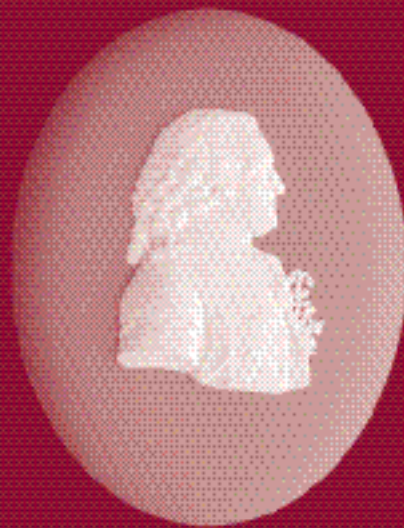




The Linnean



Carl Linnaeus
1707–1778

NEWSLETTER AND PROCEEDINGS OF THE LINNEAN SOCIETY OF LONDON

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A forum for natural history

THE LINNEAN SOCIETY OF LONDON

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THE LINNEAN

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Edited by Brian G Gardiner

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Editorial

This issue of *The Linnean* marks a turning point in its history. This will be the last issue that I edit and my successor from Volume 30 will be Gina Douglas, known to many of you previously as the Librarian of the Society, and now its Honorary Archivist.

The origins of *The Linnean* are to be found in Irene Manton's Presidency. Shortly after Irene was made President I was elected to be her Zoological Secretary. Irene decided that we needed to communicate more closely with the Fellows and she persuaded me to write and edit a Newsletter, an informal publication containing News of Fellows, information from the Officers of the Society, appeals etc.. Our last Newsletter was issued in 1981.

Council finally agreed to the publication of a more elaborate Newsletter to include the Society's Proceedings. *The Linnean* as we have called it contains Society News, notices of meetings and Proceedings. There were to be three issues a year with the editor welcoming historical articles, correspondence and short papers on newsworthy subjects.

The first issue of *The Linnean* included a short article by Margot Walker on the Admission of Ladies, and a longer article by myself on Linnaeus' Medical Career. In it I noted that Linnaeus initially set up practice in Stockholm where he seemingly cured a young rake of gonorrhoea. Realizing there was a great deal of money to be earned in the treatment of venereal disease, he wrote for advice to François de Sauvages at Montpellier who kindly supplied him with the recognized remedy – mercury ointment! As William Stern remarked "One night with Venus and a lifetime with Mercury!"

I wrote many subsequent articles, including those on Beatrix Potter's fossils, lampreys and, more recently, eels. Finally, in 1990, courtesy of the Treasurer, we were able to illustrate our articles with colour images.

In 1993 Dr Mary Morris joined me and not only made great improvements in the layout of *The Linnean* but also gave me much needed support. I shall greatly miss the stimulation of writing for and editing *The Linnean*.

BRIAN GARDINER

The history of *The Linnean*

This seems an appropriate moment to review the past history of *The Linnean*. In 1982, the Society's Editorial Committee reported that, as part of preparations for the coming 1988 Bicentenary of the Linnean Society of London, the Aims and Objectives Committee had recommended that the duplicated Newsletter, sent out to Fellows with information on future meetings and other events (for which Dr. B.G. Gardiner was already editor) should be replaced by a "revitalised Newsletter".

By the October 1983 meeting of the Editorial Committee, the format, contents and distribution of the new Newsletter had been agreed. It would be printed in a similar format to the Society's journals, as a soft-back 32 page black and white publication, to include an editorial, the Society's Proceedings, articles, obituaries, correspondence, Society news, book reviews (for books not of the same scientific significance as those included in the Journals) and a diary. It was also agreed that the new Newsletter would be distributed by the Society's publisher at that time, Academic Press, to all the Society's

members, would include a summary of contents of the current journals and would also be available on subscription.

The first issue, Volume 1, part 1, appeared in January 1984, distributed with the *Biological Journal* Vol. 20 (4). The first volume eventually had 6 parts, with Part 6 appearing in 1985. Subsequent issues from 1986 to 1998 were each of 3 parts. The decision to publish an Annual Report, from 1993 onwards, made the number of parts in each volume somewhat complex, with the Annual Report sometimes appearing within the sequence as an issue of *The Linnean Newsletter* (as in Vol. 12, part 1, Vol. 13, part 1 and Vol. 14, part 1 (Annual Reports for 1995, 1996 and 1997 respectively) or independently (in 1993, 1994, and from 1998 onwards). By 1999 *The Linnean* had grown to 4 parts, with the Annual Report appearing separately but in the same format, and continued to appear quarterly until 2008, with three issues in 2009 and 2010, reducing to the current biannual format from 2011, with PuLSe taking over current news. Page numbers for *The Linnean* were increased, to allow for publication of the backlog of submissions and to take account of the longer interval between the publication of Library donation records and the inclusion of the Proceedings of the Anniversary meeting.

The issues from Volume 10, 1994, to the most recent one, Volume 29 (1) are all available to download on the Society's website. It is hoped to make earlier issues accessible in due course, together with the associated Index volumes: "INDEX Historical figures in Vols 1-17, & Contemporary persons in Vols. 1-16" and the "INDEX Volumes 15-22", a task undertaken at intervals by Dr J.T.C. Sellick.

The first of the Special Issues appeared in 1998 and nine Special issues have now been published. Six of these had biographical overviews, treating the life and work of Christina Gottfried Ehrenberg, Colin Patterson, John Percival, Percy Sladen, Irene Manton, and Robert Wight, with the last three being associated with the celebration of the Linnaean Tercentenary in 2007 (7: The Linnaean Collections & 8: The Linnaean Legacy) and of Charles Darwin and Evolutionary biology (9: Survival of the fittest) in 2008. All those are still available as hard copy on request: see the Society's web site Publications page for information.

The content has always broadly followed the initial remit, with the picture quiz and the Library donations and accessions added as additional items. Featured articles have varied greatly in both length and content, ranging from studies of Linnaean scholarship via Palaeontological fraud to a French recipe for stewing lampreys.

The cover was initially black and white, with the Inlander medallion portrait of Linnaeus. A redesign in 2006, with the help of John Stone and his colleagues in the publishing team at the Royal Botanic Gardens, Kew, resulted in the present monochrome red cover, featuring pictures of different organisms, but retaining the Inlander medallion image. Colour images in the text appeared occasionally from Vol. 6 (2) 1990, but increasing in frequency from Vol. 14 (2) 1998 onwards.

What does the future hold? An additional change is that Mary Morris, currently responsible for layout and typesetting, is also handing over that task to Leonie Berwick, but has agreed to remain in an advisory capacity. That change will be accompanied by some new guidelines for contributors to facilitate copy-editing and layout. We still

hope to be able to use David Pescod's eagle eye in proof reading, a task he has been helping with for many years.

A Steering group is being formed to help guide *The Linnean* on its future path. With only two issues annually and increased postage costs, we will need to apply stricter rules on content so as to keep within page and weight limits in order to continue to keep *The Linnean* as a printed publication.

It only remains for the incoming Editor to thank Brian Gardiner for his long service to the Society as Editor, and Mary Morris for her sterling efforts over 20 years, as well as John Sellick and David Pescod for their past and future help.

GINA DOUGLAS

Why being a Fellow of the Linnean Society is Special!

We often get asked 'Why should I become a Fellow when I can come to most meetings anyway?' Well one good reason (there are many others) is that we do have special events for Fellows only – and the last three have been a great success, namely the Anniversary Meeting and Dinner, the Field Trip and the *Conversazione*.

The Anniversary Meeting is the Society's most important annual meeting, and includes the presentation of medals as well as elections for Officers and Council, in addition to the Presidential address. The Minutes of the 2013 Anniversary Meeting



Medal winners with the President at the Anniversary Meeting:
(from left) Dr Haris Saslis Lagoudakis, John Marsden Medal; Prof. Kingsley Wayne Dixon, Linnean Medal (Botany); President, Prof. Dianne Edwards CBE, FRS; Dr Janine Pendleton, Irene Manton Prize; Dr Magda Charalambous and Dr Jeremy Dagley, former students of Prof Godfrey Matthew Hewitt who was awarded the Darwin-Wallace medal posthumously

are included in this issue and, you will see the citations for the Society's medals and awards winners. As a Fellow, you have the opportunity to nominate individuals for medals each year, and Council will then vote on the nominees, who will include both professional and amateur naturalists as well as botanical artists – please note that the end of November is the deadline for the following May – please see the website for details http://www.linnean.org/The-Society/awards_and_grants/Medals+and+Prizes

The Anniversary Dinner, to which all medal and award winners are invited, was this year held at the Royal Society of Chemistry, across the Courtyard – and they did us proud – the food, wine and service were superlative and the floral table centres, which were created by Victoria and Samantha, made a stunning finishing touch to the delightful ambience.

Readers of our Fellows' magazine PuLSe will have seen a brief report on the field trip to North Wales in June, and some more details and images are being included here. Our trusty organisers Professor John Good OBE and his colleague Dr Tony Ramsay, Honorary Senior Lecturer in Geology at Cardiff University, put together an extremely varied programme for the 27 eager participants, who ranged from 24 to over 70 years old and included many new Fellows of the Society.

Day One was spent on the sunny Isle of Anglesey, where we visited 3 areas, starting with Parys Mountain, an open cast site where copper has been mined since Bronze Age times, although the main period for ore extraction was between 1768 and 1883, when the mine was the main source of copper in Europe. The acidic waters from Parys Mountain flowed into the bay (the red river) where ships used to dock to de-foul. Professor David Jenkins (past chairman and founder member of Amlwch Industrial Heritage Trust, a geologist formerly at Bangor University) provided fascinating insights into the industrial archaeology of the site. The many bacteria there which oxidize metals provide a major potential resource for the remediation industry.



Some of the group on Parys Mountain

Parys Mountain is an extraordinary landscape in terms of topography and colours, and is gradually being colonised by plants and lichens, which was explained to us by Professor Alan J.M. Baker (a botanist/ecologist specialising in phytoremediation). Metals make for an especially extreme environment to which certain plants, notably grasses including *Agrostis capillaris*, have responded by developing tolerant ecotypes, a few of which have been bulked up commercially for use in revegetating restored metal mine wastes elsewhere. Dr William Purvis (a lichenologist, Associate at the Natural History Museum) explained how lichen colours may be derived organically or from mineralisation, especially iron and sulphur.

We then drove to South Stack in search of some rare plants, including spotted rock rose *Tuberaria guttata* and fleawort *Tephrosia integrifolia* subsp. *maritima*. Although these eluded us we observed the maritime dwarf shrub heath, dominated by *Ulex gallii* (western gorse or dwarf furze) which is only found in the extreme west of Britain and three species of heather: *Calluna vulgaris*, *Erica tetralix* (cross-leaved heath) and *Erica cinerea* (bell heather), which make a Persian carpet of colour in July/August. On the cliff tops, we saw *Valeriana officinalis* (valerian) and *Jasione montana* flowers (sheep's

A few of the wild flower species on the cliffs at South Stack on the Isle of Anglesey



bit scabious), as well as wild carrot (*Daucus carota*), thrift (*Armeria maritima*), sea campion (*Silene vulgaris* ssp. *maritima*), kidney vetch (*Anthyllis vulneraria*), scurvy grass (*Cochlearia danica*, *C. officinalis*), spring squill (*Scilla verna*), and wild thyme (*Thymus praecox*). We had further insights from Tony into the geology of the area, where the disputed age of the rocks at this site i.e. whether late Precambrian (rocks older than 542 million years) or Cambrian (post 542 million years), was resolved by a radiometric date of 522 million years obtained from detrital zircon. Zircon was used as a substitute for diamonds in engagement rings after the Second World War in response to a shortage of gemstones.

We saw the amazing bird colonies (mainly guillemots and razorbills in spectacular numbers) on the cliffs, while the informative RSPB reserve lookout had live video footage of young choughs in a nest deep in the cliff face. As we walked back to the car-park, the peace was shattered by a dramatic fly-past of the Red Arrows, with red, white and blue vapour trails – John and Tony's organisational skills know no boundaries!

It was then onto Newborough Warren, a 2300 ha reserve with around 33 habitats/niches, to hear from Craig Shuttleworth (Project Manager for the Red Squirrels Trust Wales) about the success of the red squirrel conservation programme there and the many challenges faced, not just from grey squirrels but also adenovirus and poxvirus infections. Red squirrels were re-introduced to Newborough about 20 years ago, and tend to be better adapted to conifer forests than grey squirrels, competing better in that habitat than elsewhere (around 700 ha is planted to conifers, mainly Corsican pine).

We then split into two groups, one to visit a dune re-stabilisation project with Graham Williams (Countryside Council for Wales, Newborough Warden), where an area of the dunes had been destabilised in March in order to create small new areas of bare, open sand and dune slacks, to boost the survival chances of the sand dunes' rarest plants and insects including petalwort (*Petalophyllum ralfsii*), sand wasps, mining bees and rare beetles. There was lots of interesting botany en route, including good populations of orchids, *Dactylorhiza purpurella* and *D. incarnata* ssp. *coccinea* in full flower in the larger dune slacks, and hosts of the marsh helleborine (*Epipactis palustris*) about to flower.

The other group walked along the beach to Llanddwyn Island, an important geological and cultural site that provides striking exposures of rocks assigned to the Mona Complex which characterize the geology of Anglesey. The group visited the remains of a 13th-16th Century church dedicated to Dwynwen, the Welsh patron saint of lovers, a 5th Century princess who died c.460AD. Her saints' day is celebrated on the 25th January, the Welsh equivalent of St Valentines day. At Porth Twr Bach, a delightful bay, we examined the colourful mixture of rocks, called mélange by Edward Greenly, the geologist who first described them, including green basalt, pink quartzite, purple mudrocks and honey coloured limestone, and saw the remains of two scyphozoans on the beach, the lion's mane jellyfish *Cyanea cappilata* (identified by Gill Mapstone) as well as the moon jellyfish *Aurelia aurita* (identified by Jill Darrell).

We convened for an excellent dinner at the Straits Restaurant in Menai Bridge, which fortified us for Day 2 – starting with a walk (battling the wind and sand-blasting!) on Great Orme, a massive dolomite peninsula. In addition to its geology the Great Orme is also an archaeologically significant site. In 1870, on the east side of the Great Orme, Thomas Kendrick excavated a shallow cave which he intended for use as a workshop to polish pebbles to sell to tourists. A decade or so later the site was visited by the Reverend Eskrigge, who discovered a decorated horse jaw in the spoil dumped by Kendrick, which a recent study by the British Museum has shown was dated from 12,000 – 11,000 years ago, making the horse jaw Wales' oldest known artwork.

Great Orme is home to the beautiful silver-studded blue (SSB) and grayling butterflies. Like many other blue butterflies, SSBs have a symbiotic relationship with black ants (*Lasius* spp.). Eggs laid on or near the ground hatch and the larvae produce a honey-dew like liquid which the ants feed on. In return, the ants protect the larvae from predators. The main botanical interest here was the extremely rare and endemic dwarf Welsh cotoneaster (*Cotoneaster cambricus* [syn. *C. integerrimus*]), a white flowered nectar source for the SSB. We also saw many typical limestone grassland plants including ladies bedstraw (*Galium verum*), pyramid orchid (*Anacamptis pyramidalis*), yellow goat's beard (*Tragopogon pratensis*) and meadowsweet (*Filipendula ulmaria*).



The group on the way to Cwm Idwal

The trip ended with a rather wet (i.e. horizontal rain) walk up to the semi-circular valley of Cwm Idwal, bounded by the cliffs of Twll Du (Devil's Kitchen), and the Llyn Ogwen lake, where Dr Barbara Jones (Upland Ecologist with CCW) explained about efforts to minimise grazing by sheep and goats to allow the alpine plants and scrubby heath to expand, so returning the landscape to its 'original' state. Dr Brian Rosen gave an interesting account of Charles Darwin's visits to the area in 1831 and 1842, Darwin being an excellent geologist, and we saw the erratic boulders which Darwin observed when investigating glaciations, while Tony showed us beautiful examples of flow-banded rhyolite, a quartz rich finely crystalline acid igneous rock and welded tuff. All-in-all, the field trip was a resounding success and much enjoyed by all participants!

In July, Lawrence and Elizabeth Banks, former Treasurer and President, respectively, of the Royal Horticultural Society, generously provided a wonderful day for the *Conversazione*, our third Fellows' event in 2013, at their Hergest Croft Gardens, which lie in the heart of the Welsh Marches with stunning views towards the Black Mountains. Following welcome cakes and coffee on arrival, we had an informative lecture from Andrew Allott FLS, entitled 'An Eye to the Land', which provided fascinating insights into the geology and ecology of the Welsh Marches. Those of you who collect the New Naturalist Series may have seen Andrew's superb treatise entitled '*The Marches*' (HarperCollins 2011, ISBN 978-0-00-724816-2). A delicious buffet luncheon preceded a personally guided tour with Elizabeth and Lawrence and their three well-behaved spaniels around the stunning grounds of Hergest Croft Gardens, which extend to over 70 acres with over 5,000 rare trees and shrubs collected from the Far East and elsewhere – a gardening tradition created by four generations of the Banks' family over the last 115 years. Of particular note are the Azalea Garden, dominated by a massive avenue of cedars and magnificent birches that form part of the National Collections, and Maple Grove, while Park Wood, in a secluded valley hidden deep within an ancient oak wood, with many giant rhododendrons and exotic trees creates a Himalayan scene. The gardens also include herbaceous borders and a traditional vegetable and fruit garden containing many rare varieties. Small groups



Top: The Conversazione group at Hergest Croft Gardens – in the front row from left: The President Dianne Edwards, Andrew Allott, the speaker, and Lawrence and Elizabeth Banks, the hosts (plus their spaniels)

Centre: The stunning cones of *Abies delavayi*, Delavay's Fir, native to Yunnan, China

Left: Sylvia Phillips by the spectacular hanging catkins of *Pterocarya x rehderiana*, a cross between the Caucasian and Chinese species of wingnut.



The Conversazione group admiring the trees at Hergest Croft Gardens.

also had the opportunity to visit the Hergest Croft archive. The day concluded with a visit to the Banks' delightful home, Ridgebourne, where we had the opportunity to see their truly superb private art collection.

So, spread the word amongst your friends and colleagues that being a Fellow is special, and get recommending new Fellows – the Society is looking forward to welcoming them!

Elizabeth Rollinson
Executive Secretary

Society News

Hooray! We are open for business after around nine months of agony – the builders have done a great job but we are truly glad to see the end of all the dust and disruption, and to see our beautiful building returned to glory, especially the staircase – it's a dramatic transformation all round – the wheelchair-friendly lift is already much used, as are the newly configured toilets in the basement, while we can once again enjoy socialising in the Reading Room with tea and wine. Although there's still much to do, particularly in refurbishing basement rooms and transferring journals to Toynbee House, our Burlington House rooms are available for hire again, so please do get your friends and colleagues looking for a prestigious central London venue to contact Tom Helps – this is a useful way in which you can support the Society's income.

We continued holding evening meetings at the Royal Astronomical Society, with the jointly held (with the Systematics Association) Science Policy Lecture in April by Julian Hosking on Agricultural Biodiversity creating much discussion, as did Rich Boden's fascinating talk on the Movile Cave in Romania which was the first meeting

back in the Society in June. The President's address at the Anniversary Meeting in May traced the evolution of terrestrial ecosystems, as higher plants began to dominate landscapes. The Wallace Centenary celebration event held jointly at the University of Bournemouth with the Society for the History of Natural History in June was much applauded, as was the day meeting in April at the NHM on Protists and Next Generation Sequencing. Reviews on the field trip to North Wales in June and the *Conversazione* in Herefordshire in July are included in the preceding article on 'Why being a Fellow of the Linnean Society is Special'.

Those of you who missed the Bournemouth event will be able to immerse yourselves in more Wallace events, with a 2-day meeting at the Royal Society in October, which will conclude with an evening lecture at the Society by Sandy Knapp 'The Compleat Naturalist' and be followed by a Wallace day at the NHM, while this year's Christmas party in December will include Theatr na nÓg's production of 'You should ask Wallace'. For those of you in Wales, keep an eye out for a Wallace programme on channel S4C, some filming for which was done at the Society, and for the President's lecture series in Cardiff.

Recent scientific papers in our journals have been capturing the limelight, including one on colour change and camouflage in the horned ghost crab and look out for the one on the species-identity of two specimens of *Elephas maximus*, the Asian elephant. Together with the Systematics Association, we were pleased to announce the Systematics Research Fund awards in May, to support 28 of the 114 scientists who applied from around the world, for a wide range of projects across all kingdoms. The Society is delighted to have received further generous funding from the Andrew W. Mellon Foundation which will enable us to catalogue, conserve and digitise around 20,000 pages of Linnaean manuscripts, and for this we warmly welcome 2 new members of staff, Dr Isabelle Charmantier, from Exeter University, and Naomi Mitamura, a recent MA graduate from Camberwell College of Art, and established bookbinder.

Our education team, ably led by Hazel, using helpful teacher feedback and input from the Education Working Group, is developing and testing loan boxes for primary schools – boxes will contain ideas and equipment that will facilitate the teacher's task of covering curriculum-relevant topics such as Life Cycles, Classification and Plants. Ideas for potential school workshops are also on the agenda, while a number of fact sheets on famous naturalists and other topics are being prepared for the website, so will be available to all schools. The Student Lectures have been finalised by Leonie: Simon Watt on 10th October 'Dissections uncut' and Professor Hilary Lappin-Scott on 14th November 'How bacteria rule planet Earth'.

We are continuing to receive some great feedback on the website, thanks to Samantha, particularly the Fellows' Portal, and Hazel has launched a 'Lifelong Learning' page in the Education section listing identification, taxonomy & systematics course providers in the UK – so whether you want to attain a specific qualification, learn to identify certain groups of organisms or just take the family to a one-day educational event, please take a look. The final word: we now have 1,500 followers on Twitter (up from 500 this time last year) – so get tweeting!

Elizabeth Rollinson
Executive Secretary

Library

The building work has been completed and the Library is up and running again. Access from the main staircase remains unchanged, but there is now an additional entrance to the Library leading through from the new lift and the adjacent stairs. Readers using the new entrance come in via the workroom so the layout there has been altered to take that into account, with Library staff more accessible and visible at desks closer to the entrances.

I am pleased to report that we were able to maintain our e-mail and telephone enquiry service throughout the period of closure. Many of the enquiries were more complex than usual, and we enjoyed spending time on in-depth research on behalf of many of the enquirers who, in the normal course of things, would have come in to the building to consult the material themselves. This was all achieved in spite of much of the shelving being swathed in plastic and a great deal of material having been displaced to allow for demolition of walls and, later on, the re-flooring of the workroom.

Two new collections have recently been added to the new-look Online Collections – the Smith Herbarium and, to mark this Wallace anniversary year, the fascinating notebooks of Alfred Russel Wallace. Do log on to explore these new images. Wallace's *Palms of the Amazon* is a particular favourite with some wonderful illustrations. Elaine has also been busy liaising with the provider of our library management software to negotiate our switch to Cirqa, the new version of the Heritage library system. The changeover is imminent and should be seamless, with the new system being fully hosted by the Heritage team.

Progress on the projects was not stalled by the building work. Tom Kennett has successfully completed the Smith correspondence cataloguing project. Armed with the knowledge of Sir James Edward Smith and his circle which he has gleaned from reading every one of the letters in the correspondence collection, Tom has now embarked on researching material for a new biography of our founder. The projects to conserve, re-house and digitise the Smith letters continue and are well on schedule to be completed by the end of the year. As mentioned in *Society News*, planning for the next major project is already under way. At the turn of the year we shall be embarking on the cataloguing, conservation, re-boxing and digitisation of the Linnaean manuscript collection.

On safety grounds, our loyal team of volunteers had to be “stood down” for the duration of the main demolition and re-construction phases. We can now welcome them back and I know they are anxious to return to the projects that had to be suspended. Unfortunately, one of our longest-serving volunteers, John Sellick, is no longer able to travel into London to continue with his transcribing of our correspondence collections. I would like to thank John for the thousands upon thousands of letters that he has made accessible to those of us unable to cope with eighteenth- and nineteenth-century handwriting and abbreviations.

The transfer of lesser-used journals to our premises in Wimbledon has continued and more than half the compactor shelving has been filled.

The Society's portrait of John Lubbock, painted by Leslie Ward, was loaned to English Heritage for an exhibition celebrating the birth of archaeology. The display

was mounted in the new Quadriga Gallery within the Wellington Arch. The painting has now been safely returned and has been re-hung in its place in the Meeting Room. The Linnaean pearls are on loan to the Victoria & Albert Museum for the Pearls exhibition which will run from 21 September 2013 to 19 January 2014.

The re-construction work has made the past few months a taxing time, but we are very pleased with the results and are looking forward to resuming a normal service for all our readers and visitors in this very special building.

LYNDA BROOKS

Librarian

Donations

Lynda Brooks: Knapp, Sandra. *Alfred Russel Wallace in the Amazon: footsteps in the forest*. 183p. London: Natural History Museum, 2013. ISBN 9780565093303.

Laws, B. *Fifty plants that changed the course of history*. 223p. Newton Abbot: David & Charles, 2010. ISBN 9780715338544.

John Burton: Brazenor, C.W. *The mammals of Victoria and the dental characteristics of monotremes and Australian marsupials*. 125p. Melbourne: Brown, Prior, Anderson, [1950].

Davey, K. *Australian marsupials*. 111p. Melbourne: Periwinkle Books, [1970].

Jones, F.W. *The mammals of South Australia*. Pt.1. 131p. Adelaide: [British Science Guild], [1923].

Taylor, J.M. *The Oxford guide to the mammals of Australia*. 148p. Melbourne: OUP, 1984. ISBN 0195545842.

R. Clifton: Clifton, R. [ed.]. *The botany of Bernard de Jussieu: comparison of 2 sources: Duchesne and Laurent de Jussieu*. 68p. [Dover]: The Geraniaceae Group, 2012. ISSN 1464-7265.

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Gina Douglas: Corbett, J. *My Kumaon: uncollected writings*. 142p. Oxford: OUP, 2012. ISBN 9780198082897.

Jones, A.E. *The common birds of Simla*. 99p. [New Delhi]: Himachal Birds, 2012. ISBN 9788192235806.

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Dr Mike Fitton: Rasnitsyn, A. P., Quicke, D. [eds]. *History of insects*. 517p. Dordrecht: Kluwer Academic Publishers, 2002. ISBN 140200026X.

Jenny Grundy: Cox, B., Cohen, A. *Wonders of life*. 288p. London: HarperCollins, 2013. ISBN 9780007452675.

Crane, P. *Ginkgo*. 384p. New Haven, Conn.: Yale University Press, 2013. ISBN 9780300187519.

Margarita Hernández-Laille: Hernández-Laille, M. *Charles Darwin y Lucia Sapiens: lecciones del origen y evolución de las especies*. 138p. Madrid: UNED, 2012. ISBN 9788436264258.

Professor Per M. Jorgensen: Jorgensen, P.M. *Under magnoliaen: planteminner*. 167p. Bergen: John Grieg Forlag, 2013. ISBN 9788253303017.

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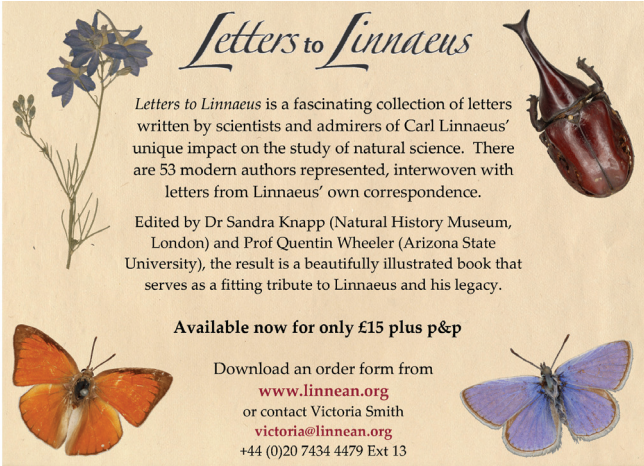
Correspondence

From: George Lawrence Allen FLS

Last month's issue of "The Linnean" was, as usual, full of interest. May I mention just two of the articles?

Elizabeth Rollinson's article entitled "Open Access" is a major contribution to the debate, and presents the arguments, both for and against, with crystal clarity. May I add the following thought? If the "Article Publishing Charge" (APC) or publication fee payable by an author in order to have an article published under the proposed Gold Open Access model is to be a four-figure sum ("£1,725 is the average APC as determined by the Finch group"), then I am of opinion that this would beholden authors to their heads of department whose cooperation in most cases would be required to make available the funding for the necessary publication fees (APCs). A head of department, as holder of the purse strings, is unlikely to be qualified to review, certainly not impartially, a submitted paper, and, moreover, may be improperly influenced either, on the one hand, by a wish to boost the department's reputation by increasing the number of papers published by members of the department, or, on the other hand, by a liking for or a dislike of the prospective author. Not only would authors be put in hock to their heads of department, but it would create situations even more invidious than the existing questionable procedure of peer review. In short, there would be no kind of effectual quality control whatsoever.

Professor John Cloudsley-Thompson's article entitled "Serendipity in Biological Research" is not only of great interest, but a delight to read. Professor Cloudsley-Thompson points out that it has been believed since the time of Lucretius "that sleeping dogs, horses and other mammals may dream.". I have never entertained any doubt that at least my previous Border collie dog Pax (who passed away on 27th July 2008) regularly dreamed. I would often observe that, while Pax was sleeping soundly, he would utter series of rapid quiet barks while making rapid small coordinated movements of all four limbs as if running. It was clear and unmistakable that my dog Pax was dreaming, and that in his dreams he was chasing another dog (he never chased cats).



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How should the history of industrial melanism in moths be interpreted?

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Laurence Cook's reaction (2013) to my remarks on industrial melanism in moths (Fryer 2012b) calls for a response. An admirer of his work on the subject, who appreciated his help and comments on my original article (Fryer 2010), which he does not cite, I was aware of his disapproval of some of my deductions. By way of introduction he states that "it is generally now concluded that the central driving force" [of the spread of melanic individuals in industrial areas] "was selective predation" – adding the rider "notwithstanding the diversity of response and the difficulties in demonstrating cause and effect in individual cases". This is a curious remark from one of the authors of two excellent papers (Bishop, Cook and Muggleton (1978a, b) on the response of *Odontopera bidentata* – a well known example of industrial melanism – to industrialisation. Adults spend the daylight hours so well hidden that they are almost entirely free from predation by birds. During their entire study they found only one adult moth in daytime – hiding in a crevice! – and no evidence whatever that *O. bidentata* is ever eaten by birds, so predation could hardly have been "the central driving force" in its acquisition of melanism. Predator-wise it is irrelevant whether a hidden moth is sombrely attired or brilliantly coloured. In essence Cook claims that melanism was acquired in *O. bidentata* as a result of selective predation by birds, and that, in a dramatic series of events, the melanic morph (first recorded c1896) became predominant within a few decades. I maintain that it didn't, and couldn't, and that it wouldn't have become predominantly melanic by this means even if granted limitless time. That, reflecting environmental changes, it has now reversed this change is another story.

Nor is this an isolated example. A prime purpose of my original article was to make known the remarkable, highly significant, but forgotten, and to the best of my knowledge never meaningfully cited, observations of Porritt (1907) that began about 40 years earlier. These recorded, first, the arrival and rapid increase in incidence of melanic individuals of *Biston betularia*, in the then rapidly industrialising area of South West Yorkshire and, subsequently, the appearance there, and even more rapid spread, of melanic individuals of more than 40 other species of moths of diverse affinities. Indeed females of *Apocheima pilosaria* and *Agriopus marginaria*, neither of which, as he noted, is exposed to predation by birds by day, became melanic at a rate perhaps as much as ten times as fast as did *B. betularia*. He documented a biological event lamented by Ford (1955, 1964) as unrecorded. I submit that the facts revealed by Porritt destroy some long cherished beliefs about industrial melanism and its history.

The long-held, still widely accepted explanation, was that in soot-blackened areas melanic individuals were rendered less conspicuous to predatory birds and therefore survived better than pale, "normal" individuals. Notwithstanding his experience with *O. bidentata* Cook accepts this hypothesis, claiming that experiments – some of which were indisputably seriously flawed – "led to acceptance of the general importance

of selective predation”, and cites with approval the statement of Majerus (2009) that “industrial melanism in the peppered moth is still one of the clearest and most easily understood examples of Darwinian evolution in action”. Coyne (1998), who contentiously reviewed an earlier book of Majerus, and who cast doubt on the validity of the peppered moth story, would not have agreed. Moreover, far from supporting the belief that melanism is always protective in soot-blackened areas, Porritt’s findings frequently contradicted it. Thus *Colostegia multistrigaria*, that became melanic very rapidly, spends the daylight hours hidden among grasses and other vegetation and is “absolutely out of evidence until dusk”, so its colour is irrelevant to protection: nor is this an unusual state of affairs.

Cook makes no reference to an even earlier – again largely unknown – observation and prediction of Porritt (1904), which I cited in 2010, that, having almost eliminated the normal form in the polluted area that he knew so well, the melanic form of *B. betularia* “bids fair to do so throughout the county at no distant date”. It was already colonising clean areas where, according to the logic of those who claim that it spreads in smoke-polluted regions at the expense of conspicuous normal individuals that readily fall prey to birds, it should have been at a disadvantage for that very reason. Porritt’s prediction was conclusively fulfilled. It was estimated that, by the late 1960s, probably more than 95% of the Yorkshire population was melanic (YNU 1970). This does not simply contradict the selective predation hypothesis: it surely completely destroys it. Moreover, several other species that subsequently became melanic in South West Yorkshire, repeated the pattern set by *B. betularia*: indeed it became a countrywide phenomenon. Even a century later, two talented investigators, Cook and Turner (2008), were reluctant to concede the full significance of this event, referring to unpolluted areas colonised by melanics as “less affected areas” that “sometimes offered conditions favourable to persistence of a low frequency of melanics” and where some pollution “appears to have been required”. In fact melanics overwhelmingly predominated in rural Yorkshire, as they came to do in clean areas elsewhere. *Ectropis bistortata* was mentioned by Porritt (1904) as another early example of the phenomenon, displayed, among others, by *O. bidentata*. Why this has not been universally recognised, even as an unexplained anomaly, if not as a fatal blow to the entire concept of the adaptive nature of industrial melanism in the Lepidoptera, is difficult to understand.

Cook criticises me for suggesting that “neither orthodox random mutation nor natural selection” were involved in the often dramatically rapid change in melanic frequency in polluted areas, and – even more heretical – that change was an induced heritable process resulting from exposure to pollutants. Or, more precisely, to a component of pollution that acted as a mutagen, and did so even though some of the species concerned were never exposed to selection for this attribute. Like *O. bidentata* and others they are hidden from predatory birds by day. Of course this did not initially happen in clean areas where the mutagen was not present. While not proven, the induction of melanism by a mutagen can explain not only its widespread occurrence in industrial regions, irrespective of the habits of the moths concerned, be it to sit fully exposed or to be completely hidden; its spread into clean areas, for which natural selection cannot be invoked, and should in fact operate to prevent; and its later decline as levels of pollution – and the mutagen – fell. “Orthodox” mutation and natural

selection do not. Other responses can perhaps be attributed to the suggested mutagen (or even mutagens). Morley (1906) reported from part of the polluted area familiar to Porritt that not only did many species become melanic, but others changed in other directions. Some even became lighter in colour and “frequent examples are obtained, the bright colours of which are surprising”. Such facts have never been considered in recent times because they have completely escaped attention. They do not conform to the orthodox theory.

That induction of an attribute much more complex than a simple change in pigmentation is possible is demonstrated, appropriately in a moth, by the bivoltine North American geometrid *Nemoria arizonaria*. Larvae of the spring brood feed on oak catkins, of which they are knobbly, yellowish mimics: those of the summer brood feed on oak leaves and are slender, less knobbly, greenish mimics of oak twigs, and have larger jaws and jaw muscles needed to deal with leathery leaves. Behaviour is appropriate in each case. Experiments by Greene (1989) using foods kept frozen between seasons, revealed that, regardless of season, **all** larvae fed on catkins developed into the catkin morph, and **all** fed on leaves into the twig morph. With such a dramatic, proven example of induction that involves changes in morphology and behaviour, as well as colour, to demonstrate what is possible, how can the suggestion that a simple change in pigmentation may be similarly induced be rejected without evidence?

To revert to the historical sequence, mysteries remain. East of Porritt’s area, at unpolluted Skipwith Common, *Acronicta menyanthidis* – which for long remained pale in the polluted area – was predominantly melanic. To complicate matters it here spent the day resting, fully exposed, on rocks and other objects – which is not behaviour that conceals it from birds; it renders it conspicuous. Porritt was also puzzled by *Antitype chi*. In the town of Huddersfield and surrounding villages melanic individuals rested commonly on soot-blackened walls, yet “on the equally black, or even blacker walls” bordering the adjacent high moors, all individuals were of “the palest form” and could easily be seen from afar – which he found at odds with protective resemblance. Such facts do nothing to support the orthodox view. To complicate this situation, in 1911 Morley reported in a lecture, recorded only as a tantalisingly brief précis, that, after two seasons of melanism, a population of *A. chi* displayed a remarkable reversion to the pale form. He attributed the melanic form to damp, sunless weather during its development, and the pale form to having passed through these stages during a period of hot, dry weather (see Fryer 2012a), which is not at odds with control of the character by a single gene that reacts to conditions that prevail in the larval and pupal stages. Harrison (1956), unaware of the experiences of Porritt and Morley, recalled his much earlier observations on *A. chi*, both typical and melanic forms of which rested openly on walls, sometimes in large numbers. Counts, morning and evening, showed that it was very unusual for even a single individual of either form to disappear during daylight hours – which suggests that birds had very little interest in these moths, which was in keeping with the impression formed by Porritt, a first class naturalist who found little to suggest that moths were much taken as food by diurnal birds.

I am puzzled by Cook’s statement that “to get the *observed responses* (my italics) in the times they took” to become melanic, the species concerned “would require mutation rates of at least several per cent per generation”, as if this contradicted my

argument. It demonstrates exactly what I suggest took place. They did change at this remarkable rate – which is readily explained if this was caused by a mutagen. Indeed (Fryer 2010) I emphasised how Porritt stressed that *B. betularia* “remained for years our only representative of true melanism”, and that it was only from about 1880 onward that other species, began to produce dark forms in increasing numbers, “some of them rather rapidly”. Contrary to Cook’s remarks, these high rates of what I suggest were induced change, were certainly noticed by contemporary naturalists living in the affected area. When Porritt reported his, and their, finding in 1906, more than 40 species were displaying the acquisition and rapid increase in the incidence of melanism, none of which were doing so before about 1880.

Cook goes on to say that it is unclear how I explain the subsequent decline of melanic frequencies in the 1970s, which was a rapid process that took place as the countryside became cleaner. We have no idea for how long a postulated mutagen might remain effective, but, contrary to the suggestion that existing mutants would not be affected by waning of the effect of a mutagen responsible for the situation, five years after the use of chloroquin as an effective anti-malarial drug was discontinued because it had ceased to be effective, *Plasmodium falciparum* had again become susceptible to it.

I am also unclear as to the significance of his remarks about migration between industrial and non-industrial areas, which he says would lead, “not to the disappearance of melanics” but to “their spread throughout the country”, which is exactly what took place. However, such spread makes no sense if melanism was an adaptation to a soot-blackened background, as the orthodox view holds. (But which, as the cryptic habits of some of the species concerned demonstrate, was certainly not so in all cases.) Indeed, if it was, it would be theoretically suicidal for melanic species to leave such terrain for clean areas – yet several not only did so successfully but even to a large extent replaced pale forms there! What role can be assigned to natural selection here? And when melanics successfully colonised and came to predominate in clean areas, why did they later yield to non-melanics there, as they did in several species? The orthodox view has no answer. But if the claimed mutagen that initially rendered the moths concerned melanic, began to decline in polluted areas as they became cleaner, this would inevitably lead to the loss of melanics in *both* zones.

The penultimate paragraph of Cook’s analysis is the most revealing. Using *B. betularia*, Majerus did indeed “set himself the task of conducting an experiment that took account of the reservations”, expressed about earlier such, and I do not seek to denigrate his efforts. I cited the internet version of his lecture on the work in my 2010 paper. A synopsis of his findings was published by Cook, Grant, Saccheri and Mallet (2012) after perusal of data collected by Majerus before his untimely death. In six seasons of observations and experiments he located 135 resting individuals – far more than had been found hitherto. According to Cook *et al.* records of his observations have been lost, but they present a table giving various details. In his experiments moths exposed to possible predators were not “allowed to find their own settling places on trees” as Cook says they were. Site selection was largely determined by Majerus. Domestically reared moths – of both sexes – were released, one per sleeve, into 12 sleeves of netting, each surrounding one of about 100 randomly selected branches of trees growing on a 1ha plot near Cambridge. Here they were confined until the netting

was removed before dawn, by which time, following their natural rhythm, they had usually lost any urge to fly. Their choice of resting place was in fact extremely limited – which may go some way to explaining why so many fell victim to birds. Resting sites were checked 4h after dawn and any moths not present were *presumed* to have been eaten by predators. In nature males disperse and may fly several kilometres in search of a female that attracts them by scent. It is virtually impossible to replicate this situation in an experiment. In six seasons Majerus liberated 4,864 *B. betularia* on his 1ha site. According to Cook they “were presented in the natural ambient frequency and density”, which is variable. All were additional to any individuals already present in the area. The natural behaviour of males in particular was clearly thwarted by the experiment. As a final comment on methodology I stand by my earlier comment (2010) that “all experiments that expose moths to birds are inherently flawed, for a simple reason”. Moths displayed on a background that renders them conspicuous will be taken more frequently than those displayed on a background against which they are inconspicuous, so results are always predictable. It was predictable that proportionately more melanics than typicals would be taken, and they were.

In keeping with the national trend, as the effects of industrialisation were reversed, melanics were in decline throughout the period concerned; particularly in the last two years. Disappearance of, equated with predation on (!), 4,522 typicals released, ranged from c17 to 27.8% per season (mean c21.5); on 342 melanics from c17.6 to 33% (mean c29.2). In year 6 only 14 melanics were available: 4 disappeared. Predictably, a greater *proportion* of released melanics (not ‘more’ as Cook et al. (2012) put it) than non-melanics disappeared. They say “this lower fitness of melanics is expected if the observed decline in melanism is explained by visual predation”, which provides “strong evidence of overall selection against the melanic form ($p=0.003$), while taking into account year to year heterogeneity in the non-selective fraction eaten”. But this was *not* the case when melanics *colonised* the area! Melanics were *always* more conspicuous than typicals here, so this *appears* to be true only if considered as an isolated short series of events at a *particular time*. It is grossly misleading in the context of the complete history of the situation. There is indeed a problem that this interpretation does not address, let alone answer, which firmly negates the conclusion drawn.

The area concerned is *clean*, and melanics have *always* been the conspicuous morph since they invaded it from polluted areas. If selection was based on a match or mismatch with the background, why were conspicuous melanic invaders not taken by predatory birds more frequently than typicals and the invasion prevented? They were clearly *not* taken in sufficient numbers to prevent, not only the establishment, but an increase in incidence of melanics, to such a degree that they came to predominate in the area! Just as predation had nothing to do with the development and spread of industrial melanism (witness the examples of *Odontopera bidentata* and other cryptic species that are essentially immune from it), it had no ability to prevent the establishment and increase of melanic moths (such as *B. betularia* and *O. bidentata*) in clean areas, which indisputably took place – as it did here. On the other hand a mutagen can induce melanism in moths in a polluted area, which can then colonise a region where their blackness does not match the background, but where predators are completely unable to eliminate them because their depredations are ineffectual.

B. betularia and *O. bidentata* again provide examples – via quite different behaviour. Likewise the subsequent decline in incidence of melanic moths in always clean areas is explicable by the waning of the effect of the mutagen, or mutagens, which, I suggest are no longer produced, and whose influx has ceased. Such a decline can take place irrespective of the nature of the background. Why should melanism suddenly become selected *against* in an always clean area where – inexplicable by the orthodox story – it had become, and for some time reigned, as the dominant allele?

I suggest that industrial melanism did *not* arise as a result of spontaneous random mutations. These do not occur at rates that are sufficiently high to explain the rapidity with which it arose and spread, *simultaneously*, in *so many species*, in a restricted area, and sometimes in widely separated areas. Mutation rates in nature generally range from about 10^{-4} to 10^{-10} per generation, which would be woefully inadequate to explain the rapid, virtually synchronous, changes in entire populations of more than 40 species in the same area, in about 20 years. As particularly striking examples Porritt dated the advent of melanism in the apterous females of *Apocheima pilosaria* and the brachypterous females of *Agriopus marginaria* to about 1880; yet almost all females were black *before* 1886. Moreover, and particularly damning, melanism spread rapidly in several species whose habits ensured that they were *never even exposed* to the selective forces that had allegedly determined the success of the mutation concerned!

The spread of melanism in *B. betularia*, while rapid, was much slower than it was in many species that became melanic in the same area. Thanks to the long forgotten observations of Porritt and his contemporaries, but unknown to more recent investigators, we know that many co-existing species, of diverse affinities, and habits, with different flight times, or with wingless females, became melanic in the same restricted area, in evolutionary terms, simultaneously. The ‘microlepidopteran’ *Diurnea fagella*, which became melanic very rapidly, had ancestors that diverged from all other species mentioned herein >110 Mya. All this implies a common cause. Some species that became predominantly melanic were certainly not even exposed to natural selection for this attribute as they spend the day completely hidden from potentially predatory birds. The ineffectiveness of alleged selection on the basis of this attribute was also unequivocally demonstrated by the subsequent colonisation of “clean”, unpolluted areas by melanic individuals of species that came to dominate such regions and, in well attested cases, to make up the majority of the population there. Selection on the basis of a match or mismatch with the environment was clearly either not involved or was ineffective. The subsequent decline of melanic individuals in clean areas – where their initial success was always difficult (some would argue, impossible) to explain by natural selection – is particularly embarrassing to those who seek to invoke it. Why should such selection signally fail to operate for many years, then, for no apparent reason, begin to do so? I have seen no satisfactory explanation of this curious situation. Moreover, when melanics began to yield ground in clean areas that they had come to dominate (with no obvious changes in the environment to suggest why they did so) this demonstrated that they did *not* enjoy greater viability than non-melanics, as some had claimed when they colonised clean areas from polluted, smoke-blackened regions. Ironically Cook *et al.* (2012) argue for what they describe as the “expected lower fitness” of the melanics of *B. betularia* that feature in the study of Majerus! A

question for them is – if, as there was when Majerus studied it, there was selection *against* the melanic morph in the Cambridge area because it was conspicuous against a clean background, how had *this self same morph* managed to achieve dominance – rapidly – in this clean area when it invaded from a soot-blackened environment?

B. betularia was not the only species whose populations enacted the series of changes described. Of others *O. bidentata* provides an informative example. As Cook et al (1978a,b) confirmed, adults are so well concealed by day that they suffer virtually no predation. Having become melanic in industrial areas (the work of a mutagen?) it spread into clean areas, largely replacing the typical form. No predation and no natural selection were involved. Why then did it later go into reverse and give way to non-melanics in such areas? And do likewise in polluted areas as they became cleaner? I suggest that the disappearance of a mutagen – and therefore its effects – explains all.

Cook et al. conclude that the new evidence, added to existing data, make it “virtually impossible to escape the previously accepted conclusion that visual predation by birds is the *major cause* (my italics) of rapid changes in frequency of melanic peppered moths”, and that “industrial melanism in the peppered moth is still one of the clearest and most easily understood examples of Darwinian evolution in action”. The first claim is firmly refuted by, first, the success of melanic *B. betularia*, which had earlier come to predominate in smoke polluted regions, but which subsequently spread into and came overwhelmingly to do so in large areas of clean countryside where, if natural selection had operated via predation, it would have acted *against* melanic individuals and prevented their establishment! Natural selection *did not* do this. Subsequently, however, when, with melanics dominating the population (>95% melanic in Yorkshire where the same scenario was enacted as around Cambridge) pollution diminished in industrial areas, the incidence of melanism declined there. But so too did it diminish in *clean areas* where there was *no change* in the background against which moths were supposedly either hidden or rendered conspicuous. Why should natural selection, that had been completely ineffectual in preventing the conquest of clean areas by melanic *B. betularia*, where they were highly conspicuous, suddenly become effective, for no obvious reason as the background *did not change*? And, highly significant, why should several other species, of which *O. bidentata* is an excellent example, behave in an exactly similar manner – becoming melanic in polluted areas, subsequently conquering clean areas, then reversing the process, yet as adult moths they are almost never exposed to *any* selective predation? Like *B. betularia*, they do not even display Darwinian evolution in this way. The phenomena displayed by these and several other species can, however, be explained if mutagens acted in the way I suggested in my original account (Fryer 2010) of the discoveries of G. T. Porritt and his fellow naturalists that began about 130 years ago – subsequent to the advent of melanism in *B. betularia* with which they were already familiar. These provide invaluable historical background information that enables us to trace the history of events, against which to consider more recent happenings. They do not support the alleged explanation of the history of melanism in *B. betularia*. While not proven, the induction of melanism in *many* species provides a more satisfactory, and certainly more comprehensive, explanation of events, not just in one species but in many, with diverse habits, than does what I claim is the discredited “orthodox” story of the Peppered moth.

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Wallace's Acceptance of Darwin's Priority in his own Words

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Introduction

This year marks the 100th anniversary of the death of Alfred Russel Wallace (8 January 1823 – 7 November 1913), the British naturalist and co-discoverer of the theory of evolution by means of natural selection with Charles Darwin. Wallace published a two-volume autobiography in 1905 and an abridged, one-volume edition in 1908. His interesting, scientifically important life has been the subject of several scholarly biographies including: Marchant (1916), George (1964), Williams-Ellis (1966), Raby (2001), Shermer (2002), Fichman (2004), and Slotten (2004). His writings have been included in four anthologies: Beddall (1969), Smith (1991), Berry (2002) and Camerini (2002). An intellectual history of Wallace was edited by Smith and Beccaloni (2008), and the journal of Wallace's 10-month lecture tour through North America in 1886–87, owned by the Linnean Society of London, has recently been published (Smith and Derr, 2013). Cope's (1891) sketch included an elegant woodcut of Wallace (see Fig 5).

Wallace undertook two major expeditions to collect plants and animals in remote, dangerous, and scientifically important frontiers. From 1848 (Fig. 1) to 1852 he explored the Amazon River basin, the first two years in the company of entomologist Henry Walter Bates who stayed until 1859, and later alone. Out of these adventures came Wallace's (1853) *A Narrative of Travels on the Amazon and Rio Negro* and Bates' (1863) *The Naturalist on the River Amazons*. Wallace's experiences prepared his mind for the idea of natural



ALFRED R. WALLACE. 1848
(From a daguerreotype)

Fig 1. Alfred Russel Wallace in 1848 at age 25 just before he left England for the Amazon. (from *My Life I* : opposite p 266.)



Figure 2. Alfred Russel Wallace in 1862 at age 39 in Singapore on his way home from the Malay Archipelago (from Marchant, 1916, frontispiece).

selection, and Bates eventually elaborated his theory of mimicry, now known as Batesian mimicry, a beautiful demonstration of natural selection in action. While returning to England in 1852, Wallace's ship caught fire and sunk and all his specimens and most of his notes were lost. He spent 10 days at sea in an open boat before being rescued (McCalman, 2009).

A lesser man might have been permanently devastated by such loss, but Wallace regrouped after 18 months of lecturing and writing in London.

In a chance encounter, he met Darwin in the insect division of the British Museum in 1854, but this had no effect on either man (Gardiner, 1995; Raby, 2001). Wallace left the comfort of England for Asia where he spent eight years from 1854–1862 (Fig. 2) traveling and collecting throughout the Malay Archipelago. He amassed a staggering 125,600 specimens including 310 mammals, 8,050 birds, 100 reptiles, 7,500 mollusks, 13,100 butterflies and moths, 83,200 beetles, and 13,400 other insects. Over 1000 of these were species new to science (Shermer, 2002). Wallace's (1869a) book *The Malay Archipelago* ranks along with Darwin's (1839) *Journey of Researches* (now known as *The Voyage of the Beagle*) as two of the greatest travel books ever written. The other great book that resulted from Wallace's travel experiences is the two-volume *tour de force* on zoogeography, *The Geographical Distribution of Animals* (1876). In it he outlines the zoogeographical provinces of the earth and explains why animals are found where they are. The boundary between the Asian fauna and the Australian fauna, first proposed by Wallace (1860), is now known as Wallace's Line in recognition of Wallace's role as one of the pioneers of biogeography.

Wallace's observations are still stimulating research. For example, Holt *et al.* (2013) combined geographical ranges and phylogenetic relationships of 6110 amphibian species, 10,074 nonpelagic bird species, and 4853 nonmarine mammals and arrived at 20 distinct zoogeographical regions that could be grouped into 11 larger realms. Wallace's original six zoogeographical realms more or less followed the continental plates. Various authors have explored Wallace's travels and their significance to biology and history: Beddall (1969), Quammen (1996), Severin (1997), van Oosterzee (1997), and McCalman (2009).

While recovering from an attack of malaria in Ternate, Mollucas, sometime in early March 1858, Wallace sent a letter to Darwin with an essay “On the tendency of varieties to depart indefinitely from the original type”. The original letter and essay have not been found (Burkhardt, *et al.* 1991, vol 7: 108). Like Darwin had done 20 years previously, Wallace had read Thomas Malthus’s *An Essay on the Principle of Population*. This led Wallace to the idea of natural selection, just as it had done for Darwin. Darwin had 20 years of data to support the idea; Wallace had “an ingenious speculation” about the mechanism of natural selection (see below Wallace’s letter to Darwin 29 May 1864) but without the supporting evidence. Wallace asked that Darwin read the manuscript and pass it along to Charles Lyell if Darwin considered it significant (Wallace, 1905, 1: 362-3). The reason Wallace sent the letter to Darwin was because of Darwin’s favorable and encouraging response to Wallace’s 1855 paper (Porter, 2012).

This convergence of independently developed ideas, Darwin’s stunned reaction to Wallace’s letter, and Lyell’s and Joseph Dalton Hooker’s solution to whether it was honorable for Charles to publish his idea now that he had Wallace’s essay, have been chronicled in depth by many historians of science including the principal Darwin biographers (Desmond and Moore, 1991; Browne, 2002). The intellectual debt that Darwin owed to those who had gone before him was recently examined by Stott (2012).

A truncated version of the events that followed Darwin’s receipt of Wallace’s letter is as follows (Berra, 2009). Darwin sent Wallace’s essay to Lyell as Wallace requested, on the day he received it, 18 June 1858. Lyell and Hooker were familiar with Darwin’s 20-year unpublished work on natural selection. They hastily arranged a meeting of the Linnean Society where Darwin and Wallace would announce their ideas together. Darwin sent an extract of a sketch of natural selection he had written in 1844 (4 pages, Gardiner, 1995) and an abstract of a letter to Harvard botanist Asa Gray from 5 September 1857 (3 pages, Gardiner, 1995) in which Darwin described natural selection. These items and Wallace’s essay were read before about 30 people at the Linnean Society meeting on 1 July 1858 and published as separate contributions in the *Journal of the Proceedings of the Linnean Society* in August (Darwin and Wallace, 1858). One should not imply that Darwin and Wallace were co-authors of a joint paper; rather, they were individual authors of separate, simultaneous papers.

Some revisionists diminish Darwin’s reputation and character by claiming that Wallace was deprived of credit for the concept and go so far as to accuse Darwin of stealing the idea of natural selection or some aspect of it from Wallace (McKinney, 1972, Brackman, 1980; Brooks, 1984, and Davies, 2008). They claim that Darwin actually received Wallace’s letter at least two weeks before he said he did and was thus able to modify his own work before presenting it with Wallace’s essay. Van Wyhe and Rookmaaker (2012) very cleverly traced the 75-day route taken by the mail steamers that transported Wallace’s letter using newspaper accounts of steamship arrivals and departures. They concluded that Wallace’s letter could not have left Ternate on the 9 March steamer, but had to wait until early April. They say this because Wallace’s letter mentions Darwin’s previous letter of 22 Dec. 1857. Given the 77 day transit time from England to Ternate, Darwin’s letter would have reached Wallace upon the arrival of the 9 March 1858 steamer. This would not leave enough time for Wallace

to get his new letter back on the steamer for a departure that same day. Gardiner (1995) speculated that Wallace's letter was probably posted between 5-19 March. Assuming that Wallace's letter was at the Ternate post office before 25 March, the next mail steamer, *Makasser*, would have picked it up about 5 April 1858, and the letter would have arrived in Surabaya on 20 April. The mail steamer *Banda* took the letter to Jakarta on 23 April, then on to Singapore on 30 April. The Peninsular & Oriental steamship *Pekin* left Singapore with the letter on 1 May. It arrived in Galle on 10 May, and the letter departed on the P & O steamer *Nemesis* on 14 May, arriving in Suez on 3 June. Mail from the *Nemesis* was transported overland in Egypt by camel and boats to Alexandria and arrived there on 4 June. The P & O steamship *Colombo* left Alexandria with the mail on 5 June, stopped at Malta and Gibraltar and arrived at Southampton on 16 June. The letter went via train to the general post office in London on 17 June and was delivered to Down House on 18 June, just as Darwin said (Van Wyhe and Rookmaaker (2012)!

Davies (2012) constructed a shipping scenario that allowed Wallace's letter to have made the 9 March departure which would allow its arrival at Down House on 3 June. Given the indisputable fact that in 1844 Darwin had already written a 230 page, 52,000 word essay on natural selection that contained multi-faceted evidence, shown it to Hooker (who annotated it in his own hand), and discussed the concept in correspondence with Asa Gray, it defies common sense to say that Darwin lifted the idea of natural selection from Wallace's brief essay.

It is certainly true that Wallace has been overshadowed by Darwin, and some of this may be due to the fact that Darwin was part of the upper class scientific establishment and Wallace was relatively poor and self-educated. But Darwin earned his dominance and prominence by the wealth of data presented in *Origin of Species* (Darwin, 1859). It was a popular and scientific success and forever linked Darwin's name with the subject. Darwin did, however, omit acknowledgment of Wallace in the first edition of the *Origin*, but compensated for this inadvertent omission on p 484 of the second edition (Burkhardt, *et al.* 1993 vol. 8: 29). Biologists and historians of science recognize that Wallace did come up with the idea of natural selection independently from Darwin and quite willingly credit Wallace as co-discover of natural selection with Darwin. However, Wallace did not help his case by his involvement in spiritualism, séances and communication with the dead, and advocacy of the anti-vaccination movement (Wallace, 1905). These things hurt his scientific acceptability even though he made great contributions to evolution and biogeography.

Darwin and Wallace had areas of disagreement such as dispersal vs land bridges; the relative importance to each sex of protective coloration, sexual selection and natural selection; the role of natural selection in forming the mind of man, etc. But they were always friendly and cordial to one another. Their letters are laced with details of their family lives, an exchange of photographic portraits, news of health issues, etc. (Burkhardt, *et al.* 1985-2012). Wallace was a frequent visitor to Down House. Darwin's daughter Elizabeth wrote to her sister Henrietta about the Wallaces's 12 September 1868 visit to Down House and pronounced Mr Wallace "very pleasant" (Berra, 2013). Darwin also called on Wallace when he went to London.

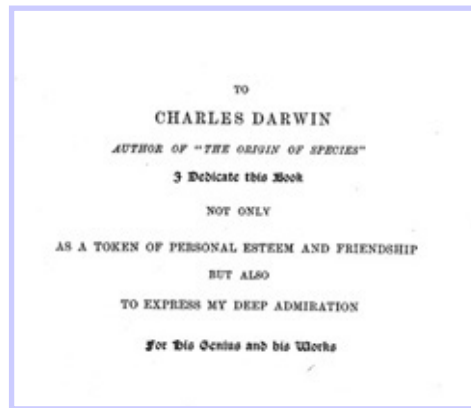


Figure. 3. Dedication of Wallace's *Malay Archipelago* (1869) to Darwin.

Darwin was instrumental in arranging a pension for his monetarily less fortunate friend. Wallace was in financial strife. His only income was from books and failing investments. He considered applying for jobs as registrar, curator or librarian at the College of Science. He confided his anxieties to Lyell's former secretary, Miss Buckley, who notified Darwin. Darwin and Huxley petitioned Prime Minister Gladstone, requesting recognition of Wallace's service to science. With letters of support from 12 others, Queen Victoria conferred a pension of £200 annually upon Wallace. Wallace received the first payment in 1881. At age 58, Wallace finally had financial security for life, thanks in large part to Darwin (Wallace, 1908: 374-5).

Charles Darwin died of heart disease on 19 April 1882 and was buried in Westminster Abbey at the request of 20 members of parliament on 26 April. Pallbearers included Wallace, Hooker, Huxley, and Lubbock (Berra, 2009).

Darwin's major biographers, Desmond and Moore (1991) and Browne (2002), who have made a thorough examination of his life, do not give much credence to the unsubstantiated revisionist view that Darwin somehow plagiarized from Wallace. However, the best evidence that Darwin conducted himself as a gentleman and behaved honorably comes from Wallace himself. The following writings show that Wallace, in his own words, felt privileged to be included along with Darwin as co-discover of natural selection. He dedicated *The Malay Archipelago* to Darwin in 1869 (Fig. 3). Wallace greatly admired what Darwin had accomplished and did not feel cheated in any way. Wallace even used the word *Darwinism*, a term coined by Huxley (1860: 569), as the title for his 1889 book (Fig. 4). If Wallace had been intellectually cuckolded by Darwin, why would he not recognize it?

The extensive Darwin-Wallace Correspondence began with a letter from Darwin to 21 collectors around the world, including Wallace who left for the East Indies in 1854, asking for specimens of domestic poultry, pigeons, etc. This request reached Wallace in February 1856 via his agent (Gardiner, 1995). The following letters and writings have been extracted from the 19 published volumes of *The Correspondence of Charles Darwin* (Burkhardt, *et al.* 1985-2012) and both versions of Wallace's autobiography. Wallace's bibliography has been compiled by Shermer (2002).

In their own words

Edward Blyth → CD: 8 Dec. 1855

- “What think you of Wallace’s [1855] paper in the *Ann. M. N. H.*? Good! Upon the whole!
- [CD’s marginal notes:] “Uses my simile of tree – It seems all creation with him...he puts facts in striking point of view – Argues against our geological perfect knowledge - - Explains Rudimentary organs...& I quite agree”

Darwin → Wallace: 1 May 1857

- [Wallace letter of 10 Oct. 1856 from Celebes received late April 1857, but lost.]
- “By your letter & even still more by your paper in *Annals*...I can plainly see that we have thought much alike & to a certain extent have come to similar conclusions...I agree to the truth of almost every word of your paper;”
- “This summer will make the 20th year (!) since I opened my first -note-book, on the question how & in what way do species & varieties differ from each other.– I am now preparing my work for publication, but I find the subject so very large, that though I have written many chapters, I do not suppose I shall go to press for two years.—”

Wallace → Darwin: 27 Sept. 1857

- “...I had begun to be a little disappointed that my paper had neither excited discussion nor even elicited opposition.”

Darwin → Wallace: 22 Dec. 1857

- “You say that you have been somewhat surprised at no notice having been taken of your paper in the *Annals*. I cannot say that I am; for so very few naturalists care for anything beyond the mere description of species. ...two very good men, Sir C. Lyell & M^r. E. Blyth at Calcutta specially called my attention to it. Though agreeing with you..., I believe I go much further than you;”
- “My work, on which I have now been at work more or less for 20 years, will *not* fix or settle anything; but I hope it will aid by giving a large collection of facts with one definite end:”
- “...you have my very sincere & cordial good wishes for success of all kinds: & may all your theories succeed, except that on oceanic islands, on which subject I will do battle to the death.” [ARW’s land bridges vs CD’s dispersal]

Wallace → Bates: 4 January 1858

- “I have been much gratified by a letter from Darwin, in which he says that he agrees with ‘almost every word’ of my paper [Wallace 1855]. He is now preparing his great work on ‘Species and Varieties,’ for which he has been collecting materials twenty years. He may save me the trouble of writing more on my hypothesis, by proving that there is no difference in nature between the origin of species and of varieties; or he may give me trouble by arriving at another conclusion; but at all events, his facts will be given for me to work upon.” [*My Life*, 1905 I:358]

Wallace’s description of his letter to Darwin from Ternate early March 1858 as he remembered it 50 years later. [Original lost.]

- “The more I thought over it the more I became convinced that I had at length found the long-sought-for law of nature that solved the problem of the origin of species....I waited anxiously for the termination of my fit [malaria] so that I might at once make notes on the subject....That same evening I did this pretty fully, and on the two succeeding

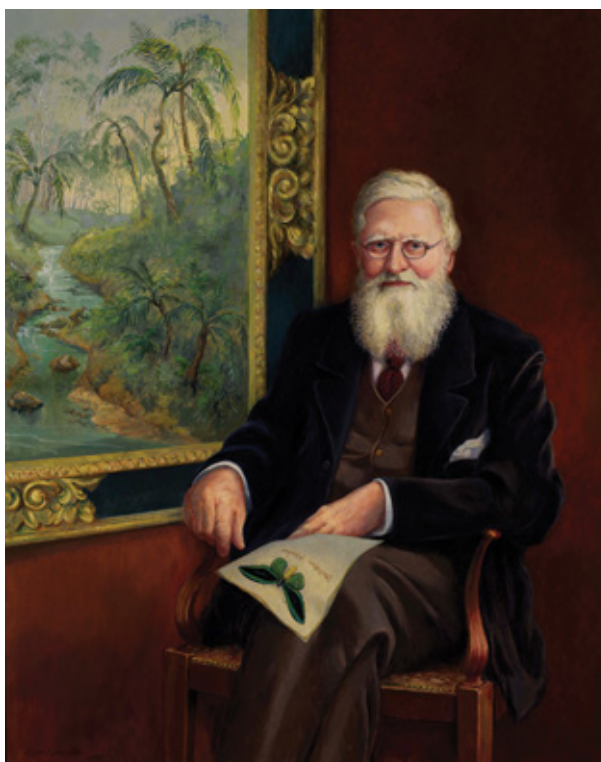


Figure. 4. Oil on canvas portrait of Alfred Russel Wallace by Roger Remington (1998) based on all available photographs of Wallace. This portrait is on display in the meeting room of the Linnean Society alongside John Collier's well-known 1883 oil painting of Charles Darwin. The Wallace portrait was commissioned to have exactly the same dimensions (127 x 102 cm [50 x 40 in]) as the Darwin portrait to give equal prominence to the co-discoverers of natural selection. The book on Wallace's knee depicts a male birdwing butterfly, *Ornithoptera poseidon*, now known as *O. priamus* (Linnaeus, 1758). The painting-within-the-painting shows Wallace as a small figure at streamside with a butterfly net. The importance of Wallace's butterfly studies has been detailed by Mallett (2009). Portrait used by permission of the Linnean Society of London.

evenings wrote it out carefully in order to send it to Darwin by the next post, which would leave in a day or two. I wrote a letter to him in which I said that I hoped the idea would be as new to him as it was to me,I asked him if he thought it sufficiently important to show to Sir Charles Lyell, who had thought so highly of my former paper.” [My Life, 1905: 362-3]

Darwin → Lyell: 18 June 1858

- “Some year or so ago, you recommended to me to read a paper by Wallace in the Annals He has to day sent me the enclosed & asked me to forward it to you....Your words have come true with a vengeance that I sh^d. be forestalled. ...I never saw a more striking coincidence, if Wallace had my M.S. sketch written out in 1842 he could not have made a better short abstract! Even his terms now stand as Heads of my Chapters.
- Please return me the M.S. which he does not say he wishes me to publish; but I shall of course at once write & offer to send to any Journal. So all my originality, whatever it

may amount to, will be smashed. Though my Book, if it will ever have any value, will not be deteriorated; as all the labour consists in the application of the theory.

- I hope you will approve of Wallace's sketch, that I may tell him what you say."

Darwin → Lyell: 25 June 1858

- "There is nothing in Wallace's sketch which is not written out much fuller in my sketch copied in 1844, & read by Hooker some dozen years ago. About a year ago I sent a short sketch ... to Asa Gray, so that I could most truly say & prove that I take nothing from Wallace. I sh^d. be *extremely* glad **now** to publish a sketch of my general views.... But I cannot persuade myself that I can do so honorably."
- "But as I had not intended to publish any sketch, can I do so honourably because Wallace has sent me an outline of his doctrine? – I would far rather burn my whole book than that he or any man sh^d think I had behaved in a paltry spirit. "
- P.S. [26 June] It seems hard on me that I should be thus compelled to lose my priority of many years standing, but I cannot feel at all sure that this alters the justice of the case."

Darwin → Hooker: 29 June 1858

- [CD reported death of his baby, Charles Waring Darwin, on 28 June, from scarlet-fever. Letter sent in morning.]
- "But I can see that you have acted with more kindness & so has Lyell even than I could have expected from you both most kind as you are." [Hooker & Lyell proposed they submit Wallace's paper with extracts of CD's writings to Linnean Society as joint papers.]
- "I have just read your letter, & see you want papers at once. I am quite prostrated & can do nothing but I send Wallace & my abstract of abstract of letter to Asa Gray.... I dare say it is all too late. I hardly care about it.... I send my sketch of 1844 **solely** that you may see by your own handwriting that you did read it."
- "I really cannot bear to look at it. – Do not waste much time. It is miserable in me to care at all about priority. –"
- Enclosed [Wallace: 'On the tendency of varieties to depart indefinitely from the original type'; CD's abstract of Letter to Asa Gray; CD's extract of essay of 1844 annotated in Hooker's handwriting.]

J. D. Hooker & Charles Lyell → Linnean Society 30 June 1858

- "The accompanying papers, which we have the honour of communicating to the Linnean Society, and which all relate to the same subject, viz. the Laws which affect the Production of Varieties, Races, and Species, contain the results of the investigations of two indefatigable naturalists, Mr. Charles Darwin and Mr. Alfred Wallace."
- "These gentlemen having, independently and unknown to one another, conceived the same very ingenious theory to account for the appearance and perpetuation of varieties and specific forms on our planet may both fairly claim the merit of being original thinkers in this important line of inquiry; but neither of them having published his views, though Mr. Darwin has for many years past been repeatedly urged by us to do so, and both authors having now unreservedly placed their papers in our hands, we think it would best promote the interest of science that a selection from them should be laid before the Linnean Society."

Darwin → Hooker: 13 July 1858

- "I always thought it very possible that I might be forestalled, but I fancied that I had

grand enough soul not to care; but I found myself mistaken & punished; I had, however, quite resigned myself & had written half a letter to Wallace to give up all priority & sh^d certainly not have changed had it not been for Lyell's & yours quite extraordinary kindness....I am **much** more than satisfied at what took place at Linn. Soc^y."

Wallace → his Mother: 6 Oct. 1858

- "I have received letters from Mr. Darwin and Dr. Hooker, two of the most eminent naturalist in England, which have highly gratified me. I sent Mr. Darwin an essay on a subject upon which he is now writing a great work. He showed it to Dr. Hooker and Sir Charles Lyell, who thought so highly of it that they had it read before the Linnean Society. This insures me the acquaintance of these eminent men on my return home." [My Life, 1905 I: 365]

Wallace, *My Life* 2nd ed 1908

- "Both Darwin and Dr. Hooker wrote to me in the most kind and courteous manner, informing me of what had been done, of which they hoped I would approve. Of course I not only approved, but felt that they had given me more honour and credit than I deserved, by putting my sudden intuition-...on the same level with the prolonged labours of Darwin, who had reached the same point twenty years before me, and had worked continuously during that long period in order that he might be able to present the theory to the world with such a body of systematized facts and arguments as would almost compel conviction."
- "I think...that I may have the satisfaction of knowing that by writing my article and sending it to Darwin, I was the unconscious means of leading him to concentrate himself on the task of drawing up what he termed an 'abstract' of the great work he had in preparation,...the celebrated 'Origin of Species'...."

Wallace → Hooker: 6 Oct. 1858

- "Allow me in the first place sincerely to thank yourself & Sir Charles Lyell for your kind offices on this occasion.... I cannot but consider myself a favoured party in this matter, because it has hitherto been too much the practice in cases of this sort to impute *all* the merit to the first discoverer of a new fact or a new theory, & little or none to any other party who may, quite independently, have arrived at the same result a few years or a few hours later."



Figure 5. Woodcut of Alfred Russel Wallace published in *Popular Science Monthly*, 11 June 1877 opposite p.129 and reproduced in Cope (1891).

- “It would have caused me much pain & regret had Mr. Darwin’s excess of generosity led him to make public my paper unaccompanied by his own much earlier & I doubt not much more complete views on the same subject, & I must again thank you for the course you have adopted, which while strictly just to both parties, is so favorable to myself.”

Darwin → Wallace: 25 Jan. 1859

- “I was extremely much pleased at receiving three days ago your letter to me & that to Dr. Hooker. Permit me to say how heartily I admire the spirit in which they are written. Though I had absolutely nothing to do in leading Lyell & Hooker to what they thought a fair course of action, yet I naturally could not but feel anxious to hear what your impression would be.”

Darwin → Wallace: 6 April 1859

- “P.S. [to letter describing progress on *Origin*] You cannot tell how I admire your spirit, in the manner in which you have taken all that was done about publishing our papers. I had actually written a letter to you, stating that I would *not* publish anything before you had published. I had not sent the letter to the Post, when I received one from Lyell & Hooker, *urging* me to send some M.S. to them, & allow them to act as they thought fair & honourably to both of us.”

Darwin → Wallace: 13 Nov. 1859

- “I have told Murray [Darwin’s publisher] to send you by Post...a copy of my Book...I sh^d very much like to hear your general impression of the Book as you have thought so profoundly on subject & in so nearly same channel with myself. ...Remember it is only an abstract & very much condensed. God knows what the public will think...I do not think your share in the theory will be overlooked by the real judges as Hooker, Lyell, Asa Gray, & c.”

Darwin → Lyell: 10 Jan. 1860

- “As yet only two things have annoyed me; those confounded millions of years... & my not having by inadvertence mentioned Wallace towards close of Book in summary, – not that anyone has noticed this to me. – I have now put Wallace’s name at 484 in conspicuous place.”

The *Origin*, 2d ed., pp.484-5

- “When the views advanced by me in this volume, and by Mr. Wallace in the Linnean Journal, or when analogous views on the origin of species are generally admitted, we can dimly foresee that there will be a considerable revolution in natural history.”

Darwin → Wallace: 18 May 1860

- “I received this morning your letter from Amboyna dated Feb. 16th, containing some remarks & your too high approbation of my book. Your letter has pleased me very much & I most completely agree with you on the parts which are strongest and weakest of all;” [Wallace’s letter has not been found.]

Wallace → G. Silk: 1 Sept. 1860

- [Re: *Origin*] “I have read it through five or six times, each time with increasing admiration. It will live as long as the ‘Principia’ of Newton...Mr. Darwin has given the world a *new science*, and his name should, in my opinion, stand above that of every philosopher of ancient and modern times. The force of admiration can no further go!!!” [My Life, 1905 I: 372.]

Wallace → Bates: 24 Dec. 1860

- “I know not how, or to whom, to express fully my admiration of Darwin’s book. To him it would seem flattery, to others self-praise; but I do honestly believe that with however much patience I had worked and experimented on the subject, I could *never have approached* the completeness of his book, its vast accumulation of evidence, its overwhelming argument, and its admirable tone and spirit.
- I really feel thankful that it has *not* been left to me to give the theory to the world. Mr. Darwin has created a new science and a new philosophy; and I believe that never has such a complete illustration of a new branch of human knowledge been due to the labours and researches of a single man.
- Never have such vast masses of widely scattered and hitherto quite unconnected facts been combined into a system and brought to bear upon the establishment of such a grand and new and simple philosophy.” [*My Life*, 1905 I: 374.]

Darwin → Bates: 3 Dec. 1861

- “Some are born with a power of good writing, like Wallace; others like myself & Lyell have to labour very hard & slowly at every sentence....I was a *little* disappointed in Wallace’s Book on the Amazon; hardly facts enough....Many thanks for Wallace’s letter; he rates me much too highly & himself much too lowly....But what strikes me most about Mr. Wallace is the absence of jealousy towards me: he must have a really good honest & noble disposition. A far higher merit than mere intellect.”

Darwin → Hooker: 9 May 1863

- “I do not believe there are above half-a-dozen real downright believers in modification of Species in all England: certainly not more who speak out. The only honest downright ‘flat-footed’ men in all England!!! Darwin, Hooker, Huxley, Wallace, Lubbock, Bates.”

Hooker → Darwin: 14 May 1864

- “I have just received Wallace’s [1864] anthropological paper & read ½ & am amazed at its excellence... I am struck too with his negation of all credit or share in the Natural Selection theory – which makes me think him a very high-minded man. I am burning to know your opinion of the paper.

Darwin → Hooker: 22 May 1864

- “I have now read Wallace’s paper on Man, & think it **most** striking & original & forcible;... I quite agree about his high-mindedness, & have long thought so; but in this case it is too far & I shall tell him so. – I am not sure that I *fully* agree with his views about man; but there is no doubt, in my opinion, on this remarkable genius shown by this paper.”

Darwin → Wallace: 28 May 1864

- “...but you ought not in the Man paper to speak of the theory as mine; it is just as much yours as mine. One correspondent has already noticed to me your “high-minded” conduct on this head.
- The great leading idea is quite new to me, viz that during late ages the mind will have been modified more than the body; yet I had got as far as to see with you that the struggle between the races of man depended entirely on intellectual & *moral* qualities.”

Wallace → Darwin: 29 May 1864

- “You are always so ready to appreciate what others do, & especially to overestimate my desultory efforts, that I can not be surprised at your very kind & flattering remarks on my papers.”

- "...the external characteristics of the chief races of man must I think be older than his present geographical distribution..."
- "As to the theory of "*Natural Selection*" itself, I shall always maintain it to be actually yours & yours only. You had worked it out in details I had never thought of, years before I had a ray of light on the subject, & my paper would never have convinced anybody or been noticed as more than an ingenious speculation, whereas your book has revolutionized the study of Natural History, & carried away captive the best men of the present Age. All the merit I claim is the having been the means of inducing *you* to write & publish at once."

Wallace → Darwin: 30 Aug. 1868

- "Darwinianism was in the ascendant at Norwich [BAAS meeting]; (I hope you do not dislike the word, for we really *must* use it, —) and I think it rather disgusted some of the parsons, joined with the amount of *advice* they received from Hooker & Huxley."

Hooker: BAAS 1868 Presidential Address

- Referred to Wallace as "Mr. Darwin's true knight," and complimented his modesty.

Wallace → Darwin: 20 Jan. 1869

- "It will give me very great pleasure if you will allow me to dedicate my little book of Malayan Travels to you, although it will be far too small and unpretending a work to be worthy of that honour." [Fig. 3]

Darwin → Wallace: 22 Jan. 1869

- "Your intended dedication pleases me much & I look at it as a *great* honour & this is nothing more than the truth."

Darwin → Wallace: 5 March 1869

- "I was delighted at receiving your book this morning.... Blessings on you & your publisher for having the pages cut & gilded. — As far the Dedication, putting quite aside how far I deserve what you say, it seems to me decidedly the best expressed dedication, which I have ever met.... The dedication is a thing for my children's children to be proud of."

Darwin → Wallace: 22 March 1869

- "I have finished y^r book; it seems to me, excellent & at the same time most pleasant to read. That you ever returned alive is wonderful after all y^r risks from illness & sea voyages,... Of all the impressions which I have rec^d from y^r book the strongest is that y^r perseverance in the cause of science was heroic."

Wallace → Darwin: 24 Mar. 1869

- "Many thanks for your corrections in my book. It only shows what absurd errors a person having once written may go over & over again & never see." [Wallace responded to CD's comments]
- "In my forthcoming article in the 'Quarterly', I venture for the *first time* on some limitations to the power of natural selection."

Darwin → Wallace: 27 March 1869

- "I shall be intensely Curious to read the Quarterly: I hope you have not murdered too completely your own & my child."

Wallace (1869) *Quart. Rev.* 126: Geological Climates and the origin of species

- Wallace reviewed Charles Lyell's *Principles of geology* and *Elements of geology*. He

suggested that natural selection could not account for the human intellect, delicate hand movements, language, etc. Such features arose from “a Power which has guided the action of laws in definite directions and for special ends.”

Darwin → Wallace: 14 April 1869

- “I have been wonderfully interested by your article, & I sh^d think Lyell will be much gratified by it. ... Your exposition of Nat. selection seems to me inimitably good; there never lived a better expounder than you....but you are the only man I ever heard of who persistently does himself an injustice & never demands justice. Indeed you ought ... to have alluded to y^r paper in Linn. Journal...”
- “I presume that y^r remarks on Man are those to which you alluded in y^r note. If you had not told me I sh^d have thought that they had been added by some one else. As you expected I differ grievously from you, & I am very sorry for it. I can see no necessity for calling in an additional & proximate cause in regard to Man. But the subject is too long for a letter.”

Wallace → Darwin: 18 April 1869

- “I can quite comprehend your feelings with regard to my ‘unscientific’ opinions as to man, because a few years back I should myself have looked at them as equally wild & uncalled for....My opinions on the subject have been modified solely by the consideration of a series of remarkable phenomena, physical & mental, which I have now had every opportunity of fully testing, & which demonstrate the existence of forces & influences not yet recognised by science. This will I know seem to you like some mental hallucination,... I am in hopes that you will suspend your judgment for a time till we exhibit some corroborative symptoms of insanity.”

Darwin → Wallace: 26 Jan. 1870

- “But I groan over Man – you write like a metamorphosed (in retrograde direction) naturalist, & you the author of the best paper that ever appeared in Anth. Review.” [Wallace, 1864, *Origin Human Races*, argued that intelligence, morality, social instincts of humans formed by natural selection. Wallace (1869) said these characters required the guidance of a higher intelligence.]

Darwin → Wallace: 31 Mar. 1870

- “I must add that I have re-read y^r article in the Anthropol. Rev. [Wallace, 1864] & I defy you to upset y^r own doctrine.”

Wallace (1870) *Contributions to the theory of natural selection. A series of essays.* Macmillan, London

- [P 4 of Preface:] “I have felt all of my life, and I still feel, the most sincere satisfaction that Mr. Darwin had been at work long before me, and that it was not left for me to attempt to write ‘The Origin of Species’.”

Darwin → Wallace: 20 April 1870

- “I have just received yr book & read the preface. There never has been passed on me, or indeed any one, a higher eulogium than yours. I wish that I fully deserved it. Your modesty and candour are very far from new to me. I hope it is a satisfaction to you to reflect, – & very few things in my life have been more satisfactory to me – that we have never felt jealousy towards each other, though in one sense rivals. I believe that I can say this of myself with truth, & I am absolutely sure that it is true of you.”

Linnean Society 50th Jubilee of reading joint essays, Feb. 1908

- [Wallace was presented with Darwin/Wallace Medal containing both of their portraits.]
- "...I can only say that I would have been fully content with a lower place than that accorded me, and feel that I attained to the honour more from the accident of my having lived to see the Celebration, than from any idea that I could have the slightest claim to be placed on anything approaching a level with Darwin." (*My Life*, 2nd ed., 1908: 397).

Who's who?

Bates, Henry Walter. 8 Feb. 1825-16 Feb. 1892. Naturalist, entomologist. Explored Amazon with A.R. Wallace 1848-50 and alone until 1859. Author of *Naturalist on the River Amazons* (1863). Developed concept of protective coloration now known as Batesian mimicry. Assistant Secretary of the Royal Geographical Society of London, 1864-92. FRS, 1881.

Blyth, Edward. 1810-1873. Curator of Zoology at Museum of Asiatic Society of Bengal, Calcutta 1844-1862. Called Darwin's attention to Wallace's 1855 paper. Returned to England and continued to write on zoological subjects and the origin of species.

Gladstone, William Ewart. 29 Dec. 1809-19 May 1898. Statesman, four times Prime Minister 1868-74, 1880-85, 1886, 1892-94. Considered greatest British statesman of 19th century. Visited Down House with T.H. Huxley 1876. Arranged Civil List pension for A.R. Wallace at CD's request 1880. FRS 1881.

Gray, Asa. 18 Nov. 1810-30 Jan. 1888. Botanist. Professor at Harvard 1842-72. First met CD at Hunterian Museum in London in 1839. CD's strongest supporter in America. Visited and stayed at Down House 24 Oct. 1868. Lifelong correspondent and friend of CD. CD dedicated *The Different Forms of Flowers* to "Professor Asa Gray ...As a Small Tribute of Respect and Affection". Author of *Manual of Botany of Northern United States* (Gray's Manual) 1848 and *Darwiniana* 1876.

Hooker, Sir Joseph Dalton. 30 Jun. 1817-10 Dec. 1911. Botanist. CD's closest friend and confidant. Assistant surgeon on Antarctic expedition of James Clark Ross 1838-43, published botanical results. Collected plants in Himalayas 1848-50. Specialist in plant taxonomy and plant geography. FRS 1847. President of Royal Society 1873-8. Knighted 1878 as K.C.S. I (Knight Commander of the Order of the Star of India). This honor is limited to 60 individuals and reflects service under hardship. Son of Sir William Hooker whom he succeeded as director of Royal Botanical Gardens (Kew Gardens) 1865-85. Supplied many botanical specimens to CD from Kew Gardens. CD and Hooker exchanged about 1400 letters. Helped Charles Lyell organize the joint reading of CD's and Wallace's paper at Linnean Society in 1858. Was pall bearer at CD's funeral 1882.

Huxley, Thomas Henry. 4 May 1825-29 Jun. 1895. Zoologist, comparative anatomist. Earned nickname of "Darwin's Bulldog" for his staunch defense of Darwin at Oxford debate with Bishop Samuel Wilberforce in 1860 and in published articles. Surgeon on HMS *Rattlesnake* 1846-1850 surveying east coast

of Australia. Studied marine invertebrates. FRS 1851. Lecturer/Professor, Royal School of Mines 1854-84. Hunterian Professor, Royal College of Surgeons 1862-9. Fullerian Professor of physiology at Royal Institution 1855-8, 1866-9. Close personal friend of CD from 1855. Frequent visitor to Down House. Was pall bearer at CD's funeral 1882. President of Royal Society 1883-1885. Author of *Evidence as to Man's Place in Nature* 1863, nine volumes of *Collected Essays* 1893-4.

Lubbock, Sir John, 4th Baronet. 30 Apr. 1834-28 May 1913. Banker, politician, naturalist. Son of elder Sir John Lubbock. Neighbor of CD until 1861. CD considered him a member of the family and trained his young neighbor in entomology and natural history. He became a strong supporter of CD and natural selection. He was elected as a Liberal Member of Parliament 1870 and 1874; became a spokesman for science. FRS 1858. Lubbock suggested that CD be given a Westminster Abbey funeral and helped organize the event. He was a pall bearer. Established the first Baron Avebury 1900.

Lyell, Sir Charles. 14 Nov. 1797-22 Feb. 1875. Geologist, lawyer. Geological mentor of CD, his close friend, correspondent, and supporter. Visited CD at Down House. Professor of Geology Kings's College, London 1831-3. President of Geological Society 1834-6, 1849-50. President of British Association for the Advancement of Science 1864. FRS 1826. Knighted 1848. Copley Medal 1858. Author of *Principles of Geology* 3 vol., 1831-3 which CD read during voyage of *Beagle*. Promoted uniformitarian geology. Paved the way for CD's acceptance in scientific society. Orchestrated the joint reading of CD's and Wallace's paper at Linnean Society in 1858. Traveled widely and published accounts of his visits to the United States. Author of *Elements of Geology* 1838, *The Geological Evidence of the Antiquity of Man* 1863.

Malthus, Thomas Robert. 13 Feb. 1766-23 Dec. 1834. Clergyman and political economist. Quantified the relationship between population growth and food supply in *Essay on the Principle of Population* 1798 which stimulated CD in 1838 (and A.R. Wallace 20 years later) to develop the concept of natural selection. FRS 1819.

Murray, John. 16 Apr. 1808-2 Apr. 1892. CD's main publisher from 1845. 50 Albemarle St. London. Personal friend invited to funeral of CD.

Silk, George. (18-19) Schoolmate, childhood friend and lifelong correspondent of Alfred Russel Wallace.

Acknowledgments

The remarkable *Correspondence of Charles Darwin* made the accounting of this intensely intimate exchange possible. The editors are to be commended for their extraordinary dedication and thoroughness. I am grateful to the Linnean Society for permission to use the portrait of Alfred Russel Wallace by Roger Remington, and I am very grateful to Elaine Charwat, Deputy Librarian, for the details of the painting.

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Johan Moræus – Book collector and Linnaeus' father-in-law

Laila Österlund,

Senior Librarian, Uppsala University Library

In the manuscript collections of The Linnean Society of London, a register of books can be found that was without doubt written by Linnaeus himself. It concerns a collection of books that once belonged to his father-in-law – Johan Moræus (1672-1742). It was probably written in great haste, with abbreviated titles, before the estate inventory proceedings following Moræus' demise in 1742 when Linnaeus visited Moræus' homestead, Sveden, near Falun in Dalecarlia, at the time of the funeral.

Johan Moræus was born in Falun in 1672. The name Moræus, based on the name of the parish of Mora in northern Dalecarlia, was adopted by his grandfather. He became fatherless at a young age, but was brought up by his uncle Jesper Swedberg, who at an early stage noticed his nephew's talent. At that time Swedberg was a regimental chaplain in Stockholm and he later became the Bishop of Skara. In preparation for Moræus' medical studies, Swedberg arranged an apprenticeship for him at a chemist's shop in Stockholm. This position gave him a sound grounding in pharmaceutical preparation which was of great use in his future profession as physician.

The Linnean Society's collections hold a notebook - a *Vademecum* - that belonged to Moræus. On the inside cover the words "J. Moræus 1692" are written showing that he started making notes during his apprenticeship at the chemist's. In those days a large quantity of prescriptions circulated between physicians. It was common that a physician kept his own register of prescriptions written down in a pocket sized notebook.

Moræus, even at that early stage had already collected a great number of medical books but like many other learned men in Uppsala, he lost most of them in the great fire in 1702.

Before he began his university studies in Uppsala in 1697, Moræus held a position as a private tutor to Swedberg's children. At the time Swedberg was a professor of theology. Among the children was Moræus' cousin Emanuel, who would later be known as the scholar, philosopher, theologian, interpreter of the bible and Christian mystic Emanuel Swedenborg.

Swedberg continued to support his nephew before his medical studies abroad where he would gain his degree in medicine. At this time there was no such possibility in Sweden. However before setting out on his Grand Tour of Europe, Moræus presented *pro exercitio* (for practice) a dissertation, *De Vitriolo*. Vitriol is the historical name for *sulphuric acid*. In the dedication Moræus mentions his uncle with gratitude. During his studies in Leiden, he had the benefit of having the renowned Herman Boerhaave, professor of botany, medicine and chemistry, as a teacher. During Moræus' years abroad he rebuilt his reference library, the one that was eventually to be organised by his son-in-law. The books often contain notes about date and place of acquisition, mostly in Holland.



Johan Moræus. Portrait by unknown artist. Photo: Tommy Westberg. UU Art Collections

From Holland his Grand Tour went via Paris to Reims, where after due examination, *pro gradu*, he received his doctorate in 1705. The conferrer of the doctoral degree was Gilles Culoteau M.D. Moræus' dissertation, entitled *De Hydrope*, dealt with dropsy. Today Reims is the regional capital of the Champagne-Ardenne region in France.

Whilst in Europe Johan Moræus assisted *Erik Benzelius the younger* (1675-1743) – a prominent university librarian and subsequently the Archbishop in Uppsala – by providing his old Alma Mater with literature on demand.

Once back in Sweden, Moræus began his professional career as a district medical officer in the county of Skaraborg, later he became a doctor for the miners in Stora Kopparberg and finally the town medical officer of Falun. He settled down with his family in Falun at his mother's ancestral farm Sveden, where among others Linneus' future wife Sara Lisa was born in 1716.

In 1720 Moræus became a member of the *Collegium Medicum* and was elected as a member of *The Royal Swedish Academy of Sciences* in 1739. The fact that the Academy's original president – Linnaeus – had married *Sara Elisabeth Moræa* alias *Sara Lisa* (1716-1806) the same year probably had some bearing on this appointment.

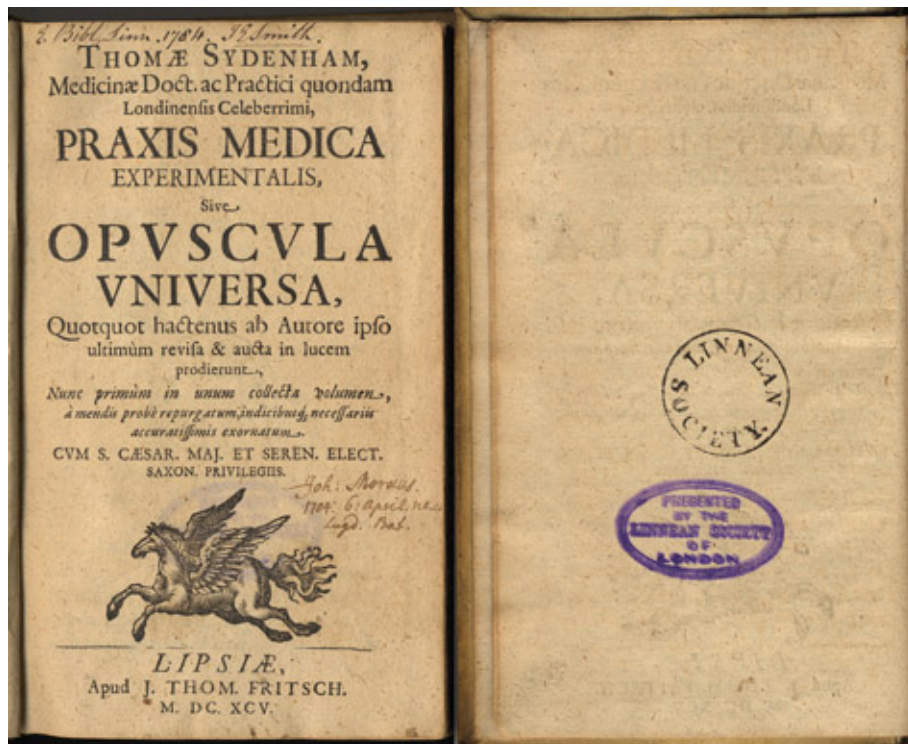
Johan Moræus himself did not write very much. There are two papers in the Academy archive that demonstrate his knowledge of natural history. In one paper he competently describes a case of intoxication with fatal outcome caused by eating a poisonous plant – *Aconitum Napellus* (*Aconite*). The article was published in *Kongliga Svenska Vetenskaps-Akademiens Handlingar (KVAH)* Vol. 1, 1739.

In the other paper, in *KVHA*, vol. 3, 1742, on farming, Moræus describes how to make a meadow from forest land and how to manage the meadow to make it yield a good hay harvest before making it into a field for crops. Today we know this procedure as crop rotation. Not long after the publication of the paper in 1742, Moræus passed away after 33 years as an active physician.

Johan Moræus' book collection contained about 450 volumes and, apart from the classical Greek and Roman authors, consisted of works in medicine such as anatomy, surgery, chemistry, pharmacology, botany and obstetrics. There are also some works on theology, philosophy and philology. Moræus' collection is considered of high medical and cultural quality. As for the medical literature, Arvid Hjalmar Uggla states that "As far as the pure medicine is concerned, a variety of the competing trends appear to be represented and in those days the library certainly corresponded to what a well-informed physician should be familiar with".

When Carl Linnæus the Younger or Linnæus Filius (L.f.) (1741-1783) passed away in 1783 his mother Sara Lisa was still alive, living together with her two unmarried daughtersⁱ and a granddaughterⁱⁱ. As for the matter of inheritance, Linnæus himself had his daughters' future in mind at an early stage. He willed his legacy to be sold to the highest bidder.

The entire collections of Linnean books, manuscripts and specimens were eventually purchased by Sir James Edward Smith, the founder of the Linnean Society of London and shipped to London in 1784. Johan Moræus' residual library was included in



Title page with provenances by Johan Moræus and J. E. Smith (recto) and stamps of The Linnean Society of London (verso)



Johan Moræus' Doctor's Diploma from 1705.

these collections. Johan Gustaf Acrel (1741-1801), a professor of medicine at Uppsala University and a close friend of the Linnean family, conducted the negotiations. After Smith's decease all the collections were sold to The Linnean Society of London by his widow.

From a letter sent by The Linnean Society of London dated the 4th October 1894 to The Royal Swedish Academy of Sciences, we learn that the Society wished to return certain parts of the Linnean book collection to Sweden. The reason for this was that the medical books did not align with the purpose of the Society. A great number of the medical books had originally belonged to Moræus. To Linnaeus and his contemporaries some of these books might have appeared a bit old fashioned, but for us they provide interesting information on the state of medicine a generation before Linnaeus. The shipment to Sweden contained about 300 works and apart from Moræus, provenances from Linnæus and Smith can be found in many of these books.

To start with the collection was held at the library of The Royal Swedish Academy of Sciences in Stockholm. Eight years later, in 1902, Theodor Magnus Fries, professor of botany and supervisor of Linnæus' estate of Hammarby outside Uppsala, applied for a transfer of the collection to Hammarby in order to keep it as state property. This was granted with the provision that the Academy and the Karolinska Institutet, the medical university in Stockholm, were permitted to select works for their own libraries.

The way they had been kept and handled earlier had proved detrimental to the books and they were transferred to Uppsala University Library in the late 1970s. In

preparation for the Linnean Tercentenary in 2007, the Riksbankens Jubileumfond granted financial means for the preservation of the books. This work has been carried out by the Section for Preservation at Uppsala University Library.

ⁱ Lovisa (1749-1839), Sara Christina (1751-1835)

ⁱⁱ Sara Elisabeth Bergencrantz (1766-1846)

The conservation of the collection from Hammarby

Adam Larsson

Bookbinder, Uppsala University Library

The collection consists of 400 volumes, divided in three major parts: vellum bindings, leather bindings and sewn text blocks with or without a paper wrapper. There were also a small number of unbound pamphlets and small prints. Apart from normal damage from handling and time, the collection was also heavily polluted due to previous storage.

Illustration I (right)



Vellum bindings

The 91 vellum bindings were all in very good structural condition and only two rebackings were necessary. An overall cleaning of the vellum was done using the foam from a liquid leather dressingⁱ, care had to be taken not to lose any valuable written information on the bindings. The edges of the text block were cleaned using dry cotton swabs.



Illustration 2: Linné 117 before



Illustration 3: Linné 117 after



Illustration 4: Linné 125 before



Illustration 5: Linné 125 after

Leather bindings

Of a total of 116 half- and full leather bindings 40 rebackings were done. The majority of the bindings were originally bound in calfskin. Archival quality calfskinⁱⁱ, coloured to match the original leather, was used for the rebackings. All the parts from the original binding were re-attached on the new spine.



Illustration 6: Linné 116:1 before



Illustration 7: Linné 116:1 after

Partial repairs on the headcap, joint or corner were done to more than 30 of the bindings. Japanese paper, coloured to match the leather, was used for those repairs. After the repair had dried, a thin coat of an acrylic polymer wax was appliedⁱⁱⁱ.



Illustration 8: Linné 2:24 before (left)

Illustration 9: Linné 2:24 after



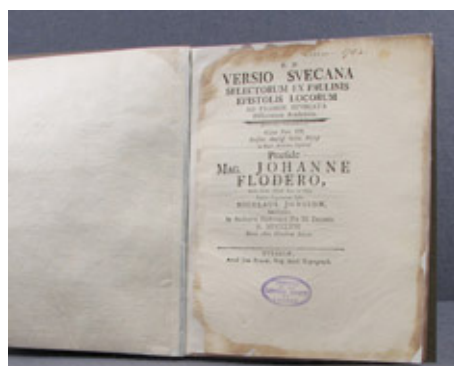
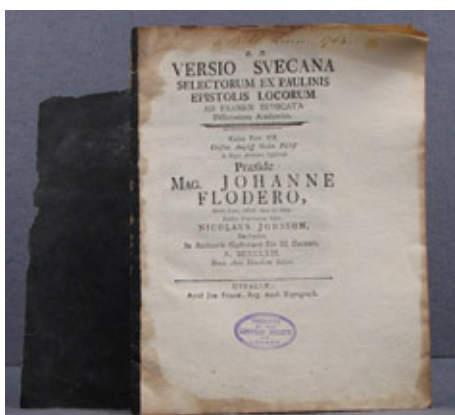


Illustration 10: Linné 2:40 before (left)

Illustration 11: Linné 2:40 after

The bindings were cleaned with dry cotton swabs and in cases with very dry and cracked leather a thin coat of leather dressing was applied^{iv}.



Illustration 12: Linné 2:135 after



Illustration 13: Linné 2:135 after

Sewn text blocks with or without a paper wrapper

This part of the collection was the largest, more than 150 volumes, and also the part that needed most conservation treatments. Almost every item from this part did go through some sort of conservation treatment. Dry cleaning and in some cases wet cleaning, paper repairs, re-sewing and adding supportive covers were some of the treatments used for this part of the collection. As much as possible of the original binding material was re-used. Care was taken not to lose any written, or printed information regarding their provenance.

Apart from the above-mentioned groups, there are also a small number of books that have been bound or rebound in modern times. Apart from cleaning, these books had no need for other treatments. Books-shoes were made for the whole collection before re-installing it on the shelves. The conservation of the Linnéus collection was done during 2007 at the Section for Preservation of the Uppsala University Library, Sweden



Illustration 14: Linnéus collection at Uppsala University Library

Footnotes

ⁱ “Maroquin-Lederbalsam,” manufactured by Maroquin, Germany

ⁱⁱ Archival Book Calf, J Hewit & Sons Ltd, Edinburgh

ⁱⁱⁱ Don Etherington, “Japanese paper hinge repair”, New Horizons’, DB conference, Oxford 1995

^{iv} Two leather dressings were used; “Cire 213”, BNF, France and “Leather Preservation & Cleaning Wax”, J Hewit & Sons, Edinburgh

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Fredbärj, Telemak. 1962. Johannes Moræus, Linnæi svärfader. Svenska Linnésällskapets årsskrift. 45:103-127.

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Uggla, Arvid Hj. 1945. Ett läkarebibliotek från början av 1700-talet. In: Donum Grapeanum. Pp. 221-248.

Book Review

Ascomycetes in Colour. Found and photographed in mainland Britain

Peter I. Thompson. Xlibris publishing. 367 pp.

Those fungi that bear their spores in sac-like asci – the Ascomycota – comprise an extraordinarily varied group with thousands of species. Yet they tend to be neglected by naturalists, who are often only aware of the largest members of the group such as morels, the ‘fairy cups’ (*Peziza*) or, of course, that queen of comestibles, the Perigord truffle. This is to overlook a wonderful array of coloured cups, discs, and spheres, as well as less showy black crusts, and tiny flasks immersed in wood, stems or leaves. They deserve to be better known.

One of the problems has been the lack of guide books with coloured illustrations. R.W.G. Dennis’s standard work on *British Ascomycetes* did have a number of watercolour illustrations, but they were sometimes rather schematic, and most figures were drawings. Ellis and Ellis’s magisterial *Microfungi of Land Plants* (1985) used only line drawings, and might seem rather intimidating to the uninitiated. The only work that invites comparison with Peter Thompson’s new book is Breitenbach and Kränzlin’s first volume of *Fungi of Switzerland* (1984) which described 390 species with excellent colour photographs and drawings of the microscopical characters. However, Thompson’s book almost doubles the number of species (700), and there is relatively little overlap between the two books, applying to common species. Each species carries a description, including that of the microscopic characters that are usually essential before a really confident identification can be made. Thompson also gives us a sketch of the spores, and of features such as marginal hairs, which are important in discriminating genera. The taxonomy is up-to-date, which is necessary since a number of the genera used by Dennis, such as *Dasyscyphus*, have now been greatly subdivided. It really is a most useful book. Many ascomycetes have to be ‘spotted’ in the field using a hand lens, and they then have to be brought back for microscopic examination; one can imagine Thompson’s book taking an honoured place alongside the other handbooks in the quest for an identification. It is still possible for the amateur mycologist to make an important contribution to knowledge of the lesser-known species, and this book will be an important tool in the process, quite apart from the pleasure to be derived from studying some of the more exquisite fruit bodies.

Ascomycetes in Colour is provided with a very comprehensive index, including synonyms. The systematic order is a fairly standard one for Mycota, but it would have been useful to have some higher taxon listed on each page, Family or Order perhaps, to help the beginner orientate himself among the bewildering array of fungi. The magnification of the illustrations is very different from one species to another, and the only way of determining the life size of the species concerned is from the maximum size given in the text – perhaps a simple (x10 or whatever) would have been simpler to use. But these are minor nitpicks on a serviceable and lasting achievement.

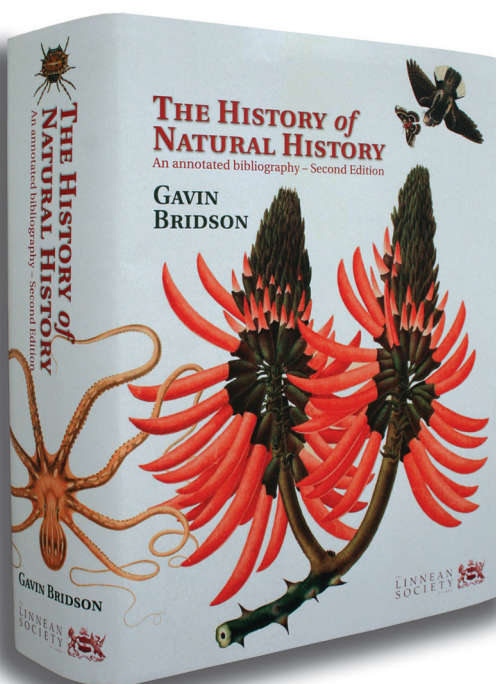
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THE HISTORY of NATURAL HISTORY

Second Edition

GAVIN BRIDSON



THE HISTORY OF NATURAL HISTORY (Second Edition) by **Gavin Bridson**, is an essential source of information for scientists, researchers and enthusiastic amateurs. This annotated bibliography, the only one to encompass the entire subject area, provides a unique key to information sources for this wide-ranging subject. This revised and greatly updated edition was published by The Linnean Society of London in October 2008, priced **£65 (+ p&p)**.

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225th Anniversary Meeting of the Linnean Society

**held at RAS, Burlington House, Piccadilly, London W1J 0BF
at 4.00 pm on Friday 24th May 2013**

1. The President took the Chair and welcomed 90 Fellows and their 14 guests to the meeting, which was held at the Royal Astronomical Society due to the ongoing lift building works in the Society's rooms. Capacity constraints at RAS meant that some Fellows had to use the overflow space in the RAS library, to which the meeting was beamed.

2. Apologies had been received from: Sylvia Phillips, Alastair Land, Tom Richards, John Allen, Brian Ford, Philip Willenbrock, Mike Claridge, Richard Bodenham, Gina Douglas, Pamela Le Couteur, Sara Churchfield, Hilke Ruhberg, David Hardman, R J Berry, Paul Leonard, David Rapport, Margaret Wright, Paul Raven, Charles Dewhurst, S J Hawkins, Ian Caldwell, Crispin Tickle, Ken Allen, William Chaloner, Ruth Temple, John and Jacqueline St Quinton, Sara Oldfield, Roger Cutcliffe and Tom La Dell.

3. Admission of Fellows. The following signed the Obligation in the Roll and Charter Book and were admitted Fellows: Hugh JONES, Michael RIBBANDS, Benjamin BATHER, Mike ALLEN, Ray CANNON, Barry GARDINER MP, Andrew POWELL, Kingsley DIXON and William RICHARDSON.

4. The Minutes of the Meeting held on 18th April 2013 were accepted and signed.

5. Appointment of Scrutineers. The following were appointed as scrutineers; Dr Mary Morris, Dr Alan Brafield and Dr Brian White.

6. Ballots. Fellows voted in the ballots for Members of Council, the Officers, and for Fellows and Associates.

7. Citations and Presentations of Medals and Awards

The President drew attention to the fact that relatively few nominations had been received for the 2013 medals and awards, and urged Fellows to ensure that nominations for 2014 were submitted by the due date of November 30th 2013. She was delighted however with the quality and worthiness of the 2013 awardees, citations for whom follow below:

a. The President presented the **2013 Linnean Medal in the field of Botany** to **Professor Kingsley Dixon**. The citation was read by *Scientific Secretary, Dr Sandra Knapp*:

“Professor Kingsley Dixon is a world-renowned plant conservation biologist whose work spans such diverse fields as restoration ecology, germination and mycorrhizal biology, conservation genetics, seed storage, micropropagation and cryopreservation. Notable areas of research include the role of smoke and its constituents in germination in Mediterranean ecosystems, habitat restoration after mining activity and *in vitro* culture as a tool in conservation.

He was an early advocate of “integrated conservation” and one of the hallmarks of his work is the skill with which he stitches together different facets of study to produce coherent overviews of conservation biology in its broadest sense. During his time at Kings Park and Botanic Gardens he has developed a major research facility, now housing more than 40 researchers, all from an original team with just one technical scientific officer! He plays a significant role in training the next generation of plant biologists who will take on new challenges in plant conservation. He is also frequently called on to act as an advisor for new botanic gardens and restoration projects.

All this reflects Kingsley’s remarkable productivity: he has more than 300 publications, including four in *Nature* or *Science* and seven books; he has supervised 43 PhD students; and raised more than Aus\$13M in grant funding in the last 10 years.

His record of service to the scientific community is excellent and wide ranging. He has played important, often leading, roles in the International Society for Ecological Restoration, Global Partnership for Plant Conservation, Orchid Specialist Group of the Species Survival Commission, Australian Network for Plant Conservation, Australian Flora Foundation and Australian Orchid Foundation, among others. He has also served on several editorial boards.

In recognition of his skills and achievements, he was made a Permanent Visiting Professor at the University of Western Australia. Among other honours, Kingsley has been awarded three Golden Gecko Awards for Environmental Excellence and the Chancellor’s Medal from the University of Western Australia.

Professor Dixon is truly a great advocate for plant conservation in Western Australia and globally. His achievements make him an outstanding recipient of the Linnean Medal in the field of Botany for 2013”.

b. There was no award for the **2013 Linnean Medal in the field of Zoology**.

c. The President presented the **2013 Darwin-Wallace Medal** posthumously to **Professor Godfrey Matthew Hewitt**. The medal was collected on behalf of his family (who were unable to attend) by two of his former PhD students. The citation was read by **Professor Mark Chase, the Editorial Secretary**:

“Sadly, Godfrey Hewitt was taken ill suddenly and died before he knew that he was to be awarded the Darwin-Wallace medal. We are thus awarding this medal posthumously and it will be collected on behalf of his family by two of his former PhD students (Drs Magda Charalambous and Jeremy Dagley), as his son is unable to be here today.

Godfrey Hewitt’s unparalleled research into European phylogeography earmarked him as one of the seminal evolutionary biologists of the last four decades. He pioneered the use of molecular markers to study hybridisation and speciation, and his early work on hybrid zones forms the cornerstone of contemporary studies of hybridisation. His research progressed through three main phases: clines for B chromosomes, hybrid zones, and Quaternary phylogeography. Of several major research achievements in these areas, those of this last topic are the most significant and far-reaching. Phylogeography seeks to understand the geographic distribution of

lineages, genealogies and genes: probably no region on Earth is better understood than Europe with regard to its phylogeographic history, and no one has contributed more to that understanding than Godfrey Hewitt. Professor Hewitt's major insight was to see large-scale spatial patterns of genetic variation in Europe in the context of the continent's glacial history. Professor Hewitt did in large part train the current generation of evolutionary biologists working in hybridization and speciation, either directly as some of his more than 60 doctoral students or indirectly as students of his students. His dedication to field-based studies combined with insightful laboratory work has led to advances in understanding of the biology of organisms as diverse as trees, hedgehogs and grasshoppers. His papers not only provide the framework for ongoing phylogeographic studies in Europe, but they have also greatly influenced the development of the field of phylogeography worldwide.

Professor Hewitt trained an entire generation of British (now spread far and wide) evolutionary biologists; he was also active in undergraduate teaching and mentoring, as evidenced by his being awarded a Nature/NESTA prize for creative mentoring in 2006. He was an honorary professor in Spain and China, and served as the President of the European Society for Evolutionary Biology from 1999 to 2001. He was a much sought after speaker at international conferences. He served on editorial boards of nine journals as well as on many grant review panels and science committees, in both Britain and Europe. It is particularly fitting that we award the Darwin-Wallace medal in this Wallace anniversary year to one whose far-reaching influence on the field of biogeography has been equivalent to that of Wallace himself".

d. There was no **2013 HH Bloomer Award**.

e. There was no **2013 Bicentenary Medal**.

f. The President presented the **2013 Irene Manton Prize** to **Dr Janine Pendleton**. The citation was read by the *President*:

'Dr Pendleton's thesis is entitled 'Palynological and palaeobotanical investigation of the Carboniferous deposits of the Bristol Coalfield, UK: biostratigraphy, systematics and palaeoecology'. The main strength of the thesis is the interdisciplinary nature of the research, with Janine undertaking a comprehensive palynological study of the dispersed spores/megaspores/pollen and palaeobotanical study of plant megafossils. Such a combined palynological and palaeobotanical approach is rare as most workers tend to concentrate on one or the other. Both aspects (palynology and palaeobotany) were subjected to a detailed taxonomic treatment. Janine then applied novel statistical methods on the taxonomic database to reconstruct vegetation in the different palaeoenvironments by disentangling the influences of age, facies and palaeoenvironment. Janine has already published four papers emanating directly from her thesis, and more will undoubtedly follow.

Janine did her undergraduate degree in Geological Sciences in Leeds, and went straight onto her PhD at Sheffield. While at Sheffield, she provided scientific advice for an exhibit on the giant dragonflies and ecosystems of the Carboniferous for the Creswel Crags visitor centre, as well as giving a public lecture. She has also worked

with several local enthusiast groups in the Bristol Coalfield, passing on knowledge gained from her PhD work and providing continuing support for the establishment of geological walks and other related activities in the area. Since gaining her PhD, she is now a stratigrapher for PetroStrat Ltd and continues gaining knowledge of palynology throughout geological time. In fact, Janine had arrived by helicopter from a North Sea rig’.

g. The President presented the **2013 John C. Marsden Medal** to **Dr C. Haris Saslis Lagoudakis**. The citation was read by *Scientific Secretary, Dr Malcolm Scoble*:

“Dr Haris Lagoudakis’ thesis is entitled ‘Evolutionary perspectives on medicinal plant use’. It comprises an interpretation of ethnobotany by seeking to understand it within a phylogenetic framework and by exploring more objective methodologies than have been used to date. The work provides therefore significant new knowledge, and it is also an excellent example of innovative cross-disciplinary research. Dr Lagoudakis assembled huge data sets, analysed them carefully and wrote up his findings beautifully. The quality of his work is attested by the four publications already arising from his research, including one in *PNAS*, with a fifth in preparation, also for that journal.

Haris Lagoudakis graduated with a BSc in Biology in Greece in 2006 and came to London that year to study for the joint Imperial College and Natural History Museum’s MSc in Advanced Methods in Taxonomy and Biodiversity. His MSc research was carried out in the Jodrell Laboratory at Kew and his PhD was through the University of Reading and Imperial College London, but funded by the John Spedan Lewis Foundation. Currently he works as a post-doctoral fellow at the Australian National University in Canberra, studying the evolution of salt-tolerant plants, while his broader research interests encompass biological and cultural evolution, systematics, biogeography, community ecology, ethnobiology and phylogenetic approaches to the sustainable utilisation of untapped biodiversity resources. He is an editorial board member of the *Academia Journal of Medicinal Plants*. This year he was awarded a significant Marie Curie Intra-European Fellowship, for €221k, to work on Biodiversity Altitude. Dr Lagoudakis is a most worthy recipient of this, the second, John C. Marsden Medal”.

h. No award was made in respect of **Jill Smythies** in 2013.

8. The Treasurer presented the **Accounts for 2012**. These are to be found in the 2012 Annual Report which had been mailed to all Fellows in mid-April. He expressed special thanks to the Society’s Journal Editors and Publishers whose continued conscientious commitment secured the Society’s main revenues.

A background slide announced the launch of the Society’s new look for the Online Collections, which had been achieved through JISC funding with the Society’s platform provider ULCC, to considerably improve the look, feel and functionality of the Online Collections. With this new version, the Smith Herbarium was now also freely available online, and the Alfred Russel Wallace Notebooks Collection would follow in June.

9. Professor David Pye, a member of the **Audit Review Committee** read the following statement. “In accordance with Bye-Law 12.6, the Annual Statement of Accounts for 2012, and the report of the professional auditors, were carefully examined by the Audit Review Committee of Fellows on 11th March 2013. 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 2012. I therefore move that they be accepted”. This was carried unanimously on a show of hands.

10.

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.

c. The Treasurer expressed his thanks to all the staff for their commitment and hard work in the very trying conditions during the building work.

11. The President gave her address on “Plants invade the land! What happened next?” The President, who is a Professor in Cardiff University School of Earth and Ocean Sciences, recapped on how plants had invaded land, from microbial mats through bryophytes and lichens in the Ordovician (c.450 Ma) and lycopods and other vascular plants from the Lower Devonian. There had been a large downward trend in atmospheric CO₂ in the mid-Palaeozoic, thought largely due to accelerated silicate weathering associated with CO₂ increases in the lithosphere generated by rooted vascular plants. To test this hypothesis, trays of rootless bryophytes and *Psilotum*, plus *Equisetum* as an analogue for rooted plants, were grown at ambient and elevated CO₂ concentrations in a controlled environment facility, but only the latter showed substantial CO₂ increases in the leachate. The President then presented the direct evidence for the appearance of animals in the Silurian and Devonian (e.g. tracks in sandstone in WA, scutigeromorph appendages in UK, and trigonotarbid, a model of which had been reconstructed by Nigel Trewin). Indirect evidence for animals was provided by the fossil remains of plants damaged by animals eating them (e.g. *Psilophyton* wounding in the early Devonian of Canada, hypertrophy of parenchyma and darkening in the Rhynie Chert, which preserved early plants in cellular detail) and the fact that plants developed spines as possible defence mechanisms against being eaten by animals. The Cardiff team had conducted feeding experiments in millipedes to demonstrate their preferred mode of feeding by analysing their faecal outputs, the latter comprising pristine spines, but macerated tissues. The President completed her presentation by showing the food web of life in the Lower Devonian compared with extant examples.

12. On behalf of the Fellows, Professor Gren Lucas thanked the President for her interesting and highly informative talk.

13. Results of the Ballots

a. The following were elected to Council: Professor Anthony Campbell (polymath), Dr Mark Seward (lichenologist), Professor Simon Hiscock (botanist) and Dr Michael Wilson (entomologist).

Details of these new Council members can be found in The Linnean Society of London Anniversary Meeting 2013 Council Agenda and Council Nominations, circulated with The Linnean in April 2013. These nominations were for Fellows to replace Professor Geoffrey Boxshall, Mr Alastair Land, Mr Brian Livingstone and Dr Sara Oldfield. The President thanked outgoing Council members for their services to the Society.

b. The Officers elected were: President, **Professor Dianne Edwards**; Treasurer, **Professor Gren Lucas**; Collections Secretary, **Dr John David**; Editorial Secretary, **Dr Mark Chase**; Scientific Secretary, **Dr Sandy Knapp**; and Scientific Secretary, **Dr Malcolm Scoble**.

The President thanked the out-going Collections Secretary, **Susan Gove**, for her commitment over the past nine years, presenting her with a bouquet of flowers, and Susan responded by saying that she had greatly enjoyed the role, seeing the Society through a period of significant change.

c. The Fellows were elected as on the 24th May 2013 ballot list.

14. Names of Vice-Presidents

The President, Professor Dianne Edwards, named her **Vice Presidents** for the coming year as **Dr Janet Cubey**, **Dr Malcolm Scoble**, **Professor Simon Hiscock** and **Dr Sarah Whild**.

15. Any other valid business

The President noted the dates of forthcoming meetings.

The next evening meeting would be on **Thursday 20th June** when Dr Rich Boden would be speaking on 'Life without light: the natural history of Movile Cave, Romania – from microbes to arthropods'.

The President also drew attention to the 2-day '**Wallace Celebration Event**' being held in Bournemouth 7th-8th June 2013, as well as the **Conversazione** on 21st July, which is being held at Hergest Croft Gardens in Herefordshire. Registration is required for both these meetings.

The next Anniversary Meeting will be on **Friday 23rd May 2014 at 4pm**.

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

There being no other valid business, the President declared the meeting closed and invited those present to join her for the reception being held in the RAS library upstairs.

Birkbeck Lectures

Supported by The Linnean Society

Autumn Series: “Invertebrates and us – the good the bad and the ugly.”

Fridays 11th October to 15th November, lecture theatre B33, downstairs in the Birkbeck main building, entrance off Torrington Square. Starting at 6.30pm, followed by discussion finishing at 8pm. All free.

The Spring Series: “Management of wildlife habitat”

Friday evenings 14th February to 21st March 2014 - same venue and times.

For more details see: <http://www.bbk.ac.uk/environment/news/lectures>

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The Linnean Society of London offers a prestigious central London venue for meetings, conferences and lectures with facilities for meetings of up to six people, board meetings of up to 40 or lectures for audiences of 100. Rooms are available at surprisingly competitive rates.



The Linnean Society's meeting room
on the ground floor



The Linnean Society's Reading Room
on the first floor

For more information please get in touch with Tom Helps (tom@linnean.org)

Lifelong Learning

If you are looking for places that offer instruction in identifying and classifying organisms please look at the new page on the Education section of our website. Perhaps you are interested in attaining a specific qualification, or just want to take the family or grandchildren out to a one-day, educational event. You may even be looking for an easy-to-find, central place to send others with queries about studying taxonomy.

The Linnean Society Programme

At the Society's Meeting Room in Burlington House, Piccadilly, unless otherwise stated.

2013

21st-23rd ALFRED RUSSEL WALLACE AND HIS LEGACY

Oct ** Meetings: 9am-5pm: on 21st-22nd at the Royal Society
and on 23rd at Natural History Museum.

22nd Oct ALFRED RUSSEL WALLACE – THE COMPLEAT NATURALIST
Tues 6pm^{a**} Dr Sandra Knapp FLS

30th Oct Palaeobotany Specialist Group Meeting
Weds** CELEBRATING THE RHYNIE CHERT Day meeting: 10am-6pm

30th Oct The Darwin Lecture at the Royal Society of Medicine,
Weds** STEM CELL RESEARCH AND POTENTIAL APPLICATIONS TO
6pm THE TREATMENT OF EYE DISEASES Sir Martin Evans

31st Oct Palynology specialist group meeting: pollen and spore research
Thurs** Day meeting: 10am-5pm

13th Nov THE BRITISH CONSERVATION MODEL: UNAMBITIOUS,
Weds*** IRRATIONAL AND AFRAID OF NATURE?
6pm A debate between conservationists and rewilders.
Panelists: George Monbiot, Clive Hambler, Aidan Lonergan & Miles King FLS

27th Nov WILLI HENNIG (1913-1976): HIS LIFE, LEGACY AND THE
Weds** FUTURE OF PHYLOGENETIC SYSTEMATICS
Joint meeting with Systematics Association: 10am-7pm
Organiser Dr David Williams FLS

2nd Dec Founder's Day Lecture: SIR JOHN HILL AND LINNAEAN
Mon^a 6pm TAXONOMY IN GEORGIAN ENGLAND George Rousseau

9th Dec Christmas Party: 'You should ask Wallace'
Mon^{a**} 6pm A theatrical performance by Theatr na nÓg

Lectures at the Linnean Society for post-16 and undergraduate students 6pm:

10th Oct** Simon Watt "Dissections Uncut"

4th Nov** Prof Hilary Lappin-Scott 'How bacteria rule planet Earth'

2014

10-11th Jan British Lichen Society Symposium at the University of Nottingham
Fri-Sat** LICHENS: THEIR CLASSIFICATION, ECOLOGY AND USE AS
INDICATORS OF ENVIRONMENTAL QUALITY

For further details, please consult the Society's website www.linnean.org or to obtain a copy of the Programme Brochure, contact Samantha Murphy Samantha@linnean.org or the Society Office on 0207 434 4479. (Next election of new Fellows January 2014.)

** Registration required ^a Admission of elected Fellows

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