



Image © Paul Wilkinson

A Gem of a Place

In April, the Linnean Society welcomed its first CEO, Dr Gail Cardew. Here, Gail shares her background and outlines that everyone has experience to bring when it comes to the protection of the natural world.

The people who initially shaped and nurtured my love of science were my biology teachers, my DPhil supervisor and the evolutionary biologist John Maynard Smith, although now there are too many names to mention who continue to feed my curiosity and imagination. During my training as a biologist, I was also fortunate to study not just 'the science' but also its place within society. Who controls science? Who decides how we use it to shape our future world? What knowledge do they take into account? A discussion of these questions shaped my interest in exploring the interfaces between the sciences, social sciences, arts, humanities, policy and the applications of science. Above all, it led to a commitment to public engagement and to investigating ways in which science can be opened out and explored inclusively with a wide variety of people. My previous role as Director of Science & Education at the Royal Institution was a perfect opportunity to work on this, but with an important added dimension—the history of science. After all, these are not new questions: people have been exploring the wonder of science and working out what to do with it for a long time. So as we look forward to the future, we have to bring with us a knowledge of the past and use it in ways that are relevant to today's world.

The Society's vision of a world where 'nature is understood, valued and protected' is hugely relevant and bold. My instinct is that it won't be achieved by scientists working in isolation and publishing their work in journals only read by specialists. Yes, we will need to invest in research, inspire the next generation of scientists and have a deeper understanding of our incredible collections. Yet, alongside this, we will need to recognise that everyone has a part to play. One of our greatest challenges in this respect will be to reach out to people presently unconnected to the world of science, recognise they may have valuable experiences and knowledge to bring to the table, and support each other's actions to protect our natural world. I look forward to working with the staff, Council, Fellows and other stakeholders to develop a common approach for how we might achieve this ambitious vision. People have told me that the Linnean Society is a like an undiscovered gem, but its purpose and ambitions are far too important to lie undiscovered for much longer!

Dr Gail Cardew
Linnean Society CEO

Butterfly Biology Systems:

CONNECTIONS AND INTERACTIONS IN LIFE HISTORY AND BEHAVIOUR

by Roger Dennis

BELOW:
A female eggfly (*Hypolimnas bolina*) has a number of strategies, some previously unrecorded, to avoid unwanted male attention. Photo John Tennent, Tonga, 2018.

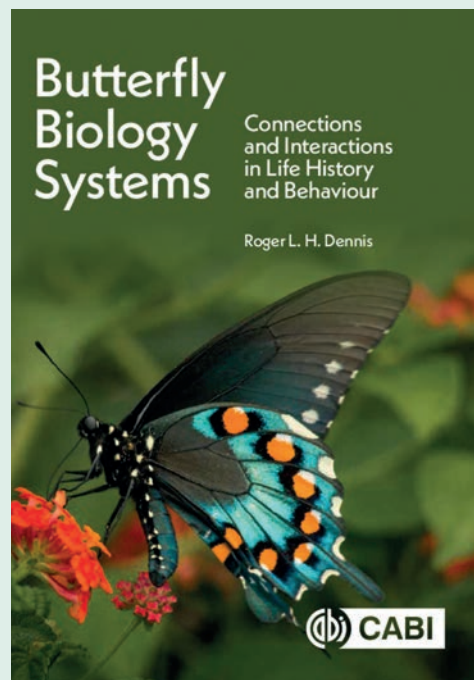
This is a weighty book in every sense; a detailed preface outlines the research over more than three decades leading to publication. Main content is divided into four sections: 'language and concepts of systems theory'; 'perspectives on butterfly biology'; 'butterfly life history—basic trade-offs in reproduction, development and survival'; and 'butterfly behaviour—interactive adjustments in the habitat'. Each section is subdivided into 7–10 well-defined chapters. The author's expertise, experience—and original thought—result in an unusual text; not a book to read from cover to cover at a sitting, it is something to dip in and out of. Some subjects the reader may be familiar with are sometimes seen from a slightly different perspective: the butterfly fossil record, butterfly-plant evolution, sexual dimorphism, mimicry, gregarious behaviour of early stages, benefits and consequences of ant-butterfly symbiosis, consequences of sexual dimorphism for growth and development—and much more. With a bewildering variety of forms, complicated by seasonal and sexual dimorphism, mimetic associations, and in many cases with the advantage of several generations annually, butterflies are ideal animals for study. The author explores, of necessity succinctly, their complexity to a degree where a student embarking on study relating to any aspect of butterflies life and behaviour will find much of their basic research done for them.

The book offers a learning experience. A comprehensive list of contents combine with the index to direct the reader to authoritative discussion on current research on numerous subjects. Later sections of the book are fieldwork-based and include behaviours the reader may have noted in the field and placed on a mental 'back-burner'. For example, a section on 'mate refusal; its development, breakdown and consequences' (pp. 253–256) spurs the reviewer to pursue previously unrecorded behaviour of female *Hypolimnas bolina* in avoiding unwanted male attention,

collated on Pacific islands over many years. Intergeneric pairing is something most butterfly researchers have probably encountered at some time in the field as a rare and aberrant event; it is extraordinary to find that 16% of 440 European butterfly species are known to hybridise in nature.

The book is crammed with information. Mimicry and crypsis are familiar subjects as a result of propositions advanced by Henry Bates and Fritz Müller. In the eastern tropics one might ponder how Batesian mimicry works when a supposed 'mimic' is more common than the 'model', or when both are rare, or where the two are largely allopatric. Here (Chapter C.8: mimicry: honest and dishonest signals of unpalatability, pp. 179–191), the author presents comprehensive data, some new—and all helpful—to illustrate that neither Batesian nor Müllerian mimicry is anything like as simplistic or straightforward as was once believed. The impressive depth of research the author has invested in his latest book is reflected in 3,000+ references (pp. 345–464): 120 pages, occupying 25% of the whole content.

Ground covered is broad; to deal with everything in detail would require a whole bookshelf. The book clearly explains basic—but



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£150 / ISBN 9781789243574



far from uncomplicated—concepts, supported by a glossary of terms of exceptional clarity (pp. 317–335) which goes the extra mile in explaining ideas. Text is supported by a plethora of colourful and simplified figures and charts which in some books and publications can be daunting, but here captions are as lengthy and detailed as required to explain a point or principle. An appendix of 32 supplementary figures available online is itemised (pp. xv, xvii). As a comprehensive whole this book serves as a fascinating, deftly and elegantly written summary of current knowledge. It doesn't seek to provide definitive answers to specific questions—in many cases there are none—but presents issues and ideas fundamental to

future research in a readable and accessible text.

There is no avoiding the fact that the book is quite expensive, but the reader reaps the benefit of many years research from a prominent and respected writer which in the opinion of the reviewer is very good value. This is a solid platform which will make the reader think; it will sit comfortably on the shelf of entomologist, ecologist, zoologist and anyone with an enquiring mind and an interest in the natural world.

Reviewed by
John Tennent FLS

Save Burlington House

After more than 145 years of continuous occupation at Burlington House, the Linnean Society faces being priced out of its London home because of unaffordable and rapidly rising rents.

Finding an affordable solution with our landlord, the Government, is vital to secure our internationally recognised natural history collections, alongside our aim to inform, inspire and involve people of all ages and backgrounds in nature and its significance, for the benefit of economy and society, in the UK and beyond.

The Burlington House campaign was launched on 24 February 2021, and over 600 letters have been written to local MPs and Lords to campaign for the government to provide us with a suitable long-term solution as a result. A letter from supporters was also published in The Sunday Telegraph on 21 March 2021, signed by 67 organisations and individuals. The story has been covered by multiple news outlets including The Observer, The Critic and Museums Journal. Members of the Society and the public have written testimonials, as published on our 'Save Burlington House' website page. It has been truly uplifting to read these messages, and hear of the impact the building has had on our visitors. We sincerely thank all our Fellows for their continued support with the campaign.

Parliamentary Debate

On 8 June, the debate 'The Future of the Learned Societies at Burlington House' was held at Westminster Hall, having been secured by Tim Loughton MP, who highlighted that: 'Since just 2019, the rent has increased by a further 39% at a time when financial positions have been made even worse by the pandemic. The problem is that the Government are still treating the buildings as investment properties housing commercial tenants rather than as the academic charities and educational research institutions that they really are. [...] They are charities with limited income and particularly limited routes to raise more income while their tenancy is highly uncertain. These [...] are very much living, breathing and highly relevant institutions that provide guidance to the Government on matters such as climate change and greenhouse gases, the safe disposal of radioactive waste, and the impact of immigration planning on the future of UK science.' Overall, the MPs in attendance seemed unanimous in their support, and unified in their stance that the government should find a viable solution for the learned societies around the courtyard.

Sir Robert Neill MP stated: 'It is irreplaceable and, as has been observed, putting any other type of tenant in there for

commercial operation would destroy something that scarcely exists anywhere else. [...] In reality, this is a cultural and an educational asset, and therefore needs to be approached as such, [...] rather than as part of the Government's investment property portfolio.'

Chris Bryant MP added: 'It was built for them; it is form and purpose united. Why on earth would we want to unpick that? As has already been said, the cost of removal of all the valuable and fragile material in the libraries and various exhibits would be so prohibitive that we would effectively be closing down some of those charities. That would be a terrible mistake.'

In response, Eddie Hughes MP, Parliamentary Under Secretary of State at the Ministry of Housing, Communities and Local Government (MHCLG) was grateful for the input of each MP and agreed that the Government appreciates the combined heritage at Burlington House ('we all want to see the future of the five learned societies secured'). He stated: 'The Government recognise their contribution, but we need to support them to survive and adapt in a post-COVID world to become, dare I say, modern and accessible institutions for all. The societies' future must also reflect a more open and commercial existence, in order to identify and deliver alternative sources of income.' Mr Hughes spoke of a deal that had just been proposed to the Societies at Burlington House, but that 'both parties are in the early stages of the negotiations'. Visit <https://hansard.parliament.uk/commons/2021-06-08/debates/CF486DE7-3C98-4C38-82BD-132941D02CA5/LearnedSocietiesAtBurlingtonHouse> for the full transcript.

BELOW:
Burlington House.
© Isabelle Charmantier



Passing the Parcel:

A Short History of the Vasculum

by Glenn Benson,
Curator of Artefacts



ABOVE:
Though the young Linnaeus is shown here holding a vasculum, he does not seem to acknowledge their use in his own works until *Philosophia Botanica* in 1751, when he would have been 44. © The Linnean Society of London

BELOW:
A loosely bound folio can be seen at Linnaeus' feet in this medal presented by the Royal Academy of Sciences Sweden to Joseph Hooker. © The Linnean Society of London

Plant hunting is a term that has always made me smile. In my mind I picture an intrepid botanist stalking some unsuspecting plant, taking it by surprise and bringing it home for the benefit of our greater knowledge. Though many Linnean Society Fellows have travelled the world studying plants, it is actually something that we can all do.

Once 'caught', botanists have always faced the problem of transporting their specimens. While it is possible to press specimens in the field in a 'portfolio' or 'field-book', the resulting bundle of papers may be more awkward to carry, so a relatively air-tight receptacle, where specimens can be kept until pressed, naturally developed. After taking cuttings, many 19th-century botanists would place them in a tin box known as a vasculum, or a 'botanical box' as defined by American botanist Asa Gray (1810–88) in his *Lessons in Botany and Vegetable Physiology* (1873). He describes the box as being 'made of tin, in shape like a candle-box, only flatter, or the smaller sizes like an English sandwich case...'. The 1903 English metal biscuit tin (M.666-1983) shown here (held in London's V&A Museum) shows the shape of an English sandwich case, and this 19th-century cylindrical metal candle box owned by the author give us an idea as to what Gray meant by his description. In fact, British botanists were so inclined to store sandwiches in their vascula—19th-century naturalist James Charles Dale (1791–1872) even went so far as to recommend 'a vasculum (for sandwiches)'—that their design was often inspired by the shape of the common sandwich case, which led to 'a British vasculum that is still markedly different in aspect from the usual models on the Continent' (Allen 1976).

The origin of the vasculum is extensively covered in articles by David Elliston Allen FLS (b. 1932) and Herbert George Baker (1920–2001) in the *Proceedings of the Botanical Society of British Isles* (a well-recommended read). While an absolute starting point of this unassuming object seems difficult to trace, we do know from Allen's writings that the first mention of a receptacle for plant collection was by Edward Lhwyd in a letter about plant collection in Wales in 1682. Earlier materials for these vessels ranged from woven baskets, to material bags, to copper cylinders (Allen 1959).

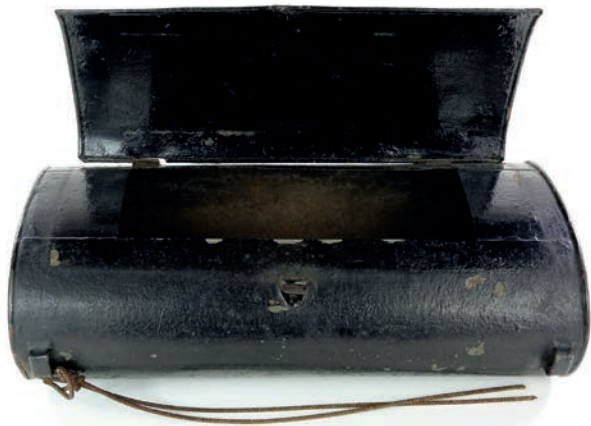
One vasculum to rule them all

It's possible that one vasculum above all others encapsulates the spirit of adventure of the 19th-century plant hunter, and the distances they went to, to find new species. Namely, the vasculum used by English naturalist Charles Robert Darwin (1809–82) aboard the HMS *Beagle* on its 65,000 km voyage of discovery. This artefact was donated to the Linnean Society of London in 1925 on the instruction of Brian Wynne (1846–1924), having previously been the property of Caroline Sarah Wedgwood (née Darwin) (1800–88) of 'The Mount', Shrewsbury.

This cylindrical container—fabricated from steel sheet which has been coated in tin (known as tinplate) and painted with a black metal paint—measures 400mm long, 196mm deep and 134mm high.

A conservation assessment by Rachel Weatherall in 2017 revealed that the inside of the container was once





coated with an unknown substance, possibly rubber, though much of it is now missing. Understandable, as it must have been well used, for Darwin brought back around 5,000 plant specimens from the voyage.

Vasculum Dillenianum and its depiction

In his account of his journeys through Lapland in 1732, the Swedish naturalist Carl Linnaeus (1707–78) favoured bringing specimens home in 'a parcel of paper stitched together for drying plants'. A loosely bound folio can be seen depicted at the feet of Linnaeus on the gold medal awarded in 1907 to botanist and explorer Sir Joseph Dalton Hooker (1817–1911) by the Royal Academy of Sciences Sweden, on the occasion of the Linnaean Bicentenary.

Yet, some 19 years after his travels in Lapland, Linnaeus recommended in his *Philosophia Botanica* (1751) that his students take a 'Vasculum Dillenianum' with them on their botanical excursions around Uppsala. In a footnote, he describes it as: 'a semi-cylindrical container made of copper [...] for the purposes of keeping specimens moist and fresh till the evening.'

In Louis Prosper Roux's (1817–1903) fanciful image of the young Linnaeus, he is depicted asleep after a hard day's plant hunting, a full 'Vasculum Dillenianum' at his feet. Linnaeus' term for the vasculum suggests that he had derived his knowledge of it from the German botanist Johann Jacob Dillenius (1684–1747). The two had met in Oxford in 1736 while Linnaeus was travelling in England, and they became correspondents for the next 11 years. (An admirer of Dillenius, Linnaeus would dedicate his 1737 work *Critica Botanica* to his friend.) Like many illustrations of the life of the young Linnaeus, the accompanying image from 'Les Enfants Célèbres' is speculative and adds to the notion that Linnaeus was a child devoted to the study



FAR LEFT:

Charles Darwin's vasculum, used on board the voyage of the HMS *Beagle*, shows similarities to other receptacles of the day.
© The Linnean Society of London.



LEFT:

The Victorian biscuit tin (shown here from the collections at the V&A Museum) and candle box (private collection) may have had an effect on the shape of the British vasculum
© Victoria and Albert Museum, London;
© Glenn Benson.

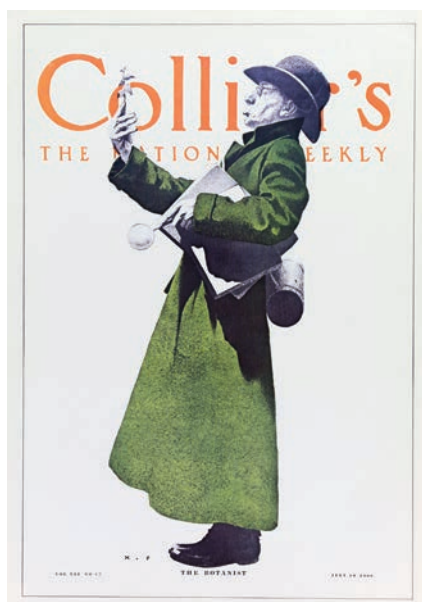
of nature. However, it can be disputed that if he did not encourage the use of a vasculum until 1751, and had perhaps been unaware the receptacle before his meeting with Dillenius, it is doubtful that he would have used one as boy while out botanising with his tutor Johan Stensson Rothman (1684–1763).

Responsible plant hunting

As we move into summer in the Northern hemisphere, it's not necessary to travel thousands of kilometres to have our own botanical adventure. To help with your own family plant hunt, visit <https://www.linnean.org/learning/content/plant-hunting>. And as you do so, perhaps you'll think back to the botanists who came before, carrying their tools of the trade and the specimens they've collected for study.

However, it is important here to note that every naturalist, professional, budding or otherwise, has a responsibility to the environment. In the 19th century, collecting had become so popular, and vascula so readily available, that 'there was a serious danger that the countryside of Britain would become irreparably injured by the very people who were among its keenest admirers' (Allen 1976). 'The advance of technology,' notes Allen, 'as so often, had outstripped the social attitudes appropriate to its use.' Every country has regulations to follow, and local restrictions must always be adhered to: <https://www.plantlife.org.uk/uk/discover-wild-plants-nature/picking-wildflowers-and-the-law>

Lastly, this wonderful July 1908 cover of *Collier's Weekly* by Maxfield Parrish (1870–1966) shows that 'The Botanist' has followed Linnaeus' advice—to study the natural world, you do not always need expensive equipment, just a magnifying glass, note paper and a vasculum.



FAR LEFT:

Louis Prosper Roux's illustration of a sleeping Linnaeus shows a vasculum full of botanical specimens by his chair. © The Linnean Society of London.

LEFT:

'The Botanist' by Maxfield Parrish in *Collier's Weekly*.
© The Linnean Society of London.

References

Allen, D. E. 1959. The History of the Vasculum. *Proceedings of the Botanical Society of the British Isles* 3: 135–150. <http://archive.bsbi.org.uk/Proc3p135.pdf>
Allen, D. E. 1976. *The Naturalist in Britain: A Social History*. New Jersey: Princeton University Press.

NETWORKS OF KNOWLEDGE

The Library and Herbarium of John Martyn at Cambridge



Fig. 2 A colour copperplate image depicting the species *Cleome spinosa* Jacq. from John Martyn's *Historia Plantarum Rariorum* (1728). © Cambridge University Library, Rare Books, CCF47.34.

by

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Coming from a successful career in business, John Martyn (1699–1768) started to turn his attention to botany and medicine in the mid-1720s. Inspired to take up botany by the apothecary John Wilmer (1697–1796), the Physician Patrick Blair (c. 1670–1728), and the head gardener at the Chelsea Physic Garden Philip Miller (1691–1771), Martyn's interests in botany led to his appointment as the second Professor of Botany at the University of Cambridge in 1732. Unlike the first holder of this position, Richard Bradley (1688–1732), whose main interests were in horticulture, plant physiology and disease, Martyn was responsible for transforming the botanical teaching and collections in Cambridge into a programme that represented contemporary interests in plant taxonomy. As a result, Martyn assembled an herbarium that now contains around 2,500 specimen sheets and a botanical library of over 300 volumes. These books and specimens were sourced from correspondents across Britain, Continental Europe, Africa, Asia and the Americas; materials Martyn donated to the university after his retirement in 1763. These continue to form the historic core of the botanical collections held by Cambridge University Library and Cambridge University Herbarium.

Martyn's simultaneous donation of books and specimens indicates the interconnected nature of these two entities. Books and specimens shared fundamental connections for Martyn. Many of the specimens contain labels that link with printed descriptions, images and annotated notes added to the margins of books from Martyn's library. Other books and physical specimens were received simultaneously, often as gifts from their respective authors and collectors. The main object of this short article is to outline some of these connections, examining a sample of books and specimens from Martyn's global collection, material being uncovered and analysed as part of Edwin Rose's year-long Munby Fellowship project at Cambridge University Library.

The library

The botanical library Martyn assembled grew from the 1720s and contains printed works extending from the late 15th and early 16th centuries, such as a 1518 edition of the works of Dioscorides, to the most recent works on taxonomy and gardening by Carl Linnaeus and Philip Miller. Martyn obtained many of the earlier works from the sales of the libraries of his colleagues and as gifts from friends and acquaintances such as those he

received from the bibliophile Richard Rawlinson in 1734. Other books were

presented by friends and correspondents; a network that extended across Britain and

Continental Europe. Examples include

Hans Sloane (1660–1753), the posthumous founder of the British

Museum; and Philip Miller, who gave

Martyn a copy of his lavishly illustrated *A Catalogue of*

Trees, Shrubs, Plants and Flowers Both Exotic and Domestic (1730). Linnaeus

sent Martyn an inscribed copy of

Critica Botanica

shortly after its publication in 1737 (Fig. 1). Other books came from further afield, such as those Martyn received from William Houston (c. 1695–1733) who explored the botany of the West Indies during the early 1730s and sent frequent instalments of books and manuscripts back to Sloane, Miller and Martyn.

Many of the books from Martyn's library were annotated with information concerning his fieldwork around Cambridge and the materials he compiled from a global range of correspondents.

A typical example is Martyn's interleaved copy of *Methodus Plantarum Circa Cantabrigium* (1727) to which he added notes concerning the physical appearance and locality of the plants he and his students found during their collecting expeditions around Cambridgeshire. Other books Martyn produced include the grand folio *Historia Plantarum Rariorum* (1738), a publication that contains numerous large copperplate illustrations, many of which were printed by Edward Kirkall (also known as Elisha Kirkall, c. 1682–1742), a known pioneer of colour printing. Many of the individual plates from this volume were funded by wealthy naturalists, apothecaries and physicians. Examples include William Sherard, Philip Miller, Hans Sloane and Robert Nicholls who funded the plate that depicts the species *Cleome spinosa* Jacq. (Fig. 2). A specimen of this plant, now in the Martyn Herbarium in Cambridge (Fig. 3, CGE07129) was originally collected by William Houston from Cuba in 1730 and grown at the Chelsea Physic Garden by Philip Miller. A specimen of a related species in the same genus, also in the Martyn collection (Fig. 4, CGE07130 - overleaf), appears to have been communicated to Cambridge by James Sherard (1666–1738), from Oxford. These two specimens offer us a tantalising glimpse into Martyn's global network of correspondents and how the specimens and books he collected came together.

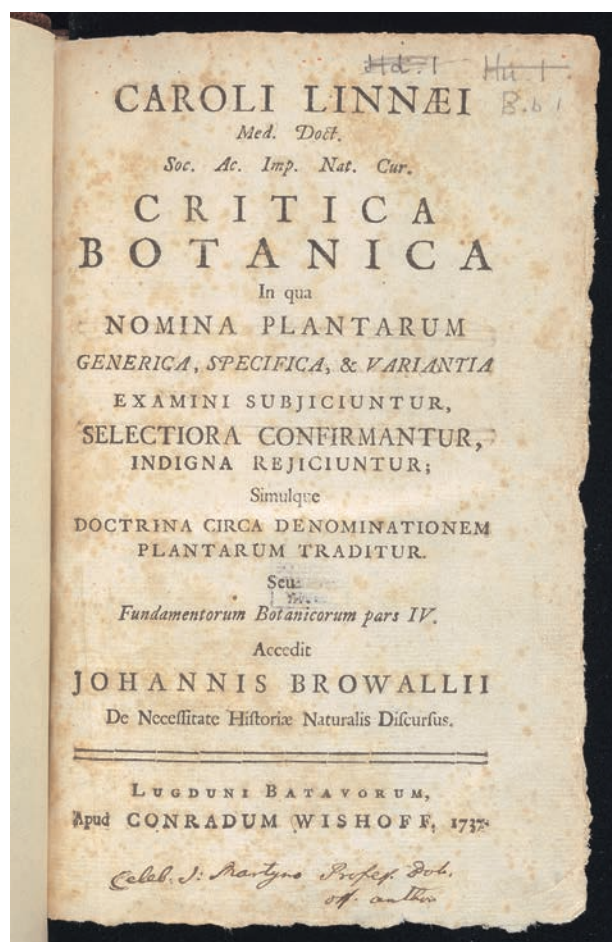


ABOVE:

Fig. 3 *Cleome spinosa* specimen in Martyn's Herbarium, collected by Houston in Cuba and cultivated at Chelsea Physic Garden by Philip Miller. © Cambridge University Herbarium, CGE07129.

LEFT:

Fig. 1 The inscribed title page from the copy of *Critica Botanica* (1737) presented by Linnaeus to John Martyn. © Cambridge University Library, Rare Books, CCC.47.217.



The herbarium

After their donation to the University of Cambridge, John Martyn's herbarium specimens were worked on and added to by his son, Thomas Martyn (1735–1825), who had succeeded his father as the third Professor of Botany in Cambridge in 1762. Thomas Martyn added Linnaean binomial names to many of the thousands of sheets of specimens brought together by his father, and his distinctive handwriting can be seen alongside the pre-Linnaean polynomial names written in John Martyn's hand. The 1720s *Anemone nemorosa* specimen presented here (Fig. 5, CGE08887) shows labels written by both John and Thomas Martyn, including Thomas Martyn's addition of the page and species number for the corresponding binomial and description in *Species Plantarum*, and labels in other hands including the collector of the specimen (Dr) Robert Foulkes, and subsequent Cambridge botanists, namely John Stevens Henslow and Peter Sell.

When Henslow became the fourth professor of botany in Cambridge, he was said to have found many of the Martyn specimens had been neglected in the later years of Thomas Martyn's 60-year tenure and were rotten beyond the point of salvage. He rescued (and often remounted) as many specimens as he could but wrote that many had to be discarded. Today the Martyn specimens remain part of the collections of the Botany School in Cambridge (now the Department of Plant Sciences) and make up the oldest part in the University Herbarium, with the earliest written date on any specimen being 1703.

Accessing the material

Many of the pre-20th century collections in the Cambridge University Herbarium (international code CGE) received very little attention in the 20th and early 21st centuries and are currently poorly known and quite inaccessible. Digitisation work of the collection is progressing and high-resolution images of specimens from the University Herbarium will start to be made available freely accessible online later this year—including all the surviving Martyn specimen sheets. As the few examples highlighted in this article show, the annotations on the specimens and throughout the margins of volumes in Martyn's library are starting to reveal a wide range of connections and networks of knowledge and specimen exchange within the UK and internationally, in which John Martyn was deeply involved.

Look out for the launch of the first new images from the University Herbarium online later in 2021—including the Martyn Herbarium.

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Fig. 4 *Cleome* specimen in Martyn's Herbarium, communicated by James Sherard at Oxford.
© Cambridge University Herbarium, CGE07129.



Fig. 5 *Anemone nemorosa* specimen collected by Robert Foulkes, sent to John Martyn, and annotated further by Thomas Martyn.
© Cambridge University Herbarium, CGE08887.

An Archaeology of *Ortus Sanitatis* (1491)

by Dr Isabelle Charmantier,
Head of Collections

Written at the end of the Middle Ages, the *Ortus* (or *Hortus*) *Sanitatis* ('Garden of Health') offers a window into an age when the natural world, believed to be created by God for humanity's use, included mythical creatures like phoenixes and mermaids, and contained cures for diseases. First published in 1485 by Jacob Meydenbach in Mainz (Germany), the book describes the medicinal uses of plants, animals and minerals and modes of their preparation, and includes as a coda a treatise on urine.

The Linnean Society holds not one but four editions of the *Ortus*. Carl Linnaeus owned the second edition (Mainz, 1491) and the fourth (Strasbourg, 1499), both conserved recently within the AdoptLINN programme. The other two editions are the third (Strasbourg, 1497) and the first Italian edition (Venice, 1511).

The 1491 edition, one of the bulkiest volumes in Linnaeus' library, must have been a handsome book: bound in calfskin with blind tooling over wooden boards, it was kept closed by brass clasps, now broken. Years of use by successive owners took their toll: when specialist book conservator Tony Bish received it, the front board was detached, leather was missing from the spine and boards, and the paper was torn in places.

When Tony Bish rebound the volume in full book calf, he discovered that,

to consolidate the binding, the binder had used several pieces of manuscript parchment, which look like late-medieval notary documents, although no date could be established.

Various owners' names can be discerned on the remarkably busy title page, providing clues for an attempted chronology of provenance. Among its first owners was Henning Wendius of Flensburg, who purchased it in Lübeck on 21 August 1587, and copied the aphorisms from Hippocrates below the title. Wendius appears in the Rostock University student registers in the winter semester of 1589, but must have been in Rostock earlier, since on 1 November 1587, he donated the volume in 'everlasting memory' to its next owner, whose name and city ('Rostokensis') were scratched out by a successive owner, along with that of Wendius. Another owner, possibly 'Christian Schmilern', inscribed his name on the first page in 1630. The last name appended was that of James Edward Smith in 1784, after his purchase of the Linnean collections.

These owners used the *Ortus* as a reference book, indexing the margins, inserting headings and occasional Renaissance-style manicules. Whereas one reader heavily annotated

the treatise on urine at the end of the book, Wendius' successor's distinctive hand appears throughout. By contrast, nowhere did Linnaeus annotate the work, not even adding his name to the title page.

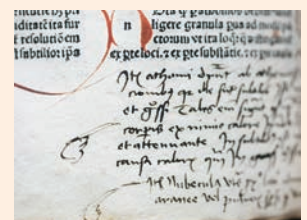
There is much yet to discover of this wonderful book, not least identifying the different hands throughout the work. The reader is instantly charmed by the delightful and often humorous woodcut illustrations of stylised plants and animals, but it is the distant voices of the past that make handling this copy such a moving experience. The annotations and student names testify to late-night studies, and the voyage of a book that, by means still largely unknown, journeyed from user to user, from Mainz to Lübeck, Rostock, Uppsala, and finally to the Linnean Society of London.

Acknowledgements

Many thanks to James Abell for adopting the 1491 *Ortus Sanitatis*; Tony Bish for his conservation and extremely helpful conservation report; Dr Ulrich Fischer (Cologne Historic Archives) and Dr Anna Maerker (King's College London) for their help identifying Henning Wendius; The Twitter community (especially Dominik Hünninger, Martin Nickol, Péter Szabó and Tobias Winnerling) for their help with Christian Schmilern's name; Brian Clarke for his eagle eye, as always.

References

1. Librarian Will Beharrell wrote about the 1499 edition in *PuLSe* 47, Dec 2020.
2. The aphorisms can be traced to *Magni Hippocrates Praesagia*, Book 1.
3. Universität Rostock, Matriculportal Rostock, Immatrikulation von Henningus Wendius, <<http://purl.uni-rostock.de/matrikel/100042182>>, last accessed 10 May 2021.
4. After struggling to decipher this last name and submitting it to Twitter, historians suggested various other names including Schrieber and Schmilaur: <https://twitter.com/isacharmant/status/1392028871453708289>



ABOVE LEFT:

The title page is covered with the names of successive owners, leaving an historical trail from Flensburg to London. All images © The Linnean Society of London.

TOP RIGHT:

Heavily annotated by a variety of hands, Linnaeus' annotations remain surprisingly absent.

ABOVE:

Throughout the book are a number of manicules highlighting portions of text, as well as doodles and other marginalia like the face shown here.

BOTTOM LEFT:

Before conservation through AdoptLINN, Linnaeus' 1491 copy of *Ortus Sanitatis* showed damage to the spine, cover boards and internal pages.



Ancient Oaks and Biodiversity

by Aljos Farjon FLS

England has more large ancient oaks than any other country in Europe. My research across England has led to the recognition of around 25 sites considered 'most important' for truly large (≥ 6 meters circumference of trunk) oaks in England.

The top site turns out to be a section of Blenheim Park in Oxfordshire, where 143 oaks ≥ 6 m in girth are crammed into 130 ha. Five of these exceed 9 m in girth. Ancient oaks of this size are the most important micro-habitat for biodiversity in Europe. These oaks are wild, not planted, and link the biology of this site with the deep past. Known as High Park, it is situated around High Lodge, a former hunting lodge. After my recording of all the ancient oaks I obtained permission from Blenheim Palace to organise the High Park Biodiversity Survey.

High Park

Before John Churchill, First Duke of Marlborough, was granted Blenheim Park in 1705 and built a palace there, it was known as Woodstock Park. This was a royal hunting park, carved out of the ancient Wychwood Forest by Henri I, the youngest son of William the Conqueror, in 1110. Since 1705 many alterations were made to this semi-wild park and it became one of the masterpieces of landscape design by Lancelot ('Capability') Brown, including an artificial lake which is the largest body of water in Oxfordshire. However, High Park remained for the most part in its primitive, unimproved state. It is preserved as ancient pasture woodland. You can see it from the bridge near the palace across the lake.



The surveys

In summer 2016 I could begin to recruit surveyors. But how to find the specialists? I am a botanist at the Royal Botanic Gardens, Kew and know nothing of substance about lichens, insects, snails or birds. Here is where the Internet and its search engines came in. I was amazed to find how many naturalist societies and working groups there are and within a month I had a list of people I could approach. An incentive ('carrot') was undoubtedly that I was able to organise access to this amazing place, of which many had heard. For several groups of organisms High Park attracted nationally renowned names. In February 2017, after the autumn/winter shooting season, we could enter High Park. Each visit had to be announced by me and given a green light by the estate managers. Soon the records began to come in by the bucket-load. When a site is virtually unrecorded, as this one was for many groups, the first years yield large numbers of species. For each group, with 2–8 people in it, one person took on to compile the data, using an Excel template designed by the Thames Valley Environmental Records Centre (TVERC). Some groups are relatively easy, as they are conspicuous and do not move, and so after four years we already have all the vascular plants, bryophytes and lichens. Non-lichenised fungi ('mushrooms' and 'toadstools') are also sedentary, but you need the 'fruiting bodies' to identify them and many of these rarely appear. It could take decades to get a complete list. Animals move and are conspicuous or secretive. Many need special techniques (trapping) by day or night to be found. Some are relatively easy, such as birds, or have few species, like amphibians, reptiles and mammals. Other groups, such as Coleoptera (beetles), Diptera (flies) and Lepidoptera (butterflies and moths) are very diverse and it would also

take many years to find all species. What is special about this site is without doubt the ancient oaks. We therefore decided to concentrate the effort on organisms associated with these trees and to pay less attention to stretches of open grassland or the lakeshore bordering our site.



What we found

In this short article I shall give a few statistics in the form of a table and concentrate on some of the remarkable species discovered. We still have another year to go, so for most groups the figures will be interim results only.

LEFT:
Ancient oaks in High Park,
a wild section of
Blenheim Park, Oxfordshire
© Aljos Farjon.

RIGHT:
Roman snail (*Helix pomatia*)
in High Park.
© Aljos Farjon.

Taxonomic group	Number of species	Years of surveys	Status by end 2020
Vascular plants	278	2016–2020	Complete
Bryophytes	67	2017–2020	Complete
Lichens	224	2016–2019	Complete
Fungi	334	2017–2020	Incomplete
Molluscs	80	2017–2020	Complete
Arachnids	35	2018–2020	Incomplete
Diptera	361	2017–2020	Incomplete
Hemiptera	54	2017–2020	Incomplete
Hymenoptera	161	2017–2020	Incomplete
Butterflies	22	2017–2020	Complete
Moths	611	2017–2020	Incomplete
Coleoptera	531	(2002) 2016–2020	Incomplete
Other insects	30	2017–2020	Incomplete
Amphibians/Reptiles	7	2016–2020	Complete
Birds	51	2017–2020	Complete
Mammals	19	2017–2020	Complete



ABOVE:
Oak polypore
(*Buglossoporus quercinus*)
on an ancient fallen oak.
© Aljos Farjon

Apart from the amazing ancient oaks, the botany of High Park is not very remarkable. A few plants that are relatively rare in Oxfordshire were found, such as Meadow Saffron (*Colchicum autumnale*), but otherwise the flora is more or less as can be expected in ancient pasture woodland in this region. Bryophytes (mosses and liverworts) are also all common. The specialities start with the lichens, for which High Park is one of the best sites in the English Midlands. That is all to do with the ancient oaks. 'The list of notable lichens is now exceptional for the region' the lichenologists reported already in 2018 and it includes the second record of *Dimerella tavaresiana* in Britain. Ancient oaks, provided they are not overshadowed by other trees, make a very stable, long-lasting habitat for rare lichens. Moving on to fungi, the ancient oaks have an important role to play as well. One species of bracket fungus, Oak Polypore (*Buglossoporus quercinus*) occurs only on large ancient native oaks. So far, we have found it on 14 separate trees. Many other species, some also rare in Britain, occur on the abundant dead wood (no dead oak wood is ever removed from the site). Out of 16 'ancient oak saprotrophs' recognised by Kew mycologist Martyn Ainsworth (a member of our survey team) 10 have now been found in High Park. Saprotrophs 'feed' on dead wood.

Moving on to the things that move, we are really getting into high biodiversity. The table gives you numbers of species found in each group to end 2020. For some groups we estimate that we have found >95% of what is likely to be there and I have marked these as 'complete'. I was amazed to learn that Molluscs (slugs and snails) already fall in this category: to me they are secretive creatures, especially when it has not rained for a while. Conspicuous in High Park is the Roman Snail (*Helix pomatia*) of which there is a large population perhaps introduced by the Romans as Akeman Street runs just to

the north of here. There is even a bee in the park (*Osmia spinulosa*) that uses the empty shells to make a nest in. An ant, *Lasius brunneus*, lives in large numbers in the ancient oaks, tunnelling through the brown-rotting wood inside and throwing dry frass like powder out through cracks in the bark. They turn the tree trunk into the equivalent of a huge termite nest and, like termites, remain hidden from view. The bee and the ant represent the Hymenoptera. For Diptera the project is fortunate to have attracted the interest of Peter Chandler. Peter is widely acknowledged as the foremost authority on flies in Britain. Flies, too are often associated with the ancient oaks, these are identified as saproxylic. Their larvae feed on dead wood, but with flies this often works in association with a fungus which decomposes the cellulose and lignin. Without this process the larvae could not cope. These may then pupate in the fungal fruiting body and emerge as flies. One saproxylic rarity found in June 2018 is *Neoempheria striata*, trapped by Ivan Wright and identified by Peter, it was the third record of this species in Britain.

Butterflies and moths are traditionally recorded separately as we do here, but really are only one taxon, Lepidoptera. We have the usual assembly of oak woodland butterflies, including the rare and spectacular Purple Emperor (*Apatura iris*) in High Park. Moths are the most numerous so far, but you can see from the table that beetles are racing close on their tail. Considering that we have surveyed only 4–5 years, 611 species of moth and 531 species of beetle are an astonishing result. In both groups there are still many samples awaiting identification. Ecologically comparable sites such as the New Forest and Windsor Great Park have yielded more, in the order of 1,000 species in each group, but there, surveys have gone on for decades, the areas are much larger and these pasture woodlands have open public access. To mention the many rare

beetles and moths found in High Park would go beyond the limited space available. I pick just a few examples, almost randomly: The small beetle *Laemophloeus monilis* was found by Ben Pollard in autumn 2020 under bark on an old cut log. High Park is the seventh location known in the UK and the first for Oxfordshire. Ben is one of our most active surveyors; he lives nearby and 'pops over' whenever he has some time to spare. He is being helped, sometimes in the field, at other times with identifications, by two top coleopterists in Britain, Darren Mann and John Cooter, both of the Oxford University Museum of Natural History. 'Firsts for Oxfordshire' are now becoming a common feature of High Park's beetles. Local residence has also benefitted our recording of birds. After some hesitant beginnings, I found Anthony Cheke to become the

local 'birder' and so we are now getting a more complete picture of breeding birds in High Park. Sometimes, a species may have been considered extinct in Oxfordshire. The last record in the county of the moth *Cydia strobilella* is dated sometime between 1914 and 1929. It reappeared in High Park as a larva in a spruce cone (*Picea abies*) in February 2019. Meanwhile, the spruce trees and other non-native conifers have been removed from High Park. And one night in August 2019 the moth trappers led by Martin Corley had strung out a 'wine rope' in the bushes. This attracted a Clifden Nonpareil (*Catocala fraxini*), a rare and giant moth and in my unprofessional opinion the most spectacular insect so far discovered in High Park. Seen again in 2020, it may even breed there.

BELOW:
Clifden nonpareil
(*Catocala fraxini*)
in High Park.
© Pedro Pires



Acknowledgements

Funds supporting this project were received from the Finnis Scott Foundation and Thames Valley Environmental Records Centre (TVERC).

References

- Farjon, A. 2017. *Ancient Oaks in the English Landscape*. Kew Publishing: Richmond.
1. Ancient oaks in High Park, a wild section of Blenheim Park, Oxfordshire. © Aljos Farjon
 2. Oak polypore (*Buglossoporus quercinus*) on an ancient fallen oak. © Aljos Farjon
 3. Roman snail (*Helix pomatia*) in High Park. © Aljos Farjon
 4. Clifden nonpareil (*Catocala fraxini*) in High Park. © Pedro Pires



SHIFTING TIMES

BioMedia Book Arts and the Evolution of Cross-Curricular Teaching in the Digital Era

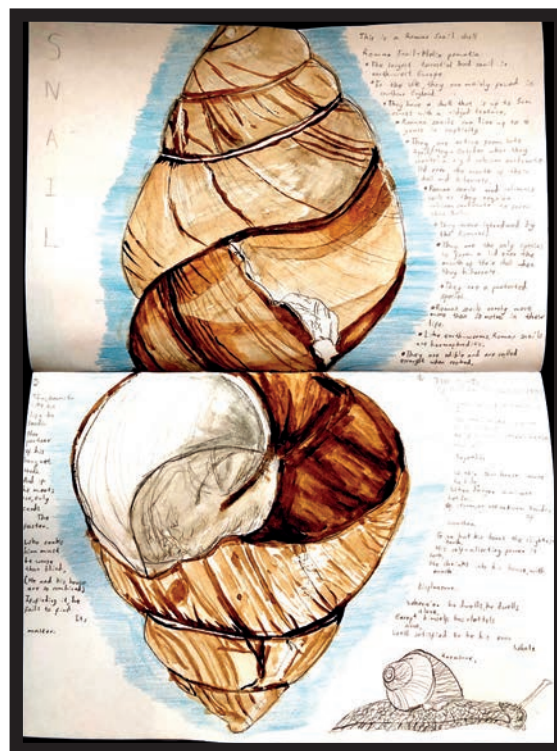
by Daryl Stenvoll-Wells, BioMedia Project Manager

In the summer of 2020, while many Brits were feeling the sweet release of relaxed restrictions after our first lockdown, I was mulling over the coming year and what it would mean for the BioMedia Meltdown Project. Even though schools had resumed for the final weeks of summer term, the enforcement of social distancing made our former reliance on in-person workshops unlikely to bear fruit during the 2020–21 project cycle. I had already started a series of conversations with two friends and Linnean Fellows, science educator Ania Driscoll-Lind and expert ecologist Michael Holland, who were also interested in keeping nature-based learning alive through some sort of remote programming—although we had little idea what that would mean. We began recording our chats and submitting clips of footage around our respective ideas, with a mind towards building these into a short video or two.

Adapting to circumstance

Once I had the chance to speak with teachers in September, I realised that my fears were well-founded. Most secondary school teachers had been forbidden from inviting external visitors onsite, and after having missed two months of schooling in the summer term, most were unable to consider booking workshops. However, they were interested in the concept of working on a longitudinal project, using instructional videos with activities that could be completed in the pupils' own time. Another lockdown was looking likely, and we agreed this would be one way to ensure continued cross-curricular learning during any upcoming school closures.

I would need to provide materials for all pupils that could be taken home and used without significant supervision, so I developed a kit containing a soft-cover sketchbook with a quality set of coloured pencils, a tray of watercolours, a watercolour brush, graphite pencil and rubber—all packed in a portable sleeve. Pupils received their kits in early November, with our introductory BioMedia Book Arts video published shortly thereafter.



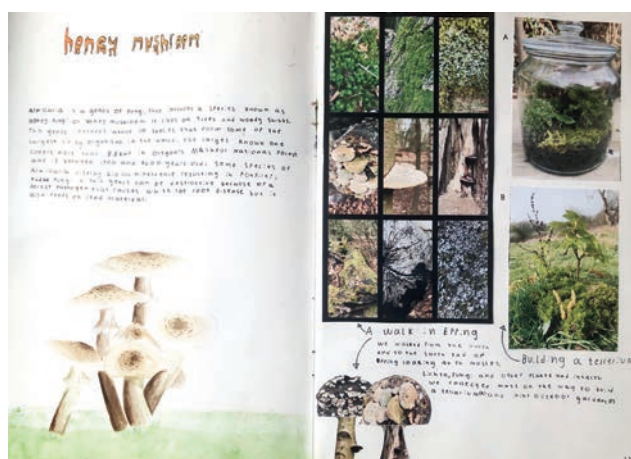
From the entries we've received, the variety of styles, ideas, layouts and research has been staggering. Covering topics from fungi, to plumology, to molluscs, each book shows that even during a lockdown, you can still explore nature. These students (and in some cases, their families alongside them) produced these fantastic works during a time when schools were operating under unusual circumstances, and time was tight for parents, making these incredible entries even more impressive.



Building the project

Two other Linnean Fellows, Dan Brown and Rachael Iveson-Brown, had heard about the project and offered to contribute additional input from their perspective as conservationists. Alongside the introductory and concluding videos, we planned seven 15-minute videos using a similar framework: the project partners would discuss the topic (usually an animal or plant family), followed by an interview with a guest expert, and ending with a segment where I would demonstrate the activities around the topic, to be completed in the book. These included not only science-inspired art, but cooking (such as rosehip soup for the Rosaceae chapter) and creative writing. I was lucky that several Fellows and people with connections to the Society were keen to engage with the project, including Howard Nelson and Ellie Devenish-Nelson chatting about birds and plumology, and Maarten Christenhusz discussing seed evolution. Another old friend, artist Maya Ramsay, discussed the use of lichen in her contemporary art practice.

Despite the enthusiasm of teachers and pupils, the crisis made for a bumpy start, with five of the seven participating schools closed for several weeks in November due to COVID-19 cases. Wondering if overwhelmed and burnt-out teachers would have the capacity to oversee the project's continued success, and after building so many resources for the project, I was reluctant to leave it to fate. I decided to reach out to some home-schooling parents and see if the project would interest the home-educator community, and the response was overwhelming. By the end of February 2021 I had a new cohort of home-educating families registered, and during March, weekly videos were released to families all over the UK (including Merseyside, Birmingham, Kent and Devon), and even Ireland. Low-income families could request materials kits, and pupils shared their work via email. The comments and questions were my first direct exposure to pupils in over a year, and I was overjoyed to provide them encouragement and recommendations, and have them engage with the Linnean Society.



The work speaks for itself

The final video offered instructions on re-binding sketchbooks with a bespoke cover and twig spine. At just a cursory glance (judging is due to begin at time of going to press) pupils have submitted some incredibly impressive and inspiring work. Participating schools have submitted entries despite the challenges presented by the UK's lengthy second lockdown, and we even managed to squeeze in some CPD sessions on how to use the videos for discrete lessons with secondary pupils at University College Hospital school.

The 2020–21 school year has put everyone to the test. For me, BioMedia Book Arts has been a real-time action research experiment, a crash course in producing digital learning content, and an incredible way to involve the expertise of the larger Linnean community. There have been many lessons learned about working with excluded and underserved communities, supporting teachers, and addressing the need for imaginative enrichment programmes. I'll have to wait until the project's conclusion to make my final assessment, but the work speaks for itself. When I look at these pieces, I see young people connecting with nature in the most insightful ways, with a deeper understanding of the relationship between creativity and scientific observation.

NAME	COLOURS	DETAIL/TEXTURE	SMELL
Lavender			Floral, fresh, buzzy, Sweet, calming, medicinal
Sage			Cucumbery, Fresh
Rosemary			Sausagey, medicinal
Thyme			Smells like oregano, Comforting

FORTHCOMING EVENTS 2021

4 Aug
Lunchtime Lecture
12.30–13.00

New and Emerging Threats to Plant and Tree Health in the UK

Speaker: Professor Nicola Spence,
Chief Plant Health Officer, DEFRA

2 Sep
Evening Lecture
18.00–19.00

Richard Spruce on the Rio Negro: Reanimating Biocultural Collections

Speakers: Professor Luciana Martins,
University of London
Dr William Milliken, *Research Leader, RBG Kew*
Dr Mark Nesbitt, *Sr Research Leader, RBG Kew*

8 Sep
Lunchtime Lecture
12.30–13.00

Niche Partition Without Speciation: Web Polymorphism on an Island Spider

Speaker: Dr Darko Cotoras,
California Academy of Sciences

23 Sep
Evening Lecture
18.00–19.00

The Global Heritage of British Natural History

Speaker: Professor Pratik Chakrabarti,
University of Manchester

REGISTRATION IS ESSENTIAL FOR ALL EVENTS:

<https://www.linnean.org/events>

Please check our website for other events not listed here

Roots to Seeds:

EXHIBITION REVIEW

By Will Beharrell,
Librarian



After so many months of lockdown, the idea of visiting an exhibition in-person might seem daringly *outré*, and maybe just a little forbidding. Those looking to ease themselves in gently could do a lot worse than *Roots to Seeds*, a new exhibition at the Bodleian Library charting four centuries of botanical studies in Oxford.

Marking the 400th anniversary of the Oxford Botanic Garden, the exhibition examines the history of plant science through a gorgeous assortment of nearly 300 rare books and specimens. The range of work on display is dazzling, and given a thoughtful overarching structure by Exhibition Curator and Druce Curator of the Oxford University Herbaria, Professor Stephen Harris. The purpose-built exhibition space in the Bodleian's Weston Library building provides a perfect setting for these botanical and bibliographical jewels.

The exhibition runs until 24 October 2021, and is free (no booking required).

ABOVE: Brendel's botanical teaching models. © Image courtesy of the Bodleian Libraries.

Event highlight

Richard Spruce on the Rio Negro: Reanimating Biocultural Collections

2 September, Thursday, 6 PM BST

Speakers: Professor Luciana Martins, *University of London*,
Dr William Milliken, *Research Leader, RBG Kew* & Dr Mark Nesbitt,
Sr Research Leader, RBG Kew



© Luciana Martins

Join us in September for this illuminating talk on sharing Indigenous knowledge, and strengthening the capacity of Indigenous communities on the Rio Negro for autonomous research.

<https://members.linnean.org/events/60da18149c114b0007766c30/description>



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