




The Linnean

NEWSLETTER AND PROCEEDINGS OF THE LINNEAN SOCIETY OF LONDON

Volume 31  Number 2  October 2015



Nothofagus:
Captain Scott's
fossil plants

HC Dollman:
Linking library and
specimen collections

Rebuttal of Claims:
How old can a tree be?

AND MORE...

A forum for natural history

The Linnean Society of London

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The Linnean is published twice a year, in April and October. All contributions are welcome, but please contact the Editor or see the *Guidelines for Contributors* document on our website before writing and submitting articles (www.linnean.org).

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.

Cover image: *Pinus longaeva* on Telescope Peak, California © Aljos Farjon

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The Linnean

Newsletter and Proceedings of the Linnean Society of London

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Editorial

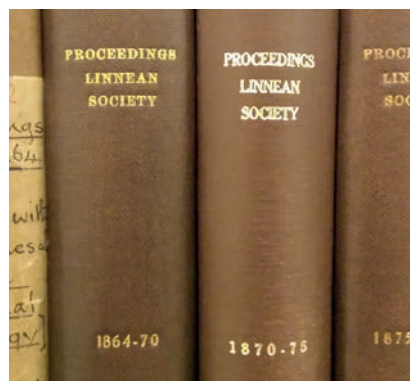
The inclusion of the Minutes of the Anniversary Meeting in this issue serves as a reminder that *The Linnean* is part of the Society's long history of publication; it is a successor to the Society's *Proceedings*, and so continues to fulfil the role of documenting key Society business. Alongside the diverse papers, the Society's activities, events and receipt of significant donations are all part of the past and present role of the *Proceedings*.

Although there have been changes to Council, the membership of the Linnean Steering Group will remain the same, with Mike Wilson remaining as our link with Council. He, together with Pieter Baas, Mary Morris, Sarah Whild and Fernando Vega are all thanked for their useful guidance, advice and corrections.

Since our April issue went to press, we've received the sad news of the deaths of a number of Fellows who contributed significantly to the Society. As full obituary notices for these have now been published in online journals or newspapers, the *In Memoriam* section in this issue will list their names, with a brief note on their service to the Linnean Society of London, along with the link to the published obituary. Should you have any difficulty accessing these please get in touch.

Lastly, do please remember that we rely on your submissions for the content of this publication. Short informative articles are always welcome, as is correspondence on Society affairs, activities and on the contents of previously published articles.

Gina Douglas, *Editor*
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It's a time of changing faces for both the Society's Council and staff. Professor Dianne Edwards CBE FRS handed over the Presidential reins in May; we are indebted to Dianne for her indefatigable support and regional initiatives over the past three years. Taking up those reins is entomologist and Director of the Cambridge University Zoology Museum Professor Paul Brakefield FRS, who is well placed to steer the Society through its forthcoming challenges. After eight years' incredible service Dr Peter Hayward has retired as Editor-in-Chief of the *Zoological Journal of the Linnean Society (ZJLS)*. The Society is deeply indebted to Peter for his dedication and commitment to the *ZJLS*, and we are pleased that he will continue to work on the *Synopses* series. We would like to warmly welcome Dr Louise Allcock who will be replacing Peter as Editor-in-Chief of the *ZJLS*.

Sadly, we have also said goodbye to many staff members—Tom Kennett (Smith Biographer) has taken up an full-time archivist role at Lambeth Palace, Tom Helps (Room Hire Manager and Membership Assistant) has gone travelling and Tom Simpson (Events & Communications Manager) has moved

on to manage a London Park. With the end of the Linnaean Manuscripts Project, generously funded by Andrew J Mellon Foundation, we are also losing Helen Cowdy and Naomi Mitamura (Project Conservators), Andrea Deneau (Digitisation Officer) and Isabelle Charmantier (Manuscripts Specialist). Isabelle will continue for a few months to work on grant applications which, if successful, will allow us to tackle outstanding cataloguing, conservation and digitisation work, and develop further educational initiatives based on the Collections. And congratulations to Andrea who has moved on to a new project—being mum to a beautiful baby boy.

We would like to warmly welcome Tatiana Franco to the team, who is replacing Tom Helps as the new Room Hire Manager and Membership Assistant, as well as Alicia Fernandez as incoming Events & Communications Manager.



**BioMedia
Meltdown
Competition**

In education news, Mair Shepherd (Education Resources Design Coordinator) completed her contract earlier in the year,



Professor Paul Brakefield, President

having launched the third and final post-16 module of the Darwin Inspired Learning series (www.linnean.org/darwininspired). The Society was also delighted to be awarded a grant by John Lyon's Charity for the Biomechanics Meltdown Competition (www.linnean.org/biomelt), which will initially focus on schools in deprived areas of London, offering 11–14 year-olds the opportunity to use their creative skills while learning about evolution and ecosystems. Ross Zeigelmeier joined in May to implement this project, and work is well underway developing free resources that will help teachers and students acquire the necessary skills to interpret these aspects of science through creative media.

The Society's events programme has been diverse, ranging from lunchtime lectures exploring birdsong and music, to evening lectures covering arthropod evolution and next-generation biodiversity discovery. Additionally, the two-day digitisation workshop organised by staff brought together academics and cultural sector professionals who work on projects specifically involving digitisation of correspondence and manuscripts



The Christmas lecture: the narwhal's 'unicorn' horn was worth more than its weight in gold

related to natural history and medicine, from the 16th to the 19th century, and was especially successful, so we hope to make this a regular biennial event. Looking forward, in November the Society will hold its annual debate, which will consider how far evolutionary history should inform species conservation. The Founder's Day lecture in December will take an in depth look at the life of the Society's own founder, Sir James Edward Smith, by his biographer Tom Kennett, and the Christmas lecture by Geoffrey Munn OBE FLS will look at myth and magic in jewellery.

Visitor numbers
for Open House
London were
1,205—double the
number for the
same event in 2010.

And the public are clearly demonstrating an interest in finding out more about the Society. Visitor numbers for Open House London 2015 were 1,205—double the number for the same event in 2010. Our Treasures Tours continue to be oversubscribed—we look forward to having much more accessible displays in future but this will depend on the success of funding bids currently in process.

Elizabeth Rollinson, *Executive Secretary*
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We are very pleased to report that the Charles Darwin Trust's collection of books by and about Darwin and Alfred Russel Wallace has been formally gifted to the Linnean Society. The material also includes works that were influential in stimulating Darwin's ideas as he moved towards his theory of evolution by natural selection. The collection, to be now known as the Darwin-Wallace Collection consists of around 320 monographs plus 24 manuscripts. The manuscripts are chiefly correspondence items but they also include a draft of chapters one and seven of *The formation of vegetable mould by the action of worms*, in Darwin's hand. A number of photographs and a ticket to Darwin's funeral are also included in the gift. The task of cataloguing the material is now under way and the detailed inventory created by Randal Keynes is proving enormously helpful in this process.

The manuscripts include a draft of chapters one and seven of *The formation of vegetable mould by the action of worms*, in Darwin's hand.

Collections in the Spotlight: Loans and Filming

The portrait of Percy Sladen (1849–1900), a Vice-President of the Society, has been returned to its place in the Meeting Room after it received attention from our paintings conservator. It was re-lined, mounted on

a new stretcher and a previous poor repair was put right before it was surface-cleaned and re-varnished. Additionally, the Society's artworks and artefacts continue to be in demand for exhibitions. The Science Museum has made an application for the loan of Robert Brown's microscope, through which he observed Brownian motion while examining pollen grains. The exhibition will

be entitled *Einstein's Legacy* and will run until November 2016.

Arrangements are being finalised for the loan of John Lewin's watercolour *A newly discovered animal of the Derwent* [Tasmanian Tiger/Thylacine] to Tate Britain's *Art and Empire* exhibition.



Einstein's Legacy: Robert Brown's microscope

The Society's Botanical Curator, Dr Mark Spencer, recently filmed a segment about Linnaeus as part of a documentary on Sir Joseph Banks, directed by Ian Cross. Sections were filmed in the Collections Store and the Reading Room. The Reading Room was also chosen as the backdrop for filming an interview with Italian physicist Carlo Rovelli.

His unexpected bestseller *Sette brevi lezioni di fisica* (*Seven brief lessons in physics*) has been translated into more than 20 languages and is about to be published in English by Penguin.

In March, the Librarian attended the annual meeting of the European Botanical and Horticultural Libraries group at the Botanical Garden and Botanical Museum, Berlin-Dahlem, where she gave a presentation on the Linnaean Manuscripts Project.

Natural Associations: Collaborative Tours

In a new initiative, the Courtyard Societies at Burlington House were invited to participate in a series of special tours linked to the Royal Academy's exhibition, *Wanderlust*, which celebrated the work of Joseph Cornell through a display of 80 of his 'shadow boxes'. Elaine Charwat, Deputy Librarian, created a veritable 'cabinet of curiosities' within our Collections Store, showcasing objects relevant to Cornell's work; a mini-exhibition entitled *Natural Associations*. The tours were very well received and it is hoped that this may lead to other co-operative, cross-themed ventures based around the collections held within the courtyard.

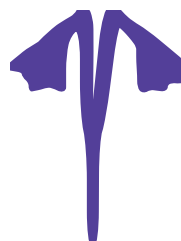
The lunch-time Treasures Tours continue to be very popular and, in addition, we have recently provided tours for groups of various ages and backgrounds: Danish high school and Swedish university teachers; Roedean biology teachers; high school student groups from Japan, Denmark, Italy and Chingford; members of the Athenaeum; members of the U3A; Blue Badge tour guides; and a series of six Secret London tours. As usual we have also entertained a number of summer school students from Harvard, Columbus State University, University of Maryland and Blue Ash College, Cincinnati.



Lynda Brooks, Librarian
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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:



Stuart Baldwin

Dr Michael J Balick

Mr Henry S Barlow

Dr Mark Benecke

Glenn Benson

Dr Andrew Berry

Lynda Brooks

Dr CJ Clegg

Professor John E Cooper

Mrs Margaret Cooper

Edward C Dickinson

Brent Elliott

David J Elliott

Dr Margarita Hernandez Laille

Shirley Higgins

Ted Higgins

Craig Hilton-Taylor

Dr Jeremy D Holloway

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Gerald Moore

Dr Pat Morris

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Dr E Charles Nelson

Dr Sauris Panda

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Rosie Peddle

Pere Fraga i Arguimbau

Ray Society

Royal Society of Tasmania

Professor Michael Schmitt

Dr Trevor Shaw

Victoria Smith

Dr Daniel Steinbach

Professor Lars Werdelin

John Wright

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.

A NOTE ON DARWIN'S HARBINGERS

The note 'Darwin's Harbingers' by Tim E Berra, published in the last issue of *The Linnean* (April 2015), deals with Darwin's thought about the history of evolutionary ideas, as is expressed in the first chapter ("An historical sketch") of the *Origin of Species*.

Darwin believed that the intuition that living species evolve through time by means of natural selection was first conceived, albeit in an embryonic form, by the French philosopher and naturalist Georges-Louis Leclerc, Comte de Buffon. Regarding the schools of thought preceding the Enlightenment, he dedicated just a foot-note to the "classical writers", and the only author mentioned is Aristotle, with an unfortunate miscitation. Obviously, Darwin had no direct knowledge of Aristotle's writings, whose views had nothing to do with evolution.

Apart from this, Darwin omitted all ancient Greek and Latin natural philosophers, reducing the matter to "allusions to the subject in the classical writers". It is remarkable, although not surprising, that he ignored the fact that his theory of evolution by natural selection had been explicitly formulated in the first century BC by Titus Lucretius Carus, in his poem 'De Rerum Natura'.

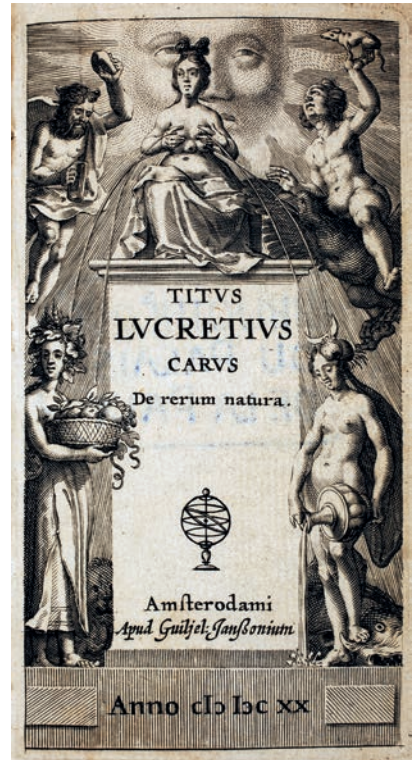
It is generally unknown that the very idea of "descent with modification" is intimated in the fifth part (*liber quintus*) of Lucretius' poem, where the description of the origin and physical evolution of the universe (lines 55–770) is followed by the gradual appearance of plants and animals (782–802), the origin and evolution of mankind (803–828) and ends with human cultural evolution (924–1455).

A follower of Epicurus, Lucretius described the world's natural history and the evolution of living beings on a purely materialistic basis, as the outcome of a relentless falling of atoms, their direction of motion being occasionally driven by a random swerve (*clinamen*).

It is really astonishing how Lucretius clearly articulated the principles of survival of the fittest, and of stocks' extinction by natural selection (lines 855–859):

*Multaque tum interiisse anumantum saecula necessest / nec potuisse propagando
procudere prolem. / Nam quaecumque vides vesci vitalibus auris, / aut dolus aut
virtus aut denique mobilitas est / ex ineunte aevo genius id tutata reservans.*¹

[Perforce there perished many a stock, unable / By propagation to forge a
progeny. / For whatsoever creatures thou beholdest / Breathing the breath of



life, the same have been / Even from their earliest age preserved alive / By
cunning, or by valour, or at least / By speed of foot or wing.]²

Further, at lines 871–877:

*At quis nil horum tribuit natura, nec ipsa / sponte sua possent ut vivere ... /
scilicet haec aliis praedae lucroque iacebant / indupedita suis fatalibus omnia
vinclis / donec ad interitum genus id natura redegit.*

[But those beasts to whom / Nature has granted naught of these same things /
Beasts quite unfit by own free will to thrive..... / Those, of a truth, were wont
to be exposed, / Enshackled in the gruesome bonds of doom, / As prey and
booty for the rest, until / Nature reduced that stock to utter death.]

As an Epicurean and hard adversary of any religion, Lucretius was steadfastly defamed and obscured during the early Christian era; as a consequence of such ostracism, and also because of the intrinsic linguistic difficulty, his poem was (and still is) often cited but little known, and his far-sighted intuition remained and still remains mostly ignored.

Nevertheless, no one thinker, in either classical, medieval or modern times before the age of the Enlightenment, came as close as Lucretius to Darwin’s evolutionary theory—the only true ‘Darwin’s Harbinger’ of the antiquity, and perhaps the brightest of any time.

1. Latin version established by Alfred Ernout: *Lucrece—De la nature*. Texte établi et traduit par Alfred Ernout. Société d'Édition “Les Belles Lettres”, Paris, 1948.
2. English translation: *Lucretius. De Rerum Natura*. William Ellery Leonard. EP Dutton. 1916.

Giovanni Cristofolini FLS

The Herbarium, University of Bologna
Italy

.....

LOST IN TRANSLATION: *HERNANDIA* DISAPPEARS FROM *HORTUS CLIFFORTIANUS*

When reading Theodore (‘Ted’) W Pietsch’s fascinating novel *The Curious Death of Peter Artedi: A mystery in the history of science* (2010) (reviewed in *Archives of natural history* 38(2): 370–371), in which Linnaeus is not painted as a hero but looms over all as a rather duplicitous character, possessed of “preposterous self-assurance”, I was puzzled by the description of the “abodes of ADONIS”—that is, George Clifford’s glasshouses—rendered by Pietsch as a monologue. These were “so full ... of such a variety of plants that they bewitched a Northerner”, exclaimed Linnaeus (Pietsch 2010: 117), who then reeled off a list of forty-odd genera which were growing in these “abodes”: plants from southern Europe in the first quarter, “treasures” from Asia in the second, others of Africa in the third, continuing with “progeny of the New World” in the fourth and concluding with a selection of four genera representing “the earth’s strangest wonders ...”. This last sentence was

.....

evidently a victim of spellchecking software because it read as “bananas, exquisite hermannias, silver-leaved protects, and valuable camphor trees”. “Silver-leaved protects”?

The source was immediately obvious—the dedication that Linnaeus had written for *Hortus Cliffortianus*. Heller (1968) had translated the same text: “Dumbstruck was I when I entered Your ADONIDES, houses filled with so many and such varied shrubs as to bewitch a son of Boreas, ignorant of the strange world into which you has led him.” There followed the cadaster of genera, until, as Heller translated it: “Disporting among these [I saw examples of] *Musa*, most remarkable in the Whole world, most Beautiful *Hermannia*, silvery *Protea*, costly *Camphora*.”

Something prompted me to go back to the original Latin text, and thus I noticed that the last sentence had another mistake in it. “Has interludentes spectatissimas Toto orbi *Musas*, Plucherrimasque *Hernandias*, argenteas *Proteas*, pretiosas *Camphoras*”, Linnaeus wrote. A typesetter’s inversion of l and u in *Pulcherrimasque* evidently had not been noticed. But the second genus was *Hernandia* not *Hermannia*: *Musa*, *Hernandia*, *Protea* and *Camphora* were the four genera singled out for praise and each was represented in the allegorical frontispiece (see Stearn 1957).

Was there any reason for Heller to substitute *Hermannia* for *Hernandia*, or was this an unnoticed error in translation or a careless transcription mistake, now propagated in several works including Pietsch’s novel and a previous special issue, number 7, of *The Linnean* (Griffiths 2007), but not by Müller-Wille (2003)? The fact that the word occurs at the end of the page and so is split inconveniently and by two hyphens into *Her- / nan-* (acting as the ‘catchword’) and, overleaf, *nandias* probably contributed.

“...was this an
unnoticed error
in translation
or a careless
transcription
mistake?”

The plant named by Linnaeus certainly was *Hernandia* which, as noted, is one of those in the frontispiece accompanying *Musa*, *Camphora* and “*Protea*” (now *Leucadendron argentea*). The moral of this is that authors should check original sources and not rely on transcripts or translations; only then will their text be accurate.

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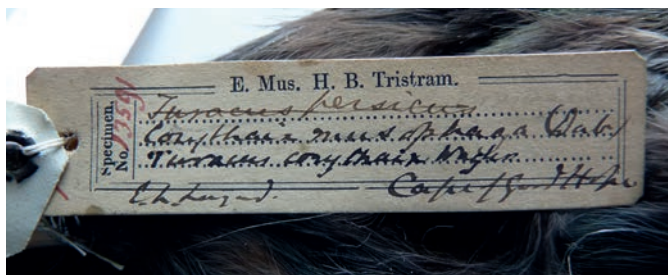
Information Request

HENRY BAKER TRISTRAM PROJECT

Over many years of visiting bird collections in museums worldwide, I have noticed that several contain Tristram material. Henry Baker Tristram (1822–1906) was born in Northumberland and became a clergyman, first in Devon, then Bermuda, Castle Eden and Greatham (Durham) and finally as Canon of Durham Cathedral. Tristram's life-long interest in birds and ill-health from tuberculosis led to him spending much time abroad in dry, warm climates and he collected birds and eggs in many localities in North Africa and the Middle East. His work on the birds of former Palestine and other biblical lands is of particular importance. Canon Tristram added greatly to his own collections by purchasing or exchanging material from all over the world.

Tristram's primary collection of eggs is in the Natural History Museums's ornithological outstation at Tring, in Hertfordshire. In 1896 he sold his primary collection of over 17,000 bird skins to the then Liverpool Museum (now World Museum, National Museums Liverpool). In 1896 Tristram was over 70, but he immediately started another collection, accumulating about 7,000 specimens of about 3,000 species. Most of this later collection went to the Academy of Natural Sciences in Philadelphia, but other Tristram bird specimens appear to exist in many other museums, and some of these have been obtained by exchange.

Tony Parker, Assistant Curator (Zoology) at World Museum, and I have decided it would be a worthwhile project for him to construct a database of all Canon HB Tristram's specimens that



could be located. Tony is at present combining the NML and ANSP Tristram catalogues as an Excel spreadsheet, and we are now requesting for information and details of any Tristram specimens you may have in your collection. If you are unfamiliar with Tristram's labels and his rather spidery writing, attached is an example.

We would appreciate any information you can give us. Thank you very much.

Dr Clemency Fisher FLS

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Did Captain Scott's *Terra Nova* Expedition Discover Fossil *Nothofagus* in Antarctica?



Professor Bill Chaloner FLS¹ and Dr Paul Kenrick FLS²

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One of the great palaeobotanical “discoveries” of the last century was the finding of fossil leaves of the Permian gymnosperm *Glossopteris* by Captain Robert Falcon Scott’s ill-fated *Terra Nova* Expedition (or British Antarctic Expedition) to Antarctica in 1910–12 (Fig 1). The leaves were collected from a fallen block on the Beardmore Glacier, when the party were on their return from the South Pole, and although they were apparently unaware of its identity or palaeobotanical significance, they carried the specimens as part of the load on the sledges that they were towing by hand. The material was subsequently found, beside the tent in which they had finally succumbed, and brought back to Britain, where it is now housed in the Natural History Museum, London (Anon. 2008). The description of the fossil plants was first assigned by the Trustees of the museum to EA Newell Arber, the demonstrator in palaeobotany



Fig 1 Captain Robert Falcon Scott, *second from right*, on the *Terra Nova* Expedition

at Cambridge University, but just as his results were about to be published, he unexpectedly raised strong objections to editorial changes, and the manuscript was withdrawn (Riffenburgh 2010). The work was reassigned to AC Seward FRS, a leading palaeobotanist and the Professor of Botany at Cambridge. Seward described and illustrated the material, promptly publishing a detailed analysis (Seward 1914). Both Newell Arber and Seward came to essentially similar conclusions.

Glossopteris has long been recognised as one of the most distinctive and significant components of the Permian fossil plant record from the ancient southern-hemisphere

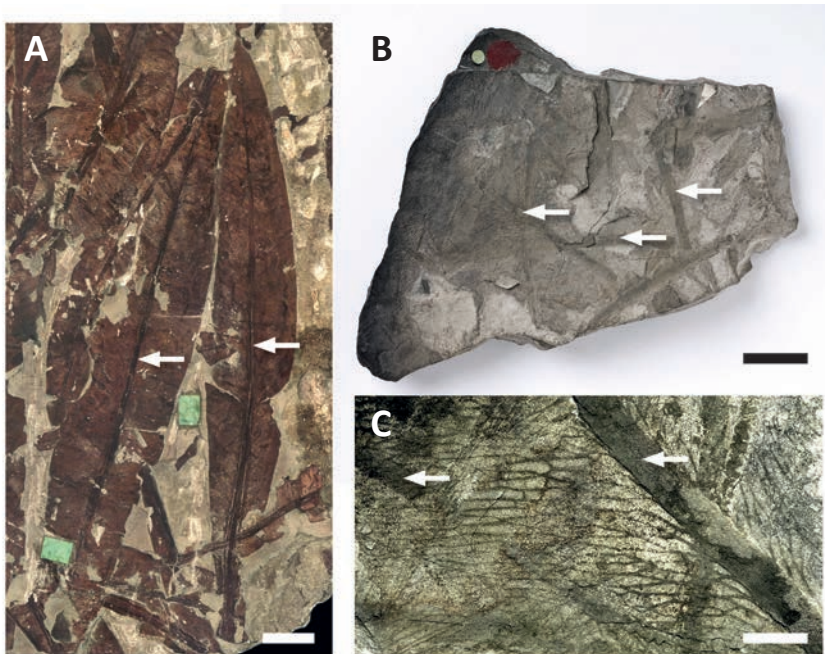


Fig 2 Leaves and leaf fragments of *Glossopteris* (Permian Period). Arrows indicate the leaf midribs. **A.** Whole feather-like leaves of *Glossopteris browniana*, Nagpur, India. Scale Bar = 3.0 cm. NHMUK V64045. **B.** Overlapping leaf fragments of *Glossopteris indica* collected from the Beardmore Glacier (Buckley Island), Antarctica, by the Polar Party, Terra Nova Expedition, February 1912, NHMUK V13451. Scale Bar = 1.5 cm. **C.** Details of part of leaf from B. Mesh of anastomosing veins characteristic of *Glossopteris* are clearly visible between two leaf midribs (arrows). Scale Bar = 0.5 cm. Specimen photographed using illumination by cross-polarised light to enhance organic component.

continent of Gondwana (Du Toit 1937) (Fig 2A). Even before its true character and systematic status were established, the distribution of the genus, based on leaves alone, was a classic of the disjunct distributions of both plants and animals produced by the breakup of Gondwana. Before its discovery by Scott in Antarctica, it was known from abundant material from South America, South Africa, India and Australia—the present-day components of the Palaeozoic supercontinent Gondwana.

It is perhaps appropriate to briefly introduce an added dimension to the story, relating to Marie Stopes FLS, the family planning pioneer and author of *Married Love* (Stopes 1918; Rose 2007). At the time Marie Stopes was a lecturer in palaeobotany at the University of Manchester and at the peak of the palaeobotanical phase of her career (Chaloner 2005). She met with Scott shortly before the *Terra Nova* Expedition to Antarctica. In her memorable textbook of palaeobotany, *Ancient Plants*, published coincidentally in 1910, Marie Stopes wrote of *Glossopteris*: “A fossil flora which has aroused much interest, particularly among geologists, is that known as the *Glossopteris* flora.” She goes on to say that this flora is “characteristic of the Permo-Carboniferous period in the regions in the southern hemisphere now known by the names of Australasia, South Africa, and South America, and in India. These regions,

at that date, formed what is called by geologists ‘Gondwanaland’” (Stopes 1910). Interestingly there is no mention of Antarctica there; for in his biography of Marie Stopes, Keith Briant (1962) describes the meeting between her and Captain Scott while he was making a fund-raising tour to support his projected second Antarctic expedition. Briant reports that at a lunch in Manchester when they met, she tried to persuade him to take her (and his wife) to Antarctica, “where she might make valuable palaeontological discoveries on the subject of coal”. Although Scott did not accept this proposition he “later visited her at the university to familiarize himself with the look of the fossils; and when he was found dead in the Antarctic there were discovered near him some pieces of fossil plants” (Briant 1962).

Alas, we do not know what fossil plants Marie Stopes showed to Scott on that occasion—did she show him any *Glossopteris* specimens from other Gondwanan sources? Was that indeed the focus of her interest there...or was she perhaps hopeful of early angiosperm fossils, another subject of her enthusiasm that time? We don’t know, but it seems that Scott did not come away from the meeting with a sharp image of what characterises *Glossopteris* leaves, for when they made that remarkable discovery, the identity of those leaf fragments went unrecognised.

The first fully documented account of Antarctic *Glossopteris* is in Seward’s “Antarctic Fossil Plants” (Seward 1914). This account covers the fossil plant material from Scott’s first expedition, Ernest Shackleton’s 1908 expedition, but most particularly Scott’s second and final (*Terra Nova*) Expedition. Here we have an account of the *Glossopteris* material collected by Scott and Wilson in February 1912. This was one of two important fossil plant discoveries made on Scott’s return journey from the pole, on two successive days, 8–9 February. Seward records:

In his journal on February 8th, Captain Scott wrote ‘We lunched at 2 well down towards Mt. Buckley the wind half a gale and everybody very cold and cheerless. However, better things were to follow.... The moraine [rock debris lying on the glacier surface] was obviously so interesting that when we advanced some miles and got out of the wind I decided to camp and spend the rest of the day geologising we found ourselves under perpendicular walls of Beacon Sandstone weathering rapidly and carrying veritable coal seams. From the last Wilson, with his sharp eyes, has picked several pieces of coal with beautifully traced leaves in layers.

(Which, Seward adds in parenthesis, were *Glossopteris indica*, of which he published descriptions and photographs.)

But other fossil leaves were found the following day, as is recorded in Wilson’s own diary (King 1972): “Fri. 9 Feb, 1912: — We made our way along down the moraine and at the end of Mt. Buckley unhitched and had half an hour over the rocks and again got some good things written up in sketch book.”

In a page dated 9 February of his sketch book, reproduced in King’s account (p 241), he writes:

Some of the weathered blocks which we found on the moraine were of good burning shiny crystalline coal – but most of it was shaly, lignite or slaty.But the best leaf impressions and the most obvious were in the rotten lumps of weathered coal which split up easily to sheath knife and hammer. Every layer of these gave abundant vegetable remains...

Seward continues that quotation from Wilson's notes: "Most of the bigger leaves were like beech leaves in shape and venation. In size, a little smaller than British beech and the venation much more abundant and finer in character, but still distinctly beech like." Clearly these were totally different from the *Glossopteris* leaves collected the previous day. No one could describe the *Glossopteris* leaves brought back from Scott's expedition as being "beech-like".

Following this quotation from Wilson's diary, (written the day after he had collected what Seward had identified as *Glossopteris indica*, 8 February) Seward goes on to say, "...on the surface of the carbonaceous shale pieces of *Glossopteris*- leaves are clearly shown: these are the beech-like impressions referred to in the diary". But one has to ask—how did Seward know that it was *Glossopteris* leaves that Wilson was describing? The *Glossopteris* material that Seward studied, now in the Natural History Museum, London (NHM), is not remotely like beech. We cannot believe that the material that Wilson described as "distinctly beech-like" was *Glossopteris*. Wilson was unquestionably a critical observer as well as a highly competent naturalist with an artist's eye for detail (Seaver 1937; Williams 2008) and indeed had familiarity with our beech, *Fagus sylvatica* and hence his remark. So we have the intriguing mystery—what were the "beech-like leaves" seen by Wilson and reported in his diary? They were seen on 9 February (1912) a day after the *Glossopteris* leaves described by Seward, but no material or sketches of them appear to exist, nor to our knowledge were any of these beech-like leaves collected by Scott's party.

It is important at this point to accept that all the plants brought back from Scott's expedition were collected from loose material on the moraine surface, and not from the cliffs of Beacon Sandstone. Newell Arber, in his unpublished report on the *Terra Nova* material, wrote "all the plant-specimens have been obtained from moraine material scattered abundantly on the face of the glacier and were not *in situ*".



Fig 3 Leaves of *Nothofagus* collected from Sirius Group sediments in the Transantarctic Mountains (Dominion Range) (late Pliocene–Early Pleistocene). Scale Bar = 1.0 cm.

The most obvious—and appealing—possibility is that Wilson had encountered fossil leaves of *Nothofagus*, the Southern Beech (Fig 3). *Nothofagus* leaves are indeed

beech-like (and hence of course the choice of the generic name—based on *Fagus*, the Beech of the northern hemisphere—and both genera may be regarded as members of the same family, Fagaceae *s.l.*, although many botanists now place *Nothofagus* in a closely related but separate family, the Nothofagaceae). Wilson’s “beech like” leaves would of course have been far younger than the Permian *Glossopteris*, indeed probably of Pliocene age, as is the material of that species described by Francis and Hill (1996) from the Beardmore Glacier.

Fossil leaves of *Nothofagus* have been reported, together with wood and pollen from a number of Cretaceous and Tertiary localities in Antarctica over the last 20 years [see Hill *et al.*, (1996) and Francis and Hill (1996) and a broader review in Cantrill & Poole (2012)]. Its significance in relation to the breakup of Gondwana and the resulting disjunction of plant distribution is quite comparable to that of *Glossopteris*. As stated by

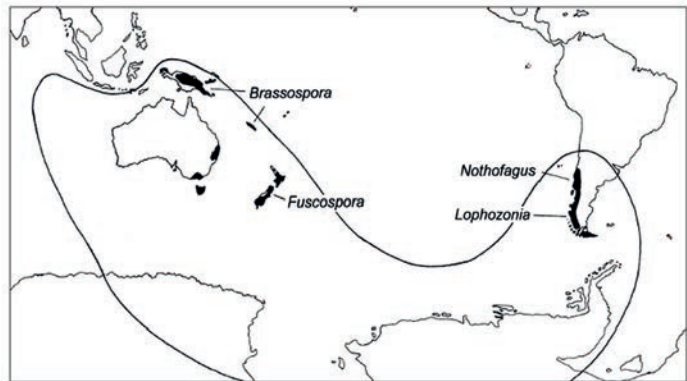


Fig 4 Distribution of *Nothofagus*: fossils (continuous line including the Ninety East Ridge and Antarctica), extant distribution solid black and main massings (extant and fossil plus extant) of the four extant subgenera. With permission from Heads 2006, Fig. 1.

Swenson *et al* (2001): “The Austral biota reveals many links between Australia and South America that have challenged biogeographers for many years. *Nothofagus*, the Southern Beech is probably the classical example” (Fig 4). However, in a recent paper Christenhusz and Chase (2013) question the role of continental movement (plate tectonics) in explaining the widely-separated occurrences of certain southern-hemisphere genera such as *Nothofagus*. They suggest that “...families with a crown age appropriate to be explained by plate tectonics did not seem to have distributions indicating an involvement of long-distance dispersal, but the advent of molecular systematics and molecular clocks has shown this to be otherwise”. They go on to say that “the stem group of Nothofagaceae, for instance, is certainly old enough to have been widespread before the breakup of Gondwana (up to 95mya) but Cook and Crisp (2005) estimate the crown group to be too recent and the sequence of break up of continental areas does not fit relationships of the clades in *Nothofagus*”. However, Cook and Crisp do accept that “the molecular dates for the divergences of Australasian and South American taxa are consistent with the rifting of South America from Antarctica”. So, a modern reading of the biogeography of *Nothofagus* is complex suggesting possibly a significant role for dispersal, but this is not universally accepted (Heads 2006; Cantrill & Poole 2012).

Professor Jane Francis (Director of the British Antarctic Survey) published on *Nothofagus* leaves from Neogene Sirius Group sediments that outcrop on the other side of the Beardmore Glacier (Francis & Hill 1996). This Neogene flora is particularly significant for what it tells us about the geologically recent climatic deterioration in Antarctica. It documents a short interlude of relative warmth within the general cooling trend that saw ice sheets retreat temporarily to within 500km of the South Pole (Cantrill & Poole 2012). It also provides evidence for the final stages of ecosystem collapse, when glacier advance destroyed the last vestiges of higher plant communities. She wrote (in an e-mail to WGC, 19 September 2012):

I am pretty convinced that the 'beech-like' leaves that Wilson saw were most likely *Nothofagus* from Neogene boulders in moraines. The Sirius Group rocks are glacial tillites with layers of periglacial outwash sediments sandwiched within them, which must have been land surfaces adjacent to retreating glaciers colonised by small, dwarf bushes of *Nothofagus*. It is highly likely that there might be boulders of this sediment on the other side of the Beardmore because Sirius Group sediments are plastered all along the walls of the Beardmore valley. It will probably be impossible to prove that Wilson and Scott actually saw *Nothofagus* leaves but I totally agree that the specimens of *Glossopteris* from Scott's expedition look nothing at all like beech leaves.

This leaves us with a puzzle. If Wilson did observe *Nothofagus* on the Beardmore Glacier, why did he not collect these specimens too, extending the collections of the previous day? Perhaps there was just too little time and there were more pressing issues on his mind. On 8 February, they spent an afternoon collecting and had an evening to consider their finds. On 9 February, when the beech-like leaves were recorded, they stopped for only half an hour. Wilson writes, "We made our way along down the moraine and at the end of Mt. Buckley unhitched and had half an hour over the rocks and again got some good things written up in sketch book" (King 1982). We must also remember that at this time they were under severe conditions of mental and physical strain, with three of the party injured. Wilson was still limping from the effects of a badly strained tendon. Only three days later Scott records, "We are in a very critical position" (Seaver 1937). Professor Jane Francis (email 5 February 2015) has made this very pertinent comment on the apparent lack of any fossil leaves collected by the party: "The *Nothofagus* leaves on the other side of the Beardmore Glacier are preserved in a very fine-grained sedimentary matrix that breaks up very easily, so any *Nothofagus* leaves may have disintegrated after collection."

On the available evidence it certainly looks as though Scott's *Terra Nova* expedition made not one but two very memorable palaeobotanical discoveries. If our interpretation of Wilson's "beech-like leaves" is valid, then Scott's party were the first to discover the Antarctic occurrence of two iconic southern hemisphere plant genera, *Glossopteris* and *Nothofagus*. One hundred years on from that ill-fated expedition, there are numerous records of both genera from the Antarctic continent (Cantrill & Poole 2012).

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The Dollman Collection: A Case Study of Linking Library and Historical Specimen Collections at the Natural History Museum, London



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Hereward Chune Dollman (10 March 1888–3 January 1919) was an entomologist who devoted much of his short life to the study of sleeping sickness (African trypanosomiasis), a deadly disease to humans and animals transmitted by the tsetse fly *Glossina morsitans*. The same disease tragically killed him at the age of 30. He carried out extensive research into the natural history and identification of insects in Zambia, much of which remains unpublished.

A more in-depth study into his work was initiated when the Natural History Museum (NHM) Library identified for further research a collection of vivid original watercolours and scientific notes, relating to the immature stages of Lepidoptera (butterflies and moths), held in their collection (examples in Figs 1–3). In order to match the individual specimens they contacted the NHM's butterfly curator to collaborate.

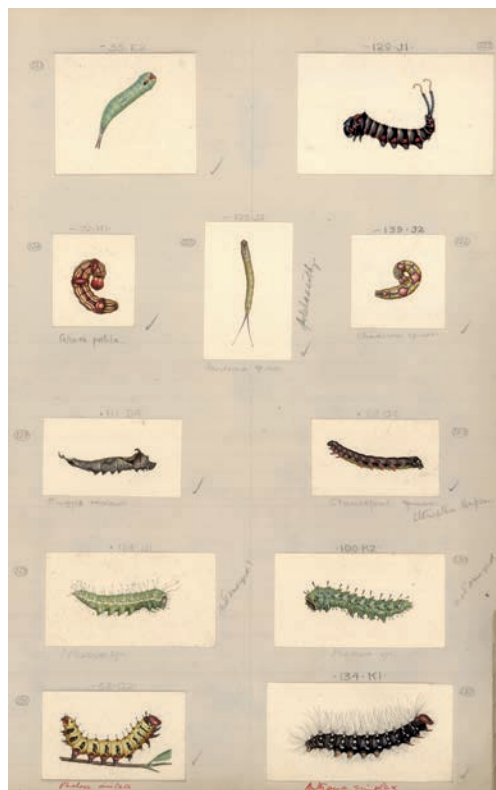


Fig 1 One of Dollman's illustrations of adult butterflies and their larvae

The material that Dollman produced in Africa consists of 157 watercolour drawings of caterpillars, along with data relating to his breeding and collecting of northwest Rhodesian (now Zambia) butterflies and moths. These exquisite colour illustrations of butterfly and moth larvae also include his unique identification codes alongside them. There are only two drawings of adult butterflies in this collection. Dollman's biological specimens were also donated to the then British Museum (Natural History) (BMNH)—now the NHM—after his death and are presently found in the scientific collections.

Our research shows that the caterpillars illustrated by Dollman were not prepared as specimens. Instead, they were bred in captivity when the illustrations were drawn. The butterflies were collected on emergence and as a result are perfect specimens, unblemished by sunlight or abrasion. Some caterpillar heads were, however, kept as specimens. This is consistent with practices of the time: caterpillars are difficult to preserve in a way that allows their original coloration to be maintained. Due to them being bred in the field, the only scientific record of the immature organisms that Dollman studied are his illustrations. His drawings link directly to his scientific notes, in which he details the development of the caterpillars to adult butterfly or moth. Dollman's notebook, held in the NHM's Library and Archives, include important information about his study sites and living conditions. The authors are working on a more detailed paper to show the true extent of the Dollman's butterfly collection, including his illustrations of immature stages (Huertas & Pethers MS).

The caterpillars in the plates were not arranged taxonomically and include immature stages of both moths and butterflies. However, both adult specimens and caterpillars can be matched with those in his notebook based on the codes supplied, with appropriate expertise and knowledge of the groups concerned. Some of the other butterflies in the collection were taken in the field.



Figs 2–3 Further examples of Dollman's illustrations held in the Natural History Museum's collections



Fig4 Dollman, *left*, collecting butterflies as a young boy with his brother, John Guy

A fascinating and tragic history stands behind these collections.

Dollman attended St Paul's School in Barnes, London, winning the John Watson prize for proficiency in drawing and painting, and was elected fellow of the Entomological Society, London on 21 March 1906, aged just 18. The following year, he won a scholarship to attend St John's College, Cambridge to study natural sciences (Fig 5). At this time, he continued to collect and study British beetles (some

of which were deposited in the BMNH), and published several papers on British Coleoptera (Dollman 1910, 1911, 1912 a,b,c, 1913).

In 1913, aged 25, Dollman first travelled to northwest Rhodesia (now Zambia), employed by the British South Africa Company (BSAC) on a study to research the tsetse fly and sleeping sickness (trypanosomiasis). He carried out most of his research in the Upper Kafue River in the District of Namwala, being based at the Government station of Mwengwa. The BSAC had engaged Dollman and two other entomologists: Llewellyn Lloyd and Robert AF Eminson. Dollman investigated seasonal variations, breeding habits and distribution of the tsetse fly and, at the same time, pursued his interest of collecting insects. The first published result of these studies came when Turner (1915) published a paper describing a new species of parasitic wasp, *Mutilla glossinae* from a specimen collected by Dollman in Mwengwa. Later that year Dollman (1915) published findings of "a high percentage parasitisation of the pupae of *Glossina morsitans* by a small species of *Mutilla*". This article included a figure illustrated by him.

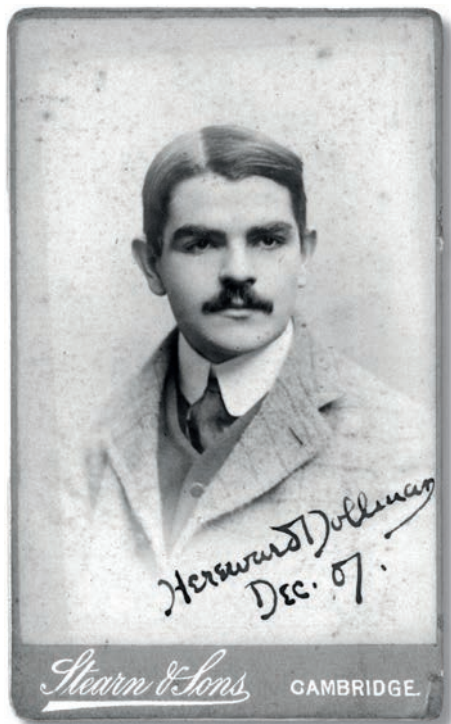


Fig5 Dollman, taken while at Cambridge University in 1907

Dollman returned to England in November 1915 and married Norah Alice Sydney Holloway on 23 February 1916. Two weeks later, the couple set out for Africa. Norah died on 5 July 1916 at Kasempa Northern Rhodesia Administration, reportedly of exhaustion. Dollman stayed in Africa but continued to Solwezi to collect and study beetles, sending some back to the BMNH. However, he was by this time himself in bad health—suffering the early symptoms of sleeping sickness with continuous bouts of fever. In the early 1900s, sleeping sickness was a fatal disease but took time to develop. By September 1918, he had returned to England, dying only a few months later on 3 January 1919. Various obituaries were published, including in *Entomologists' Monthly*, *Entomologists Record* and *Entomological News*.

In the months before his death, Dollman made arrangements which ultimately ensured a legacy for his research. His father wrote to the BMNH three months after his son's death to offer the collection of specimens, artwork and notebooks, expressing Hereward's wish that part of the collection of northern Rhodesian Lepidoptera remain together for a specified period of 15 years, to allow for further research. His collections of butterflies comprise 300 species, represented by 3,500 specimens; almost 60% of which were captive bred specimens from northwest Rhodesia with full data on host plants, occurrence and habitat (Champion *et al* 1919). The collection includes various important specimens from little-studied parts of Africa, all with detailed locality data and many with notes on ecology. His study sites were remote and materials from this part of Zambia are little-known in other collections. In a recent study of ca. 3,000 specimens of the widespread polymorphic African swallowtail butterfly *Papilio dardanus*, Dollman's were the only ones from this region.

Following the BMNH's receipt of the collection, various researchers began to work with these materials. In preparation for a proposed publication containing Dollman's artwork, Tams (1930) described various moth species from the collection "so that their names may be available for the forthcoming publication". These included a new species *Odontocheilopteryx dollmani* and genus *Dollmania*. However, the plates seem never to have been published. Riley (1921) conducted an in-depth review of the whole butterfly collection, describing eight new species, six new subspecies and five new forms of butterflies, including *Mylothris dollmani*. The latter author left one species for Bethune-Baker (1923) to describe as part of a separate generic revision. Dollman's specimens of all groups continue to be a source of information for the region, with a new species of Coleoptera described from the collection more recently (Scholtz 1986).

Dollman's collections, along with various others donated to the museum, were never consolidated with the main collection and have been little-studied as a result. However, the NHM has recently started to amalgamate its collections, arranged not by origin of donation but by taxonomy (Huertas 2011), a step which will lead to greater accessibility to researchers. We are now working afresh with Dollman's materials with a view to finding out more about his research on immature stages of moths and butterflies, which remain unpublished. Our initial work shows highlights

the necessity of collaboration between those working with library and specimen collections, the role that paper collections can play in research (Pethers 2013), and the importance to museums of researchers keeping and donating field notes that are linked to series of specimens.

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How Old Can a Tree Be?

A Rebuttal of Claims of Extraordinary Ages of Trees and Other Organisms in Recent Research and Popular Science Literature



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Introduction

In recent years an increasing number of claims or inferences of extraordinary ages of trees and other organisms have been published, some in the scientific literature but many in the popular science press or in online blogs or websites. All exceed the much earlier published ages of what were then thought to be the “oldest known living thing(s)” (E Schulman in *National Geographic Magazine* 113(3): 354–372, 1958), ie several trees belonging to the Great Basin Bristlecone pine (*Pinus longaeva*, Pinaceae) growing in California and Nevada, western USA. The maximum age of a living tree of this species as determined by growth ring counts was 5,063 years in 2012, counted by Tom Harlan at Rocky Mountain Tree-Ring Research (<http://www.rmtrr.org/oldlist.htm>). In stark contrast with the admittedly remarkable age of five millennia for a still living tree, some of the newer age claims for trees or shrubs are double, three times or even ten to 15 times higher, ranging from 9,550 to 80,000 years and more (http://en.wikipedia.org/wiki/List_of_oldest_trees accessed 1 Jan 2015). Other kinds of organisms, such as actinobacteria (*Actinobacteria* spp.) found in Siberia, are even given estimates of 400,000–600,000 years (see Sussman 2014 for another recent compilation). Are we making valid or invalid comparisons between these and the Bristlecone pines here? In both the Wikipedia List of oldest trees, and in Sussman’s book, a distinction is made between “individual” (Wikipedia) or “unitary” (Sussman 2014) and “clonal” trees or organisms. There seems to be no dispute of the fact that all claims of organisms older than the Bristlecone pines relate to organisms that reproduced clonally and that the age claim or estimate refers to the clone or, as some would define it, to the clonal population. However, the underlying assumption made in these claims is that evidence for the continued presence of a clonally reproducing population on a site is proof of the age of the living clone. We have to establish if these assumptions are philosophically and scientifically valid or not.

Criteria

Perhaps the first and most important problem is to formulate criteria by which we can discern what it is to be an individual organism, or in philosophical terms, for that organism to have *haecceity*ⁱ. One criterion could be autonomy: the organism exists on its own and suffers only one death. There are certainly many organisms that meet this criterion, but it may not be a valid concept ‘across the board’ in biology. It could be argued that a butterfly suffers several deaths as the caterpillar metamorphoses via a chrysalis phase to an adult butterfly. Life that exists as a colony of organisms in which no single entity is viable on its own can be argued not to consist of individual organisms, as each single entity has no autonomy. However, if we begin to look at some examples, we discover the phenomenon of *sorites*ⁱⁱ (the predicate of one argument forms the subject of the next) ie the fact that in many cases there is no undeniable distinction between one state and another. In some types of organisms a juvenile autonomous state can converge to an adult colonial state, as in corals. In colonies, organisms or entities may die without directly jeopardising the life of the colony. The colony only dies when too many entities have died for it to function as a colony. But, as Francis Hallé has argued (Hallé 2002) most trees behave in this respect like colonies. Large parts of the tree can be dead while the tree is still alive. Autonomy therefore is not a sufficient condition, but functional autonomy could well be a necessary condition to determine what an individual organism is (see RA Wilson’s tripartite view of organisms: Wilson 2005, 2013).

“As Francis Hallé has argued, most trees behave in this respect like colonies. Large parts of the tree can be dead while the tree is still alive. Autonomy therefore is not a sufficient condition, but functional autonomy could well be a necessary condition to determine what an individual organism is.”

Another criterion could be genetic identity. This criterion is indeed often used in claims of longevity of clonal organisms and presented as evidence in the question of their age. All the parts or entities of a clone are genetically identical or nearly so mainly because there is no recombination of genes by sexual reproduction; alleles are carried over to new entities wholesale. Only stochastic mutations in some entities (‘ramets’ see below) could cause them to differ slightly from other entities. The genetic similarities in clonal offspring are overwhelming compared to those in sexually produced offspring and this evidence can easily be detected, even if only parts of the genome are analysed. However, genetics does not define individuality (*haecceity*). We adduce: 1) identical twins are not a single individual; 2) a pond surface of duck-weed (*Lemna* spp.) may consist of millions of genetically identical plantlets, but they are found to be individuals when separated; 3) pollen, although genetically identical (but haploid) does not constitute the plant that produced it and nor does

seed (diploid). In claims of clonal longevity it is first established that eg a grove of seemingly individual trees consists of genetically identical entities. Further evidence may come from interconnectedness above or underground. Some trees spread from roots by suckers, others by layering, ie by rooting branches that bend down and touch the ground. It is possible to consider such a clone to be a colony because there is interdependence (joint utilisation of vital parts) and individual entities may die without jeopardising the clonal colony. Or, if one so chooses because of the *soritic* nature of a colony, it is possible to interpret the clone as an individual organism. But is it therefore justified to claim ages in excess of five millennia for such clones?

An important criterion to establish whether an organism has *haecceity* is to address the question of its continuity. An individual organism is alive as a continuum of form. The age of a banked (ie preserved alive) seed is irrelevant to the age of the plant that germinated from it; a 200 year old acorn planted ten years ago does not result in a 210 year old oak tree. Continuity of form is necessary before we can attribute age to a living entity. The germination of a seed is the starting point of the life of a tree; we do not consider a seed to be a tree. Otherwise we confuse means of propagation with the life of an individual organism and all individual life becomes as old as the origin of life.

Another relevant criterion is connectivity. An entity separated from another entity is no longer part of that same entity. A tuft of grass produces a stolon (runner) at the end of which grows another tuft of grass. So far they are one living entity (and genetically identical, ie clonal). If we cut the stolon and send one plant to another place we could no longer argue that these are the same plant. If we did, then *a fortiori* one would have to argue that all of the grass in the world so produced is one plant. In trees, large parts of what we consider an individual tree may be dead matter, but as long as other connected parts are still alive the tree is said to be alive. The main reason for this is that much of the dead matter is still functionally connected with the living parts, lending them support. Foliage has to remain aerial and bark, cambium and sapwood need support from dead wood. Without this, the connectivity and therewith the functions of roots, cambium, sapwood and foliage would soon break down causing the death of the tree.

How do the latter two criteria apply to the clonal shrubs and trees for which extraordinary ages are claimed? In trees, there would also be dead wood supporting the living entities, ie in the stems for the most part and in some of the roots as well. But any dead material that has become disconnected from the living parts of the clone is no longer a part of it, just as a branch that has been disconnected from a living tree is no longer a part of that tree. Continuity of form and connectivity of parts are not subject to *sorites* and appear to define *haecceity* of a living organism both for individual (unitary) and clonal organisms. Do these two interconnected criteria apply to the claims of ages in excess of 5,000 years for clones? They do apply very definitely and they appear to invalidate such claims. We shall investigate a few examples.

Examples

Possibly one of the most celebrated claims made of an organism in excess of five millenia of age involved a conifer tree, being an apparently layering clonal spread of Huon Pine (*Lagarostrobos franklinii*, Podocarpaceae) on Mt Read, Tasmania. This was picked up widely by the popular press around 1995, but no peer reviewed scientific paper making this claim explicitly has been found. Yet the reported findings led to a widely quoted claim of an age of this clonal tree “in excess of 10,000 years”. Podocarpaceae trees are monoecious and the stems of the Huon Pine on Mt Read appear to be all male. No trees of this species grow within 20 km of Mt Read and no female trees have been found there. Layering is evident and insofar as DNA samples have been taken, they showed identical sequences in the chloroplast genome, which in conifers is paternally inherited. Wood core sampling of individual large stems has not demonstrated ages for these greater than 1,500 years (Parks and Wildlife Service, Tasmania, Dept of Tourism, Parks, Heritage and the Arts, blog Dec 2003). Fossil pollen assigned to *L. franklinii* has been found in a sediment column of nearby Lake Johnston, the lowest section of which was ^{14}C dated at 10,500 years old. No DNA was obtained from the fossil pollen, but the implication was that this demonstrated a similar age for the clone. We can now dismiss this claim: continuity of individual life form over this long period is not demonstrated as disconnected pollen is not part of a living organism. All that has been shown is the probability that the species has existed in the area since the end of the latest glacial phase of the Pleistocene. It is probable (but not absolutely proven) that the species only persisted by layering, but separation from dead material that existed in the past has created new individuals. The Huon Pine clone on Mt Read is not older than its oldest dead wood connected to a living tree: 1,500 years.



‘King Clone’: clonal Creosote Bush in the Mojave Desert, California

A spreading clonal Creosote Bush (*Larrea tridentata*, Zygophyllaceae) in the Mojave Desert, California has been given an estimated age of 11,700 years (Vasek 1980). Individual large shrubs may reach ages “well in excess of 100 years” but they often spread by stem segmentation and the production of new stems at the outer edge of stem segments, in a more or less radial pattern from the parent bush. The old wood in the centre dies and disintegrates, leaving a bare area, so that the living bushes form a circle or more often an ellipse expanding outwards.

The bushes in the circle were found to be genetically identical based on isoenzyme analysis (in 1976) and undoubtedly now from DNA sequence data. The age of the clone is an estimate based on the following variables: growth rates of living and dead woody stems, rates of spreading of the bushes across the terrain, ^{14}C dating of dead (subfossil) wood samples and radius of bush clones. The ^{14}C derived ages of dead wood samples are added to the ages of the living bushes as they are assumed to have belonged to the same clone. Disconnected dead material is not part of a living organism and its age cannot be summed with the age of the living clone. Given the nature of growth of Creosote Bush clones and the location of the dead ^{14}C dated material belonging to the same species a stronger case is made than in the example of the Huon Pine that the ^{14}C dated material was a direct ancestor to the living clone, although genetic evidence is lacking. However, it is no longer a part of that clone and its age cannot be validly added to it. Again, all that is demonstrated is that Creosote Bushes have grown at this locality, probably in clonal fashion, since the end of the last Ice Age.

Perhaps at the top of the list of 'oldest trees' features a clonal forest of Quaking Aspen (*Populus tremuloides*, Salicaceae) in Fishlake National Forest, Utah, which is claimed to be at least 80,000 years old. This clone of poplar trees covers 43 ha (107 acres) with about 47,000 stems "which continually die and are renewed by its roots". (http://en.wikipedia.org/wiki/List_of_oldest_trees accessed 2 Jan 2015). The phenomenon of aspen clones is described by Mock *et al* (2008) who use the concepts of 'genet' and 'ramet', whereby 'genet' is identified as the genetically identical assembly of 'ramets', ie the actual living stems and their roots, branches and foliage. They speak of "genets of great chronological age" (but question the actual ages claimed for some) and in the Introduction of the paper assert that clonality "challenges anthropocentric views of individuality and mortality". But "genet age" here merely refers to an estimate of "chronological age" ie the time elapsed since a particular clone started to develop from a single plant, which presumably germinated from a seed. We still cannot add the age of dead and disconnected plant material, even if it belonged to the clone that was, to the age of the living clone. These two ages are about different things (*haecceities*) and cannot logically be combined. The living clone is not older than its oldest living entities; the average age of stems in 'Pando', the largest clonal Quaking Aspen, is about 130 years.

Another case of a tree of extreme age that frequently turns up in the popular science press is that of a Norway Spruce (*Picea abies*, Pinaceae) claimed to be 9,550 years old growing in Fulu Mountain, Dalarna, Sweden (<http://www.sciencedaily.com/releases/2008/04/080416104320.htm>). Under the crown of a spruce tree (the photograph shows decumbent growth and one thin upright stem a few meters tall) remains were found (cone and wood fragments) ^{14}C dated at 375, 5,660, 9,000 and 9,550 years old, representing "a continuous clonal series dating back to the early Holocene" (Öberg & Kullman 2011). In the scientific paper cited, the authors clearly refer to "megafossils" of spruce yielding these ages and yet they claim that the living

spruce tree known as ‘Old Tjikko’ is 9,550 years old. “Living clonal spruces, growing in open cold-marginal landscapes, have attained ages of 9,500 years and possibly more.” No evidence (eg genetics) is presented that shows beyond doubt that the megafossils belonged to the same clone (genet) that now lives there. The oldest ring-dated living stem found in another spruce clone in Sweden was a little over 600 years. We may accept this age as the theoretical maximum age of clonal spruce trees in Sweden. Once again, the age of dead and disconnected material cannot validly be added to the age of the living plant. All the authors of this paper have demonstrated is that (contrary to earlier results from pollen analyses) *Picea abies* occurred here from the early Holocene to the present. This was in fact the main aim of their paper, as is evident from its title.

Great Basin
Bristlecone
Pine (*Pinus
longaeva*) on
Telescope
Peak, with
view looking
down into
Death
Valley,
California



Many other examples could be given, as claims of extreme ages have been made for Mojave Yucca (*Yucca schidigera*, Agavaceae) 12,000 years, Box Huckleberry (*Gaylussacia brachycera*, Ericaceae) 8,000–13,000 years, Palmer’s Oak (*Quercus palmeri*, Fagaceae) 13,000 years, Tasmanian Lomatia (*Lomatia tasmanica*, Proteaceae) 43,600 years and more of the same, including the 400,000–600,000 years old Siberian actinobacteria. All of these have in common that they pertain to organisms with clonal propagation and that the age claims are based on dating of fossil or subfossil material believed to have been genetically identical to the clone now alive. In cases of fossil material it is unlikely that conclusive genetic evidence can be produced that demonstrates this. However, even if it could be demonstrated, it is irrelevant. The only difference, apart from the physical mechanisms, between clonal and sexual reproduction is the genetic similarity and dissimilarity respectively of the offspring.

Two qualities only determine the *haecceity* of an individual organism: continuity of form and connectivity of parts. Continuity of life through reproduction involves the death of parents regardless of the method of reproduction and the age of the parents cannot validly be added to that of the offspring. The “oldest known living thing” is still a tree of the species Great Basin Bristlecone Pine (*Pinus longaeva*).

Notes

- i. **Haecceity** (/hɛk'si:ti, hi:k-/; from the Latin haecceitas, which translates as “thisness”) is a term from medieval scholastic philosophy, first coined by Duns Scotus, which denotes the discrete qualities, properties or characteristics of a thing which make it a particular thing.
- ii. **Sorites**, a polysyllogism in which the premises are arranged so that intermediate conclusions are omitted, being understood, and only the final conclusion is stated.

ACKNOWLEDGEMENTS

The issues of individuality and longevity in biology were, at the suggestion of the author, discussed by participants in a colloquium organised by James Shaftesbury, philosopher of science, at several meetings. I also had private discussions on these subjects with James, helping greatly to clarify the arguments. I am however, the author of this article and take responsibility for it, errors and all.

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Names of Fellows who passed away in 2014 appear in the Society's most recent Annual Report. Additional losses in 2014–15 of those who have made significant contributions to the Society are recorded here, and for whom obituary notices are now available online. If you require further information please contact the editor (gina@linnean.org).

DAVID JOHN GALLOWAY (1942–2014): During the period in which David John Galloway was on the staff of the Natural History Museum in London, from 1982 to 1994, he assisted both Peter James and Per-Magnus Jorgensen in work on both the lichens in the Linnaean herbarium and those in that of JE Smith. He was also important in linking the Society with that of the British Lichen Society, one result being the Linnean Society Bicentenary joint meeting in 1987. A full obituary notice and bibliography can be found through the following link to the Royal Society of New Zealand:

<http://www.royalsociety.org.nz/organisation/academy/fellowship/obituaries/david-john-galloway/>

PETER W JAMES (1930–2014): One of the founders of the British Lichen Society, Peter James did much to identify lichen specimens in the Linnaean and Smithian herbaria:

<http://www.independent.co.uk/news/obituaries/peter-james-lichenologist-who-was-one-of-the-first-to-establish-the-study-of-these-primitive-plants-as-a-scientific-speciality-9224719.html>

ROSEMARY LOWE-McCONNELL (1921–2014): Apart from her many achievements as a fish biologist, Rosemary Lowe-McConnell was the first Editor of the *Biological Journal of the Linnean Society*, served as the Society's Vice President in 1967 and was the recipient of the Linnean Medal for Zoology in 1997. A recent event in July was held at the Linnean Society to celebrate her life. Among the many informative notices available on the worldwide web, the following highlight her scientific achievements:

<http://www.telegraph.co.uk/news/obituaries/11333472/Rosemary-Lowe-McConnell-obituary.html>

<http://www.theguardian.com/science/2015/jan/29/rosemary-low-mcconnell>



Rosemary Lowe-McConnell

JOHN WALTER GUERRIER LUND (1912–2015): John Walter Guerrier Lund always remained an active Fellow of the Society, and might even have been the oldest, making much use of the Society's Library resources for his work as a phycologist, algal physiologist and microbial ecologist. He died on 21 March, aged 102:
<https://royalsociety.org/~media/about-us/fellowship/lund.pdf>

JOHN R PACKHAM (1930–2015): John R Packham led two joint expeditions, with the Svenska Linné Selskap, into Lapland in 1988 and 1998. The Society published an account of the first expedition in 1989, authored by John and Roland Moberg, entitled, '*In the footsteps of Linnaeus, Lapland 1988*'. Obituary notices by Ian Truman can be found in *The Arboriculturalist* and the *Bulletin of the British Ecological Society* and on the link below:
http://www.ccfg.org.uk/news/images/John_Packham_Obituary_April_2015

FELICITY POWELL (1961–2015): Felicity Powell became a Fellow after her commission to design the Tercentenary medal of the Linnean Society. She was also commissioned to design the John Marsden medal and, more recently, the John Spedan Lewis medal, but sadly her untimely death prevented her from being present when it was awarded for the first time this year:
<http://www.theguardian.com/artanddesign/2015/may/12/felicity-powell>
<http://www.bams.org.uk/felicity-powell-1961-2015/>

JAMES REVEAL (1942–2015): Jim Reveal's contribution to the Linnean Plant Name Typification Project and his more recent work on identifying plants in Mark Catesby's publications will be among his many other contributions to taxonomy:
<http://www.nbh.psla.umd.edu/collection/reveal.html>



The obverse of the John Marsden medal, designed by Felicity Powell

227th Anniversary Meeting of the Linnean Society

held at Burlington House, Piccadilly, London W1J 0BF

4.00 pm, Friday 22 May 2015

1. **The President** took the Chair and welcomed 85 Fellows and their 25 guests to the meeting.
2. **Apologies** had been received from 22 Fellows. Greetings had been received from The Linnean Society of Bulgaria (Dr Jivko Krastanov and Dimitar Dimitrov FLS).
3. **Admission of Fellows:** The following signed the Obligation in the Roll and Charter Book and were admitted Fellows: Jill HARRISON, Alex GANN, Roger BUTLIN, Howard GRIFFITHS, Sally-Anne SPENCE, Jozef KOLENDOWICZ, Francois GOFFINET, Patricia DE CHAIR, Fiona BATTLE, John ALLEN, Edmond HUI, Torsten THIELE, Jesper KAREHED, David BURT and Oscar BRATTSTRÖM.
4. **The Minutes of the Meeting held on 16 April 2015** were accepted and signed.
5. **Third Reading of Certificate of Recommendation for:**
 - a. **Honorary Member: Prince Akishino (Fumihito) of Japan**
At the request of the Imperial Palace, this was deferred until the Prince is next in the UK.
6. **Appointment of Scrutineers.** The following were appointed as scrutineers; Dr Janet Cubey, Dr Anjali Goswami and Professor Max Telford.
7. **Ballots.** Fellows voted in the ballots for Members of Council (5 of 8 nominees), the Officers (6) including the Treasurer-Elect, and for Fellows (30).
8. **Citations and Presentations of Medals and Awards**
 - a. The President presented the **2015 Linnean Medal in the field of Zoology** to **Professor Claus Nielsen**. The citation was read by *Scientific Secretary, Dr Malcolm Scoble*:

“Professor Claus Nielsen is a Danish Zoologist and Naturalist who has spent his career at the University of Copenhagen where he initially studied marine biology. Subsequently he became director of the Laboratory in 1970 and Director of the Zoological Museum in 1992. He retired in 2008, since which point he has continued as a very energetic Emeritus Professor.

Claus Nielsen is acknowledged as the world authority on the phylum Entoprocta, studying and publishing on all aspects of entoproct structure



Professor Claus Nielsen receives the 2015 Linnean Medal in the field of Zoology for his work on the phylum Entoprocta, and the phylum level inter-relationships of the animal kingdom

and biology. He also has an enduring interest in molluscs, in particular the odd worm-like caudofoveates, the development of which was almost completely unknown until he described the development of *Chaetoderma*. He is well known internationally for his work on the phylum level inter-relationships of the animal kingdom. Studies of structure and function of ciliary bands from larvae and some adults revealed important differences of considerable value in classification, leading to a theory for the evolution of the eumetazoans, later called the trochoaea theory, which has been the backbone of much later research. His other great achievement is the beautifully illustrated and thoroughly referenced book *Animal Evolution: Interrelationships of the Living Phyla*, 2012.

Claus Nielsen is also a great teacher of zoology and continues to contribute to an annual European course 'Molecular Approaches to Evolution and Development'. He was elected a Foreign Member of the Linnean Society in 2006. For his indisputably significant service to science over 50 years, Professor Claus Nielsen is a most worthy recipient of the Linnean Medal."



The 2015 Medal, Award and Prize Winners: (from left to right) Professor Rosemarie Honegger (Linnean Medal—Lichenology); Mercy Morris (John Spedan Lewis Medal); Dr Vincent Smith (Bicentenary Medal); Dr Shanna Ludwig (Irene Manton Prize); Professor Roger Butlin (Darwin-Wallace Medal); Claire Banks (Jill Smythies Award); Professor Claus Nielsen (Linnean Medal—Zoology); Professor Dianne Edwards PPLS; Robert Heckford (HH Bloomer Award) and Professor Paul Brakefield PLS

- b. The President presented the **2015 Linnean Medal in the field of lichenology** to **Professor Rosemarie Honegger**. The citation was read by *the President, Professor Dianne Edwards CBE FRS*:

“Professor Rosemarie Honegger was Professor in the Institute of Botany, University of Zurich from 1994 until her retirement in 2012. Previously, she had been researcher and lecturer in Basle and Zurich following a post-doc at the University of California, Riverside.

She is the foremost investigator in the world on the ultrastructure of lichens, and has widened her interests to encompass physiological and developmental questions as well as structural, producing new ideas about the nature of the interactions between the partners of the symbiosis and our understanding of the physiology of symbiosis. Professor Honegger’s experimental work on the nature of the physical contact between lichen fungi and their algal symbionts clarified the matter, and led to her publishing the first substantial, technically accurate and comprehensive review of the topic for 40 years. Her work has enabled a much deeper insight into the nature of the host/symbiont interactions than was previously possible.

Professor Honegger is also a very good lecturer, excellent in training graduate students in techniques and methods of electron microscopy, and has



engendered enormous loyalty and affection in her academic family. For her considerable contribution to science, Professor Rosemarie Honegger is thus a most worthy recipient of the Linnean Medal 2015.”

- c. The President presented the **2015 Darwin-Wallace Medal to Professor Roger Butlin**. The citation was read by the *Scientific Secretary, Professor Simon Hiscock*:

“It is a great privilege for me to read this citation for Professor Roger Butlin, one of this country’s most distinguished evolutionary biologists, who has made outstanding contributions to the study of speciation.

Professor Butlin is Professor of Evolutionary Biology at the University of Sheffield, holds the Waernska Professorship 2014 at the University of Gothenburg, is visiting Professor at the University of Leeds, and is an Honorary Scientific Fellow at the Royal Belgian Institute for Natural Sciences. He is President of the European Society for Evolutionary Biology, Associate Editor of *Molecular Ecology* and an Editorial Board member of *Insect Molecular Biology*.

Professor Butlin has made some of the greatest recent contributions to the study of speciation. His research is concerned primarily with the origin of barriers to gene exchange and the evolutionary genetics of reproductive isolation. He has used insect acoustic and chemical signals as model systems to test and illuminate the controversial process of speciation by reinforcement, and has highlighted the crucial importance of understanding the genetics of signal characters and the form of female preferences.

Professor Butlin’s work has always been characterised by a thoughtful and careful approach to addressing deep questions in evolutionary biology using

the most appropriate taxonomic group for the question—this freedom from taxonomic constraint means he works on organisms across the biological spectrum, from grasses and palms, to insects, mammals and snails, whilst at the same time never losing touch with evolutionary theory. It is for this outstanding contribution in the field of evolutionary biology that the Linnean Society is honouring Professor Butlin today, with the Darwin-Wallace Medal 2015.”

- d. The President presented the **2015 Bicentenary Medal** to **Dr Vincent Smith**. The citation was read by *Scientific Secretary, Dr Malcolm Scoble*:

“Dr Vince Smith is a ‘cybertaxonomist’, the first ever designated, although attempting to define his parameters is to lose the very essence and free-flowing dynamic of his research. His studies have taken him in two directions. The more conventional path has seen Vince Smith publish innovative research, in top journals, on the evolution, phylogeny and host-associations of parasitic lice (Phthiraptera). The less conventional and now dominant component of his work has arisen from his imaginative efforts to apply computer technologies and the Web to the study of taxonomy and biodiversity. His transformative approach belies the perception that taxonomists dwell hidden in a backwater.

Vince’s many activities have included building, with his team, the Data Portal for the Natural History Museum’s research outputs and developing new approaches to the mass digitisation of that organisation’s 80 million specimens. Additionally, he was, or is, Co-ordinator of two large EU-funded projects (ViBRANT and SYNTHESYS3), a Co-Principal Investigator on the NERC-funded *eMonocot* initiative and the editor-in-chief of the *Biodiversity Data Journal*.

He initiated and, with his team, developed the highly innovative ‘Scratchpads’. These e-platforms allow anyone to share data and create their own online virtual research environments for biodiversity and taxonomy. The foundational nature of these platforms has led Vince Smith to explore derivative areas of the publication of biodiversity results and the sociology of how taxonomists can work together virtually. To have achieved this much by the age of 40 years makes Dr Smith a truly worthy recipient of the Bicentenary Medal.”

- e. The President presented the **2015 Irene Manton Prize** to **Dr Shanna Ludwig**. The citation was read by *Editorial Secretary, Professor Mark Chase*:

“Shanna Ludwig’s thesis represents one of the first attempts to understand the interrelationship between the processes of hybridisation, polyploidy and

facultative apomixis (asexual reproduction) in the evolution of phenotypic and genotypic novelty in a taxonomically difficult group of closely related plant taxa (a 'syngameon'), illuminating one of the mechanisms of plant evolution in a novel way. The combination of structural biology, reproductive development, molecular technologies, and fieldwork is ambitious.

The study system was *Sorbus* (whitebeams and wild service trees) in the Avon Gorge, Bristol—the world 'hotspot' for *Sorbus* biodiversity with >20 different *Sorbus* taxa, many endemic to the Gorge. The thesis shows that *Sorbus aria* (a sexual diploid species) is the primary driver of ongoing *Sorbus* evolution through hybridisations as pollen (paternal) parent with polyploid taxa, showing for the first time that such hybridization is facilitated by a complex mating system. This reproductive complexity was shown using a combination of molecular marker analysis and flow cytometry of endosperm and embryos from seeds of triploid apomictic taxa.

Data from the project have been used to inform *Sorbus* conservation strategy in the Avon Gorge Management Plant produced by Bristol City Council in collaboration with Natural England and the National Trust. Work has been featured on local radio and television and on a NERC podcast associated 'Planet Earth'."

- f. The President presented the **2015 Jill Smythies Award** to **Claire Banks**. The citation was read by *the Treasurer, Professor Gren Lucas*:

"This year's awardee, Claire Banks, has been based at the Royal Botanic Garden, Edinburgh since 2009. Her colleagues say she is an excellent observer of plant morphology, and an ideal collaborator on taxonomic studies of all types. In the judges own words, Claire Banks has produced 'a very good range of plates' that were 'quite outstanding', consisting of 'very fine, clear drawings', particularly those of *Rhynochotechum*



Professor
Dianne Edwards
PPLS presents
Robert Heckford
with the HH
Bloomer Award
2015

and *Ammomum* that were ‘*excellent for comparison purposes*’. The illustrations of *Ammomum* ‘*making this revision most complete*’. ‘*A glorious collection of styles to suit the subjects*’, was noted, with the judges commenting further on the usefulness of the Compositae plates in the *Flora of Nepal* as well as for example in the Crassulaceae, Grossulariaceae and Rosaceae.

Thus in recognition of her outstanding talent and hard work, with the valuable contribution she has made to taxonomy, the Linnean Society is delighted to bestow the Jill Smythies Award 2015 on Claire Banks.”

- g. The President presented the **2015 HH Bloomer Award** to **Robert Heckford**. The citation was read by *Collections Secretary, Dr John David*:

“Robert (Bob) Heckford, a solicitor by profession but now retired, is the most gifted field microlepidopterist Britain has had in many decades. It is his ambition to clarify Microlepidoptera life histories not previously observed in the British Isles, and the list of his 230 meticulous, superbly researched notes and papers (170 in his own name, 70 co-authored) published over almost 40 years in British entomological journals bears witness to his industriousness, perseverance and success.

Bob has particular skill in clarifying the unknown or poorly known life histories of British small moths. A large number of life histories were firsts for the British Isles, some (such as *Bryotropha politella* (Stainton)) new to science. Bob also discovered several species new to the British Isles, and one of his discoveries in Devon, a species of Nepticulidae new to science, was named in his honour: *Ectoedemia heckfordi*. The breadth and depth of his knowledge made him a natural choice to be a co-editor of the recently revised *Checklist of the Lepidoptera of the British Isles*, a Royal Entomological Society Handbook published in 2013.

It is of no surprise that Bob’s expertise is in wider demand, for example in his contribution to public engagement by demonstrating moth identification at recording events.

In recognition of his achievements he was made a Scientific Associate of the Natural History Museum, London, in 2010, and his exceptional collection of British Microlepidoptera is promised to that institution. Thus, his outstanding achievements in clarifying previously unknown life-histories of British Microlepidoptera make Bob Heckford a most worthy recipient of the HH Bloomer award for an amateur naturalist.”

h. Sir Charlie Mayfield, Chairman of the John Lewis Partnership, presented the inaugural **2015 John Spedan Lewis Medal** to **Mercy Morris**. The citation was read by *Collections Secretary, Dr John David* and Sir Charlie Mayfield gave a brief overview of the background to the Medal, which had been prompted by the 50th Anniversary of the founding of the John Spedan Lewis Foundation (JSLF), a foundation that provides modest grants to naturalists and supports biology PhD students. The Linnean Society had undertaken to establish and administer the medal, which is awarded 'in recognition of significant contributions to Conservation, particularly in the fields of ornithology, entomology, and horticulture'. Born in 1885, John Spedan Lewis (JSL) went on to found the John Lewis Partnership in the late '20s, an ambitious business experiment in co-ownership that has survived for over 80 years. Spedan was an enthusiastic naturalist, and a Fellow of the Linnean Society for some 30 years, from his election in 1933 until his death in 1963.



"Mercy Morris joined NCCPG, now Plant Heritage, as Plant Conservation Officer at the beginning of 2007, to support and develop the National Plant Collections, of which there are currently over 600, having spent two years at Wakehurst Place as Team Leader for the Southern Hemisphere Garden. She has made a major contribution to the Growing Heritage Action Plan, which sets out the themes, targets and actions for cultivated plant conservation for the years ahead. Mercy quickly recognised that with over 70k plants in trade in the UK and maybe over 300k plants in garden cultivation, it would not be practicable to conserve them all, and that, for most effective use of resources, an objective system was required to evaluate the threat and priority level for each cultivar.

In response to this, she developed the Threatened Plant Project (TPP), which uniquely adds a significant element for evaluation of priority. This scheme provided a major advance for cultivated plant conservation and has been put into practice by Plant Heritage over the past four years, led by Mercy with great skill and commitment. Mercy's work also led to an invitation by the UK Government to develop a biodiversity indicator for cultivated plants for the UK to report on its conservation activity to 2020—highlighting the fact that cultivated plant conservation is now being taken seriously at national and international levels.

In 2014, Mercy and her team launched the Plant Guardians scheme, which encourages individuals to play a role in conservation, by taking responsibility for one or a few plants, so increasing the sense of ownership of the issue across the whole of Plant Heritage. From 2007–11 Mercy studied for the RHS MHort. and the subject of her dissertation was 'An Assessment of the Conservation Work of Plant Heritage from an International Perspective' and she has been invited to give presentations on this in Europe, US and most recently at the 5th Global Botanic Gardens Congress in Dunedin, New Zealand in October 2013.

Thus, Mercy has been at the forefront of transforming cultivated plant conservation, and promoting it both nationally and internationally. Thanks to her efforts it is now an accepted element of the UK's conservation activity, for instance being a part of the UK Global Strategy for Plant Conservation, something which was not even considered in 2007. She thus richly deserves the John Spedan Lewis medal."

9. Treasurer's Report

The Treasurer presented the **Accounts for 2014**, full details of which were in the 2014 Annual Report which had been mailed to all Fellows in mid-April. The Treasurer ran through a short summary of the highlights of the Society's achievements during the year, in particular, the Designation of the Society's collections in their entirety by the Arts Council England in December 2014. He went on to review the figures in the Annual Accounts, explaining the Society's revenue and expenditure, pointing out that he greatly welcomed Fellows leaving monetary legacies to the Society, drawing attention to the pie chart in the Annual Report which clearly illustrated the effect of donations bolstering income. He concluded by expressing special thanks to the Society's staff, curators and other volunteers, as well as to the Journal Editors and Publishers, emphasising that the Society would not exist without this, large and largely unseen, team—he thanked them for their total commitment to the Society which could do nothing without them.

10. Motion to Accept Accounts for 2014

Dr Robert Huxley, a member of the **Audit Review Committee** read the following statement. “In accordance with Bye-Law 12.6, the Annual Statement of Accounts for 2014, and the report of the professional auditors, were carefully examined by the Audit Review Committee of Fellows on 9 March 2015. On behalf of the Committee, of which I was a member, I am pleased to report to the Anniversary Meeting that we concluded that the Accounts give a true and fair view of the Society’s finances as at 31 December 2014. I therefore move that they be accepted.” This was carried unanimously on a show of hands.

11. Appointment of Auditors for 2015 and Banking Arrangements

- a. **The Treasurer** moved that the firm of **Knox Cropper, of 16 New Bridge Street, EC4V 6AX**, be appointed as **auditors** in accordance with Bye-Law 12.5, which was accepted unanimously.
- b. **The Treasurer** moved that **Barclays PLC, PO Box 13555 Acorn House, 36–38 Park Royal Road, London NW10 7WJ** be reappointed as the Society’s **bankers** and this was accepted unanimously.

12. The Presidential Address: Following in Their Footsteps—Cambridge women botanists and the Linnean Society

The President started by explaining about the first admission of women to the Linnean Society, on 19 January 1905 (following their election at the end of 1904), and drew attention to the oil painting depicting that occasion which hangs on the second floor landing in Burlington. Palaeobotanist DH Scott (PLS 1908), then botanical secretary, who had done much to promote women in the Society and provided their botanical guidance when Honorary Keeper of the Jodrell Laboratory, Kew is present, but unfortunately not the two women, Margaret Benson (1859–1936 Newnham) and Ethel Sargent (1863–1918 Girton), to be featured in the lecture, which also includes two further eminent early Fellows namely, Edith Saunders (1865–1945 FLS 1905, Newnham) and Agnes Arber (1879–1960 FLS 1908, UCL/Newnham). She then gave a brief overview of the timeline from the founding of Girton in 1869 and Newnham in 1871, up to the first woman President of the Linnean Society, Irene Manton (1904–88 FLS 1947, Girton) in 1973, emphasising the difficulties encountered by these pioneers whose presence at lectures and practicals was in the largesse of male academics and who were not recognised in the university by awards of full degrees until 1948. Sargent was a colourful lady, who researched in home laboratories in Reigate and Cambridge and concentrated on monocotyledon cytology and seedlings—interests shared with her protégée and lifelong friend, Agnes Arber,

the first botanist to be elected to the Royal Society a year after women were so recognised and first female recipient of the Linnean Society Gold Medal. Arber was essentially a plant morphologist and anatomist but published widely, across a range of historical and philosophical topics, including *Herbals their Origin and Evolution*, *Water Plants*, *Monocotyledons*, *The Graminae*, *The Natural Philosophy of Plant Form*, and *The Mind and the Eye*, as well as providing the Introduction and translations to *Goethe's Botany*. A delight in the preparation of the lecture had been the discovery in the Girton archive of more than four hundred lectures that Ethel Sargent wrote to Arber, although Ethel had destroyed all her replies. Nevertheless, they provide insights of their family affairs, including Arber's marriage and life with her daughter, their research *modi operandi*, interactions with other scientists, as well as events at the Society. Particularly noteworthy was Sargent's pride in Edith Saunders when she presented her paper on Mendel, speaking without notes "*not a word too much and all as clear as daylight*", "*they clapped and reclapped*". Saunders, best remembered for her books on floral morphology, spent her whole career at Newnham, the college which set up the Balfour Laboratory, specifically to prepare female students for the Natural Sciences Tripos and to provide research facilities outside the University. The President concluded her address by quoting from Arber's thoughts on the suitability of women for scientific research, and her emphasis on the importance of encouraging *independent thought* in education of young girls.

13. On behalf of the Fellows, Professor Simon Hiscock thanked the President for her interesting and highly informative talk.

14. Results of the Ballots (84 and 85 papers, respectively, returned for Officers and Council, 61 for Fellows)

- a. The following were elected to Council: Rosie Atkins (writer, former curator of Chelsea Physic Garden and RHS Trustee), Professor Juliet Brodie (phycologist at NHM, former President of Systematics Association), Dr Michael Fay (editor *BJLS*, and senior research leader in conservation genetics at RBG Kew), Dr Paul Bates (a zoologist and Director of the Harrison Institute plus leader of several Darwin Initiative projects) and Dr Zerina Johanson (palaeobiologist at NHM).

Details of these new Council members can be found in *The Linnean Society of London Anniversary Meeting 2015 Council Agenda and Council Nominations*, circulated with *The Linnean* in April 2015. These nominations were for Fellows to replace Dr Janet Cubey, Dr Sarah Whild, Dr Anjali Goswami, Dr Pat Morris and Professor Thomas Richards, who

have served three years on Council. The President thanked the outgoing Council members for their services to the Society.

- b. The Officers elected were: President, **Professor Paul Brakefield FRS**; Treasurer, **Professor Gren Lucas OBE**; Collections Secretary, **Dr John David**; Editorial Secretary, **Dr Mark Chase FRS**; Scientific Secretary, **Professor Simon Hiscock**; and Scientific Secretary, **Dr Malcolm Scoble**. **Deborah Wright** (former Publishing Manager at Wiley) was elected Treasurer-Elect.
- c. The Fellows were elected as on the 22 May 2015 ballot list (30 Fellows).

15. Names of Vice-Presidents

The President, Professor Paul Brakefield, named his Vice Presidents for the coming year as **Dr Malcolm Scoble**, **Professor Juliet Brodie**, **Professor Max Telford** and **Professor Mark Seaward**.

16. Introduction of New President, Professor Paul Brakefield FRS

The out-going President, Professor Dianne Edwards, said Professor Paul Brakefield (elected FLS 1987 and FRS in 2010) would be the 50th President of the Society and she was sure that he would bring distinction and indeed gravitas to the Society. He was born in Kent and gained his first degree in Zoology at Pembroke College, Oxford, and went on to do his PhD at Liverpool in ecological genetics, developing a fascination for the patterning on butterfly wings and understanding the evolution of these diverse patterns. After a Royal Society post-doc in Utrecht in 1980 and a NERC post-doc in Exeter, he took up a Research Fellowship in Cardiff, and thence the Chair in Evolutionary Biology in Leiden in 1987, which he held for 20 years before taking a Chair in the Department of Animal and Plant Sciences at Sheffield University. He was appointed Professor of Zoology and Director, University Museum of Zoology, Cambridge in 2010, and a Fellow of Trinity College Cambridge in 2011. Professor Brakefield is now researching radiations of the many species of Mycalesine butterflies in the old world tropics that are related to the laboratory model species, *Bicyclus anynana*. Professor Brakefield has received many honours, has published extensively, is a regular keynote speaker at conferences, and has taught widely. He is a REF Panel member (Research Excellence Framework, which assesses the quality of research in UK higher education institutions).

Professor Paul Brakefield thanked Professor Dianne Edwards, saying she would be hard act to follow given her enormous contribution throughout her Presidency, in particular having a record number of new Fellows elected (> 430), her unstinting commitment to all Society meetings and Committees, despite being based

in Cardiff, and her initiatives to further develop regional meetings for Fellows around the UK and in the US.

Professor Brakefield then said a few words about his personal involvement with the Linnean Society—being awarded the Bicentenary Medal in 1989, he felt had launched his academic career, and although he had been based abroad in Leiden for 20 years, he had retained links with the Society through being on the editorial board of the *Biological Journal of the Linnean Society*, and had attended scientific conferences at the Society.

17. Future Events

The President noted the dates of forthcoming meetings:

- 3 June: (Lunchtime lecture) The Genetic Diversity of Farmed Animals by Andrew Sheppey
- 18 June: (Evening lecture) Plant Conservation by Timothy Walker
- 27 June: Conversazione at University of Bristol Botanic Garden
- 3 July: (Memorial evening) *Remembering Ro McConnell, a 'fishy evening'* on evolution, speciation and conservation of freshwater fish in the African Great Lakes.

The next Anniversary Meeting will be on **Tuesday 24 May 2016 at 4pm.**

The Anniversary dinner was held at the Royal Society of Chemistry.

18. Any other valid business

There being no other valid business, the President declared the meeting closed and invited those present to join him for the reception being held in the Library.





Medals and Prizes 2016

With huge congratulations from all at the Linnean Society to this year's medal and prize recipients, the Society would like to call on Fellows to start nominating candidates for 2016. As a reminder of our medal and prize categories:

- **THE LINNEAN MEDAL:** awarded to a botanist or a zoologist for service to science
- **THE BICENTENARY MEDAL:** awarded to a biologist under the age of 40 years in recognition of excellent work
- **THE DARWIN-WALLACE MEDAL:** awarded to persons who have made major advances in evolutionary biology
- **THE HH BLOOMER AWARD:** awarded to an amateur naturalist for an important contribution to biological knowledge
- **THE IRENE MANTON PRIZE:** a prize of £1,000 to a PhD student for the best botany thesis in an academic year
- **THE JILL SMYTHIES AWARD:** a prize of £1,000 to a botanical artist for outstanding illustrations
- **THE JOHN C MARSDEN MEDAL:** awarded for the best doctoral thesis in biology
- **THE JOHN SPEDAN LEWIS MEDAL:** awarded to an individual making a significant and innovative contribution to conservation

To nominate candidates, visit www.linnean.org/medals and complete the appropriate form online. All nominations should be entered no later than **30 November 2015**. We look forward to hearing from you!



The Linnean Society of London : Programme of Events

November 2015–February 2016

- 19 Nov^A
18.00** **Darwin's Ark: Should Evolutionary History Inform Species Conservation?**
The Annual Debate with the London Evolutionary Research Network (LERN)
- 27 Nov
18.00** **Tripping the Light Fantastic: Uncovering the Secrets of Plant Cell Dynamics**
Dr Imogen Sparks, *University of Exeter*
IRENE MANTON LECTURE 2015 @ THE UNIVERSITY OF HULL
- 2 Dec
12.30–13.00** **The King of Puddings: The Story of the Botanical Ingredients of the Traditional Christmas Pudding**
Angela Dixon, *Author of The King of Puddings*
LUNCHTIME LECTURE
- 2 Dec
18.00** **The Lord Treasurer of Botany**
Tom Kennett, *The Linnean Society of London and Lambeth Palace Library*
FOUNDER'S DAY LECTURE 2015
- 12 Jan
18.30** **New Radiocarbon Evidence and Megafaunal Extinctions**
Professor Adrian Lister, *Natural History Museum, London*
PARTNER EVENT @ CARDIFF UNIVERSITY
(<http://sites.cardiff.ac.uk/events/view/new-radiocarbon-evidence-and-megafaunal-extinctions/>)
- 21 Jan^A
18.00** **Title tbc**
Dr Zerina Johanson, *Natural History Museum, London*
- 3 Feb
12.30–13.00** **200th Anniversary of Nepalese Collaborations**
Dr Mark Watson, *Royal Botanic Garden, Edinburgh*
LUNCHTIME LECTURE
- 18 Feb^A
18.00** **Ancient Oaks and Their Important Role in Biodiversity in England**
Dr Aljos Farjon, *Royal Botanic Gardens, Kew*

↑ 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 or other talks not listed here visit
www.linnean.org/events