Fellows of the Linnean Society: the Linnean Learning team needs your help! We're currently working on numerous exciting projects for primary and secondary schools, home educators, university students and lay audiences, and we really need your support. With Fellows in countries all over the globe working in diverse areas of the life sciences we're keen to utilise all of your knowledge, and would love to tap into your expertise. Your input could be as little as sending us one quick email, to running an exhibit at a careers or science festival.

Right now we have three specific projects that could use your help:

**Careers Profiles**

We recently conducted an extensive survey of university students to find out what they want from membership to a scientific society. Overwhelmingly we were told that careers advice and support is paramount as they don’t feel enough is currently available to them online. So that’s what we’re aiming to give them. Over the next few weeks we’d like to profile as many of our Fellows as possible and make these available on our website. Not only will this offer career inspiration to students (and suggestions on how to go about achieving their goals), it will also show them that it’s completely normal to not always have a plan straight out of university. Our Careers Profile questionnaire takes only five minutes for you to complete but could help shape the careers of the next generation of scientists! Access it here: https://goo.gl/2AAEHZ

**Volunteering**

We’d love to run a Careers Day from the Linnean Society HQ. In addition, our plan for the forthcoming academic year is to increase our presence on a local and national scale through science festivals and STEM outreach programmes. All of these events are going to require an enthusiastic team of volunteers, presenters and demonstrators. We received a substantial number of offers for running our exhibit at the Royal Society of Biology’s Bioscience Careers Festival, and we’d love to continue involving Fellows in our outreach and engagement work. As such, we’re setting up a database of Fellows who’d like to volunteer with us or take part in our events.

**Images**

Our online educational resources are hugely popular with tens of thousands of views per year, and our schools’ Loan Kits are almost permanently fully booked. To keep our resources fresh and new, we have multiple projects at various stages of development (new worksheets and practicals, new Loan Kits, and a series of educational videos). However, all of these require a substantial number of images of different species and environments to see them to completion. So if you have a vast image collection or even just a handful of nice photos, we’d love to hear from you. We also need some drawings for illustrative purposes, so please let us know if you’re skilled in this area too!

If you are interested in supporting the Education team through any of the means listed, then please email us at education@linnean.org. We’d really appreciate any help or time you can give.

Dr Rhys Grant
Education Officer
Herbie Rides Again
Conserving the Linnaean Herbarium Cabinet

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Swedish design is famed the world over for its combination of form and function, and there is no better example of that than Linnaeus’s own herbarium cabinet, held at the Linnean Society. The cabinet is now in need of modern conservation treatment, and a display case to properly exhibit and protect it. In aid of this, the Society has mounted a campaign to raise the several thousands of pounds that this will cost.

Prodigious Confusion
The cabinet—and the revolutionary way it was to be used—was described by Linnaeus in his Philosophia Botanica (1751), though he had probably been using this new method of specimen storage from the time he catalogued his own and George Clifford’s herbaria in the 1730s. Herbaria (hortus siccus) were not new; they had been in existence from the 1500s (though arguably plant collecting had been in practice since antiquity). At this time it was the norm for botanists to work from real specimens, to compare specimens side by side. Further, his practical system also allowed for expansion and revision; something that was not possible with a bound volume. What Linnaeus’s herbarium cabinet did, with its loosely filed and mounted specimens, was to provide the practical botanist with a method of sorting, storing, accessing and revising the systematic grouping of preserved botanical specimens.

But what of our beloved cabinet? It was one of three that were purchased and shipped by Society founder James Edward Smith to England in 1784, and close inspection of the cabinet reveals where it was once sealed with wax in two places, perhaps as part of the preparations for that great voyage. The Society returned two of the three cabinets to Sweden in the 1930s, and these are now in Uppsala and Hammenby.

Further reading
Pavord, Anna. 2005. The Naming of Names: The Search for Order in the World of Plants
Burlington House on London’s Piccadilly is home to five learned societies (Linnean Society of London, Society of Antiquaries of London, Geological Society, Royal Astronomical Society, Royal Society of Chemistry) and the Royal Academy of Arts. Our proximity to one another around the courtyard allows us to advance our individual society objectives as well as working together to provide a cultural hub for the arts and sciences.

We want to create a ‘Cultural Courtyard’ that will celebrate common threads between the Societies and allow us to make these institutions more accessible to the public. A new website is now bringing together each organisation’s individual events as well as tours, events and exhibitions that link the Societies together. For more information about past and future events and projects visit http://burlingtonhouse.org/

Poetic Botany—Art and Science of the 18th-Century Vegetable World

Poetic Botany: Art and Science of the 18th-Century Vegetable World is a digital exhibition that brings together historical and contemporary resources—illustrations, photographs, videos, texts, and more—in an attempt to facilitate an experience not possible in a traditional museum setting.

An overarching aim of the exhibition is to reveal that plants, like humans, are agents of historical change. Another aim is to reaffirm that the imagination is an ecological force, responsible for how we have thought of nature in the past, how we think of it now, and how we will think of it in the future. The imagination, moreover, flaunts any boundary imposed on it by disciplines or areas of expertise, showing itself to be at home as much in the arts as in the humanities as in the sciences.

Any view of nature, then, that ignores a discipline or entire domain of disciplines is necessarily deficient. At the same time, paradoxically, any view that sacrifices the expertise that results from the focus of one of these disciplines will also be severely impoverished.

Hence, a complete view of nature can only result from an openness to the work of one another, from an ongoing collaboration and commitment to understand the more-than-human world through art, scholarship, and science.

Poetic Botany celebrates this very effort, along with the artists, scientists, and scholars of both the eighteenth-century and our own time. These figures attempt to understand the vegetable world, and in so doing offer us a wealth of perspectives that substantially enrich our own engagements with nature. Visit the exhibition http://www.nybg.org/poetic-botany.
In 1966, the first two volumes of a projected nine-volume Flora of Iraq were published by the Royal Botanic Gardens, Kew (RBG Kew) in association with the Iraqi Ministry of Agriculture & Rural Development. Despite interruptions, the project is now approaching completion and two of the remaining three unpublished volumes are in draft or on press. However, one of the questions that has been encountered is whether to assign old plant records from ‘Mesopotamia’ to modern Iraq. I have been investigating the poorly localised collections made under the direction of the then Colonel Frances Rawdon Chesney in 1836 during a military expedition travelling in two steamships along the Euphrates river. While solving the rather baffling problem of where the plants were actually collected, it emerged that the collectors themselves were a Czech-born naturalist and physician, Jan Vilém Helfer (then aged around 26) and his wife Pauline (a German-born Huguenot), and not the leader of the expedition whose name appears on the specimen labels. They had joined the group as supercargo, offering valuable medical support to the crews.

**Navigation and Loss**

The Chesney Expedition had echoes of Fitzcarraldo, in that a brace of paddle-steamers built in kit form by Lairds in Birkenhead was hauled overland through Latakia, then part of the Ottoman Empire, to be launched near Birecik in what is now southern Turkey. Chesney aimed to prove that the Euphrates was navigable and could offer a shorter route to India; his experiment pre-dated the construction of the Suez Canal. Plants collected along the route were sent back to London to botanist John Lindley, who then shared them with Antonio Bertoloni of Bologna, Italy. The new species he described were published in Bologna; Lindley published a single new species from the collection, *Populus euphratensis*, in the Gardener’s Chronicle of 1849 under the pseudonym ‘Jael’.

The voyage was not without incident. The Helfers witnessed the sinking of the paddle steamer *Tigris* during a tornado; the Colonel, who was on board, survived, but 22 hands were drowned and most of the expedition’s papers were lost. The other, larger, steamer *Euphrates* survived the storm and after a trip to Bushire on the open

**The History of the Project**

The Flora of Iraq project was initiated by Cliff Townsend (Kew taxonomist), Evan Guest (former colonial official in Iraq) and Ali al-Rawi (Iraq) and involved several Kew herbarium staff. The montane and alpine flora was covered in Karl Heinz Rechinger’s monumental *Flora Iranica* (1963–) and the lowland flora by Rechinger’s *Flora of Lowland Iraq* (1956). But there was an urgent need for a modern synoptic treatment, not least because of Iraq’s position at the intersection of several phytochoria and its importance as the source of the progenitors of many important crop plants. By 2016, six out of the nine projected volumes had been published in full or in part (vol. 5 part 2 appeared in 2015, and vol. 5 part 1 in 2016). The
monocots were completed in two volumes (8 and 9) and the single largest family Asteraceae will appear as volume 6. The final volume (7) is currently in preparation under the joint editorship of Shahina Ghazanfar FLS and myself. It is being published by Kew Publishing with financial support from the Iraqi Ministry of Agriculture & Rural Development. Here I must also acknowledge a grant from the Linnean Society’s Appleyard Fund, which has covered my travel and accommodation costs during visits to Kew. The Bentham-Moxon Trust also funds visits by Iraqi botanists and others, who come to Kew to work on the collections.

Some might see this traditional Flora with keys, descriptions, figures and specimen citations, as anachronistic in this era of modern web-based systems. But the project embraces two separate processes: research into the taxonomy and distribution of Iraqi plants, which is greatly assisted by online access to reference collections and botanical literature; and the accurate naming of preserved material, which is vital for future investigations. A recent paper by Z.A. Goodwin et al. (2015) highlighted the lamentable state of naming many of our taxonomic reference collections. It is a symptom of under-resourced curatorial teams, as well as the redirection of research funds away from alpha-taxonomy. Floras that cite specimens in extenso are now a rarity.

Chesney’s exploits in Mesopotamia earned him a Fellowship of the Royal Society, his diplomatic skills, and his prior experience of rafting along the Euphrates had made him well qualified for the task. The collections made under his supervision are now to be found in numerous herbaria; the most complete set appears to be in Cambridge, UK (mostly in the Lindley herbarium) while many are also to be found in Berlin, Bologna, Edinburgh, Geneva, London (NHM and RBG Kew), Paris, Vienna and Cambridge, USA (in the Gray herbarium).

Further Reading
Growing our Knowledge of Grasses

A SUMMARY OF THE EVENT

Many people do not realise that ‘grasses’ are not just the ubiquitous little plants we find in our gardens and on our lawns; they are actually one of the most diverse and useful of all plant groups, with almost 12,000 species known across the world. The grass family (Poaceae) feeds the world: with wheat, rice, maize, sorghum and sugar cane all belonging to Poaceae. The grass family also covers over 25% of the world’s land surface with natural grasslands and savannas.

Many of the foundations of grass classification have been built by scientists from Royal Botanic Gardens, Kew (RBG Kew) from the 1800s onwards, including George Bentham, Joseph Hooker, Otto Stapf, Charles Hubbard and Norman Bor. Using their knowledge of the small and complex reproductive parts, they have constructed a classification system which is relied upon throughout the world. Kew grass specimens have been consistently identified to a high standard, and Kew’s herbarium collection serves as a reference library of grass diversity.

Grass Celebrity Derek Clayton turns 90
The most famous modern grass taxonomist at RBG Kew is Derek Clayton; he assembled data on all grasses of the world and published the reference book Genera Graminum in 1986. This compendium of information allowed the study of grass diversity to take a leap forwards, and paved the way for later computerised systems. Despite the success of the book, Derek realised that a database would be more suitable, providing a more flexible means of storing and presenting information in the longer term. As a result, he built the first comprehensive taxonomic database, called GrassBase, which is now an active repository for species descriptions and associated data (Vorontsova et al 2015; Clayton 2016).

Classifying Grasses
On 18–19 July 2016 members of the worldwide community of scientists studying grasses gathered at the Linnean Society of London to congratulate Derek on his 90th birthday and celebrate his amazing work, as well as to discuss future research directions and the continued development of GrassBase. Eighty delegates attended and listened to 29 presentations by scientists from Australia, China, France, Madagascar, Russia, South Africa, Switzerland, UK and the USA.

Following a welcome from RBG Kew Director Richard Deverell, the morning session of the first day traced the history of Poaceae classification at RBG Kew, placing it at the centre of the British Empire’s plant specimen exchange network. After Gren Lucas and Steve Renvoize set the scene describing the generations of taxonomists who built the grass species knowledge base, Tom Cope spoke about the principles of classification, Derek Clayton presented his work on GrassBase, and Terry Macfarlane described grass taxonomic databases in Australia (a specialist region for the development of descriptive taxonomy software). Rob Soreng compared the two latest Poaceae classification systems in current use: Kellogg (2015) and Soreng et al. (2015). In spite of being perhaps the best known large family of flowering plants, c. 50 out of 700 grass genera still lack DNA sequence data. In addition, incomplete understanding of hybridisation and reticulate evolution can cause difficulties in producing classifications, and the current state of knowledge is still far away from anything like a final consensus taxonomic system for the family.

Evolution and Phylogenetics
The exact origins of the grass family remain mysterious, and Jerrold Davis reviewed the current state of knowledge and recent data from full chloroplast genomes. Lynn Clark presented an
overview of the complex polyploid history of the bamboos: Poaceae subfamily Bambusoideae. Paul Peterson explained his extensive work on collecting, sequencing and rearranging the classification of tropical grasses called the Cynodonteae. Poaceae tribe Andropogoneae is a group of grasses which contains sugar cane and maize, and Elizabeth Kellogg explained the significance of paired spikelets which define this group. Nigel Barker presented a survey of knowledge gaps in African grasses. Marina Olonova and Wenli Chen covered in-depth studies of Asian Poa and Miscanthus. Peter Linder presented the last talk of the day summarising long-term multidisciplinary research on the evolution and global spread of the danthonioid grasses.

Day two of the meeting stepped beyond the grasses themselves and into broader interdisciplinary science. Caroline Lehmann presented research on the contrasting C3 and C4 grassland and savanna vegetation assemblies of different continents. Colin Osborne explained his research into the C4 photosynthetic pathway and its relationship to plant physiology, flammability and environmental dominance. The outermost epidermis cell layer in the grasses is different from other plants in its sequence of long and short cells, the shape of stomatal cells and production of silica bodies called phytoliths, as reviewed by Paula Rudall. Lynn Clark and colleagues investigated leaf shape evolution to understand the transition of ancient grasses from forest to open environments. Pascal-Antoine Christin discovered lateral gene transfer in the evolutionary assembly of photosynthesis genes and challenged fundamental assumptions in the field of phylogenetics. Guillaume Besnard demonstrated the use of large-scale DNA sequencing to study extinct species.

**Growing Forward: GrassBase in the Future**

A new generation of grass specialists, graduate students and postdoctoral researchers also presented their work. Marjorie Lundgren and Luke Dunning used sequence data to understand the evolution of Alloteropsis semialata and Themeda. Polina Gudkova combined morphological and molecular data to classify Siberian Stipa Naranjoalo Ovirdina Prausa listed the endemic grasses of central Madagascar, and Jan Hackel itemised all grass radiations that have colonised Madagascar. Mark Lee presented new data on forage grass nutrition, greenhouse gas emissions, and links to climate change.

But what of the future? Abigail Barker presented Kew’s new web plant information platform, the Plants of the World Online Portal. Maria Vorontsova argued that grasses remain a natural model group for information management and e-taxonomy and highlighted the challenges of maintaining trait data. Scientific research moves ahead through a myriad of independent research projects, advised by a globally interconnected community of scientists. This meeting provided a platform to showcase the multifaceted work being carried out on so many different aspects of the grass family. Research programmes have been given a boost of inspiration. Collaboration will continue and the community will build on Derek’s work to better understand grasses, to help produce better crops and to improve our understanding of managing the world’s ecosystems.

**References**


FORTHCOMING EVENTS
2016/2017

2 Dec
Evening Meeting
18.00–19.00
The Invention of Nature
FOUNDER'S DAY LECTURE 2016
Speaker: Andrea Wulf, Winner of the Royal
Society Insight Investment Science Book
Prize 2016
No registration required

6 Dec
Evening Meeting
16.00
On You, Inside You: The Amazing World of Parasites
IRENE MANTON LECTURE 2016: Taking place at Manchester Museum
Speaker: Dr Sheena Cruickshank, University of Manchester
Registration is essential:
https://www.linnean.org/Irene-Manton-Manchester

6 Dec
Lunchtime
Lecture
12.30–13.00
The Botany of Christmas
Dr Mark Nesbitt, Royal Botanic Gardens, Kew
Registration is not necessary

18 Jan 2017
Lunchtime
Lecture
12.30–13.00
Josef Frank: Patterns–Furniture–Painting
Speaker: Celia Jocey, Fashion and Textile Museum London
Registration is not necessary

19 Jan
Evening Meeting
18.00–19.00
From Genome Evolution to Animal Diversity: A Tale of Moths and Mammals
Speaker: Prof Peter Holland, University of Oxford
Registration is not necessary

1 Feb
Lunchtime
Lecture
12.30–13.00
Speaker: Dr David Lowther, Durham University
Registration is not necessary

9 Feb
Nature Reader
18.00–19.00
So Many Celestial Animals So Vividly Drawn: Birds and their Images in Pre-Nature Reader Linnean Italy
Speakers: Henrietta McBurney Ryan FLS and Carlo Violani FLS
Registration is not necessary

Please check our website for other events not listed here

Liz Mcgow: Archivist

Liz Mcgow joined the team in early September as the Society’s first permanent full-time Archivist. Liz was originally inspired to pursue a career in archives whilst working as a student at Buckingham Palace and Windsor Castle in a customer service role, where she had a brush with the Royal Archives. After graduating with a Masters in Classics from Durham University in 2009, she volunteered at and worked in various archives, including the Royal Archives and Oxfam Archives, and completed a PGDip in Archives and Records Management from University College London in 2012.

Liz has completed several large-scale cataloguing and digitisation projects at a number of institutions including Lambeth Palace Library, the Royal Society, the Royal London Hospital Archive and the Wallace Collection. At the Wallace Collection, Liz introduced new policies for managing archive collections, tested the suitability of a museums database for cataloguing archive material, wrote cataloguing guidelines, and arranged for conservation work to be carried out. She also worked for a short time as the Archivist & Records Manager at the Paul Mellon Centre for Studies in British Art which involved advising architects on preservation requirements for new storage rooms during a large expansion project at the Centre, and overseeing the move of collections in to storage during building work.

Liz developed an interest in the natural sciences after cataloguing botanical papers at Royal Botanic Gardens, Kew, and transcribing documents for the Alfred Russel Wallace correspondence project at the Natural History Museum, London. She says: “I am delighted to be starting at the Linnean Society and am looking forward to working with such fascinating collections.” Welcome Liz, from all the team at the Society.

Congratulations Sara Oldfield OBE FLS

Everyone at the Linnean Society would like to offer their congratulations to Sara Oldfield FLS who has been awarded an OBE for services to the Conservation and Protection of Wild Tree Species Worldwide. For over 25 years Sara has been involved in assessing the world’s trees for the IUCN Red List of Threatened Species. She established the Global Trees Campaign a joint initiative of Fauna & Flora International (FFI) and Botanic Gardens Conservation International (BGCI) which takes action to conserve priority tree species. Sara was Secretary General of BGCI for ten years and continues to work with BGCI on the Global Tree Assessment which aims to assess the conservation status of all trees by 2020. Congratulations Sara!