our Members' Area has been buzzing with activity over the last few months. We've really enjoyed seeing the wide scope of interests of our members, from science to horticulture to illustration and art history.

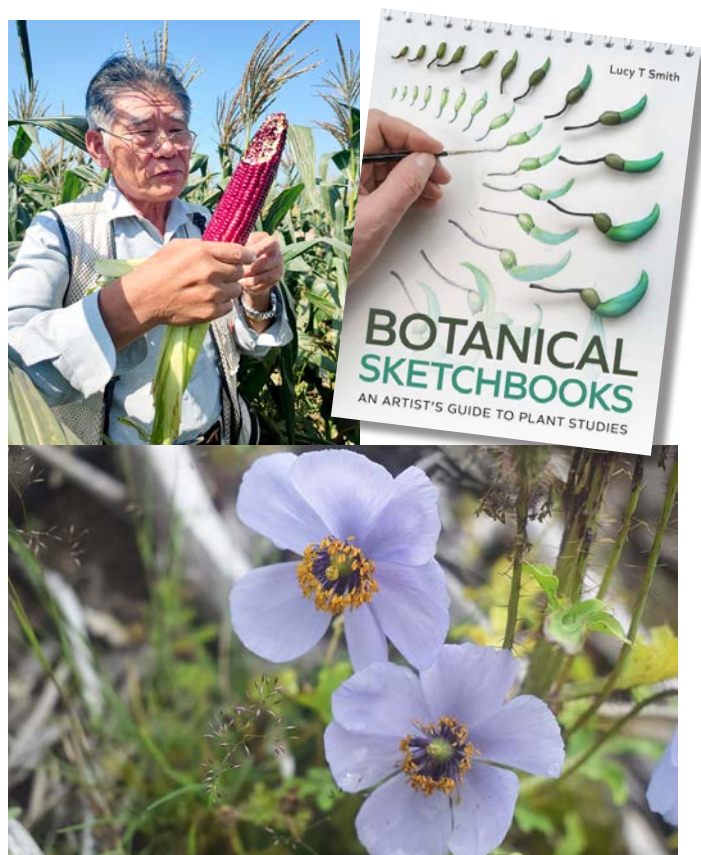
Sumit Singh FLS has been sharing his beautiful and fascinating images of Himalayan flowers, some of which are endangered. Lucy T. Smith FLS highlighted her new how-to book, *Botanical Sketchbooks: An Artist's Guide to Plant Studies*. On the topic of illustration, Victoria Kayser-Cuny FLS shared her latest composition with the Yale Peabody Museum of Natural History, based on a photo of a bird taken on Toronto Islands.

Chinese agricultural expert Zhu Sihao FLS has added images of some fascinating varieties of fruit and vegetables, bred using traditional techniques. They include the world's smallest melon and 'purple princess' sweetcorn.

Natalie Smith also shared Scilicet, her new blog on a history of knowledge. The post 'Should Royal Monkeys wear sweaters in the Winter?'—a question posed by Swedish nobleman Olof von Dalin to Carl Linnaeus—is a great read.

Don't miss all of the exciting news happening in the members' newsfeed. You can catch up with all of this and post your news by logging into the Members' Area on the top right of linnean.org.

If you're having trouble logging in, contact membership@linnean.org for assistance.



CLOCKWISE FROM TOP LEFT: Zhu Sihao FLS has cultivated 'Purple Princess' corn using traditional Chinese agricultural models; Lucy T. Smith FLS shared the news of her book *Botanical Sketchbooks*; and Sumit Singh FLS has posted photos of several plant species, including the endangered Himalayan blue poppy (*Meconopsis aculeata*).

Congratulations to our President, Professor Anjali Goswami FRS



Linnean Society President Professor Anjali Goswami was made a Fellow of the Royal Society (FRS) in May.

Anjali is an evolutionary biologist of international renown at the Natural History Museum, London, specialising in vertebrate evolution and development, particularly in the emerging area of evolutionary phenomics. Our CEO Gail Cardew stated: 'Anjali's Fellowship of the Royal Society is richly deserved. It is wonderful to see her scientific excellence recognised in this way, and I'm pleased to congratulate her on behalf of everyone at the Society. As President of the Linnean Society, Anjali has brought energy and drive that is reflected in her achievements so far in her Presidency. Her passion for communicating about her research and increasing diversity in STEM is an incredible example for all scientists.'

Helping young people make a difference in nature



ABOVE: Through OLN, the Society supported a Wild Parade in Usk, Wales, encouraging the local community to learn about vulnerable species in their area.

Every year we welcome applications from young people around the UK for our Our Local Nature (OLN) grant scheme, which aims to inspire the promotion and care for nature in their local area. At the start of the year, our OLN Youth Panel selected seven projects (from a staggering 200 applications) across the UK to be awarded funds.

This year's successful applicants spanned a range of project ideas, such as fun days to engage communities with the nature on their doorstep, youth-led invertebrate ID walks and students with special educational needs and disabilities supporting the biodiversity in their local area.

We'll soon be opening the doors on the next round of OLN funding, so if you know of any keen and committed young people who might be interested in joining our youth panel, please do ask them to get in touch.

And keep an eye on our website (linnean.org/OLN) for more information about how to apply for an OLN grant in the new application cycle in October.

Goodbye to Education Officer Dani Crowley

At the end of July we said sadly had to say goodbye to our brilliant Education Officer, Dani Crowley. Dani will be starting a PhD at Bangor University with the Zoological Society of London (ZSL) and National Resources Wales on the socio-ecological importance of sharks and rays in a changing climate.

During her 15 months at the Society, Dani accomplished a huge amount as a creative member of the team, co-developing and delivering workshops for primary students on life cycles, classification and mythical creatures.

Her passion for inclusive science outreach was also evident in her tours for Pride with Royal Parks, and her very popular themed tours and quizzes for Halloween ('Spooktacular Nature') and Valentine's Day ('Flirty Nature'). Dani also developed infographics and stories for our social media and managed the youth panel in support of the Society's Our Local Nature grant scheme for environmental projects in the UK.

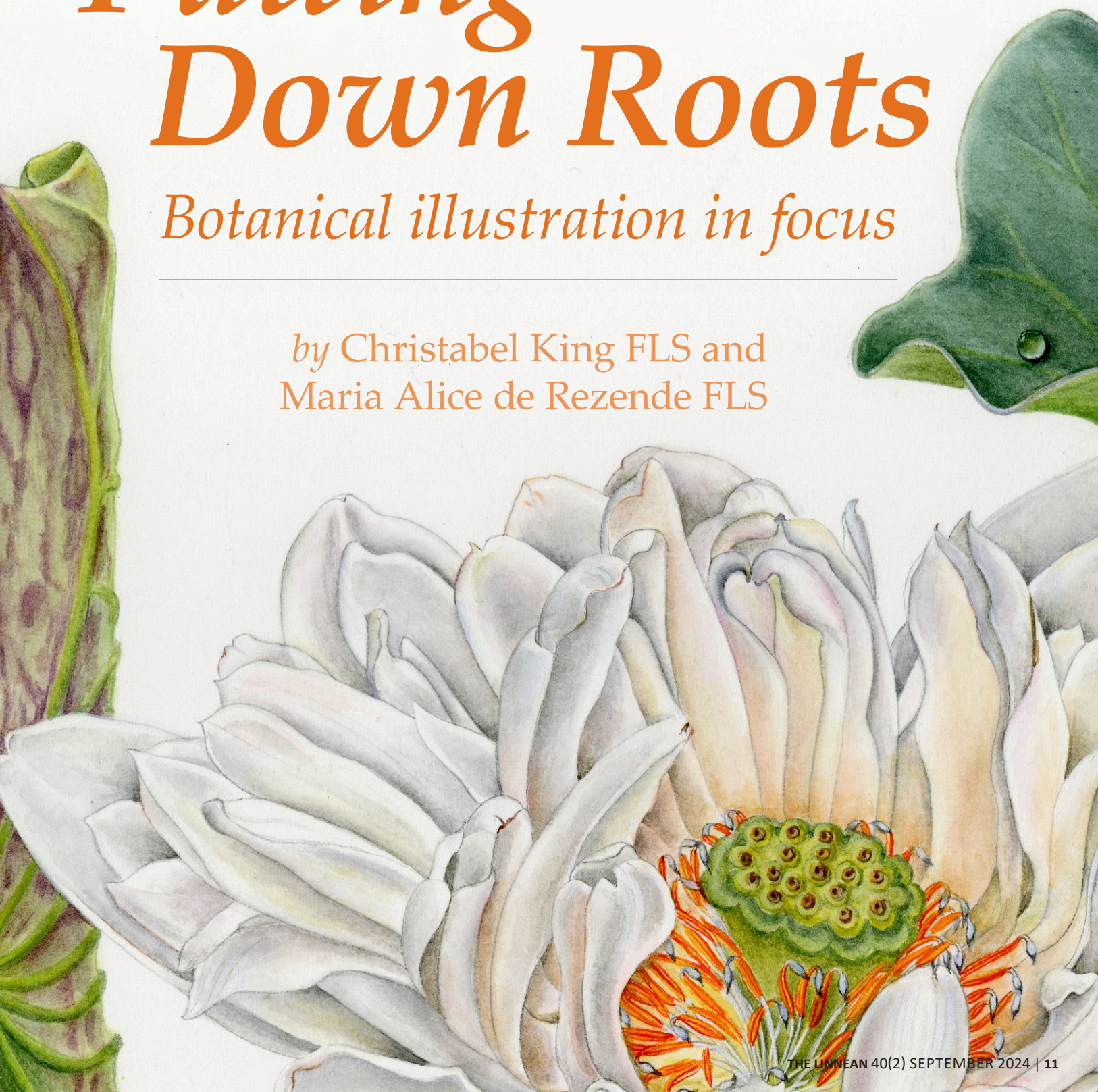
These are just a few examples, amongst many, that show why Dani will be sorely missed. We wish her all the very best for her future studies and hope you will join us in persuading her to come back and share her research!



Putting Down Roots

Botanical illustration in focus

by Christabel King FLS and
Maria Alice de Rezende FLS



PREVIOUS PAGE:
Nelumbo nucifera alba
painted by Maria Alice
de Rezende in 2024.

BELOW: 2024 Jill
Smythies Award
recipient Maria Alice de
Rezende FLS (*left*) and
1989 winner Christabel
King FLS (*right*) at the
Society's Anniversary
Meeting in May.

In July, we were lucky enough to catch up with two winners of our Jill Smythies Award, which recognises outstanding work in published diagnostic botanical illustration. This year's recipient, Maria Alice de Rezende FLS (known as Alice) chatted with Christabel King FLS, our 1989 recipient and, aptly, one of Alice's mentors through the Margaret Mee Fellowship at the Royal Botanic Gardens, Kew. Christabel came to our Burlington House premises and Alice joined us online from her home in Brazil. They chatted about their careers, what they find challenging about their work, and their hopes for the future of botanical illustration.

Can you remember when you both first wanted to draw plants?

Alice: Ever since I was a child, I always loved drawing. As a teenager, I started to paint, and my paintings almost always represented landscapes, animals or plants. Plants have always been special to me, maybe because from the age of seven I used to help my grandfather in the garden, and I loved it.

Christabel: Oh yes! My grandparents' garden was important to me, too. They lived in a town called Glastonbury [in the UK], which is now the centre of a pop festival, but there was no festival in those days. Well, that's interesting isn't it? Both our grandparents were influential. Have you always lived near Rio de Janeiro?

A: I live in Paracambi, a small city about two hours from Rio—near the forest. I was born here, so I've lived near nature all my life. I spend some days a week at the Jardim Botânico Rio de Janeiro (JBRJ).

C: Did you have a good art teacher at school?

A: I started university quite late—I was married and had a child—and there wasn't a specific botanical course. But I went to a fine arts university and I painted watercolours. My teacher said, 'you paint so many flowers—you need to become a botanical artist!' They told me about the Margaret Mee Fellowship. I'd done a short course at the JBRJ in pen and ink, and the following year I applied for the Fellowship and was selected. That's when I met you, in London, in 2004.

C: What are you working on now?

A: I'm working on some black and white paintings of vanillas for a resource at the JBRJ. And I am trying to finish my drawing of the huge *Coccoloba gigantifolia* leaf. Christabel, I have a question for you...

A: For me, the most difficult thing is finding time to dedicate to my work. What is the main obstacle for you, with regard to painting?

C: I find that I get quite tired now and can only paint for an hour and a half as my eyes get sore. I am working on a rather difficult project on the tree species *Nothofagus*. They live in Chile, Argentina and southern South America, and they have very small leaves, about 1 cm, and the flowers are 0.5 cm. Much of it is done with a microscope and to begin with I couldn't find the flowers—then I realised that they were so small you can hardly see them. (*continued on p. 14*)



Images: (Previous page) Maria Alice de Rezende; (This page) The Linnean Society of London



Margaret Mee and the Margaret Mee Fellowship

Margaret Mee (1909–1988) was an English botanical illustrator who explored and studied the flora of Brazil, particularly along the River Amazon and in the Amazon rainforest. She moved to Brazil in 1952 with her husband Greville to teach art at St Paul's, the British school in São Paulo, before expeditions took her to the Amazon Basin. Margaret was an active environmentalist and lent her voice to protests against deforestation in the Amazon. She received an MBE in 1976 and was awarded the the Brazilian order of Cruzeiro do Sul (Order of the Southern Cross) in 1979. Sadly, Margaret passed away in 1988, as a result of a car accident.

In 1989 the Margaret Mee Amazon Trust was established. Though it is now closed, it went on to offer a Fellowship programme with the Royal Botanic Gardens, Kew, providing scholarships for Brazilian botanical artists.



ABOVE: Greville Mee (*centre*) with his second wife Elizabeth meeting Maria Alice de Rezende (*right*) during her time at Kew as part of the Margaret Mee Fellowship programme.

LEFT: Alice painting in Temperate House at Kew, as part of her Fellowship training in 2004.

Images: Christabel King



Images: Maria Alice de Rezende

A: (*Laughing*) I know what you're talking about—I have worked with bryophytes. That was also using the microscope, and my eyes would get so tired.

C: Yes, you have to rest, and often! I still find it very interesting, but I don't have as much stamina as I used to.

C: **Is there a favourite plant species that you have enjoyed working on? And what would you like to draw that you have not already illustrated?**

A: This is a very difficult question because I love every plant I illustrate. But being able to paint the proteas from South Africa was incredible. I would like to paint a plant I've never painted before—one I saw the last time I was at Kew, with a large flower—a peony.

C: Oh, they are fabulous, yes. Can you grow peonies in Rio de Janeiro?

A: No—no peonies, no poppies. It's very hard to grow them. I think this is why I find them so interesting—it is very different from Brazil.



C: I wasn't sure how I would answer this question myself: what have I not drawn that I would like to draw? My answer was going to be that I would like to draw plants in their habitats. Landscapes. I would like to study and draw the plants in situ.

C: What is the most challenging species that you have worked on?

A: At first it was the bryophytes, but now it is the *Cocoloba gigantifolia* leaf because it is not possible to have the leaf with me all the time. I have done sketches, I did some annotations and colour work, and took some pictures, but it is not easy as the leaf is so large.

C: How big is the piece of paper [that you're painting on]?

A: It's 3 m. The full paper size I'm working to is 3 m by 2.5 m.

C: (*Visibly surprised*) 3 m x 2.5 m? I have never done anything that size! That's like painting on a wall! Do you have a room that is big enough to paint it in?

A: I had this project in mind and I bought the paper, then I realised it's not possible to put it in my workroom! I tried to find another place in my house—a small room with one side that is bigger. But the light is not good, so I had to buy additional light for the space. It's not easy—I worry that I spend so much time on it and then I feel I haven't done enough! And for you—what is the most challenging species you have worked on?

ABOVE LEFT: Alice with a leaf from the *Cocoloba gigantifolia*, a species found in the Brazilian Amazon that has the third largest leaf in the world.

ABOVE RIGHT: Painting the *C. gigantifolia* leaf.

OPPOSITE: Alice's illustrations of (TOP) *Brownea grandiceps* and (BOTTOM) *Protea longifolia*.



ABOVE: Alice and Christabel met online to discuss their previous work, Christabel's time as Alice's mentor at Kew and the importance of engaging people with plants. Christabel admires Alice's painting of *Ceiba speciosa* in the *Mata Atlântica: Ciência e Arte* exhibition catalogue.

C: When I worked on cacti in the 1980s and 1990s, they were the most challenging. When I began, I had no idea how to paint them. I had to experiment to find out. And of course, I had to fit in painting with teaching classes at Capel Manor, Enfield. In the years when I was teaching the Margaret Mee students, such as yourself, one each year, I gave them cacti as one of their more challenging subjects for study. To begin with, I didn't know how to do it, so it was a challenge. Other plants are a challenge too, like the one I am working on at the moment, because they are so small. It needs patience. I made a note about my own favourite plant to draw—it's the easy ones! (*They both laugh.*) Like tulips—easy to draw. I enjoyed alpine species too, but they were not as easy to draw.

A: I remember that you told me, when I was at Kew in 2004, that 'yellow is not easy to paint'. You liked a painting I did of a yellow *Tabebuia*. For me, I find the greens more difficult.

C: Greens, yes, they are always difficult and there are so many ways to mix the colour green.

A: Yes, it is not easy to represent all the different kinds of shape and light—it's a challenge.

C: And the different textures. I enjoy the leaves actually; I don't mind if the plant is not colourful.

C: *Do you enjoy the process of working with scientists? I enjoy working with them because they have a different point of view and they make one think. They have ideas of what to paint that you'd never thought of. I hadn't thought of *Nothofagus*, but once I was asked to do it I found it was quite interesting. I enjoy that process.*

A: I like it because they offer more information about the species and that truly helps us. (*Smiling*) Principally I work in pen and ink and I do a beautiful composition. Then the scientist may ask for changes that mean the composition doesn't work anymore! (*Laughs*) But I like to work with them because they teach us so much.

C: (*Shows a copy of the exhibition catalogue Mata Atlântica: Ciência e Arte to Alice.*) *I wanted to bring this to show you! You did these beautiful paintings. (Shows a painting of *Ceiba speciosa*, the floss silk tree.) Are you still having exhibitions like this one in Brazil?*

A: Oh yes, I spent two years painting this. I painted the flower, then I needed to wait to paint the fruit. And finally, I needed the fruit to open in order to paint the cotton-like matter and seeds.

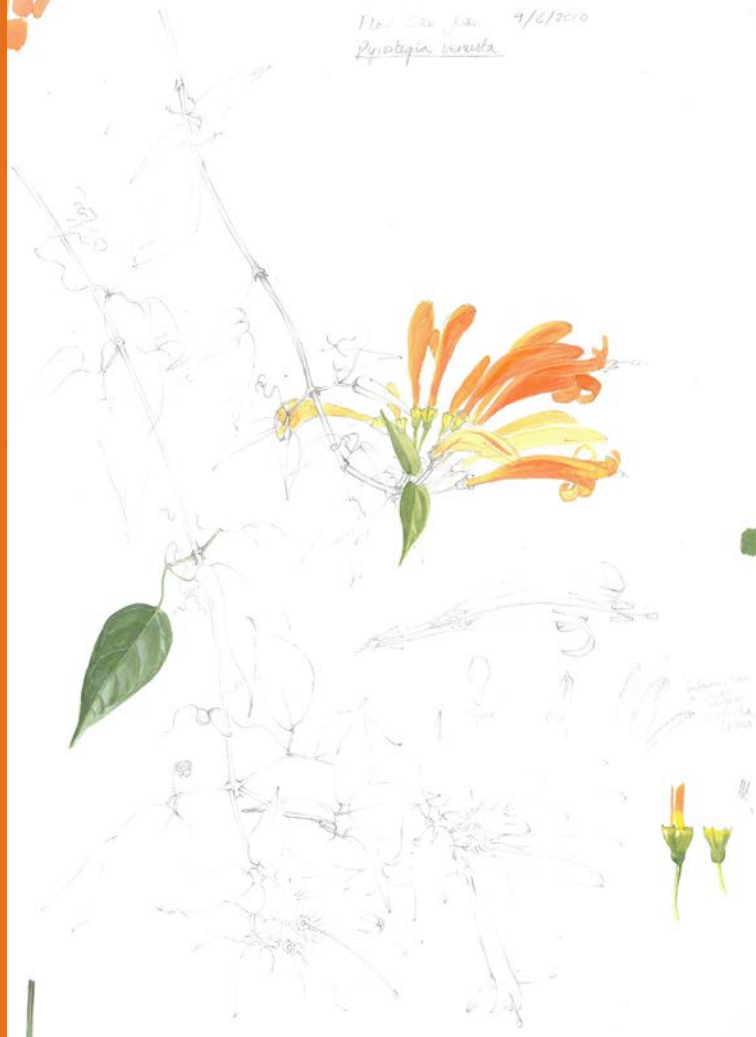
Fátima Zagonel, Marcos Silva-Ferraz and I are on the steering committee for Botanical Art Worldwide, for next year. We're the team organising it for Brazil, and it will be with the American Society of

THE 2025 JILL SMYTHIES AWARD IS NOW OPEN!

TO NOMINATE FOR THIS AND ALL OF OUR AWARDS, VISIT:

[LINNEAN.ORG/MEDALS-AWARDS](https://linnean.org/medals-awards)

Deadline for nominations: 30 Sept.



Botanical Artists (ASBA). About 25 countries will participate on the same day, onsite and online. We'll also prepare the physical catalogue too.

C: Excellent!

Final question: what do you think the future holds for botanical illustration?

C: Do you remember my sketchbook, Alice, with all the Brazilian plants in it? I think the future for botanical illustration...well, let's call it scientific illustration...is for school children and anyone who likes drawing to make nature study sketchbooks. Maybe they're good at plants, maybe they're better at insects, but I think it's best to keep it general and not too specific when encouraging young people. Then they have the option to find what they're interested in. When it gets to the very finely finished work that we do, which is very detailed, that is more difficult as it needs a destination, like an exhibition or gallery. The Shirley Sherwood Collection at Kew has previously run a Young Botanical Artist competition. These sorts of things can get younger people interested.

A: I think if more artists get involved, not just in the illustration, but in conservation, then the paintings can show the beauty of nature. This could engage more people, not only with the beauty of nature but the necessity to appreciate all life. Our work could change minds about this.

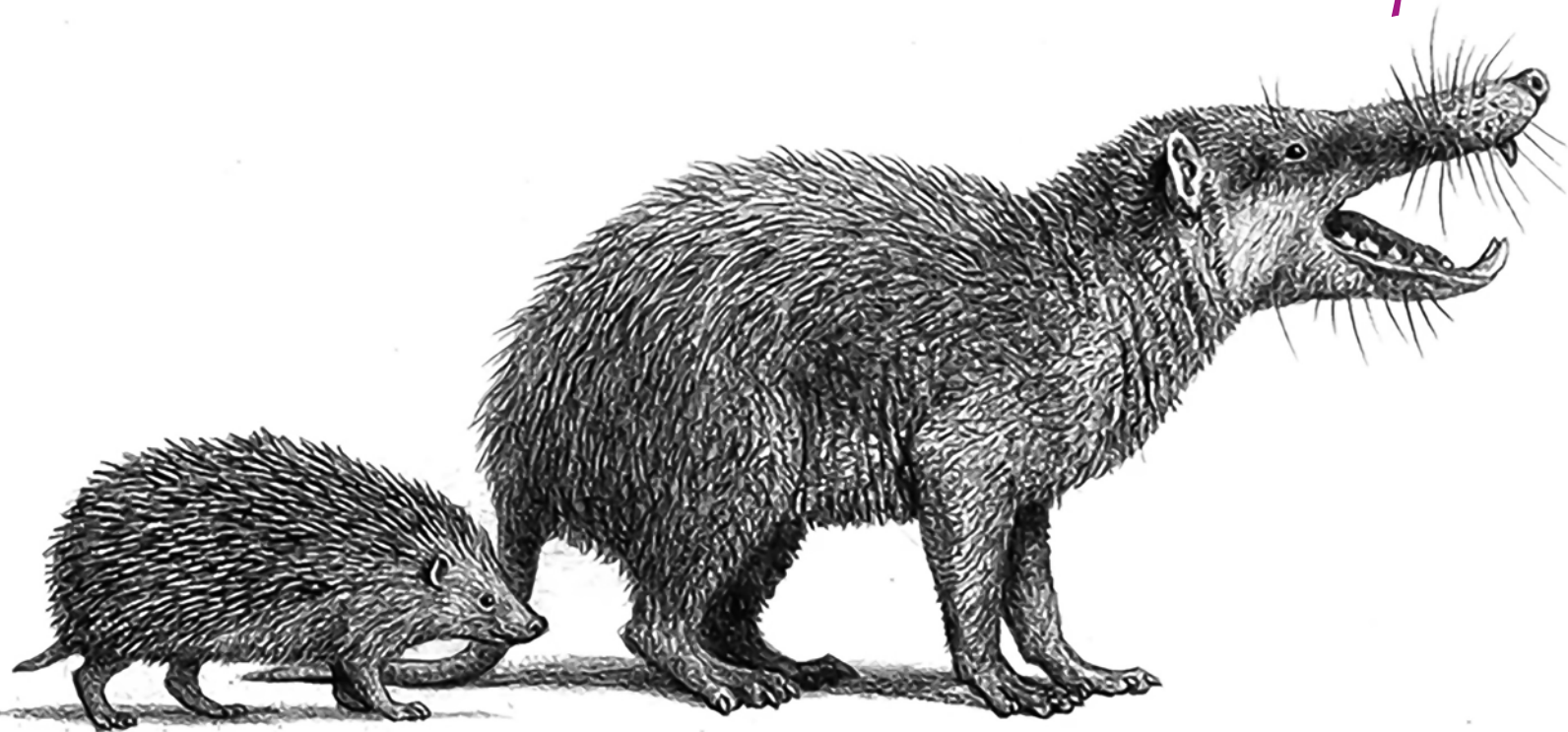
C: Yes, and it makes people look—otherwise they don't notice the plants and life around them, with all the other distractions. Maybe they'll make a drawing, or just find out what it is—but they are looking at it. If they are aware of it and the fact that it may not be there in the future, it means that they become aware that the *whole planet* has to have a future, not just a small section.

ABOVE LEFT: Christabel's Brazilian sketchbook showing *Pyrostegia venusta* and

ABOVE RIGHT: The finished painting. Is the future of scientific illustration in nature study sketchbooks?

Size Matters

*Mammal dwarfs and giants
under the microscope*



by Justyna J. Miskiewicz

Ilands produce fascinating ecological experiments. They follow their own environmental rules which determine how insular mammals grow and exist. Island mammals often follow a trend where their body size becomes smaller (dwarfism) or larger (gigantism) compared to mainland relatives, depending on variation in factors such as predation, competition and resource availability. Our 2024 Trail–Crisp Award winner for microscopy, Justyna J. Miskiewicz, examines this trend.

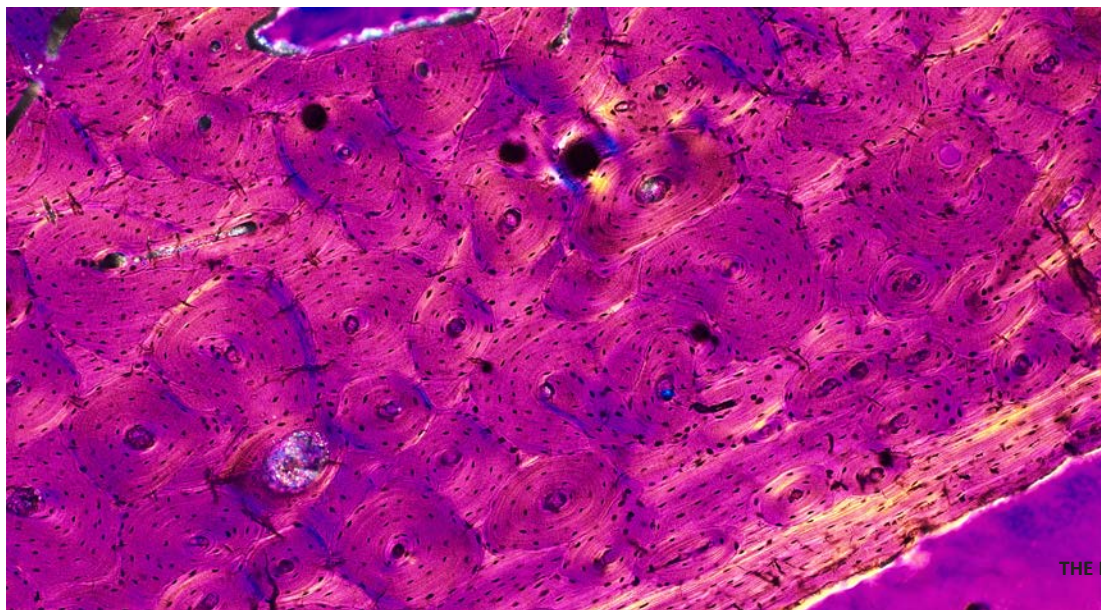
The Island Rule, as it has long been known, describes adaptations that pose a physiological conflict for a mammal—the need to change body size without compromising reproductive potential and health. Evolutionary biologists think that mammals mitigate this issue by shifting aspects of their life histories. ‘Slow’ mammals (long-lived and large) or ‘fast’ mammals (smaller mammals with shorter longevity) can evolve strategies that sit at opposite ends of the spectrum typical for their group. This has been found both in extant and extinct species, as can be seen from fossil dwarf elephants in the Mediterranean and ancient proboscideans in Indonesia and the Philippines, or conversely, giant hedgehog relatives on what would have been Gargano Island in modern day Italy.

The hidden elements of adaptation

When working with fossils, we are limited in what aspects of the Island Rule we can reconstruct, and we mostly rely on skeletal anatomy to estimate body size. Of interest to me is determining ‘hidden’ elements of adaptation to insular conditions, namely shifts in longevity and metabolic capacities in fossil species. To do so I turn to histology, the study of biological tissue microstructure. When the analytical option of extracting small bone pieces and preparing them into thin sections exists, the data generated by such approaches are powerful in unlocking what the gross morphology of the bone alone cannot show.

In most mammals, as they age, cortical bone (the supporting ‘wall’ of major bones) develops increasing numbers of microscopic tubes called osteons (figure below). This occurs through a life-long process of bone resorption and renewal called remodelling. Bone cells responsible for this process are osteocytes which reside in cavities called lacunae. Densities of these lacunae are a proxy for live bone cell proliferation. Osteons contain blood vessels and form dense bone tissue that can withstand weight and movement.

Many think of bone as a static hard structure, but the remodelling processes actually makes it very metabolically active. Cell level information captured in bone histology can thus offer us a window into bone maintenance in fossil species. I have been lucky to work on fossil bones that had these cell structures preserved.



OPPOSITE PAGE: The giant hedgehog relative (gymnure) *Deinogalerix* from Late Miocene Gargano, Italy (right), compared to modern European hedgehog *Erinaceus europaeus* (left). Modified image courtesy of Mauricio Antón from Daniel DeMiguel in *Scientific Reports* 6: 29803 (2016) (open access article).

BELOW: Cortical bone histology of a rib from *Candiacervus*, a fossil deer showing round structures called osteons ‘peppered’ with black dots which are osteocyte lacunae—small cavities that house bone maintenance cells called osteocytes. The image is pink as viewed using lambda compensated polarised light optical microscopy. The scale bar is 200 microns (0.2 mm).

TOP: Skull of a black rat (*Rattus rattus*, on the right) next to fossil remains of an extinct Timor giant rat (on the left). CC BY 3.0 (https://commons.wikimedia.org/wiki/File:Coryphomys_musseri_1.jpg).

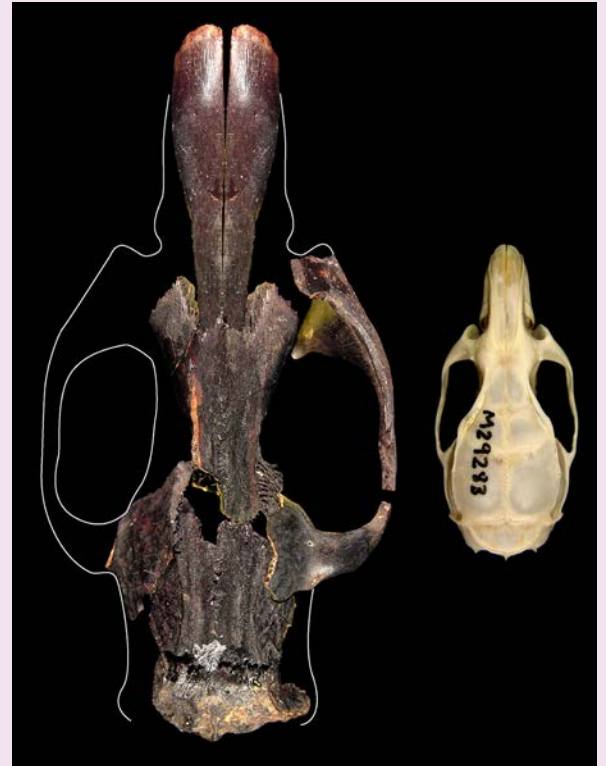
BOTTOM: Reconstruction of dwarf Cretan *Candiacervus* deer and dwarf hippo *Hippopotamus cruetzburgi* from Late Pleistocene. CC CA-SA 3.0 (https://commons.wikimedia.org/wiki/File:Hippopotamus_cruetzburgi.JPG).

Giant rats, and dwarf deer and hippos

Small mammals such as rats, due to their fast life histories, do not typically experience remodelling. However, I was astounded to find high osteon densities in the femur of an extinct giant rat (Murinae) from Timor Island in Asia (Miskiewicz *et al.* 2019). Dated to the late Quaternary, these cat-sized rats (*right*) roamed what would have been abundant tropical forests of the island. Their highly remodelled bone histology indicates longer lifespans than typical lab or black rats.

As the Timorese rats are a part of a larger assemblage showing a range of sizes, I was able to test for allometry in osteocyte lacunae densities with increasing femur size. Together with a team of palaeontologists, we showed that bone metabolism in the giant Timor rats slowed down as their body size increased (Miskiewicz *et al.* 2020). We interpreted our finding to be a result of extended growth periods of these rats without significant predation.

I also discovered that high osteon densities, indicating extended longevity, were retained in a dwarf deer species. Together with Alexandra van der Geer who is an island palaeontology expert, we were able to work on the extraordinary Pleistocene fossils of the dwarf *Candiacervus* deer that occupied the terrain of today's Crete (Miskiewicz and van der Geer 2022). *Candiacervus* was represented by species displaying a range of dwarf sizes, with the shortest estimated to reach only 40 cm at the shoulder (*right*). Our examination of the histology of *Candiacervus* ribs found widespread and high densities of osteons of various shapes and sizes, indicating a very dynamic process of remodelling that would have progressed with age. Despite its dwarf form, these deer likely enjoyed long lifespans for their size, like that of adult mainland deer. Pleistocene Crete was predator free during the time of *Candiacervus*, likely allowing it to thrive for longer than predicted based on their small body size alone.



I was able to apply the same technique to rib histology of insular fossil dwarf hippos. We tested for the osteocyte lacunae and body size gradient in extraordinary material of two dwarf hippos: *Hippopotamus minor*, the smallest hippo (~132 kg) to have ever existed, from Late Pleistocene Cyprus, and a slightly larger dwarf *H. creutzburgi* (~398 kg) from Pleistocene Crete (Miskiewicz *et al.* 2023) (*bottom left and right*). We also had a comparative hippo *H. antiquus* (~3200 kg) specimen from mainland Greece. Amazingly, we observed the same trend as in the Timorese rats, whereby the dwarf hippos had highest osteocyte densities indicating faster metabolism typical of smaller fast living mammals. We concluded that as these hippos evolved into dwarfs, their bone tissue optimised its metabolism to ensure physiological stability.



Future research

Whether we can make further links to overall organism metabolic rates based on our bone histology data remains to be seen. There is some indication in the literature that regulation of mammalian bone mass is tied to energy metabolism through leptin, which is an appetite suppressing hormone. However, these speculations are thus far based on observational data in a limited number of clinical studies.

It has been a truly rewarding experience working on such unique fossils of dwarf and giant mammals from across the globe. Even more humbling has been the trust specimen curators have placed in me to allow invasive sampling for this type of histology research. With continued aggregation of similar data, we should be able to develop a much more nuanced understanding of the mammalian experience of island life.

ABOVE: Skeleton of *Hippopotamus minor* mounted from fossil bones by palaeontologist George Lyras. CC BY-SA 3.0 (<https://commons.wikimedia.org/w/index.php?curid=14581103>).

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From Jungle to Lab

Systematics, evolution and conservation in Panama

by Alba Enguídanos García and Carles Galià-Camps

The Tropics play host to areas of higher, more densely packed biodiversity. Panama is considered one of the most biodiverse countries inside the Mesoamerican biodiversity hotspot, hosting 5–12% of global diversity [Myers *et al.*]. Although many iconic species are well characterised in the area, studies on invertebrates are often neglected, and their diversity is underestimated. In addition, most invertebrates are difficult to identify by using traditional methods, since there are few specialists capable of identifying neglected taxa, and even fewer capable of describing them. With support from the LinnéSys: Systematics Research Fund, PhD students Alba Enguídanos García and Carles Galià-Camps tell us more about their programme of research.

Morphological identification is sometimes problematic due to phenotypic plasticity among populations (different populations having different phenotypes due to environmental pressures), limited diagnostic traits, and the presence of hidden species. In the current scenario of the biodiversity crisis, it is of utmost importance to catalogue species suitably, as species are the functional units upon which protection efforts rely. So, merging methodologies becomes essential to making biodiversity easily approachable and relatively comparable across the ‘tree of life’. Genetics, with an emphasis on cytochrome oxidase I (*cox1*, commonly used as a molecular species barcode in animals), offers a fast and easy way to label species—a game-changer for extremely biodiverse, yet endangered, ecosystems.

A local perspective

To support this rather underserved area of study, we developed a one-week theoretical and practical course, taking place at the University of Panama, to identify and classify part of Panama’s invertebrate biodiversity. We designed the course to include sampling (of marine and terrestrial invertebrates), and applied laboratory methods for molecular biology. It also introduced students to the field of bioinformatics, with the ultimate objective of training a new generation of Panamanian scientists capable of studying their own biota from a new, local perspective.

The turnout was fantastic, with 32 participants from Panama and Colombia hailing from eight academic, research and governmental institutions.

Together, we collected and properly preserved 60 marine invertebrate specimens, 121 terrestrial invertebrate specimens and utilised eight pitfall traps. In the end, we generated 293 entries in our

OPPOSITE TOP: Participants and Instructors of the course. (Front row—Instructors: Carles Galià-Camps, Alba Enguídanos (directors), and Víctor Cuesta).

OPPOSITE BOTTOM: Marine sampling in Portobelo, Panama.

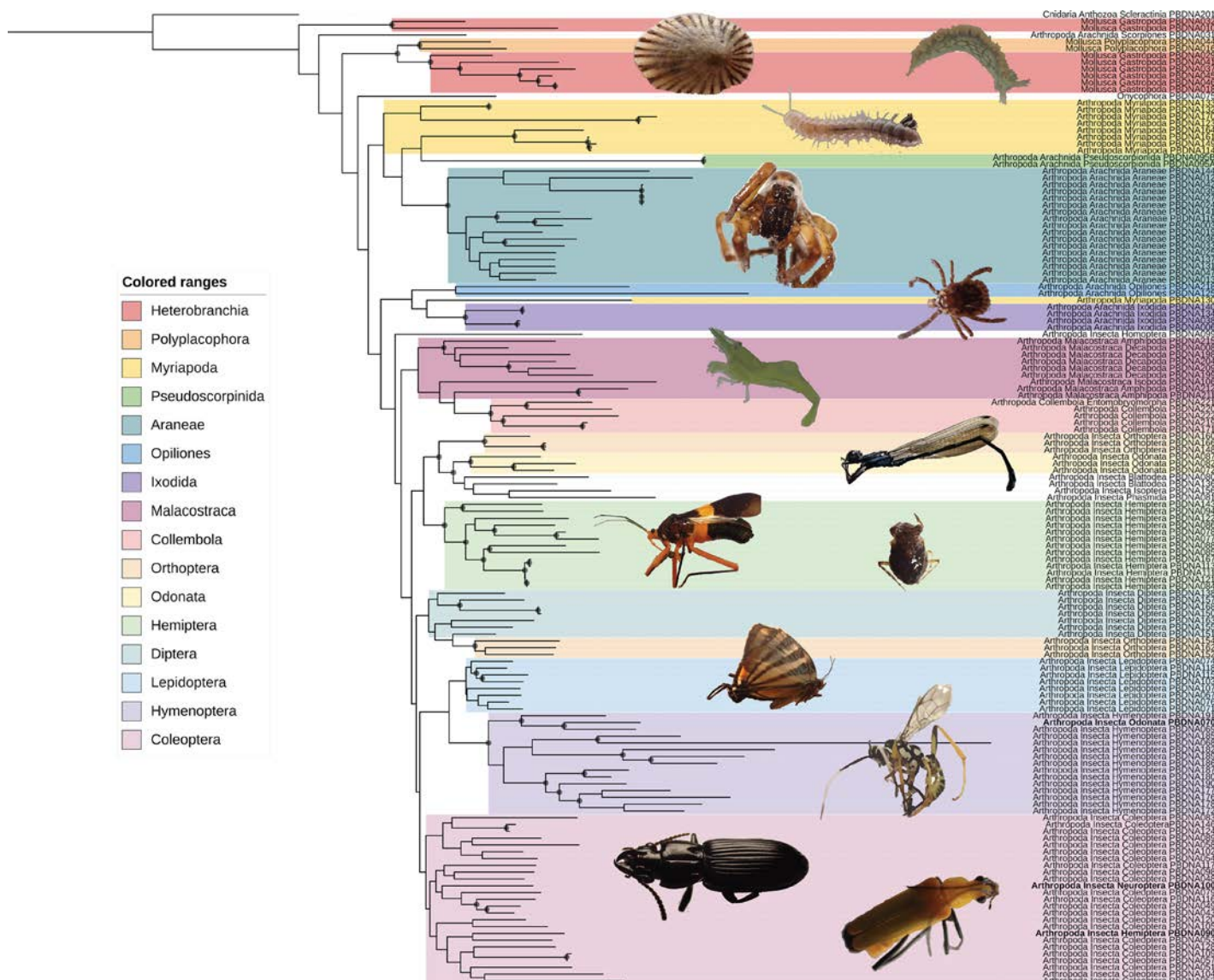


ABOVE: Molecular laboratory at the Facultad de Ciencias Naturales, Exactas y Tecnología, Universidad de Panamá.

spreadsheet, with up to 318 specimens—a wide diversity of organisms corresponding to 11 classes of invertebrates. These specimens enabled the students to learn good practice in a molecular biology laboratory. We oriented the lessons towards obtaining *cox1* sequences as DNA barcodes for posterior species delimitation. Overall, we extracted the DNA of 237 specimens and obtained 163 positive barcodes, all of which were sent for sequencing. Before the sequences were returned, the group had to learn how to analyse the *cox1* sequence data—a powerful tool for large-scale species delimitation and richness estimation. As a result, our bioinformatics training was aimed at knowing how to edit raw sequences, obtaining correct alignments, inferring phylogenies, delimiting species, population genetic structuring within the same species and learning the software RStudio for the graphical visualisation of data for publication.

The results of the data

But what about our barcodes? What about the species richness of Panama? After the raw data sequences arrived and were curated, we compared the sequence information using BLAST (Basic Local Alignment Search Tool) to obtain an approximation of what was sampled. The results were astonishing! We collected numerous species across the invertebrate ‘tree of life’, with more terrestrial species accumulated than marine. Of the 163 barcodes, just 62 *cox1* sequences had an identity above 95% when compared to those of GenBank, meaning that less than 40% of our samples could be assigned at the genus taxonomic level. Moreover, only 12 *cox1* sequences returned an identity of 100% (compared to already published datasets), meaning that more than 90% of the genetic diversity generated in this course is new to science. In addition, the lower identities ranged from 75–80%, meaning that these sequences may be novel for whole families, or even orders!



Generating knowledge

Our results show that there is a lack of genetic knowledge of Panamanian invertebrate species, and that there is great potential in training local researchers to unveil them. This course could set a precedent in Panama, with a rotation of professors teaching local participants who will eventually lead the training programme. Our expectations are that, year after year, more and more Panamanian researchers will be able to uncover the genetic diversity of their local biota, especially of those neglected taxa. With this improved knowledge, supported by scientific evidence, we hope that local researchers and the government will work together to preserve the best legacy any country can have—a genetically well-catalogued biodiversity hotspot.

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ABOVE: Maximum likelihood tree using cytochrome oxidase I sequences obtained in the practical course. Supported nodes are highlighted with a gray circle. Pictures from top to bottom, from left to right, correspond to the vouchers: PVOU015, PVOU030, PVOU363, PVOU390, PVOU360, PVOU088, PVOU276, PVOU287, PVOU288, PVOU257, PVOU280, PVOU266, PVOU255.



Science and Satire

The remarkable cartoons of Richard Owen

by Leah Demetriou FLS

20 July 2024 marked the 220th anniversary of the birth of one of the most divisive figures in the history of natural history, Sir Richard Owen (1804–1892). To celebrate, Leah Demetriou FLS will be examining a seldom-seen aspect of his personality through Owen’s personal sketchbook in the Linnean Society’s collections (MS/713).

LEFT: Richard Owen, c. 1861, engraved by D. J. Pound.

Born in Lancaster, Owen began as a surgeon’s apprentice working in the local gaol, then studied medicine at Edinburgh University. His time there was cut short when his tutor provided him with a letter of introduction to John Abernethy (1764–1831), a surgeon at St. Bartholomew’s Hospital in London, to work as prosector (performing dissections for educational purposes) for the anatomy lectures run by Abernethy. Owen moved to London in 1824 and quickly established himself within the medical community. He became a member of the Royal College of Surgeons in 1826 and set up a medical practice at 11 Cook’s Court in Lincoln’s Inn Fields. Abernethy observed Owen’s skills in dissection and recommended him for a position that would ultimately make his career. He suggested that Owen join William Clift (1775–1849), curator of the Hunterian Museum, and his son in cataloguing, dissecting and arranging the collections. Owen was then submerged in the anatomical collections of famed naturalist-surgeon John Hunter (1728–1793). Soon, his interest in comparative anatomy outweighed his desire to practice medicine. Although Owen retained his medical practice until the mid-1830s, his real passion lay in the burgeoning field of comparative anatomy, and he funnelled his efforts into making a name for himself in the scientific world.

Owen was elected a Fellow of the Linnean Society in 1835 and became the first recipient of the Linnean Medal in 1888, alongside botanist Joseph Hooker (1817–1911). In 1856, he left the Hunterian Museum and became the superintendent of the British Museum’s natural history collections, establishing the British Museum (Natural History)—now Natural History Museum, London—which opened in 1881. The vast body of work he produced over his 56-year career sweeps through almost all realms of science. From coining the iconic term ‘dinosaur’ and developing the vertebrate archetype theory, his areas of interest also extended to more sociological affairs, such as serving on London’s Sanitary Commission.

OPPOSITE TOP: Richard Owen is the subject of satire in an 1893 issue of the (in)famous *Punch* magazine.

OPPOSITE BOTTOM: Richard is probably not the first Owen to use this sketchbook. Though it is difficult to read, faintly written upside down in the front of the sketchbook is 'Mrs Owen Her Boke of Coaks'.

Rocky reputations

Despite his numerous contributions to scientific understanding, Owen's name is primarily associated with controversy: disputes with his peers and accusations of plagiarism may leave him remembered with little sympathy. However, this perception of Owen's personality as malicious may stem in part from his peers struggling to read and understand his behaviour. For example, Thomas Henry Huxley (1825–1895), known as a bitter rival of Owen's, describes him with some bewilderment:

Owen has been amazingly civil to me [...]. He is a queer fish, more odd in appearance than ever... and more bland in manner. He is so frightfully polite that I never feel thoroughly at home with him (Huxley 1900).

The cloud that surrounded Owen darkened after the publication of Charles Darwin's *On the Origin of Species* (1859), which brought preexisting tensions to a head between him and the newly formed Darwinists. This cast him in a shadow his reputation has never quite recovered from. One certainly does not automatically associate him with a lively sense of humour.

However, the Linnean Society's archives hold an item that proves otherwise—a sketchbook, bound in ornate green and gold, of comedic cartoons drawn by the eminent scientist. Domestic documents from the Owen family are few and far between, as scientific notes were preserved in greater numbers and considered more relevant than familial ephemera. His private persona is hard to uncover. *The Life of Richard Owen*, written by his grandson Richard Startin Owen, remains the most accessible account of Owen's character, though as with most 'life and letters' style biographies, it removes any trace of conflict. With such polarising opposites at play, finding a synthesis between these two sides to Owen can be difficult. Perhaps this overview of his sketchbook will assist in bridging the gap.

Cartoons in context

Due to his background, Owen's strength was anatomical illustration. However, the sketchbook drawings are reminiscent of snappy illustrations found in *Punch*, or *The London Charivari*, the popular Victorian-era satirical magazine that paved the way for modern cartoons. *Punch* made light of current news and politics with accompanying illustrations, and it would have been read by most of Owen's scientific contemporaries. Owen featured in it several times, taking it in good humour:

On September 28 an amusing caricature appeared in 'Punch'—a night at the Royal Institution, Owen lecturing. 'The diagrams very well done,' he remarks, 'and the picture is really very clever.' (Owen 1893)

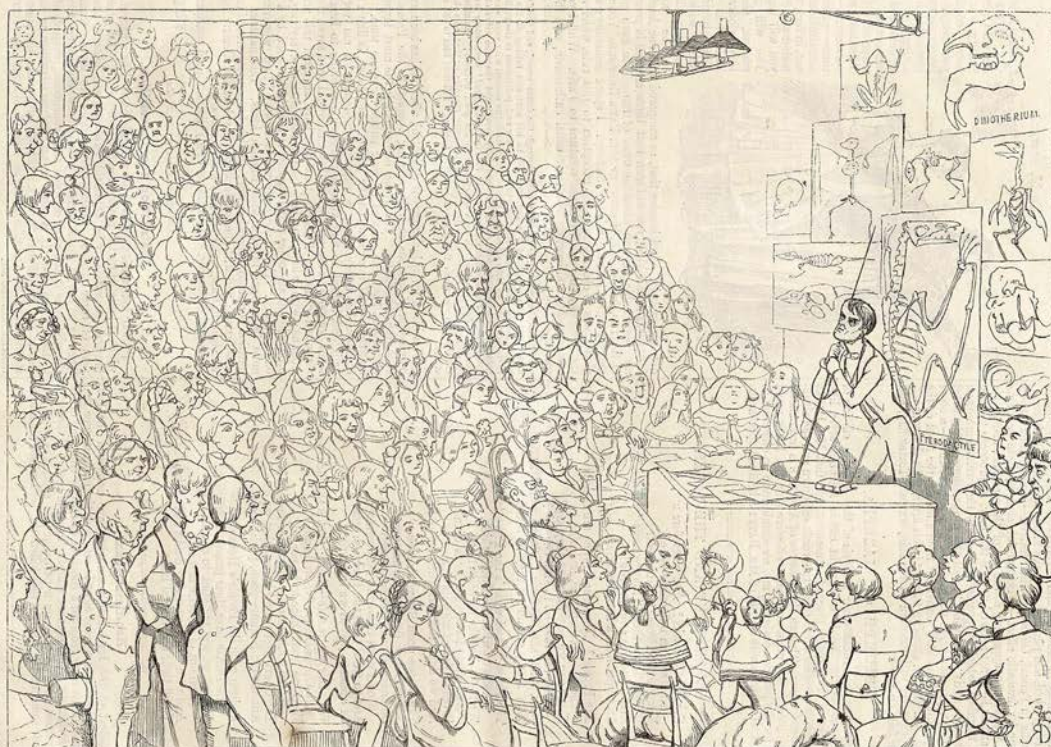
The sea of faces in the illustrated crowd displays a wide range of emotions: some seem engaged and enraptured, with others presumably eyeing the exits in case of a hasty retreat. It is easy to presume that *Punch*'s seminal cartoon style may have influenced the rich expressions present in Owen's work. And it also seems that this humorous nature may run in the family.

Mrs Owen's 'Boke of Coaks'

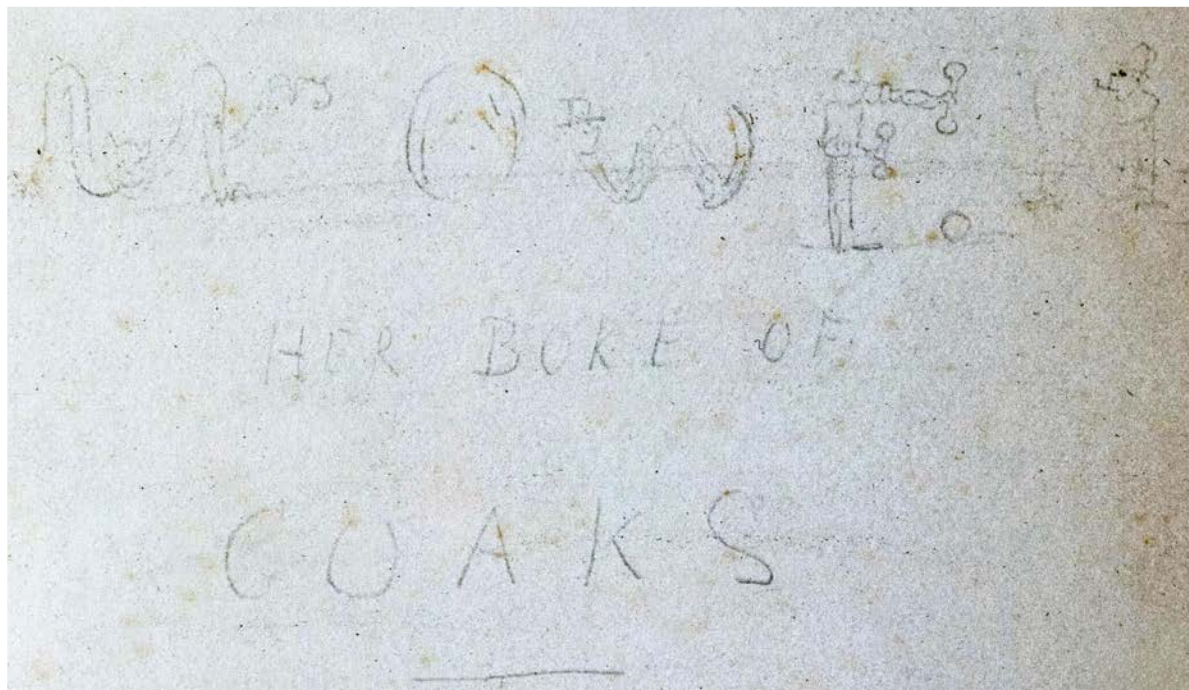
While Owen's drawings fill the sketchbook, it seems to have had a different owner before it fell into his possession. On the first page, written upside down, is a faded pencil sketch that reads 'MRS OWEN HER BOKE OF COAKS'. The 'Boke of Cokery', published in 1500, is considered one of the first recorded English recipe books; the illustrative nature of the title in Owen's sketchbook evokes motifs of the Middle Ages. Each letter has been fashioned into an illustration, with the 'M' resembling a small gargoyle. The 'Boke of Coaks' was likely a project solely for entertainment, as the Owens employed a cook, so it is unlikely that Mrs Owen did her own work in the kitchen.

The 'Mrs Owen' in question was Caroline Amelia Clift (1801–1873), the daughter of William Clift. The couple met when Caroline, trying to hang a curtain pull, slipped and injured herself. Owen was called to attend to her and they were engaged by the end of the year. However, Owen was not in a sound financial position, and it was not until seven years later that he could afford to support a family. They were married on his birthday in 1835, making 2024 also their 189th wedding anniversary.

Manners and Customs of an Englyshe (New Series) No. 10.



A. SCIENTIFIC INSTITUTION. DURING A LECTURE OF AN EMINENT 'SAVAN'



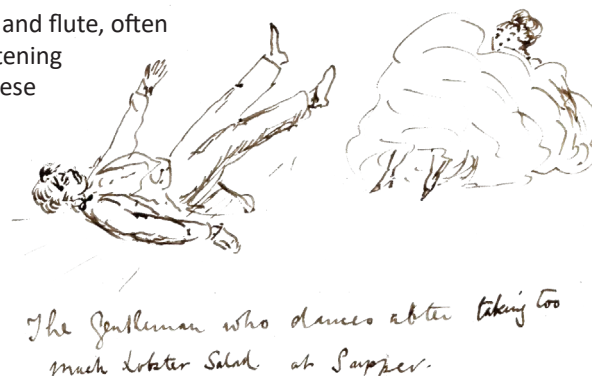
BELOW RIGHT: Owen's sketch of a dancing couple who've toppled over shows his skill for satire with just a few strokes of the pen.

At a glance, dating the journal is a challenge, as Owen mostly forgoes stating the year. Perhaps he considered these sketches, meant only for his family's eyes, as not worthy of such accuracy. Most of the cartoons are drawn directly into the book, but the larger, more complete illustrations have been pasted in later (approximately 1860–1861). Looseleaf paper made in the 19th century was required to carry a watermark stating the date of manufacture; one of the drawings in the nautical sequence, which we shall examine later, was not fully secured, allowing it to be held up to a light, revealing the date of manufacture to be 1859. The rest of the journal is likely from around the same period, with two of the cartoons definitively dated 1868.

Ballroom scraps

A segment entitled 'Ball Room Scraps' beneath a header of a crossed violin and flowers portrays a society scene and introduces us to a cast of characters attending a fine ball. The entrants into the ballroom include 'the first man' (a nervous gentleman surprised to be the first to arrive), 'The people who are not wanted' (a rather harsh observation of an unpopular group of attendees) and a haggard-looking figure who is announced, with great emphasis, to be 'LORD DECIMUS FOGY!!!'. The joke is now lost on a modern audience, perhaps a private reference within the family or a cultural nod. Either way, who or what Lord Decimus Fogey represents is obscured by time.

A great fan of music, Owen could play the cello and flute, often singing or performing at private gatherings. Listening to the band was likely his main enjoyment at these events, though the illustrated band appears sullen, chatting amongst themselves, perhaps debating over what should be played next. This is followed by a dramatic mishap in which a dancing couple fall to the floor, captioned 'The gentleman who dances after taking too much Lobster Salad at supper', as his partner gets tangled in her skirts.



Naval exploits and foreign tours

Several pages of the sketchbook depict a maritime sequence. A boat is shown leaving a quaint English port, embarking on a journey through treacherous waters fraught with icebergs and, it seems, running out of rations. The final two panels show the crew shooting a nearby seagull, the shooter in the background, clutching his bow as the seagull falls to the deck, presumably to be eaten by the crew.

It is sometimes claimed that Owen took up a position as a midshipman in his youth. Lancaster had a bustling port, and there would have been plenty of opportunities for a boy to forge a career. This narrative of Owen as the young sailor was so appealing to contemporary authors that it had snaked its way into Victorians' understanding of his life. In *The Strand Magazine*, one writer claims:

in early life [he] evinced a great love of the sea, and entered the navy as a midshipman; but he was only ten years old when he left the Tribune to become a pupil of a surgeon. At twenty-one he entered as a student at St. Bartholomew's where he soon attracted the attention of the great Abernathy, who showed him much kindness, and prevented him from accepting a post as a ship's surgeon in 1826. 'Going to sea, sir!' said Abernathy; 'You are going to the devil!' 'I hope not sir!' 'Go to sea! You had better I tell you go to the devil at once!' (*The Strand Magazine* 1891).

There is no real evidence to suggest Owen ever had any designs of taking to sea. His surgical tutor, John Seed, became a Royal Navy surgeon in 1823, the year after he took on Owen as a pupil. Owen's grandson asserts that this might be where the confusion stemmed from, with people assuming



LEFT: Owen's sense of humour takes aim at the attendees of a fine ball, with social norms and awkwardness in full view.

he joined Seed aboard the vessel. However, Owen did have personal interests lodged in maritime endeavours: colonial zoological specimens flooded into British ports and subsequently under his scalpel for inspection. Often, he would go in person to oversee the unloading of his precious scientific cargo; he would have observed the hustle and bustle as boats arrived and offloaded their passengers, a large portion of whom were French travellers. Owen was fluent in the language, a tool that served him well. In 1830, zoologist Georges Cuvier (1769–1832) paid his last visit to England. Owen was the only faculty member present at the Hunterian Museum who spoke French and could lead the illustrious naturalist around the collection. Cuvier returned the favour by inviting Owen to the Jardin des Plantes in 1831. Letters were exchanged between the two until Cuvier's death.

RIGHT: Several panels in the sketchbook deal with ideas of maritime life, like this one with the crew shooting a seagull, presumably to be eaten.



Owen's flitting back and forth between France and England must have thrown the contrast between the two countries into sharp relief. The most extensive sequence in the sketchbook investigates this: 'A True History of the perilous adventures of M. Lebrun to perfide albion.' A French greengrocer makes the 'mistake' of visiting Britain expecting a pleasant holiday, but instead is subjected to the various horrors of Victorian London. The sequence depicts sprawling chimneys expelling thick clouds of smoke from his hotel window, almost getting drawn into a street fight and perhaps most alarming of all, the bill for his stay at the hotel.

Enduring history

'History of the Art of War from the Earliest Ages' demonstrates the great versatility of Owen's illustrations, running through a whistle-stop tour of military endeavours throughout the human race. From early man bludgeoning each other with rocks to the 'introduction of guns of precision', which sees a whole line of soldiers shot by an invisible enemy. Owen divides up the evolutionary leaps in warfare into stages—'stage 1' to 'stage 12'—adjusting his artistic style to suit each period of history. A noteworthy example is 'Stage 4, the Egyptian'. Owen approximates the style of ancient Egyptian artwork in his depiction of the pharaoh Ramesses II. In 1869, Owen took the first of four visits to Egypt, suggested by his doctor, who thought the warm weather would improve the recurring bronchitis from which he suffered. Most of his time in Egypt was spent sightseeing, and never able to pry himself from his main passion, he spent time collecting fossil specimens from the petrified forest in Cairo.

Tucked away at the end of the sequence in light pencil lies an addendum—another instalment entitled '13. Short-range artillery used in the First World War'. Owen had been dead for 22 years by the outbreak of WWI, so the artist of this 13th panel offered some stylistic changes. The sketchbook lay in Sheen Lodge—the grace-and-favour home in Richmond Park awarded to Owen by Queen Victoria—where his descendants lived until the 1930s. Apparently some relative felt compelled to add to the series, updating Owen's work as the new century came to pass. Eventually, the book was given by Owen's great-granddaughter Francis Morley to Brian Gardiner, Past President of the Linnean Society and the first editor of *The Linnean*. Brian then presented it to the Society.

A more genial picture

Examination of this sketchbook shows us more a genial picture of Owen, who seems to have delighted in everyday follies, amusing himself by scribbling comics during his limited leisure hours. Not only does it elucidate a new side to a controversial figure, but it also highlights daily life in the mid-Victorian period.

Often we view preeminent figures through a scholarly lens, and forget that they were 'just people' before finding recognition in their fields. This wonderful little sketchbook allows a bit of Owen's humanity to shine through, learning a little bit about his humour, his family and life beyond his reputation.

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[View the catalogue entry for Richard Owen's sketchbook at bit.ly/4dqlgaH](https://bit.ly/4dqlgaH)

Acknowledgements

I would like to express my gratitude to the Linnean Society's Library and Archive staff for giving me the opportunity to write this article and for all their help gathering the necessary resources.

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BELOW: Owen depicts various horrors endured by a French greengrocer on holiday in Victorian London...including his bill from the Grosvenor Hotel.



Image: The Linnean Society of London

Maude Lina West Cleghorn (1882–1946)

A citizen scientist in Calcutta



by Shyamal Lakshminarayanan

Any one with some experience of India must be only too familiar with complaints of the dulness[sic] of existence there, especially from people who are not wholly overwhelmed by obligatory work. It may seem strange that any one should fail to find the means of killing time in a land thronging with such varied interests, but the fact remains that many people do so, and that there is ample occasion for even the humblest attempts to point out sources of pleasure that lie open to all, even in the smallest and most remote country stations.'

—D. D. Cunningham, *Some Indian Friends and Acquaintances* (1903)

LEFT: A harbour in Calcutta bustling with trade, c. 1890–1910.

Towards the end of the 19th century, the natural history craze made many travellers collect specimens, most being sent back to Europe where they were compared against a growing global reference collection, catalogued and named, if found to be novel. Collectors were often rewarded by having their names immortalised in binomials. Zoology and botany, dominated by the classificatory quest, was largely explored through dried, dead and discoloured specimens mounted on paper, on pins, as skins, or pickled in jars of spirit and formaldehyde. Applied botany, with commercial value, on the other hand, had much more to do with living organisms. Research in India was largely conducted by specialised organisations, of which the earliest was the Geological Survey of India founded in 1851 with the quest for coal to power industry, steamships and railways. Agricultural research grew in response to commerce as well as widespread famines; plant taxonomy was dealt by the Botanical Survey (founded in 1890), while its zoological counterpart, the Zoological Survey of India was a laggard, founded only in 1916, emerging out of the Indian Museum established by the Asiatic Society of Bengal, the oldest scholarly society in India. The early universities were seen largely as venues for teaching established subjects, not for research. Studies on ecological themes, driven purely by curiosity, and without obvious economic benefit, was something professionals could indulge in spare time but there was also space for talented amateurs, and a culture of nurture existed across disciplines in the few scholarly societies that existed in India.

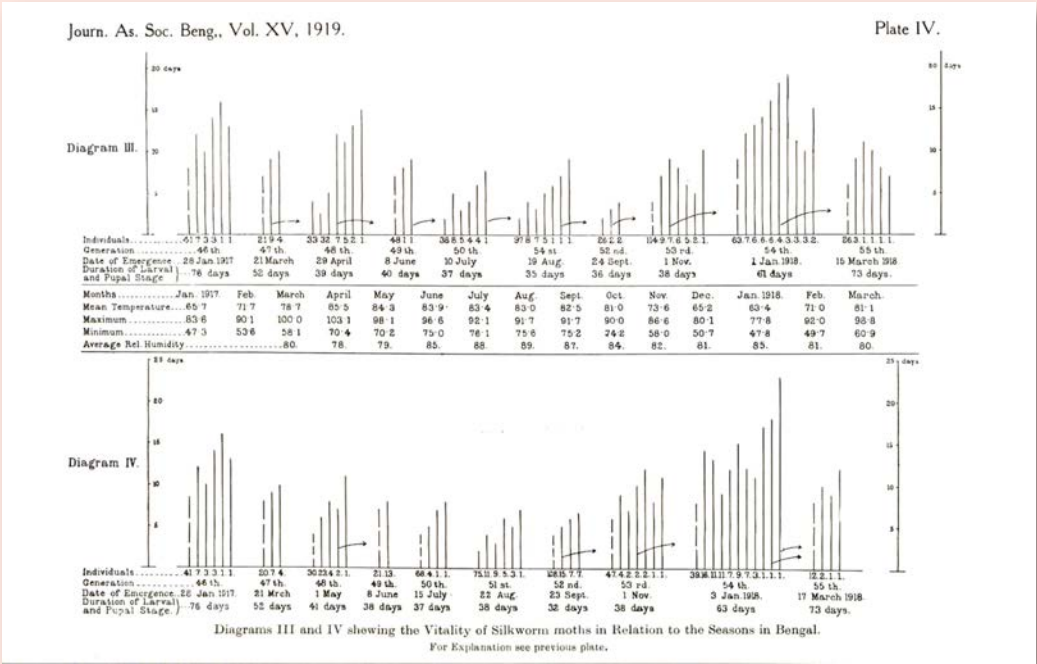
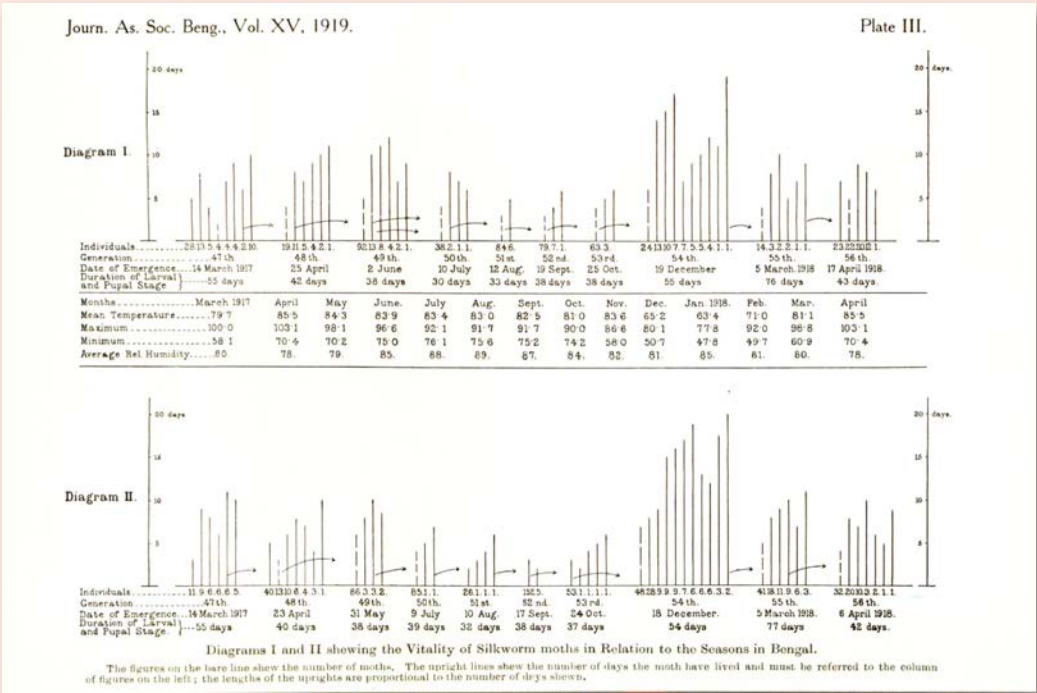
Maude's early life

Little is known about the early life or education of Maude Lina West Cleghorn. Her father James Price Cleghorn (28 April 1846, Calcutta–22 October 1916, Calcutta), had been a civil engineer in the public works department of Bengal. He married Letitia Gertrude (15 March 1863, Calcutta–4 August 1938, Calcutta), daughter of William O'Brien West on 15 December 1881 at Calcutta. Maude, their first child (born 30 September 1882, christened at Buxar on 14 December 1882), was followed by sister Olive on 27 January 1885, brothers Frank Leslie on 23 April 1886, and Colin on 3 December 1894. What we can tell from available sources is that her father took an officially sanctioned interest in silk production (sericulture) from 1877 while serving as executive engineer in the Mahanadi division at Cuttack (Mukerji 1903). He worked on hybridisation of silkmoths (especially for control of voltinism, the number of generations produced in a year which is also associated with quality), resistance to the disease pebrine, and studied the life-history of a tachinid fly that parasitises silkworms (Cleghorn 1887). The losses from the fly parasite were substantial and Cleghorn claimed to have discovered an effective control method that he refused to divulge¹ unless paid a lakh (hundred-thousand) rupees.² He also wrote on a melon pest (*Carpomya pardalina*) in Baluchistan where he was posted in 1890 (Cleghorn 1914). He took out a patent on a method for preserving meat in 1903–1904 (Patent number 366 under the Inventions and Designs Act of 1888), which indicates some knowledge of applied microbiology. Medicine, the germ theory, and microbiology had advanced and a prominent naturalist

1 The fly is currently managed in Indian sericulture through the use of nets surrounding the silkworm rearing area.

2 This is now better known as the uzi fly, *Exorista sorbillans* (Wiedemann 1830), some older works refer to it as *Exorista bombycis*.

RIGHT: Plates III and IV from Maude's piece 'A note on the vitality and longevity of silkworm moths during the cold and rainy seasons in Bengal' in the *Journal and Proceedings of the Asiatic Society of Bengal* (1919). The graphs form part of a sequence showing that adult silkworms emerging in the rainy season are short-lived.



who pioneered the study of aerial microbes in Calcutta was David Douglas Cunningham (1843–1914).³ Although no record can be found of a connection to Cunningham,⁴ his contemporary writings were popular enough to have influenced the Cleghorns, even if he was not a family acquaintance.

3 Cunningham was elected Fellow of the Linnean Society in 1876.
4 James Price Cleghorn's parents are noted as James and Susan Cleghorn on some genealogy sites. A possible relative, Surgeon-General James Cleghorn (1841–1920) served in the Indian Medical Service until 1898.

A family affair

It would seem that young Maude became involved in her father's sericultural experiments, for in the minutes of a 1908 committee report on the improvement of silk industry in Bengal we find the following:

A sustained effort to be made to produce improved seed of boro-polo, chota-polo and nistari worms, by selection. Cross-breeding not to be undertaken. The work to be offered to Miss Cleghorn.

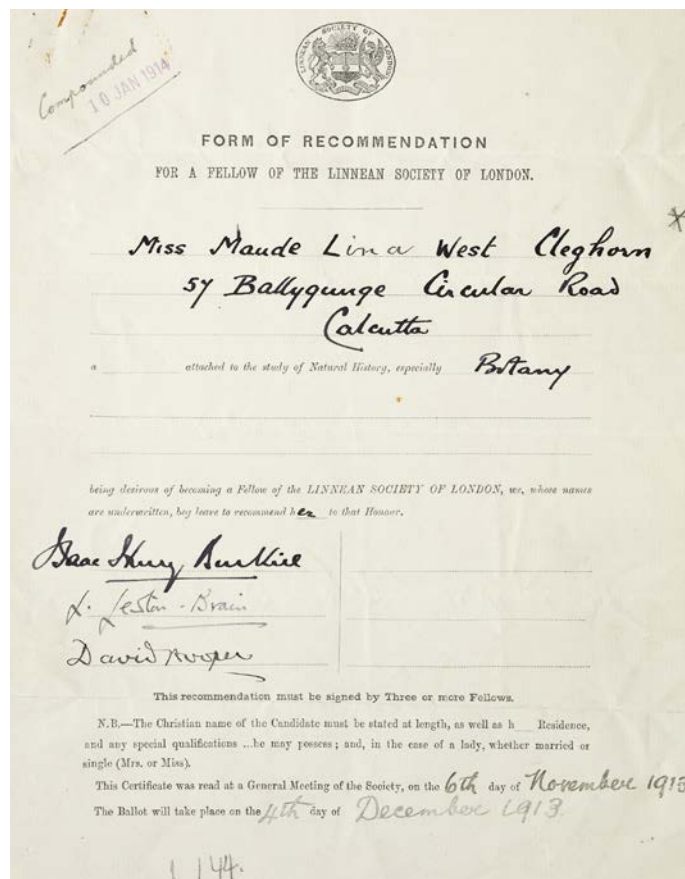
By 1910, she had impressed the Imperial Entomologist Harold Maxwell-Lefroy (1877–1925) enough to be entrusted with several experiments both on the breeding of silkworm as well as varieties of mulberry. She had apparently found a variety of mulberry that did not set fruit, yielding more leaves for feeding silkworm caterpillars. Her report in 1913 was titled *Experiments in the inheritance of visible and invisible characters in Silkworm* (Maxwell-Lefroy and Anson 1917). In 1914–1915, the Bengal government, on the recommendation of Grangeon, a French sericultural expert, gave Miss Cleghorn an initial grant of Rs 5,615 and an annual subsidy of Rs 5,000 for five years to continue her work (Anon. 1916). In 1918, she published an analysis of Mendelian inheritance and genetics in silkworm in the *Proceedings of the Zoological Society of London*. She found multi-voltinism to be a dominant trait in females but recessive in males (Cleghorn, M. L. 1918). The next year she published a note on seasonal differences, involving controlled breeding over 57 generations of moths. Using elegant graphs she concluded that the moths that emerged in the cold season lived the longest and that an increased variation in temperature made them short-lived (Cleghorn, M. L. 1919). By 1926 Miss Cleghorn held the official post of third superintendent of sericulture in Bengal.

Memberships of Societies

The Asiatic Society of Bengal founded by Sir William Jones in 1784 was the learned society of Calcutta, although it largely focused on linguistics, history and culture; its museum founded in 1814 was filled mostly with cultural artefacts. Sir William Jones had discouraged zoological specimen collections, suggesting that it involved needless suffering and slaughter (Anon. 1914). That founding prejudice lasted long enough that Edward Blyth who became its curator in 1841 would complain of being 'accused' of being an ornithologist (Brandon-Jones 1997)!

Things had changed by the time Miss Cleghorn was proposed as a member in 1915 of the Asiatic Society, supported by the zoologists T. N. Annandale (1876–1924) and F. H. Gravely (1885–1965). She was, however, apparently admitted as an 'associate member', a lower grade of membership, as opposed to 'ordinary member'. She had already been admitted into the Linnean Society as a Fellow on 4 December 1913, nominated by the botanist Isaac Henry Burkill, economic botanist David Hooper and Lawrence Lewton-Brain who directed agriculture in Malaya. In 1914, she was admitted Fellow of the Entomological Society of London.⁵ Burkill was clearly a major influence in the work of Miss Cleghorn. While serving in the Botanical Survey of India, he published a series of articles dealing with pollination biology in the *Journal of the Asiatic Society*, beginning in 1906 and continuing after he moved from Calcutta to Singapore in 1912. His observations made in Sikkim in 1904 and 1906, with remarks on the possibility of flower orientation as an adaptation to protect pollen from rain, exemplifies the typical

⁵ Admitted Fellow on 2 April 1914. Proposed by P. W. de Rue Philipe and seconded by G. Wheeler [probably George Domrile Chetwynd Wheeler, 1858–1947] and J. J. Walker [probably James John Walker, 1851–1939].



ABOVE: Miss Maude Lina West Cleghorn's Form of Recommendation for Linnean Society Fellowship was signed by Isaac Henry Burkill, who from 1912 was the Director of the Singapore Botanic Gardens.

BELOW: Maude's work on *Typhonium trilobatum* showed how dung beetles are trapped in the base of the plant overnight, and gather pollen when they are released. From *Curtis's Botanical Magazine* vol. 49 (1821–1822).

teleological thinking that we see also in Cleghorn's writings (Burkill 1908).⁶ Summaries of the meetings of the Asiatic Society of Bengal from 1916 to 1928, held well after working hours from 9.15 pm, record the regular attendance of Maude Cleghorn, often accompanied by her siblings Olive and Colin. On 2 August 1916, she is recorded as exhibiting a specimen of the painted frog, *Kaloula pulchra* (now *Uperodon taprobanicus*). On 6 February 1928, she exhibited pictures of mulberry varieties while her sister Olive showed her photographs of the eri silkworm (*Samia cynthia*).

Pollination biology

Maude Cleghorn's work in pollination biology is represented in three concise papers, the first published in 1913 on *Colocasia antiquorum*; the second on *Typhonium trilobatum* in 1914; and the last, after a significant gap, in 1922 on bat-pollination in the mahua tree (*Madhuca latifolia*).⁷ Illustrated with photographs, the first two are brief but precise descriptions of the mode of trap-pollination in two species of Araceae that are common in Bengal, the tuberous roots of the first being well-known in local cuisine. In her works, she cites the work of the pioneer pollination biologist Hermann Müller. In *Colocasia*, she notes the multiple mechanisms that encourage cross-pollination including protogyny, the attraction of flies to the odour, the overnight entrapment of flies by the spathe surrounding the basal pistillate portion of the spadix, and the later uncovering of the spathe surrounding the terminal male flowers. Her work on *Typhonium* showed how the spathe constricted itself around the basal pistils, trapping dung beetles (*Caccobius* sp.) overnight, which would then be released the next day to gather pollen on their way out.

Her note on mahua hints of a self-trained naturalist's annoyance at formal and over-simplified teaching, appearing for her perhaps as a retrogression in the state of knowledge, apart from lacking appreciation for the plant's 'rather extraordinary' and 'wonderfully perfected' floral adaptations. She notes that her interest in mahua was drawn by the large numbers of bats visiting the flowers which she found seemingly paradoxical, particularly if the flowers were in fact being damaged by bats. Noting that the flowers smelled strongly of bats, she further notes that it was unclear if the odour was natural to the flowers or if they had gained it from the visiting bats. She notes that two contemporary Indian botany texts illustrated the flower of the very common and culturally deeply-embedded mahua in an unnatural semi-open state. The two books she was referring to were *A Manual of Elementary Botany of India* (1916, second edition 1921) by K. Ranga Achari⁸ and the three-volume *Indian Medicinal Plants* (1918) begun by K. R. Kirtikar and completed after his death by Baman Das Basu.⁹ She then notes that the rather fruit-like flowers of the mahua had been very accurately described way back in 1785 (the correct publication date being 1788) by Lieut. Charles Hamilton in *Asiatick Researches*, the first publication of the Asiatic Society (Hamilton 1788). She goes on to describe the changes in the flowers with age; how the pendulous young flowers shed pollen through gaps in the corolla onto the wings of visiting bats as they hung from the

- 6 Teleological thinking was frowned upon much later, and in the 1930s it would draw J. B. S. Haldane's provocative comment: 'Teleology is like a mistress to a biologist: he cannot live without her but he's unwilling to be seen with her in public.' This quote may however have an older German origin—see Riskin, J. (2020). Biology's mistress, a brief history *Interdisciplinary Science Reviews* 45(3): 268–298. doi:10.1080/03080188.2020.17943
- 7 The mahua is a tree with religious associations and the sweet flowers are used in many tribal cultures to make fermented drinks for festive events.
- 8 Cleghorn's original note has several typographical errors and Achari is listed as 'Achain', the second edition of the book she was referring to uses the spelling 'K. Rangachari'. Kadambi Rangachari (1868–1934) worked at the Madras Museum and became a keeper of the Madras State Herbarium after it was moved to Coimbatore. He also taught botany at the Agricultural College in Coimbatore.
- 9 K. R. Kirtikar (1849–1917) and B. D. Basu (1867–1930) were both army physicians and conservative Hindu nationalists.



Image: BHL

inflorescences; the development of the fleshy corolla in older flowers that are partially eaten; and the stigma at the end of a long emergent style becomes receptive to pollen from the body of the bats. She comments that this rather rare floral mechanism is 'costly' (it is unclear if this refers to the nutritional or energetic investment in the fruits or the risk of loss of the flowers through being eaten or damaged) and expresses her surprise at finding no loss of flowers in her samples. Maude suggests that the form of closed flowers is evolutionarily recent and derived from other closely-related species that have the usual open flowers, and that the only parallel was in the bat-pollinated flowers of *Freycinetia* of Java. Her writing suggests that she granted (evolutionary) agency to the plant, and considered the costs and benefits associated with the choice of strategies to attract pollinators.

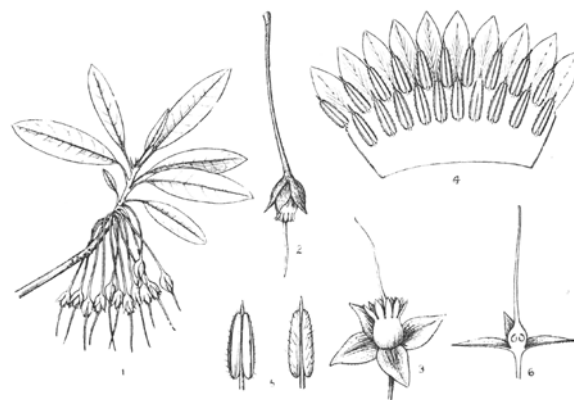


FIG. 320. *Bassia longifolia*, L. 1, branch; 2, flower bud; 3, open flower; 4, corolla and stamens; 5, anthers; 6, pistil.

Celebrating a forgotten figure

Sadly, Maude Cleghorn vanished into oblivion in the following years and almost nothing is known beyond the announcement of her death in 1946, a year before India became independent. Her sister Olive exhibited a water-colour of a pied myna bird observed pollinating red silk cotton flowers (*Bombax malabaricum*) at the annual meeting of the Asiatic Society on 4 February 1925. Her brother Colin may have continued his association with the Asiatic Society and gave a series of lantern talks on 'Indian Life' in 1944 (Annual Report 1944).

Shyamal Lakshminarayanan (lshyamal@gmail.com)

Acknowledgements

This note, and an earlier blog post on the same subject, would not have been possible but for the wonderful online archive created by the Biodiversity Heritage Library. Thanks are due to Lynda Brooks, former Librarian at the Linnean Society, Ann Sylph at the Zoological Society of London, and Rosemary Pearson at the Royal Entomological Society for help with information. Prashanth Mohan Raj and Henry Noltie provided helpful comments and suggestions on drafts.

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ABOVE: Maude's work on the mahua plant in India (*Madhuca latifolia*, listed here as *Bassia longifolia*) led to her critique of its representation in two main Indian botany texts, including the one shown here, *A Manual of Elementary Botany of India* (1916), where the flower is depicted in an unnatural semi-open state.

The Elusive Edward Donovan FLS

Artist, publisher and naturalist

by E. Charles Nelson FLS

BELOW: Eurasian nuthatch (*Sitta europaea*) from Edward Donovan's *The Natural History of British Birds*, published 230 years ago in 1794.

Edward Donovan would become renowned during his own lifetime for his finely illustrated, hand-coloured publications about birds, shells, insects and plants. A Fellow of the Linnean Society from 1799, he counted amongst his works *The Natural History of British Birds*, the first of the 10 volumes being issued 230 years ago in 1794, just five years after Donovan's first known publication. Despite this, little is known about Donovan. The late E. Charles Nelson, a Fellow and good friend to the Society, offers a glimpse into misconceptions about Donovan's life.

A little background

Biographers have struggled to obtain accurate information about Edward Donovan, and the general conclusions prevailing today are that his origins are obscure, with very little certainty about his early life (Gilbert 2004; Gibson 2017). Donovan emerges in London in 1789 as an inconspicuous character who was a moderately accomplished artist, engraver, and interestingly, his own publisher (Gibson 2011, 2017). His earliest signatures are on dated plates in two rare slim works, *An Essay on the Minute Parts of Plants in General* (Donovan 1789–1790b) and its companion *The Botanical Review, or the Beauties of Flora* (Donovan 1789–1790a), his only works that concentrate on botany. Perplexingly, the signatures on the plates read 'E. O. Donovan', which has caused some authorities to suggest that Donovan's surname was actually O'Donovan. However, as he engraved a full stop, not an apostrophe, after the capital 'O', it does not signify an Irish patronymic surname. A further twist to his personal moniker is that 'Edward' was not his initial Christian name.

In the Society's possession are several letters from Donovan to fellow zoologist William Swainson. The Society also holds several of Donovan's works, including the aforementioned *The Natural History of British Birds*, *The Natural History of British Insects* (1792–1796)—through which he established his reputation—and *An Epitome of the Natural History of the Insects of India and the Islands in the Indian Seas* (1800–1804), a plate from which is currently on display as part of the natural history prints that adorn the staircase at Burlington House.



Image: The Linnean Society of London

Shining light on an obscure figure

There are overlooked sources that add substantially to information about Donovan and his family—the parochial burial register of his parish and a published inscription of his tombstone. But how reliable are they? Donovan died on 1 February 1837, his death soon reported in contemporary London newspapers including the *Morning Herald* (Anonymous 1837):

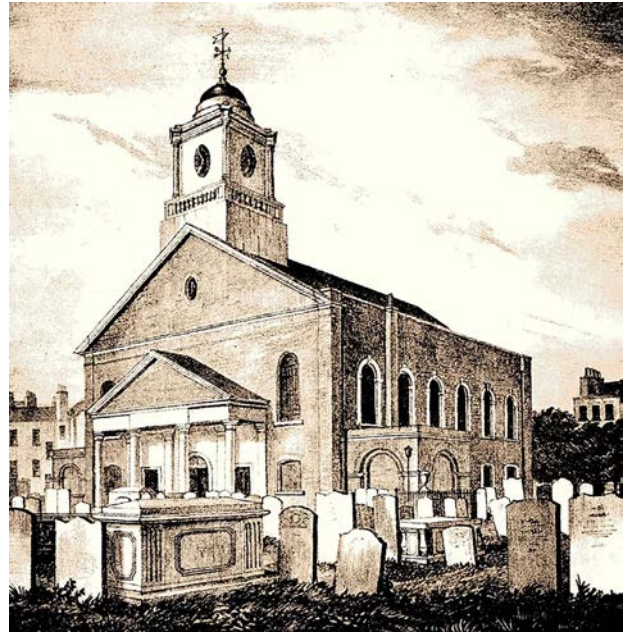
On the 1st inst., at his house, John-street, Kennington-road, Edward Donovan, Esq., F. L.S., author of numerous works in zoological science. Mr. Donovan has left a large family in destitute circumstances.

Donovan lived in the parish of St Mary, Newington (on the south side of the River Thames, now part of the London Borough of Southwark) and the parochial register of burials records that: ‘Elijah Edward Donovan, aged 61, was buried on 28 February, the committal performed by the Reverend William Josiah Irons (1812–1883), Curate of the parish.’ There can be no doubt that this record relates to the naturalist; there were no other Donovans in the parish at this time (besides his family).

The present-day parish church of St Mary, Newington is a replacement for the Victorian church designed by James Fowler PRIBA and consecrated in May 1876. That building was itself a replacement for the church that was pulled down so that the part of the thoroughfare called Newington Butts could be expanded. As a result, many of the older monuments had been lost by the 1870s and memorial stones in the graveyard were illegible. Robert Hovenden FSA (1830–1908) recorded the remaining readable inscriptions, publishing those for initials A–I in 1880. Hovenden’s *The Monumental Inscriptions in the Old Churchyard of St. Mary, Newington, Surrey* preserves details of the altar tomb belonging to the Donovan family. The tomb was inscribed:

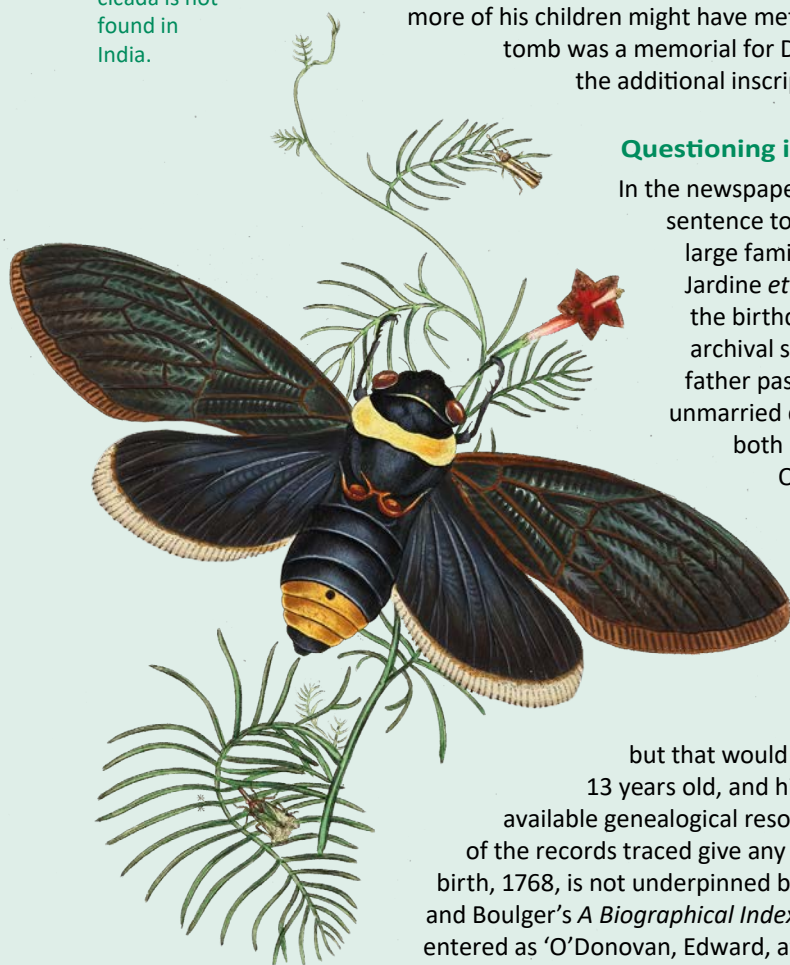
Sacred
to the memory of
JANE DONOVAN who departed this life
on the 9th day of Feb^y 1813, aged 74 years
also of
MARGARET WILLOUGHBY DONOVAN,
the beloved Wife of ELIJAH EDWARD DONOVAN Esq^r
who died on the 31st day of Oct^r. 1822, aged 55 years
also of the said
ELIJAH EDWARD DONOVAN F.L.S. & F.Z.S. &c. &c. &c.
who died on the 1st day of Feb^y. 1837
Aged 61 years.

A man of great genius, and one of the brightest ornaments
of natural philosophy, possessing great literary attainments,
and an eminent author of natural history. He promoted
the views of science, the extension of knowledge and
the arts, and strictly observed the fulfilment of every
duty that society could demand.



ABOVE: St Mary’s Church, Newington, as it would have looked in 1827. From the *Survey of London*.

BELOW: The cicada *Tacua speciosa* from *An Epitome of the Natural History of the Insects of India and the Islands in the Indian Seas* (1800–1804). Like several species from this book, this cicada is not found in India.



St Mary's church was burnt out on 10 May 1941 following an air raid. There is no current record of an altar tomb in the surrounds of the present church, so it was presumably destroyed in the bombing.

Accepting that Hovenden's (1880) record is accurate and that the inscription was legible in his day, his account provides confirmation that 'Edward Donovan' FLS was christened Elijah Edward, as also noted in the parish register of burials. The expensive altar tomb that covered the family's burial plot is perhaps not in accord with the view of Donovan, whose life ended as an impoverished man (Gilbert 2004). He might have erected the tomb himself after his wife Margaret died, when he was able to afford such a monument; she pre-deceased him by almost 15 years.¹ It is also possible that one or more of his children might have met the cost of the altar tomb, although this seems less likely. If the tomb was a memorial for Donovan's wife and mother, his children must have arranged for the additional inscription marking their father's death.

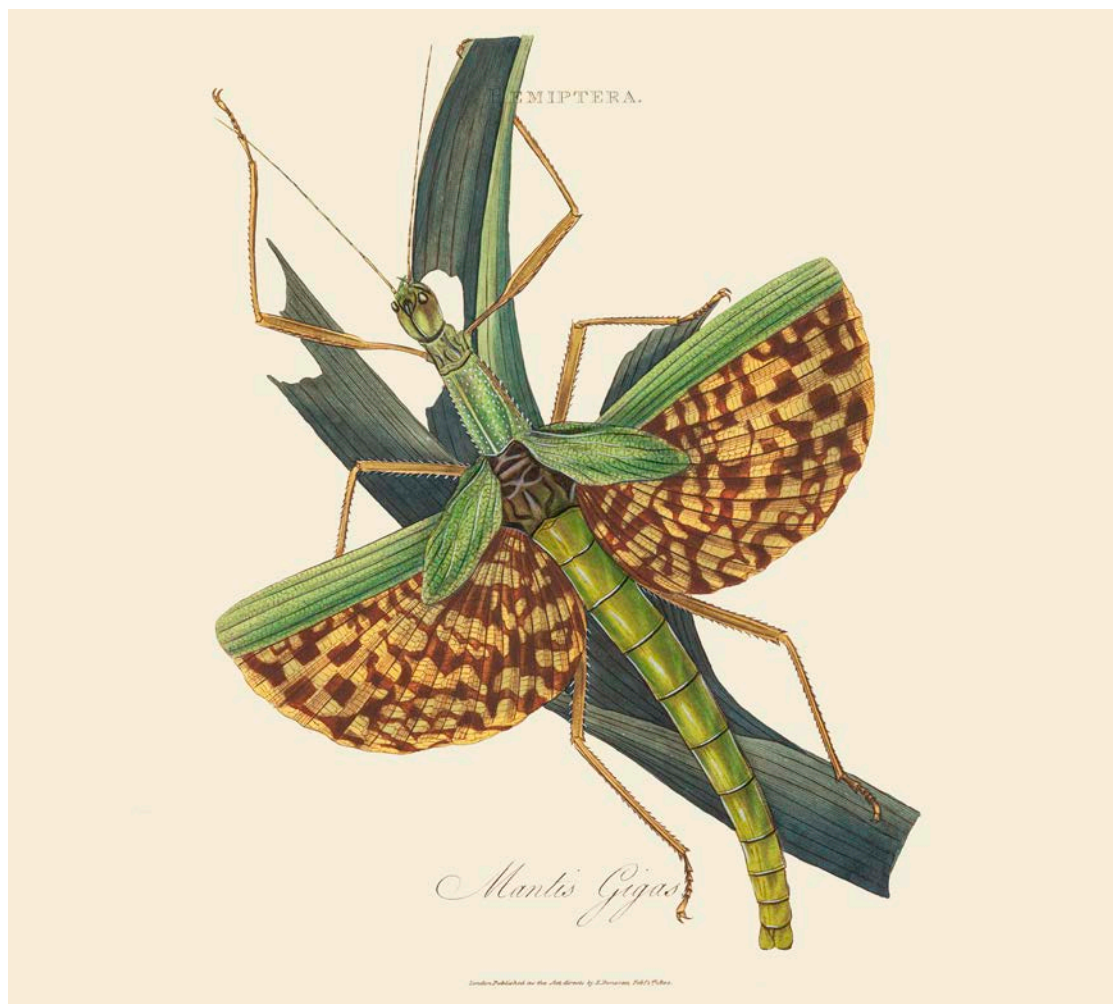
Questioning inaccuracies

In the newspaper notices recording Donovan's death in 1837, several added a sentence to the basic details, noting (as already quoted) that he 'has left a large family in destitute circumstances' (for example, Anonymous 1837; Jardine *et al.* 1837; see also Gilbert 2004). This statement seems untrue, as the birthdates of the majority of his 10 children are known from reliable archival sources (particularly their baptismal records) and when their father passed away they were all more than 30 years of age.² The eldest unmarried daughter, Sophia, was 46 (born 31 May 1790). Only two children, both boys, had died during childhood more than 20 years previously.

Of course, it is possible that some members of the family did not have financial resources to fall back on, if Edward had continued to be the principal wage-earner, but to have eight adult sons and daughters dependent on him seems highly improbable.

The parochial burial register and tomb inscription both give Donovan's age at his death as 61 years, yet this is also improbable. Such an age indicates that he was born in c. 1776, but that would mean that he fathered Sophia, his first child, when he was hardly 13 years old, and his three eldest sons before he reached his majority. None of the available genealogical resources lead to any record of his own birth or baptism, and none of the records traced give any indication of his age. Likewise, the date universally cited for his birth, 1768, is not underpinned by any archival source. It apparently was first published in Britten and Boulger's *A Biographical Index of British and Irish botanists* (1893: 129) where Donovan was entered as 'O'Donovan, Edward, afterwards Donovan (1768–1837)'. Earlier authors, including

- 1 'Elijah Donovan Bachelor and Margaret Bennet Spinster both of this Parish [St Mary's, Rotherhithe, Southwark] were married in this Church by Licence this eleventh day of July one thousand eight hundred': London Metropolitan Archives: Church of England Marriages and Banns, 1754–1938; Saint Mary, Rotherhithe, 1785–1899, f. 332. Available via Ancestry.co.uk (accessed 19 December 2023). Elijah and Margaret married more than 10 years after the birth of their first child, and after seven of their children had been born (see note 2). Clearly they had been a couple since at least mid-August 1789, shortly before the first dated plates of his publications were issued.
- 2 St Margaret's Church, Westminster, England, Church of England Baptisms, Marriages and Burials, 1538–1934, f. 98: 'Baptized December 1801 ...': eight of the children of 'Elijah [Donovan] by Margaret' were baptised on the same day, 30 December 1801. Their dates of birth were all recorded in the baptismal register: Sophia [31 May 1790], John [24 April 1792], Joseph [14 March 1794], Elijah [31 May 1795]; the twins Anne and Isabella [27 September 1797], Maria [2 May 1799] and Charles [28 May 1801]. Available via Ancestry.co.uk (accessed 19 December 2023).



LEFT: The giant stick insect (*Mantis gigas*, now *Phasma gigas*) from *An Epitome of the Natural History of the Insects of India and the Islands in the Indian Seas* (1800–1804). This image is one of several prints from the Linnean Society’s collections on permanent display to the public, up the main staircase at Burlington House.

Benjamin Daydon Jackson (1880: 540), did not usually provide any date of birth but in the third edition of E. Cobham Brewer’s *The Reader’s Handbook ...* (1882: 1188) Donovan’s dates were given as ‘1798–1837’. Britten and Boulger (1888: 309) also had ‘b.1798’ but clearly, they recognised an error and a subsequent list of errata in the *Journal of Botany* included ‘309, delete entry for “Donovan, Edward”’. (Britten 1888: 389).

Given there is no record of Elijah Edward Donovan’s birth or baptism in English archives, his date of birth cannot even be guessed. There remains another unverifiable claim that is propagated on the internet and in a few publications (Butler 2023, for example) that he was ‘Anglo-Irish’ from County Cork in Ireland. Irish records for the 18th century are almost non-existent, and the fact he has an Irish surname does not mean he was of Irish origin. This claim appears to have been initiated on a family page on a genealogical website that is, like many such pages, rather a mishmash of information.

A multifaceted mystery

What we can be sure of is that Donovan was quite prolific in his endeavours, publishing more than 10 works (some multi-volume) and numerous letters and papers in a relatively short space of time. Donovan also provided many of the fine illustrations for his books himself. He had links with many

respected names of the era, being nominated for Fellowship of the Linnean Society by naturalist and Colonial Secretary of New South Wales Alexander Macleay, and celebrated botanical illustrator James Sowerby, amongst others.

In 1807, Donovan founded the London Museum and Institute of Natural History, in Catherine Street, the Strand, displaying birds, mammals, insects, and fish, and charging a shilling a visit. Similar to the Linnean Society's own mission, his goal was to share his private natural history specimens to aid public education about the natural world. Financially, it was not a success, but it is enlightening to know that his educational objective aligns with those of institutions today.

E. Charles Nelson FLS

While this article was in production, we learned the sad news that Charles had suddenly passed away. We would like to publish it to celebrate his connection with the Society and our community. His friend Elaine Shaughnessy FLS has helped with this article and has written an obituary, which can be found on p. 52.

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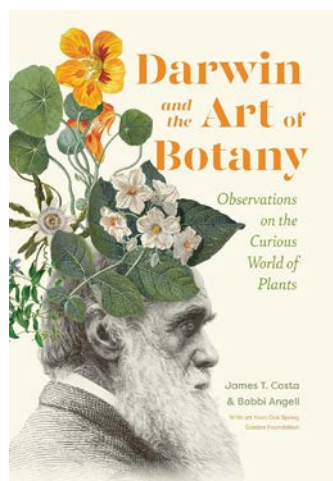
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Reviews

Darwin and the Art of Botany: Observations on the Curious World of Plants

James T. Costa and
Bobbi Angel

380 pp, Timber Press
2023 (Hardback)
ISBN 9781643260792
Col. illust. £25



Bearing in mind the number of books recently issued about Charles Darwin, one wonders if another is necessary. However, on reading this new one it is obvious that it fills an important new niche. We tend to think of Darwin in terms of finches and fossils, but this book clearly shows the major contributions that Darwin made to botany. His books on orchid pollination, climbing plants, carnivorous plants, different forms of flowers on the same species, cross and self-fertilisation in plants, and movement in plants demonstrate clearly the amount of research that he carried out with plants.

This book focusses on 45 species or genera of plants that were researched by Darwin. Every entry is illustrated by one or more classical colour illustrations carefully chosen from the archives of the art collection in the Oak Spring Garden Foundation by Bobbi Angel, herself an accomplished botanical artist and a winner of the Jill Smythies Award from the Linnean Society. Each entry is also accompanied by explanatory text by James Costa, an extract of the text from one of Darwin's botanical books and a colour plate and an enlargement of a section of the plate. The selected illustrations include many by well-known botanical illustrators, such as Georg Ehret, Sarah Anne Drake, Ann Hamilton and Walter Hood Fitch.

The combination of Darwin's original text with an informative update by Costa makes this a most interesting read and it re-emphasises the importance of Darwin as a botanist. Darwin had access to an incredible variety of plants from around the world due to his friendship with many botanists, especially Joseph Hooker at Kew and Asa Gray in North America, so the

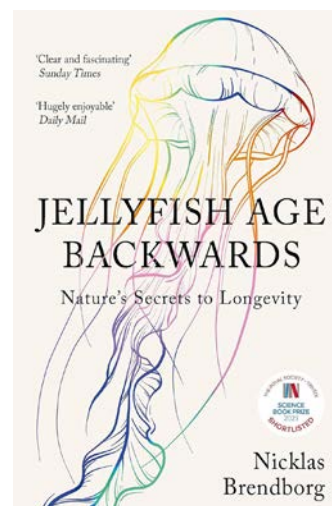
plant species treated here are a worldwide selection. Many of Darwin's pencil sketches from his books are included, but the addition of the well-selected colour plates achieves the goal of the authors, of combining what was ground-breaking science with beautiful art. The book concludes with a chapter about the library of Rachel Lambert Mellon at Oak Spring Garden Foundation from where all the artwork was so appropriately selected.

Ghilleen T. Prance FLS

Jellyfish Age Backwards: Nature's Secrets to Longevity

Nicklas Brendborg

288 pp, Hodder & Stoughton
2023 (Paperback)
ISBN 978 1 52938793 3
B/w illust. £12.99



First published in English in 2022, previous reviews for Danish scientist Niklas Brendborg's *Jellyfish Age Backwards* have generally been laudatory, with

the book being shortlisted for the Royal Society Trivedi Science Book Prize. This review will be no different. The title effectively refers to the jellyfish *Turritopsis* (10–12 mm in size), which reverts from its adult stage to an intermediate phase of the life cycle (the polyp) in response to stressors, like a change in water temperature or lack of food. It can then develop to the adult stage again and continue this cycle, apparently ad infinitum. Stress is also a factor in human ageing. In his Introduction, Brendborg says the book is about 'dying young' at an old age. The succeeding text leads us through some of the body's weird and wonderful ways of staying young.

The book is in three parts. Part I: Nature's Wonders, has four chapters, the last of which discusses the 'Disadvantages of Immortality'. Part II: Scientists' Discoveries, comprises 13 chapters including 'Flossing for Longevity' (Brendborg has a

thing about dental floss which he contends removes bacteria that are inimical to the brain and to longevity in general). Part III: Good Advice, contains seven chapters which, among many other topics, discusses 'Cargo Cult Nutrition' and 'Medieval Monks to Modern Science'. A short Epilogue outlines that we have still a long way to go in the search for solutions that will increase longevity. At some unknown time in the future, through scientific progress, the human race will achieve immortality. There are 35 pages of references which are listed somewhat idiosyncratically by chapter, but not alphabetically, within chapters. As might be expected in such a book there is a comprehensive (and much needed) index.

At the time of writing *Jellyfish Age Backwards* Nicklas Brendborg was working on a PhD in Molecular Biology at the University of Copenhagen and had already won many awards. Originally written in Danish, the English translation by Elizabeth DeNoma with help from Brendborg himself is a joy. The text, humorous and with tongue-in-cheek in parts, flows smoothly, with no discernible hint that the book was originally written in another language.

There are no other books comparable to this wonderful and fascinating title, in popular or in academic science. This reviewer usually avoids the word unique, but 'Jellyfish Age Backwards' is certainly as close as it gets.

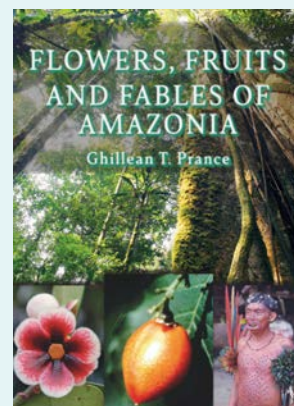
There are no other books comparable to this wonderful and fascinating title, in popular or in academic science. This reviewer usually avoids the word unique, but *Jellyfish Age Backwards* is certainly as close as it gets. Most biological scientists will benefit from reading it and the general reader will not feel that they are being patronised. The paperback version is very good value for money. I will certainly not achieve eternity, but will probably get closer to it after reading this title and practising some of nature's tricks.

Trevor Wilson FLS

Flowers, Fruits and Fables of Amazonia

Ghilleen T. Prance

297 pp, Redfern Natural History Productions
2023 (Hardback)
ISBN 9780691251332
Col. illust. £25



This is a modern day naturalist's notebook, written by Sir Ghilleen T. Prance, an authority on the botany of all things Amazonian. He spent from 1963 to 2005 collecting a plethora of photographs and information about the plants themselves, revealing their interactions with animals and humans. Prance notes, 'This book is really about the natural history of the Amazonian rainforest illustrated by some of my studies in plant taxonomy, ethnobotany and of the beliefs of indigenous and local peoples.'

There is no doubting the suitability and expertise of Prance in writing this tome, as the author of over 590 scientific papers and 27 books. He has also engaged in 39 expeditions to Amazonia collecting over 350 new species of plants. Clearly, Prance's book has a lot to offer specialists and lay readers alike, and it does not disappoint.

The book is 297 pages long (on good quality paper that enhances the photographs) and divided into 12 sections, opening with the classification of plants into families, beginning with the Pteridophytes, the Gymnosperms, Monocotyledons and the Dicotyledons. Finally, these sections are followed by a Conclusion, a Bibliography, a Glossary, Charities That Protect the Rainforest, About the Author, Index to Scientific Names, Index to Local Names and a General Index.

Woven throughout the text are fables relating different plants to the Gods. The shaping of the landscape is also covered, as well as the provision of essential materials, notably food, medicines, food dyes, cosmetics, hunting materials and as hallucinogens used in religious practices. These are passed down between generations and are important not only for the links they make, but often for the conservation message they convey. The captions are written in green italic font to distinguish it from normal text.

Each section of the book is supplemented with stunning colour photographs showing exquisite detail of the plant

parts of particular interest to the peoples under discussion. The text is readable by both specialist and non-specialist alike with interesting botanical features highlighted together, with commercial applications where known. For example, the red carotenoid compound bixin and the yellow norbixin are used as food colourings in Red Leicester and Double Gloucester cheeses.

The overall presentation and content represent excellent value for money, making this book much more than a coffee table publication but a work of academic and seminal learning.

Prance ends his book with photographs showing what is happening to the Amazon rainforest today. The first page of the Conclusion is devoted to comments made by notable people such as Sir David Attenborough, Jane Goodall, Pope Francis, Davi Kopenawa Yanomami, all advocating for the need to listen to the planet and change our ways before it is too late. The second page calls upon the World's politicians to listen to the climate and environmental experts and act accordingly.

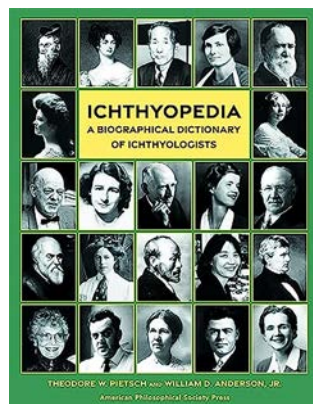
The book is both a delight and a challenging read, but one that deserves to be read by politicians and all who profess a genuine concern for the present and future of our planet.

Stephen Hoskins FLS

Ichthyopedia: A Biographical Dictionary of Ichthyologists

By Theodore W. Pietsch and
William D. Anderson, Jr.

301 pp, The American
Philosophical Society Press
2022 (Hardback)
ISBN 9781606189252
Bw illust. \$60



It can be surprisingly difficult in this internet age to find authoritative biographies of deceased natural historians without trawling through multi-volume biographical dictionaries, where many wouldn't be mentioned. This book is a major addition to this lacuna; fish will readily cover the largest swathe of historical vertebrate authors. This book

mentions about 1,400 of them, all deceased, and does admit to having used Wikipedia. Their qualification appears to be only that they wrote something useful on fish. *Ichthyopedia* qualifies to be cited academically.

This considerable compendium is arranged alphabetically with good photographs or suitable facial images of many of the subjects, with detailed references and a bibliography at the end taking about a third of the volume. There is no lack of interest in trawling through all the names, and you'd know quite a few of them too.

The letter U contains only two names, extending to the letter B with about 144. Among the oldest names are Arcestratus of Gela, a 4th century BCE Poet, to Aristotle, Pausanias, Plutarch, Pliny the Elder, Strabo and Theophrastus. From 325CE we have St Eustathius. John Cabot in the 1450s noted Atlantic seas boiling with cod blocking ships; Pierre Carbonnier was the first in Europe to breed tropical fish; Sigmund Freud is included, and others like Ernst Haeckel, Alexander von Humboldt, Jean-Baptiste Lamarck, Pierre Sonnerat, Erik Stensiö, William Swainson, Alexander Wilson and most prolifically for fish, Albert Günther. Though there are but three names under Y, William Yarrell of the Zoological Society of London had considerable presence in their journal. We hear far more about their deaths than their early lives, as with most typical biographical entries, and the only 'favouritism' shown—based on surviving and known output—appears to be geographical, as the majority of entries represented appear to be from the USA, especially for the 20th century.

The omission of taxonomist Ernst Mayr seems deliberate. However, regarding names that have been qualified with 'His only contribution to ichthyology is...', omitted are Lyall Watson who wrote popularly on gobies, Derek Yalden who endeavoured to reify the Cyclostomes and P. E. P. Deraniyagala from Sri Lanka who composed technical treatises on fish. Clearly, such a volume, though comprehensive, cannot be exhaustive and will hopefully be updated.

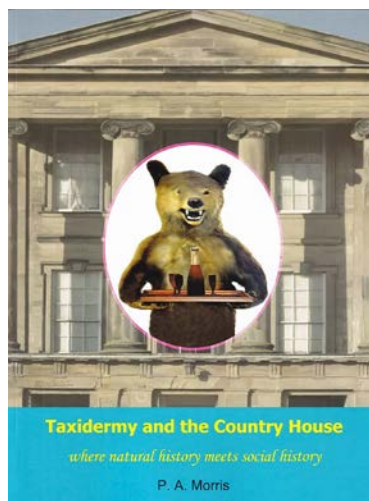
This is a major work that marshals together a global compendium of names with enough material to trace others or further details. The authors and publishers deserve every credit. For natural historians, this brings well known taxonomists together, almost until 2023. Ideal for reference libraries and researchers.

Rajith Dissanayake FLS

Taxidermy and the Country House: Where Natural History Meets Social History

P. A. Morris

284 pp, MPM
2023 (Paperback)
ISBN 9781739716110
Col./bw illustr. £29.95



Taxidermy has long been featured in museums, both to display specimens and in dioramas, and more recently moving into the art world and market. This book opens the door to another circle of taxidermy in private collections, in country houses, both public and private. High quality photographic images throughout the text (colour and black and white), provide a unique insight into hitherto hidden collections of taxidermy, the people who created them and the houses themselves. Photographs of taxidermist Rowland Ward's workshops and workers, as well as both exteriors and interiors of the houses that were the destination of their work, gives us a fuller insight into both aspects of the culture that created these private collections.

Named individuals get brief biographical treatments throughout the book, including Charles Waterton and Walter Rothschild. Most show examples of specimens associated with them and reproductions of contemporary photographs, including overfull interiors decorated entirely by a huge variety of sport trophies, from taxidermy bears serving as a static butler to myriad objects made from parts of animals, such as elephant feet.

The subheadings on the various chapter titles emphasise the social history context of this work, recognising the often-paternalistic role of the country house owners and their historical links with the British Empire. The author highlights the way in which taxidermy resulted from sports and hobbies, such as fishing, and was used for decorative effect and as entertaining conversation pieces. Women feature as customers for the exotic bird feathers used in the millinery trade and users of fur, but also as instigators of the movement to protect such wildlife. There is even a discussion on miniature taxidermy done on behalf of children.

The last two chapters focus on losses, and what has happened to those collections, as well as the ways changing attitudes and laws impact them. Throughout the book author Pat Morris emphasises the fact that we must be non-judgemental and see them as a product of their time. He also shows that they still have an important role to play. Two appendices inform the reader about country houses still open to the public and point to sources on others either still private, or now lost. With the growth of interest in 'animal history', this is a balanced, informative account as well as entertaining read, highlighting some extraordinary creations and people of a past era.

Gina Douglas HonFLS

Fen, Bog and Swamp: A Short History of Peatland Destruction and Its Role in the Climate Crisis

E. A. Proulx

208 pp, 4th Estate
2023 (Paperback)
ISBN 9780008534431
Bw illustr. £9.99



Ever since C. P. Snow's controversial Rede Lecture of 1959, there has been an unhelpful divide between what he called 'Two Cultures', namely sciences and the arts. Now, as every human on our planet is experiencing the effects of the climate crisis, Snow would surely be heartened to read *Fen, Bog and Swamp* by Annie Proulx. Proulx is the Pulitzer Prize-winner from New England, author of *The Shipping News*, *Barkskins* and writer of noir short stories, including the filmed *Brokeback Mountain*.

After dedicating this book to the people of Ecuador, Proulx's preamble modestly declares she is not a scientist. She explains how a fascination with historical literature relating to environmental issues led her to battle against specialised vocabulary, and she developed what had started as a personal essay into this scholarly book. Her immediate definition of the three eponymous terms for different kinds of wetlands is clear to see in the book's title.

The first chapter covers Proulx's 'Discursive Thoughts on Wetlands'. Perhaps surprisingly, the term wetlands dates back no earlier than 1955, where it had been coined in the context of American legislation on the hunting of migrating birds. Her deep appreciation of both North American and European (especially British and French) literature, dating back to Roman times, is evident here. Further to her preamble's scientific definitions, Proulx adds 'Wetlands are classified by the values of what-use-are-they-to-humans'. The nature and value of peat, in both its fresh and frozen states is covered here, including its storage of water, carbon and diverse Quaternary fossils.

'The English Fens' are the subject of Chapter Two, with subsections on 'Before the Fens There Was Doggerland' and 'What Were the Fens Like?'. As an East Anglian, I was particularly interested in this part of Proulx's book, dealing as it does with peat-accumulating wetlands that once covered about 6% of the area of Great Britain in the counties of Norfolk, Suffolk, Cambridgeshire (*sensu lato*) and Lincolnshire. Here was one of Charles Darwin's hunting grounds for beetles ahead of his travels on HMS *Beagle*. The drainage of Whittlesey Fen in 1851 in the name of agricultural 'improvement' spelt doom for butterflies like the large copper and swallowtail. She states: 'Botanists have identified ninety-four fen plants in the area of the Whittlesey Mere; a quarter of them are now extinct.' Proulx's historical interests extend to archaeology and palaeontology where she considers Doggerland, a vegetated land-bridge between Holland and the proto-England that the rising waters of the North Sea submerged sometime between 6500 and 2000 BC. She goes on to describe that the higher fenlands that remained above sea-level became populated by humans from the Palaeolithic to the time of Hereward the Wake, and remain so to the present day. She also considers human diseases related to wetlands. Malaria was so linked to *Plasmodium falciparum* that it resulted not only in the death of a Huntingdon MP (Oliver Cromwell in 1658) but also led Daniel Defoe to report in 1727 that one fenland farmer was on his 25th marriage, whilst one of the same farmer's sons was married to his 14th wife. On a more positive note, she comments here on the progress in wet farming (paludiculture) since 2001 in the Great Fen Project in Cambridgeshire, praising its long-term vision to rewater drained agricultural land to benefit biodiversity.

Chapter Three on 'Bogs' is likewise sub-divided; an introductory section distinguishes between raised bogs and blanket bogs, discusses etymology of bog terms, details the loss of biodiversity and addresses water- and carbon-storage

in Scotland's Flow Country and elsewhere. More positively, Proulx notes, 'As the glaciers and ice melt, as oceans and groundwater rise there will come a world of new estuaries, rivers, lakes, fens and, eventually-vast bogs and swamps.' 'Sphagnum Moss' concerns a genus of bryophytes that has existed for at least 200 million years since the Jurassic. She refers to these bog mosses as 'keystone species in peatland ecosystems that hold one third of the earth's organic carbon and provides anatomical and physiological details as to how *Sphagnum* achieves this magnificent feat. 'Bog Bodies' deals with the ritual significance of human remains recovered from peat. Perhaps the most anthropocentric part of the book, it deals with drowning in peat as a punishment for homosexuality and the warped interpretation by Nazi Germans of texts by Tacitus.

'Swamps' are covered in Chapter 4. Here the focus is largely on America where Proulx states such wetlands were roughly halved in area by the 1980s. I was interested to read about *Franklinia*, *Stewartia* and the Georgia 'fever tree' *Pinckneya*, but surprised not to find the name *Taxodium*.

Given Annie Proulx's reputation for dark stories, I found this book surprisingly positive. In spite of her claim not to be a scientist, I found very few factual errors: for example, she mistakes the orthography of *Sphagnum recurvum* P.B. A contents list, glossary, index and references in the text to the numbered notes would also be helpful.

I hope that Scribner choose to offer this remarkable book for sale from their British, Australian and Indian bases as they have done in Canada and the USA as it deserves to be read in wider markets.

H. L. Pearson FLS

Books for Review

Please contact the Editor before sending books for review (leonie@linnean.org).

Books for review should be sent to the attention of the Editor at:
Burlington House, Piccadilly, London W1J 0BF

Please note: While the Society aims to review as many books as possible, a review is not guaranteed, and is dependent on finding a reviewer and the decisions of the Editor and Linnean Steering Group.

Members

Please join us in welcoming the following new members to the Society (elected April–August 2024):

FELLOWS

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Dr Simeon Bezeng
Mr Richard Bimpong
Mr Michael Bithell
Mr Mark Brownlow
Mr Joel Cadbury
Dr Prosanta Chakrabarty
Prof. Ian Charles
Mr Josh Davis
Dr Annabelle de Vries
Ms Leah George Demetriou
Dr Samjetsabam Bharati Devi
Dr Rashmi Dubey
Miss Sarah Flower
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Dr Tanay Ghosh
Prof. Rosemary Gillespie
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Prof. Sadiya Qureshi
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Mrs Norma Saunders
Prof. Zhu Sihao
Mr Stewart Simonson
Dr Sumit Singh
Professor Emeritus T V K Singh
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Lives remembered

Pieter Baas (28 April 1944–28 April 2024)

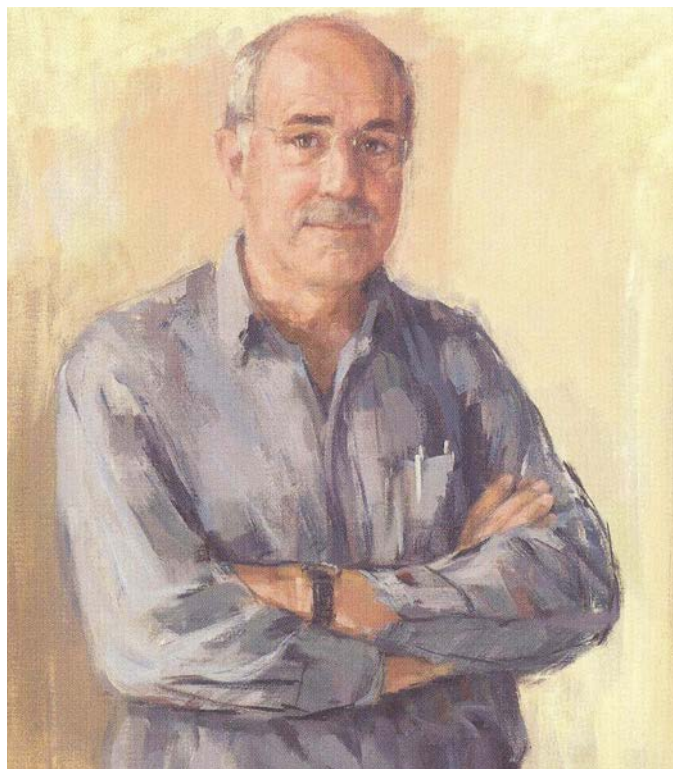
At the end of April, we were incredibly saddened to hear of the passing of Professor Pieter Baas. A good friend to the Linnean Society, Pieter was born on 28 April 1944, and died on his 80th birthday.

Growing up in the Netherlands, Pieter studied biology at Leiden University, resulting in a BSc awarded on 14 December 1965, followed by a MSc with honours on 18 February 1969. During his MSc work he started to specialise in wood anatomy: he studied technical aspects in Delft (Netherlands). This was later followed by his study of systematic anatomy, supervised by Charles Metcalfe (1904–1991) at the Jodrell Laboratory, Royal Botanic Gardens Kew, sponsored by a British Council Scholarship. He would eventually be offered a position as wood anatomist at the Rijksherbarium at Leiden University, where he would write on systematic wood anatomy for plant families published in *Flora Malesiana*.

Eventually he would take up the role of Extraordinary Professor of Systematic Plant Anatomy in 1987, before becoming Scientific Director of the Rijksherbarium in 1991. Later, with the merger of several university herbaria, Pieter would become the first Director of the National Herbarium of the Netherlands (NHN). Throughout his career he emphasised the need to support research on tropical biodiversity and training taxonomists from developing countries. Pieter has received many honours, including the Linnean Medal and becoming a Knight in the Order of the Netherlands Lion.

With his drive for research and easy manner, Pieter was a member of many organisations up until his death. He was an esteemed member of the International Association of Wood Anatomists (IAWA), running the then-*IAWA Bulletin* (now *IAWA Journal*) with Emma van Nieuwkoop until 2019.

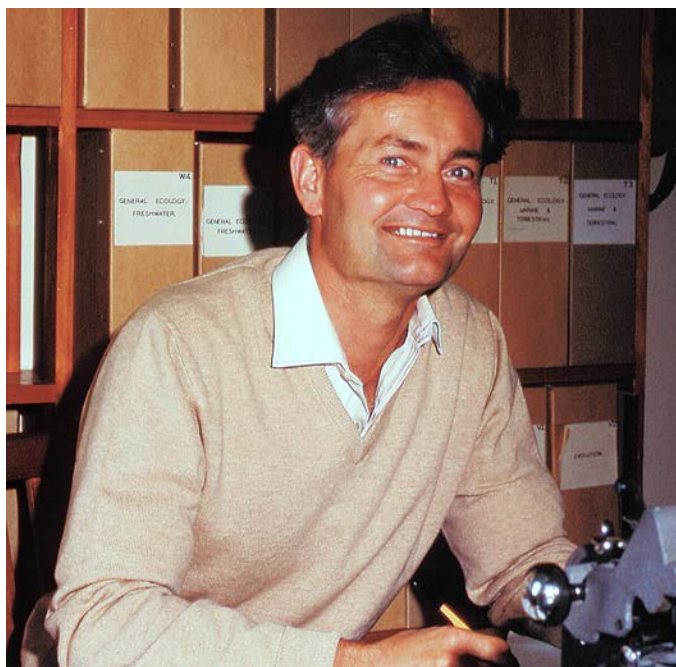
To look more closely at Pieter's support of the Linnean Society, he seemed to take delight in working on UK-based projects, and was elected a Fellow in 1969. By the 2000s, he had organised the conference 'Plant Species-level Systematics: Patterns processes and new applications' at the NHN in collaboration with the Society. In 2007, he was elected to the Society's Council, and that same year he was a part of the Society's 'Unlocking the Past' symposium which spanned from



London to Sweden to celebrate the Linnaean Tercentenary. Pieter gave a talk at the London portion on 'Apollos of Systematic Botany.' In 2011, he organised the day meeting 'Visions from the Blind Seer of Ambon: A celebration of Georg Everard Rumphius (1627–1702) and his Amboinese herbal', a joint meeting with The Royal Netherlands Academy of Arts and Science and the Society for the History of Natural History, supported by *Annals of Botany* and Yale University Press. By 2013 he was advising on this very publication as part of the steering group, and in 2014, in recognition of his achievements in the biological sciences, he was made a Foreign Member of the Society. We are very grateful to have had Pieter's support and expertise in our corner; he will be greatly missed.

A full obituary by Pieter's friends and colleagues can be found here: Van Welzen P. C., Lut C., Lens F., *et al.* (2024). In Memoriam Pieter Baas, 80 years old. *Blumea* 69. DOI: (1): i–x. <https://doi.org/10.3767/blumea.2024.69.01.00>.

Geoffrey Fryer (6 August 1927–18 March 2024)



In March we received the news that Dr Geoffrey Fryer, a longstanding Fellow of the Linnean Society, had passed away. He was renowned for his work on the fishes of the Great Lakes of Africa and his detailed study of crustaceans.

Geoffrey grew up near Huddersfield in England, before serving as an Electrical Artificer in the Navy. His BSc honours degree and his eventual PhD were gained as an external student of London University. His research career began in 1953 as a member of the Joint Fisheries Research Organisation, working out of an isolated laboratory half-way up the western shore of Lake Malawi, in Central Africa. In just two years he had gathered enough data and field time to outline his studies on the Mbuna (cichlids) and catalogued the crustacea of Lake Malawi.

Though modest, his resourcefulness was formidable and admired. His love for living things was evident, be it in his research or his care for animals, such as nursing an injured martial eagle back to health.

Eventually he would take up a position at the Freshwater Biological Association (FBA) back in England, along the shores of Lake Windermere. It was at the FBA where he and T.D. Illes would write the now classic *The Cichlid Fishes of the Great Lakes of Africa* (1972). From 1981–1988, Geoffrey served as the FBA's Deputy Chief Scientific Officer.

Image: WikiCommons

Geoffrey made particularly important advances in our understanding of the evolutionary processes of waterfleas, alongside other Crustacea, by applying engineering principles to microanatomy. His accurate observations have revealed the immense diversity of form and function that exists, particularly within groups such as the Cladocera.

His work on the parasitic crustaceans of African freshwater fishes have provided the framework necessary for understanding their taxonomy, biogeography and host specificity. Similarly, his painstaking studies of the microdistribution of British freshwater entomostracans have dramatically increased our knowledge of their ecological requirements.

Geoffrey was elected as a Fellow of the Royal Society in 1972, and was awarded the Zoological Society of London's Frink Medal in 1983. Geoffrey had been a Fellow of the Linnean Society for c. 69 years, having been elected in 1955, and was awarded the Linnean Medal in 1987.

Ernest Charles Nelson VMM (15 September 1951–20 May 2024)

Dr E. Charles Nelson was an internationally acclaimed botanist and author. Born in Belfast, Northern Ireland, Charles grew up in Enniskillen, Co. Fermanagh and was educated at Portora Royal School, University of Aberystwyth (BSc in botany, 1971) and the Australian National University, Canberra (PhD, 1976, on the ecology and taxonomy of *Adenanthos*). Returning to Ireland, he became horticultural taxonomist at the National Botanic Gardens, Glasnevin, Dublin. In 1995, Charles met his future wife Sue and in 1996 moved to near Wisbech, Cambridgeshire where he worked as a freelance botanist, author and editor.

Charles's interests were wide ranging, and he had a great capacity for writing prolifically on the numerous topics that interested him. He has left an outstanding publication record as author and/or editor including for over 40 books and more than 160 research papers on botany, horticulture, floristics and the history of botany. He served for many years as Editor for the Heather Society yearbook and the journal *Archives of Natural History*. His contribution to the history of Irish plants (native, introduced and cultivated), Irish gardens and to the people associated with them is unsurpassed. He was a founding member of the Irish Garden Plant Society



and was instrumental in the establishment of the Northern Ireland Heritage Gardens Trust, serving as co-president until 2018. Charles also presented programmes on Irish television and radio including the popular 'A Growing Obsession' and 'Sunday Miscellany'.

Charles specialised in the heather family, Ericaceae, and on the genus *Erica* in particular. He collected, described and named many cultivars including *Erica tetralix* 'Curled Roundstone', *E. cinerea* 'Kerry Cherry' and *E. mackayana* 'Errigal Dusk'. Both *Daboecia cantabrica* 'Charles Nelson' and *Erica* × *nelsonii* are named after Charles. He was a dedicated member of the Heather Society (closed 2020) and acted as the Society's official registrar of heather names, maintaining a meticulously curated database. Recently, Charles collaborated with colleagues at the Royal Botanic Garden Edinburgh, the University of Bergen and the South African National Biodiversity Institute to ensure this unique resource, documenting the often-obscure origins of thousands of heather names, is now openly accessible through its incorporation into World Flora Online (<https://doi.org/10.3897/phytokeys.243.121555>). This is a significant contribution to work on the systematics and conservation

of *Erica* species creating a definitive source of information for *Erica* names and linking to many other resources such as descriptions and threat status.

Charles was elected a Fellow of the Linnean Society in 1973, served on Council 2001–2004 and has been a regular contributor to *The Linnean*. In 2015, the publication launch for *The Curious Mr Catesby: A naturalist explores new worlds* was held in the Society's rooms in association with the Catesby Commemorative Trust of which Charles was honorary senior research director.

In 2013, Charles received the Society for the History of Natural History's Founders' Medal and in 2015 the Royal Horticultural Society awarded him the Veitch Memorial Medal. In 2016, Charles received the Heather Society's Award of Merit and the Royal Horticultural Society of Ireland's Medal of Honour.

Charles's contributions to botany, horticulture and natural history and his membership of the societies he enjoyed contributed to his having a wide circle of colleagues and friends working in many disciplines. His loss will be acutely felt. We send our condolences to Charles's family.

by Elaine Shaughnessy FLS

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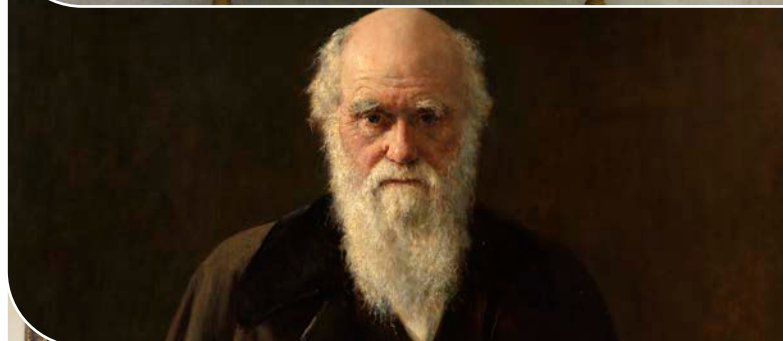
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