The LINNEAN SOCIETY of London

The Linnean

NEWSLETTER AND PROCEEDINGS OF THE LINNEAN SOCIETY OF LONDON

Volume 37 Number 2 December 2021

A Quagga Tale:
How accurate were Harris' descriptions?

The Brightwells:
A father/daughter natural history team

Darwin's Well:
Water management at Down House

AND MORE...

Communicating nature since 1788

The Linnean Society of London

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Publishing in *The Linnean*

The Linnean is published twice a year, in spring and autumn. 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).

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

Cover image: 'The Quagga (*Equus quagga*)', courtesy Brown University Library.

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ISSN 0950-1096 Charity Reference No. 220509

The Linnean

Newsletter and Proceedings of the Linnean Society of London

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Editorial

The last issue commemorated Brian Gardiner, past President and long term Editor of this newsletter, and this issue marks the next step, as I expect it to be the last one I will be editing. Our new CEO, Gail Cardew, marks the beginning of a new era for the Linnean Society of London, and with my promises to Brian Gardiner to maintain wide ranging content for *The Linnean* fulfilled, I am now handing the reins over to Leonie Berwick, who already has already had a major role in seeing it to press for many years.

My thanks must also go to past and present members of the Linnean Steering Group who have consistently provided good advice and useful feedback on submissions. Our book reviewers have also done sterling service in delivering copy on time and sometimes agreeing to significant cuts in their work to permit timely publication.

Lastly, thanks must go to all those authors whose work made it into print, and also to those whose submissions, for one reason or another, were not published. No newsletter can exist without content, and a balanced range of submissions on subjects of interest to our Fellows will still be needed. From now on Leonie will have a deciding role on those and will be in touch with those authors whose submissions still await publication. Many thanks to you all for both your past and future support.

Gina Douglas, *Editor*
gina@linnean.org

Hello to our extraordinary membership,

First and foremost, I would like to start this short message by saying a huge thank you to Gina Douglas, who has been Editor of *The Linnean* since 2014, and prior to that was the Society's longstanding Librarian. Her knowledge of our collections is something that is not only a privilege to behold, but to tap into—as many Fellows will know, she is a treasure trove of information. I have very much enjoyed working with Gina on *The Linnean* these past six years, and I am glad that she will have more time to dedicate to her appointment as President of the Society for the History of Natural History.

Alongside my role as Production Editor of *The Linnean*, I also edit and develop books for the Society (previously *Order out of Chaos* by Charlie Jarvis, more recently *L: 50 Objects, Stories and Discoveries of the Linnean Society of London*), and content for *PuLSe*, our other, shorter 'magazine'. I started *PuLSe* in 2009, and with issue 50 having just been published by the time you read this, I am proud of how it has advanced, and am always pleased to hear that our Fellows enjoy it.

I am also delighted to have worked with many Fellows and contributors on the content of both *The Linnean* and *PuLSe*, and hope to continue to get to know more of you as *The Linnean* expands further. With this in mind, going forward we would like to make our contact with the Fellowship more meaningful and engaging. When I started *PuLSe* it was a more regular way to keep our members up to date with the Society's plans and events. Since then, things have continued to evolve, and we now have our monthly online newsletter Linnean News, and our new membership platform where Fellows can connect with each other and the Society—please do make sure you have signed up to the latter (membership@linnean.org). As a result, in 2022 we will be intergrating *PuLSe* and *The Linnean* together into one refreshed publication. *The Linnean* will now increase to three times a year (instead of twice), in a slightly larger format, and with more articles. You will still receive the type of content you have enjoyed in *PuLSe*, but it will now appear in *The Linnean*, alongside longer articles—more content all round. Any ideas you have for future issues are very welcome.

Previously *The Linnean* was only available online as a PDF, but from 2022 it will be available as a more interactive virtual publication, much like *PuLSe* is now. We will still print copies for those who would prefer it, but in line with the work of our Linnean Future committee, the Society's values and the results of the COP26 conference, it is our aim to reduce our carbon footprint as much as we can.

To let us know if you'd prefer to take *The Linnean* in hard copy, please contact membership@linnean.org, or call +44(0) 207 434 4479 ext. 13. Otherwise, we hope that as many of you as possible will show your support by agreeing to take *The Linnean* as an online publication. (The *Annual Review* will also be available on our website as always.) Thank you—we highly value your encouragement and input.

Leonie Berwick


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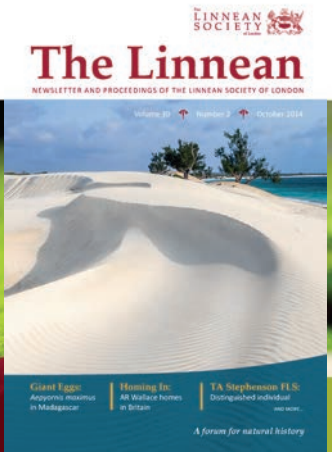
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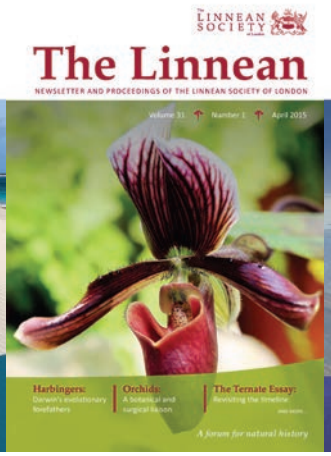
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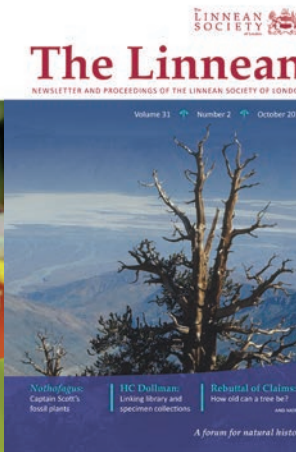
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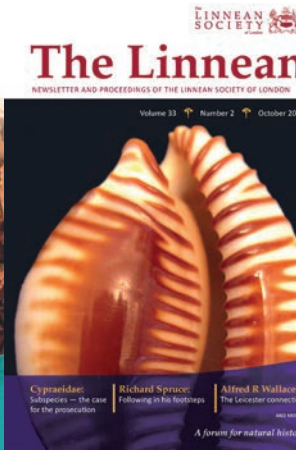
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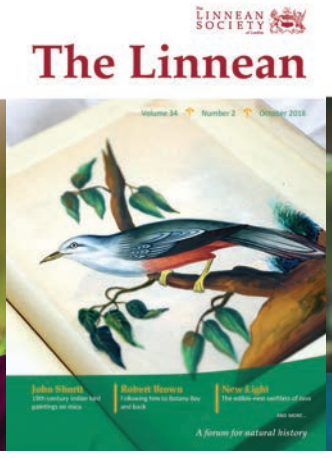
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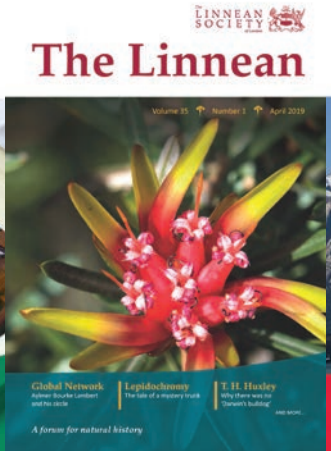
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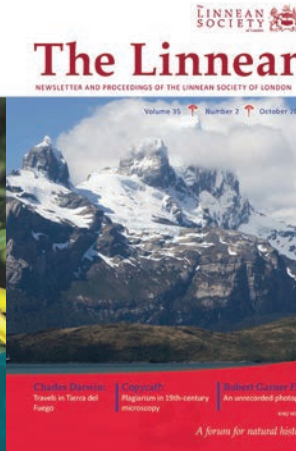
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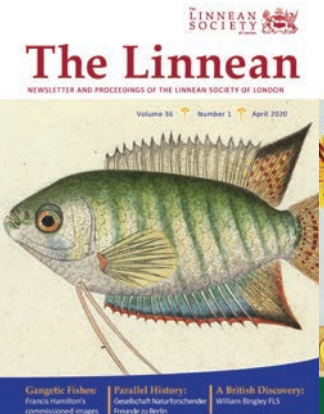
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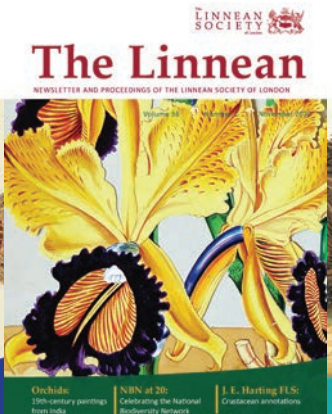
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The Brightwells: A father/daughter natural history team
Darwin's Wells: Water management Down House

It's been a whirlwind eight months since I started my role as CEO of the Linnean Society, and I'd like to thank you all for welcoming me so warmly. After attending my first Anniversary Meeting in May, I was incredibly moved by the personal accounts of our medal and award winners. Many acknowledged the help and encouragement given to them by others, and the overwhelming culture seemed to be one of support, dedication and kindness. This is something we at the Society would like to encourage further, through our all of our publishing, projects and grant funding schemes, but also through a revision to the Bye-Laws which you can read more about below.

In my short time at the Society I have worked with both our Council and staff on the start of some new projects, reconfigurations and changes as the Society moves forward. In that time, I have appreciated how important it is to be supported by a group of united trustees, and that it should be recognised that our small-but-dedicated team of staff are regularly 'punching above their weight'.

Thank you to Editor Gina Douglas


Why there was no 'Darwin's Bulldog': Thomas Henry Huxley's Famous Nickname

Speaking of recognition, I'd like to mention someone who is very special to the Linnean Society, and gave me a sincere welcome (as well as a personal Linnean mug!) when I arrived. As many of you will know, Gina Douglas has played a variety of roles in the Society, not least as our highly-respected Librarian until 2008, but more recently as the Editor of this publication. Gina took over the role as Editor in 2014, during which time *The Linnean* saw a slight refresh in its design. Working with the *The Linnean* Steering Group—Pieter Baas, Michael Wilson, Mary Morris, and up until last year, Fernando Vega—Gina has overseen the publication of many terrific articles, ranging from 'Plants, War and the Natural Capital of Empire' to 'Why there was no 'Darwin's Bulldog'', the latter of which also gained some traction online. As you will have seen in the Editorial, Gina will be stepping down to focus on her presidency at the Society for the History of Natural History, and will be handing *The Linnean* over to Publications Manager, Leonie Berwick, who has worked alongside Gina during her

time as Editor. We know you will join us in offering our heartfelt thanks to Gina for her dedication to the role and wish her all the best for her presidency.

Work begins on the Bye-Law revisions

In other news, and as you will have seen in *PuLSe*, we are busy beginning work on revising the Society's Bye-Laws. I'd like to give a special thanks to Council member Mark Watson for Chairing the Bye-Laws Revision Group, as well as other members Anjali Goswami, Angus McCullough and Keith Lawrey. As Mark stated in his piece in *PuLSe*, the external governance review in 2018 resulted in several recommendations, some of which have been implemented already. 'In order to support these changes,' he wrote, 'and to enable the Society to fulfil its aspirations as an inclusive, public-focussed modern charity, changes to our Bye-Laws are needed.'

With the last revision a generation ago in 1990, Mark explained the need for 'a new set of Bye-Laws to provide a solid foundation for good governance in today's world', through which we will aim to secure the longevity of the Society, and encourage more people to engage with its work and values ('a world where nature is understood, valued and protected'). The Group is ably supported by our new Governance Manager, Cathy Youthed, so that we can move ahead relatively quickly—Cathy is to be heartily thanked for all of her hard work and dedication. Fellows with a particular interest in the Bye-Laws are encouraged to get in touch via the President (president@linnean.org).

It's beginning to look a lot like Christmas

Finally, some of you might remember that one of my previous roles was at the Royal Institution (Ri), where one of my more enjoyable duties was Ri Executive Producer for the BBC Christmas Lectures. I was delighted to find out that the Linnean Society also has the Founder's Day and Christmas Lectures, both of which can be found online if you missed them. Why not catch up with some of our lectures and videos on YouTube over the Christmas season? Visit our channel to explore: https://www.youtube.com/user/LinneanSociety

Gail Cardew, *CEO*
gail@linnean.org

Though it seems a long time ago now, it was with great joy that we reopened the Library in April (initially on reduced days and hours). Slowly, we have been working hard to enable these hours to be extended: Tuesdays–Fridays, 10am–5pm. (To keep staff safe, we are working in a hybrid manner, with staff on a rota to cover Library opening hours.)

The Library has been busy with researchers throughout the last few months, hosting many readers coming into London for the first time in 18 months. We are proud to provide a safe haven in central London for researchers to return to work on primary sources.

News from staff & volunteers

Archivist Liz McGow left on maternity leave at the end of March 2020, and we welcomed her maternity cover, Alex Milne, at the beginning of July. Alex has dived straight into cataloguing important collections, such as the Darwin, Wallace and Alexander Anderson manuscripts, collaborating with Assistant Archivist Luke Thorne to update the archives catalogue. (http://www2.calmview.co.uk/Linnean/Default.aspx)

Two volunteers have continued their invaluable work remotely: Sheila Meredith has been helping Librarian Will Beharrell with deaccessioning journals, while David Pescod has continued to extract information from the historical Presents books, from scans provided by Digital Assets Manager Andrea Deneau. These two volunteers have worked almost every day on Linnean Society projects, and we are extremely grateful for their support.

Archivist Alex Milne started at the Society in July

Improving resources & access

Collections staff have effortlessly moved from lockdown-tailored to in-house projects that aim to improve the smooth running of the Society, as well as access to our resources: continuing the cataloguing of archival collections, starting a records management restructure, and implementing the deaccessioning of modern journals holdings, with the approval of the Collections Committee.

Grateful for your ongoing support

Considering the uncertainty of the last 18-months, our AdoptLINN programme has been going from strength to strength. The sum of £3,550 had been donated by November 2021. Amongst the items conserved were Carl Linnaeus' annotated *Species Plantarum* (1753) and John Evelyn's *Sylva* (1786); we are grateful for the generosity of

all AdoptLINN supporters (https://www.linnean.org/support/adopt-linn/adoptlinn-supporters). The list of items up for adoption is renewed twice a year, but if you have a particular favourite in our collections that you know is in need of conservation, please contact the Collections team (library@linnean.org).

The breadfruit tree illustration

We were delighted to have acquired a new drawing signed by the Antiguan artist John Tyley, who worked for Superintendent of the St Vincent Botanic Gardens, Alexander Anderson, in the late 18th century. The drawing depicts a breadfruit tree and is of considerable historical and cultural significance. Fellows can find out more from a video on YouTube (https://bit.ly/3d0MkAM) and from two talks at our recent day meeting 'Natural History and Visual Art from the Margins'.

John Tyley's depiction of a breadfruit tree is a culturally important addition to our collections

Putting our collections in front of the lens

Though the Collections Store is currently closed to visitors, we have been able to give several tours of the building and show some of our collections to students from London universities throughout the autumn. A new library display features highlights from the recent Society's book of treasures, *L: 50 Objects, Stories and Discoveries from the Linnean Society*, as well as the new Tyley drawing. Fellows and visitors are welcome to drop in to see the display.

From September, the Collections team set up a new monthly event: 'Linnean Lens', which focuses on a specific item from the Society's collections. These events, which have so far included Linnaeus' student manuscript, Anna Atkins' book of cyanotypes, the 1491 *Ortus Sanitatis*, and most recently, Linnaeus' *Species Plantarum*, have been extremely successful and are available to watch on our YouTube channel. Check our events webpage for future 'Linnean Lens' sessions (www.linnean.org/events).

Isabelle Charmantier, *Head of Collections*
isabelle@linnean.org

Donations

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

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

Glenn Benson
Geoff and Sheila Chapman
Ian D. Conacher
Michael Darby
Martyn Denney
John Dolan
John Edmondson
Fred Langford Edwards
Brent Elliott
John Feltwell
Jenny Grundy
Alberto Gómez Gutiérrez
Frank Horsman
Sandra Knapp/Natural History Museum, London
Henrietta McBurney
David Moore
E. Charles Nelson
The Ray Society
Keith Salvesen
Pilar San Pío Aladrén
John Massey Stewart
Ray Williams
Michael Wren

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

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

More on Samuel Jennings (1839–1916): Orchidologist and Angel-Evangelist

In a previous article about Samuel Jennings FLS, and an album of Indian paintings on mica based on his orchid illustrations (*The Linnean*, 36(2): 18–25), many gaps remained concerning details of his biography. I was thrilled, therefore, to receive an email from Thomas Schrader in Neustadt am Rübenberge, Germany, who has been researching priests of the Catholic Apostolic Church of which, it emerges, Jennings was one. Thomas has also added to the bibliography of Jennings's religious publications in addition the one on the captivity of the Jews that I cited. These are as follows: a book titled *The Great Problem of Man's Future Place*, of which the second edition of 1905 ran to 175 pages; two reprints from this work 'Marriage, its Institution and Purpose' and 'Recognition in the Kingdom'; a reprint from part of the captivity book titled 'The Whole House of Israel', and a history-of-science paper on 'Solar Eclipses and Ancient History' published in 1908 in the *Journal of the Royal Astronomical Society of Canada*. Also in the email was an image of Jennings's grave in a Manchester cemetery, which gives his date of death and that of what turns out to have been his second wife. With this additional information I got back to my genealogist friend Margie Frood who had earlier been unable to establish the date either of Jennings's birth or death on account of what turns out to have been mistaken information provided by me about a possible date for the latter. As a result of Thomas's and Margie's work it is now possible to fill in some of the gaps.

Carte de visite of Samuel Jennings

Samuel Jennings was born at 52 Gibson Square, Islington, on Boxing Day 1839 to Samuel Jennings, a livery stable keeper who later became an East India Company clerk, and his schoolmistress wife Ann (*née* Wilshire); the couple later had a further son and daughter. The younger brother, at one point also an East India clerk, is probably the Edward Jennings who illustrated Samuel's 1881 book on the Wynaad goldfields. Around 1860, Jennings went to India as a 'Merchant', and on 24 December 1863, in St Paul's Cathedral, Calcutta, he married Ellen Rachel Hughes. While Jennings was working in the Financial Department of the North West Provinces in Allahabad the couple had three children, two daughters and a son, but the son died aged 16 months in Mussoorie and in 1869 Ellen died, aged only 30. In 1880, following his return to England in around 1873, Jennings married for a second

time, in Beverley, Yorkshire, his bride being Harriett Florence Rowney of King's Lynn. The couple appear to have settled in Camberwell where in the early 1880s two children were born: a son Frank, who emigrated to Canada (hence, presumably, the place of publication of Jennings's solar-eclipse paper), and a daughter Agnes Mary who would marry Samuel Mee Hollick, the 'Angel' (bishop) of Manchester's Catholic Apostolic congregation.

St Paul's Cathedral in Kolkata c. 1865, where Jennings and wife Ellen Rachel Hughes married in 1863.

I am grateful to Thomas Schrader for information on Jennings's role in the Catholic Apostolic Church, which had a hierarchy based on that described by St Paul. As in other episcopal churches the hierarchy was threefold, with unordained (but apostolically blessed) deacons, and ordained priests and bishops ('angels'); after this things become more complicated as the priests and angels could have one of four ministries: elder/apostle, prophet, evangelist or pastor. As the Church believed in an imminent second coming, it felt no need for what is today called succession planning. Only the original apostles could authorise ordinations; after 1869 only three of these were still living and when the last of them died in 1901 no more ordinations were possible.

At an unknown date Samuel Jennings must have been ordained as a priest, and he was later consecrated as an angel. From, or shortly after, 1896 he held the rank of Angel-Evangelist. Not attached to a congregation it is possible that he may have become the District-Evangelist for the Midland region of England and between 1907 and 1909 he is recorded as having preached at, among other places, Stoke on Trent, Nottingham and Wolverhampton. At the time of the 1901 Census Samuel and Harriett lived in Edgbaston, Birmingham, in a house called 'The Rowans'. Illness appears to have struck as it is the reason given for his resignation from the Linnean Society in 1909; in 1911 the couple were staying in an hotel at Buxton, presumably 'taking the waters'. Around 1912, perhaps to be closer to their daughter and son-in-law, they moved to Whalley Range, Manchester, where they continued the arboreous theme of house names. It was at 'Hazelhurst' that Samuel Jennings died on 1 June 1916 aged 76. He left a relatively modest estate (gross value £1237/8/5) but must earlier have transferred money to his wife as when she died, 19 months later, she left £3712/9/6.

Henry Noltie FLS

A Curious Little Book by an Interesting Father-Daughter Team: *Sketch of a Fauna Infusoria for East Norfolk* by Thomas Brightwell FLS (1787–1868), with illustrations by Lucy Brightwell (1811–75)

John Dolan FLS

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I am always on the lookout for early illustrations of my favorite organisms, tintinnid ciliates of the marine plankton. Periodically, I search listings of used books for titles containing variants of the old-fashioned term 'infusoria', referring to organisms found in 'infusions' by Leeuwenhoek and his followers. Recently, I came across an offer of an unfamiliar title from 1848, *Sketch of a Fauna Infusoria for East Norfolk* (Brightwell 1848a). A quick Internet search yielded a digitised version of the book of poor quality but a tintinnid was apparently shown so the purchase was made. An 1848 illustration of a tintinnid would be remarkable, to me at least.

A couple of weeks later the book arrived. Brightwell's book turned out to be a curious, small (14 x 20cm), volume. As the title suggests, it is an account of microorganisms found in the region of Norfolk. The preface states that a member of his family, who we now know to be his daughter, Cecilia Lucy Brightwell, commonly known as Lucy Brightwell, did the figures (see Fig. 1, overleaf):

> *Figures are given of every species noticed in the work. The drawings were carefully executed by a member of my own family, and the whole transferred to stone and colored by the same hand.**
>
> ** 100 copies only have been printed for private distribution*

Given the small press run and a 'private distribution', it is perhaps not surprising that the work is not well known. It appears to have been cited only six times in the last 120 years. However, it is available. The 'World Catalogue' lists 15 libraries holding the

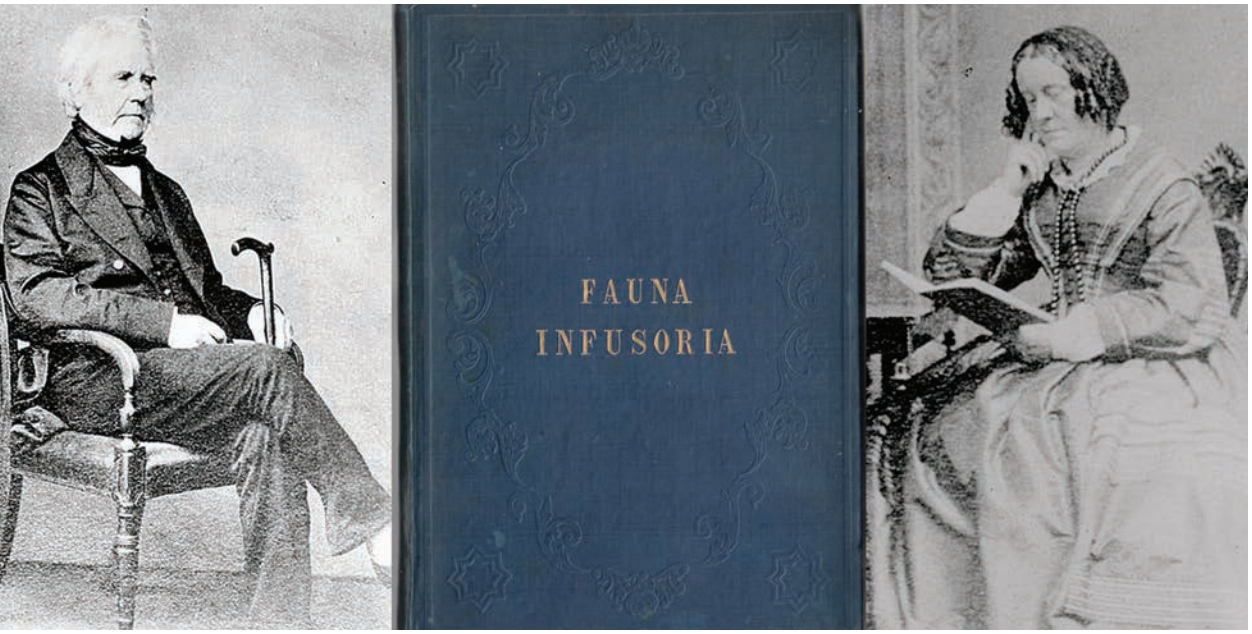

Fig. 1 Father and daughter: Thomas Brightwell FLS and Lucy Brightwell and their work *Sketch of a Fauna Infusoria for East Norfolk*.

book, not including the copy in the library of the Linnean Society. A digitised version, albeit of poor quality, is freely available through the British Library and Google Books.

How reliable were the observations recorded? What did Thomas Brightwell know of infusoria? The preface lists 'the only works consulted', quite valuably then it defines Thomas Brightwell's knowledge base and the illustrations at his disposal. These works were the 1) '*Infusoires*', Brugiere's 1791 contribution to the *Encyclopédie Méthodique*, rightfully noted by Brightwell as chiefly a copy of Müller's (1779) compendium, 2) Baker's *Employment for the Microscope* (1764) which contains a fair amount on rotifers but little on infusoria, 3) Pritchard's *History of Infusoria* 2nd ed. (1841), rightfully noted by Brightwell as principally a compilation of Ehrenberg's 1838 illustrated catalogue of all known infusorian species, and finally Dujardin's *Zoophytes*... (1841). The works used by Brightwell were the best available at the time. Knowing exactly which authorities were used allows easy assessment of the originality of the illustrations in his book; as alluded to in the descriptions above, copying of earlier works was not at all uncommon at the time.

The text descriptions are brief and the illustrations (all appear to be original creations) are rudimentary, but sufficient to allow identification to the genus level for most of the forms described. The book would not easily serve as a guide to the aquatic microorganisms of Norfolk as the organisation is idiosyncratic. The text lists descriptions of taxa by genus and plates (without legends) shows taxa of very different groups from distinct environments pictured together (see Fig. 2.). It is

rather a record of Thomas Brightwell's microscopical findings in his home territory. One of his findings was significant for me. The tintinnid ciliate shown in PL XIX 19, fig. 7, said to have been 'Found in brackish water, near the Railway Station, Yarmouth', does indeed constitute the fourth historical record of a tintinnid. It is preceded only by Müller's (1779) and Ehrenberg's (1838) observations from the Baltic Sea near Copenhagen, and Dujardin's (1841) observations from the Mediterranean Sea near Sète.

Who were the Brightwells? All that we know of Thomas Brightwell is based on Lucy Brightwell's 1869 book, *Memorials of the Life of Thomas Brightwell by his Daughter*, and an obituary notice in the *Proceedings of the Linnean Society* (Anon 1869). The obituary notice consists of some of the same text as in a chapter in Lucy Brightwell's

Fig. 2 How reliable is *Sketch of a Fauna Infusoria...*? Organisation of the plates is idiosyncratic, with taxa from different groups and environments pictured together. However, plate XIX, fig. 7, shows a tintinnid ciliate—the fourth historical record of the organism, after Müller, Ehrenberg and Dujardin.

Memorials...; a chapter on him as a naturalist, said to have been dictated and corrected by her father. Thus, it appears that Thomas Brightwell largely penned his own obituary notice.

What we learn from Lucy Brightwell's text is that her father was a solicitor and a deeply religious man, a scholar of Latin, German, Greek, and Hebrew texts. He published a weighty tome, *Notes on the Pentateuch*, in 1840. Brightwell served a term as Mayor of Norfolk in 1837 and as Mayor, attended the ascension to the throne of Queen Victoria, ushering in the Victorian era.

He was an enthusiast of natural history in general, and in his later years in particular, of diatoms, the microscopic algae shown in Fig. 2, PL IX. According to Lucy Brightwell's text, he began his naturalist pursuits by collecting insects. His collection came to the attention of his next door neighbour in Norfolk, Linnean Society founder Sir James Edward Smith, who found it better than that of Linnaeus, housed in his residence at the time. This perhaps motivated Smith's nomination of Brightwell to the Linnean Society in 1821, describing Brightwell as one of Britain's premiere entomologists. There are two beetles in the Linnean insect collection catalogued as from Brightwell via Smith. Oddly enough, Brightwell never published on insects, nor in the Society's *Proceedings*. Although he always appeared as FLS, he published mostly in *Quarterly Journal of Microscopical Science* and in the *Annals and Magazine of Natural History*. Like many Victorian naturalists, he published on a wide variety of organisms. He wrote about lobsters (Brightwell 1835), leeches (Brightwell 1842; 1846a) on a dolphin (Brightwell 1846b), a rotifer (Brightwell 1848b), diatoms (Brightwell 1853; 1856a,b; 1858a,b; 1860) and on a dinoflagellate (Brightwell 1857). In his later years, he suffered from cataracts and his last scientific efforts were to give his slides containing new diatoms to engraver and lithographer Tuffen West for him to publish (West 1860). Brightwell's daughter did not do the illustrations for his articles; except for a dolphin illustration (Brightwell 1846b), they were mostly done by Tuffen West, well known at the time for his own work on diatoms and his illustrations (Dolan 2021). Lucy Brightwell never married and survived her father by only seven years. She is today known as a writer and an artist. Her first and best-known book was the biography of the

> "*Sketch of a Fauna Infusoria* turned out to be a book of interest not only because of its rare illustrations, but also as a reminder of a bygone era in which a solicitor could be both a biblical scholar as well as an accomplished naturalist and a writer of inspirational books could be also a lithographer and a master copyist of Rembrandt."

Romantic era novelist, Amelia Opie (Brightwell 1854) another Norwich resident and dedicated abolitionist, followed by *A Life of Linnaeus* (Brightwell 1858). She published many inspirational titles such as *Heroes of the Laboratory and the Workshop* (1859) and *Above Rubies; or, Memorials of Christian Women* (1865), for the young. All told, she published 20 books, and she is also known for her artwork. She was renowned for her etching after masters such as Rembrandt and Dürer; the British Museum holds 79 of her prints. Lucy Brightwell is likely better known than her father. Unlike her father, she has entries in the Oxford Dictionary of National Biography. The first was by Alexander Gordon (1885), it includes a complete list of her books, and in the recent edition, a new entry by Norma Watt (2004).

Sketch of a Fauna Infusoria turned out to be a book of interest not only because of its rare illustrations, but also as a reminder of a bygone era in which a solicitor could be both a biblical scholar as well as an accomplished naturalist and a writer of inspirational books could be also a lithographer and a master copyist of Rembrandt. Hopefully, once you have read this, you will be able to drop by the Linnean Society and have a look at this curious little book yourself.

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W. Cornwallis Harris: How Accurate and Original Were His Publications Describing Southern African Animals?

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During 1836 and 1837, Major William Cornwallis Harris (1807–48), a military engineer on leave from the British Army, travelled through southern Africa from the coast of the Cape Colony almost to the Tropic of Capricorn. He shot many large animals and recorded information about them in three books: *Narrative of an Expedition into Southern Africa* (1838) which was republished with minor changes as *The Wild Sports of Southern Africa* (1839), and *Portraits of the Game & Wild Animals of Southern Africa* (1840). The former two books exist online and the third with its colour and black-and-white plates has been republished several times as facsimile editions (1969 and 1976). These books have been widely cited and continue to be cited which makes considerations of their accuracy important.

Dr. Richard Liversidge's zoological note to the 1969 facsimile edition of *Portraits of the Game & Wild Animals of Southern Africa* credited Harris' 'very observant nature and accurate record' of southern African wild life on the veld during the early 19th century (Harris 1969, p. xxi). The Introductory essay by Edward C. Tabler in the same facsimile is well disposed to Harris, but notes that he had inaccurately described female roan antelopes (*Hippotragus equinus*) as being hornless (Harris 1969, p. xviii). Frank R. Bradlow's introduction to the 1976 facsimile edition of *Portraits of the Game & Wild Animals of Southern Africa* refers to the value of 'His written records and his (on the whole) accurate and beautiful delineations of the animals he encountered and their natural surroundings' (Harris 1976, p. xiii).

My own reading of Harris' books has focused on his descriptions of quaggas (*Equus quagga*) and Burchell's zebras (*Equus burchellii*) which he—like most of his contemporaries—viewed as separate species but which are now known to be conspecific as *Equus quagga*, the plains zebra. For both animals, Harris provided detailed descriptions of male animals and concluded, 'Female similar. Has an udder with four mammae' (Harris 1969, pp. 12 and 30). In fact, there are only two nipples—a major mistake which is difficult to understand as Harris claimed to have killed many of

Fig. 1 *Equus quagga*. The Quagga. Detail from Plate 2 in Harris 1840.

these animals (Harris 1969). The remainder of this statement is also open to question as Harris does not mention the sexual dimorphism that occurs in plains zebras (Klingel 2013) and which has been reported in quagga museum specimens (Heywood 2019). Harris states that quaggas had a shoulder height of four feet six inches, but then gives a lesser height on the following page (Harris 1969, pp. 12–13).

Harris' portrayal of quaggas shows animals with full horse-like tails (see Fig. 1) and he describes them in this way in his three books; however, the tails of quaggas had a distinct dock at their base followed by a terminal part (the brush) with long hairs. A long dock is present on the animal in the background of Fig. 2; most quaggas had a shorter dock and a more extensive brush as in the animal in the foreground of Fig. 2 (Gray, Hawkins and Derby 1850). Although the length of dock and brush is variable, Harris' assertion that the tail is 'strictly equine' is incorrect (Harris 1969, p. 12). Harris described the tails of quaggas as extending below the hocks but my examination of taxidermy specimens and paintings (for example, see Fig. 2) shows that they were often shorter than this length (Heywood 2020).

Fig. 2 is an accurate representation of the markings of quaggas, animals which had fewer dark stripes than other plains zebras. Stripes were absent from their legs and bellies and posteriorly they faded out before the rump. Dark stripes extended from

the dorsal line over most of the lateral surface which was brown and ended before the white of the belly. This marking is present in taxidermy specimens, most paintings of quaggas and in photographs taken of a quagga in the London Zoo and of another in southern Africa. Harris painted quaggas with different markings of their lateral surfaces (Fig. 1): the dark stripes ran downwards from the lateral line for only a short distance and the white of their bellies extended approximately half way up the lateral surfaces of their bodies.

Harris' painting of quaggas, although differing from most other representations, conspicuously resembles Plate 15 in (Daniell 1820) which is available at https://archive.org/details/Africanscenerya00Dani/page/n47/mode/2up. A letter writer in the *African Journal of Wildlife Research* had no doubt that Harris had plagiarised Daniell's image, but the editor of that journal viewed Harris as having only modeled his painting on Daniell's (Rainier 1984). Other writers have stated that Harris' painting 'clearly echoes' Daniell's aquatint and 'drew heavily on' it (Plumb and Shaw 2018, pp. 90–91). Why Harris should have copied the work of another artist is a mystery given the many quaggas he shot; however, it seems to be a solitary occurrence. I have compared Harris' illustrations of animals with those previously portrayed by Daniell and have found no other instance of copying. This case, however, introduces the second criticism about Harris' work: a failure to acknowledge his sources. In particular, Harris drew on the work of Andrew Smith (1797–1872), a physician who was Superintendent of the South African Museum in Cape Town. Smith published extensively on the fauna of southern Africa and is sometimes referred to as the father of South African zoology (Rookmaaker 2016).

Fig. 2 *Quagga, Asinus quagga.* Detail from Plate 54 in Gray, Hawkins and Derby 1850.

Harris acknowledged the 'liberal and friendly information' that Smith had given him but denied that Smith had told him about a hitherto undescribed species of antelope and its location (Harris 1969, p. 149). One of Harris' goals had been to discover a new animal, 'Not a new lizard, or a new rat, no, nor even—by which to immortalise myself as a naturalist—a new weasel; but an entirely new something or other' (Harris 1969, p. 145). Harris' ambitions were fulfilled in the form of the sable antelope (*Hippotragus niger*) which he described as '*Aigocerus Harrisi*. The Sable Antelope. Undescribed by Naturalists. Unknown to the Matabili' (Harris 1839, p. 378). The claim that the animal was unknown to the Indigenous people of the region was both unlikely and unproveable, and Harris was, of course, criticised for the animal's name which he ascribed to a printer's error for what he claimed should have read *Aigocerus Niger* (Harrisii). This explanation rings hollow because none of the other species names in his account were listed with an authority. Harris denied the other criticism that Smith's information had played a part in his success, and felt strongly enough to issue a rebuttal, 'No soul on earth ever breathed to me of the existence of a still undiscovered species *before* I had found it' (Harris 1969, p. 149).

"Ogilby was a naturalist who disdained hunters—hence his scorn for Harris, who delighted in killing animals and who had written 'From my boyhood upwards, I have been taxed by the facetious with *shooting madness*, and truly a most delightful mania I have ever found it.'"

Whatever the truth of the situation, in this instance the issue of Smith's aid seems a minor point: the credit for describing and naming this species belongs to Harris alone. However, more serious charges were reported in the 1976 facsimile edition of *Portraits of the Game & Wild Animals of Southern Africa*. The preface by Frank R. Bradlow reported that William Ogilby, Secretary of the Zoological Society of London from 1839–47, had claimed that Harris had 'literally copied, *word for word*, from Dr. Andrew Smith's 'African Zoology'' (Harris 1976, p. xxvi). Ogilby believed that the reason for this 'unjustifiable piracy' was 'the craving ambition which Capt. Harris betrays in every page of his work, to be thought a scientific scholar, a character which is so badly sustained by his actual performance' (Harris 1976, p. xxvi).

Bradlow noted that Ogilby was a naturalist who disdained hunters (Harris 1976, p. xiii)—hence his scorn for a man who delighted in killing animals and who had written, 'From my boyhood upwards, I have been taxed by the facetious with *shooting madness*, and truly a most delightful mania I have ever found it' (Harris 1838, p. xi). Harris' overblown language and disparagement of Indigenous people probably also

distressed Ogilby who later was to return to famine-stricken Ireland where he joined a Relief Committee and, by employing local people, was able to put food on their tables (Wikipedia 2021). It is easy to understand how a person of Ogilby's sensibilities would respond to Harris' prose about Bushmen. A single page of Harris' account of quaggas contains these mentions of them: 'voracious Bushman hordes', 'tame Bushmen', 'savage tribes', and 'two-legged devourers of carrion' (Harris 1969, p. 13). The white settlers in southern Africa fared only slightly better being described as 'indolent Colonists', and even their horses were scorned as 'miserable, conditionless hacks' (Harris 1969, pp. 13–14).

Bradlow investigated Ogilby's charge of plagiarism and concluded that some of Harris' sentences were similar to those of Smith but not to the extent that Ogilby had claimed (Harris 1976, p. xxvi). Bradlow referenced Ann Datta of the British Museum (Natural History) who observed that Andrew Smith's 'African Zoology' had incorporated parts of Charles Hamilton Smith's contribution to Baron Cuvier's *The Animal Kingdom*. As noted by Ogilby, Andrew Smith's account of the Order Ruminantia in 'African Zoology' contains the author's acknowledgement that it had 'been copied almost *verbatim*' from Hamilton Smith's text (Smith 1834, p. 182). In contrast, Harris presented as original text content that he had derived from Andrew Smith and Hamilton Smith.

Ogilby claimed that Hamilton Smith had made use of earlier sources and that this material had then been transmitted via Andrew Smith to Cornwallis Harris who passed on the information as though he himself had made these observations. Believing that some of this information that Harris had appropriated was incorrect led to Ogilby's complaint that 'The grossest and most palapable errors are unhesitatingly advanced by Capt. Harris upon the authority of his own personal observation' (Bradlow 1976, p. xxvi).

I confirmed the re-use of content in the case of the roan antelope, then named *Aigocerus equina*. Andrew Smith's account of this animal (Smith 1834, p. 185) was virtually identical to Hamilton Smith's (Cuvier 1827, vol 5, pp. 324–325) and contains this description, 'Horns very robust, about twenty-four inches long, strongly bent back' which is very similar to 'Horns very robust, above two feet in length, strongly bent back' (Harris 1969, p. 114). Andrew Smith's description, 'Hair coarse, undulating, loose, mixed red and white' (Smith 1834, p. 185) reappears as 'Hair coarse, loose, scant, and undulating; mixed red and white' (Harris 1969, p. 114). To Harris' credit, he supplied additional description for this species but, as noted ealier, he erroneously described the female as lacking horns. There are other examples of Harris using Smith's writing and not acknowledging it.

Unlike some other hunters of his generation who also killed on a large scale but left no scientific record, Harris provided descriptions of animals and their habitats. These accounts are written in a florid language, incorporate the ideas of other naturalists and contain inaccuracies. Nonetheless, Harris' descriptions and portrayals provide much useful information. To ensure a comprehensive understanding, however, they

should be studied alongside the work of other 18th- and 19th-century observers of southern African animals such as John Barrow, Henry Bryden, William John Burchell, Samuel Daniell, Robert Jacob Gordon, Martin Lichtenstein, Andrew Smith, William Somerville and Anders Sparrman.

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Darwin's Water Management at Down House, England

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On Charles Darwin's return to England from his voyage on the HMS *Beagle* in 1836, he was chronically ill for the remainder of his life. He was living in the disease and dirt of London; unhealthy dense smog from coal burning, foul water from untreated sewage and cholera epidemics. He moved to Down House (Fig. 1), in the village of Downe in Kent, about 15 miles south of London in 1842, with his wife Emma and two children, seeking a healthier and more peaceful lifestyle, and remained there until his death in 1882. It was at Down House that he wrote his master work, *Origin of Species* (1859). Down House is recognised as a site of outstanding historical significance and is a Grade I listed building under the guardianship of English Heritage.

Fig. 1 Darwin's home Down House in Kent.

Water management system

When Darwin bought Down House, he inherited a rainwater collection system and a deep well that was 325 ft deep into the Chalk Formations aquifer (Whincup 2021). Groundwater was winched out of this well using a spindle, flywheel and 12-gallon oak bucket attached to a heavy chain; the total weight to be lifted was 368 lbs. The 'chalky' groundwater from the well was used for drinking as it was considered to have health benefits, whereas the lime-free rainwater was used exclusively for watering the garden.

There was reference to a 1901 hand-drawn map of the drainage system which English Heritage was able to locate in the Down House archives, as shown in Fig. 2.

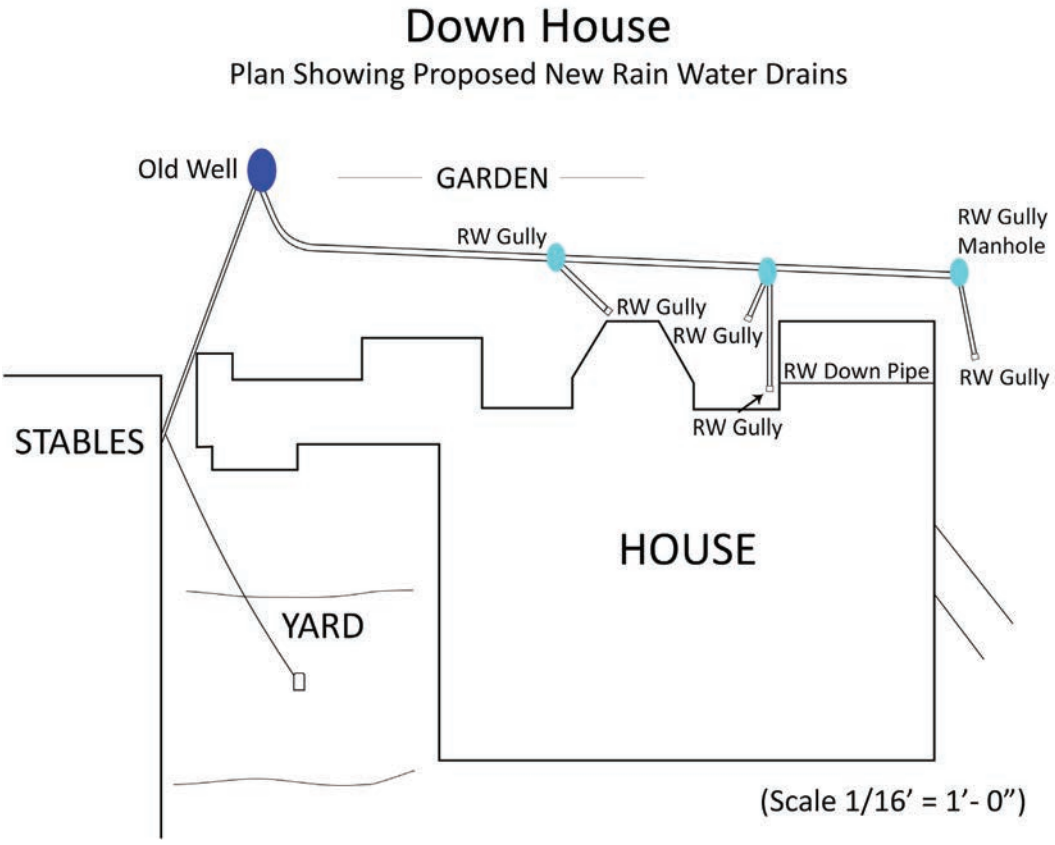

Fig. 2 Drainage system 1901, showing rainwater tanks and deep well. Down House Archives.

Rainwater

There is limited information on the dimensions of his buried rainwater tanks excepting for their depth (21 ft), the maximum lift of hand piston pumps. Deeper tanks would have served no purpose. There were three in total, extending in a line

along the rear of the house near the lawn, the furthest being about 180 ft north-northwesterly from the deep well, and all three would have been positioned near the drainpipes from the roof (Fig. 2). It was common practice in those days to use buried tanks rather than above-ground tanks which would have been considered unsightly and with lower capacity. An archaeological survey conducted on behalf of English Heritage (Pre-Construct Archaeology Ltd, 2019) uncovered a small brick drain downslope from the stables (Fig. 3) which was suggested could be part of a septic tank system that Darwin had for his horse excrement. The excrement was placed in one end, near the stables and it filtered through a series of settling tanks, leaving dry manure at one end and liquid fertiliser at the other.

Fig. 3 Drain for collecting horse manure from stables

There was ample roof cover for rainwater collection to meet his garden requirements, the roofs were lined with lead flashings and the gutters were also lead. Rainwater salinity would have been in the range 10 to 15 mg/L mostly as sodium calcium chloride and acidic with a probable pH of 5 to 5.5, although given the heavy air pollution in the Thames Valley the pH could have been lower. It is likely that given its acidity the rainwater runoff from the roofs was contaminated with lead and may have exceeded today's drinking water standard. Emma Darwin in her Receipts and Memoranda Book (retained at Down House) actually copied in her own handwriting a method for determining lead contamination of water from a press clipping from *The Times* of 1865, but her reason for doing so is not known. The 'chalky' groundwater was perceived to have health benefits, but was considered too 'limy' for his plants, salinity was probably in the range 400 to 500 mg/L, predominantly as calcium bicarbonate with a pH of about 7.5 (Adams, 2008) and was not exposed to lead.

The water cure

The water cure was very popular at that time involving cold baths, wrapping in wet sheets and a cold water drenching in a douche. Charles Dickens was an adherent, he actually had a tin hat specially made to protect his head against the force of the douche's cascading water (Healey 2001). After spending several months at Malvern in 1849 and receiving a favourable impression, Darwin adopted the treatment when he returned to Down House, building a douche specifically for that purpose and continuing until 1853. A description of the douche at Malvern (Fig. 4, Leech 1851, overleaf) provides the detail

Fig. 4 The douche

and design required by Darwin to reconstruct the douche when he returned to Down House:

> You descend some eight or ten feet into a pit. From the roof two large long pipes, one nearly two and the other about three inches in diameter, point menacingly down on you. According to your constitution, you get your bath through one or the other, but the larger one is more generally used and is capable of launching down upon the body, in a straight, unbroken column of water, one hogshead per minute, and that with such force, the fall being more than twenty feet, that when it struck me straight on the shoulder it knocked me clean over. Again I returned to the scratch, inclining my back a little this time, and taking it obliquely as like a cataract the strong column broke in foamy splinters upon my body, and all but beat me to the ground. For a minute and a half I remained under this water-spout, buffetting fiercely.

Darwin constructed his douche in 1849:

> In the garden, near his spectacular well—100 yards deep—he had the village carpenter build a miniature church-shaped hut to contain a tub with a platform in it and a huge cistern above (Desmond *et al.* 1992).

The village carpenter's son, John Lewis, whose father John Lewis constructed the douche for Darwin, shared his memories in *Evening News* (12 February 1909):

> I went to him sixty years ago as page for two years. I was fifteen then. Now I'm seventy-five. Mr. Darwin went to Malvern to Dr. Gully for the water cure. He wrote to my father to make him a tank thirteen feet deep, with a stage in the middle. And then there was a big cistern above that held six hundred and forty gallons. I had to pump it full every day for two years. Mr. Darwin came out and had a little dressing place, and he'd get on the stage and go down, and pull the string, and all the water fell on him through a two-inch pipe. A douche they called it. He used to get up every morning at seven, and I had to have the big bath outside the study on the lawn to get cold. I've seen it freeze often and me having to break the ice, and Mr. Darwin would come down and sit in a chair with a spirit lamp and all rolled around with blankets till the sweat poured off him in showers when he shook his head. I've heard him cry to the butler, Parslow, I'll be melted away if you don't hurry! Then he'd get into the ice-cold bath in the open air. Then he'd go for an hour's walk in the sand walk, and then have breakfast and work till twelve, then have that douche through the two-inch pipe, then walk again for three-quarters of an hour.

Douche image courtesy author

At Malvern, the height of the cistern was 20 ft above the platform, and Darwin would have tried to reproduce this dimension. The height of his Down House douche cistern above ground level is not recorded, but allowing for water storage in the 13-ft deep pit below his platform, it appears that the cistern must have been about 12 ft above ground level and his platform about 8 ft below ground level, similar to the Malvern douche. On entering the douche from his dressing room he would have stepped down to the platform. After his douche the water would drain down below the platform into the bottom of the pit and then be pumped up into the cistern the following morning by young John Lewis using the douche pump, ready for Darwin's noon time douche. Periodically the sump would have been topped up or replaced by groundwater. The normal household use of groundwater was one 12-gallon bucket increasing to 3 or 4 buckets in summer and required some effort to lift, the total weight with the chain was 368 lbs. To refill the overhead tank from the well would have required more than 50 buckets, more than a week's labour and there is no record of any connection to the rainwater tanks, that came later. At Malvern 2-inch and 3-inch pipes were used depending on the constitution of the patient. At Down House the 2-inch was adopted, which would have released the 640 gallons in about 6 minutes, a 3-inch pipe would have released it in less than half that time. The water cistern capacity (about 100 cubic ft) could be accommodated in a sump occupying the lowermost 3 ft of the pit which conforms to a platform raised about 5 ft above the floor of the pit. Once the douche was dismantled there remained a pit estimated to be 6 ft square and 13 ft deep with a water storage capacity of 470 cubic ft (3,000 gallons).

Here are some impressions from his daughter Henrietta (Litchfield 1926 and n.d) on Darwin's use of the douche given in two sketches for her autobiography. She would have been 10 years old when he stopped douching:

> My father, as he thought returned home much the better for the 'cure'. To enable him to continue the treatment a little wooden house was put up by the Well for him to use as a dressing room. The water from the adjoining well was pumped up into a little steeple attached to the dressing room. By pulling a string the ice cold water came down with a good deal of force, & made a practical douche. We children used to stand outside to listen to his groans & I have an image of his coming out half running & half frozen to take his usual morning walk in the Sandwalk, where we meant to accompany him. I think the water cure was one of the many attempts to gain health which failed. After a time, & not I think a long time, this home treatment was given up. He never went again to Dr *Gully›s.* I think in the early days we used generally to take his midday walk with him, for I remember after Malvern our standing outside his douche hearing the rush of water & his groans from the shock & cold, & stamping of feet & then when he was up & dressed we were allowed to pull the string & see the remains of the water come down. He then used to set off at a run & we with him.

New tank near douche

According to the account of John Lewis he recalls filling the cistern at the douche every day for two years which covers the period 1849 to 1851. It appears that for the next two years Darwin reduced his use of the douche ceasing completely in 1853 when he embarked on his next water project, initially planned to be the construction of a large tank for rainwater collection connected to his existing 21-ft buried tanks by a siphon. However, always mindful of cost, he ultimately settled for a 13-ft deep tank with a capacity of 3,000 gallons using his redundant douche pump to transfer the water. He states (Darwin Correspondence 1853) 'that the douche pump was in the right position'; the tank depth and capacity of 3,000 gallons are so similar to those of the pit at the douche that it appears from a cost perspective alone, that this new tank may simply have been the upgrading of his douche pit by brickwork, a domed roof and connecting pipeworks to the rainfall downpipe near the kitchen and to the other underground tanks. He moved quickly after the douche was dismantled, all related correspondence was during April 1853 and according to the dates of payments made to his builder, the work was completed quickly. He wrote to his brother Erasmus on 26 April 1853 (DCP-LETT-1380) with an enquiry about the tanks:

> I am very much obliged for the calculations about the Tanks. I am scheming a great water-work & heartily wish you were here to scheme: it is to make a very large tank; & then to be able from this to fill my three others, which are much smaller but as deep or deeper, from the shallow one. I want you to look when next at Athenaeum in Encyclopaedia, & see if you can find anything on the subject. The siphon would have to be about 180 feet from top of the furthest tank to tank, not in a quite straight line.

And again to the *Gardeners' Chronicle* (1853):

> C R D intends making a large tank, and has three others, much smaller but deeper tanks, standing on the same level or a little lower, which he wants to have the power of filling from the large tank … The distance between the two furthest tanks is about 180 feet, but not in a quite straight line; the deepest tank is 21 feet … What bore should the syphon have, to convey in the course of 10 or 12 hours 3000 gallons of water?

In a letter to Edward Cresy, his architect, on 29 April 1853 (DCP-LETT- 1677) he wrote:

> From what you say, I will try the siphon plan, with 1-1/2 inch pipe, which was just what I wanted to know. What you say about a good pump being required to fill the siphon, has made me think of my hydropathic Douche Pump (not now used) which is a three inch lift pump and stands just in the right place. I am also very grateful for suggestion about the 9-inch ribs of Brickwork which shall be done. In your section, I see that the extra and upper half-brick work does not bond with the lower half-brick, and I suppose this is intentional, for Mr. Laslett told me before, that in strengthening a dome all over, the upper course was only cemented on the lower, not bonded into it.

According to his account book he paid £32/3s/7d to the builder and bricklayer Isaac Laslett on 22 April 1853 (Accounts Book at Down House 1853), probably an advance, and a second instalment of £40/15s on 4 July after the work was completed. It is also likely that Darwin consulted George William Johnson's book (Johnson 1852) which claimed that the best water 'for the gardener's purposes is rainwater, preserved in tanks sunk in the earth, and rendered tight either by puddling, or bricks covered with Parker's cement' and '[t]o keep these tanks replenished, gutters should run round the eaves of every structure in the garden and communicate with them'.

Conclusions

All the known documentation relating to the water management system at Down House has been reviewed. The system comprised a deep well, several interconnecting buried rainwater tanks and a cold water douche which for several years played an important role in his medical treatment. These features have been summarised with several observations, a number of calculations and other items which may be of general interest and have not been reported previously. They add to our knowledge of Darwin's interest in water management and his family's concern with his health at a time when pollution and disease were almost a fact of life. The 'Deep Well' was capped and is still visible from the Tea Terrace at Down House; the design and dimensions of the wellhead are known, and it could be reconstructed at some time. The douche and subsequent buried rainwater tank were adjacent to the well and it is probable that their locations can be more accurately established.

"These features add to our knowledge of Darwin's interest in water management, and his family's concern with his health at a time when pollution and disease were almost a fact of life."

Acknowledgements

My sincere thanks to John van Wyhe, and Christine Chua (Associate Editor of Darwin Online), who both provided many of the valuable references and publications which have been cited. To the English Heritage staff at Down House who went out of their way to access unpublished reports and recover previously unreleased data from the Down House archives; Olivia Fryman, curator of collections and interiors; Antony O'Rourke, head gardener; Emily Parker, senior landscape advisor; and Terry Pyle, volunteer.

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The Society is very saddened by the loss of a number of our Fellows during 2020, and 2021.

Jean Brenan FLS (1922–2021): Jean Brenan, elected as FLS in 1999, was a volunteer at Royal Botanic Gardens, Kew, for many years after the untimely death of her husband Pat. Many staff there kept in touch after she eventually stopped as a volunteer due to mobility problems. She was a steady and regular attendee of the Linnean Society evening lectures which she thoroughly enjoyed, again until she became less mobile. She passed away at her family home in Kew and was cremated in August on what would have been her 99th birthday.

Keith Hotson Hyatt FLS (1933–2021): Keith Hyatt died on 23 February 2021, a month to the day before his 89th birthday. He left school at 16 and joined what was then the British Museum (Natural History), or BM(NH) (now the Natural History Museum, London), in 1948, working there for 40 years, retiring from the Arachnid Section in 1988. He was one of the 'old school' museum curators, learning on the job without any academic qualification but acquiring wide ranging knowledge of his subject specialism and a wider appreciation of all aspects of natural history.

A short break in his work at the Museum took place when he did his National Service in the RAF, where he was involved in bomb disposal. As part of his work for the BM(NH) he went on three collecting trips to Nepal, acquiring a lifetime enthusiasm for curry. In the 1950s, he also helped set up the Bird Observatory at St Agnes on the Isles of Scilly.

Apart from bird watching, he was a keen cyclist, supporting the Catford Cycling Club, as well as restoring old Ford cars.

Keith visiting Alfred Russel Wallace's grave in Dorset, at a Society event.

Elected a Fellow in 2001, he was also a Trustee of The Ray Society, a member of the Society for the History of Natural History, as well as being a long term member of the London Natural History Society, serving as the Book Review editor for *The London Naturalist* until 2019. His frequent attendance at meetings meant that, when online registration was required, the Linnean staff automatically reserved him a place, as he never used email or mobile phone, relying on traditional post or a landline phone call for communication.

Walter H. Lewis FLS (1930–2020): Walter H. Lewis was elected to the Society's Fellowship in 1983. Studying first at the University of British Columbia, Walter went on to earn his PhD at the University of Virginia in 1957, and would later complete postdoctoral studies at the Royal Botanic Gardens, Kew, the Swedish Academy of Sciences, and the University of Leeds with Irene Manton. Walter retired as a professor of biology at Washington University in 2000, where he taught classes in botany.

His interests also lay in ethnobotany, and his collaborative work in this field with Indigenous peoples of Peru, alongside his wife Memory Elvin-Lewis, led to the publication of the highly-regarded *Medical Botany: Plants Affecting Man's Health*, which catalogued the medicinal plants of the world over 800 pages. Walter has often been commended for including and recognising 'the contributions of Indigenous people in the process of discovery'; he received the Martín de la Cruz Silver Medal, from the Mexican Academy of Traditional Medicine in 2000.

He was also recognised as the world expert in wild roses of North America, and held an appointment as senior botanist at the Missouri Botanical Garden, serving as editor and principal investigator for the Flora of Panama.

Norman Keith Bonner Robson FLS (1928–2021): Elected a Fellow in 1958, Norman Robson served the Society both as Botanical Curator of the Linnaean Collections (1985–95), as Editor of the *Botanical Journal of the Linnean Society* (1968–76) and on the Society's Bicentenary Committee.

He graduated from the University of Aberdeen with his first study of the genus *Hypericum*, and attained his PhD at the University of Edinburgh. A lifetime career as a curator at the Natural History Museum, London, he continued his work on *Hypericum* as an Associate of the Museum after his retirement in 1988. He makes an appearance in in Bill Bryson's *A Short History of Nearly Everything*, where he shares a lift with Bryson and Richard Fortey, recorded as 'a scholarly looking elderly man with whom Fortey chatted genially and familiarly…a very nice chap named Norman who's spent forty-two years studying one species of plant, St John's Wort…'. With over 80 publications, his monograph on the genus *Hypericum* covers 490 species and was finished in 2010.

"With over 80 publications, his monograph on the genus *Hypericum* covers 490 species and was finished in 2010."

Norman's gentle friendly nature endeared him to all, and he will be much missed. He passed after a short illness at the age of 93. A longer piece about Norman and his work will feature in a future issue of *The Linnean*.

Keith Hyatt image © Janet Ashdown; William Stern image supplied

Paul Wenning Sowan FLS (1940–2021): Paul sadly passed away on 4 June this year. Having been a teacher of geography and science, he was a regular user of the Linnean Society's Library, elected FLS in 1971, using his visits to deliver recent publications from the Croydon Natural History and Scientific Society, having served as their Secretary in 1963. He had also been a director from its incorporation in 1967, and later served as President (twice), Honorary General Secretary, Company Secretary and as Honorary Librarian and Archivist. Paul was also a great catalyst for Croham Hurst in South Croydon becoming a Site of Special Scientific Interest (SSSI). A fuller obituary can be found here: obituary-paul-wenning-sowan-1940-2021-4.pdf (wordpress.com)

William Stern FLS (1926–2021): William Louis Stern, or 'Bill' as he was more familiarly known, died on 1 November 2021 at the age of 95. Among his many honours over the years, Bill served as President of the Botanical Society of America (1985–86), President of the American Society of Plant Taxonomists (1981), founding member of the Association for Tropical Biology, and served on the Board of Directors of the American Institute of Biological Sciences (1987–89). In 1987 he was named a Distinguished Fellow of the Botanical Society of America.

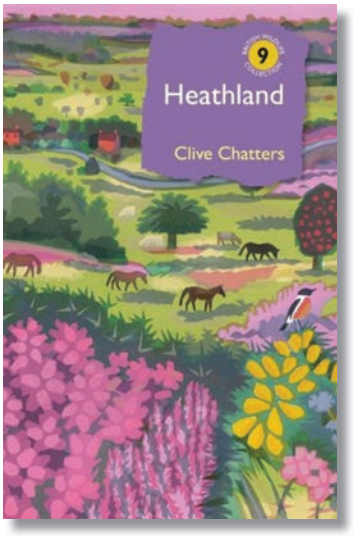
He also served as Chairman of the Department of Botany of the Smithsonian Institution (1964–67), Professor in the Department of Botany there 1967–79), Program Director of Systematic Biology at the National Science Foundation (1978–79), Professor in the Department of Botany at the University of Florida (1979–2002), and Chairman of that Department (1979–85). He edited *Tropical Woods* (1953–60), *Plant Science Bulletin* (1962–65), *Memoirs of the Torrey Botanical Club* (1972–75), and was editor and founder of *Biotropica*. In 1972, Bill was elected a Fellow of the Linnean Society.

Book Review

Heathland

Clive Chatters

432pp, Bloomsbury Wildlife, 2021, hardback
Col. illustr. £35.00 ISBN 9781472964748



As the 9th volume in Bloomsbury's ambitious British Wildlife Collection series, *Heathland* covers lowland open spaces of Britain in a vast narrative of scale and depth. Clive Chatters revises and updates elements of histories of the British countryside (like that of Oliver Rackham) by looking at biodiversity and landscapes, but also culture, management and conservation. Heathlands are introduced from the start, delving into their emergence from the ice ages as mixed landscapes often bordered by woods, rivers and marshes encompassing aspects of moorland, chalk downs and sand dunes. They represented vast areas of commons before enclosure, modern agriculture and even golf courses began to confine them.

From Scotland to Cornwall, there are impressive species accounts, not just heather or bracken, but fungi, other ferns, orchids and rarities—the only extant population of Welsh Chweinllys Arfor, or South Stack fleawort, is in Ynys Gybi. Localised British extinction lists are given, as well as more recent total extirpations like the Alpine butterworth, extinct in a matter of decades from discovery. Black grouse were southern birds, whereas great bustards became extinct from Breckland, a heathland now less than 1/8th the size it was in the 1930s.

Heathlands occur in *Beowulf*. Naturalists, painters and poets have provided vivid documentations and laments. 'In these days of drainage and reclamation of land it is very refreshing to the Naturalist to find here and there patches in almost a primitive state. Scotton Common is still one of these … and it may long remain so.' Sadly, young local curate Francis Blathwyte's 1908 optimism was misplaced. John Clare's poems and fieldwork, or Constable's concerns about Bergholt's heath echo in paintings that remain in our culture, but Hounslow Heath is but an atom of its former self. Heaths have been drained and ploughed, and even the grazing and the dung that supported a wealth of invertebrates is now in decline.

The author is painstaking in detail and photographs amply provided. This is a considerable reference that would deserve repeated readings for both experts and those who enjoy the countryside. The inception of the National Trust and visions of rewilding offer rays of hope in a battle against intensive agriculture, urban spread and climate change. It's useful to see heathland in context as part of the idea of an Atlantic wilderness.

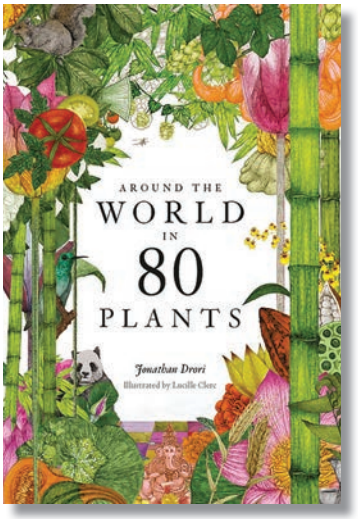
There's vision: '… we know enough about these habitats to secure their place in the countryside of the future, as an integral part of British culture and home to a wealth of species that occupy ecosystems of immense richness.' But the work's dozen chapters are cemented in a realism that provides a substantive archive, and a possible prospectus.

Rajith Dissanayake

Around the World in 80 Plants

Jonathan Drori

216pp, Laurence King Publishing, 2021, hardback
Col. illustr. £20.00 ISBN 9781786272300



This book was difficult to review: it was removed from beside my reading chair by visitors who became enchanted by it! Drawn in by Lucille Clere's illustrations, they became engrossed in the text as well, dipping in and out of the short accounts of the plant species included.

The book is not aimed at botanists in their professional capacity, but Fellows may find it useful to help enthuse those who, like many pupils, say, 'plants are boring: they don't do anything!' While Drori does not focus on plant behaviour, fascinating instances come close: for example, spore 'launching' by horsetails; 'luring' pollinators or prey; 'attacks' on utility cables by *Nuytsia* roots. (Drori admits 'it is hard not to anthropomorphise'.) The behavioural focus is on human interaction with plants: the number of species used as aphrodisiacs is surprising; although this may be an artefact of species choice it certainly grabs the reader's attention.

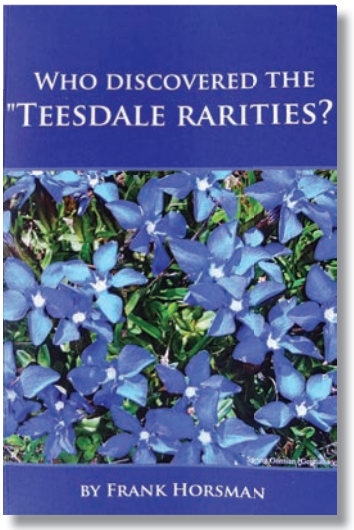
Organisation by 11 regions of the world reflects not only species' places of origin, but also areas where they facilitate a good story. The opium poppy is dealt with in Oceania, because Tasmania is 'the world's largest legal producer'. (Authorities are not cited in the book, but the related website—www.jondrori.co.uk/80plants—includes species-specific citations, with hypertext links where available, although I couldn't verify that this statement remains true.) The southern magnolia is dealt with in North America, its origin, and the main story is of its co-evolution with beetles, although its human relevance as 'a common motif in southern style weddings' or 'a potent symbol of the white American South—sometimes distastefully so' is not neglected.

There are many modern books that use a similar 'organising' principle, each entry a stand-alone item. Such a method is not new. The medieval *Bestiary* has a similar feel,

while of course having an overriding purpose: each creature being a kind of moral entity, revealing the way to redemption. Here Drori also has a moral message, implicit in every account, and explicit in his introduction: we must protect biodiversity and avoid the hellish consequences of its reduction.

A. M. Lucas

Who Discovered the 'Teesdale Rarities'?



Frank Horsman

153pp, Self-published, 2021, paperback
(For illustr., visit www.etheses.dur.ac.uk/983/) £19.00

Like much else, the remarkable alpine flora of Upper Teesdale in the North of England came to the wider notice of botanists in the first part of the 19th century. If you have read anything on the history of its discovery you may expect the answer to the book's title is the Backhouse family, father and son, and the Teesdale lead miner, John Binks (1766–1817) who guided them on his days off. You may also know of the Rev. Harriman, a curate in Middleton. These names, like many assertions, are copied from text to text, without serious questioning. However, as the author convincingly argues in considerable detail, the credit should really go to the little-known surgeon, William Oliver, who came from Edinburgh to the 'Dale in 1783. To be fair, he also mentions the earlier work of the 17th-century botanist Ralph Johnson, correspondent of John Ray, but his work was not widely read. Oliver's 18th-century surgical training was an apprenticeship which required knowledge of botany, as so many remedies were prepared from plants collected from the wild, or from the medicinal garden. Most probably he was armed with John Lightfoot's *Flora Scotica*, published during his training in 1777, in English with Linnaean binomials, and which was very applicable to Teesdale. A few years after arriving he was indeed joined by Rev. Harriman, who borrowed his copy of Lightfoot (sound familiar?). They worked together on Lichens, contributing several new species to James Sowerby's *English Botany* but Oliver was the more experienced. You do not master lichens quickly. However, Harriman was the 'gentleman' while the surgeon was a tradesman, and this must, at least partly, explain the lack of recognition afforded him.

This work is from the author's Ph.D. thesis that he has reworked into a narrative for the book. It remains academic with many references and it is very closely argued. It is based on original documentary sources. Since these are quite dispersed (some of

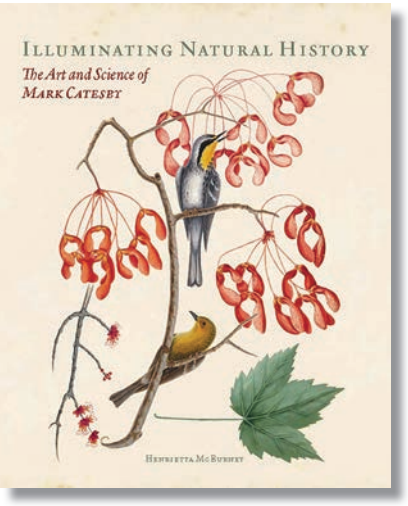
them were at the Linnean Society), this must have been very time consuming, and as he implies, sometimes frustrating. It is a *tour de force* in the history of botany. The reader is left with little doubt that Surgeon Oliver was the man who first recognised the assemblage of the 'Teesdale Rarities' and that he had done so by the end of the 18th century, even though better-known names made discoveries there subsequently. In dealing with the claims of those later botanists, the book also explains a lot about how botany was done and publicised at the time. It is not a very easy read; initially the format is rather intimidating and you have to concentrate. However, I think it tells an important story with one lesson being that, as well as being a good botanist, you have to be published if you are to be remembered. Another is the importance of separating facts from opinions and going back to original sources to find them. As noted, there are no illustrations but these can be found at the website quoted at the head of this review. That is, of course, awkward, but with a self-published book compromises have to be made.

Brian Livingstone FLS

Illuminating Natural History: The Art and Science of Mark Catesby

Henrietta McBurney

352pp, Paul Mellon Centre for Studies in British Art/Yale, 2021, hardback
Col. Illustr. £40.00, $50.00
ISBN 9781913107192



In recent years there has been a remarkable revival of interest in the British naturalist, artist and scientist Mark Catesby (1683–1749). There have been several books and even an institution and a trust founded in his name, The Mark Catesby Centre at the University of South Carolina and the Catesby Commemorative Trust. It is good to see a revival of interest in this great naturalist of the early 18th century, who seems to have been unfairly overshadowed by Audubon. This book does a lot to show why we should be reminded of Catesby again today. Catesby's two extended trips to America, in Virginia (1712–19) and in South Carolina and the Bahamas (1722–26) resulted in a large portfolio of magnificent paintings that were published in his *Natural History of Carolina, Florida, and the Bahama Islands*. Many of his paintings are reproduced in this new, beautifully illustrated book. Catesby's paintings are those of a naturalist, as many are of both plants and animals; he was one of the first naturalists to depict the interactions between animals and plants.

This fact is well emphasised by McBurney, and several examples are given, such as Catesby's illustration of a *Sarracena* pitcher plant with a frog, or of a hummingbird visiting the flowers of a *Campsis radicans* trumpet creeper (*RIGHT*).

I particularly like the chapter on 'Catesby as a horticulturist'. The paintings have been given a lot of attention recently, but not so much is remembered about Catesby's plant introductions of ornamental trees and shrubs from America, for Catesby's trips to the Americas were largely funded by sponsors specifically wanting him to collect living plants. He was obviously a keen and expert gardener as well as a naturalist and artist and his contribution to plant introductions and horticulture is well documented here. Much of the horticultural information presented here is taken from Catesby's detailed labels on his herbarium specimens which are mainly deposited at the Natural History Museum in London. Several images of Catesby herbarium specimens and their extensive labels are reproduced here. Catesby himself gardened enthusiastically both while living in America and after when he returned to London. His association with many great gardens and great gardeners such as Peter Collinson's garden at Peckham is well documented. Many of the seeds and plants collected by Catesby were sent to William Sherard's brother James for the brothers shared a garden in Eltham, Kent. The Chapter on 'Catesby as an artist' is equally interesting and it shows how Catesby was influenced by the work of other artists, particularly by Georg Ehret.

A very useful feature of this book is an appendix that reproduces all the known extant letters from Catesby, some of them published for the first time. Many of them are to William Sherard, several to fellow plant collector John Bartram, six to one of his sponsors Hans Sloane, and even one to Linnaeus about a shipment of live plants selected by Catesby for the cold winter climate of Sweden and attaching a copy of his *Catalogue of American Trees and Shrubs*. These letters reveal a lot about Catesby's enigmatic character and his interests in science and horticulture. They are an important record of the exchange of plants to and from America. The extensive notes and bibliography at the end of this book shows the thorough research involved in telling us more about this amazing and important artist and naturalist.

This well-researched book by a historian is a fascinating read and it reproduces well many of Catesby's paintings and other illustrations about his life. I am sure that it

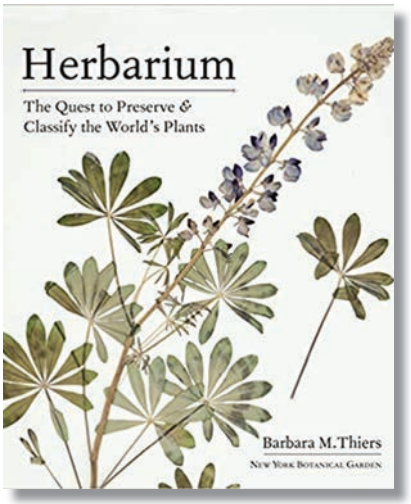
will turn out to be the definitive study of this great and versatile naturalist and artist Mark Catesby.

Ghillean Prance PPLS

Herbarium: The Quest to Preserve and Classify the World's Plants

Barbara M. Thiers

304pp, Timber Press, 2021, hardback
Col. Illustr. £30.00
ISBN 9781604699302



This somewhat oversize, but beautifully illustrated, book explains the origins and uses of the dried pressed plant collections gathered together in herbaria. Rather that taking an academic approach, with numerous notes and references, it is a narrative, often focussing on the achievements of key persons that helped create herbaria, telling the stories of how herbaria were established, again with a focus on key places and institutions. With five main sections, each with an introductory page, colour images and maps, it describes the origins, importance and features of herbaria in Europe, Australia, Brazil, China and the USA. A final chapter explains their current uses in everything from DNA identification to providing data on phenology and climate change, as well ways in which anyone can help in maintaining herbaria. An Appendix lists selected herbaria and another gives selected reference. The Linnaean herbarium obviously features in it, with appropriate images.

It is an easy read, and the author tells interesting stories, often of the role played by women, from Jeanne Baret (Philippe Commerson's assistant on Bougainville's voyage) to Alice Eastwood (who risked her life to save the California Academy of Sciences type specimens from fire rather than her own possessions). Thiers brings information together to explain the present destination of many collections, including the cryptogam exsiccate that were often sold and exchanged worldwide.

While more detailed reference sources would have been useful, the readability of her text would have been lost. The hope is that a book such as this will help in explaining the importance of herbaria, prevent any future losses and possibly engage a new cohort of volunteers, supporters and patrons.

Gina Douglas FLS

233rd Anniversary Meeting of the Linnean Society

Online (via Zoom)

18.30 pm, Friday 24 May 2021

1. **Welcome to the closed session:** The Linnean Society of London (LSL) President, Sandy Knapp, welcomed Fellows to this online meeting.

Part I – AGM

2. **Apologies for absence:** No apologies for absence reported at the start of the meeting. (NB. David Hardman sent apologies that were conveyed to the President after the meeting.)

   An announcement was made to acknowledge the loss of Fellows who have given important service to the LSL over the years:

   - Ray Desmond, on the Library Committee for many years, Honorary Archivist in 1996 and one of our Fellows honoris causa (see *The Linnean* 36(1) p. 31)
   - Trevor James, a loyal supporter of our Taxonomic and Systematics Committee
   - Georgina Mace, Council member and personal source of support for the current President (see *The Linnean* 36(2) p. 41).
   - Robert May, helped the LSL increase its relevance at a critical time (see *The Linnean* 36(2) p. 42).
   - Eve Williams, Clerk and volunteer at the LSL (see *The Linnean* 36(2) p. 42).

3. **Minutes of meeting held on 1 April 2021:** The record of this virtual meeting is available on YouTube. The President took the opportunity to thank Padma Ghosh for organising an amazing series of events during the pandemic and making them available on YouTube.

4. **President's Report (for the period 1 January 2020–31 December 2020)**

   The President directed Fellows to the Annual Report, available online, to read in detail about the many achievements of the LSL. She took the opportunity to thank all the staff for their hard work and dedication to the LSL over the past year.

   The President summarised the 2019 reframing of the vision of the LSL 'A world where nature is understood, valued and protected', as well as the mission and values. These were put together by a small group of Council led by Paul Henderson and are important for the future of the LSL to stay relevant and able to address the challenges facing today's society. The President gave thanks to Paul and those involved in this work.

In 2018 the LSL Council commissioned a governance review to make recommendations for how the LSL needs to change or improve its structures and governance. This review made 16 recommendations, most of which were accepted by Council. Progress so far includes:

- Appointed a CEO
- HR function implemented
- Starting the process of revising the Bye-laws

One of the challenges facing LSL over the year concerns the discussions with our landlord, MHCLG (Ministry of Housing, Communities and Local Government). Escalating rents mean that more and more of our charitable resources are being spent on rent rather than on our charitable purpose. Council made the decision to:

- Continue discussions with the landlords to find an agreeable solution.
- Launch a public campaign alongside other societies around the Burlington House Courtyard (this resulted in publicity in the national press). As part of this campaign, Fellows and supporters were asked to write to their MPs. Of the 600 letters written to MPs, 100 were written by Fellows of the LSL, and the President thanked all the people who have supported the society in this way.
- Form a Location Options Group to consider alternatives.

Last year a resolution was passed that obligated the LSL to report on progress to address the Planetary Emergency. The Linnean Future Committee was established (chaired by Steph Holt) to take this forward, with four key principles: (a) practice what we preach; (b) support the science; (c) share our expertise; and (d) inspire action. This Committee has collected data that show our carbon emissions have gone steadily downwards from 2018 to 2021. They have also produced a Carbon Action Plan that can be downloaded from the LSL website.

In 2021 we said farewell to Elizabeth Rollinson, our Executive Secretary. We thank her for her almost 10 years of sterling service to the Society, and to the study of natural history more generally. She will remain with us as part of the Percy Sladen Trust administration, and has been unanimously nominated by Council for Fellowship *honoris causa*.

5. Introduction of Gail Cardew, Society CEO

We welcomed the LSL's first CEO, Gail Cardew, who had been in post for just over a month. In that time she prioritised getting to know the staff and found them to be extremely committed, talented and passionate about the Society's vision. She thanked them for all their support with the settling-in process. She explained that her background is rooted in public engagement within the scientific, cultural and heritage sectors, and she is committed to the new vision of the LSL, and to increasing the society's relevance, impact and visibility.

6. Treasurer's Report

Ed Banks took over as Treasurer in May 2020, and thanked his predecessor Mark Watson for ensuring an orderly handover and Priya Nithianandan (Head of Finance).

The Treasurer was pleased to report that the finances have remained resilient during this challenging year of the COVID-19 pandemic. The income for the year was £2.3 million, which is a modest improvement over 2019. The majority of this came from the publication of our three journals. Income from room hire was down, but we were fortunate to receive donations and legacies, which more than compensated for this short-fall. The Society is extremely grateful for these very generous donations and legacies during this unusual time.

The expenditure for 2020 was £1.5 million. This was broadly consistent with the expenditure the previous year, but there was a change in breakdown, with more money spent on rent and less on deferring projects that could not be carried out due to the pandemic. There was also a sensible level of cost control. The net result of this was a surplus of £830k including gains on investments.

On the balance sheet, net assets increased during the year, now standing at just over £8 million, which includes over £2.5 million of heritage assets that we would not monetise. More detail on the financial reporting can be found in the Annual Review 2020 on the website.

As part of the Linnean Future Committee, we have implemented an Ethical Investment Policy. Our investment company Tilney, have a long-term target of delivering a return on investments of at least 3% per annum above inflation. This involves a medium level of risk, and also now need to abide by the principles in our Ethical Investment Policy.

In December 2020, we took the decision to renew the publishing contract with Oxford University Press for a further five years.

We expect the financial outlook for the Society over the medium and long term to continue with the same trends. Income from room hire will be down due to the pandemic and there may be a slight decline in publishing income. We expect expenditure to remain tightly controlled, but to continue to invest in our charitable activities. Rent will also increase, but we still expect to deliver a small surplus in 2021. Open access publishing and the rent increases represent risk areas in the future.

7. Appointment of Auditors

This year we ran a tender process to choose a new auditor for 2021 and beyond. The committee received a number of tenders from a strong field, and concluded that our existing auditors, Knox Cropper, provided the best service and value

for money. The recommendation of Council is therefore to continue with Knox Cropper Chartered Accountants as our auditors.

8. Confirmation of banking arrangements

The recommendation of Council is to continue with Barclays, i.e. to stay with our current banking arrangements.

9. Motion to accept Accounts for 2020—Audit Committee member

As a member of the Audit Committee representing the fellowship, Robbie Blackhall-Miles proposed a motion to accept the accounts for 2020 as a full and accurate record of its activities.

10. Introduction to the Society's new CRM system (video)

Over the last year the staff having been working to implement a new Customer Relationship Management (CRM) system with a company called Very Connect. The President thanked the staff for all their hard work in preparing for the launch, including the arduous task of cleaning all the records. A video introducing this system was presented.

11. Any other valid business

No areas of other valid business were received in advance of the meeting. However, the President encouraged those present to pose their questions using the online 'chat function'.

Areas discussed:

- In the CRM system, Fellows will be able to manually add their areas of expertise if they are not on the list. They will also be able to pay their subscriptions using direct debit.
- The LSL might wish to consider transferring some of their banking to an ethical bank. Our investments have a blanket ban on sectors such as arms and tobacco. Mining is a complex area, and we have asked Tilney to look into this further.
- We received generous legacies from people who have been involved in LSL and we are very grateful.
- The LSL will be looking at membership as part of the governance review. Questions were asked about life membership. A suggestion of a member-sponsor-another member was presented.
- The LSL is working with people who are not currently engaged with **n**atural history through various programmes throughout the UK, such as the BioMedia Meltdown project and the Our Local Nature grants scheme. We are also looking at our collections in more inclusive ways.
- The LSL is buying energy from non-renewable sources, but we are looking at changing this as part of our Carbon Action Plan.

- We are continuing negotiations with our landlords in good faith and we hope we can find a solution. The Society may have more news around six weeks after the AGM; if we do we will write to Fellows. DCMS (the Department of Culture, Media and Sport) is involved in these discussions. The Royal Academy is supportive of the Courtyard Societies remaining.
- When COVID-19 restrictions are lifted, we expect to use virtual communication systems (e.g. Zoom) for some of our meetings and events in a hybrid model, as we have found them to be more accessible for people who cannot travel.
- We make our library resources more widely available online. Currently, we have an online digital collection, offer virtual treasure tours, write blogs and share content on Twitter. All this helps to attract a younger audience, but we think physical libraries spaces are not obsolete.

12. Voting procedures

The Fellows were directed to the Members' Area on the website to vote for the Fellows *honoris causa*; new members of Council; a President-elect, accepting the accounts; reappointment of the auditors; and the banking arrangements.

The President closed this section of the meeting and thanked the Fellows for attending. The stats showed that nearly 170 Fellows took part from 44 different countries.

A break followed for Fellows to vote, and the Anniversary Meeting reconvened for presentation of the Medals and Awards.

Part II – Medals & Awards 2020 & 2021

The President welcomed everyone back to this wider session, giving a brief review of the Society's 'Vision and Mission' for new arrivals, and explained that this session would include awards for both 2020 and 2021, it not being possible to present these in 2020, as originally planned.

Linnean Medal (Botany) 2021

Dr Shahina Ghazanfar, Royal Botanic Gardens, Kew

Dr Shahina Ghazanfar is based at the Royal Botanic Gardens Kew and as an associate professor at Sultan Qaboos University, Oman, she founded the country's first institutional herbarium in 1990. Extensive fieldwork led to the publication of the four-volume Flora of Oman (2003–18). Her work at the University of the South Pacific, Fiji, resulted in the publication *Trees of Fiji*. She joined Kew as co-editor for the Flora

of Tropical East Africa, and as Head of the Temperate Regional Team (covering Australasia and Eurasia), she developed projects through Kew's Innovations Unit establishing herbaria, seed banks, restoration projects, use of native plants for landscaping, and building capacity in Arabia. Shahina was instrumental in reactivating the Flora of Iraq project in 2011, and as lead co-editor she published two new volumes of the Flora (2013–19).

Linnean Medal (Botany) 2020

Professor Juliet Brodie, Natural History Museum, London

Professor Juliet Brodie is a preeminent international expert in seaweeds, with research spanning over 30 years, ranging from genomic approaches to macroalgae and microbiomes to taxonomy and phylogenetics. She is the leading world authority on the taxonomy and phylogenetics of the Bangiales, and was the first to apply molecular techniques to distinguish species and to recognise distinct phylogenetic groupings, subsequently revolutionising the study of this group. Juliet is highly invested in science outreach, and has also held several Presidencies, including being the first female President of the Systematics Association since its inception in 1925. Additionally, she is Editor-in-Chief of the *European Journal of Phycology*.

Linnean Medal (Zoology) 2021

Dr Mary Jane West-Eberhard, Smithsonian Tropical Research Institute

Entomologist Dr Mary Jane West-Eberhard studies the complex societies, behaviours and phenotypes of social wasps, and performed the first field test of kin selection, demonstrating that such selection was not based on high degrees of relatedness, thus reconceiving the evolution of sociality. Her research has led to advances in developmental plasticity and evolution, and her work with alternative phenotypes has shown that plasticity can lead to novel traits and then to genetic divergence and speciation. When her book *Developmental Plasticity and Evolution* was published in 2003, George Williams called it 'a classic that people will be quoting decades from now'. Mary Jane is a member of the National Academy of Sciences (USA) and served on its Human Rights Committee as Vice-Chair.

Linnean Medal (Zoology) 2020

Professor Ben Sheldon, University of Oxford

Professor Ben Sheldon's ground-breaking studies in wild birds, which combine innovative methodologies, including field experiments, behavioural analyses and quantitative genetics, have led to important insights into ecology, evolution and behaviour. His work has encompassed the role of phenotypic plasticity in adaptation, the ecology of social behaviour and the nature of information flow in wild populations. By studying sexual selection, specifically sperm competition in wild birds using molecular genetic markers to measure critical variables, Ben's work has shown that social links between individuals drive variation in behaviour at the individual level, and are crucial for understanding information transmission and that the structure of social networks could modify, or even change the direction of, natural selection on behaviour.

Bicentenary Medal 2021

Dr Scott A. Taylor, University of Colorado, Boulder

Dr Scott Taylor is an evolutionary biologist at the University of Colorado, Boulder who uses natural hybrid zones and recent radiations in birds to understand the genetic bases of traits involved in reproductive isolation, population divergence, speciation, and the impacts of anthropogenic change, including climate change, on species distributions, interactions, and evolution. He has a record of highly visible and field-advancing academic research in evolutionary biology using genomics integrated with field biology and natural history, and is a recognised leader in the field of ornithology, having been awarded the Ned K. Johnson Young Investigator Award by the American Ornithological Society in 2018. Scott is committed to improving inclusivity in the STEM community, and his ability to communicate effectively about science and natural history is evident in events ranging from academic conferences to public venues including TedXBoulder and Story Collider.

Bicentenary Medal 2020

Professor Kayla King, University of Oxford

Professor Kayla King is an evolutionary ecologist who explores the coevolution of species interactions from across snails, insects and worms to bacteria and viruses, sparking a re-think of how species interact in nature over evolutionary

time. Her work has shown that genetic diversity limits disease, fuels coevolution, and can be enhanced by polyploidisation and hybridisation. She has observed that parasites can retaliate, boosting their transmissibility, but at a cost to virulence. In her experiments, hosts coevolve to accommodate protective symbionts, in an unprecedented show of the adaptive processes involved in mutualism. Kayla also serves on several editorial boards and works with organisations such as the Young Academy of Europe to inform science policy on climate change.

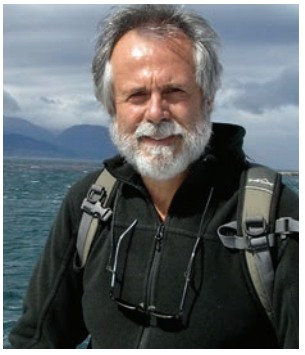
Darwin-Wallace Medal 2021

Dr Sarah P. Otto, University of British Columbia

Dr Sarah Otto (known as Sally) is a Canadian mathematical evolutionary biologist at the University of British Columbia. Her work has generated a new and much more focused synthesis of the debate about the evolution of sex and recombination, in spite of its known evolutionary costs. Sally has developed new models that show that genetic drift, even in rather large populations, can provide a major evolutionary impetus for the evolution of sex. In 2000, she published a landmark paper estimating the fraction of plant species that originate by polyploidy. Her iconic 'saw-tooth' graph of the distribution of chromosome numbers recorded in plants demonstrated that species with even numbers of chromosomes tend to outnumber species with odd numbers due to recent speciation by chromosome doubling. Sally also co-founded the Canadian Society for Ecology and Evolution, and has served on panels advising the Canadian government on climate change mitigation.

Darwin-Wallace Medal 2020

Professor Spencer Barrett, University of Toronto



Professor Spencer Barrett is one of the world's leading authorities on the reproductive biology and genetics of flowering plants, and is a Fellow of both the Royal Society of Canada and the Royal Society of London. Among his original findings are the first experimental demonstration of the selective purging of deleterious genes following inbreeding, the first genetic estimates of effective population size, and the most

comprehensive evidence for the role of genetic drift in initiating adaptive changes in plant mating. His work has also demonstrated that self-fertilisation involves hidden costs because of lost mating opportunities through male fertility, and he provided the first experimental evidence in support of the Darwinian hypothesis for the adaptive significance of tristyly, as well as solving the long-standing puzzle of the evolution and function of mirror-image flowers.

Irene Manton Prize 2021

Dr Sophie Harrington, University of East Anglia

For thesis titled 'Understanding the molecular and genetic mechanisms regulating senescence in wheat'

Understanding senescence (aging) in crops is essential for improving food security. Dr Sophie Harrington's work focused on understanding the regulation of monocarpic senescence in wheat, and by using novel TILLING populations, she mapped new mutants, identifying some that were caused by specific missense mutations in the known senescence regulator *NAM-A1*, a NAC transcription factor. This led to identification of specific residues which were essential for protein function and which are likely to have similar roles in NAC transcription factors across all plants. In collaboration with colleagues, Sophie developed a toolkit of plasmids which can be used to generate heat-shock-inducible transgenic constructs for cereals to investigate the roles of other transcription factors in the regulation of senescence. Her work showed that transcription factors *NAM-1* and *NAC3* work together to regulate the onset of senescence in wheat, and has generated new insights into plant aging.

Irene Manton Prize 2020

Dr James Clark, University of Bristol

For thesis titled 'Whole genome duplication and the evolution of the land plant body plan'

Dr James Clark's thesis improves our understanding of whole genome duplication, or WGD, by establishing methods for characterising WGD events and their outcomes over geological time. It presents novel methods to identify WGD events using phylogenomics, pinpointing which species have undergone a specific WGD event, and novel applications of molecular clock methods to estimate the precise timing of each given event. James' thesis also establishes a

method for capturing phenotypic disparity across broad taxonomic clades, such that hypotheses linking WGD and phenotypic complexity can be tested within a comparative framework, something which has previously never been attempted. It is anticipated that this research will contribute to debate over several pressing issues including the role of polyploidy in mass extinctions and crop evolution, as well as the evolution of the flower.

John C. Marsden Medal 2021

Dr Benjamin Van Doren, University of Oxford

Thesis titled 'Flexibility in an avian migration across scales'

Migratory birds form a network of organisms that connect the world, serving as indicators of ecosystem health. Dr Benjamin van Doren's thesis surveyed the drivers of bird migration, and using a wide variety of data, he focussed on the contributions of the innate migratory program and birds' responses to environmental cues and conditions. He showed how natural selection can act on birds' migratory strategies and that ongoing responses to climate change in long-distance migrants involve not only phenotypic plasticity, but also evolutionary change. The thesis revealed that variation in migratory phenotypes may be key to responding to environmental change. Benjamin also developed methods to reliably predict nightly avian migratory movements, and showed that artificial light at night can drastically affect migratory journeys, with human impact also affecting their broader ecology. His methods for prediction will have wide-ranging applications.

John C. Marsden Medal 2020

Dr Patrick Kennedy, University of Bristol

Thesis titled 'Uncertainty and the evolution of altruism: Theory and fieldwork in the paper wasps of Central and South America'

Dr Patrick Kennedy's thesis considers two major topics of broad biological relevance: how unpredictability in environmental conditions can impact the evolution of altruism (costly helping of others) and why some individuals in social wasp populations drift between nests (helping at colonies other than their own). He tackled the first using complex analytical modelling and evolutionary simulations, while the second involved arduous fieldwork, experimental manipulations and sophisticated statistics. The breadth of approaches, and the expertise shown, is highly unusual. Patrick

has also been active in outreach to schools internationally, as well as an invited speaker at meetings in UK, Portugal, Switzerland Brazil and Panama.

Trail-Crisp Award 2021

Dakota E. McCoy, Harvard University

Dakota E. (Cody) McCoy's innovative use of microscopy has revealed new insights into the phenomenon of colour. Using SEM, micro-CT, and ray tracing models, Cody and her colleagues showed that some birds-of-paradise have 'super black' feathers that absorb as much as 99.95% of incident light, due to novel micro-scale structures which trap and iteratively absorb light, causing nearby colours to look impossibly bright. She paired scanning electron microscopy with finite-difference time-domain optical simulations to discover that peacock spiders have an array of light-focusing bumps, shaped and sized to absorb more, and reflect less, light in partnership with melanin pigments. Cody has shown that micro-scale structures have a significant impact on appearance, and her discoveries have inspired not only new studies of structural light manipulation in many animals, but also have had an impact in fields as diverse as new solar technologies and bio-inspired artwork.

H. H. Bloomer Award 2021

David Lindo

David Lindo is a broadcaster and writer who has been fascinated with birds since he was a child, observing and recording the birds around him while growing up in London. Known as the Urban Birder, his primary work is now in science communication, enthusing others to share his passion about birds right in the heart of cities where many people, particularly urban-based youth, can feel disassociated from, and disinterested in nature. The ongoing effect of his work is in expanding biological recording to areas and communities where it may be rare. David actively advocates for diversity and inclusion in natural history, advising government and NGOs worldwide, and runs the online Urban Birder Club. He was also recently named one of the most influential people in wildlife by *BBC Wildlife Magazine*.

H. H. Bloomer Award 2020

Hans de Blauwe

A fireman by profession, Hans de Blauwe is an extraordinarily productive amateur naturalist with a particular interest in colonial marine invertebrates (bryozoans, hydrozoans, ascidians). Over the last 20 years, Hans has authored 97 papers on these typically difficult groups that include the description of 17 new bryozoan species and three new bryozoan genera, numerous reports of non-native/invasive species, and new species records for Europe. He has published an expertly-written identification guide for the bryozoans from the Southern Bight of the North Sea, which is expertly written and all the more important when considering there are currently no employed bryozoologists in any of the Benelux countries. His publications have also been raising awareness of plastic substrates as rafting material facilitating long-range dispersal of encrusting epiphytes.

Jill Smythies Award 2020

Alice Tangerini, National Museum of Natural History, Smithsonian Institution

Alice Tangerini has made diagnostic illustrations for over 1,000 plant species in pen and ink, graphite, and more recently in digital media, for a variety of publications including botanical books and journals. Her detailed portrayal of their diagnostic characteristics have meant that her drawings can be used to distinguish a species, and her accuracy has resulted in authors changing many descriptions. Using mainly herbarium specimens as her resource material, her illustrations portray each species in a realistic manner, with reconstruction necessary to remove the artefacts of drying and physical damage, and significant taxonomic characters are enlarged with the aid of a microscope. As a result of Alice's detailed examination of a proposed new species of bromeliad, authors Lyman B. Smith and Harold Robinson named it Navia aliciae in her honour.

THE NEXT **ANNIVERSARY MEETING** WILL BE ON **TUES 24 MAY 2022**.

Fellows Elected April–Dec 2021

Dr Peter Adams
Mrs Susan Alexander
Dr Keshav Lalit Ameta
Dr Waheed Arshad
Dr R. S. Balamurali
Prof. Saroj Kanta Barik
Mr Lee Beaumont
Dr Herrick Brown
Ms Áinne Burke
Prof. John Carr
Mr Paul Cawsey
Dr Kok Gan Chan
Ms Julian Child
Dr Madhukar Chowdary
Dr Theresa Crimmins
Dr Saswati Das
Mr William Dean
Dr Steven Dodsworth
Prof. David Dunér
Dr Pranab Dutta
Ms Linnea Drexhage
Mrs Margaret Easter
Mr Les Evans-Hill
Dr Fatem Filimban
Mr James Firth
Prof. Andrew Gale
Mr Gerald Gardiner
Mr Chadwick Hagan
Ms Jeanette Hall
Ms Heidi Henderson
Dr Frank Hirth
Dr Peter Holt
Dr Dominik Huenniger
Ms Gillian Jones
Dr Carina Kern
Dr Ashwani Kumar
Dr Sujata Magdum
Mr Richard Mair
Mr Kit Malthouse
Dr Sumit Mandal
Ms Julia Massey stewart
Ms Lindsey Martin
Prof. William McComas
Dr Gaurav Mishra
Dr Joseph Monks
Dr Andrew Nicoll
Mr Christopher O'Brien
Dr Julien Ochala
Dr Priyanka Panwar
Mr Felix Parker-Smith
Mr Daniel Phillips
Dr Phil Richardson
Lord John Randall
Dr Mathukumalli Rao
Ms Geetanjali Sachdev
Mr Allen Sandico
Dr Rupa Sanyal
Dr Madan Mohan Sharma
Dr Merlin Sheldrake
Mr Jared Shiffert
Dr Martin Štefánik
Dr Gautam Srivastava
Dr Simon Strietholt
Mr Matthijs Strietman
Mrs Christine Taylor
Prof. Parimelazhagan Thangaraj
Dr John Thompson
Mr Anthony Thorn
Mr Thomas Travers
Mr Willem Van Gulck
Mr Christopher Woodard
Mr Nayer Youakim

Associates

Mr Stuart Abram
Mr William Ashford
Mr Marko Bogdanovic
Mr Donald Browne
Dr Janet Cole
Associate Prof. Lucinda Cole
Dr Ana Costa
Mr Simon Claybourn
Ms Dorothy Davison
Ms Katherine Hartle-Mougiou

Mr James Haselman

Dr Helena Helmby

Mr Odel Hilgendorf

Ms Jo Homan

Mr Andrew Hood

Ms Graziella Iossa

Dr Carol James

Mr Thijs Koster

Ms Amelia Lewis

Mr Robert Luck

Dr Alison Mason

Mr Joshua Pacheco Gonzalez

Ms Alison Petretti

Mr Leo Plass

Ms Sarah Roberts

Prof. Gauri Saxena

Mr Christian Sweeting

Mr Dmytro Tupchiienko

Mr Kevin Upton

Students

Mr Bernhard Kløw Askedalen

Mr Gwyn Cooper

Mr Juan Fernando Cuestas Carrillo

Ms Sian Chalkley

Mr Charlie Day

Mr Regan Drennan

Mr Scott Galloway

Ms Katie Lois Hutchinson

Mr Seán Thomas Kane

Mr Sachin Bhardwaj Lock

Mr Geoffrey Morley

Mr Muthukumaran Panchaksaram

Ms Kailin Sun

Deaths Reported to Council

Mr Stuart Baldwin

Mrs Ann Birnie

Dr Quentin Bone

Mrs Jean Brenan

Mr Ian Caldwell

Prof. Thomas Cavalier-smith

Dr David Chapman

Dr Anthony Farmer

Dr Emma Hampton

Mr Frederick Hechtel

Mr Harold Holthouse

Mr John Howlett

Mr Nigel Hughes

Mr Keith Hyatt

Dr Malcolm Jenkins

Prof. Malcolm Lader

Dr Andrew Lyall

Prof. Walter Lewis

Dr Angela Milner

Prof. Brian Morton

Dr Donald Noakes

Dr James Parker

Dr Bruce Riddoch

Dr Margaret Roberts

Dr Norman Robson

Mr Paul Sowan

Prof. William Stern

Colonel Philip Thorpe

Dr Jessica Tucker

Prof. David Wake

Honoris Causa

Sir Jonathan Miller

Foreign Member

Dr Norman Platnick

The Linnean Society of London : Programme of Events

January–February 2022

19 Jan
12.30–13.00
Nigeria's Role in Global Pangolin Trafficking
Charles Emogor, *University of Cambridge*

20 Jan
18.00–19.00
The Case for Conservation Optimism
Martin Harper, *Birdlife International*

17 Feb
18.00–19.00
Caught in the Middle: Oceanic Sharks, Climate Warming and Fishing
Professor David Sims, *Marine Biological Association (MBA) Laboratory*

23 Feb
12.30–13.00
Energy and the Changing Climate
Professor Chris Rhodes, *Advisor on low-carbon energy to the European Commission*

25 Feb
18.00–19.00
The Natural History of Viruses
Pranay Lal, *Biochemist and Natural History Writer*

At time of going to press, all meetings are being held via Zoom.

REGISTRATION REQUIRED FOR ALL EVENTS

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

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