The Linnean

Communicating nature since 1788

Vol 42 | No 1 | May 2026

The Pollinator Puzzle

How bats and moths have shaped baobab flowers across Africa

From Patrons to Pen-pals

Women in James Edward Smith's botanical circle

Environmental DNA

Filling in missing dimensions to biodiversity data

The LINNEAN SOCIETY of London

HOMO sapiens

Classifying the human animal

Unpacking the origins of Carl Linnaeus' classification of human beings

FREE EXHIBITION
12.00–16.00 Tues–Fri
Opens 17 March 2026

The Linnean Society of London
Burlington House
Piccadilly W1J 0BF

www.linnean.org

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: Egyptian fruit bat (*Rousettus aegyptiacus*) visits a baobab flower (*Adansonia digitata*) © Sarah Venter

Dear Fellows,

As we move towards summertime in the UK, we are proud to announce our medal and award recipients for 2026. From groundbreaking discoveries in the wild to long-running studies of evolution, this year's awardees represent the very best of curiosity and commitment—including a much-loved natural history presenter who has brought the wonders of nature into UK homes for over 40 years, while unwaveringly advocating for its protection. Read more about our awardees from p. 10.

This issue looks at a study published in the *Botanical Journal of the Linnean Society*, where researchers found some incredible regional evolutionary traits in baobab trees, due to their specific pollinators.

We also explore the impact and promise of environmental DNA through the work of last year's Bicentenary Medal winner, Joanne Littlefair, highlighting how this cutting-edge approach is reshaping the way we detect, monitor and understand biodiversity.

Other articles look at the life and work of naval officer Frederick Marryat FLS (author of the classic Victorian children's book *The Children of the New Forest*) and the correspondence of Society founder Sir James Edward Smith, revealing, through letters in our collections, the often-overlooked but significant influence of women within his botanical circle.

Leonie

Leonie Berwick
Editor, *The Linnean* and 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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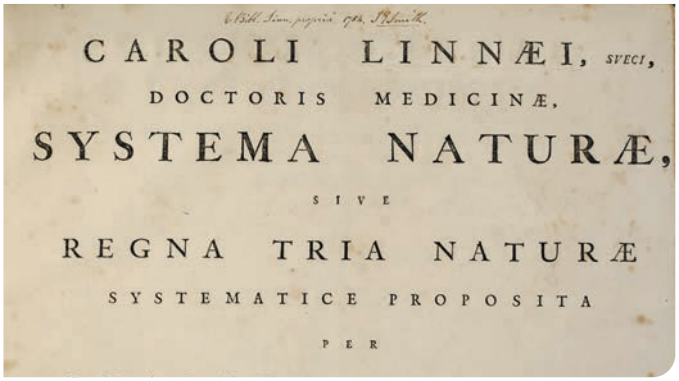
CAROLI LINNÆI, SVECI,
DOCTORIS MEDICINÆ,
SYSTEMA NATURÆ,
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REGNA TRIA NATURÆ
SYSTEMATICE PROPOSITA
PER

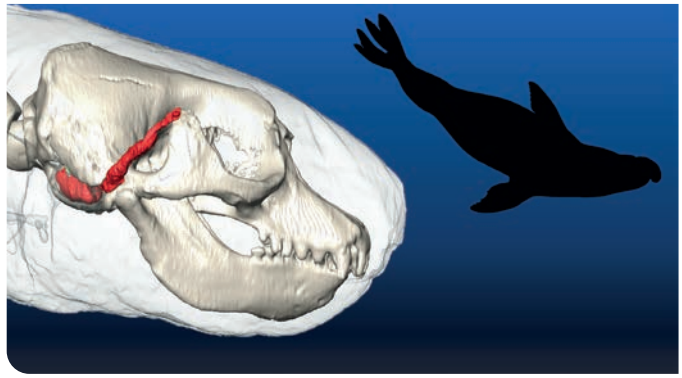
Linnean Lens: Animal, Vegetable or Mineral? Linnaeus' *Systema Naturae*, First Edition

Speaker: Andy Shaw FLS

26 May 2026 | 14.00 BST (Online: Free)

Linnean Society Fellow Andy Shaw is on a mission to locate every surviving copy of the 1735 *Systema Naturae*, one of science's most influential works. In this engaging lecture, he explores the story behind its publication, how it was printed and shared and what surviving copies reveal to us today.

Drawing on his expertise in biology and the history of science, Shaw offers a fascinating glimpse into his global census project and the enduring legacy of Linnaeus' groundbreaking book.



Hear Far, Wherever You Are: The Amphibious Hearing of Pinnipeds

Speaker: James Rule

27 May 2026 | 12.30 BST (Online: Free)

Pinnipeds possess a rare superpower: amphibious hearing, allowing them to communicate both on land and underwater. In this talk, Dr James Rule explores how seals, sea lions and walruses evolved this ability after returning to the ocean millions of years ago. Using CT scans and fossil evidence, he traces its deep origins and diversity. James will also highlight their unusual vocal talents, from ultrasonic sounds to rhythm and learning, revealing a surprisingly sophisticated and ancient auditory world across marine environments today.

Exploring Our Wild Pavements

Guide: Amanda Tuke

2 June 2026 | 18.00 BST (Nature Walk: £)

Join London-based urban naturalist and nature writer Amanda Tuke as she takes you on a relaxed walk around Notting Hill Gate in search of the fascinating wild plants and other wildlife which find a home on our pavements.

In her wonderful book *Wild Pavements*, Amanda shares her delight in the overlooked and underappreciated wildlife in our UK cities—from wild bees living on a canal bank and black redstarts nesting in London's Oxford Street—and perhaps this walk may just change the way you think about life in our cities for good.

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

Images: The Linnean Society of London; James Rule; Amanda Tuke

Discovering Insects: A Guided Walk Through Wandsworth Common

Guide: Connor Butler FLS

17 June 2026 | 18.30 BST (Nature Walk: £)

Explore the hidden world of insects on London's Wandsworth Common, through meadows, grasslands and woodlands. Using a hand lens and sweep net, spot insects in their natural habitats and gain tips for identifying different families. Perfect for beginners and the curious alike, it's a chance to slow down and see nature differently. Led by Connor Butler—AKA Connor the Ecologist—a London-based expert who has inspired over 3,000 people through engaging urban nature walks.

The Traveller: The Revolutionary Life of George Forster

Speaker: Andrea Wulf FLS

2 July 2026 | 18.00 BST (Onsite: £)

Discover the forgotten firebrand of the Enlightenment. In this vivid talk, Andrea Wulf reexamines George Forster—explorer, radical thinker and teenage voyager with Captain Cook—whose daring ideas on equality, human rights and freedom defied his age. Rubbing shoulders with history's great minds, Forster championed unity over division and helped spark revolutionary change. Wulf's book *The Traveller* reclaims his legacy, revealing a visionary who still speaks powerfully to our modern world.

The Last Tree (Always Ask the Man with a Dog)

Speaker: Elaine Duigenan FLS

18 June 2026 | 18.00 BST (Onsite: £)

In the early 1900s, suffragettes recovering from imprisonment planted a living legacy—46 trees at Eagle House, Batheaston, symbols of defiance and hope. In the 1960's the arboretum was razed to the ground to make way for a housing estate…but one tree endured.

Elaine Duigenan will reveal how its rediscovery sparked an extraordinary journey, where art, nature and feminism intertwine, reviving forgotten voices and proving this powerful story still resonates today.

Treasures Tours 2026

Guides: Our fantastic Collections Team

4 June, 2 July, 6 Aug, 3 Sept | 14.00–15.30 (Onsite: £)

Join our expert staff on one of our ever-popular Treasures Tours, an in-depth, behind-the-scenes journey around our unique home at Burlington House in central London. See Carl Linnaeus' own collections and library, and come away with fascinating information about their scientific, historic and artistic importance, and the story of the Linnean Society itself.

Join the journey—book your place!

Images: Pixabay; Andrea Wulf; Elaine Duigenan; The Linnean Society of London

News

HOW TO…BECOME A FELLOW (REFLECTIONS ON A YEAR OF NEW PROCESS)

In December 2024, a new election process for Fellows was launched (https://bit.ly/LSCharterByeLaws), to make the selection process more structured, robust and inclusive. The revised process broadens access while maintaining rigorous standards.

Previously, prospective Fellows were nominated by Fellows, with Certificates of Recommendation approved by Council before being put to the Fellowship for a vote. While effective, this approach relied on Fellows nominating individuals within their networks, which could limit access for equally deserving candidates who did not have direct connections or had not considered applying.

The new process was devised to promote good governance and accessibility, with a greater level of scrutiny. Rather than by nomination, applications are now self-made via application form, making the route clearer to those considering applying. All applicants must demonstrate support for the Society's mission through academic research, amateur involvement, advocacy, education or other nature-related professions. They must state why they wish to become a Fellow and provide two references.

Following quarterly deadlines, the list of Fellows is shared with the Fellowship. If any Fellow has a reasoned objection to an applicant, this may be shared confidentially with the CEO.

Fellowship Committee

Alongside this process, a Fellowship Committee has been established to advise Council on whether to recommend applicants for election. It is chaired by a Trustee and includes one additional Trustee, four non-Trustee Fellows, and the President and Treasurer as ex officio members. The Head of Membership and Development acts as administrator.

Since its formation, the Committee has been reviewing applications, thoughtfully assessing each candidate's suitability. Where further information is needed, referees are contacted to ensure decisions are informed and fair. The Committee then makes recommendations to Council, which reviews and approves elections.

This revised process has strengthened due diligence and encouraged an interdisciplinary range of applications—from botanical artists and conservation campaigners to taxonomists and biologists—reflecting our Fellows' commitment to studying and protecting nature. It also shows that a wide range of experience enhances our impact.

However, it has also highlighted a gender imbalance, with more applications from men than women. We heartily encourage applications from women in nature-related fields and ask Fellows to help share this opportunity. We also value insights into any potential barriers, and welcome feedback to improve accessibility and ensure the process is open to all eligible applicants.

Pru Shackley, Head of Membership and Development
(pru@linnean.org)

Image: The Linnean Society of London

Beyond the Page: Bringing Research to Life Through Our Journals, Events and Accessible Voices

Publishing in our journals is not a quiet or hidden process. It is an active, evolving space where research is rigorously assessed, widely shared and carried beyond the page. From submission through to promotion, our journals provide a setting in which work is both carefully scrutinised and effectively disseminated. Whether your research addresses long-term evolutionary patterns, present-day biodiversity or emerging environmental challenges, it sits within a framework that values precision and reach.

Our evolving journal line-up

Our four journals reflect the breadth of the natural sciences. The *Biological Journal of the Linnean Society*, our flagship title, continues a distinguished legacy across evolution, ecology, behaviour and organismal biology. The *Botanical Journal of the Linnean Society*, founded in 1856, provides a forum for research on plants and fungi. The *Zoological Journal of the Linnean Society* focuses on systematic and evolutionary zoology, covering both extant and extinct taxa. Completing the portfolio, the *Evolutionary Journal of the Linnean Society*, our fully Open Access title launched in 2022, centres on detailed research in evolutionary biology, with particular attention to genetic and genomic approaches across scales.

Together, these journals cover taxonomy, biodiversity and the processes that sustain biological diversity, balancing specialist focus with a broad scope.

Extending the reach of your research

What distinguishes our journals is not only what they publish, but how that work reaches a wider audience. Publication marks the start of broader activity supporting discussion, interpretation and visibility.

Our events programme plays a central role, with day meetings and lectures offering opportunities to explore research in greater depth and encourage dialogue across disciplines. A recent day meeting linked to the *Biological Journal* brought researchers together to examine organismal resilience, while a sold-out event with Peter and Rosemary Grant (RIGHT) highlighted decades of work on Darwin's finches and adaptive radiation in conjunction with the *Evolutionary Journal*. These events place individual papers within broader scientific conversations and connect authors with audiences.

Alongside this, our blog series, The Paper Trail, offers an accessible route into current research, presenting selected papers in clear language without losing substance. Many pieces are written by early career researchers, supporting

Image: The Linnean Society of London

the development of communication skills while extending the reach of the research. Contributors consistently note its value, both for outreach and for promoting their work. The series extends the life of published papers and invites engagement from a wider readership.

Recognition of emerging researchers is another key element. Our PhD medals and prizes highlight outstanding doctoral work published in our journals, drawing attention to the next generation of scientific discovery. These awards reinforce publication as part of an ongoing research trajectory rather than an endpoint.

Publishing with purpose

This work is underpinned by thorough peer review and careful editorial oversight. Submissions are assessed fairly and efficiently, and published to a high standard. Publishing with our journals helps to support the Society; as a not-for-profit organisation, the income generated from our journals funds our charitable endeavours and community engagement.

If you are seeking a publishing environment that combines academic rigour with sustained engagement, we invite you to submit your work and join a community shaping how we understand the natural world. Visit our website:

www.linnean.org/our-publications/our-journals

Exploring Science and Religion for British Science Week

As part of British Science Week 2026, we partnered with Westminster Abbey to deliver two free 60-minute workshops for KS2 students (aged 7–11). Designed to spark curiosity and bring science and history vividly together, the sessions explored the shared stories of scientists connected to both organisations.

Through specially created videos, pupils were transported between the two locations, encountering figures such as Charles Darwin, Alfred Russel Wallace and Carl Linnaeus, alongside Linnaeus' work on classification. In an interactive live session with facilitators Ayesha Meredith-Lewis (Linnean Society) and Sophie Holland (Westminster Abbey), students applied their learning by imagining and sketching their own species, carefully considering habitats and how living things are named, as well as touching on other topics like astronomy.

A remarkable 1,445 students joined online from the UK, Northern Ireland, United States and Saudi Arabia, with teachers describing the workshops as engaging, enjoyable and highly relevant to the curriculum. Pupils threw themselves into discussions on women in science and key scientific ideas, while relishing the chance to explore places many had never visited.

The impact was clear: over 97% of teachers valued the cross-institutional approach, and 91% said the pre-recorded videos enhanced the experience, helping students feel immersed in the 'secrets' of both the Abbey and our home on Piccadilly.

Welcome to Nida Shah

In March we welcomed Nida Shah to the Society as Assistant Archivist. Nida says: 'I was excited to join the Collections Team at the Linnean Society, as it presented a great opportunity to work with such unique and historically significant records. Having recently completed an MA in Archives and Records Management, I really wanted to step into a role that involved working closely with collections and supporting individuals in accessing and engaging with them. As Assistant Archivist, I am able to work across various aspects of the Society's archival service, including cataloguing and collections care, supporting users in the reading room, responding to enquiries, and contributing to outreach activities. What also drew me to the Linnean Society was its mission to promote the science of natural history through its collections and various outreach programmes. It's a rewarding and fulfilling role to be part of such a long-established society that is working to better our environment.'

Prior to this role, Nida worked as the Senior Archives and Library Assistant at an art history research institution. She enjoys the constant challenges of archives, including engaging with new subjects and considering how best to curate records for researchers. Please say hello to Nida next time you're visiting our library!

Image: The Linnean Society of London

2026

Linnean Society

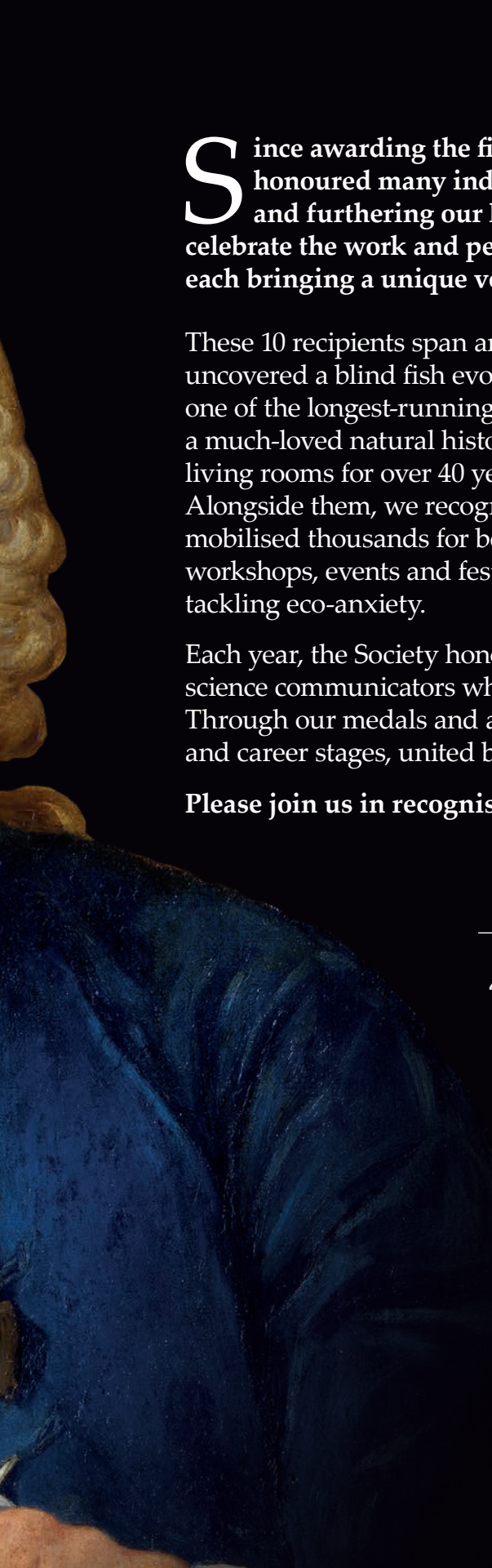
Medals and Awards

Since awarding the first Linnean Medal in 1888, the Linnean Society has honoured many individuals for their dedication to science, natural history and furthering our knowledge of the natural world. This year we are proud to celebrate the work and perseverance of 10 individuals from a diverse range of fields, each bringing a unique voice to how we connect with nature.

These 10 recipients span an extraordinary breadth of work, from an ichthyologist who uncovered a blind fish evolved for life in darkness, to an early-career researcher leading one of the longest-running studies of natural selection in wild lizards. We also honour a much-loved natural history presenter who has tirelessly brought nature into UK living rooms for over 40 years, while championing threatened species to policymakers. Alongside them, we recognise the founder of a youth-led charity in Cumbria that has mobilised thousands for beach and forest clean-ups, combining a digital platform with workshops, events and festivals that drive climate action while supporting wellbeing and tackling eco-anxiety.

Each year, the Society honours researchers, naturalists, artists, conservationists and science communicators whose work deepens our understanding of the world around us. Through our medals and awards, we celebrate people from a wide range of backgrounds and career stages, united by a shared commitment to safeguarding nature.

Please join us in recognising the achievements of our 2026 awardees.



‘We are thrilled to celebrate the 2026 Linnean Society medal and award recipients, whose work advances our vision of a world where nature is understood, valued and protected. At a time when the importance of biodiversity and conservation has never been clearer, their achievements show the power of curiosity, dedication and scientific endeavour. Each awardee brings insight and leadership, deepening knowledge of the natural world and turning it into meaningful action. These honours recognise not only individual accomplishment, but a collective dedication to safeguarding life on Earth for generations to come.’

Dr Mark Watson, President

Image: The Linnean Society of London

The Linnean Medal

(For significant and sustained advances in the understanding of nature)

Professor Melanie Stiassny

'My first visit to the Linnean was as a graduate student based at the Natural History Museum, and I was awestruck. Champion of the enduring importance of the study of natural history, and all that that entails, the Society has served as a bellwether throughout my career. I am beyond humbled by this award from a Society I so respect.'

Professor Melanie Stiassny has made a remarkable contribution to ichthyology through pioneering research on fish taxonomy, systematics and evolutionary morphology across the teleost tree of life, with particular focus on African freshwater fishes and cichlids. Her work blends classical anatomy with geometric morphometrics, microCT and DiceCT imaging and 3D reconstruction to explore how fishes evolve and diversify. Long-term fieldwork in the Congo River, conducted regularly since 1996, has revealed extraordinary patterns of biodiversity and speciation in complex river systems, including blind species adapted to low-light environments and evidence for gene loss in their evolution. Melanie has described over 70 new species, three genera, and a new family while documenting worrying declines in aquatic biodiversity. Her research has informed conservation strategies and championed the enduring importance of natural history collections.

The Linnean Medal

(For significant and sustained dedication to the protection of nature)

Chris Packham CBE

'I am both surprised and flattered to have been chosen as a recipient of the Linnean Medal for significant and sustained dedication to the protection of nature. I've had the pleasure of visiting the Society a few times and am very honoured to accept this award.'

Chris Packham first came to national prominence in the 1980s as a presenter on the BBC children's programme *The Really Wild Show.* He later ran the production company Head Over Heels, producing programmes for Discovery and National Geographic. Since 2009 he has co-presented *Springwatch* and its sister series, bringing British wildlife into millions of homes. He has also written and presented a wide range of nature programmes, alongside award-winning work raising awareness of neurodivergence and mental health issues.

Beyond broadcasting, he is a prominent environmental campaigner and co-founder of Wild Justice, which pushes for stronger wildlife protections. He has spoken out on issues including HS2, over-grazing, the badger cull and fox hunting, while supporting conservation organisations and championing diverse environmental voices.

Images: Marianne Kelly; Jackie Black

The Bicentenary Medal

(Awarded to an early-career scientist, in recognition of excellent research in the natural sciences)

Dr James T. Stroud

'Receiving this honour from the Linnean Society of London is profoundly meaningful to me—both as an evolutionary biologist and a Londoner. To be recognized here, at the very heart of evolutionary biology's history, is deeply personal, incredibly exciting, and very special.'

Dr James T. Stroud is an outstanding early-career evolutionary ecologist, recognised for the breadth and impact of his work. He has authored 61 publications with over 3,000 citations. In 2025, he received the Maxwell/Hanrahan Award for Field Biology and a Packard Fellowship from the David and Lucille Packard Foundation.

His 2025 paper in Nature synthesises key insights from long-term evolution research, complementing more than a decade of work on natural selection in a wild lizard community on 'Lizard Island', Florida—one of the longest-running multi-species studies.

Committed to mentorship and outreach, James founded Lizards on the Loose, which since 2014 has engaged thousands of middle-school students annually, produced 10,000+ biodiversity records, and introduced many underrepresented students to science.

The John Spedan Lewis Emerging Leader Award

(For initiatives that have had a notable positive impact for the UK natural environment)

Amy Bray

'I am delighted to receive the John Spedan Lewis Emerging Leader Award to recognise my work empowering, educating and mobilising young people to take action for nature in the UK. I hope that this award shows young people that change is possible and would love to accept it on behalf of all the young people in Another Way's community who speak up for nature every day. Often, the work and impact of young people go unrecognised, which makes awards like this all the more important. Thank you!'

Amy Bray is a young leader turning environmental concern into practical action. At 16 she founded Another Way, a youth-led charity that grew from a grassroots project in Cumbria into a national movement engaging thousands of young people, schools and communities. In 2021 she launched the Power of 10 movement and digital platform, giving young changemakers tools, resources and support to tackle climate challenges while building skills and resilience. Under her leadership, Another Way has planted more than 30,000 trees and led clean-ups and community initiatives across the UK. Recognised with the Prime Minister's Points of Light Award and roles in national environmental programmes, Amy combines science, education and community action to inspire young people to lead lasting environmental change.

Images: Another Way; James T. Stroud

The Irene Manton Prize

(For the best doctoral thesis in botany, as judged by a paper published in the Linnean Society Journals)

Natalia Ruiz-Vargas

'I'm thrilled and honoured to receive recognition from this society for what I consider the privilege of studying the evolution of Caribbean plants. Thank you to everyone who made this possible, especially my advisor, Dr Mason-Gamer.'

Winning Paper: Natalia Ruiz-Vargas, Dimitris A. Herrera, Roberta Mason-Gamer. Island Hopping: Dispersal of *Pitcairnia* L'Her. (Bromeliaceae) through the Caribbean islands, *Botanical Journal of the Linnean Society*, November 2025, boaf092, https://doi.org/10.1093/botlinnean/boaf092

Natalia Ruiz-Vargas and her contemporaries conducted field collections and gathered existing samples across the *Pitcairnia* genus (Bromeliaceae), with an emphasis on northern South America and Central America. They performed state of the art phylogenomic inference using high-throughput sequencing data for 63 individuals. Using this data they decipher evolutionary relationships in *Pitcairnia*, gene flow across the group, and phylogeographic patterns. Using biogeographical analyses, they discovered the origin of the Caribbean species, with a likely dispersal event from Venezuela to the islands around 200,000 years ago.

From the Editor: 'Natalia Ruiz-Vargas' paper represents an impressive piece of work, and rather unusually for a PhD student, Natalia has driven the study from conceptualisation through to data collection and analyses. The phylogenomic data analysis is not trivial and the analyses and overall paper are neatly presented, with the findings very clearly communicated.' —Dr Steven Dodsworth, Editor-in-Chief, *Botanical Journal of the Linnean Society*

The John C. Marsden Medal (1)

(For the best doctoral thesis in biology covering areas other than botany, as judged by a paper published in the Linnean Society Journals)

Lívia Roese-Miron

'I am deeply honoured to receive the John C. Marsden Medal. This recognition reflects the efforts behind this work and highlights the importance of studying synapsid evolution. I am especially grateful to my co-authors and mentors, whose support and insight were essential to this research.'

Winning Paper: Lívia Roese-Miron, Fernando Abdala, Flávio Augusto Pretto, Rodrigo Temp Müller, Iasmim Michelotti da Costa, Marcelo Ricardo Sánchez-Villagra, Leonardo Kerber. Skull anatomy and endocranial casts of *Siriusgnathus niemeyerorum* (Cynodontia: Cynognathia) from the Late Triassic of Brazil: implications for the evolution of traversodontids, *Zoological Journal of the Linnean Society*, Volume 205, Issue 1, September 2025, zlaf107, https://doi.org/10.1093/zoolinnean/zlaf107

First emerging in the Late Permian, cynodonts mostly went extinct in the Triassic with only a few lineages surviving, including the lineage that would

Images: Lívia Roese-Miron; Víctor Pérez-Calle

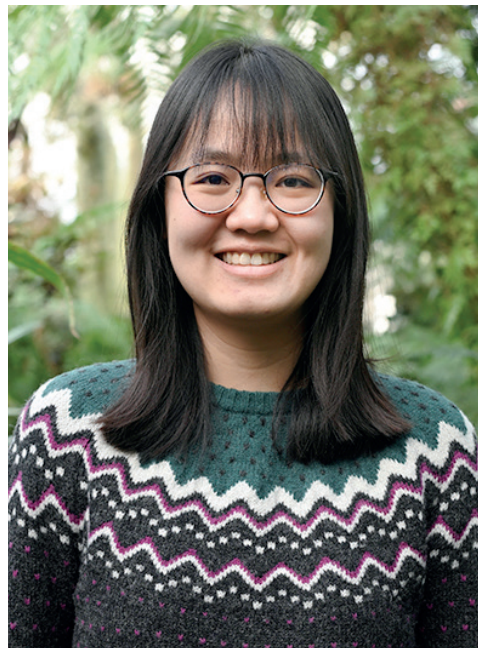
evolve into modern mammals. Roese-Miron et al. (2025) provide a detailed analysis of a nearly complete skull of *Siriusgnathus niemeyerorum*, a cynodont that lived over 200 million years ago. Using high-resolution CT scanning, they reconstructed internal features of the skull including the first ever descriptions of the cranial nerves and inner ear canal of the species. The researchers discovered new features associated with facial mobility, a finding with implications for how these ancient animals fed, defended themselves and socialised.

From the Editor: 'I was impressed by the quality of the figures and the analytical rigour of this study. I think it is simply amazing we can use technology to study the nervous system of an animal that lived over 200 million years ago.' —Dr Jeff Streicher, Editor-in-Chief, *Zoological Journal of the Linnean Society*

The John C. Marsden Medal (2)

(For the best doctoral thesis in biology covering areas other than botany, as judged by a paper published in the Linnean Society Journals)

Wenjie Zhu



'I am honoured and humbled to receive this award. It recognises work on the multispecies coalescent, where I learned that uncertainty in biology is often not noise to be eliminated, but signal to be understood. Beyond acknowledging past work, this award also motivates my ongoing research.'

Winning Paper: Wenjie Zhu, Sebastian Höhna. Two-step species tree inference under the multispecies coalescent using full-likelihood, *Evolutionary Journal of the Linnean Society*, Volume 4, Issue 1, 2025, kzaf018, https://doi.org/10.1093/evolinnean/kzaf018

Inferring species relationships is challenging because different genes may show conflicting histories, which the multispecies coalescent (MSC) model explicitly accounts for. This study introduces a two-step approach, providing a novel full-likelihood methodology for MSC inference that first estimates gene trees and then infers the species tree, combining computational efficiency with statistical rigor. Simulations and an analysis of gibbons show that the two-step approach performs consistently well, offering a practical, innovative solution for large genomic datasets and advancing our ability to reconstruct complex evolutionary histories.

From the Editor: 'This paper stands out for addressing the trade-off between statistical rigour and computational feasibility in species tree inference. Its two-step, full-likelihood framework under the multispecies coalescent, delivers both methodological innovation and clear guidance on when different approaches succeed or fail.' —Professor Julia Day, Editor-in-Chief, *Evolutionary Journal of the Linnean Society*

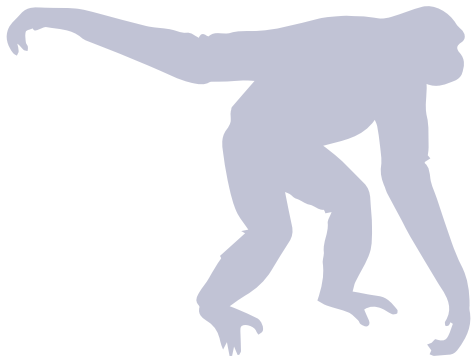


Image: Luo Chen

The PhD Student Paper Prize

(Awarded to a doctoral researcher whose work forms an important part of a published journal article, as judged by a paper published in the Linnean Society Journals)

Sierra Lopezalles

'I am honoured to accept the PhD Student Paper Prize from the Linnean Society. Completing my PhD has been a deeply satisfying experience and receiving this award in recognition of it is a delightful and unexpected privilege.'

Winning Paper: Sierra M. Lopezalles. The shape of speed: 3D geometric morphometrics of the humerus predicts maximum running speed in canids (Carnivora: Canidae), *Biological Journal of the Linnean Society*, Volume 146, Issue 4, December 2025, blaf118, https://doi.org/10.1093/biolinnean/blaf118

This study exemplifies the power of integrative evolutionary biology by linking morphology, performance and the fossil record. Using 3D geometric morphometrics of the humerus across domestic dog breeds, the author exploits exceptional variation in limb form and running speed to uncover a strong relationship between bone shape and size-corrected maximum speed. This relationship is validated in wild canids and applied to estimate locomotor performance in fossil species, including the dire wolf and early canids. By translating skeletal form into quantitative predictions of performance, the study provides a robust framework for reconstructing functional evolution and ecological dynamics in extinct mammals.

From the Editor: 'I was impressed by the study's integrative approach, which bridges morphology, performance, and deep-time inference. By leveraging the extraordinary diversity of domestic dogs, the authors resolve a long-standing challenge in palaeontology and deliver a rigorous, quantitative method for predicting locomotor performance in extinct species with broad evolutionary implications.' —Dr Karen Sears, Editor-in-Chief, *Biological Journal of the Linnean Society*

The H. H. Bloomer Award

(Awarded to an amateur naturalist for their contribution to biology)

Wessel Swanepoel

'I am deeply honoured to accept the 2026 H.H. Bloomer Award. My sincere thanks to the Linnean Society of London for this incredible recognition. It is a privilege to contribute to our understanding of the natural world, and I accept this award with great gratitude and humility.'

Wessel Swanepoel is a remarkable modern explorer of Namibia's desert flora. Born in South Africa and training as a civil engineer, his path changed after joining railway operator TransNamib in 1989, when travel across the country sparked his fascination with plants adapted to harsh, arid landscapes. His work soon centred on the remote Kaokoveld, a rugged region rich in unique species. In 2002 he discovered the tree *Commiphora kaokoensis*, beginning a close collaboration with botanists. Since retiring in 2017 he has devoted himself fully to exploration in Namibia and southwestern Angola. Now a leading authority on southern African

Images: Hannelie Swanepoel; Sierra Lopezalles

species of *Petalidium* and *Commiphora*, by 2025 Wessel had authored or co-authored papers on 45 new plant species, including two new genera (*Oberholzeria*, *Tiganophyton*) and a new flowering plant family (Tiganophytaceae).

The Jill Smythies Award

(To a botanical artist for outstanding, diagnostically relevant, published illustrations)

Diana Carneiro

'From observing plants, I have come to understand that every being on Earth carries the secret of life within. As a botanical illustrator, I aim to raise awareness—especially among children and young people—about the need to preserve and restore the environments on which our existence depends. To the scientists and artists of nature who shape the history of this honourable institution, my sincere thanks.'

Diana Carneiro is a Brazilian artist and botanical illustrator based in Curitiba. Initially training in the biological sciences in 1968, she spent 25 years teaching science and biology before turning to botanical art full time. Later studying painting, she graduated from the School of Music and Fine Arts of Paraná in 1992. A 1997 Margaret Mee Foundation fellowship took her to the Royal Botanic Gardens, Kew, where study with artist Christabel King deepened her commitment to botanical illustration. Working in watercolour and pen and ink, Diana has produced approximately 400 descriptive botanical illustrations, including newly discovered species. Her work appears in journals worldwide, and she trains illustrators through the Centro de Ilustração Botânica do Paranáthe (Center for Botanical Illustration of Paraná or CIBP), of which she is a founding member.

Image: Theo Marques

From groundbreaking discoveries in the wild to long-running studies of evolution, this year's awardees represent the very best of curiosity and commitment as nominated by you, our membership.

Together, they tell a dynamic story of perseverance, impact and hope for the natural world.

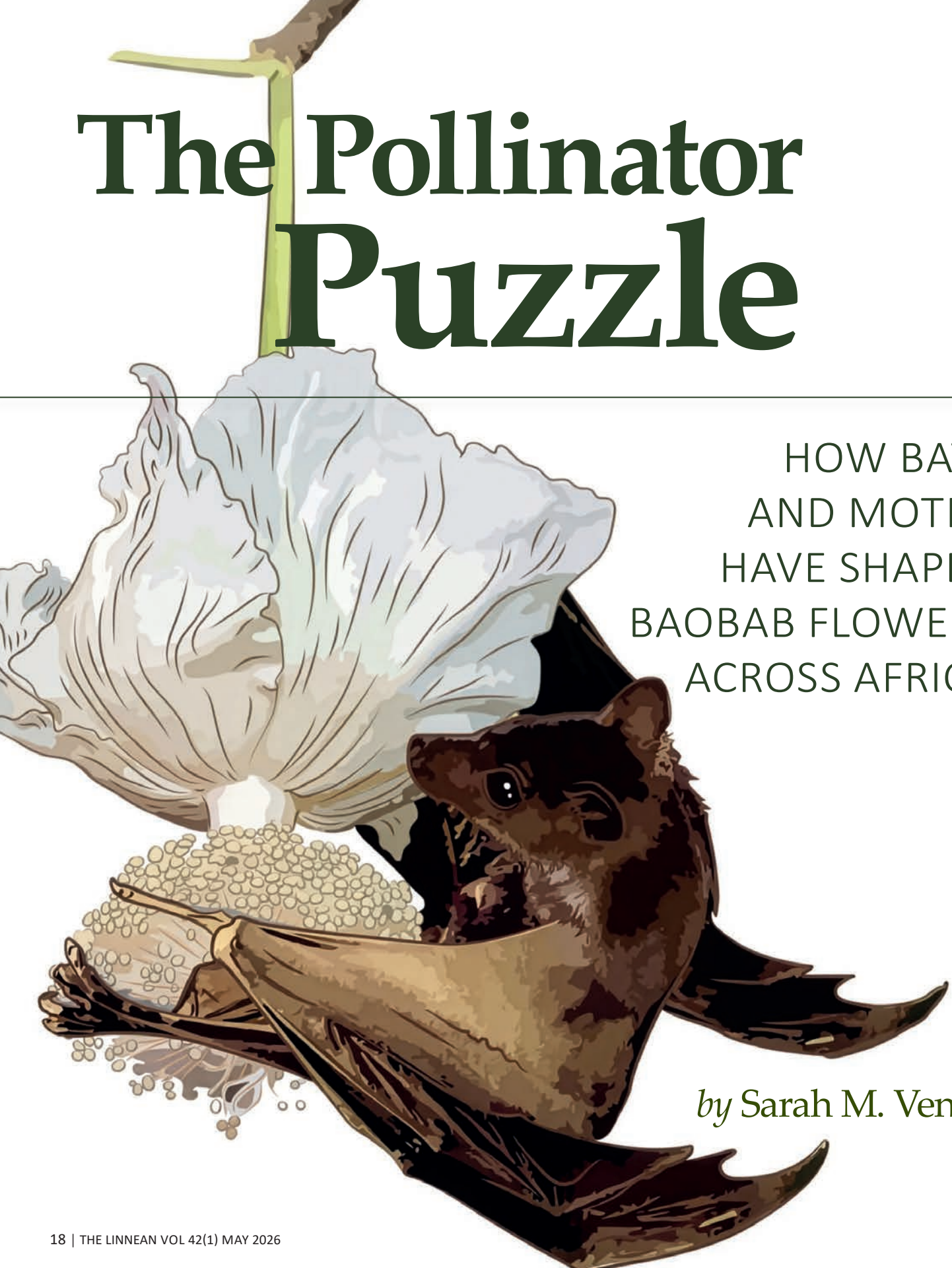
Nominations for next year's award recipients are opening soon. Don't miss the chance to have your say and shine a spotlight on an outstanding scholar, innovator or changemaker.

MEDAL AND AWARD NOMINATIONS FOR 2027 WILL OPEN AT THE ANNIVERSARY MEETING (21 MAY).

VISIT **WWW.LINNEAN.ORG/MEDALS** TO NOMINATE (NOMINATIONS CLOSE 30 SEPTEMBER).

The Pollinator Puzzle

HOW BATS AND MOTHS HAVE SHAPED BAOBAB FLOWERS ACROSS AFRICA



by Sarah M. Venter

Across the African savannas, the baobab—often called the 'tree of life'—produces large, pale flowers that open at night and release a distinctive scent into the air. These striking blooms have long been associated with bat pollination, a relationship widely assumed to be consistent across the continent. Yet closer observation reveals a more complex picture. Sarah M. Venter explains that, rather than a single, uniform interaction, baobab flowers and their pollinators appear to vary across regions, suggesting a subtle but important interplay between the trees and the animals that visit them.

OPPOSITE: Shaped by their pollinators, baobab flowers across Africa tell a story of evolution in motion—distinct forms, scents and nectar strategies emerging as different bat and moth species drive regional floral diversity.

From among the eight baobab species worldwide, *Adansonia digitata* L. is the only species found in continental Africa, occurring widely across the savannas in the west, east and south. Baobab fruit is food to thousands of people and is an integral part of many local and global markets. For decades, the African baobab was considered chiropterophilous—bat-pollinated—due to its large, white, musty-scented flowers that open at night, attracting frugivorous bats. Observations of bats visiting baobab flowers in West and East Africa have been documented frequently (Jaeger 1945, Start 1972, Baum 1995). However, in 2020 we discovered that only moths visited baobab flowers in South Africa, even though fruit bats were present (Taylor *et al.* 2020). This prompted an intriguing question: what causes this, and do baobab flowers across Africa vary in response to their diverse pollinators?

The pollinator effect

Pollinator-driven changes to floral traits have been documented for at least a quarter of evolutionary divergence events (van der Niet and Johnson 2012). These shifts involve modifications of floral traits, such as morphology, scent and nectar, that are associated with the attraction and utilisation of specific pollinator groups such as birds, bees, moths and bats (Fenster *et al.* 2004).

Our research focussed on three areas of Africa: West, East and Southern Africa. We collected flowers in each region to measure their size, how much nectar they produced and tested if their scent differed between regions. Using camera traps and visual observations, we recorded the behaviour and frequency of the different flower visitors and used mist nets (a fine, lightweight mesh held between two poles) to catch and identify bats.

We found that not only were the baobab flowers completely different between different regions of Africa, but that there were also differences in the species of bats that were visiting the flowers. This too was causing further regional differences in flower traits.

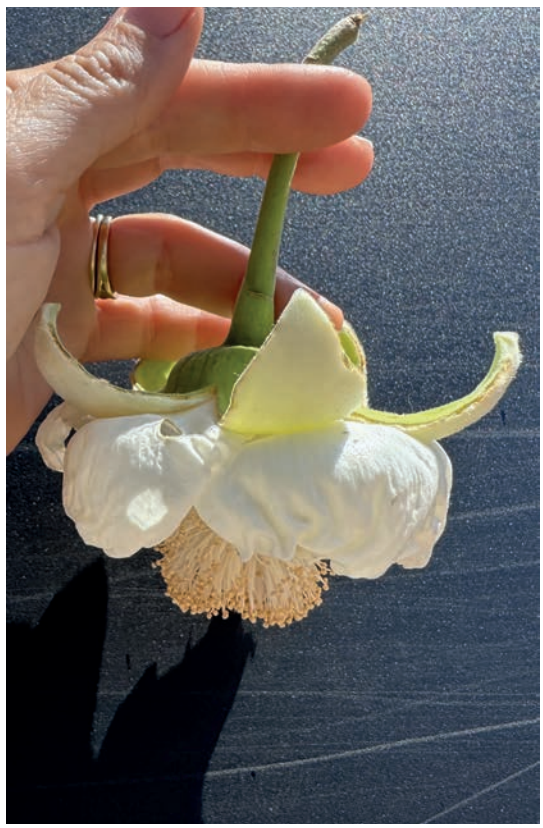
Precision fit

In West Africa, we learned that the baobab flowers had longer peduncles (flower stalks) and larger flowers than in East and Southern Africa. The West African flowers also had more nectar and smelled muskier than flowers in the other two regions. East and Southern African flowers were similar in size, but the Southern Africa flowers had less nectar, a sweeter scent and much wider stigmas and some flowers had droopy petal, a feature not seen in West or East Africa.

We found that the West African baobab flowers were visited by straw-coloured fruit bats (*Eidolon helvum*). A very large and highly social megabat species, the fruit bats would first land in the branches and then crawl towards the flower. Reaching the flower, they would hang on the branch with their feet and reach down headfirst, rotating the flower beneath them while leisurely drinking copious amounts of nectar. The long flower stalk of the West African flowers matched the body length of the large bat, allowing for the head to be positioned close to the flower, perfect for the flower to deposit large amounts of pollen on their heads and chests.

In East Africa, baobab flowers were visited by the medium-sized Egyptian fruit bat (*Rousettus aegyptiacus*). These bats 'crash landed' directly on the flower with the short peduncle acting as a 'shock absorber'. Once landed, they clasped the flower with their thumb and forefinger holding onto

Image: Sarah Venter



This page

Far left: Typical length of a baobab flower peduncle (stalk) in West Africa.

Centre bottom: By contrast, this was the typical length of a flower peduncle in Southern Africa.

Centre top: Flowers in Southern Africa showed the stigma embedded in stamen ball.

Above: In West Africa, the stigma extended from the stamen ball.

Opposite page

Flower visitor activity on baobab flowers in the different regions of Africa. Figures were digitally redrawn from photographs.

Top left: West African baobab flowers were visited by large straw-coloured fruit bats (*Eidolon helvum*).

Top right: In East Africa the flowers were visited by the medium-sized Egyptian fruit bat (*Rousettus aegyptiacus*).

Bottom right: In Southern Africa only moths were recorded.

the petals with the pollen ball against their chest, therefore making contact with the reproductive parts of the flower. From this position, they placed their noses between the petals to access the nectar. These bats only spent two to five seconds feeding before flying away.

The moth strategy

The Southern African flowers were only visited by moths. Large hawkmoths with long tongues usually hovered at a distance from the flowers while drinking nectar from between the petals, but the flowers with droopy petals, appeared to be 'coaxing' the moths, which could easily thieve nectar from the flowers in East and West Africa to fly in closer, thus encouraging contact with the reproductive parts. Smaller moths landed on the petals or stamen ball to get closer to the nectar, and often touched the stigma as well as the stamen ball. In addition, the significantly wider stigma and shorter style of the Southern African flowers (as opposed to the longer stigmas and narrower styles of the West and East African flowers) is thought to encourage moth contact with the reproductive organs. Furthermore, the Southern African flowers produced less nectar and only retain drops of nectar on the surface of the nectaries, enough for use by moths, but not by bats.

Images: Sarah Venter

ABOVE: Baobab trees are more than icons; they're income. As pollinators keep these trees fruiting, thousands of rural communities depend on them for food, trade and economic survival.

Image: Sarah Venter

A shared future

Our research, published in the *Botanical Journal of the Linnean Society* found that the variety of floral visitors in different areas of Africa were probably responsible for the wide range of baobab flower shapes, sizes, nectar volumes and sugar concentrations and scent that we see across Africa. Over millennia, these differences may become more or less pronounced, shaped by the ebb and flow of pollinators in these landscapes.

Pollinators are critically important for fruit production, which in turn supports local economies and the persistence of the species. While baobabs can cope with a wide range of environmental and climatic conditions (Venter and Witkowski 2024), pollinators may be more susceptible to global change (Brunet and Fragoso 2024). Understanding how pollinators vary from place to place matters, because conservation efforts need to back a broad mix of species. This helps keep baobab trees pollinated and fruiting—something that many thousands of rural people rely on for their livelihoods. It's just as important that conservation and tree-planting schemes match flower types to local pollinators, so the trees being planted will go on to produce fruit in the years ahead.

Ultimately, the future of Africa's baobabs depends not only on the trees themselves, but on the often-overlooked relationships they share with the pollinators that sustain them.

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More about the paper: Venter, S. M., Cory-Toussaint, D., Glennon, K. L., Kigathi, R. and Johnson, S. D. (2025). Regional flower visitor assemblages and divergence of floral traits of the baobab *Adansonia digitata* (Malvaceae) across Africa. *Botanical Journal of the Linnean Society*, boaf085. https://doi.org/10.1093/botlinnean/boaf085

REFERENCES

Baum, D. A. (1995). The Comparative Pollination and Floral Biology of Baobabs (Adansonia-Bombacaceae). *Annals of the Missouri Botanical Garden* 82(2), 322–348. doi: 10.2307/2399883

Brunet, J. and Fragoso, F. P. (2024). What are the main reasons for the worldwide decline in pollinator populations? *CABI Reviews* 19(1): 1–13. doi: 10.1079/cabireviews.2024.0016

Fenster, C. B., Armbruster, W. S., Wilson, P., Dudash, M. R. and Thomson, J. D. (2004). Pollination Syndromes and Floral Specialization. *Annual Review Ecology, Evolution, and Systematics*. 35: 375–403. doi: 10.1146/annurev.ecolsys.34.011802.132347

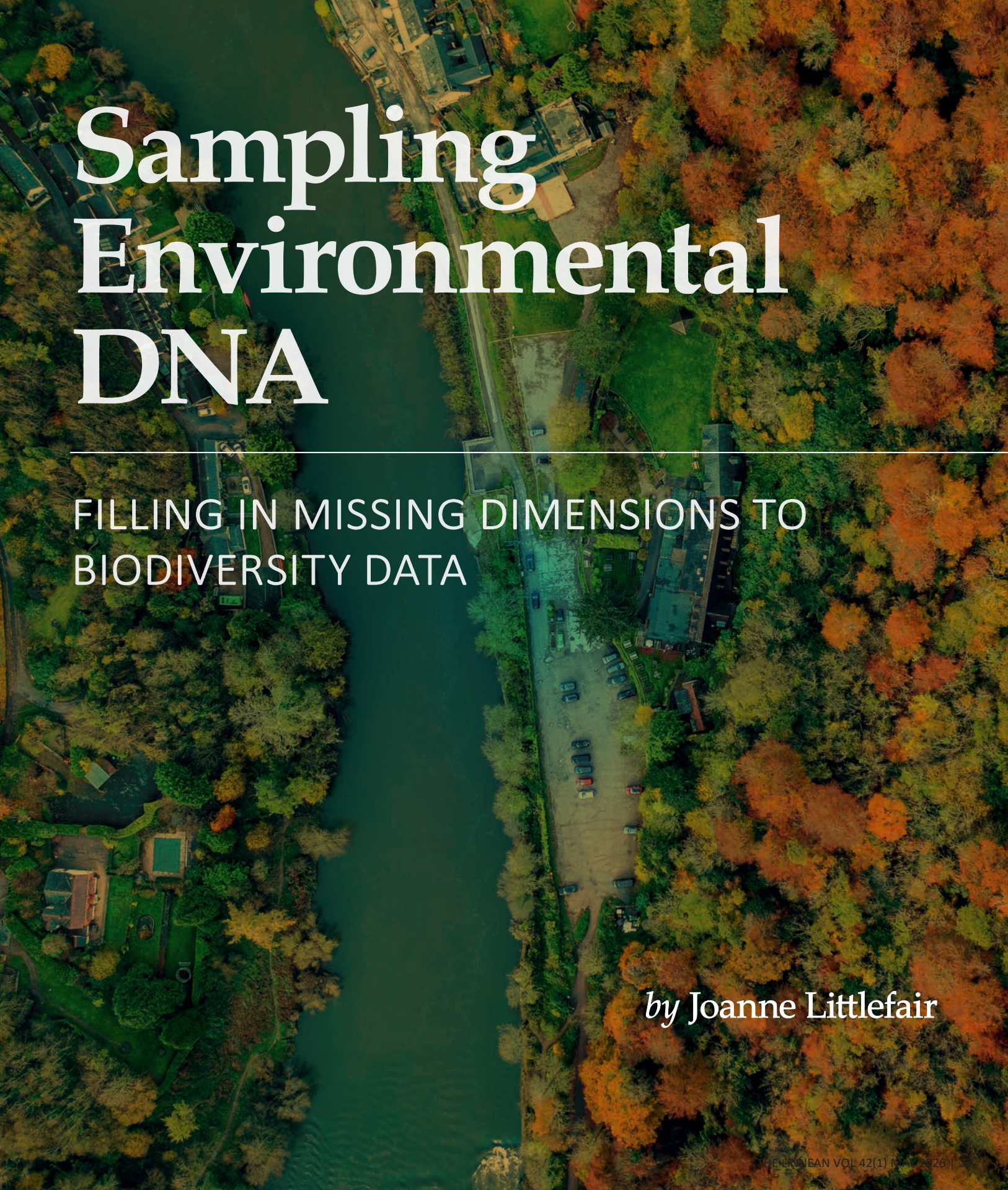
Jaeger, P. (1945). Epanouissement et pollinisation de la fleur du Baobab. *Comptes rendus de l'Académie des Sciences* 220: 369–371.

Start, A. N. (1972). Pollination of the baobab (*Adansonia digitata* L.) by the fruit bat *Rousettus aegyptiacus* E. Geoffroy. *African Journal of Ecology* 10: 71–72. doi: 10.1111/j.1365-2028.1972.tb00861.x

Taylor, P. J., Vise, C., Krishnamoorthy, M. A., Kingston, T. and Venter, S. (2020). Citizen Science Confirms the Rarity of Fruit Bat Pollination of Baobab (*Adansonia digitata*) Flowers in Southern Africa. *Diversity* 12(3): 106. doi: 10.3390/d12030106

van der Niet T and Johnson S. D. (2012). Phylogenetic evidence for pollinator-driven diversification of angiosperms. *Trends in Ecology & Evolution* 27(6): 353–61. doi: 10.1016/j.tree.2012.02.002.

Venter, S. and Witkowski, E. (2024). Baobabs as symbols of resilience. *Nature Plants* 10(5): 732–735. doi: 10.1038/s41477-024-01681-4.



Sampling Environmental DNA

FILLING IN MISSING DIMENSIONS TO BIODIVERSITY DATA

by Joanne Littlefair

PREVIOUS:
Environmental DNA is transforming biodiversity monitoring, revealing hidden species, correcting our bias toward charismatic animals and uncovering the full web of life as ecosystems face accelerating decline.

Biodiversity monitoring is the cornerstone of understanding responses to disturbance, the effect of interventions in degraded ecosystems and progress towards targets to improve ecological health. Large-scale repositories provide extensive data, revealing alarming trends: biodiversity is declining, and species occupancy is shrinking due to land-use change. Joanne Littlefair explores how sampling environmental DNA reveals previously undetectable species, exposing the hidden networks that underpin ecosystems and providing richer data for measuring environmental change.

Much of the data we collect is primarily focused on charismatic animals, particularly vertebrates (Troudet *et al* 2017), giving us a limited picture of ecosystem health and function from lower trophic levels. Troudet and colleagues found that birds comprised over half of the total records within the Global Biodiversity Information Facility (GBIF), one of the largest global repositories of biodiversity information, despite comprising only 1% of the species richness therein. Moreover, this bias has been increasing over time since the 1950s, such that records of the same charismatic species are collected again and again. Conversely, our understanding of insects and plants remains limited, despite their critical roles in ecosystem functioning.

Ecologists are increasingly turning to technology to address the gaps in spatial, temporal or taxonomic coverage of biodiversity, deploying camera traps on vast gradients of land use or examining phenological changes with satellites. Filling these gaps will give us the big data needed for a complete picture of ecosystem responses. One tool in the ecologist's arsenal which has been growing in popularity in the last decade is environmental DNA. Originally developed to monitor aquatic species, surveys can now be undertaken on everything from bacteria to macroinvertebrates to fish. Because everything releases DNA, eDNA captures diversity across the Tree-of-Life, offering a window into undersampled groups that provide the backbone of ecosystem function.

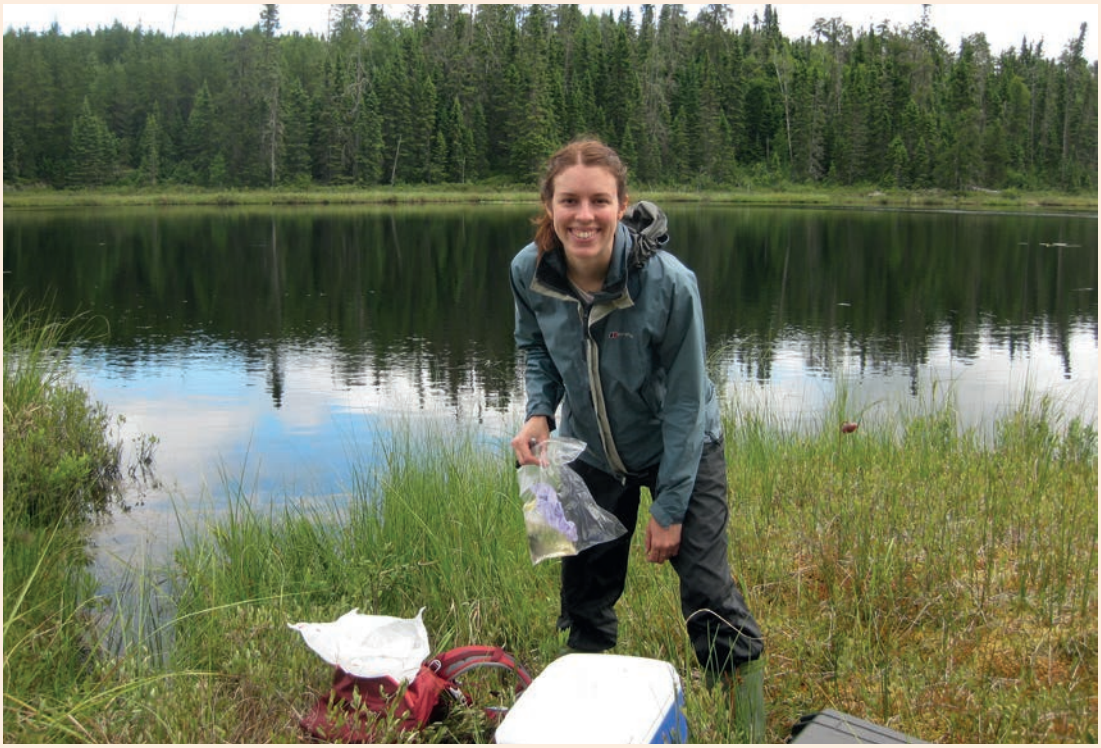
Using technology to monitor over time

Until now, environmental samples were primarily collected by hand, which often still offers certain efficiencies because of coverage across several taxonomic groups. Alternatively, collection via technological means may allow monitoring where none could previously take place. For example, fisheries managers might not allow gillnetting of a lake which is being managed for sports fish, but would be happy to permit non-invasive water sampling. Nevertheless, each sample represents a single moment in time and space. To understand how ecosystems are changing, or to gain early warning signals of disturbance, the gold standard will be to collect co-located samples through time.

My team have been investigating how environmental DNA could be harnessed to passive or autonomous samplers to move beyond 'snapshot' datasets, in a way that is difficult to achieve with observation-based data. We work in collaboration with physicists to understand the power of existing widespread networks of air samplers to additionally capture DNA during their routine sampling. These air quality networks monitor pollution levels on a weekly basis and are widespread around the world. In the UK, our study showed that they also captured DNA representing over a thousand terrestrial taxa, and our initial studies show that they reflect gradients in rural-urban biodiversity (Littlefair *et al* 2023, Tournayre *et al* 2025).

Crossing over disciplines, the UK government's Environmental Monitoring for Health Protection programme was able to track the spread of the Omicron COVID-19 variant using 291 'autosamplers' at sewage treatment plants during the pandemic. These samplers take a composite sample over a 24-hour period which provided an integrated picture of the COVID-19 burden on those living in the catchment area, as well as tracking the spread of new variants over time and informing policy decisions. The wastewater epidemiology programme is now providing a sentinel system for the emergence of new diseases in the UK.

Image: Shutterstock.com/steved_np3



LEFT: Joanne Littlefair collecting lake water eDNA samples in July 2017 at the International Institute for Sustainable Development - Experimental Lakes Area, Northern Ontario. These samples then became part of a study examining the flow and accumulation of eDNA in a natural landscape (Littlefair *et al*. 2023).

eDNA sampling can be extended much further back in time than the present day. One challenge with rewilding is the concept of shifting 'biodiversity baselines', in which habitat has already been heavily altered before biomonitoring records began, which means that we have little idea of the pre-human contact assemblage. The question of going back to a rewilded or natural state is controversial, but one potential source of information as we tackle these tricky decisions is the reconstruction of past ecological assemblages from DNA in sediment or permafrost cores. Several groups have reconstructed time series of ecosystems during natural or human-induced environmental impacts, tracking the extirpation or introduction of species.

Challenges and public perceptions

A key question will be the privacy issues raised by harvesting more genetic information from the environment. It is not possible to identify individuals from the short 'barcode' regions used for species identification in biodiversity monitoring applications. This would require assembling longer regions and comparing SNPs (single nucleotide polymorphisms) against a reference sequence. Nevertheless, it remains a question that journals, databanks, labs and regulators will have to consider in the future.

As with any biomonitoring, the countries with the most biodiversity often have the lowest capacity to monitor it. Tech can be expensive, although innovations such as the air quality networks that piggyback onto existing sampling networks could add value to what is already in place. Our collaborators have pioneered the use of 3D-printed samplers which can be produced at a fraction of the cost (Garret *et al* 2023), and which allow open-source modifications to the design. It will be important for well-resourced countries to assist with capacity-building in molecular biomonitoring so that developing countries can retain sovereignty over their natural resources.

Finally, eDNA is part of a family of environmental sensors for monitoring biodiversity, which also includes bioacoustics, citizen science apps and camera traps. As with all sensors, some question

Image: Rachel Henderson

RIGHT: Members of the lab prepare a display of air sampling instrumentation for a visit by Her Royal Highness The Princess Royal to the People and Nature Lab in February 2025.

whether the use of technology aids our understanding of ecology more than it removes people from a direct experience of nature. I would argue that putting these technologies into the hands of scientists and citizens can enhance their experience and depth of knowledge of nature because they are able to sample for longer time periods or at night, when sampling might be inaccessible. School communities, natural history groups and ecological surveyors have been intrigued by the additional species that can be detected by eDNA, bringing complexity to familiar landscapes as they are able to consider previously hidden biodiversity.

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More about the study: Littlefair, J. E., Hleap, J. S., Palace, V., Rennie, M. D., Paterson, M. J. and Cristescu, M. E. (2006). Freshwater connectivity transforms spatially integrated signals of biodiversity. *Proceedings of the Royal Society B* 1 September 2023; 290 (2006): 20230841. https://doi.org/10.1098/rspb.2023.0841

REFERENCES

Brunner, F.S., Payne, A., Cairns, E., Airey, G., Gregory, R., Pickwell, N.D., … Paterson, S. (2023). Utility of wastewater genomic surveillance compared to clinical surveillance to track the spread of the SARS-CoV-2 Omicron variant across England. *Water research* 247: 120804. doi.org/10.1016/j.watres.2023.120804

Garrett, N. R., Watkins, J., Simmons, N. B., Fenton, B., Maeda-Obregon, A., Sanchez, D. E., . . . Clare, E. L. (2023). Airborne eDNA documents a diverse and ecologically complex tropical bat and other mammal community. *Environmental DNA* 5(2): 350–362. doi:10.1002/edn3.385

Littlefair, J. E., Allerton, J. J., Brown, A. S., Butterfield, D. M., Robins, C., Economou, C. K., . . . Clare, E. L. (2023). Air-quality networks collect environmental DNA with the potential to measure biodiversity at continental scales. *Current Biology* 33(11): R426–R428. doi:10.1016/j.cub.2023.04.036

Tournayre, O., Littlefair, J. E., Garrett, N. R., Allerton, J. J., Brown, A. S., Cristescu, M. E., and Clare, E. L. (2025). First national survey of terrestrial biodiversity using airborne eDNA. *Scientific Reports* 15(1): 15 pages. doi:10.1038/s41598-025-03650-z

Troudet, J., Grandcolas, P., Blin, A., Vignes-Lebbe, R., and Legendre, F. (2017). Taxonomic bias in biodiversity data and societal preferences. *Scientific Reports* 7: 9132. doi.org/10.1038/s41598-017-09084-6

Image: University College London

Revisiting Frederick Marryat

SCIENCE, CARICATURE AND PREJUDICE IN THE SHADOW OF EMPIRE

by John Dolan FLS

PREVIOUS PAGE:
An engraving of 'Captain Marryat' from 1851, in front of his Letter of Recommendation for Fellowship of the Linnean Society in 1817.

Frederick Marryat's life intersected with a period of profound change, spanning war, empire and the early stirrings of modern science. Remembered chiefly as a naval officer turned novelist, he also moved in what for some may be less familiar circles, as an aspiring naturalist and a creator of satirical images shaped by the attitudes of his age. These lesser-known pursuits reveal a figure both curious and creative, yet also entangled in the cultural assumptions and prejudices of early 19th-century Britain. Here John Dolan FLS turns to those overlooked dimensions, examining Marryat's scientific interests and artistic output with a clear-eyed view of their historical context.

Frederick Marryat (1792–1848) found success in a world undergoing rapid and far-reaching transformation. Spanning the late Georgian period into the dawn of the Victorian era, his lifetime encompassed the upheavals of the Napoleonic Wars, the steady expansion of the British Empire, and the early momentum of the Industrial Revolution. These forces not only shaped the course of nations but also informed the experiences and outlook of individuals like Marryat, whose varied career unfolded against this complex, and often turbulent, backdrop.

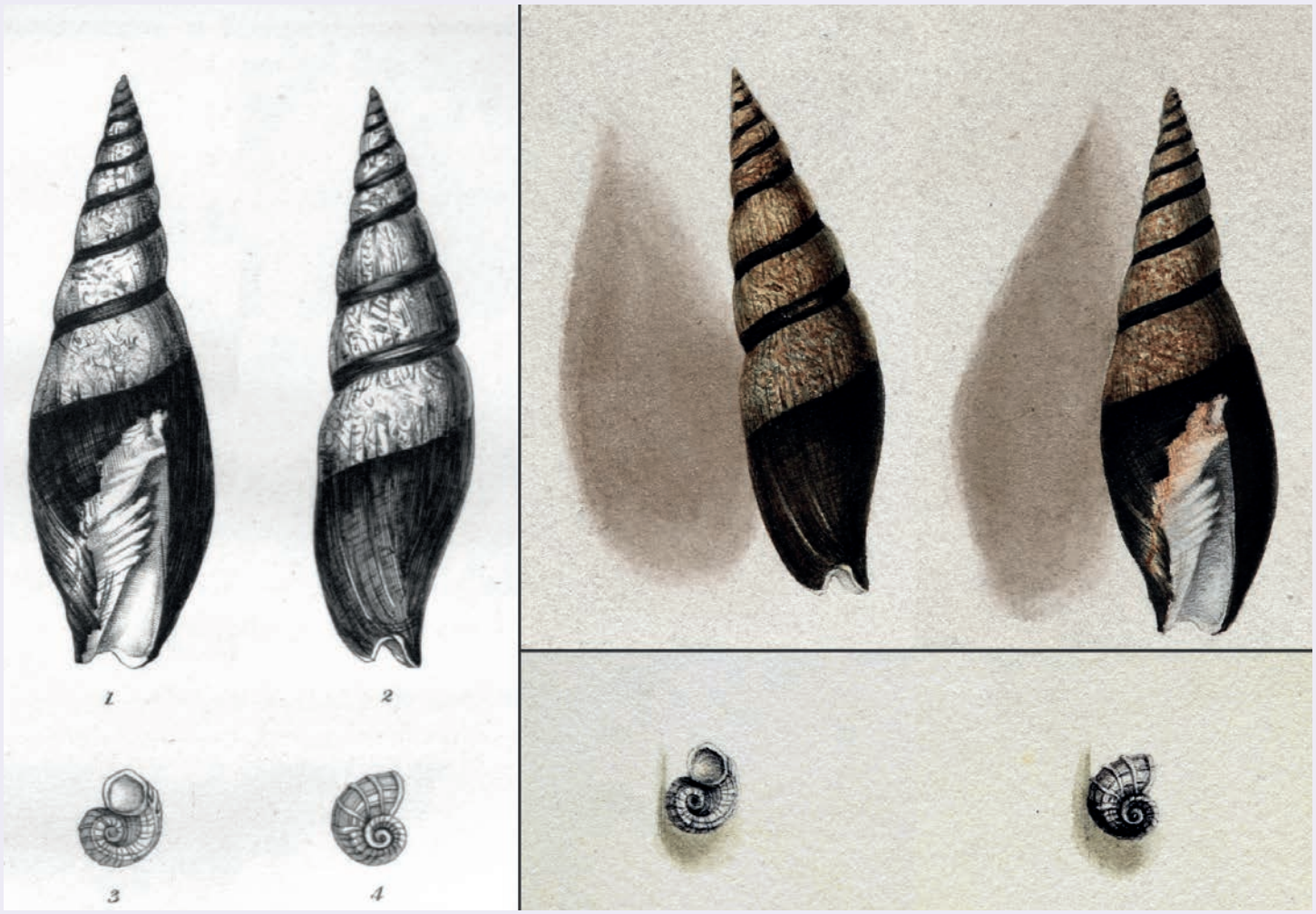
While today Marryat may primarily be known as a prolific 19th-century author, his career began at age 14 as Midshipman in the Royal Navy. By 23, he had risen to the rank of Captain, having participated in many battles in the Napoleonic Wars, the war of 1812 with the United States, and in Burma (O'Byrne 1849). Later, a literary career followed, with Marryat penning dozens of popular 'naval' novels (a burgeoning genre), many based on his experiences, as well as children's books. His most enduring work may be 1847's *The Children of the New Forest*, as confirmed by the four television adaptations made by the BBC between 1955 and 1998.

A contemporary and friend of Charles Dickens, Marryat's own novels are known to have influenced later authors such as Joseph Conrad (Conrad 1898), Virginia Woolf (Woolf 1950) and Ernest Hemingway (Spilka 1984). There is a considerable literature on Marryat, with seven full biographies, a PhD thesis and innumerable biographical sketches and treatments in books and articles. His daughter, Florence Marryat, published the first biography in 1872 (Marryat 1872). Subsequent accounts all heavily drew upon it, but focused either on his work as a novelist (i.e. Hannay 1889; Gautier 1973; Parascandola 1997; Popcock 2000; Buster 1979) or on his naval exploits and adventures, as in those by Lloyd (1939) and Warner (1953). What all of these works have overlooked is his research as a naturalist, and mention only in passing his images of African peoples in satirical prints, now recognised as overt depictions of the racism of the time. Here, Marryat's naval and literary careers, treated at length in the biographies and elsewhere, are not considered. Rather, a light is shone on Marryat the naturalist and Marryat the cartoonist.

The naturalist

By early 1817 Marryat had set his sights on Fellowship of the Linnean Society. He was then 25 and, like many naval officers in the post-war years, was shore bound without a commission and consequently, on half-pay. He is said to have busied himself, beginning in 1815, with the study of natural sciences in the hope of being chosen to command a voyage of exploration (Lloyd 1939). Marryat's wish to join the Linnean Society was likely motivated by a desire to be recognised as knowledgeable in natural history. It is possible that he knew of the considerable overlap in the memberships of the Linnean Society and Royal Society (about 21% of Linnean Fellows were also FRS in 1817 —see Linnean Society of London 1851), and he was perhaps already angling for eventual nomination to the latter. Marryat's letter of nomination to the Linnean described him as a '...a gentleman well versed in several branches of natural history being desirous of becoming a Fellow...' and it was signed by William Elford Leach, Michael Bland (both FRS), and Rev. John Burrow, as well as two others whose signatures are illegible. Marryat was proposed on 21 January 1817 and elected on 21 March. On 18 February, in between his proposal and election, his singular contribution to the

Images: The Linnean Society of London



Society was read: 'Descriptions of two new Shells', and was published in the *Transactions* in 1818 (Marryat 1818). The article is quite brief at 138 words, with a plate showing two new gastropod species, *Mitra zonata* and *Cyclostrema cancellata*, of the new genus *Cyclostrema*. Marryat acknowledged the advice of one of his Linnean sponsors, Leach, a zoologist at the British Museum, with regard to erecting the new genus.

Of note is that it is the only known scientific publication of Marryat, and it has proven to be solid. Marryat is still credited today with the first description of both species, and both appear to be quite rare (Abbott 1950; Federico 2010). Exactly how the specimens described were obtained is not mentioned. In the article, Marryat states that the shell of *Mitra zonata* was found attached to a sounding line from deep water near the port of Nice, and that of *Cyclostoma cancellata* to have been in a collection of shells mostly from West India (= British West Indies). However, none of the many biographies make any of mention of his presence in Nice. Marryat, as a new Lieutenant, was in the British West Indies in 1813, but no document concerning Marryat mentions shell collections. Lastly, the original manuscript of the article, preserved in the archives of the Linnean Society, includes the watercolour illustrations of the shells, clear and early evidence of Marryat's considerable talent as an illustrator, rarely acknowledged. Fig. 1 shows the illustration in the plate in the *Transactions* that compares poorly with Marryat's watercolours. As remarked by William Swainson in his *Zoological Illustrations* (Swainson 1820–1821), with regard to *M. zonata*: 'This unique and beautiful Mitre has

ABOVE: Illustrations of *Mitra zonata* (large shells) and *Cyclostoma cancellata* (small shells). The left panel shows the illustrations in Marryat's 1818 article. The right panels show Marryat's watercolours, complete with shadowing. No sizes were indicated in Marryat's text but it was not uncommon in species descriptions in his time. Based on later reports, *M. zonata* shells are about 8 cm long and those of *C. cancellata* are about 1.5 cm long.

Images: The Linnean Society of London

RIGHT:
Captain Marryat's Mediterranean Algae. The bound volume (bottom panel) encloses about 30 pages of specimens, without indications of the sites or dates of collection, for example the page containing. *Flabellaria desfontainii*, (top left panel). Some pages contained unlabelled specimens and pencilled notations. On the page shown in top right panel, the specimen at the top is labelled in pencil '*Caulerpa prolifera*' and the one in the bottom is labelled in pencil 'New G.?'.

already been described by Captain Marryat in the Linnean *Transactions*: the figures, however, are uncoloured, and give a very indifferent idea of the graceful symmetry of its form.'

With the hope of locating Marryat's original shells, I conducted a simple search of the holdings of the Natural History Museum, London, using the terms 'Marryat', 'Mitra zonata' or 'Cyclostoma cancellata'. While the search did not turn up his shells, it did uncover a surprising listing: 'Captain Marryat's Mediterranean Algae'. Held in the Algae Herbarium, it had been, at some point in time, transferred from the collections at the Royal Botanic Gardens, Kew. Yet no mention of the collection exists in any of the texts on Marryat, nor in AlgaeBase, Google Scholar or the Biodiversity Heritage Library.

A note linked with the algae is a transcription of an undated letter by Marryat addressed to Dawson Turner (1775–1858), an expert on marine algae (Dawson 1958) and close friend of Linnean Society founder James Edward Smith. In his letter, Marryat stated that his collection of Mediterranean algae might be of interest, although the names he attributed may not be correct, with some specimens unnamed due to lack of access to current literature. No details were provided for the collected specimens (collecting location, etc.), but according to Luisa Mangialajo of the Université Côte d'Azur, most of the species are found in shallow waters growing on rocky substrates, and given the condition of the specimens, likely were collected in late spring.

One of specimens labelled *Flabellaria desfontainii*, was described by J. V. Lamouroux in 1813 (Lamouroux 1813), thus dating the labelling, if not the collection of specimens, as post-1813. Interestingly, Lamouroux donated a copy of his article to the Linnean Society's library in November of 1816, which Marryat would have been able to access as a newly-elected Fellow. Remarkably, some pages contain notations in pencil that may have by Turner, or perhaps Joseph Hooker, to whom Turner gave his herbarium in 1820 (Dawson 1958). Regardless of the authorship of the pencilled notes, it was no doubt through Hooker that Marryat's collection made its way to the Kew Gardens collections when Hooker became the Director.

The fact that the basics were omitted (collection sites and dates) in the Marryat volume is a quite serious flaw, perhaps adding to why the volume has remained obscure. Nonetheless, it is clear evidence of his having undertaken scientific work, even if the fine details remain lost to history.

The artist of satirical prints

The manufacture and sales of satirical prints was a bustling business in the late 18th and early 19th centuries. The prints frequently depicted caricatures of famous personalities or societal groups in uncomfortable or embarrassing situations. Often hand-coloured, they were 'fit for framing' and used to decorate the walls of homes and businesses, or were collected in albums. Produced in the low hundreds, the prints were moderately priced, affordable for middle-class consumers, and sold in numerous print shops whose window displays drew the attention of passers-by (McCreey 2004). The British Museum today houses over 30,000 items catalogued as 'satirical prints'.

Marryat apparently became involved with the production of satirical prints as a source of needed income (Patten 1992), during the period in which he was 'on extended shore leave' as a Captain awaiting a commission. His first sketch, 'Game of Chess' in 1814, was submitted to Hannah Humphrey, the owner of a West End print shop, and she had engraver George Cruikshank (1792–1878) do the engraving. Thus began Marryat's partnership with Cruikshank that lasted until 1824, and produced at least 21 prints. Cruikshank would later become the most famous illustrator of the 19th century, providing illustrations for titles like Dickens's *Oliver Twist* (see Suppl. File, Web Resources).

Yet today, Cruikshank is also known for his racist images of African peoples (e.g. Hahn 2017). Most of the Marryat–Cruikshank prints were relatively simple scenes, with prints varying considerably in size, topic, complexity and potentially, the intended customer. One print however—the 1818 'Puzzled which to choose!! or The King of Timbuctoo offering one of his daughter in marriage to Capt.____} anticipated results of an African Mission'—has a particular back story, and is said to have greatly aided Marryat's election to the Royal Society. It is now recognised as iconic of the perspicuous racism towards Africans in 19th-century Britain (Odumosu 2017).

Marryat was to be involved in an expedition to North Central Africa, in order to open a new trade route. In the end he declined, wishing to remain in London to continue courting his soon-to-be wife. The sketch 'Puzzled…', apparently intended to show what he would be giving up as a married man, was originally only destined to be a joke shared among friends, but was given to Cruikshank who

ABOVE: Examples of Marryat–Cruikshank prints—(Top Left) 'Game of Chess' (1814); (Top Right) The racist 'Puzzled which to choose' (1818) showing 'the King of Timbuctoo' offering one of his three daughters in marriage to a naval officer, all drawn with the exaggerated physique of the famous 'Hottentot Venus'; (Bottom) 'Landing the Treasures or Results of the Polar Expedition' (1819) depicting the delivery of items collected during John Ross's 1818 Northwest Passage expedition to the British Museum. In the upper left, an added square shows four men, one labelled 'Sr. J. Banks' (Royal Society President), and another 'Dr. Leach' (Marryat's Linnean and Royal Society nominator). (Further details can be found in a supplementary file for this issue at www.linnean.org/thelinnean).

Images: The Trustees of the British Museum

produced the engraving for the print. In the print (ABOVE), the daughters of the King of Timbuctoo are caricatures of the 'Hottentot Venus' (Patten 1992; Wright 2013). Profiles of the 'Hottentot Venus' are conspicuous in earlier Cruikshank prints, not associated with Marryat's sketches (e.g. the 1811 prints 'Double Bass' and 'The Examination of a Young Surgeon').

The 'Hottentot Venus' was a Khoisan woman named Sara Baartman, born around 1775 in South Africa. An orphan, she was sent to work on Dutch-owned farms, then worked as a maid before being taken from Cape Town. From 1810 to 1815 she was displayed in London, Dublin and Paris in what is now described as 'enthopornographic freak shows' (Crais and Scully 2009). Georges Cuvier of the Muséum National d'Histoire Naturelle in Paris acquired her body after death and conducted a dissection. Although he acknowledged that she had been an intelligent and perceptive woman, he claimed that her skeleton closely resembled that of great apes (Gould 1982), contributing to the spread of misleading and discriminatory beliefs about racial hierarchy (Dolan 2025). In 2002, the remains of Sara Baartman were finally repatriated from the Paris Musee de l'Homme in France to a grave in the region of her birth near Hankey, South Africa. Her burial place is now a National Heritage Site (Fauvelle-Aymar 2006).

The print is said to have aided Marryat's election to the Royal Society through Sir Joseph Banks, the long-time president of the Royal Society. Florence Marryat (1872) stated that her father repeated the story that, during one of the many readings of Marryat's Royal Society nomination in 1819, Banks exclaimed, 'Marryat! Marryat! A capital fellow! Elect him by all means. Puzzled which to choose! Puzzled which to choose! I always have his caricatures on my table; wouldn't be without them for the world.' The veracity of the story is difficult to verify. However, it is quite likely that Banks knew of Marryat's satirical prints, as both Banks and Edward Leach (one of Marryat's nominators to Linnean Society and Royal Society Fellowship), actually appeared in the Marryat–Cruikshank print 'Landing the Treasures or Results of the Polar Expedition' (OPPOSITE). It was published on 18 January 1819, shortly before Marryat's nomination to the Royal Society on 18 February.

Epilogue

The aim of this article has been to illuminate lesser-explored dimensions of a widely recognised figure. Frederick Marryat, renowned as both a naval hero and a prolific writer of popular fiction, also engaged in natural history, making modest yet noteworthy contributions to the field. He was, moreover, a satirical artist whose work reflects—and now serves as a reminder of—a period in which minority ethnic groups were unjustly denied full acknowledgment of their humanity. Contemporary analysis must remain attentive to how differences often dismissed as minor can nonetheless generate harmful assumptions, particularly where they are tied to historically rooted, yet unfounded and deeply consequential, forms of social identity. A continued commitment to identifying, addressing and challenging such perceptions is therefore essential.

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Supplementary material for this article can be found for this issue (2026) at **www.linnean.org/thelinnean**

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REFERENCES

Abbott, R. T. (1950). The genus *Cyclostoma* in the Western Atlantic. *Johnsonia* 2: 193–200.

Buster, W. A. (1979). *The Life and Novels of Captain Marryat*. Ph.D. Thesis, University of Virginia.

Conrad, J. (1898). Tales of the Sea. *The Outlook* 1: 560–561.

Crais, C. and Scully, P. (2009). *Sara Baartman and Hottentot Venus: a Ghost Story and a Biography*. Princeton: Princeton University Press.

Dawson, W. (1958). Dawson Turner, F.R.S. (1775–1858). *Journal of the Society for the Bibliography of Natural History* 3: 303–310.

Dolan, J. R. (2025). Exhibitions of the Artistic and Scientific Exploitation of Baartman (ca. 1775–1815), the 'Hottentot Venus'. *Arts et Sciences* 9(3): 1–23. doi:10.21494/ISTE.OP.2025.1350

Federico, A. (2010). Storia di una rara conchiglia. *Notizario S.I.M*. 28: 16–20.

Fauvelle-Aymar, F.-X. (2006). The reappearance of the Khoesan in post-apartheid South Africa, invention of tradition and national reconciliation. in Wa Kabe-Segeti, A., Pejout, N. Guillaume, P. (eds), *Ten Years of Democratic South Africa, Transition Accomplished*?, Institut français d'Afrique du Sud, Johannesburg. (Les Nouveaux Cahiers de l'IFAS/ IFAS working Paper Series N°8).

Gautier, M.-P. (1973). *Captain Frederick Marryat: l'Homme et l'Oeuvre*. Montréal: Didier.

Gould, S. J. (1982). The Hottentot Venus. *Natural History* 91: 20–27.

Hahn, C. (2017). Nailing one's colours: Tate Britain's artist and empire. *Identities: Global Studies in Culture and Power* 24: 26–33.

Hannay, D. (1899). *Life of Frederick Marryat*. London: Walter Scott.

Lamouroux, J. V. F. (1813). Essai sur les genres de la famille des Thalassiophytes non articulées. *Annales du Muséum d'Histoire Naturelle* 20: 21–47, 115–139, 267–293.

Linnean Society of London. (1851). *List of the Linnean Society of London (1805–1851*). https://www.biodiversitylibrary.org/bibliography/2370

Lloyd, C. (1939). *Captain Marryat and the Old Navy*. London: Longmans, Green & Co.

Marryat, F. (1818). Descriptions of two new shells. *Transactions of the Linnean Society* 12: 338–339.

Marryat, F. (1872). *Life and Letters of Captain Marryat, in two volumes*. London: Richard Bentley & son.

McCreery, C. (2004). *The Satirical Gaze: Prints of Women in Late Eighteenth-Century England*. Oxford: Clarendon Press.

O'Byrne, W. R. (1849). *A Naval Biographical Dictionary*. London: John Murray.

Odumosu, T. (2017). *Africans in English Caricatures: Black Jokes White Humor*. London: Harvey Miller Publishers.

Parascandola, L. J. (1997). *'Puzzled Which to Choose': Conflicting Socio-Political Views in the Works of Captain Frederick Marryat*. New York: Peter Lang Publishing.

Patten, R. L. (1992). *George Cruikshank's Life, Times, and Art. Volume 1: 1792–1835*. New Brunswick, New Jersey: Rutgers University Press.

Popcock, T. (2000). *Captain Marryat*. Mechanicsburg, PA : Stackpole Books.

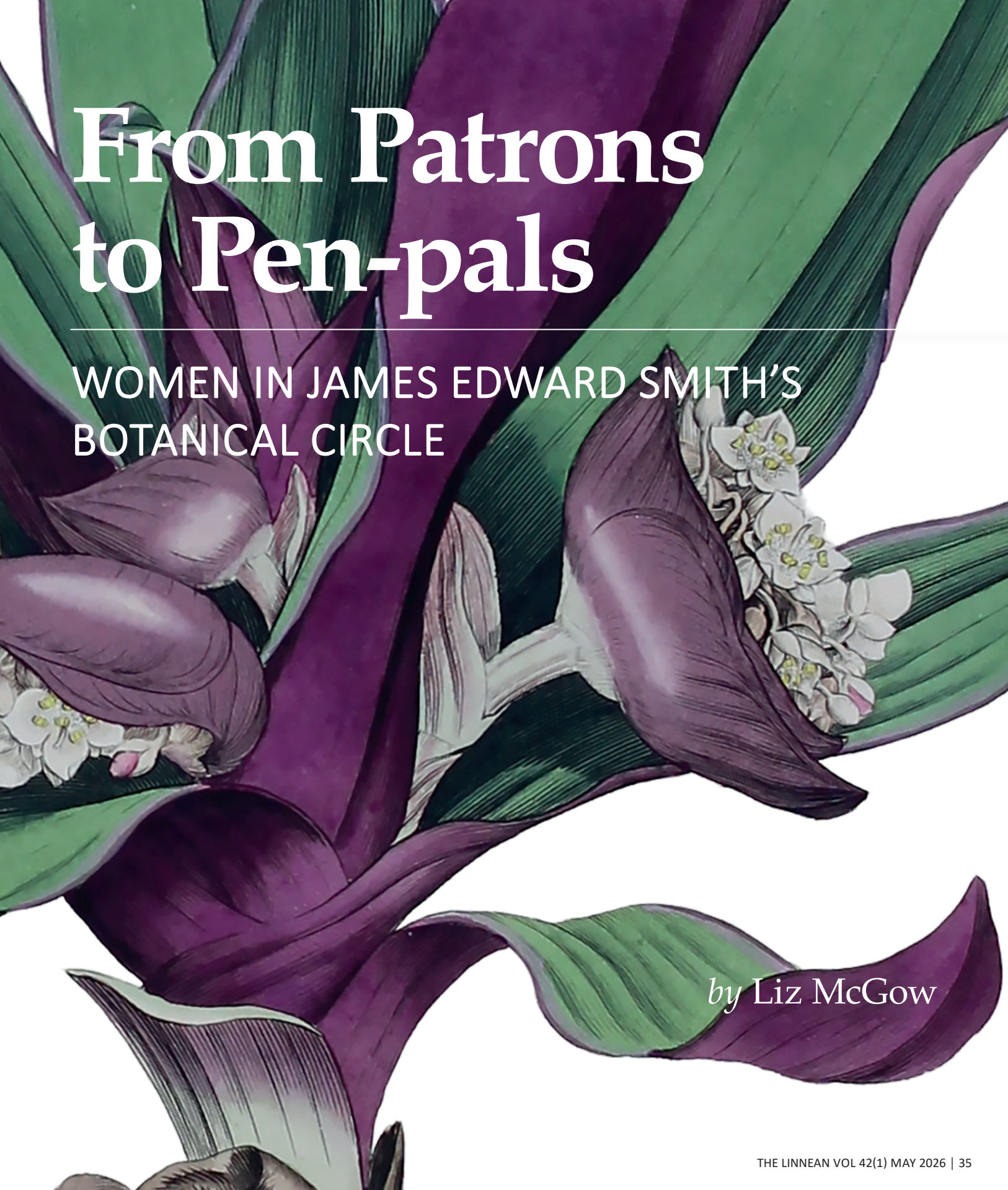
Spilka, M. (1984). Victorian keys to the early Hemmingway: Captain Marryat. *Novel: A forum on Fiction* 17: 116–140.

Swainson, W. (1820–1821). *Zoological Illustrations, etc. Vol. 1*. London: Baldwin, Cradock, and Joy.

Warner, O. (1953). *Captain Marryat: A Rediscovery*. London: Constable.

Woolf, V. (1950). *The Captain's Death Bed and Other Essays*. London: Hogarth Press.

Wright, A. E. (2013). The Hottentot Venus: an alternative iconography. *The British Art Journal* 14: 59–70.



From Patrons to Pen-pals

WOMEN IN JAMES EDWARD SMITH'S BOTANICAL CIRCLE

by Liz McGow

PREVIOUS PAGE: *Tradescantia discolor* (now *Tradescantia spathacea*) from *Icones pictae plantarum rariorum* (1790-1793), James Edward Smith's botanical work dedicated to Lady Rockingham.

In 1784 at the age of just 25, a medical student from Norwich named James Edward Smith (1759–1828) purchased the collections of Swedish botanist and taxonomist Carl Linnaeus (1707–1778). As his collaborator Sir Joseph Banks (1743–1820) had anticipated, the acquisition made Smith famous almost overnight, placing him at the centre of the European study of natural history. Soon, correspondents from across the world were writing to him. Here, archivist Liz McGow looks closely at five female correspondents of Smith, and how they helped shape the botanical world in the late 18th century.

The Linnean Society archive holds over 3,000 letters addressed to Smith and another c. 500 written by him, spanning from 1771 to his death in 1828. A good number are from women, whose roles within Smith's network and the wider botanical community can be explored through three overlapping identities: patron, published writer and pen-pal.

PATRONS

Smith's purchase of the Linnaean collections brought him into elite circles, including royalty. In 1791, Queen Charlotte invited him to tutor her daughters, the princesses Augusta and Elizabeth. He was particularly popular among wealthy women, in part because botany was considered a suitable pursuit for ladies, but also because his lectures were, unusually, open to women.

Smith soon gained several female patrons, including Mary Watson-Wentworth (Marchioness of Rockingham) and Viscountess Jane Barrington. From the correspondence we can see that their importance is clear, with 10 letters from Viscountess Barrington and 59 from Lady Rockingham. While their support is reflected in dedications and plant contributions to Smith's publications, their letters reveal a much deeper involvement.

Mary Watson-Wentworth (Lady Rockingham) (JES/COR/15/77–135)

Mary Watson-Wentworth (1735–1804), the dowager Marchioness of Rockingham, was married to Charles Watson-Wentworth, 2nd Marquess of Rockingham, who twice served as the Prime Minister of Great Britain. After the death of her husband in 1782, Lady Rockingham devoted herself to gardening, building an impressive collection of rare and exotic flora. She began her correspondence with Smith in 1788, continuing until her death in 1804, discussing plant cultivation, new publications and specimen identification.

A recurring theme is the exchange of specimens with Rockingham regularly sending plants, often with detailed observations, before inviting Smith to visit. Smith's herbarium holds a specimen of a *Portlandia* flower, sent by Rockingham in 1789. Similarly, in 1790, she writes of her astonishment at how well the *Passiflora* has flowered in her hothouse and, keen to share this treasure with Smith, planned to send him a pressed flower, fresh flowers and leaves, as well as her own written observations. In the same letter, she jokes that her botanical interests will soon leave her in King's Bench Prison (a well-known debtor's prison in London), where she 'shall look for relief to some of my botanical friends' [JES/COR/15/94].

Smith carefully nurtured this relationship. In 1788 he gave her a duplicate Linnaean volume, specially bound to match and complete her set. In return, she showed gratitude and loyalty. Yet the relationship was not one-sided. In 1789 she asked him to include her specimen of *Catesbaea* in his *Icones pictae plantarum rariorum* (*Coloured Figures of Rare Plants*, 1790–1793), despite his rule against previously illustrated species. Her tone is one of expectation and influence.

In 1792 she thanked him in advance for plants sent from Adam Afzelius in Sierra Leone, noting she was 'the first & best supply'd'—a perk of being a patron [JES/COR/15/110]. Her letters also reveal a

LEFT: Mary Watson-Wentworth (Lady Rockingham), oil on canvas by Godfrey Kneller (1720); *Portlandia* specimen sent by Lady Rockingham in the Smith Herbarium (LINN-HS 321.1).

wide network. She mentions botanist Edmund Davall, frequent visits from famed botanical illustrator James Sowerby, and exchanges with figures such as Jonas Dryander and Joseph Banks.

Rockingham also showed concern for others, seeking Smith's medical advice for her gardener, Grieg, and even asking whether he might attend one of Smith's sold-out lectures while in town—remarking that he would even stand behind the door if necessary. She also requested introductions for Grieg to figures such as John Fairbairn at the Chelsea Physic Garden. Lady Rockingham's patronage extended beyond Smith to others in her circle, her letters showing a sustained correspondence over 15 years, offering financial support, intellectual contribution and active participation in botanical networks.

Viscountess Barrington (JES/COR/2/12–14 and JES/COR/20/56–65)

Lady Jane Barrington (unknown–1807), the wife of Shute Barrington (the Bishop of Salisbury and later of Durham) only started writing to Smith in 1790, having attended one of his lectures. Like Rockingham, she placed her plant collection at his disposal. In 1793 she wrote to Smith from her home in Oxfordshire and described the success of the plants in the hothouse, offering to send any specimens he required: '[P]ray write to my Gardiner Muns & he will send them to you. You do me the honour in admitting any of my Plants among your works.' [JES/COR/20/61]

BELOW: Agnes Ibbetson's letters in the Smith Correspondence strike a careful balance of confidence and deference: 'I am so anxious to forward and improve.' Here she asks for his expertise on her work on vegetable physiology.

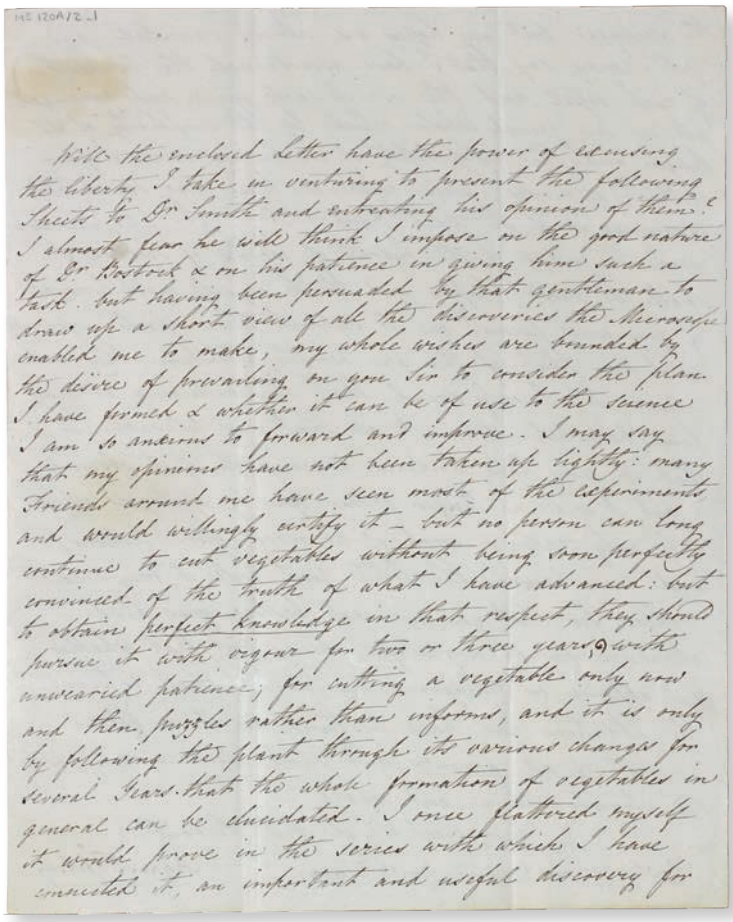
Her letters also reveal her network, mentioning visits from botanist and Linnean Society founding member Aylmer Bourke Lambert, who finds a flower in her collection that he believes is the first of its species to flower in England (a notable achievement by Barrington and her gardener) [JES/COR/20/56]. Beyond this, she showed support for a gentleman in her neighbourhood, a Mr John Harriman (an English cleric and botanist). She wrote to Smith in 1798 assuring him that it was Harriman who first discovered the species *Gentiana verna* in Britain and requested that he be properly credited by Sowerby in the book *English Botany.* A few years later, she wrote to Smith asking to pay John Harriman's lifetime Fellowship fees to the Society, anonymously.

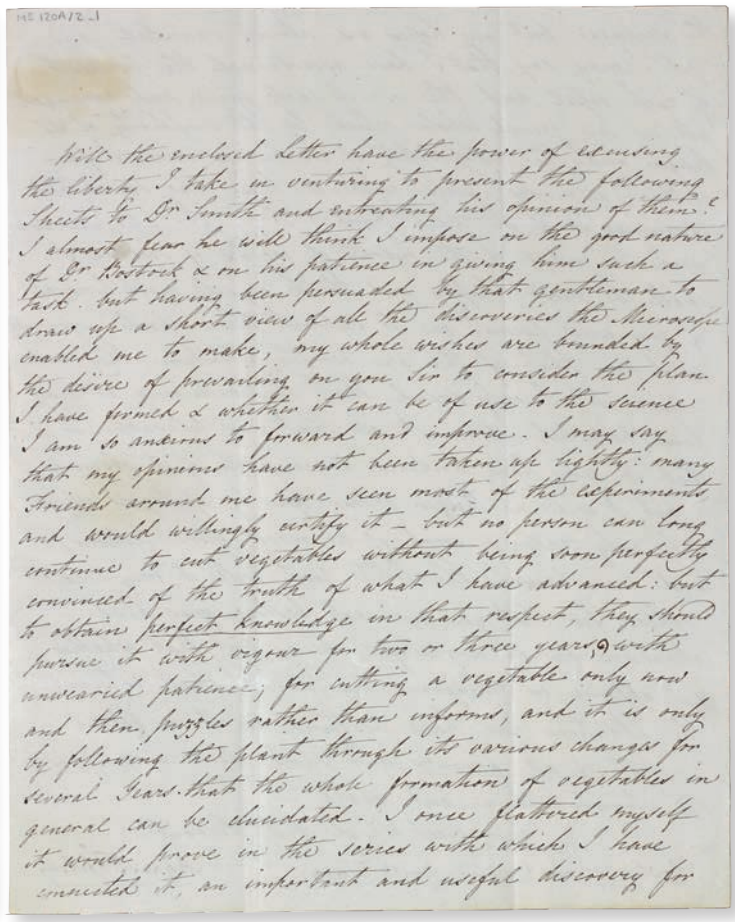
The letters of both women illustrate the broader role of patrons. Through their collections—many of which often rivalling those of institutions like the Royal Botanic Gardens, Kew—they regularly supplied the material on which botanical study depended. Additionally, their financial support, introductions and advocacy advanced the work of scientists and enthusiasts alike.

Patronage was also reciprocal, with these women gaining early access to new plants, expert advice and influence over publications, with their collections given wide recognition in print.

PUBLISHED WRITERS

The letters of two very different women—botanist Agnes Ibbetson (1757–1823) and geologist Anna Gurney (1795–1857)—show that Smith's network included women who were not only supporting knowledge but actively publishing it. Both women carried out research in their own fields and produced published works, though when writing to Smith they are at slightly different stages of their careers.





Images: The Linnean Society of London

Agnes Ibbetson (JES/COR/23/32 and MS/120a–b)

Agnes Ibbetson (1757–1823), the daughter of a merchant, became interested in plant physiology whilst in her 50s. Unable to participate in formal education due to her sex, Ibbetson was largely self-taught, relying on relevant publications, as well as careful research carried out at home. Despite this, she had already had some published work to her name, but she needed assistance to progress further. In May 1814, her acquaintance, botanist and physician John Bostock, wrote to his friend Smith to introduce Ibbetson and her work, describing her as:

> an assiduous investigator of vegetable physiology … full of energy & spirit, & completely devoted to her studies, which she pursues with unremitting ardor. [MS/120a]

In three letters to Smith, Ibbetson submitted her work for review, seeking validation and advice on publication. Her manuscript and accompanying drawings on physiology of plants and vegetables (MS/120a-b)—still held in our archive—shows the seriousness of her research. Just by writing, she now had access to Smith's expertise, despite women being excluded from formal institutions at the time, including learned societies like the Linnean.

Her letters carefully balance confidence and deference, crafting robust arguments to support the findings in her accompanying paper, assuring him that others agree with her conclusions, that she has used a methodical approach and received training to carry out a careful examination of the plants in question. She also assures Smith of her gratitude, regardless of his judgement. This strategy reflects the constraints faced by women, who often relied on modesty to gain acceptance.

Whilst Ibbetson ended up contributing over 50 papers to scientific journals and magazines, here she is at a relatively early stage of her career and is seeking Smith's assistance.

Anna Gurney (JES/AG)

By contrast, Anna Gurney (1795–1857) had already earned a strong reputation in geology by her mid-20s (when Smith began writing to her in the early 1820s). From a wealthy banking family (later linked to Barclays), she built an impressive fossil collection that drew leading figures such as William Buckland and Richard Owen. She also contributed specimens to the Geological Society of London.

Yet it was her gift for languages, not geology, that Smith sought out. Already an accomplished linguist, she had published a respected Saxon translation in 1821. Around this time, Smith approached her directly to translate some of the manuscripts and letters of Carl Linnaeus from his own collection. Their correspondence over four years shows her working steadily through difficult material, even apologising for delays caused by Linnaeus' handwriting. Her translations, sometimes accompanied by cautious interpretation, proved invaluable to Smith's research.

These letters reveal not only the scale of her contribution but also the careful tone she adopted, echoing the modesty seen in Ibbetson's writing. Through such deference, both women secured a place within a male dominated scientific world, while quietly shaping the knowledge it produced.

BELOW: Anna Gurney was in her mid-20s when she began corresponding with Smith. She was already quite established in geological circles, but she would work with Smith on translations of some of Linnaeus' manuscripts.She is seen here much later in life.

Image: Norfolk Museums Collections

RIGHT: A cameo of the young Mariamne Johnes, attributed to Thomas Stothard.

THE PEN-PAL

Mariamne Johnes (JES/COR/16/2–17)

Mariamne Johnes (1784–1811), the only daughter of Smith's friend Thomas Johnes, grew up at the Hafod estate in Carmarthenshire, Wales—a place celebrated for its wild beauty and visited by such figures as Samuel Taylor Coleridge, William Wordsworth and John Ruskin. Smith first met Mariamne as a child and was struck by her precocious passion for botany and entomology, noting her ability to identify nearly every local plant despite little formal guidance.

He soon became her mentor, and from the age of 11 she wrote to him with lively enthusiasm, sharing discoveries from around Hafod, from beetles in her father's study to a vivid yellow fungus in the stove house. She sent specimens, drawings and observations, while also supplying plants from the estate's hothouses as well as searching for particular species at Smith's request. Encouraged at home, she even had her own garden established and learned from experienced gardeners.

In return, Smith sent her specimens (even offering to send her a tortoise, to which she politely declined) and dedicated a work to his 'dear young friend'. Though her life was cut short at just 27, her letters capture the energy of an amateur botanist deeply engaged in the scientific world.

Conclusion

The letters of Sir James Edward Smith reveal just how central women were to his work, and to botany in general. Patrons such as Lady Barrington and Lady Rockingham supplied prized specimens, offered financial backing and supported others in their circles, helping to widen access to scientific study. Others played more direct roles: Ibbetson contributed original research, while Gurney's translations opened up the work of Linnaeus to Smith. Lastly, Mariamne Johnes contributed to Smith's work by supplying specimens and observations, exemplifying the value of amateur collaboration.

Beyond this, their correspondence shows women deeply engaged in scientific life. They attended lectures, built collections and libraries, carried out research and published, all while exchanging ideas with leading figures of the day. Letter writing gave them a vital way into an intellectual world often closed to them in person, allowing their influence to flourish quietly behind the scenes, something only now coming fully into view.

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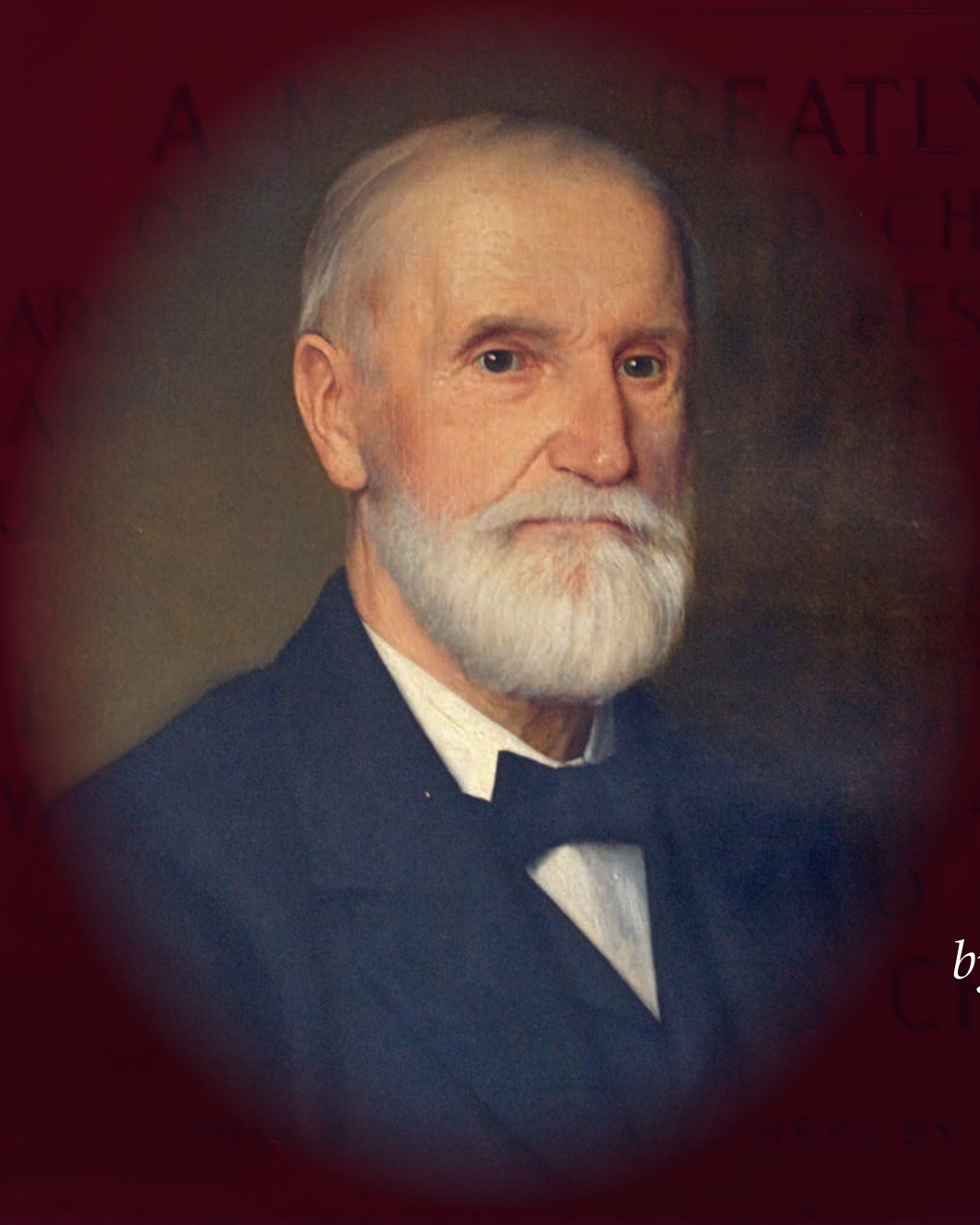
Archivist, The Linnean Society

Explore the letters of the remarkable women featured in this piece, along with the wider network of Sir James Edward Smith's correspondents. You can use the 'Refine Your Selection' tab on Linnean Online to focus your search: **https://bit.ly/SmithCorrespondence**

Image: Wikimedia Commons

Science, Faith and the Fossil Record

WILLIAM CARRUTHERS IN THE AGE OF DARWIN



by Nancy Stedman

PREVIOUS PAGE: William Carruthers, oil painting in possession of the author. (It is inscribed 'London 28.11.1919' by artist P. F. de Beule.)

In the hallway of a private house hangs a brass plaque, once fixed to a Presbyterian church in Norwood, London, bearing the name of William Carruthers (1830–1922). Its careful inscription hints at a life of faith, science and quiet authority—but it tells only part of the story. As Keeper of Botany at the British Museum during a time of discovery and fierce debate, he stood at the centre of a changing world, where new ideas about nature were beginning to challenge long-held beliefs. Here, his great-granddaughter Nancy Stedman explores the life and work of a man who navigated both science and faith with conviction.

In the hall of my house, I have a plaque that I inherited from my mother; originally located in a Presbyterian church in Norwood, it had been handed down to her when it closed.

'In thankful and loving memory of
William Carruthers
Ph.D, F.R.S, F.L.S, F.G.S, etc…Keeper of Botany in the British Museum 1871–1895
Born at Moffat 29 May 1830, died at Norwood 2 June 1922
One of the founders of this congregation

A man greatly beloved
of strong and childlike faith.
For 56 years an Elder of the Presbyterian Church of England.
His intimate knowledge of its history from Puritan times
was united with lifelong devotion to its work
at home and on the mission field.
His European reputation in science
gave weight to his frank and winning testimony
to Jesus Christ.
This brass is placed here by his wife and his son.'

I was intrigued, as William held a key and influential position not only at a time when so many new species were being discovered across the globe, but also when Darwin's theories were being introduced and debated. Did he know Darwin? Did he discuss ideas with him? And what was his position on evolution, given that he was clearly a religious man?

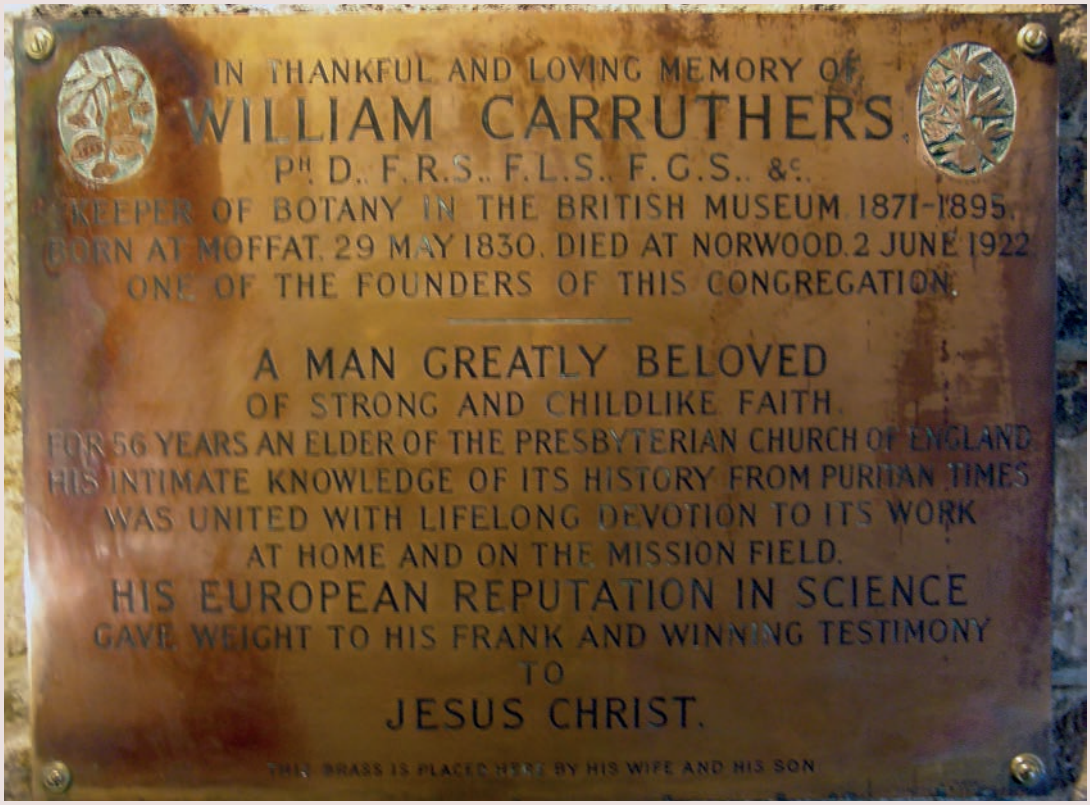
From Scotland to the British Museum

Born in Moffat, Dumfriesshire, Scotland in 1830, William attended the University of Edinburgh at the age of 15. At 19 he entered the New College, originally to study for the ministry of the Presbyterian church, but, influenced by Dr John Fleming and Dr John Balfour, he studied natural sciences until 1854. Balfour would also go on to recommend him for the post of Assistant Keeper of Botany at the British Museum, which William would take up in 1859.

Aged just 29, it must have been daunting to move to London and walk into the impressive buildings at the British Museum. However, the reality was a little different as the Department of Botany comprised just two small rooms on the first floor, just enough space for the Keeper, John Joseph Bennett, and his assistant, alongside all the specimens.

Four years after his arrival in London, a small book, *The Ferns of Moffat,* by J. C. Moffat was published (Moffat 1863). This was actually written by a woman, Jane Couch Moffatt, with the help of Carruthers; they were married in 1865. The book comprises carefully composed descriptions of ferns

Image: (Previous page) Nancy Stedman



PREVIOUS PAGE: William Carruthers' plaque, rescued when a Presbyterian church in Norwood was closed. It passed to the author's mother Dorothy Chrystal Stedman (née Hindley), and which the author then inherited.

with illustrations, and the underlying approach is revealed through the introduction of quotes from the Psalms, including one from Psalm 104: 'O Lord, how manifold are Thy works! in wisdom hast Thou made them all: the earth is full of Thy riches.'

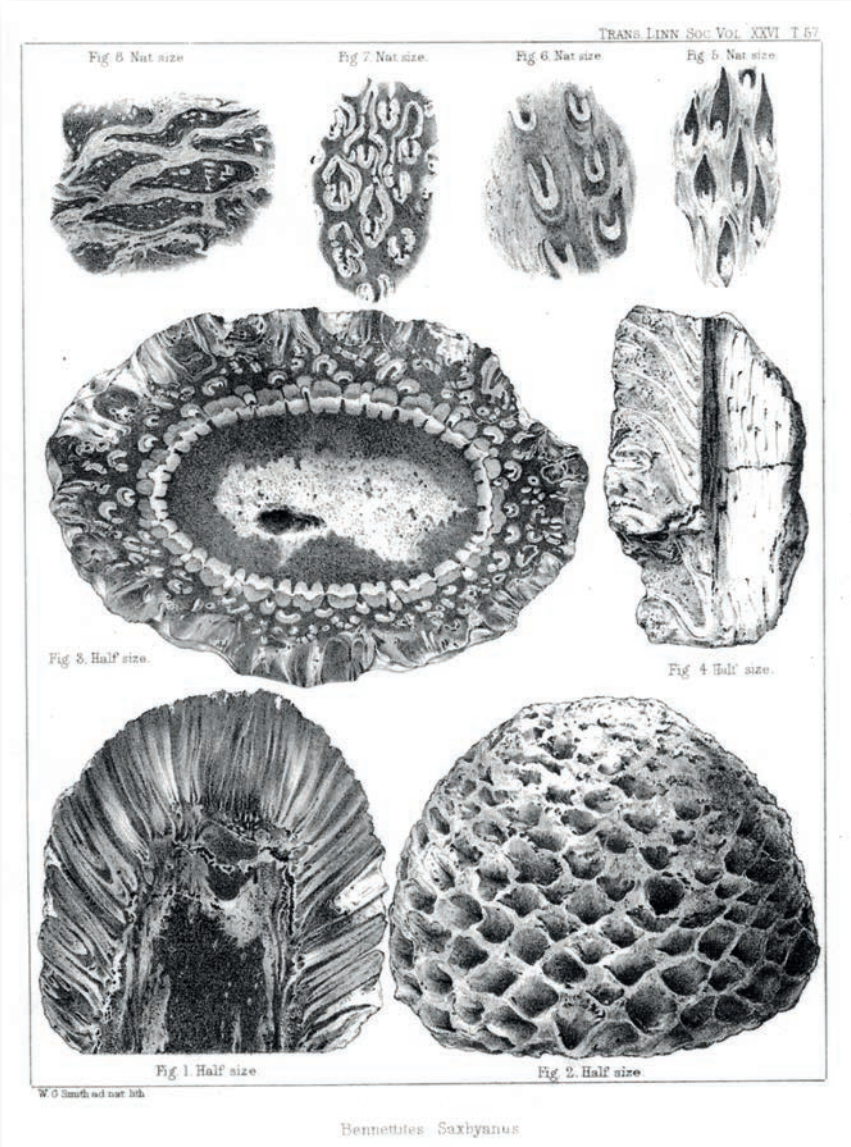
His early days at the British Museum saw him caught up in an argument with William Jackson Hooker (then Director of the Royal Botanic Gardens, Kew), his son Joseph Dalton Hooker, and George Bentham, who demanded that the entire botanical section be transferred to Kew. An enquiry concluded that the collections 'could more beneficially remain in the centre of London'.[1] In 1860, Bennett learnt that Kew didn't have the space, the staff or the funds to cope with the entire collection anyway.

Meanwhile, Carruthers settled into his job and into the circles of scientists in London, becoming a Fellow of the Linnean Society in 1861. As depicted on the plaque, he had two plants named after him—*Carruthersia scandens* and *Carruthia capensis.* I had romantic notions that perhaps he had explored far-flung corners of the globe, battled his way through forests, over deserts and up mountains, to find specimens to bring back to Britain. But I discovered that he was the 'back-room boy', methodically working his way through the boxes of specimens that were brought back by the many Victorian explorers, describing them and ascribing them to genera, establishing relationships, naming them and inserting them into herbaria with related species. He was a skilled systematic botanist, along with a particular knowledge of fossil plants.

In 1865–1873, Bertholdt Seemann published his *Flora Vitensis*, describing the flora he had collected from the Fiji Islands, amongst other places. In it he states:

1 This and the later challenges from Kew Gardens are covered by A. E. Gunther (1980) in *The Founders of Science at the British Museum 1753–1900*, pp.107–108.

Image: Nancy Stedman



ABOVE: *Bennetites saxbyanus,* Figs 1–8. Example plate from Carruthers' paper 'On fossil Cycadean stems from the Secondary rocks of Britain' from volume 26 of the *Transactions of the Linnean Society (*1870).

Images: Nancy Stedman

I have named this new genus in honour of my esteemed friend William Carruthers, Esq., FLS, of the Botanical Department, British Museum, to whom I am indebted for much kind assistance in working up the South Sea Flora. (Seeman 1865–1873)

Building a scientific reputation

Carruthers wrote over 100 scientific papers, publishing them mainly in the *Geological Magazine*, the *Journal of Botany* and the *Transactions of the Linnean Society.* His scope was wide—oaks from north China, diatoms, mosses, cones from Carboniferous strata, ferns, Lepidodendron, Calamites, Cycads and ergot in wheat.

In 1868, one of his papers was read to the Linnean Society, 'On fossil Cycadean stems from the secondary rocks of Britain' (Carruthers 1870). This is one of his more substantial works, where he describes in great detail the different fossils, identifying separate species and illustrating their fruits. In this meticulous piece of work he establishes new genera—*Yatesia*, *Williamsonia* and *Bennettites*—and I understand it remains a classic work. The 10 pages of illustrations were presumably drawn by William himself, using a camera lucida, as he commends the lithographer: 'These plates have been drawn directly on the stone, with singular truthfulness and power, by Mr. W.G. Smith, F.L.S.'

The nature of the work in palaeobotany at this time might be compared to assembling a jigsaw, where several puzzles have been mixed together, their pieces scattered across locations, with many parts missing and no final images for guidance.

Conflict, leadership and the scientific establishment

In 1870, on the retirement of John Joseph Bennett, Carruthers applied for the post of Keeper and received some glowing testimonials from, amongst others, Joseph Dalton Hooker, Sir Charles Lyell, Professor Balfour and Asa Gray of the Botanic Gardens in Massachusetts.

On his promotion to Keeper he was immediately thrown into defending the collections when Kew once again sought to have all the herbaria and library transferred to them. He put up a very strong and clear defence; when asked if the British Museum had as good a library as Kew, he replied: 'We have an infinitely better botanical library, inasmuch as we have the whole library of the BM.'

He went on to explain that journals, proceedings, travel books and more are needed, alongside works devoted to botany. The Royal Commission on Scientific Instruction and the Advancement of Science, which investigated the challenge, accepted his case that all the material should remain at the British Museum.

But Hooker was not impressed. He regularly wrote to Darwin who relied on these updates, as his health was poor and limited his ability to travel. In 1873, Hooker wrote:

> I am extremely vexed at being dragged into hostility towards the British Museum, through Mr. Carruthers intolerable insolence — & presumption […] I had no idea that he was such an ill conditioned Cur.— his letters to me are most insolent. (Hooker 1873, 7 January)

In 1871 he was elected a Fellow of the Royal Society; he was also appointed consulting botanist to the Royal Agricultural Society, a role he retained until 1909. He became a Fellow of the Geological Society (President in 1876) and the Royal Microscopical Society, and in 1886 was elected President of the Biological Section of the British Association. He had obviously established himself, gained a sound reputation and was well respected.

However, not all had gone smoothly. In 1874 a row erupted at the Linnean Society, when alterations to the Bye-Laws were proposed that met with opposition, largely from younger Fellows. The proposed move was to pay a Fellow for editorial work on the Society's publications, which went against the Bye-Laws as they stood at the time. Carruthers, amongst several others, was concerned about the legalities of this, and had suggested it be put to a separate vote (see https://bit.ly/LSByeLawControversy). Hooker wrote to Darwin:

> We have had too an awful row in the Linnean when Carruthers & Co. packed a meeting to throw out the decision of the Council & we beat him by 1! i.e. by one over & above the two thirds majority of a packed meeting. I was awfully excited & anxious for 2 days as we only heard of this secret doings by accident 24 hours before the meeting. (Hooker 1874, 20 January)

There is some doubt that Carruthers had 'packed' the meeting. He always denied this; it was simply that several others agreed with him. But it did appear that he refused to sit down… He was mortified that he was perceived as being disrespectful to the President, George Bentham, and made a point of personally and profusely apologising to him.

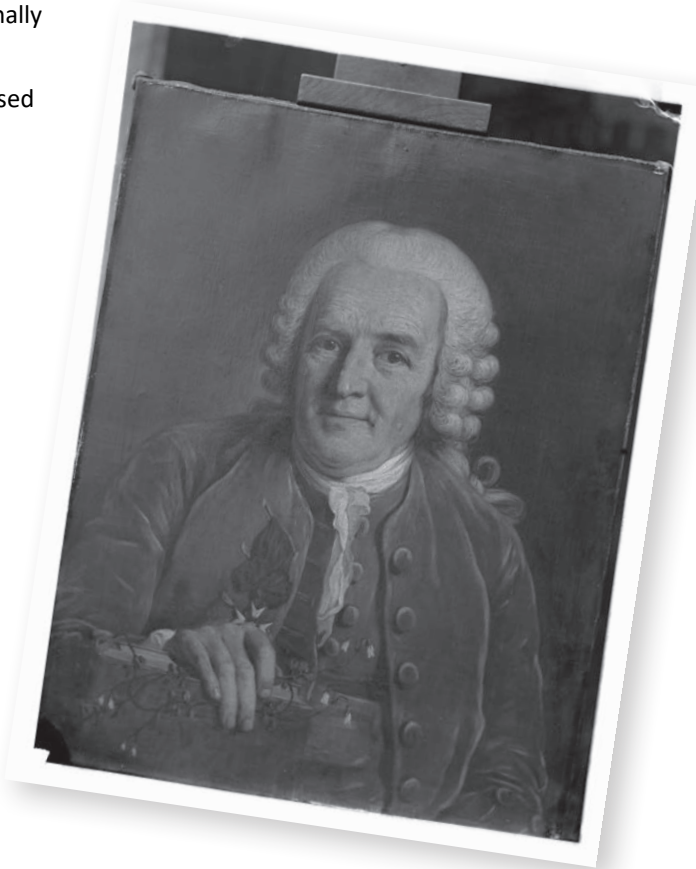
In a reply to Hooker, Darwin sympathised with Hooker's outrage and expressed indignation at the apparent treatment of Bentham, saying of Carruthers '… what an odious man he seems to be' (Darwin 1874, 4 March).

After further arguments, special meetings, legal advice and a flurry of correspondence, matters were resolved, largely in favour of those opposing the original proposals.

James Britten (of the Herbarium at Kew Gardens) wrote in the *Transactions of the Linnean Society*:

> The bringing about of these (reforms) was attended by a period of excitement rare in the annals of a learned body. Some account of what took place may be found in the Journal (of Botany) for these years; and the result was in every way beneficial, although in the course of the proceedings necessary to secure reform certain regrettable incidents occurred. Those who remember the formal meetings of pre-reformation days will agree that the contrast between then and now is nothing short of startling. (Britten 1896)

Despite all this, Carruthers went on to serve repeatedly on the Council of the Linnean Society, and as Vice-President. In 1886 he was elected President, a role he retained until 1890. His Presidential Address was, curiously, on various images of Carl Linnaeus, where he discussed the source, authenticity and merits of the several depictions in the Society's collection, and commented on errors. (For instance,



BELOW: A glass slide of one of the portraits of Carl Linnaeus from Carruthers' Presidential Address at the Linnean Society.

OPPOSITE:
Family photo 1909. Standing (LEFT TO RIGHT): Frances H. L. Carruthers (married to John Bennett C.) W. John Haldeman C. (eldest son of Samuel William C.) John Bennett C. (second son of William C.) Jeannie Moffat Hindley (née Carruthers, daughter of William C.), with her daughter Dorothy Chrystal in her arms; Samuel William C. (eldest son of William C.); Emily Hopkins C. (married to Samuel William); Henry S. P. Hindley (husband of Jeannie).

Seated (LEFT TO RIGHT): Jane Couch Carruthers (née Moffat); Jean Chrystal C. (on ground, daughter of Samuel William); Donna Carmichael C. (youngest daughter of Samuel William); William C.; Anna Reigart C. (eldest daughter of Samuel William).

Linnaeus had a wart on one side of his face, so it was possible to tell which images had been copied, rather than taken from life and where, in the process of printing, an image had been reversed.)

What was Carruthers like as the Society's President? Years later, it was said of him that:

> He made an excellent President; he had a good presence, spoke well and clearly and with knowledge of his subject, and moreover gave a sympathetic hearing to the beginner, mindful perhaps of his own early days when the young Fellow was not encouraged to take part in discussion. (A. B. R. 1924)

His dedication was such that each year he prepared summaries of the work of his department at the British Museum to report to the Linnean Society. The team of two expanded slowly to five by 1895, and amongst other work they were dealing with thousands of specimens being brought in from all over the globe. Conditions in the two rooms of the department were getting very cramped, and in 1880 he oversaw the transfer of the collections to what would become the Natural History Museum in South Kensington. Here he took a leading role in selecting the plants to be illustrated in the many carvings in the Central Hall (now Hintze Hall).

Faith, evolution and legacy

Carruthers managed to continue with his research and was obviously keenly aware of the theories of evolution that were being debated. In 1876, he gave his Presidential Address to the Geologists' Association, directly commenting on 'the popular speculations' of the origin of existing life forms (Carruthers 1877). It seems that he could accept the notion of gradual, accumulative changes that would lead to the splitting off of varieties, then species—this gradualism was the favoured process at the time. For Carruthers this process was based upon the divine creation of the original plant and animal forms, which then went through stages of development, 'until man himself is reached'. What he sought was for science to reveal how this development was accomplished.

And, as a scientist, he could not accept a hypothesis that did not fit the evidence, and he struggled with the fact that angiosperms, diverse and highly organised flowering plants, emerged suddenly in the Cretaceous period, without predecessors. If evolution was to be accepted, he argued, then surely there must be a series of intermediate forms from simpler monocotyledons and gymnosperms to the more complex angiosperms, but the fossil records revealed no such intermediate forms.

In his obituary of Carruthers, James Britten quotes him as saying:

> The relation of our existing vegetation to preceding floras has frequently been made the subject of exposition, but to handle it requires a more lively imagination than I can lay claim to, or perhaps than it is desirable to employ in any strictly scientific investigation.(Britten 1922)

In his paper published in the *American Journal of Botany,* Professor Richard Buggs explores the origin of Darwin's phrase 'abominable mystery' concerning the abrupt appearance of angiosperms in the Cretaceous period (Buggs 2021). This phrase is still applied to a range of outstanding questions about the evolution of the angiosperms, and in that sense it can be said that Carruthers was prescient in raising the issue. Buggs makes the case that the mystery might have been made 'abominable' to Darwin because it was used by some contemporary palaeobotanists, notably Carruthers, to demonstrate evidence for divine intervention. Carruthers had established his reputation as a knowledgeable palaeobotanist and skilled systematic botanist; he had the authority and status of his role as Keeper at the British Museum behind him. So his views, clearly and publicly stated, may have been formidable challenges to Darwin.

Nine years later, Carruthers gave his Presidential Address on 'The age of some existing species of plants' to the Biological Section of the British Association (Carruthers 1886). In this paper he looks at sources of evidence about earlier flora. He is dismissive of the literature of botany, saying that even

post-Linnaeus their information is not precise enough. As for earlier descriptions*:* 'The short, vague and insufficient descriptions of still earlier botanists cannot even be taken into consideration.'

He then considers illustrations that have been in use since early times, which might give greater precision, but '…not a few are extremely rude; many of them are misplaced; some fictitious'. Dried specimens in herbaria, going back to the 16th century, 'supply the most certain materials for minute comparison…'. Earlier sources include timbers in medieval buildings, which have some value, and then further back there are specimens—mostly fruits and seeds—obtained from tombs of ancient Egyptians. These show consistency over time, not just of the plants but also of the pests and diseases that still occur now. Taking a further step into the past, he considers specimens found in peat bogs, and fossils found in post-glacial clays and earlier strata, all of which relate to existing flora, despite having experienced extreme climatic changes. His point is that over geographic distance, time and climatic change, species have remained remarkably constant.

The tone of the paper is somewhat sad, as if he feels he is losing the argument and is left pleading for the concept of species as fixed entities to not be abandoned. His entire professional life had been based on the identification, classification and naming of species, a process at which he excelled. Now he was being asked to accept that all were subject to change and mutation; that even species were fluid categories.

Image: Nancy Stedman

His final Presidential Address to the Linnean Society in 1890, 'The early history of some of the species of Plants now constituting a portion of the Flora of England', was along similar lines (Carruthers 1890). He reiterated that however and whenever plants arrived in Britain, they retained all the characteristics 'without reduction or modification' that living plants possess.

He retired in 1895 when he reached the age of 65, despite the fact that he and many of his colleagues (as well as the Trustees of the Museum) asked that he continue; it was the Treasury that refused. He remained active, notably continuing to work for the Agricultural Society. But he turned his attention back to the Presbyterian Church, taking an active role including editing its magazine for young people 'Messenger for Children'. Shown on p. 47 is a photo of him and his wife Jane surrounded by their three children—Samuel William, John Bennett and Jeannie Moffatt—their partners, and five grandchildren; my mother, Dorothy Chrystal Hindley, is the young baby being held by her mother Jeannie in the centre of the picture.

But I leave the last word to Britten who considered Carruthers to be:

> …a good fighter and, when he had made up his mind that his cause was a just one, very tenacious in maintaining his ground; a certain inability to appreciate views opposed to his own was not without its advantages. (Carruthers 1890)

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REFERENCES

A. B. R. (1924). Obituary notice William Carruthers 1830–1922. *Proceedings of the Royal Society* 97: vi–viii

Britten, J. (1896). In memory of Henry Trimen. *The Journal of Botany, British and Foreign* 34: 489–494.

Britten, J. (1922). In memory of William Carruthers (1830–1922). *The Journal of Botany, British and Foreign* 60: 249–256.

Buggs, R. J. A. (2021). The origin of Darwin's 'abominable mystery'. *American Journal of Botany* 108(1): 1–15.

Carruthers, W. (1870). On fossil Cycadean stems from the secondary rocks of Britain. *Transactions of the Linnean Society* 26: 675–708.

Carruthers, W. (1877). Address at the Opening of the Session 1876–77: November 3rd, 1876. *Proceedings of the Geologists' Association* 5: 17–35.

Carruthers, W. (1886). The age of some existing species of plants. *The Journal of Botany, British and Foreign* 24: 309–318.

Carruthers, W. (1890). The early history of some of the species of plants now constituting a portion of the flora of England. *Proceedings of the Geologists' Association* 11: 251–267.

Darwin, C. (1874, 4 March). (Letter to J. D. Hooker] Darwin Correspondence Project, 'Letter no. 9333'. Accessed on 2 January 2026: https://www.darwinproject.ac.uk/letter/?docId=letters/DCP-LETT-9333.xml

Hooker, J. D. (1873, 7 January). [Letter to C. Darwin] Darwin Correspondence Project, 'Letter no. 8727'. Accessed on 2 January 2026: https://www.darwinproject.ac.uk/letter/?docId=letters/DCP-LETT-8727.xml

Hooker, J. D. (1874, 20 January). [Letter to C. Darwin] Darwin Correspondence Project, 'Letter no. 9250'. Accessed on 2 January 2026: https://www.darwinproject.ac.uk/letter/?docId=letters/DCP-LETT-9250.xml

Moffat, J. C. (1863). *The ferns of Moffat*. Moffat: William Muir.

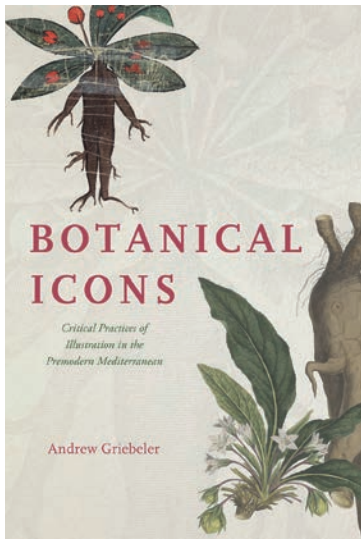
Seemann, B. (1865–1873). *Flora Vitensis: A description of the plants of the Viti or Fiji Islands*. London: L. Reeve and Co.

Reviews

Botanical Icons: Critical Practices of Illustration in the Premodern Mediterranean

Andrew Griebeler

344 pp, The University of Chicago Press
2024 (Hardback)
ISBN 9780226826790
Col. illust. $55 (US)/£44



A dense but beautifully produced and authoritative study that convincingly argues medieval botanical illustration was a sophisticated and significantly evolving scientific practice.

The climate of the Mediterranean basin is hot and dry in summer, mild and damp in winter, and wet around the edges, encouraging plants which flower briefly and vanish for another year. Other plants are highly specialised, sometimes fragrant relicts from a hot and wet mediterranean of 2.6 million years ago, only found in tiny patches of this populous region. Then there are the trees and shrubs and vines, persistent but occasionally inflammable. As a result, approximately 24,000 plant species, 10% of all the species known in the world, flourish around this charismatic sea.

Into this varied environment comes needy man, questing for biochemical bolstering from the botanical world and desperate for knowledge of things unseen. While the travailing women of western Turkey used hellebore to induce abortions, travelling heroes of the Mediterranean lusted after dittany for their suppurating wounds, and by the medieval period the trade in medicinal herbs was significant. In this superb and scholarly book, Andrew Griebeler examines the role that pictures played in the relationship between premodern people and plants for over a thousand years from the earliest known illustrated herbals to the advent of humanist botanical illustrations in the 16th century.

It was a complex one. Griebeler re-examines the development of botanical illustration in the Mediterranean from its earliest beginnings, using the myths, literature and history of the area, but pretty soon hones in on Dioscorides and herbals as the best indicator of what he terms 'critical botanical illustration', or in other words, a picture of a plant that conveys something about said plant that is deemed useful. The theory is skilfully included, with the beautiful chapter on Mithridates' library (not Mediterranean in location, but certainly in leaning), opening the possibility of *exemplaria*. These could be written texts, examples, samples, specimens or even pictures on wooden panels—twinned with their *effectus*—their (presumably written) properties, leading to a new internal reference of text against picture. This theoretical starting point then opens out into the substance of the book; an examination of thousands of years of group logic constructed for images relating to plants. This is most evident in the choice of what was depicted and what was not. Did the illustration relate to the description in the text, or was it an illustration from nature? If so, which angles or aspects of the plant in nature was it important to include or was it more about evoking some association with the plant?

Griebeler often references the extraordinary work of Minta Collins in piecing together and analysing the herbals which were lost and the herbals which remained. Of all the manuscript traditions, these are some of the most complicated, because the illustrations to the manuscripts could become detached and re-emerge, or a new illustration could be painted to accompany an old text. Later of course, when woodcuts became the norm, pictures travelled separately to herbal text, leading to the formation of some strange chimaeras. Griebeler's fine chapter on medieval herbals highlights the role of institutions—such as the *bīmāristānāt* of Baghdad—in ensuring that the knowledge of ancient herbal principals was maintained while new knowledge was added. In addition, the transmission (and re-translation) of Greek into Arabic and Syriac and the expansion of the Dioscoridean text by commentaries in Arabic is well covered. So too is the involvement of pharmacological traditions from the pre-Islamic Arabic world; the fact that Ibn al-Baytar's *Compendium of Simple Medicaments and Foods* contained 400 different drugs unknown to Dioscorides serves as an important reminder that there were massive regional variations involved. There were also times where confidence in the power of medics lapsed; an amusing quote from a letter of Photius, patriarch of Constantinople, to Zacharias, the metropolitan of Chalcedon, provides evidence for a crisis in the state of medicine in 9th-century Byzantium.

This is a long and excellent book, beautifully produced and worthy of being read continuously all the way through, though it is also not the easiest to navigate. The chapters are neither strictly chronological nor strictly thematic, and the chapter subtitles don't give much away. In light of the density of the detail, with many of the ideas new (and all bolstered by excellent footnotes), it would be nice if it were easier to find some of the specific assertions of changing practices. Clear and beautifully printed illustrations come to the rescue and allow reassessment of a part of the theoretical basis of the book. The illustrations are also extremely well chosen—indicating immediately the point that is being made and in layout allowing for excellent comparison.

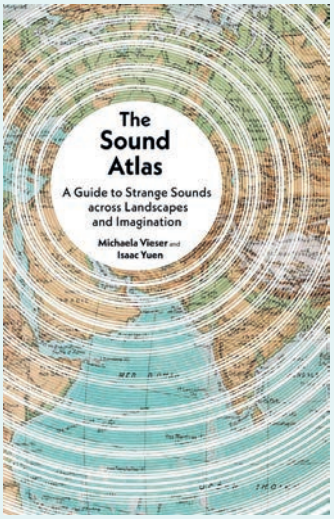
Am I convinced by Griebeler's assertion that the development of botanical illustration in the medieval period was as profound as its development in antiquity—yes. It's hard not to be teleological about the march of human knowledge, and it's a peculiarity of our engagement with Linnaean botany that we are happy to take a catastrophist approach towards herbals and place Dioscorides as the first finest father figure whose texts were constantly degraded. Here Griebeler presents irrefutable evidence that the thousands of minute changes and observations made to a canonical text explored and developed a scientific artform which was a massive improvement on the original.

Harriet Rix FLS

The Sound Atlas: A Guide to Strange Sounds across Landscapes and Imagination

Michaela Vieser and Isaac Yuen

176 pp, Reaktion Books
2025 (Hardback)
ISBN 9781836391104
Col. illust. £16.99



A richly layered, flexible journey through sound—part atlas, part timeline—that blends science and wonder to make audio feel magical again.

The preface of *The Sound Atlas* begins with a recommendation: you should read this book in two ways. Either 'pinging from location to location like an atlas', or chronologically, spanning the first sounds in the universe to those still in our future. I elected to do both. I devoured the first half in one setting, and the second over a period of weeks. The chapters are miniature essays, the titles acting as points around which the essays orbit. One might tire of the chronological approach, as one might be fatigued by an epic journey, but taking in short and random chunks inevitably led to me picking up the next few chapters as well.

The authors take aim at 'strange sounds', but what makes a sound strange? Michaela Vieser and Isaac Yuen are well placed to judge this, as they write with some serious scientific, historical and cultural background knowledge. This obviously acts as their lodestar, helping them select the sounds and their respective stories. It was a joy to read the history behind a lighthouse foghorn—now mainly silent, but once loud enough to pierce the deadening water. I learned about the aural threads between architecture and culture, all the way through to Japanese palace music traditions. Believe them when they say 'Atlas'—though, I'd argue, the book contains a few more dimensions than the typical Mercator projection.

Having had some experience as a bioacoustic algorithm engineer, I feel comfortable tackling insect bioacoustics in this review. The third chapter approaches the 'shadow war between moths and bats'. All insects in the world emit sound, some as loud as a cicada, while others offer just the pop of their joints. Our touchpoint here is British WW2 radar development, a strong landmark in both time and location. The book gives a useful grounding in what is essentially the human-engineered version of echolocation, and within two paragraphs we are presented a very respectable overview, giving an understanding of the physics of sound and echo before shifting to the animal world. Questions were asked and answered: why do bats eat moths, how do moths dodge detection or gain pre-warning? Then came some advanced facts, such as several moth species evolved 'radar jamming' some 14–18 million years ago. So why not just escape the bats, into the bold light of day? The authors end with a neat little summation of the inescapable nature of the arms race, a fact of life. This chapter was highly enjoyable.

But it isn't unique. The reverence and gentleness of the authors' collective voice feels very appropriate. They write of the SOFAR layer of ocean water (the Sound Fixing and Ranging Channel), of the universal background hum, of singing sands and Marco Polo's adventures to distant lands. The balance struck between science and wonder alone makes this book worth buying.

There are many excellent titles written about the senses well worth your attention, like *An Immense World* by Ed Young, which puts the reader in the mind of many disparate species, interpreting the world as their senses see it. Likewise, *A Book of Noises* by Caspar Henderson pursues auditory wonders across the universe. What I found in the *The Sound Atlas* was exactly this: 'A guide to strange sounds across landscapes and imagination', with two expert guides. There's a useful reference section at the back, with material used for each chapter handily segmented. However, specific facts aren't punctuated with source references, so be warned you may have to hunt for provenance on occasion.

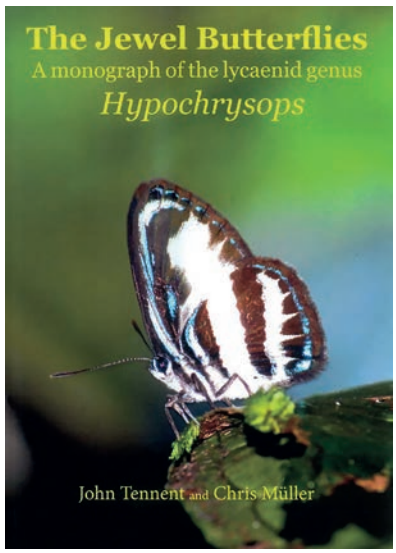
Pricewise, the book is well worth £16.99 for a hardback. In my work, I'd grown used to seeing sound as numbers, gazing at my laptop each day. For me, this book is well worth a purchase as it really made audio magical again.

Ben Raby

The Jewel Butterflies: A Monograph of the Lycaenid Genus *Hypochrysops*

John Tennent and Chris Müller

645 pp, Storm Entomological Publications
2025 (Hardback)
ISBN 9780954204532
Col./bw illust. £265



A dazzling, authoritative monograph on *Hypochrysops* ('jewel butterflies') that dramatically transforms understanding of the group and stands as an indispensable landmark in butterfly taxonomy.

Hypochrysops is the type genus of the 'Hypochrysopini' Grishin, a recently proposed tribe of hairstreak butterflies that includes the closely related *Philiris*. This new book presents a sumptuous monographic account of the species and subspecies of *Hypochrysops*—called 'jewel butterflies', due to their glittering patterns.

Biogeographically, *Hypochrysops* is interesting—its peak species diversity is in New Guinea, with some taxa occurring in the Moluccas, Western Pacific and Australia, and just a few in Southeast Asia. Among the butterflies, it is one of the best candidates for a group that originated east of Wallacea and transcended the Wallace Line westward, rather than the reverse.

This book corrects numerous taxonomic errors and misunderstandings and, in the process, the authors describe 21 new species and 30 new subspecies. Together with new synonymy and changes to the status of previously established taxa, they recognise over 90 species—an increase of more than 60% before publication.

Such large increases in species diversity following revision have occurred in the past, and, in some cases, have been subsequently demonstrated to be largely spurious. Taxonomists vary in their ability to parse individual variation—often abundantly exhibited by the wing patterns of butterflies—to reveal or recognise meaningful, 'real' (dare I say 'biological'?) species. This challenge is often exacerbated when taxonomists have little or no familiarity with the taxa in nature.

Do Tennent and Müller have appropriate experience and background to be authoritative regarding these butterflies? Without question. In fact, between them, they surely have more field experience of these taxa, and the regions in which they occur, than anyone else. Most of the species are hard or very hard to encounter, so this is important. Largely based in Papua New Guinea for the past 20 years, as a boy Chris Müller climbed trees in Australia to find *Hypochrysops* early stages and visited the Solomon Islands at the age of 11. John Tennent, a prior recipient of the Linnean Society's H. H. Bloomer Award, has spent years in Thailand, Indonesia, Papua New Guinea and the Solomons, visiting hundreds of locations and islands in the process. Both are indefatigable museum researchers. Chris has extensive experience in molecular systematics; John is an exceptional biographer, his recent 600-page account of Albert Meek being directly relevant. So, yes, we can trust them to have made good judgements throughout, but I do have one general misgiving, relating to the difference between authoritative and authoritarian.

One of the less appreciated changes to systematics wrought by the numerical and, *a fortiori*, cladistics revolutions of the 60s and 70s, was the rejection of authoritarian, *ex cathedra* pontifications in favour of analytic, evidence-

based arguments, creating authoritative but challengeable classifications. The data matrix and its method of interpretation were of the essence. In this one respect, Tennent and Müller appear somewhat in retreat.

In an interesting section about molecular systematics (pp. 19–22), after saying that 'The value of molecular data ... is undeniable', they later state 'we have found morphology to be at least equally as useful …'. However, the authors do not offer a list of morphological characters or a data matrix, nor do they provide a diagnostic key to species. Their division of the genus into 19 species groups is based on molecular data, but, for some 'political' reason, these analyses were unavailable for inclusion. As a result, no systematic analyses of either molecular or morphological data are presented. Even so, not all is lost: each species account does offer a 'diagnosis' based on wing patterns and genital morphology, although these are generally couched only in terms of separation from closest relatives (in many cases beautifully and clearly illustrated). So we have largely to accept the authors' authority with respect to the taxa recognised and groupings adopted—to challenge their conclusions, based on the information as presented, would be difficult.

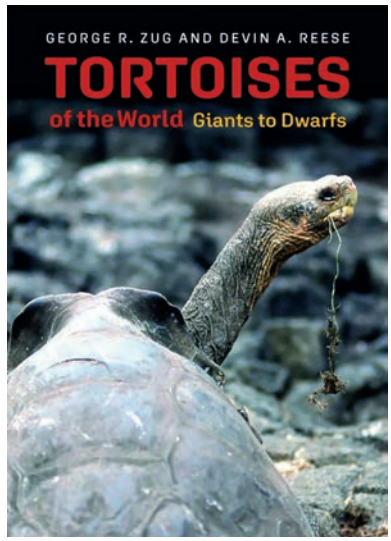
Having said that, this lack of a general analytical framework is understandable, 'forgivable' even, once the sheer effort that has gone into creating this extraordinary volume is fully appreciated. The book represents a phenomenal addition to the literature on butterfly natural history and taxonomy. Overwhelming is a word that comes to mind, and the authors must often have felt overwhelmed by their own creation. To give but one example, their research on typification is exemplary, and they include 13 pages of colour images illustrating the data labels found on more than 200 primary types—a unique resource not only for *Hypochrysops*, but also of value to other butterfly researchers and museum curators.

Inevitably, and noting Kelvyn Dunn's remarkable 10-page review (*Calodema*, 1125: 46–55), there are a few errors that go beyond the merely typographical. But '*Hypochrysops*' remains a truly phenomenal work. If you have a deep interest in the Lycaenidae of Southeast Asia and the Malay Archipelago, this book is indispensable, and is actually good value, even at £265. The brilliant colour work alone is worth the price.

Dick Vane-Wright FLS

Tortoises of the World: Giants to Dwarfs

George R. Zug and Devin A. Reese



288 pp, Johns Hopkins University Press
2024 (Hardback)
ISBN 9781421448350
Col./bw illust. £41.50

An appealing, richly illustrated and comprehensive overview of the world's tortoises, this book combines accessible storytelling with scientific depth to explore their biology, diversity and conservation.

As clearly stated in the book's title, this is a fascinating compilation of the tortoises of the world. Though written primarily for natural historians interested in the full spectrum of tortoise species, it could also be readable by older children, dissecting all aspects of tortoise life. *Tortoises of the World* comprises 10 chapters, with reference tools like a guide for further reading and several indexes (general, scientific and by subject).

The chapters guide the reader through the tortoise story—from body plan and resilience, to reproduction, life cycle, ecology, diversity, evolutionary origins, decline and conservation.

It is important to be clear that tortoises are a subgroup of turtles: all tortoises are turtles, but not all turtles are tortoises. Tortoises belong to the family Testudinidae—one of the 14 living families of turtles—and, as the authors emphasise from the outset, the term 'tortoise' is reserved for these fully terrestrial species. Within this family, modern diversity is often described in terms of three principal evolutionary lineages: *Gopherus*, *Manouria* and the subfamily Testudininae, which contains the vast majority of living tortoise species.

Some engaging tortoise facts: tortoises occur on every continent except Australia and Antarctica. They are also renowned for their longevity, with some giant tortoises living well over a century (often cited at up to around 175 years), and although they take many years to reach reproductive maturity, they continue ageing at a notably slow rate thereafter.

The book is richly illustrated with both colour and black-and-white photographs, showcasing the diversity of shell forms as well as closer views of key features and behaviours, such as feeding. The shell itself is composed of two parts: the domed upper section, or carapace, and the flatter underside, known as the plastron. These are covered by keratinised plates called scutes, which protect the underlying bone and typically show growth rings that can give a rough indication of age, rather like those of a tree. The tortoise body plan is explored in detail in its own chapter (Chapter 2), supported by clear and finely executed line drawings that enhance the discussion.

Of the authors, George R. Zug is an emeritus herpetologist, while Devin A. Reese is a natural historian who has written widely on the subject; together, they bring considerable experience and expertise to the book.

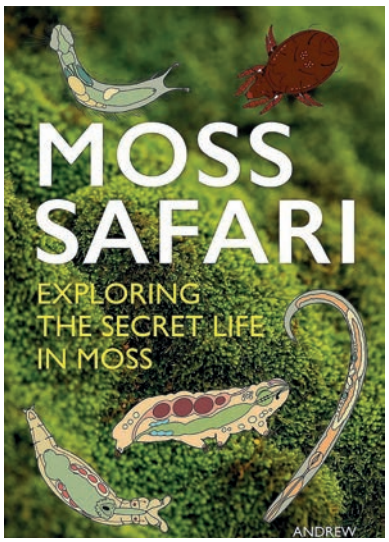
The book is engaging, accessible and well balanced in its scope, addressing both the human-driven decline of tortoises and the efforts to conserve them. Priced at £41.50, it may feel like an investment for readers of all ages, but the breadth and quality of the material make it well worth the cost.

Stephen Hoskins FLS

Moss Safari: Exploring the Secret Life in Moss

Andrew Chandler-Gevatt

192 pp, Pelagic Publishing
2025 (Paperback)
ISBN 9781421448350
Col. illust. £24.99



An engaging and accessible introduction to moss microscopy, *Moss Safari* opens up a hidden world of life while serving as a valuable starting point for both independent exploration and classroom learning.

Moss Safari is a scholarly introduction to amateur microscopy, and its enthusiastic writing captures the imagination of anyone who has never thought to explore something so abundant, so simple, yet so productive. Moss is an ecosystem: squish some water from a cushion of moss into a dish and there you have it—a world of its own. In this sense, it also lends itself well to classroom use, offering an accessible and hands-on way to introduce students to microscopy, biodiversity and the hidden complexity of everyday environments.

Chandler-Grevatt singles out his Big Five: mites, nematodes, rotifers, tardigrades and gastrotrichs. None, you'll note, are microbes; they are all multicellular. The single-celled organisms come later, including diatoms and desmids, amoebae and chlorophytes, ciliates and cyanophytes. In each case, the descriptions are precise and informative. Some are underplayed; for example, the testate amoebae are dropped into the text without much being said of their astonishing abilities.

This is intended as a visual feast, though the illustrations are somewhat uneven. The micrographs are typical of what an amateur might capture—arguably a deliberate and inclusive choice that aligns with the book's aim of engaging young microscopists, showing them that such discoveries are within reach. That said, many online microscopists produce far more detailed and striking images, which could offer novices a clearer benchmark to aspire to. Some of the line drawings, meanwhile, are stiff and simplistic.

The pleasant surprises? The section on contaminants—from air bubbles and debris to slide damage and fibres—is excellent and comprehensive. Anything missing? Just one: the book includes a leaflet image of moss and mentions Robert Hooke. In fact, the first published image of living cells, by Hooke in 1665, was of a moss leaflet—predating his more famous illustration of cork.

Microscopy, then, began with moss, and here is a contemporary book revealing what else inhabits such an everyday specimen. Read it, learn from it, and use it as a springboard—whether in the classroom or at home—to explore these hidden worlds.

Brian J. Ford Hon 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.

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Please join us in welcoming the following new members to the Society (elected Jan–April 2026):

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Dr James Allerton
Prof. Amanda Bamford
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Lives remembered

David Chivers (2 April 1944–5 March 2026)

David Chivers, born in 1944 in the village of Marsh Gibbon, Buckinghamshire, devoted his life to the study and protection of primates and their habitats. He attended the University of Cambridge in 1963 to read preclinical Veterinary Medicine, laying the foundations for a career that would bridge scientific enquiry and conservation practice. In the late 1960s he began doctoral work in Physical Anthropology, undertaking pioneering field research in the rainforests of Malaysia. His studies of the siamang (OPPOSITE) shaped a lifelong commitment to understanding how primates live within, and depend upon, their environments.

Following his PhD, David's academic path remained closely tied to Cambridge. He supervised and directed studies for Selwyn College before being elected a Bye-Fellow in 1988, and shortly afterwards a Fellow and Tutor in 1989. His dedication to teaching and pastoral care became a defining feature of his career. He was a steadfast advocate for his students, particularly those in veterinary science. Many were drawn to Selwyn by his reputation, and generations benefitted from his guidance and encouragement.

David's academic distinction grew steadily, and he was awarded a DSc in 2002, having already established an international reputation in primatology. His work emphasised the inseparability of species survival and habitat conservation, helping to shape modern approaches to wildlife protection. Over the decades he supervised more than 50 doctoral students, many of whom went on to influential roles in science and conservation policy. His own research extended widely, from gibbons to orangutans, and from ecological theory to practical conservation initiatives, including collaborative projects in Borneo.

Within the University and College, David contributed via numerous roles, serving on the College Council, and acting as Gardens Steward, Proctor and Praelector. He was promoted to a Readership in 2000 and to a Chair in 2011.

Beyond Cambridge, David maintained strong links with leading scientific and conservation organisations, his long association with the Linnean Society being one. Elected a Fellow in November 1979, he upheld a valued connection with the Society, offering his insight whenever scientific understanding intersected with urgent conservation challenges, including his involvement in 'The Great Ape Debate' in 2009—an event held jointly between the Society and the World Land Trust. Panellists, of which David was one, examined how best to protect orangutans as rapid deforestation pushed them towards extinction. He was pivotal to the discussion centred on whether efforts should prioritise rehabilitating and releasing rescued animals, or focus instead on safeguarding and restoring the forests they depend upon—a question with implications for conservation more broadly.

In retirement, David remained a lively and engaged presence in college life, never losing his enthusiasm for discussion or his attachment to causes both large and small. He died on 5 March 2026 at the age of 81, remembered as a scholar of distinction, a dedicated teacher and a passionate advocate for the natural world.

Leonie Berwick (from online sources and Society archives)

Image: Pixabay/zockfreund

Deaths Reported to Council

Fellows

Mr Barry Theobald-Hicks of Danbury
Mr Ronald Baxter
Mr David Bevan
Professor Emeritus David Chivers
Miss Jennifer de Bray
Mr Terence Dillon
Dr David Edwards
Professor Maurice Moss
Professor Jay Savage
Mr Jack Smith
Mr Terence Stephenson
Ms Kathie Way

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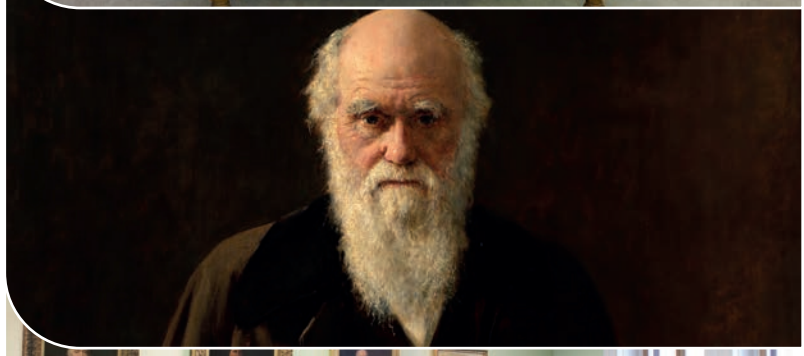

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Sir David Attenborough OM

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