



The Linnean

NEWSLETTER AND PROCEEDINGS OF THE LINNEAN SOCIETY OF LONDON

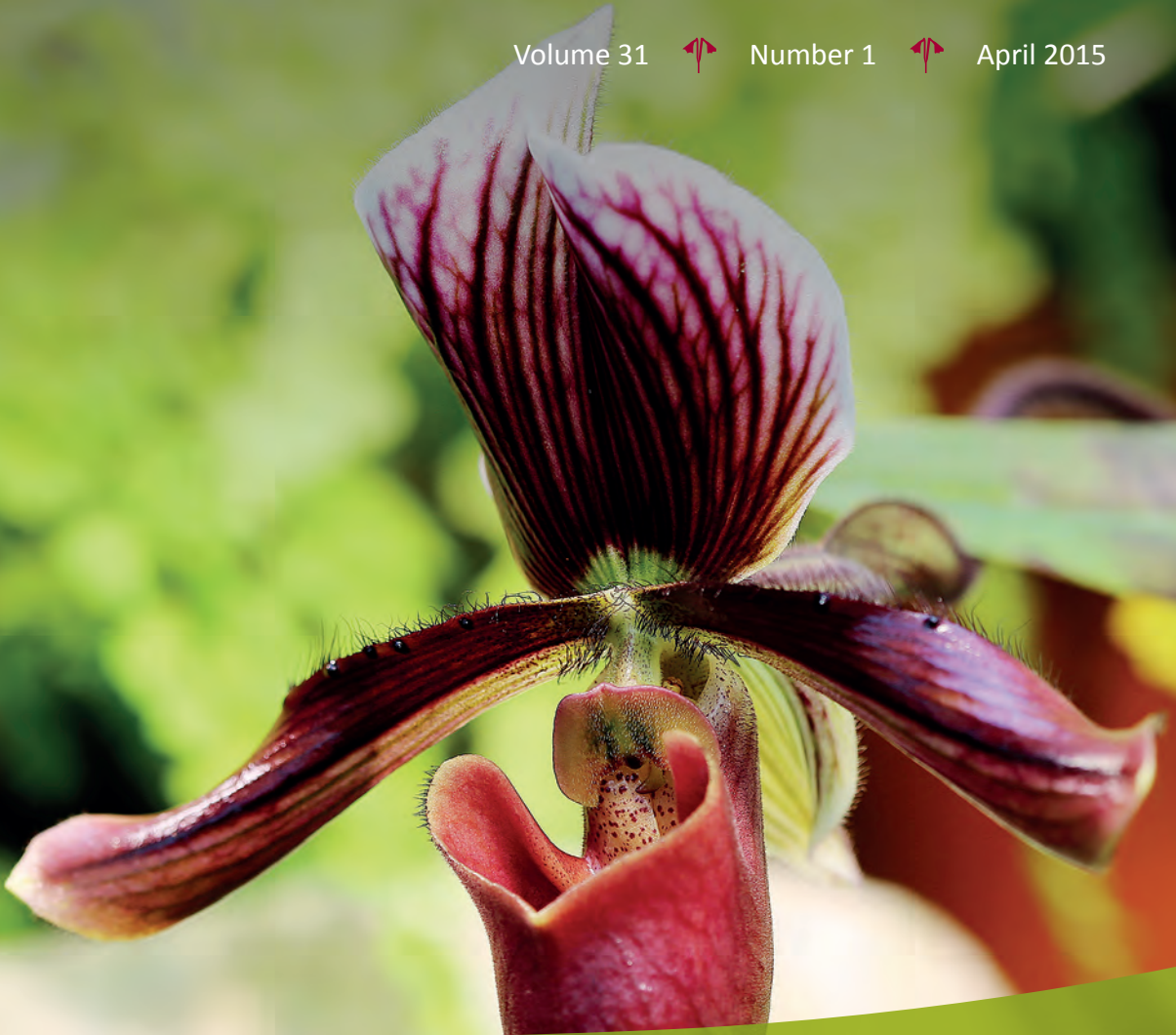
Volume 31



Number 1



April 2015



Harbingers:

Darwin's evolutionary
forefathers

Orchids:

A botanical and
surgical liaison

The Ternate Essay:

Revisiting the timeline

AND MORE...

A forum for natural history

The Linnean Society of London

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

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The Linnean

Newsletter and Proceedings of the Linnean Society of London

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Editorial

As Editor, my intent is to keep the content of *The Linnean* varied, so although Charles Darwin and Alfred Russel Wallace feature again, we are trying to ensure they do not loom too large in each issue. Papers and articles of all kinds are always welcome, so please do get in touch with your submissions.

Unfortunately, the previous issue used the wrong image of a strawberry to illustrate Linnaeus's cure for gout, but, rather auspiciously, this has led to a very interesting letter on the subject from Professor Inga Hedberg FLS. We must also apologise for the lack of an online list of library donations; this is now online at www.linnean.org/thelinnean. All donated books are also searchable via our online catalogue, which has a 'What's new' link taking you to items added in the last 90 days, though there may be a slight delay in uploading the catalogue records.



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This issue also includes an obituary notice for Paul Cornelius. Sadly we now have a list of others who have recently passed away: the lichenologist David Galloway, Rosemary Lowe McConnell, the first Editor of the Biological Journal and the botanist Jim Reveal. In Memoriam notices for some of these friends of the Society will appear in future issues.

Fellows may be interested to know that I met with Brian Gardiner, the original Editor of *The Linnean*, over the Christmas period and I am delighted to report that, although he does not venture out much now, he is well.

Gina Douglas, *Editor*
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It's official! In December last year, Arts Council England (ACE) formally accorded Designated Status to the entirety of the Linnean Society's library, archive and biological specimen Collections. This is a significant milestone for the Linnean Society because, although the Collections have always been considered internationally important, it is only with the recent improvements in access to the Collections at Burlington House, both physical (lift, disabled toilet) and electronic (website, the Online Collections) that we have been able to achieve this important designation. Improving access was made possible by generous grants and donations from a number of benefactors including the Garfield Weston Foundation, the Wolfson Foundation, the Eleanor McMillan Fund, the Lisbet Rausing and Peter Baldwin Fund, and the Andrew W Mellon Foundation, as well as by various donations from the Fellowship; Jenny Grundy FLS in particular has raised over £700 for the Society selling her beautiful cards, with a further £43,000 raised for other charitable causes. Designated status will potentially help the Society and its fundraising initiatives, with a number of grant applications in process to raise around £1 million for education, archive and public engagement projects over the next three years.



Jenny Grundy FLS has raised money through the sale of her cards

“Linnaeus the Younger's own manuscripts contain previously unpublished comments on English women...and Lady Banks's goldfish.”

The LinnBlog (www.linnean.org/linnblog) has been revealing secrets from the Linnaean Manuscripts project, such as the fact that Linnaeus the Younger made good use of his father's manuscripts once these had been published...using them to press and dry plant and insect specimens. Linnaeus the Younger's own manuscripts contain previously unpublished comments on English women, the use of electricity as a cure for several ailments and on Lady Banks's goldfish. This provided many amusing anecdotes for the City of Uppsala Mayoral Delegation and the Swedish Ambassador to London, Nicola Clase, who visited the Society in January.

Also featured on our blog is the Natural Sciences Collections Association (NatSCA)'s exciting crowdsourcing initiative 'Natural history near you' (<http://www.natsca.org/NHNearYou>), where every natural history collection in the UK & Ireland will be mapped and 'assessed', with a view to improving their care and accessibility. These collections represent hugely important resources, with verifiable data that can provide a historic baseline for population distributions, allowing environmental changes to be mapped, and supporting biological recorders in their identifications. Collections also support

school and university teaching, academic research and they provide a rich source of inspiration for artists, historians and anyone who wants to further engage with the natural world.

Open House 2014 delivered an ideal opportunity for the five Courtyard Societies, together with the Royal Academy, to celebrate the Cultural Campus of Burlington House—and we saw a record number of visitors through our doors (1,088). People were delighted to see some of the Society's treasures brought out by the library team, including the type specimens of John Dory and *Linnaea borealis*, Wallace's python skin and some beautiful art work. Another record was set by attendance at Tony Campbell's lecture '*Darwin Diagnosed*' in October but if you missed it, you can see the videocast on the Society's website (www.linnean.org/videocasts), along with Jim Endersby's musings on when, how and why a person is like a plant. Look out for forthcoming lectures which will venture into social anthropology, the curious Mr Catesby, genetic diversity in farm animals and plant conservation. Don't miss the Conversazione at the University of Bristol Botanic Garden, and of course, the Anniversary Meeting on 22 May.



Catesby's 'The Blew Grosbeak' (blue grosbeak), or *Passerina caerulea*

This year has seen a record number of applications, 178 in total, to the Systematics Research Fund (SRF), which the Society jointly administers with the Systematics Association. The recipients of this year's awards will be announced shortly, while the inaugural Attenborough Award for the best field work project from the 2014 SRF awards was presented in November to Professor David Kipling. His study '*Enhancing the systematics and recording of British ascidians*' identified four undescribed *Aplidium* species close to shore—a stark reminder of how little we know regarding the biodiversity of our own coastal waters. The Appleyard fund was stretched this year, with three awards being made (see the 2014 Annual Report).

The Society, alongside launching the second post-16 module entitled *Murderous Plants*, was pleased to facilitate the launch of the Darwin-Inspired Learning treatise, with our Education Committee also working on a five-year strategy for the Society's education initiatives. This brings me back to public engagement: if you haven't been on a Treasures Tour yet, please book yourself onto the May or June tours, which are conveniently synchronised with our lunchtime lectures.

Elizabeth Rollinson, Executive Secretary
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The 2014 Linnaeus Link Partners' Meeting took place in October and was co-hosted by the Society and the Royal Botanic Gardens, Kew. Twenty-three delegates from 15 institutions across the UK, Sweden, Germany, Switzerland, Belgium and the US attended. Representatives of several prospective Partner institutions were present this year, including the Royal Botanic Garden Edinburgh (RBGE) and the Berlin State Library. RBGE has since signed the Principles of Co-operation and has become a full member. The longstanding Partners provide welcoming support for all newcomers as they begin to contribute their records to the Union Catalogue. Elaine Charwat, Deputy Librarian, in her capacity as Administrator of the system, has been working on improvements suggested by Partners with 67 Bricks, the developers of the Linnaeus Link online repository.

Preserving Portraits and Purchasing Letters

A portrait of the Revd William Keble Martin FLS (1877–1969) was offered to the Society towards the end of last year. Keble Martin was the author of the *Concise British Flora* (1965) and the Society already holds his manuscripts and his paint-box. The portrait has now been delivered to the Society from its previous home in Cornwall and is receiving a little attention from our Conservator, Janet Ashdown, before going on display.

As reported in *PuLSe*, the portrait of Percy Sladen (1849–1900), a Vice-President of the Society, has been removed from the Meeting Room for renovation. Having visited the studio of the Society's paintings conservator, the canvas has been re-lined, mounted on a new stretcher and a previous poor repair has been fixed. The portrait has also



been surface cleaned and re-varnished. The Society is grateful to the Trustees of the Percy Sladen Memorial Fund which is meeting the cost of this work.

The Society has recently been successful in negotiating the purchase of several letters by John Claudius Loudon FLS (1783–1843). Very few Loudon letters survive and, since the Society already holds 16 within the Swainson and Winch correspondence collections, it was felt that this would be an excellent acquisition. Loudon was a Scottish botanist and a designer of gardens, notably the Birmingham Botanical Gardens, and cemeteries. His portrait hangs on the Society's main staircase. He rests in Kensal Green Cemetery, sadly not one of his own designs.

Collections on Loan

A loan of volumes of botanical illustrations was made to the World Land Trust Gallery in Halesworth, Suffolk for the exhibition *The Hookers of Halesworth*. Sir WJ Hooker settled in Halesworth, where his son JD Hooker was born in 1817. The volumes have now been safely returned to the Society.

Council has approved a loan of the John Lewin watercolour *A newly discovered animal of the Derwent* [Tasmanian Tiger/Thylacine] to Tate Britain's *Art and Empire* exhibition. This image travelled to Australia in 2013 as one of several paintings loaned to the *Lewin: Wild Art* exhibition. The Tate Britain exhibition will explore the relationship between art and empire in British history, from the 16th century to the present day. It will run from November 2015 to March 2016 in the Linbury Galleries, so if you're located in or visiting London, why not stop by the exhibition?



Lewin's Tasmanian Tiger

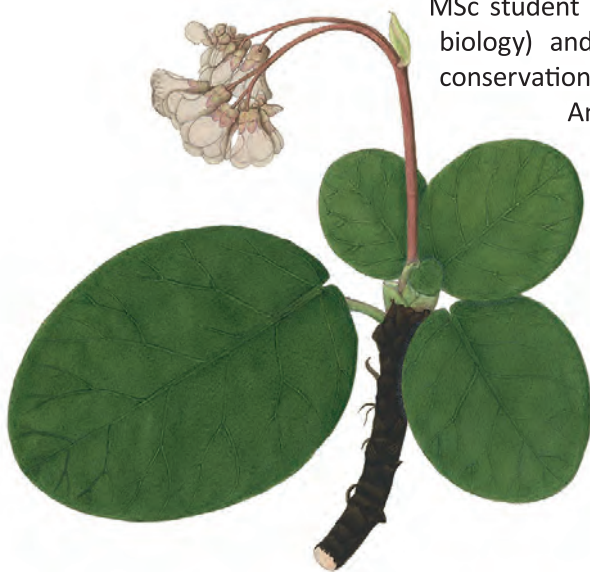
Visits to the Library and Collections

Two visits from groups of Art Fund members have taken place recently. The tours for these groups involve a detailed look at all the Society's artworks throughout the building, as well as tours of the Collections Store.

The Selborne Society has some Gilbert White material (ms sermons and the *Flora Selbornensis*) as well as Society ledgers and documents on deposit here. A visit was arranged for some members to see this material and an informative commentary on the background to the material was supplied by one of the members of the Society.

A group of Members of the Athenaeum visited in November. The visit was very popular and oversubscribed, so another tour has been arranged for the spring. We have also had

MSc student groups visiting from Heriot-Watt (marine biology) and the University of Greenwich (general conservation). There was also an extended visit from Ann-Marie Brennan's final year students (Social aspects of science) from London South Bank University.

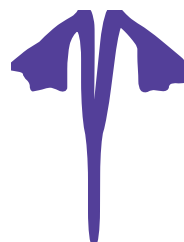


Buchanan Hamilton's *Saxifraga pacumbis*

Recently, several botanical artists from RBGE visited to view a selection of the Buchanan-Hamilton paintings of Nepalese plants. The artists are preparing for an expedition to Nepal to find examples of these plants in the wild and produce new paintings of them.

Lynda Brooks, Librarian
lynda@linnean.org

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:

Valerie Baines	Professor Gren Lucas
Professor RJ Berry	Dr Santiago Madriñan
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David Blake	Hazel Marsden
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Dr Chris Clegg	Dr David J Potter
Professor MA Colasante	Mike Poulton
Barry Cox	Professor Sir Ghilleen T Prance
Gina Douglas	Dr CD Preston
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Timothy George	Royal Pharmaceutical Society
Jenny Grundy	Professor Mark Seaward
Hagströmer Medico-Historical Library	Dr David AS Smith
Dr Brian Harding	Professor Jan Trueman
Dr John Holmes	Dr Tim Waters
Horniman Museum Library	Professor Ray Williams
Professor Edvard Hviding	Dr Ann Wood
Brian Livingstone	Dr Jean WH Young
Dr Rosemary Lowe-McConnell†	† Posthumous donation

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.

WILD STRAWBERRY VS GARDEN STRAWBERRY

The *Linnean* always contains a number of interesting articles, not least Society News, which this time (October 2014) comments *int. al.* on the refreshed website and the newly introduced LinnBlog. However, one of the illustrations on p 2 with the text “A jar a day: Linnaeus’ cure for gout”, is misleading. The berry shown is the fruit of the cultivated ‘(garden) strawberry’ (*Fragaria × ananassa*, “jordgubbe” in Swedish), but the plant Linnaeus used was the wild species, ‘wild strawberry’ (*Fragaria vesca*, “smultron” in Swedish).

There are no difficulties in separating the two species. The leaves of the garden strawberry are nearly or quite glabrous above, the sepals are appressed after flowering and the fruit is big and more or less cone-shaped to slightly roundish. The leaves of the wild strawberry on the contrary are hairy on the upper side, the sepals are patent or deflexed after flowering and the fruit is fairly small and roundish. There is also a difference in chromosome numbers.

Furthermore, the wild strawberry is found (as is obvious from its English name) in nature, almost throughout Europe, in forest glades, edges of meadows, etc., sometimes in large numbers, whereas the garden strawberry has a very long history of breeding. It is the result of crossing the North American *Fragaria virginiana* (Virginia strawberry) and the South American *F. chiloensis* (giant wild strawberry) in France in the mid-1700s, and was named *Fragaria × ananassa*. This successful hybrid has then been subjected to out-crossing with other species, so today there are a great number of varieties of garden strawberry found round the world. It can also occasionally be found as an escape.

As to medicinal or other uses, I have not found anything about the garden strawberry (except of course as a delicacy), whereas the leaves of the wild strawberry have been used to some extent; it features in European herbals. In Britain it has, for example, been used as an astringent, and girls



Fragaria vesca—‘wild strawberry’

in 17th-century Cornwall are reported to have rubbed their faces with its leaves to improve their complexion. Robert Burns is supposed to have used the dry leaves together with dried leaves of other plants and heather tops in a “Moorland Tea”, and in Sweden the dried leaves have been used in tea, as a supposed cure for swollen glands.

The berries of the wild strawberry, also a delicacy, seem to have been of little use from a medical point of view, but obviously Linnaeus’s belief in their healing properties was strong. Gout is a very painful paroxysmal disease with inflammation of smaller joints (especially that of the great toe), from which he suffered for many years, and which he tried to cure by consuming an impressive amount of the berries in the summer, when he lived in his country estate, Hammarby. The plants grew in abundance and he could buy large quantities of berries from the children living in the neighbourhood. In winter time he used preserved berries over which he poured wine or brandy. To what extent his cure (“smultron-kur”) in reality was efficient is not known, but—placebo or not—he must have experienced some relief, since he carried on with the cure as long as he lived.

Inga Hedberg FLS

Evolutionary Biology Centre, Uppsala University



ON THE GENDER OF TREE NAMES

Hugh L Pearson’s struggle with tree names in the Linnean 30(2) brought back memories from the time when I, as a student in the 1960s, tried to understand the principle of the so-called Latin names of plants.

I stumbled over some common tree names, such as *Ulmus glabra* and *Fagus sylvatica*. These appeared incorrect according to the rule that the epithet should be in the same gender as the generic name (the endings of the generic names, –us, apparently being masculine). I found no explanation for this, but took the opportunity of asking William T Stearn when I happened to meet him at a tour in the gardens of Cambridge during a course I attended. He looked surprised at this inquisitive student, and said softly:

You see, the old Romans regarded trees as female beings since they carried fruits [*Ficus*, *Malus*, *Prunus* and *Pyrus* being most fitting examples] and this tradition rules the gender of the names, and not the grammatical form of the word.

Accordingly this is one of those cumbersome irregularities languages are full of, which one has to learn if one wishes to be correct. Since then I still wonder why the Romans

did so, and have taken the opportunity to ask my learned friend Peter Wagner in Copenhagen about it. He has come up with a rather long and complicated history on each of those two original examples, which in a few words show that the origin and history of each of them also influence their gender, not only the endings.



Ficus racemosa

Linnaeus was not a great linguist, and had particular trouble with Greek—he actually failed in his final exam at the college in Växjö, but the headmaster let him go on to further studies because of his extraordinary skills in biology! This might then be the reason why he appears to have got the gender of *Liriodendron*, a Greek word, wrong. I cannot believe that the man who used the reproductive organs to make a new system was inclined to cling to an old Roman mythological approach when making a new name. However, upon checking his text in *Species Plantarum* (1753), I found the explanation: he records this as *Liriodendron Tulipifera*, the capital letter of the epithet indicating that this is not an adjective, but an indeclinable substantive in apposition to the neuter generic name, one that he took from earlier authors who used this as a generic name. This is yet another of those unpleasant irregularities which makes life more cumbersome for modern botanists.

It is understandable that this has caused confusion, but there is little we can do with these historic facts except to define what is the correct usage. This is what the International Code of Nomenclature is doing. What other alternatives are there?

I expect members of the Linnean Society to defend the Linnaean tradition, particularly when other options are not obviously simpler or better.

As a postscript, I would, however, wish that we would stop referring to these names as Latin names, since they have a Latin form, but stem from several languages. They are just international designations of plants. I prefer to call them scientific names as opposed to national or local names.

Per M Jørgensen FFLS

Professor emeritus,
Dept of Natural History, Bergen University Museum, Norway

From issue 24, December 2014 of *Pulse*

A CARBON COPY? A NOTE ON THE TERM “TROPICAL RAINFOREST”

By Luke Mander and William G Chaloner

Tropical rainforests are the most structurally complex and diverse terrestrial ecosystems that have ever existed on Earth. They form the primary gene pool for flowering plants (angiosperms) (Morley 2000), and, globally, the highest plant diversity is found in the remarkable tropical rainforests of South America (Jaramillo *et al* 2006). They are dynamic ecosystems that are thought to have modified their biogeographic ranges in response to the warming and cooling of the Earth's climate (Morley 2000), with South American tropical plant diversity showing a sensitivity to global temperature changes on geological time scales (Jaramillo *et al* 2006).



Tropical rainforests as we know them today, irrespective of their geographic location, are defined using climatic and botanical criteria (Richards 1996; Morley 2000). They grow at less than 700m above sea level in a climate characterised by at least 1,800mm of annual rainfall; for nine months of the year the monthly level of rainfall is over 100mm (Burnham and Johnson 2004). Regions supporting rainforest growth in the tropics have a mean annual temperature greater than 18°C, with a range of less than 7°C (Burnham and Johnson 2004). Almost all tropical rainforests are frost-free, and a cold month mean of 18°C is a widely used defining climatic criterion (Wolfe 1979; Morley 2000). Plants with entire-margined, large mesophyllous leaves of greater than 42 sq.cm in size are characteristic of tropical rainforests, and drip tips, ridding the plants of excess rainwater, are present in 25–70% of plant species (Burnham and Johnson 2004). Existing tropical rainforests are dominated by angiosperms, with more than 80% of species of over 10cm in diameter belonging to either dicotyledonous angiosperm families or the monocotyledonous palm family Arecaceae (Burnham and Johnson 2004). Plant diversity is high in tropical rainforests—there are typically more than 40 tree species per hectare (Wright 2002).

Such climatic and botanical characteristics can be difficult to measure in the fossil record and consequently the origin of tropical rainforests is poorly understood. *To read the full text and references, find this back issue at www.linnean-pulse.org.*

Darwin's Harbingers



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Introduction

A lecture I gave on the life of Charles Darwin in the *AC Moore Lectures in Evolutionary Biology and Society* series at the University of South Carolina (USC) was followed by a tour of the Irvin Department of Rare Books & Special Collections of the Ernest F Hollings Library. The Director asked if I could provide a list of Darwin's predecessors so that their works could be added to the impressive collection of Darwiniana at the USC. Such requests are rarely as simple as they sound. What follows is my attempt to be helpful.

Darwin, stung by Reverend Baden Powell's criticism of *On The Origin of Species* (1859) suggesting he had not acknowledged previous thinking on the subject, recalled that he had begun a list of ten predecessors in 1856 as a single-page preface to his "big species book" that he was laboriously working on (Johnson, 2007; Stott, 2012). However, because of the rush to publish—precipitated by Wallace's 1858 letter as well as by his own ill health and that of his children (Berra, 2013a & b)—he neglected to add this list to both the first and second editions of *The Origin* (24 November 1859 and 7 January 1860 respectively).

This was not the first time Darwin was taken to task for failing to acknowledge others. Captain FitzRoy shamed Darwin into adding a more complimentary preface to Darwin's *Journal of Researches* acknowledging the support of FitzRoy and the *Beagle's* officers (Aydon, 2002).

Darwin's preface finally saw the light of day in the first German edition of *The Origin* in April 1860, and in the authorised American edition (Appleton & Co.) of May 1860, which was a corrected version of the pirated first American version (Freeman, 1977). The list now had 18 names (Johnson, 2007). This preface became "An Historical Sketch of the Recent Progress of Opinion on the Origin of Species" for the third English edition

of 1861 and contained 30 names (Stott, 2012). When Stauffer (1975, p 22) assembled Darwin's "big species book" as *Charles Darwin's Natural Selection* he could not locate the Preface in surviving Darwin manuscripts. The original preface, presumably, was not preserved (Johnson, 2007).

By the fourth edition of *The Origin* in 1866 the Historical Sketch had been ten years in the making and, according to Stott (2012), contained 38 (p. xv) or 37 (p 15) entries. Darwin, in a footnote to the Historical Sketch, claimed 34 and wrote, "...that of the thirty-four authors named in this Historical Sketch, who believe in the modification of species, or at least disbelieve in separate acts of creation, twenty-seven have written on special branches of natural history or geology".

It is not always obvious who Darwin was counting as a predecessor because he mentions people in the Historical Sketch that told him about other sources in various languages. Should they be counted? For example, Godron and his *Sur l'Espèce* are mentioned by Darwin in a footnote to the Historical Sketch as a reference. Should Pander be counted since he co-authored with d'Alton? Darwin included some names (Unger, d'Alton, Pander, Oken, Bory St Vincent, Burdach, Poiret and Fries) in a footnote without much explanation. Darwin also removed the name of Benoît de Maillet (1656–1738) from the list, a French diplomat who had some rudimentary evolutionary ideas, but also some bizarre ideas about human sea creatures (Stott, 2012).

Darwin reviewed the history of the idea of transmutation, citing naturalists who, in one way or another, had postulated evolutionary change, gradual modification, the unity of life and natural mechanisms rather than supernatural explanations. Some had grasped the concept of descent with modification (=evolution), but few had the insight to recognise natural selection as the mechanism of evolution. At the end of the list he added Alfred Russel Wallace, the co-discover of the theory of natural selection, and his friends Huxley and Hooker who publically supported his ideas. British, French and German scientists dominate the list, in that order. This list continued through the sixth and final edition (1872) of *The Origin* where it was entitled "An Historical Sketch of the Recent Progress of Opinion on the Origin of Species, Previously to the Publication of the First Edition of this Work". Slight variations in the Historical Sketch can be followed in the variorum edition of *The Origin* (Peckham, 1959).

Johnson (2007) analysed Darwin's thinking on his short history of opinion on the species question. He addressed why Darwin wrote the sketch and concluded that its purpose was to demonstrate that ultimately natural selection was the product of Darwin's mind alone. Darwin was establishing his priority and showing that he took nothing from his predecessors. Stott (2012) reviewed the subject in book-length detail, incorporating deserving individuals Darwin did not know about and excluding others who should not have been included. Osborn (1894) and McKinney (1971) demonstrated that "evolution was in the air" and that the time was ripe for Darwin's explanation.

The names in the list are in chronological order as presented by Darwin, more or less, on the basis of the year of their important publications. However, Darwin did not

encounter these works chronologically as some were obscure and others required translation. The first person on the list, Aristotle, was actually the last person added. Birth and death dates and some biographical comments are from Freeman (1978), Ghiselin (2009) and the *Encyclopedia Britannica*. Other remarks and references are paraphrased from Darwin's Historical Sketch in the sixth edition of *The Origin* (1872).

DARWIN'S LIST

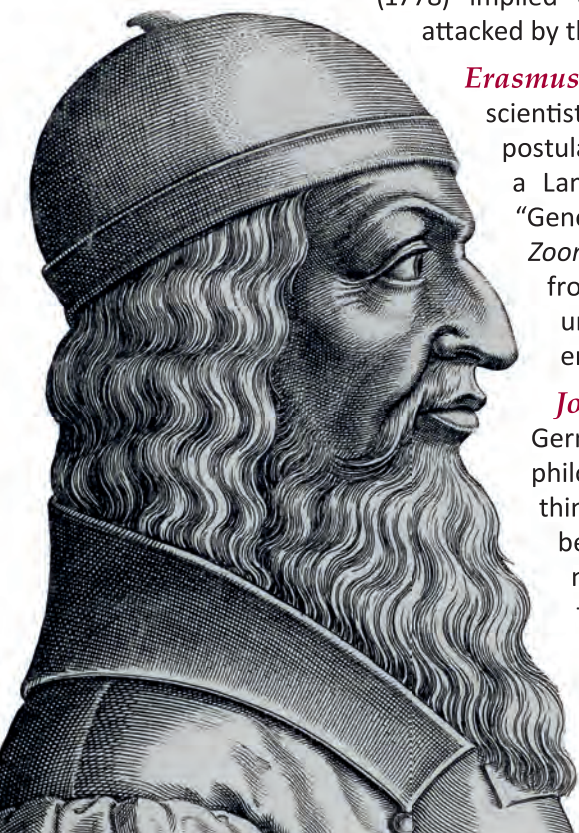
Aristotle 384–322 BCE. Greek philosopher. Darwin thought Aristotle (Fig 1) foreshadowed natural selection. In a footnote, Darwin singled out this quote: “Wheresoever, therefore, all things together (that is all the parts of one whole) happened like as if they were made for the sake of something, these were preserved, having been appropriately constituted by an internal spontaneity; and whatsoever things were not thus constituted, perished, and still perish.” *Physicae Auscultationes* Book II Part 8. Stott (2012) pointed out that this is a mistranslation by classicist James Clair Grece of Empedocles that Aristotle was summarising, and that to Aristotle, species were fixed for all time. Therefore, Aristotle should not be included in this list.

Georges-Louis Leclerc Buffon 1707–88. French naturalist. *Histoire Naturelle*. Thirty-six volumes during his lifetime. He claimed that the earth and organisms have changed over time. Theologians at the Sorbonne required Buffon to sign a letter retracting 14 “reprehensible statements”. He became more cautious and described himself as a “masked man” (Stott, 2012 p 139). His *Époque de la Nature* (1778) implied evolutionary change and was immediately attacked by theologians.

Erasmus Darwin 1731–1802. British physician, scientist, poet. Charles Darwin (CD)’s grandfather. He postulated an old earth and seemingly anticipated a Lamarckian view of change. He wrote in the “Generation” chapter of his two kilogram tome *Zoonomia* (1794) that all species descended from minute aquatic filaments in the sea. He understood that species adapted to their environment.

Johann Wolfgang von Goethe 1749–1832. German writer (author of *Faust*) and natural philosopher. He was a harbinger of evolutionary thinking “...the future question for naturalists will be how, for instance, cattle got their horns, and not for what they are used”. CD was impressed that this subject was expressed in 1794.

Fig 1 Darwin included Aristotle in his list, but Aristotle believed species were fixed



Jean-Baptiste de Lamarck 1744–1829. French naturalist. The best known pre-Darwinian evolutionist. Ideas include: that all species, including man, are descended from other species; all change is the result of a natural law, not supernatural intervention; gradual change of species; inheritance of acquired characters. In *Système des Animaux sans Vertèbres* (1801) he recognised that fossils reflected transformations experienced by living species. He amplified such ideas in *Philosophie Zoologique* (1809) (McKinney, 1971).

Étienne-François Geoffroy Saint-Hilaire 1772–1844. French zoologist. From studies in comparative anatomy, he recognised that animal anatomy reflected a common arrangement of parts and that species can and do change in response to the environment. His son, Isidore Geoffroy Saint-Hilaire, wrote that his father had these ideas in 1795. CD wrote of Geoffroy Saint-Hilaire's view that "The same forms have not been perpetuated since the origin of all things". *Sur le Principe de l'unité de composition organique* (1828).

William Charles Wells 1757–1817. British physician and scientist, (born Charleston, South Carolina, US and settled in London in 1785). CD accepted that Wells was the first to recognise the idea of natural selection, but Wells only applied it to the races of man, not all life. This paper was read before the Royal Society in 1813 and later published posthumously as an appendix to *Two Essays: One upon Single Vision with Two Eyes; The Other on Dew* (1818) (Fig 2). The first publication of the idea of natural selection had the odd title "An Account of a Female of the White Race of Mankind, Part of Whose Skin Resembles that of a Negro; with Some Observations on the Causes of the Differences in Colour and Form Between the White and Negro Races of Men". This obscure paper is reprinted by McKinney (1971). Wells discussed the formation of human races as adaptation to local diseases and climate by natural selection. He also mentioned man's use of artificial selection to improve domesticated animals; however the idea of descent with modification was not part of his thinking. KD Wells (1973, unrelated to subject) explored how WC Wells came to Darwin's attention.

William Herbert 1778–1847. British plant breeder, poet and clergyman. His plant hybridisation experiments showed that there is no clear distinction

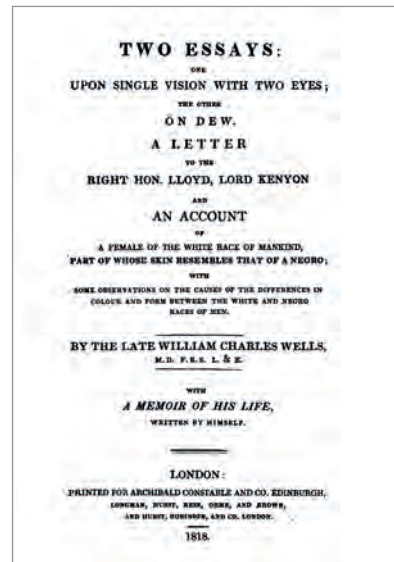


Fig 2 Title page from William Charles Wells's posthumously published book of 1818. The essay on skin colour, that appears as an appendix, is the first exposition of what is recognisable as the rudiments of the concept of natural selection. Darwin acknowledged this in his Historical Sketch that appeared in the third English edition of *On the Origin of Species* in 1861.

between species and varieties. This was published the *Transactions of the Horticultural Society of London* vol 4 in 1822.

Robert Edmond Grant 1793–1874. British zoologist and physician. He was greatly influenced by Erasmus Darwin's *Zoonomia* and was a radical Lamarckian. He became CD's mentor in natural history at Edinburgh. In his work on sponges in 1826 (p 283) he indicated that species are descended from other species, and that they become improved during modification. "On the structure and nature of the *Spongilla friabilis*" *Edinburgh Philosophical Journal* vol 14 (28): 271–285.

Patrick Matthew 1790–1874. Scottish agriculturalist. He briefly anticipated natural selection in the appendix of an obscure book, *Naval Timber and Arboriculture* (1831) (reproduced by McKinney, 1971) and called attention to it in *Gardener's Chronicle and Agricultural Gazette* in 1860 (7 April p 312–3), but was second to WC Wells in recognition of natural selection. CD apologised for his ignorance of Matthew's publication, and Matthew accepted the merit of Darwin's discovery and considered his own observation as incidental (Stott, 2012). Nevertheless, Matthew included "Discover of the Principle of Natural Selection" on his title-pages and visiting cards (West, 1937 p 259).

Leopold von Buch 1774–1853. German geologist (Fig 3). In *Description Physique des Isles Canaries* (1836 p 147) he stated that varieties slowly become changed into permanent species which no longer interbreed.

Constantine Samuel Rafinesque 1783–1840. Franco-American naturalist. In *New Flora of North America* (1836 p 6) he stated, "All species might have been varieties once, and many varieties are gradually becoming species by assuming constant and peculiar characters".

Samuel Steman Haldeman 1812–80. American naturalist. In an 1843 paper on mollusks, he provided evidence for and against modification of species and supported their mutability. *Boston Journal of Natural History* 4: 468.

Vestiges of Creation (1844). Published anonymously by Scottish writer and publisher, Robert Chambers (1802–71). It dealt with the origin of earth and life and offered a Lamarckian view of evolution and supported the mutability of species. It was profoundly heretical, immensely popular among the reform-minded middle classes, and helped prepare society for Darwin's views to be published in 1859. Criticism of this work and the scandalous hubbub it created may be reasons why Darwin delayed his own publication. *Vestiges of the Natural History of Creation* was denounced by



Fig 3 Leopold von Buch

clergy for its heresy and by scientists for its errors. CD's Cambridge University geology professor, Adam Sedgwick, wrote, "...it was so bad it could almost have been written by a woman" (*Edinburgh Review*, 1845). Chambers's authorship was not publically acknowledged until 1884, 13 years after his death, and two years after Darwin's death.

Jean Baptiste Julien d'Omalius d'Halloy 1783–1875. Belgian geologist. Published the view in 1846 that new species have been produced by descent with modification as opposed to special creation (*Bulletins de l'Academie Royale de Bruxelles* 13: 581).

Richard Owen 1804–92. British anatomist and palaeontologist. He gave conflicting views about mutability of species and natural selection in various publications. Owen tried to take credit for the idea of natural selection while simultaneously denouncing it. Darwin gave an extended discussion of Owen in the Historical Sketch. Owen anonymously wrote a scathing review of *On the Origin of Species*, and was envious of Darwin's celebrity.

“Owen anonymously wrote a scathing review of *On the Origin of Species*, and was envious of Darwin's celebrity.”

Isidore Geoffroy Saint-Hilaire 1805–61. French zoologist, son of Étienne-François Geoffroy Saint-Hilaire. His experience with wild and domestic animals led him to the conclusion that species vary. A summary of his views appeared in the January 1851 issue of *Revue et Magasin de Zoologie*.

Henry Freke Unknown–1888. Irish physician and early evolutionist. Issued a circular in 1851 that claimed all organic beings have descended from one primordial form.

Herbert Spencer 1820–1903. British social philosopher. In an 1852 essay published in the March issue of *The Leader* he compared the concept of creation with natural development of organisms. Citing evidence from domestication, embryology, and the difficulty of distinguishing species and varieties, he concluded that species have been modified. Darwin used Spencer's phrase “survival of the fittest” for the first time in 1868 in *Variation of Animals and Plants under Domestication* and then in the fifth edition of *The Origin* (1869).

Charles Victor Naudin 1815–99. French botanist. In an 1852 article (*Revue Horticole* p 102) he stated that species are formed in an analogous way as varieties are under cultivation.

Franz Unger 1800–1870. Austrian botanist and paleontologist. In 1852 he published his belief that species undergo development and modification (*Versuch einer Geschichte der Pflanzenwelt*).

Josef Wilhelm Eduard d'Alton 1772–1840. German zoologist and engraver. Expressed views that species undergo development and modification in a work on fossil sloths in 1821 with CH Pander (*Die Vergleichende Osteologie*).

Christian Heinrich Pander 1794–1865. German (born in Latvia, Russia) anatomist, paleontologist and embryologist. A “founder of embryology”, he shared views with d’Alton on species development and modification.

Lorenz Oken 1779–1851. German naturalist. Darwin included him in his list of evolutionary predecessors, but Oken, author of *Die Zeugung* (1805), was actually a supporter of spontaneous generation who defined the production of species as nothing more than a regular agglomeration of Infusoria. He was also the author of the mystical *Lehrbuch der Naturphilosophie* in 1810.

Dominique Alexandre Godron 1807–80. French physician and botanist. *De l’espèce et des races dans les êtres organisés et spécialement de l’unité de l’espèce humaine* (1859). Godron cited the next four people on this list who, Darwin wrote in a footnote to the Historical Sketch, “have all admitted that new species are continually being produced”.

Jean Baptiste Georges Marie Bory de Saint Vincent 1778–1846. French naturalist. He was an editor of the 17-volume *Dictionnaire Classique d’ Histoire Naturelle* (1827) that promoted a materialistic, Lamarckian natural philosophy. He was interested in island life and human races.

Karl Friedrich Burdach 1776–1847. German anatomist and physiologist. A member of the *Naturphilosophie* School who supported the idea that lower forms of life gave rise to higher ones. Coined the word “morphology”.

Jean Louis Marie Poiret 1755–1834. French botanist and clergyman. Explored Algeria in 1785–86 and produced an inventory of the flora, *Voyage en Barbarie* (1789). Co-authored *Encyclopédie Méthodique: Botanique* with JB de Lamarck in 1816. Endorsed a Lamarckian view of evolution.

Elias Magnus Fries 1794–1878. Swedish mycologist and botanist who developed classification of fungi *Systema mycologicum* (1821–32). Accepted that species diverge through time.

Alexander Friederich Michael Leberecht Arthur von Keyserling 1815–91. Russian (born in Estonia) palaeontologist. Suggested in 1853 that new diseases arise and that existing species may give rise to new forms (*Bulletin de la Société Géologique*. 10: 357).

Hermann Joseph Schaaffhausen 1816–93. German anthropologist and physician. In his 1853 evolutionary forerunner *Verhandlungen des Naturhistorischen Vereins* he maintained: “Thus living plants and animals are not separated from the extinct by new creations, but are to be regarded as their descendants through continued reproduction.” He also published on Neanderthal fossils.

Henri Lecoq 1802–71. French botanist. Accepted the modification of species similar to the views of Geoffroy St-Hilaire and Goethe as published in 1854 in *Étude de la Géographie Botanique de l’Europe* 1:250.

Baden Powell 1796–1860. British mathematician and clergyman. Influenced by *Vestiges of the Natural History of Creation*, Powell's 1855 *Essays on the Unity of Worlds* considered the origin of new species to be a natural phenomenon. When the first edition of *On the Origin of Species* appeared in 1859, Powell reminded CD that he had not acknowledged those whose thinking on the subject preceded Darwin's own. This stimulated CD to retrieve his forgotten 1856 list of ten names and to include the Historical Sketch in the third and subsequent editions.

Alfred Russel Wallace 1823–1913. British naturalist. Co-discoverer of the theory of natural selection with CD. Each arrived at natural selection independently. Their papers were read before the Linnean Society 1 July 1858 and their two essays "On the Tendency of Species to Form Varieties; and On the Perpetuation of Varieties and Species by Natural Means of Selection" were published in August in *Journal of the Proceedings of the Linnean Society (Zoology)* 3:45–62. In the "Historical Sketch" CD wrote, "...the theory of Natural Selection is promulgated by Mr. Wallace with admirable force and clearness". Wallace's letter, which included his essay, was received by CD on 18 June 1858. It was the impetus for him to publish *On the Origin of Species* in November of 1859.

Karl Ernst von Baer 1792–1876. Russian (born in Estonia) embryologist and naturalist. A founder of embryology and a teleological evolutionist. CD noted that von Baer argued on human skull anatomy and biogeographical grounds in 1859 that forms now distinct have descended from a single parent form. "Ueber Papuas und Alfuren", *Memoires de l'Academie Impriale des Sciences de St Petersburg* 8: 269–346.

Thomas Henry Huxley 1825–95. British Zoologist. Nicknamed "Darwin's Bulldog" for his staunch defense of CD's ideas. CD cited a lecture Huxley gave in June 1859 at the Royal Institution in which he maintained that living species are the result of gradual modification of pre-existing species.

Joseph Dalton Hooker 1817–1911. British botanist. CD's long-time friend, correspondent, and an early supporter of Darwin's ideas. CD noted that in December 1859, in Hooker's *Introduction to the Australian Flora*, "he admits the truth of the descent and modification of species, and supports this doctrine by many original observations".

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The “Muling” of Orchids: An Enduring Legacy of Botanical and Surgical Liaison



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The variety and beauty of cultivated orchids bring untold pleasure to countless horticulturalists, botanists and those who receive them as tributes and gifts. The origin of the extensive international industry of commercial orchid husbandry can be traced to a close and respected relationship between two Exeter citizens—Dr John Harris (1782–1855), an experienced apprentice-trained Devon surgeon, and his younger colleague, Mr John Dominy (1816–91), a skilled horticulturalist employed by the Veitch Exotic Nursery at Mount Radford, an Exeter suburb.

In 1852, John Harris “suggested to [John Dominy] the possibility of muling Orchids” (Veitch, 1886). It was an era when artificial hybridisation of native orchid species was considered impossible. This paper describes the events surrounding that datum milestone in the history of horticulture.

The Veitch Nurseries

For more than 100 years (from the years 1800–10), Exeter was the main base of one of the foremost horticultural nurseries in the United Kingdom (Heriz-Smith, 2002). It was established ca. 1808 by a Scot, John Veitch (1752–1839), initially at Budlake near Killerton on the outskirts of Exeter. In 1832 John Veitch and his son, James (1792–1863), bought land at Mount Radford in Exeter (later the site of the Princess Elizabeth Orthopaedic Hospital) where the Veitch Exotic Nursery became world famous. Rare species of exotic orchids and imported ferns had been grown and studied in English hothouses for fewer than four decades. In early 1800, “the lovely *Aerides odoratum* and many other showy things were introduced” (O’Brien, 1885). James Veitch ‘was a man of foresight and with plant mania sweeping throughout wealthy society, spotted an opportunity to exploit the potential that precious plants could have in the British garden market’. In 1840 he sent from Exeter William Lobb (b 1809), the first of 23 plant hunters, “to discover plants in difficult-to-reach foreign lands, often risking their lives

in search of seeds or plants” (Doy, 2012). In Exeter, the Veitch Exotic Nursery soon had 118 varieties of exotic ferns and 232 varieties of imported orchids (Heriz-Smith, 2012). By 1853, John Veitch’s grandson, James Veitch [Junior] (1815–69), had established the horticultural firm of James Veitch and Sons in Keys Road, Chelsea. The nursery was named the “Veitch Exotic Nursery”. In turn his son, Harry Veitch (1840–1924), founded the Chelsea Flower Show.

The principal orchid nurseryman at the Veitch Exotic Nursery in Exeter was John Dominy (1816–91) (Doy, 2012; Yam & Arditti, 2009). Famous for his role in orchid and insectivorous plant horticulture (Fig 1), it was said of Dominy on his retirement in 1880 that:

Few men connected with horticulture have so indelibly fixed their mark upon any family of cultivated plants as has Mr Dominy upon Orchids, *Nepenthes*, etc...by his skill and assiduous perseverance, the gardens of this country have become enriched... (*The Gardener's Chronicle*, 1880)

The orchids known before 1853 were wild or native species. In that era, it was speculated that rare interspecific hybrids were the result of natural hybridisation. Inter-generic crosses were deemed impossible. In 1847 in a paper read before the Horticultural Society of London, *On Hybridisation among Vegetables*, the Reverend W Herbert (Dean of Manchester) had opined “Cross-breeding amongst Orchidaceous plants would perhaps lead to very startling results” (Herbert, 1847). Mr Harry Veitch, addressing the Orchid Conference of the Royal Horticultural Society in May 1885, recalled “That at that time [1847] and for some years afterwards, there was a prevalent notion among gardeners that muling among Orchids was an impossibility” (Veitch, 1886: 22–36). Mr (later Sir) Harry Veitch went on to say:

It was Mr John Harris, a surgeon, of Exeter, who suggested to Dominy the possibility of muling Orchids, and who pointed out to him the reproductive organs seated in the column, and showed [John Dominy] that the application of the pollinia to the stigmatic surface was analogous to the dusting of the stigma of other flowers with pollen. This simple fact being once fairly grasped, the work of hybridisation proceeded apace.



Fig 1 The Veitch's *Nepenthes* house as shown in *The Gardeners' Chronicle and Agricultural Gazette*, 1872

Mr John Harris (1782–1855), Devon surgeon

John Harris (Fig 2) was born in 1782, the successor to an old armigerous West Country family of Quaker faith, who held property in Devon and Cornwall. He loved nature, was very fond of animals and in his adult life was elected a Fellow of the Linnean Society. He was educated “near Plymouth” and studied medicine and surgery in Exeter (Harris, 1922).



Fig 2 The portrait of Dr John Harris (1782–1855) by Henry Bryce. Courtesy of the Royal Devon and Exeter NHS Trust; and Mr Stephen Pettet-Smith of Exeter HealthCare Arts.

After completing his surgical apprenticeship in 1802, John Harris commenced surgical practice in partnership with Mr Cornish, an established and well-known surgeon of Exeter. Harris was remembered as “a singularly graceful operator” (Royal College of Surgeons, 2012). On 23 May 1815, following the death of the former Senior Surgeon of the Devon and Exeter Hospital, John Harris was elected to succeed him. He served the hospital in that role continuously throughout the ensuing 40 years (Knox & Gardner-Thorpe, 2008).

In the first half of the 19th century, Exeter was a popular place for retirement for civil servants, gentry and professional families. The City’s reputation for education, learning and art made it a stimulating place for doctors to practise. By 1834 there were 104 surgeons, apothecaries and physicians who:

mixed in the higher circles of the City’s society. They could derive a prosperous living from the neighbouring gentry and retired people who could afford a golden guinea for a brief visit and a prescription. (Newton, 1968)

By 1851, in a City population of 31,305, there were 54 surgeons and apothecaries, a ratio double that of cities such as Leicester. As now, the City of Exeter was a stimulating milieu in which a doctor could interact with other skilled professionals, including horticulturalists, to the unimagined benefit of humankind.

Like many leading doctors, John Harris was also both a leader and a servant of the civic life of his community (Royal College of Surgeons, 2012). He served twice as Sheriff of Exeter (from 1820), once as Mayor (1822), and for many years served as Deputy Mayor (Exeter, UK, 2012). He was also a Senior Magistrate for the County of Devon. He served on the Corporate ‘Chamber’, was a member of the Charity Trustees and a staunch member of the Church of England. John Harris died on 30 June 1855 aged 73 years while still practising as a surgeon. He was buried at St Bartholomew’s Church, Exeter on 7 July 1855. He has no surviving monumental memorial.

The “Muling of Orchids”

John Harris, as a senior and experienced medical consultant of his day, of necessity had an extensive knowledge of botany. The surviving documented evidence suggests that Harris’s advice to and interaction with John Dominy took place in 1852 (Cawsey, 2012), five decades before the rediscovery (1900) of Mendel’s work on artificial plant pollination and genetics. Dominy first attempted to cross two species of the orchid genus *Calanthe*, *C. masuca* and *C. furcata*. Seed was obtained in 1854 and within three years the first batch of the new orchid hybrid ‘mules’ were in flower (Rolfe & Hurst, 1909). This milestone was featured in *The Gardeners’ Chronicle* and was secondarily reported in the lay press. On 21 January the *Exeter Flying Post* published one such report, headlined *A Triumph in Horticulture*. The article concluded that: “The year 1857 has been rendered famous in the annals of horticulture (*Exeter Flying Post*, 21 January 1858).” It was said that:

it is on record that when Mr James Veitch [Junior] showed him [Dr John Harris] the plant [named *Calanthe dominii*] the Doctor exclaimed; ‘Why, you will drive the botanists mad!’ (Rolfe & Hurst, 1909)

By June 1861, Dominy had successfully raised five different and novel hybrids, the fifth being the first true inter-generic cross (*Goodyera discolor* x *Anectochilus lowii*; now reclassified as *Hsemaria discolor* and *Dossinia marmorata*). In 1869, the first hybrid slipper orchid (genus *Cypripedium*) flowered. Professor Reichenbach named it *Cypripedium harrisianum* “after Dr Harris, of Exeter, who first gave Mr Dominy the idea of hybridising Orchids”. Today it is called *Paphiopedilum* x *Harrisianum*.



Fig3 *Paphiopedilum* x *Harrisianum*

Sixteen years later, in 1885, Mr Harry Veitch was to record (in one of the first papers delivered before the Royal Horticultural Society) that:

The hybridization of Orchids [is but] on the threshold...and now that muling among them has become a pastime of absorbing interest with amateurs...how few of the least of them bear favourable comparison with the numberless lovely flowers borne by plants that owe their origin to the unerring instinct of the little winged tribe...that have performed their allotted tasks for ages past, and proving, by the perfection of their work, how inapt an operator is man. (Masters, 1886; Veitch, 1886: 35–36)

Veitch's humility was an enduring feature, common to most gardeners and horticulturalists today. Nevertheless, Harris's counsel, Dominy's skill and the vision of the Veitch Nurseries led to the billion-dollar industry of commercial orchidology today. Meristem culture has led to the clonal multiplication of selected hybrids of great beauty. Today it is estimated that some 150 new species and occasional new genera of orchids are discovered each year (Vacherot, 2000). The taxonomy of these new species is constantly being refined by DNA analysis. Besides creating beautiful new flowers, the "muling" of different species and genera of orchids provided a tool by which earlier speculation about natural interspecific hybridisation could be tested experimentally.

In 1900, four decades after Harris's and Dominy's pioneering work, Mendel's discoveries were brought to the widespread notice of the worlds of horticulture and genetics. Mendel's demonstration of the transmission of monogenetic characters provided the scientific underpinning for many of the features of the blooms created in Dominy's original 1857 hybrids and enjoyed in their successors.

Conclusion

John Harris, surgeon of Exeter, served his patients well. He saved lives, delivered babies and, in Exeter, promoted hospital reform in the era preceding Nightingale nursing and Listerian antiseptic surgery. He served his community in important civic roles as Mayor, Sheriff and Magistrate. His specific memorials are two portraits of him—one in the Royal Devon and Exeter Hospital and the other in the West of England Studies Centre, also in Exeter. His most enduring memorials are the flowers of the beautiful slipper orchid, *Paphiopedilum x Harrisianum*. Through the heritage of orchid horticulture, both John Harris and John Dominy have a presence in the countless blooms of hybrid orchids that delight the eye throughout the world of the 21st century.

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Alfred Russel Wallace notes 6: More on the mailing date of the Ternate essay to Darwin



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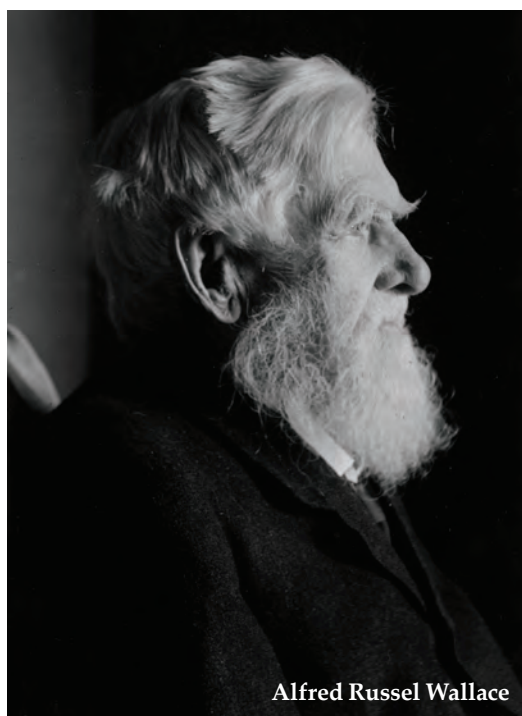
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<http://people.wku.edu/charles.smith/index1.htm>
and click on *Writings on ARW*

The debate as to when in 1858 Alfred Russel Wallace sent Charles Darwin his Ternate essay on natural selection, and what happened next, continues. Works by Roy Davies (2008, 2012) project Wallace's materials as being a March 1858 reply to a letter from Darwin dated 22 December 1857, and Darwin's subsequent reception of the materials as taking place in early June 1858; John van Wyhe (van Wyhe and Rookmaaker 2012; van Wyhe 2013) argues for an April mailing and a mid-June reception date. I (Smith 2013, 2014) have suggested an alternative interpretation of the facts. All of this bears on whether Darwin might have had time to hastily "borrow" some of Wallace's ideas before communicating his dilemma to geologist Charles Lyell in a letter (probably) dated 18 June 1858.

The Davies and van Wyhe interpretations are grounded in the understanding that Wallace's mailing was in response to the Darwin letter. No other evidence seems to exist that it was, given my recent debunking (Smith 2014) of the only other connection that has been posed to indicate such: some words Wallace wrote in his 1905 autobiography *My Life* referring to Lyell in a way that might be taken as indicating Wallace was aware of Lyell's interest in his work as of 1858 (but more likely meaning something quite different).

In one of my earlier works (Smith 2013) I listed the five publications in which Wallace related the timing of his mailing to Darwin. These all use wording similar to "sent it by the next post", with one of them reading "...the next post, which would leave in a day or two". I now find that I overlooked a sixth description, albeit a single-sentence one. As part of his acceptance speech on receiving the Linnean Society's first Darwin-Wallace medal in 1908, he wrote: "The idea came to me, as it had come to Darwin, in a sudden flash of insight: it was thought out in a few hours – was written down with such a sketch of its various applications and developments as occurred to me at the moment, – then copied on thin letter-paper and sent off to Darwin – all within



one week” (Wallace 1909, pp 6–7). Because all seem agreed that the essay was very likely written in late February or the beginning of March, these words, featuring an entirely different way of describing the time frame, again support an early March mailing date, rather than an April one.

I surmise that Wallace most probably did deposit his materials for mailing in early March, before he saw the incoming Darwin letter (*ie* he had already left them for posting by the time he received and read the latter). Still, it must yet be conceded that they could have arrived at Down in either early- or mid-June, depending on extenuating circumstances. They might, for example, have been misrouted and temporarily delayed through one of the several sorting operations occurring between Ternate and Down; alternately, perhaps Darwin did receive

the Wallace communication in early June but simply “sat” on his letter to Lyell for a couple of weeks before dating and actually sending it. Van Wyhe and Rookmaaker’s original paper (2012) in this debate produced a widespread (worldwide) reaction that Darwin was now “off the hook”, but it seems to me this conclusion is premature, at least in terms of the evidence currently available.

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PAUL FREDERICK SINEL CORNELIUS FLS

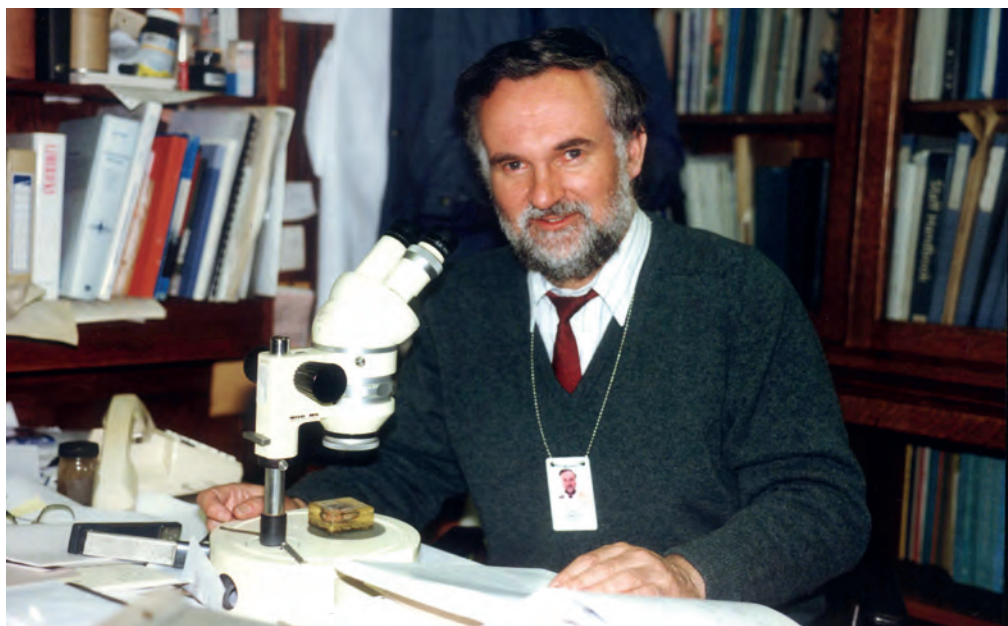
BSc (EXETER), MSc (BANGOR), PhD (LONDON), DSc (LONDON)
(1943–2014)

Paul Cornelius, born 15 August 1943 in Redhill, Surrey, England, passed away suddenly on 26 October 2014 following recurrence of cancer. He is remembered with enormous respect for academic achievements and loyal friendship. Paul was elected a Fellow of the Linnean Society of London in 1993. His role in the Society included authorship of a book (in two parts) in the *Synopses* series, and another on naturalist John Ellis (1710–76), working with Julian Groner of the USA on manuscripts held in Society's archives.

While best known as a taxonomist of hydroids, Paul's doctorate was in marine ecology. On becoming Curator of Coelenterates at the Natural History Museum (NHM) in London after graduation, he quickly mastered the principles of taxonomy and nomenclature. Few taxonomists have sufficient knowledge and experience to undertake revisionary work early in their careers, yet Paul's first publication on hydroids was a worldwide revision of *Obelia*, a large and muddled genus familiar to all who have taken introductory biology. Decades earlier, noted medusa specialist Alfred Mayer had sarcastically commented that "Every bushel basket full of *Obelia* hydroids, collected at random along our shore, is sure to contain several dozens of 'new species'". Paul likewise concluded that only a fraction of the many so-called "species" were valid. Appearing 11 days later was another major work by him on Lafoeidae and Haleciidae of British and nearby seas. Monographs soon followed on Sertulariidae and Campanulariidae. He was the author of approximately 100 publications, and editor or co-editor of volumes from several International Conferences on Coelenterate Biology and hydrozoan workshops. His research extended beyond taxonomy to biogeography, morphology, life cycles and ecology, and included a particularly insightful paper on hydroids of oceanic islands. A meticulous systematist in his own work, it was an edifying if humbling experience to receive a manuscript refereed by him. Amongst scribbled criticisms, however, were frequent pearls of utter hilarity.

“A meticulous systematist in his own work, it was an edifying if humbling experience to receive a manuscript refereed by him. Amongst scribbled criticisms, however, were frequent pearls of utter hilarity.”

Modest and unpretentious, Paul was a gracious and entertaining host. Investigators visiting the NHM were cheerfully greeted, thoroughly orientated and provided with work space. A workday often ended at an antiquarian bookstore, at dinner or at a pub for a pint. Weekends frequently included trips to places including Down House, Royal



Paul Cornelius FLS at work in 1993 © A. Antsulevich

Museums Greenwich (location of the clipper ship *Cutty Sark*), Stonehenge, Salisbury Cathedral, and Portsmouth Historic Dockyard (location of HMS *Victory* and *Mary Rose*) with Paul and his wife Pat.

Paul Cornelius was at the pinnacle of research on Hydrozoa over the last quarter of the 20th century. During that time, however, natural history museums worldwide were undergoing a disquieting internal revolution. Support of curatorial endeavours, and particularly research, was in decline partly due to budgetary issues. Astonishingly, Paul was instructed in the 1990s to abandon hydroids and undertake research on a “more important” group. Dismayed but compliant, he turned to jellyfishes and initiated worldwide fieldwork on them. Noteworthy research was undertaken on species, some of them highly venomous, in South America, Australia and southeast Asia. Adventures included having a sea lion jump off a cliff and onto his head while diving in Patagonia, and being robbed in Buenos Aires. Facing further budgetary cutbacks around the turn of the millennium, many public museums offered early retirement packages to staff. By now disheartened, Paul accepted a package from the NHM and retired in 2000.

In retirement Paul concluded unfinished research, indulged his love of nature, especially birding, and pursued hobbies including bookbinding and travel with Pat. On 15 November 2014 an appropriate send-off was held by family and friends, with seven eulogies, birdsong, and music by Mozart, Binge and Johann Strauss. Recollections of this dedicated and civilised man are cherished. His published words and wisdom live on as a lasting memorial.

Dale Calder

EVOLVING ANIMALS: THE STORY OF OUR KINGDOM

By Wallace Arthur

335 pp., illustrated with half-tone drawings,
Cambridge University Press, 2014, paperback.

ISBN 978-1-107-62795-6 (Hardback and Kindle
editions are also available)

A substantial proportion of Fellows are not professional scientists. Like this reviewer, they are more dilettante botanists or zoologists with an interest in the whole field of biological work. They will have a working knowledge of taxonomy and will be aware of the results of the new DNA-based phylogenies. However they may be rather uncertain as to why echinoderms are regarded as the close relatives to chordates. They know of Hox genes and the genetic switches that are so important in embryonic development, but they may be rather uncertain about the exact functions and importance of the highly conserved gene Sonic Hedgehog (SHH). They may also be rather vague on protostomes and deuterostomes and would welcome a reminder about the urbilaterian (it has a whole chapter here). If you recognise yourself from this description then I think you will like this book.

It brings together the themes of taxonomy, descriptions of animals and the mechanism of their evolution in a relatively non-technical text. The author, Wallace Arthur, is Emeritus Professor of Zoology at the National University of Ireland, and as he says in his preface, he is describing the Animal Kingdom as it is now understood, how its components are now thought to be related and how it all comes to be that way. Thus it includes chapters that describe the major phyla, current concepts of natural selection, animal plasticity and chapters that describe evolutionary development. The latter is probably the least familiar area for those whose undergraduate education was before 1975 and here it is very clearly described. There is also a good bibliography for those who want to go into more detail with technical texts and peer reviewed papers, or would simply like to read some more specialised “popular science” books.

Altogether it is an extremely enjoyable and easy read. The audience at whom it is aimed will finish it with much more scientifically correct knowledge than when they started and will certainly keep the book to dip into for the future.

Brian Livingstone FLS



DARWIN AND HIS CHILDREN: HIS OTHER LEGACY

By Tim M Berra

248 pp., illustrated, map, 2013, Oxford, Oxford University Press, paperback.

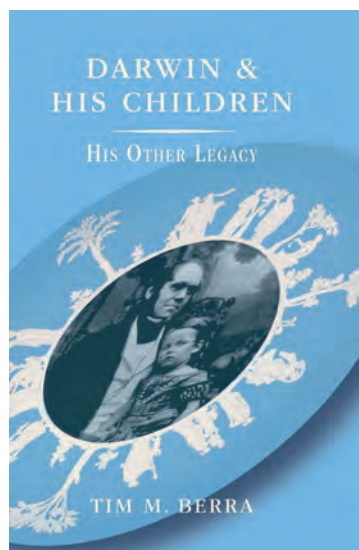
ISBN 978-0-19-930944-3

Tim M Berra, the author of this collected biography about all of Charles Darwin's children, states that he aims to provide answers to the questions that tend to arise whenever the life and work of Darwin is studied. The resulting book is a unique overview of the Darwin family, from his parents and grandparents, to his grandchildren and beyond. An introduction on the modern evolutionary synthesis is followed by an even shorter summary of Charles Darwin's post-Beagle voyage life and his marriage to Emma Wedgwood.

The book then gives entries in birth order for all his children, with details of their marriages and deaths, photographic portraits as well as their role in their father's life—short narratives throw light on the role and career of each family member and their associates.

Finally, a brief Epilogue is followed by two useful Appendices; the first is a timeline showing the dates of Darwin's publications and those of the births of his children. The second is a "Cast of Characters", a useful alphabetic cross-referenced list of all those appearing in the main text, with brief notes. I only identified one living Darwin family member listed here and the family tree on the front endpapers cuts off at 1911, so there are still some lacunae.

The comprehensive reference list is followed by an equally comprehensive index, and the back end-papers show a map depicting places in Britain with significant links to Darwin. Although compact in size, this will be an invaluable source book for anyone interested in Charles Darwin.



Gina Douglas, Editor
gina@linnean.org

IN PRAISE OF DARWIN: GEORGE ROMANES AND THE EVOLUTION OF A DARWINIAN BELIEVER

by J David Pleins

416 pp., 2014, Bloomsbury, London, paperback.

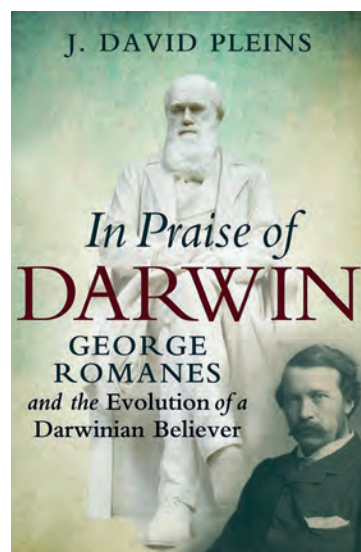
ISBN 978 1 623 56554 1 (E-book and PDF e-book editions are also available)

Firstly, I must declare an interest in this volume as it was I who sold J David Pleins, Professor of Religious Studies at Santa Clara University, the typescript on which he has based this book. One day spent in the antique bookseller Sotheran's, poring over the typescript of George Romanes's massive memorial poem to his mentor, Charles Darwin, has grown into a deeply impressive exploration of the two men's close relationship.

Pleins analyses the poem line by line, writing as much for the student of literature and the theologian as for the natural scientist. As he does so, he examines Romanes's grief and his terror at the prospect of death and a godless universe. He also identifies in Romanes's eventual finding of solace in faith a synthesis between science and religion. The fervent neo-Darwinist never lost faith in the theory of natural selection. When he found faults in Darwin's theory, Romanes fixed them; he left the theory of natural selection a stronger edifice than he found it.

After Darwin's death, though, he found that science alone provided no comfort and gave no meaning to the departed's life. In his poem, Romanes shows a sceptic moving towards a kind of religious faith. Pleins explores the tensions between different types of 'knowing'. The scientist's knowledge of his field and of God are two very different modes of 'knowing', involving different levels of certainty. Yet they call on similar processes of intuition and belief in one's instincts. In the end it is not so contradictory that it was Darwinian science—the realisation that existence is constantly evolving and progressing over vast periods of time—that led Romanes to a faith in a power greater than human understanding.

There is plenty to argue about here, and Pleins's approach is avowedly theological. Neither is the argument made easily digestible by Romanes's poetry. He was a serious man, and his poetry is suitably serious, but without the linguistic elan of Tennyson, whose magnificent *In Memoriam* was clearly the model for his work. Nevertheless, it is a moving testimony to his grief and, as Pleins skilfully shows, draws together multiple



strands of Victorian thought and sensibility. The Memorial Poem was eventually published in a very limited edition for family and friends and its critical reception is unknown. We know that he offered it to Darwin's son Francis for anonymous inclusion in the Life and Letters, who clearly rejected it. Whether this was because of the poem's sheer size or because of its sensitive content we shall never know, but Romanes's reluctance to have it published under his name and Francis's refusal to print it at all suggest that the mixture of science, religion, personal feeling and poetry was too potent to be unleashed upon the public. The Memorial Poem was finished in the late 1880s and then effectively buried for 120 years, until David Pleins excavated it; it stands as a fascinating artefact of a tumultuous period in the history of ideas.

Christopher Saunders

If you know of a book that is suitable for review in The Linnean please contact Gina Douglas via gina@linnean.org for further details.

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IMPORTANT REMINDER

JOURNAL SUBSCRIPTIONS

Subscriptions for the Society's journals (*Biological Journal of the Linnean Society*, *Botanical Journal of the Linnean Society* and *Zoological Journal of the Linnean Society*) will begin or renew on 24 May.

As Fellows have been previously informed, hard copies of the journals will no longer be available.

For those who have elected to take the electronic or print on demand journal options, your subscriptions will begin on 24 May. Anyone who has not opted for either alternative will no longer receive the journals. If you have any queries, please get in touch with Priya Nithianandan on priya@linnean.org or call us on +44 (0)20 7434 4479.



The Linnean Society of London : Programme of Events

May–October 2015

- 16 April ^A**
18.00 **A New Voyage of Discovery: Next-generation Biodiversity Discovery**
Professor Ian Owens, *Natural History Museum, London*
- 27–28 April ^{**}**
1.5 day meeting **From Cabinet to Internet: Digitising Natural History and Medical Manuscripts**
↑ Dr Isabelle Charmantier and Andrea Deneau, *The Linnean Society of London* and Staffan Müller-Wille, *University of Exeter*
TAKING PLACE AT THE LINNEAN SOCIETY OF LONDON
Registration essential: www.linnean.org/cab2int
- 6 May**
12.30–13.00 **Sorcery, War Canoes and Sacred Shrines: Field Work in the Solomon Islands in 1908**
Prof Edvard Hviding, *University of Bergen*
Prof Tim Bayliss-Smith, *University of Cambridge*
- 19 May**
18.00 **The Curious Mister Catesby**
BOOK LAUNCH
Authors David Elliot and Charles E Nelson, and *Catesby Commemorative Trust Patron*, Sir Ghilleen Prance FRS
- 22 May ^A**
16.00 **Anniversary Meeting**
Presidential Address by Professor Dianne Edwards CBE FRS PLS
- 3 June**
12.30–13.00 **The Genetic Biodiversity of Farmed Animals**
Andrew Sheppy, *The Cobthorn Trust*
- 18 June ^A**
18.00 **Plant Conservation: Now is the Time to Change our Minds**
Timothy Walker, *University of Oxford*
- 27 June ^{**}**
Time tbc **Conversazione**
Taking place at the University of Bristol Botanic Garden
Registration opens in April: www.linnean.org/Conversazione2015
- 17 Sept ^A**
18.00 **Oil and Biodiversity**
Professor Chris Rhodes

↑ Organiser(s) • * Registration required • * Payment required • ^A Admission of Fellows

All meetings are held in the Society's Rooms unless otherwise stated.

A tea reception precedes evening meetings at 17.30.

Evening meetings begin at 18.00 and are followed by a wine reception in the Library.

For more details visit www.linnean.org/events