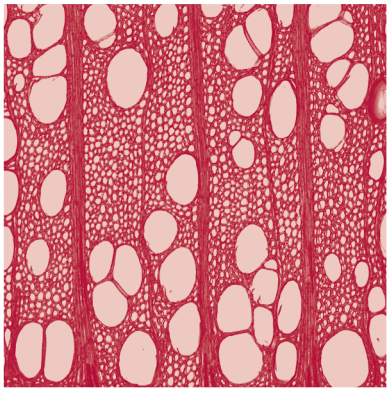
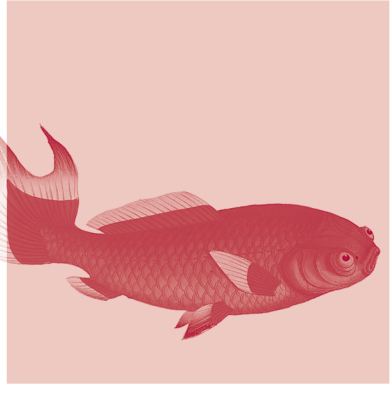
The LINNEAN SOCIETY of London

The Linnean





NEWSLETTER AND PROCEEDINGS OF THE LINNEAN SOCIETY OF LONDON

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A living forum for biology

THE LINNEAN SOCIETY OF LONDON

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Burlington House, Piccadilly, London W1J 0BF
Tel. (+44) (0)20 7434 4479; Fax: (+44) (0)20 7287 9364
e-mail: adrian@linnean.org; internet: www.linnean.org

THE LINNEAN

Newsletter and Proceedings
of the Linnean Society of London
Edited by B G Gardiner

ANNIVERSARY MEETING AGENDA

Wednesday 24th May 2006 at 5.00pm

1. Welcome to members and guests
2. Apologies for absence
3. Admission of Fellows
4. Minutes of the meeting held on 11th May 2006, which have been posted in the Society's Rooms
5. Third Reading of Certificate of Recommendation for Foreign Members and Fellows *honoris causa*
6. Appointment of three scrutineers
7. Ballots:
   (a) Ballot for members of Council (blue) *Names and details on separate paper*
   (b) Ballot for Foreign Members of the Linnean Society (*Norman Platnick and Claus Nielson FLS*: green)
   (c) Ballot for Fellows *honoris causa* (*The Rt Hon the Lord Cranbrook FLS, Desmond Morris and Jonathan Miller*: pink)
   (d) Ballot for Officers (yellow): *President and current officers list.*
   (e) Ballot for Fellows and Associates (white).
8. Citations and Presentations of Medals and Awards:
   Linnean Medal for Botany: *David Mabberly FLS*
   Linnean Medal for Zoology: *Richard Fortey FLS*
   HH Bloomer Award: *Eric Clement FLS*
   Bicentenary Medal for a botanist under 40: *Vincent Savolainen*
   Irene Manton Prize: *Yuki Yasumura*
   Jill Smythies Prize for botanical illustration: *Bobbi Angell*
9. Treasurer's Report
10. Motion to Accept Accounts for 2005
11. Appointment of Auditors for 2006
12. Presidential Address
13. Vote of Thanks
14. Results of Ballots and any casting votes
    (a) Council (b) Foreign Members (c) Fellows *honoris causa*
    (d) Officers i. President ii. Treasurer iii. Zoological Secretary
    iv. Botanical Secretary v. Editorial Secretary
    vi. Collections Secretary
    (e) Fellows and Associates
15. Names of Vice-Presidents
16. Any other valid business
17. Close

ADRIAN THOMAS
March 2006

Nominations for Council 2006

The terms of office of the following members of Council come to an end on 24th May 2006: Professor Gordon McGregor Reid, Dr J Sarah Churchfield, Dr John David, Mr Aljos Farjon, Dr Michael Fay, Dr Keith Maybury, Dr Brian Rosen and Dr Roger Sweeting. However to avoid a major change of membership in 2006, and subsequent imbalances in future years, Council agreed to accept offers by Mr Farjon, Dr Fay and Dr Maybury to remain on Council for a further year. That means there will be five vacancies and Council has nominated the following to fill them:

Shahina Ghazanfar (2003). Shahina Ghazanfar gained an MSc (Punjab) and a PhD (at Cambridge). Early in her career she contributed accounts of Convolvulaceae and other families for the Flora of Pakistan. She has subsequently worked in Oman, and also in Nigeria and Fiji. She is currently employed on the Flora of Tropical East Africa project at Kew. Her major publications include *An Annotated Catalogue of the Vascular Plants of Oman and their Vernacular names* and *Savannah plants of Africa: an illustrated guide* (1989). She has co-edited (with her husband Martin Fisher) *Vegetation of the Arabian Peninsula* (1998). Her other interests include art, particularly botanical illustration, and the use of plants in traditional medicine.

W M Alastair Land (2003). Alastair Land is a biology teacher at Winchester College. He read Natural Sciences at Cambridge, where he graduated with a First in 1994. Alastair taught biology at Eton College from 1994 until September 2003, when he moved to Winchester. He is actively involved in conservation and natural history appreciation of all sorts, from organizing the Biology Department's local field courses to leading expeditions to far-flung places. At Winchester, he has started a popular outreach and access collaboration between Winchester College and local primary and comprehensive schools. He is an enthusiastic speaker on many topics and has been a Fellow of the Linnean Society since 2003.

Mark Seaward (1973). Mark Seaward is Professor of Environmental Biology at the University of Bradford. He has a particular interests in lichens and pollution monitoring, and he has done research throughout the world, especially in Poland, where he has carried extensive environmental monitoring; his work relating to radionuclides has been invaluable in measuring the impact of the Chernobyl disaster. He is also interested in urban and industrial ecology, environmental education and environmental archaeology and has published widely. Mark Seaward recently received the title of *Doctor honoris causa* from the University of Wroclaw, Poland. He has previously served on Council from 1987–90, 1994–97 and 1998–2001.

George McGavin (2005). George McGavin is Assistant Curator of the Entomological Collections at Oxford Natural History Museum, and Lecturer in Biological and Human Sciences at Jesus College. His interests cover insect biodiversity, the insects associated with tropical tree canopies, especially in East African savanna systems, arthropod communities of caves and plant-insect interactions. He has recently been appointed Visiting Professor in Entomology at the University of Derby. He has published numerous papers and books on entomology, including the textbook "Essential Entomology". He is well known for his media appearances and was a scientific advisor for David Attenborough's series "Life in the Undergrowth".

Joe Cain (2000). Joe Cain is a senior lecturer in the history and philosophy of biology at University College London. His current research includes the history of evolutionary studies, the history of American science, and science's research infrastructure. His biographical interests include George Gaylord Simpson, Ernst Mayr, Theodosius Dobzhansky, and Carl Hubbs. He also undertakes research in teaching and learning practices in higher education. Joe Cain is a Scientific Fellow of the Zoological Society of London and President of the Society for the History of Natural History. He was formerly Associate Editor of *Archives of Natural History*.

Editorial

The main article in this issue concerns Louis Pasteur and his pioneering work on silkworm disease. Although Pasteur is best known for immunizing humans against rabies, he is also known for having resolved the problems associated with wine fermentation. Somewhat later it was suggested to him by Dumas, Professor of Chemistry at the Sorbonne, that he might turn his attention to the vexed problem of Silkworm disease, which was ravaging the silkworm nurseries of South-west France. The author of the article had recently been holidaying in the Cévennes in an old magnanerie (near Montpelier) owned by our librarian, when, in his own words, he was "stimulated to investigate Pasteur's contribution to the disease of silkworms". The article shows how Pasteur established the presence of intracellular corpuscles in diseased caterpillars. It concludes with the sad demise of the European silk industry thanks to the flooding of the markets by the Chinese and Japanese cheaper silk.

The second article is, in effect, a continuation of the Stephen Pace story which figured prominently in our January 2006 issue. Essentially it deals with the 1910 still-born concept of a Bureau of Marine Biology conceived by Pace and his wife Rose and administered from a temporary office on Haverstock Hill. In passing it points out how Pace tried to gain financial support from H.S.H. The Prince of Monaco. It also tells how Rose Pace returned to teaching at Campden School in order to support the family and how much later (1934–1945) she taught at Highgate School for Girls.

There is also a short article on Braad by Jeremy Franks, which in essence is a continuation of his three previous Linnean articles. Originally it had been intended for inclusion in the previous issue but there was insufficient space. It deals with Braad's investigation of possible trade between the Swedish East India Company and the Indian sub-continent. It also contains an autobiographical account of Braad's travels in western India and tells how the voyage was a great trading success and how his first super-cargo's share brought him enough to retire on.

The Picture Quiz features Robert Chambers and is a repeat of January 1996 (vol. 11(4)). It deals extensively with *Vestiges of the Natural History of Creation*, and its impact on contemporary thinking as summed up in the views of Darwin, Hooker, Wallace, Bates and Huxley. Despite a scathing review of *Vestiges* in 1854, Huxley and Chambers subsequently became firm friends. The final twist to the article is that both Chambers and Huxley attended the British Association Meeting at Oxford in June 1860. On the Friday evening (29 June) Huxley was having a final walk round the

town before leaving the following morning when, fortuitously, he bumped into his friend Robert Chambers who persuaded him to stay and to attend the final session on "Darwin and Society". The rest, as they say, is history for it prompted Huxley's most famous speech: "I asserted and I repeat, that a man has no reason to be ashamed of having an ape for his Grandfather." etc etc. As Francis Darwin wrote in 1861 "Huxley thereby sounded the war note for the battle of the Origin".

BRIAN GARDINER

Society News

Development News. I am delighted to report that work on digitising our Collections started in January and the Natural History Museum has already provided us with the first images of the Linnaean Herbarium specimens. We hope that work on the Linnaean insect collection will start very soon and we have already signed a contract for the digitisation of the Linnaean Letters – work will have started on them by the time you receive this. Thus we are now moving steadily towards our target of getting as much of our material as possible on the web.

As you will know it is thanks to the generosity of the Lisbet Rausing Charitable Fund that we are able to do what we are doing. We still need more resources though, not only to complete our digitisation project but also to complete the refurbishment of the building, and to establish a fund for taxonomy. It has been clear for some time that we shall need someone dedicated to development if we are to achieve our aims, and I said in the last Linnean that we would be recruiting for that. I am now very glad to announce that Elaine Shaughnessy FLS will be joining us as Head of Development at the beginning of May. Elaine has a long history of involvement with the Society and brings with her a broad range of skills. We very much hope that you will all offer her your full support in the formidable task she will be undertaking.

Building and Refurbishment Work. Most of the refurbishment work on New Burlington House is now complete and the contractors are on schedule to move out of the Courtyard at the beginning of June. The railings are being put back in place, resplendent in their original Victorian colours, and we hope that the hoarding on Piccadilly will finally come down in April.

Within the building there has been steady progress in the refurbishment of the second floor and the whole suite of rooms is already looking fresher and brighter while returning to a more appropriate period style. The project is running on schedule and should have been completed by mid-April. Shortly after that we shall be able to start work on the Meeting Room and then the Library Reading Room and Annexe. Inevitably this work will create dust and disruption and we do ask for your patience as the building work progresses.

Smith Herbarium. We are particularly pleased with the new Smith Herbarium in the basement – a very high-quality piece of work which we do encourage you to look at when you are here (please contact the Conservator or library staff beforehand as the room is kept locked for security). Recently we had a nice example of the treasures that it holds – we were able to respond immediately when the Royal Society of Chemistry

asked whether we had an example of the Ethiopian plant *Brucea antidysenterica*. Our specimen is dated 1782 and is probably derived from material brought back from Ethiopia by James Bruce a few years before. The Royal Society of Chemistry is using it to do a feature for a Parliamentary presentation on an Ethiopian student who is working on the medicinal properties of the plant.

Corporate Design. You will all have seen the fruits of our new corporate design on the cover of *The Linnean*. This is part of our plans to present a uniform and more up to date image of the Society. We welcome your comments, as well as suggestions of what images we might use. We shall of course aim to maintain a balance between the botanical and the zoological.

The List of the Linnean Society. I hope that Fellows have found the new edition of *The List* useful. We welcome feedback and would like to thank all those who have since contacted us with corrections to their addresses etc. It is always a challenge to make sure that our database is fully up-to-date, and we appreciate any information you can provide.

Fellows. We have been saddened to learn of the death of a number of Fellows, particularly Stella Ross-Craig whose obituary appeared in several national newspapers. Stella was not only the doyenne of British botanical artists but was also a Fellow of the Society for the extraordinarily long period of sixty-three years. Another sad loss is Bruce Ritchie, whose help in the Library laid the foundation for the electronic catalogue now accessible on-line. Both his daughters also worked as summer students in the Library so we have a strong family connection. A number of other Fellows who died recently have been Fellows for almost fifty years, which does show that we are a Fellowship that people join for the long term.

Staff. We shall be sorry to say goodbye to Dominic Clark, who has managed the office through a challenging period during the last eighteen months. Dominic will stay within the world of learned societies as his new job is with the London Mathematical Society. We are currently recruiting and hope to let you have details of his successor in the next issue of *The Linnean*.

Recent Lectures. Our regular programmes continue in spite of all the development work going on,. Wendy Moore started the year off in January with a very lively talk on John Hunter, the father of modern surgery, and a larger than life character with an insatiable curiosity. We were very pleased to have almost as large a gathering for the launch of the Synopsis volume on *Echinoderms*, a real labour of love which Eve Southward first started working on in the 1970s. We are grateful to her and her joint author, Andrew Campbell, for putting the subject in context in such a lively way in February.

Forthcoming Events. A number of Fellows will be giving talks over the next few months. Madeline Harley and Rob Kesseler will speak about Pollen on Wednesday 26th April, and we shall mark the Tercentenary of the death of John Evelyn with a talk on his legacy by Maggie Campbell Culver on 11th May. On 8th June Nigel Hughes will speak on Curassows in connection with an exhibition of his paintings and we shall participate in National Insect Week with a talk by Wuentin Wheeler on 22nd June. Please note however that the day meeting in May on Genomics has now been postponed to 2007.

ADRIAN THOMAS

Library

The Annual Report will include Library usage figures for the past year and the figures for the first months of 2006 will be included in the July issue. General Library use this winter and early spring included displays for Society general meetings, as well as for St Andrew's Day and the Chinese New Year, the Year of the Dog. We continued to have a wide range of pre-booked visiting groups to see the collections.

The book sale, after the Hooker Lecture on 8 December, resulted in the addition of £307 to the Library Funds, as well as a large number of new accessions selected from book sale contributions.

The cataloguing of both new accessions and older items has continued. Catalogue entries for books requiring changes to their shelf marks are being upgraded. This could be to their loan status, location or the creation of a new entry where two different copies of a work have been entered under one accession record, often when there is a later edition, or a multiple volume work. Much of this arises from re-shelving done during the summer of 2005 and will be a continuing task.

A drawing of *Roscoea* in the Buchanan/Hamilton collection and a book by Roscoe were displayed in an exhibition by the University of Liverpool Art Gallery in late 2005.

Volunteers continue to play an important role in the Library. Rita Dockery has been adding new entries to the past Fellows 'Limbo' database. Arthur Bell has made excellent progress with entering records for portraits into the Library catalogue and has now just reached the entries for Linnaeus. Jeanne Pingree has almost completed listing the papers of J.C. Willis, and some additional material presented by Prof. A. Hetherington has now been added. Iris Hughes continues to catalogue reprints whenever she is in London. Alan Brafield, John St Quinton and Enid Slatter are now helping with re-boxing manuscripts that have been in temporary storage since last February.

Reading Room temperatures were extremely low during most of January due to building work elsewhere, which required open windows and doors. Readers, staff and

volunteers had to adopt 'multi-layered' tactics to keep warm. Work on the upper floor has caused some noise and tracked dust into the galleries and stairs but the roof lights have now been cleaned to reveal the original engraved glass panels in some places.

GINA DOUGLAS

Donations December 2005 to January 2006

ALM London: BBC, *BBC Guide to researching your family history.* DVD. London, BBC Learning and Interactive, 2005.

Siddons, Isabel, *On the record, ALM London Archives strategy 2005–2008.* 12 pp., illustr., London, MLA, 2005. ISBN 0-9350930-3-1.

Dr. H. Amjad: Amjad, Hassan, *Dragonflies of West Virginia*, 162 pp. col. illustr., privately, Beckley, WV, 2005.

Amjad, Hassan, *Pomegranate: anatomy of a divine remedy.* 126 pp., illustr., some col., privately, Beckley,WV, 2003.

Brooklyn Botanic Garden: Hyland, Bob (Ed.), *Designing borders for sun and shade.* (Handbook 183) 199 pp., col. illustr. Brooklyn, Brooklyn Botanic Garden, 2006. ISBN 1-889538-71-X.

Prof. M.F. Claridge: Drousopoulos, S. & Claridge, M.F., *Insect sounds and communications.* 532 pp., illustr., (+CD), Boca Raton, CRC Press, 2006. ISBN 0-8493-2060-7.

Dr Keri and Claire Dalby: Dalby, D.H. & Dalby, C., *Shetland lichens.* 120 pp., illustr. some col., Lerwick, Shetland Amenity Trust, 2005. ISBN 0-954324 6 33.

M.J. Dawson: Dawson, M.J., *The red kite*. (Caliologists Series) 2nd edition, 83 pp. col. illustr., Brighton, Oriel Stringer, 1988. ISBN 0-948122-06-4.

Trobe, W.M., *The Merlin.* (Caliologists Series No. 8), 96 pp., col. illustr., Brighton, Oriel Stringer, 1990. ISBN 0-948122-09-9.

Gina Douglas: Minter, Sue, *The Apothecaries' Garden, a history of the Chelsea Physic Garden.* 166 pp., illustr., Stroud, Sutton, 2000. ISBN 0-7509-3638-X.

Vron, Nicole, *Monsieur Monod, scientifique, voyageur et protestant.* 631 pp., illustr., Arles, Babel, 2000. ISBN 02-7427-2900-3.

Christer Engström: Engström, Christer (series editor), *Mángfotingar, Myriapoda.* Vol. 2 of Naturnyckeln till Sveriges Flora och Fauna. 349 pp., illustr. some col., maps, Uppsala, ArtDatabanken/SLU, 2005. ISBN 91-88506-13-7.

Dr A.Farjon: Nguyen, Tien Hiep (and others), *Vietnam conifers, conservation status review 2004.* 128 pp., illustr. some col., maps, Hanoi, Fauna and Flora International, 2004. ISBN 1-903703-16.6.

Randall Keynes: [Darwin, Charles] *Darwin at Downe, nomination document for World Heritage Site.* 190 ppp., col. illustr., maps, Bromley, World Heritage Steering Group, [2005].

Dr. E. Leadley and Dr S. Jury: Leadley, E & Jury S. (Eds.), *Taxonomy and plant conservation*. 343 pp., maps, figs., Cambridge, Cambridge University Press, 2006.

ISBN 978 0 521 84506 9.

Sir Christopher Lever: Lever, C., *Naturalised birds of the world, illustrated by Robert Gillmor.* 352 pp., illustr., London, T. & A.D. Poyser, 2005. ISBN 0-7136-7006-1.

Ann Lindsay: Lindsay, Ann *Seeds of blood and beauty, Scottish plant explorers* 296 pp., illustr. some col., Edinburgh, Birlinn, 2005. ISBN 1-8418-3456.

Prof. S. Madríñán: Madríñán, S., *Flora illustrada del Parámo de Chingaza.* 163 pp., col. illustr., map, Bogotá, 2004. ISBN 958-33-68237.

Wendy Moore: Moore, Wendy, *The knife man.* 482 pp., col. illustr., London, Bantam Press, 2005. ISBN 0-593-05209-9.

Dr Mark Nesbitt: Prance, Ghillean & Nesbitt, Mark, *The cultural history of plants.* 452 pp., illustr., maps, New York, Routledge, 2005. ISBN 0-415-92746-3.

Real Jardin Botanico, Madrid: San Pio Aladrén, P. (ed.), *El Real Jardin Botánico de Madrid (1755–2005), Ciencia, Colección y Escuela.* 245 pp., col. illustr., Madrid, Lunwerg for CIC Real Jardin Botánico, 2005. ISBN 84-9785-255-9.

Royal Botanic Gardens, Kew: Dransfield, John & Patel, Meesha, *Rattans of Borneo, an interactive key* (CD-ROM), Kew, Royal Botanic Gardens, 2005. ISBN 1-84246-097-8.

Hoffman, Petra, *Antidesma in Malesia and Thailand.*292 pp., illustr., Kew, Royal Botanic Gardens, 2005. ISBN 1-84246-045-5.

Picture Quiz

The January Picture Quiz featured Robert Chambers (1802–1871) Edinburgh publisher and author of *Vestiges of the Natural History of Creation.*

Born at Peebles, the son of a prosperous muslin-weaver (who was eventually ruined by competition from machine looms) he started life with six fingers and toes. A subsequent badly performed surgical operation to remove the excess digits resulted in a slight lameness which precluded him from joining in normal boyhood pursuits and increased his inclination to study. By the time he was twelve years old the family had been reduced to poverty and had moved to Edinburgh where he lodged with his elder brother William (1800–1883), and for the next two and a half years attended a small, classical academy where he acquired a fair knowledge of Latin. Obliged to leave school at 15 he worked for a short period as a junior clerk and then a year later "set out as a bookseller with my own small collection of books as stock – not worth more than two pounds, I believe." Meanwhile William had started a printing business and together they initiated a weekly paper called *The Kaleidoscope* which was discontinued at the end of 1821. Robert Chambers next literary venture was however, far more successful. Having made the acquaintance of Scott – whose *Waverley Novels* were at the height of their fame, he wrote (1822) *Illustrations of the Author of Waverley* – consisting of descriptive sketches of the supposed originals of the novelist. There then followed in quick succession: *Traditions of Edinburgh* (2 vols 1823; new edition 1868) many of the anecdotes in which he derived from Scott himself, *Walks in Edinburgh* (1825), *Popular Rhymes of Scotland* (1826), *Pictures of Scotland* (2 vols 1826) the material for which he gathered by extensive tours on foot, *History of the Rebellion of 1745*

(1828, seventh edition 1859) and *History of the Rebellions in Scotland in 1689 and 1715* (1829).

Clue: Darwin thought his geology bad and his zoology worse!

Between 1829 and the end of his life he produced a further hundred volumes "abounding in original thought" including *Vestiges of the Natural History of Creation* (1844 which went into 4 printings in the first four months and the 12th edition of which was published in 1884) and *Explanations; a sequel* (1845). The former he laboured over for two years (in the comparative quiet of St. Andrews) and when published excited great attention – and was bitterly attacked. Chambers had foreseen this and apparently not wishing to risk his sound literary reputation or to bring his firm into discredit (W. & R. Chambers – publisher of *Chambers' Journal)* – he published the book anonymously (the secret of authorship was not fully disclosed until 1884, when Mr. Irland, the sole surviving depository of the secret, gave details in the introduction to the twelfth edition). The controversy which *Vestiges* engendered was such that when, in 1845, he was elected to be Lord Provost of Edinburgh, he thought it better to withdraw in the face of the storm that was raised against him as the supposed author (see *Proc. Linn. Soc.,* 1871:84). Ironically when he was elected a Fellow of The Linnean Society on the 4th November 1858 his form of recommendation was signed by Edward Newman (and 12 others including Bell) who had earlier written a scathing review of *Vestiges* (see *The Zoologist,* 3, 1845:954).

When the *Vestiges* were disposed of Chambers returned to Edinburgh where he completed, with Carruthers, his *Cyclopaedia of English Literature* (2 vols 1844), finished *Romantic Scotch Ballads with original airs* (1844), *Ancient Sea Margins* (1848), *History of Scotland* (1849) and *Life and Works of Robert Burns* (1851). Then, as a consequence of his geological interest – particularly the action of glaciers – he visited first Switzerland, then Sweden and Norway, then Iceland and the Faroe Islands (1855) before travelling through India and finally the United States (1860). On return from the States, Chambers moved to St. John's Wood, London in order to be able to visit the British Museum where he researched for his *Book of Days* (1864). During this period he was visited by Charles Darwin who remarked:

> "He is really a capital fellow. He made one good remark and chuckled over it, that the laymen universally had treated the controversy on the 'Essays and Reviews' as a merely professional subject, and had not joined in it, but had left it to the clergy" (letter to Hooker, April 23, 1861).

Darwin's sentiment is endorsed by the Linnean obituary *(Proc. Linn. Soc.*, 1871: 84) which describes him as in social life – a universal favourite – hospitable, full of kindness, and shrewd and amusing in conversation. He died at St. Andrews on the 17th March, 1871.

Vestiges of the Natural History of Creation[1]

Despite the fact that Chambers' teachings were essentially the same as those of Lamarck (*viz*. the tendency for grade improvement and modification by the surroundings) the publication of *Vestiges* in 1844 aroused so much interest that four editions were published within one year (and 10 editions appeared up to 1853). The reasons for this huge success was the clarity with which Chambers arranged his ideas, which were based to a great degree on natural science rather than on natural philosophy.

Although Chambers considered "appetencies" as a modifying factor in evolution he signally failed to clarify any of the problems of the theory of descent. Nevertheless he rejected catastrophes and supported *Natura non facit salturn* though he accepted the occurrence of great gaps – "due to rapid grade improvement" which he deemed "as a leap which in reality is none" and which he believed was due to the tendency for evolution!

From the 6th edition onwards he appears to reject the idea of a strict linear series of progression for one of ramification (a tree) while throughout all the editions his proof of the theory of descent is firmly linked to the concepts of geological progression and embryology.

Although *Vestiges* did not further the problem of descent it was widely discussed by scientist and non-scientist alike while its impact on contemporary thinking is best summed up in the views expressed by Darwin, Hooker, Wallace, Bates and perhaps Huxley.

Hooker's view is contained in a letter to Darwin (Kew: December 30, 1844):

> "I have been delighted with *Vestiges*, from the multiplicity of facts he brings together, though 1 do [not] agree with his conclusions at all, he must be a funny fellow: somehow the book looks more like a 9 days wonder than a lasting work: it certainly is "filling at the price." – 1 mean the price its reading costs, for it is dear enough otherwise; he has lots of errors."

While Darwin's initial view is expressed in his reply to Hooker (Down: January 7, 1845):

> "I have, also, read the *Vestiges*, but have been somewhat less amused at it, than you appear to have been: the writing & arrangement are certainly admirable, but his geology strikes me as bad, & his zoology far worse."

Later he communicates with Fox (Down: April 24, 1845):

> "Have you read that strange unphilosophical, but capitally-written book, the *Vestiges*, it has made more talk than any work of late, & has been by some attributed to me. – at which I ought to be much flattered & unflattered."

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1 A new edition has recently been published: *Vestiges of the Natural History of Creation and other Evolutionary Writings*, by Robert Chambers. Edited with a new introduction by James A. Secord. University of Chicago Press, 1994. ISBN 0-226-10072-3 (Hbk) 0-226-10073-1 (Pbk).

Following an adverse review of the book by Sedgwick *(Edinburgh Review,* 1845) who likened the anonymous author to the Serpent in the Garden of Eden – a reptile who would poison the minds of "our glorious matrons and maids" by teaching them "that they are the children of apes and the breeders of monsters", Darwin wrote to Lyell (Shrewsbury: October 8, 1845):

> "I have been much interested with Sedgwick Review; though 1 find it is far from popular with non-scientific readers. 1 think some few passages savour of the dogmatism of the pulpit, rather than of the philosophy of the Professor chair; & some of the wit strikes me as only worthy of Broderip in the Quarterly. Nevertheless it a grand piece of argument against mutability of species, & I read it with fear & trembling, but was well pleased to find, that I had not overlooked any of the arguments, though I had put them to myself as feebly as milk & water."

Darwin's views on the *Sequel to Vestiges* (published 1845 and read by him on 6 February 1846) are contained in another letter to Hooker (Down: February 10, 1846):

> "I have been amused by Chambers V. Hooker on the K. Cabbage: I see in the Explanations (the spirit of which, though not the facts, ought to shame Sedgwick) that *Vestiges* considers all land animals & plants to have passed from marine forms; so Chambers is quite in accordance. Did you hear Forbes when here, giving the rather curious evidence (from a similarity in error) that Chambers must be the author of the *Vestiges:* your case strikes me as some confirmation."

By the following year Darwin realized that both the *Vestiges* and the *Sequel* had been written by Robert Chambers and communicated this information to his friend Hooker (Down: April 18, 1847):

> "I think I have only made one new acquainta<nce> of late, that is R. Chambers, and I have just received a presentation of the 6th Edit of the *Vestiges:* somehow I now feel perfectly convinced he is the Author. He is in France & has written to me thence."

The next year[2] Chambers sent Darwin a copy of his book entitled *Ancient Sea Margins* (1848) which further convinced him that the author of *Vestiges* was none other than R. Chambers. Darwin subsequently passed this knowledge on to Lyell (Down: June 16, 1848):

> "If he be, as I believe the author of *Vestiges* – this book *[Ancient Sea Margins]* for poverty of intellect is a literary curiosity."

Although Darwin subsequently only mentioned the *Vestiges* briefly in his introduction to the *Origin* he gave a far more extensive account of it in the Preface to the American Edition:

> "The *Vestiges of Creation* appeared in 1844. In the last or tenth and much improved edition (1853, p.155), the anonymous author says "The proposition determined on after much consideration is, that the several series of animated beings, from the simplest and oldest up to the highest and most recent, are, under the providence of God, the results, *first,* of an impulse which has been imparted to the forms of life advancing them, in definite times, by generation, through grades of organisation terminating in the highest dicotyledons and vertebrata, these grades being few in number, and generally marked by intervals of organic character which we find to be a practical difficulty in ascertaining

affinities; *second*, of another impulse connected with the vital forces, tending in the course of generations to modify organic structures in accordance with external circumstances, as food, the nature of the habitat and the meteoric agencies, these being the 'adaptations' of the natural theologian." The author apparently believed that organisation progresses by sudden leaps; but that the effects produced by the conditions of life are gradual. The author argues with much force on general grounds that species are not immutable productions. But, I cannot see how the two supposed "impulses" account in a scientific sense for the numerous and beautiful co-adaptations, which we see throughout nature; – I cannot see that we thus gain any insight how, for instance, a woodpecker has become adapted to its peculiar habits of life. The work, from its powerful and brilliant style, though displaying in the earlier editions little accurate knowledge and a great want of scientific caution, immediately had a very wide circulation. In my opinion, it has done excellent service in calling in this country attention to the subject, and in removing prejudices."

Finally Darwin apparently wrote to Chambers acknowledging his contribution (letter has not been found) and this information is contained in a letter to Baden Powell (Down: January 18, 1860):

"Permit me to add that I read your Philosophy of Creation with great interest: it struck me as excellently & vigorously argued & written with a clearness, which I remember excited my warmest admiration. I most fully agree that your work must have had a great effect with philosophical minds in removing prejudices on the subject; in a higher degree but in nearly the same manner as the *Vestiges* has had with a less highly endowed class of readers. I have had to make by letter the same acknowledgement to the Author (as I believe) of the *Vestiges*."

Wallace, on the other hand, was more favourably impressed by the *Vestiges* than either Darwin or his (Wallace's) friend Bates (letter from Wallace to Bates: November 9, 1845):

"I have rather a more favourable opinion of the 'Vestiges' than you appear to have. I do not consider it a hasty generalisation, but rather an ingenious hypothesis strongly supported by some striking facts and analogies, but which remains to be proved by more facts and the additional light which more research may throw upon the problem. It furnishes a subject for every observer of nature to attend to; every fact he observes will make either for or against it, and it thus serves both as an incitement to the collection of facts, and an object to which they can be applied when collected. Many eminent writers support the theory of the progressive development of animals and plants ….

As a further support to the 'Vestiges,' I have heard that in his 'Cosmos' the venerable Humboldt supports its views in almost every particular, not excepting those relating to animal and vegetable life."

Much later in life, in his book *The wonderful century,* London 1898, Wallace recounts:

"I well remember the excitement caused by the publication of the *Vestiges* and

2. In the Athenaeum of December 2, 1854, R. Chambers was said to be generally credited with the work.

> the eagerness and delight with which I read it. Although I saw that it really offered no explanation of the process of change of species, yet the view that change was effected, not through any unimaginable process, but through the known laws of reproduction commended itself to me as perfectly satisfactory, and as affording the first step towards a more complete and explanatory theory."

In conclusion mention must be made of the effect that the *Vestiges* had on Darwin's Bulldog: Thomas Henry Huxley. In his account of The Reception of the Origin of Species in *Life and Letters of Charles Darwin,* Huxley commented:

> "I think I must have read the *Vestiges* before I left England in 1846; but, if I did, the book made very little impression upon me, and I was not brought into serious contact with the "Species" question until after 1850."

Then recalling that he had published what was a most scathing attack on that book when he reviewed the tenth edition of *Vestiges* in 1854 he continued *(loc.cit):*

> "In those days I had never even heard of Treviranus' *Biologie.* However, I had studied Lamarck attentively, and I had read the *Vestiges* with due care; but neither of them afforded me any good ground for changing my negative and critical attitude. As for *Vestiges,* I confess that the book simply irritated me by the prodigious ignorance and thoroughly unscientific habit of mind manifested by the writer. If it had any influence on me at all, it set me against Evolution; and the only review I ever have qualms of conscience about, on the ground of needless savagery, is one I wrote on the *Vestiges* while under that influence…."

Huxley's review of *Vestiges* (in *The British and Foreign Medico-Chirurgical Review,* vol. 13, 1854: 425–439) which ran into 15 pages, was both damming and vitriolic concluding that as for the foolish fancies:

> "we should be unjust to our readers, and false to our own belief, if we commented upon them, in any terms but those of the most unmitigated reprobation."

In the review Huxley exposes his own grasp of evolution (at that point in time) by his rejection of the geological progression theory advocated by Chambers, pointing out that it had no real foundation in the facts of palaeontology! Although Huxley considered that the book's only influence was to set him against evolution, it is possible that his belief in punctuated equilibrum – of which he was eventually disabused by Darwin, stemmed from the great gaps due to the rapid grade improvements advocated by Chambers!

Despite this scathing review of *Vestiges* Chambers and Huxley were to become firm friends (from about the time the former joined The Linnean Society viz. 1859) – and this friendship was to give one final twist to the story of the *Origin of Species*. Both Huxley and Chambers attended the British Association Meeting at Oxford in June 1860 – and which was scheduled to finish on Saturday (30 June) with a session on 'Darwin and Society'.

On the Friday evening (29 June), Huxley, who was having a final walk round the town before leaving the following morning, bumped into his friend, Robert Chambers. As a consequence of this chance encounter Chambers persuaded Huxley to stay on for the Saturday debate. We all know the outcome and of the famous speech particularly:

> "I asserted, and I repeat, that a man has no reason to be ashamed of having an ape for his grandfather. If there were an ancestor whom I should feel shame in

Clue: Worked at Moorfields Hospital: a good friend of Florence Nightingale.

recalling, it would be a man, a man of restless and versatile intellect, who, not content with an equivocal success in his own sphere of activity, plunges into scientific questions with which he has no real acquantance, only to obscure them by an aimless rhetoric, and distract the attention of his hearers from the real point at issue by eloquent digressions, and skilled appeals to religious prejudice."

As Francis Darwin wrote (see also letter T.H. Huxley to F. Darwin: June 27,1861):

"The following letter shows, that Mr. Huxley's presence at this remarkable scene depended on so slight a chance as that of meeting a friend in the street; that this friend should have been Robert Chambers, so that the author of the *Vestiges* should have sounded the war-note for the battle of the *Origin,* adds interest to the incident."

Postscript

Robert Chambers from time to time was an editor of the Edinburgh Advertiser. During this period he also brought out *The Gazetteer of Scotland* a work involving immense labour. All told, during the forty odd years of his literary labours he produced nearly a hundred volumes "abounding in original thought".

He was twice married, first to Miss Anne Kirkwood of Edinburgh who bore him eleven children (nine of whom survived him). He afterwards married a widow from Firth.

In social life he was said to be a universal favourite – hospitable, full of kindness and shrewd and amusing in conversation. He had an insatiable curiosity, great energy and astonishing memory. Apparently needing only a few hours sleep each night he rose early, wrote and read before attending to the day's business and went back to his books in the evening. His friends admired his genial manner and generosity. He died at his home in St. Andrews on 17th March 1871. Following his wishes he is buried at the base of the ruined eleventh century St Regulu's Tower in St. Andrews where the memorial stone simply states: "Robert Chambers LLD, Author of the Traditions of Edinburgh and many other works."

Correspondence

From: PROFESSOR JIM GREEN Teddington TW11 9LY, 21 October 2005
jimgreen17keg@btinternet.com

The highly decorated gentleman in your picture quiz in *The Linnean* (Vol. 21 No. 4 p.10) is General Sir Thomas Brisbane (1773–1860). He was born in Largs, Scotland, and after service in the West Indies he was appointed Governor of New South Wales from 1821–1825. During this time he set up an observatory at Parramatta, near Sydney, which reputedly catalogued 7,385 stars in Australia, and was the first to record the reappearance of Encke's comet in 1822. Modern instruments can trace this comet throughout its path, which has a period of only 3.3 years. Brisbane also set up weather stations, and presided over the newly founded Philosophical Society of Australasia.

From: GEOFF MOORE FLS Millport KA28 0EG 31 January 2006

Your latest Picture Quiz picture *(Linnean* **22**(1)) is of Robert Chambers (1802–1871). Later in life (than your picture) he wore a full beard. He was, of course, the writer of the initially anonymous *Vestiges of the Natural History of Creation* (1844) that so incensed Darwin (who thought his geology bad, and his zoology worse) and Huxley because of its Lamarckian views. Chambers was a journalist and publisher in Edinburgh (with his elder brother William) and had wanted to keep controversy away from the family business by obscuring his authorship. The trouble was, given the huge popularity of the title, everyone was speculating as to who might have been responsible. Eventually, Chambers had to come clean. His identity was announced in the *Athenaeum* (2 December 1854) in Mr Ireland's introduction to the twelfth edition (1884).

Chambers's eclectic *Book of days* (2 volumes, 1863) is always worth dipping into for arcane detail. In it, I found that I share a birthday with Charles Dickens (no, not the same year). In *Chambers's biographical dictionary,* subtitled *the great of all times*

and nations (1899) it states that the production of that title broke his health. He died at St Andrews, 17th March 1871. I recall seeing a plaque to his memory on a property on the cliff frontage at St Andrews, whilst I was external examiner there a few years ago.

From: LAURENCE COOK Manchester Museum M13 9PL 31 October 2005

In his interesting article on Rafinesque, Dick Vane-Wright gives references to several sources of biographical information on that eccentric gentleman. It is worth drawing attention to another. A.J. Cain (1990) translated into English several of Rafinesque's works, including the complete *Analysis of Nature* (1815) and part of the *Mirror of the Sciences* (1814) in which he outlines his intentions. Cain also provides a short account of his life and discusses the influences on him of contemporary taxonomic thought. *Tryonia* is a publication of the Department of Malacology, The Academy of Natural Sciences of Philadelphia.

Cain, A.J. 1990. Constantine Samuel Rafinesque Schmalz on classification. *Tryonia* 20:1-240.

From: DR MARION NIXON Broughton PE28 3AT 31 January 2006

I was interested but saddened when I read *Winged nymphs and Rafinesque's tomb* (Vane-Wright, 2005), but it reminded me that his name lives on for teuthologists in a cephalopod mollusc, *Ocythoe tubercuIata* (Sweeney and Roper, 1998).

Rafinesque was living in Sicily in 1911 when he was brought an unusual octopod; he described and named it in 1814 in an article devoid of illustrations, measurements and location. The paucity of detail in the description led to nomenclatural confusion and to some contemporary biologists considering that the animal lived in the shell of *Argonauta*. Rafinesque did not add any further details until 1840, and as this and the earlier description were not readily available both were translated and included in a review paper (Roper and Sweeney, 1976).

In 1840 Rafinesque stated that the specimen of *Ocythoe tuberculata* was alive, ferocious and endeavoured to bite the holder, was larger than a man's head, and weighed about 3.5 kg, and that "I do therefore aver that my *Ocythoe* is not the animal of the *Argonauta,* and could never be, by its size and thick spherical body, unfit even to enter it". The size of the specimen also indicates that it was a female; a male of the species was not recorded until the middle of the nineteenth century and it does not exceed 30 mm in mantle length compared with 310 mm of the female (Roper and Sweeney, 1976).

A type specimen would have been invaluable in solving the problems which followed Rafinesque's description in 1814, however, he made clear in 1840 that "I did eat this *Ocythoe* which afforded a meal for many, and it was as good as usual with the *Octopus*". The early demise of the original specimen is certain but Rafinesque's name for this unusual octopod does remain valid (Sweeney and Roper, 1998). This must surely be an unusual end for what should have been a type specimen.

Jatta, G. 1896. Cefalopodi Viventi nel Golfo di Napoli. *Fauna und Flora des Golfes von Neapel,* 23, 1-264.

Rafinesque, C. S. 1814. Class Malacosia – Le Mollusques. *Precis des decouvuertes et travaux somologiques de C. S. Raflnesque-Schmltz…. zoologie et en botanique entre 1800 et 1814*, 28-30. Palermo.

Rafinesque, C. S. 1840. Amenities of Nature or Annals of Historical and Natural Sciences. Philadelphia.

Roper, C. F. E. and Sweeney, M. J. 1976. The pelagic octopod *Ocythoe tuberculata* Rafinesque, 1814. *Bulletin of the American Malacological Union for 1975*, 21-28.

Sweeney, M. J. and Roper, C. F. E. 1998. Classification, type localities, and type repositries of Recent Cephalopoda. *Smithsonian Contributions to Zoology,* No. 586, 561-599.

Vane-Wright, R. J. 2005. Winged nymphs and Rafinesque's tomb. *The Linnean* 21, no. 4, 25-28.

From: EMERITUS PROFESSOR DAVID A. JONES Bicester OX26 1UF

27 October 2005

The letter [*The Linnean* 21(4)] from my erstwhile colleague Professor A.W.F. Edwards (we were the last two undergraduate students of R.A. Fisher, 1956–57) commented on Sir Christopher Zeeman's 'Catastrophe theory applied to Darwinian evolution'.

Edwards came to genetics/evolution from a mathematical background, achieving his professorship in statistics, and rightly argues from that position. My basic training was in biology, of the muddy boots type, and essentially plant orientated. Indeed, I echo C.D. Darlington's remark that 'animals are too consistent to be interesting' because plants have so many more ways of reproducing, playing with chromosome numbers and arrangements, and powers of regeneration – cut a leg off a cow and you have problems; pick a daffodil flower and there will be another one next year.

Edwards emphasized Fisher's rather brief discussion of sympatric speciation from his *'Genetical Theory of Natural Selection'*. Ernst Mayr had enormous problems with sympatric speciation, but then he was a zoologist. Unfortunately, students in the USA found Mayr easier to understand than Fisher, Wright or Haldane and so many a university teacher in the USA has a Mayr fixation.

What you need for clean speciation is some form of reproductive isolation; when some individuals within a species cannot breed with others of the same species. Ignoring sexual dimorphism, there are few examples in animals where some form of geographical isolation is not necessary, but with plants there are many ways reproductive isolation can come about even though there are numerous individuals of the same species close by. Doubling the chromosome number is a common enough catastrophe for Darlington to comment that there are more plant species consisting of a single individual than there are 'true' species in the world today.

On the other hand, doubling of the chromosome number after the catastrophe of hybridization and the usual non-compatibility of chromosomes in meiosis overcomes the sterility problems. Pasta and bread wheats evolved naturally by such a process.

When two or more groups of a plant species become geographically isolated, speciation may occur, but as these groups are physically isolated there is no **need** for

any biological mechanisms for reproductive isolation. Perhaps the best example of this is the demonstration by Verne Grant with the genus *Gilia*. Allopatric species will cross quite readily when grown together, whereas sympatric species will not. Many 'varieties' of garden plants were derived from the crosses of allopatric species, the myriads of different orchid varieties in horticulture probably being the most notorious example. The species are isolated because of their highly specific pollinators. The paintbrush of the hybridizer overcomes this problem.

From: PETER J. JAMES Hunstanton, Norfolk PE36 5EH
1 October 2005

Although I'm no mathematician, Rene Thorn's 'Castastrophe Theory' has always held a great fascination for me. Its seven elementary catastrophes with wonderful names such as cusps, butterflies and umbilics, seem to offer such an elegant and profound analysis of complex systems uniting, as they do, everything from the failure of steel girders, through phase transitions and 'Evo Devo', to the human psyche. In the 'eighties I recall building one of Zeeman's 'Catastrophe Machines' and marvelling at the way it demonstrated how small, uniform and linear changes could gradually accumulate until the threshold was reached at which the whole behaviour of the system was catastrophically transformed into a new equilibrium state.

Like John Marsden, I was intrigued by those biological catastrophes of both speciation and of the apparently even greater evolutionary leaps, which came to be known as 'macroevolutionary events'. These latter led to those acrimonious debates of the early 1980's between the advocates of 'Punctuated Equilibrium' and phyletic gradualism. Catastrophe theory provides both an explanation and a reconciliation between these theories of evolutionary discontinuities, discontinuities which Darwin, working within his Lyellian paradigm, felt forced to attribute to the incompleteness of the fossil record. If Huxley were ever to meet Thorn he would be delighted that his famous warning to Darwin about placing too much faith in 'Natura non facit saltum' would have turned out to be so prophetic!

After three decades,the reprint of Zeeman's 1992 article (*Linnean* Vol.21. no. 3 pp. 22–24) refocused my attention on catastrophe theory. It is, however, in these three decades that catastrophe theory has been somewhat eclipsed by Mandelbrot's Chaos Theory, which has swept all before it in its ability to come to grips with the dynamics of non-linear systems, systems which characterise organic complexity.

Those 'Fig Tree' cascading bifurcations, which have come to be the armorial bearing of Chaos, can all too easily be superimposed on cladograms and here lies the problem. Ian Stewart and his co-workers have used the idea of symmetry breaking, which is a natural consequence of cascading bifurcations, as a model for speciation. In this model, speciation, whether allopatric or sympatric, becomes a series of dichotomous branchings not polychotomous ones. Zeeman's model, on the other hand, interprets speciation as a cusp catastrophe which predicts multiple speciation as being the generic form and not, as with the symmetry-breaking model, a series of compressed bifurcations.

Are these two models reconcilable? If they are perhaps someone would like to provide an answer but please, not one containing too many partial differentiations! But wait. Do I hear the voice of Darwin's shade muttering darkly that it would do us all good to dissect a few real barnacles?

From MARY MORRIS: **Corrections**

My apologies for a number of typos and other errors in the last edition of *The Linnean*. The conversational curassows caused some amusement but the absence of the article by Jeremy Franks mentioned in the Editorial caused some puzzlement. It was postponed, at the last minute, until this issue in order to save exceeding the most economical number of pages. I particularly regret that the wrong version of Henry Osmaston's diagram was included with his letter in the Correspondence section. The updated version, which should have been published then, is given below. My apologies to Dr Osmaston.

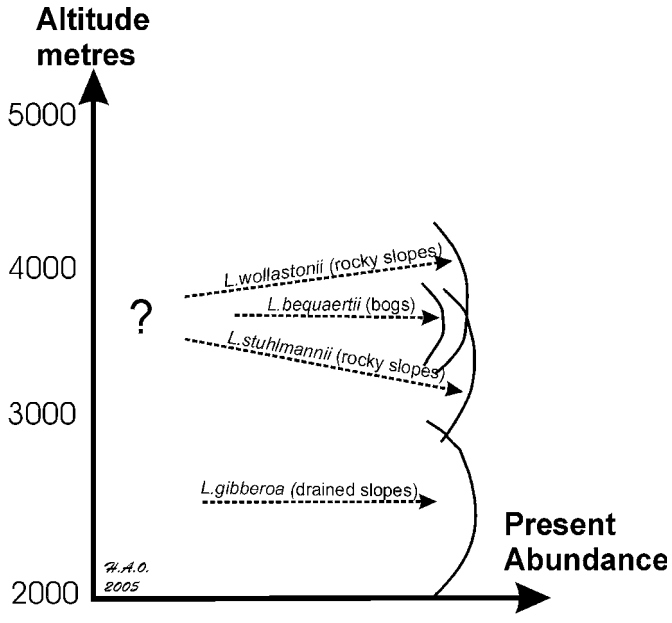

Fig. 1. *Lobelia* spp. on the Rwenzori Mountains (Uganda & Congo). Altitude ranges are taken from Flora of Tropical EA, Hedberg (1957), Knox & Palmer (1998) and personal observations. The grouping represents their possible evolutionary relationships (Knox & Palmer 1998).

Pasteur and Silkworm Disease

In 1867, Louis Pasteur provided a set of recommendations to rid the silk industry of two diseases which were ravaging the *magnaneries* – silkworm nurseries – of SW France. We now know that one of these diseases was caused by an intracellular protozoan parasite and the other by a virus. 138 years later, it has been given to few to make much impression on protozoan parasites, witness malaria, trypanosomiasis and leishmaniasis; immunization apart, antiviral therapy has been both unsure and expensive. It was, of course, Pasteur who proved able to immunize mice and humans against the rabies virus, but he had little understanding as to how vaccination worked. So how were Pasteur and his colleagues able to bring about this remarkable reversal in fortunes for the silk worm farmers? And why, notwithstanding Pasteur's Herculean efforts between 1865 and 1868, did an industry, which had, at its peak in 1853, contributed 4% (contemporary price, ca. £6M) of the Gross National Product of France (and similarly in Greece, Italy and Spain), all but disappear? By the beginning of the 20th century most references to European sericulture, which had produced 26 000 tonnes of silk in France in 1853, had vanished from the encyclopaedias.

A holiday in the Cévennes in a converted *magnanerie* stimulated me to find some answers to these questions. In the beginning it was the old story of everyone trying to cash in on a good thing. In the early part of the 19th century in the Gard of SW France, the world and his wife were growing silk worms. As Pasteur's biographer, his son-in-law, René Vallery-Radot (1885), noted, "The life of certain Departments in the South of France hangs on the existence of silkworms." What went wrong as production headed south in the 1850s and 60s was the inevitable consequence of massive monoculture, namely disease. For the Gard, and France more generally, this spelled disaster and the French Senate was implored to act, which it did in the time-honoured way, by setting up a commission to report on the matter. The reporter was J-B Dumas, distinguished French chemist, to whom it occurred to have a word with his friend Louis Pasteur who might be persuaded to tackle the matter.

But in 1864 Pasteur saw his career in other aspects of what we now call bio-technology. Had he not resolved problems associated with wine fermentation? Had not that experience led him to consider contagions to which other species, notably man, were heirs? To traipse to the Cévennes had little appeal. Pasteur declined.

But Dumas was persistent. He had been brought up in the Gard and had first-hand experience of the privations being suffered there. Pasteur protested that he knew nothing of silk worms, to which the wily Dumas is alleged to have replied, "So much the better. If you know nothing about the subject, you will have no other ideas than those which come from your own observations." An influential figure in France, Dumas was a professor of chemistry at the Sorbonne, a post Pasteur fancied for himself. So in 1865, Pasteur acceded, and coincidently became a professor of chemistry in the Sorbonne two years later! Biologists were not yet accorded their own professional status.

In fact, the silk worm "season" is a mere two or three months (in Europe, April to June) during which time the eggs of *Bombyx* laid down in the previous year hatch, the caterpillars gorge themselves on mulberry leaves, undergo a series of moults, increase their body weight 10 000 times, and then pupate. The chrysalis is heated to kill the

Figure 1. Pasteur in Alès (Photo David Pescod)

pupa and the cocoon is unwound to produce a silk fibre ca. one kilometre long. Anecdotally the dead pupae are fed to pigs or dogs, although one reference suggests they were a considerable human delicacy. A few pupae are allowed to hatch to produce adult moths (Chinese husbandry of *Bombyx mori* had usefully produced blind moths too heavy to fly), which are allowed to breed and produce next year's crop. The numbers are formidable. 28g of eggs from 75 female silk moths produce enough caterpillars to eat 10 tonnes of mulberry leaves; the 30 000 cocoons produce just 6kg of silk.

But by 1865, these were rare events. From China to Spain, most of the caterpillars died. Only in Japan did the stocks of silk worms remain healthy. The disease was initially manifested by the caterpillars looking as if pepper (demotic French, *pébré*) had been sprinkled on them. The disease had been christened *pébrine* and led to the deaths of most of the caterpillars. Of the few that made it to adult moths they, too, were mostly sickly and did not breed well.

To this dismal scene came Louis Pasteur. Great hopes were pinned on his investigations. He wasted no time, setting up a microscope [Figure 1] and examining silk worms under it within hours of his arrival at Alais (now Alès). To the incredulous locals, who had come to greet their saviour, it was all too much; microscopes were for men in white coats in the laboratory, not down on the farm. It was only when Pasteur's

eight year-old daughter, Marie-Louise, started using one that the penny dropped, they might conceivably be able to do so as well. Subsequently, there was a minor boom in the sale of microscopes in the Gard!

Pasteur saw for himself the miserable state of the land. He had had access to a report on the silk worm industry five years earlier by Monsieur Quatrefages to the French Academy of Sciences. One thing that stood out in his mind was a report from a M. Guérin-Méneville in 1849, when silk worm disease became significant, that under the microscope silk worms contained "corpuscles" in the haemolymph and silk glands of the worms, which might or might not be connected with the disease. Independently, M. Leydig, of Freiburg, had noted intracellular corpuscles in other arthropods. In fact, corpuscles seemed a feature of many invertebrates (Foster, 1965).

Pasteur (1870) rapidly established that corpuscles were indeed present intracellularly in silk worms [Figure 2]. He showed that diseased worms had rather few corpuscles; in healthy pupae and adult moths there were none. Sickly caterpillars which pupated yielded adults which contained corpuscles as did the eggs of infected females. Such eggs produced diseased worms. Pasteur also established that the health of the male moth made no difference to the viability of the eggs. Pasteur showed that the corpuscles could sometimes be seen dividing in host cells [Figure 3], but the generally paradoxical findings led Pasteur at first to discount the idea that corpuscles had anything to do with the disease.

By feeding healthy caterpillars with mulberry leaves which had been painted with an extract of sick caterpillars, Pasteur also established that, in addition to vertical transmission of *pébrine* from adult female to egg, *pébrine* was also transmitted horizontally and that it could enter a healthy caterpillar via the gut. He also showed that the contagion survived the winter in the *magnanerie* in faeces and other detritus of the silk worm and this gave rise to his recommendation that whilst growing the silk worms and after breeding, the *magnanerie* needed to be kept thoroughly clean and disinfected throughout. Any sick caterpillars or infected eggs were to be destroyed immediately.

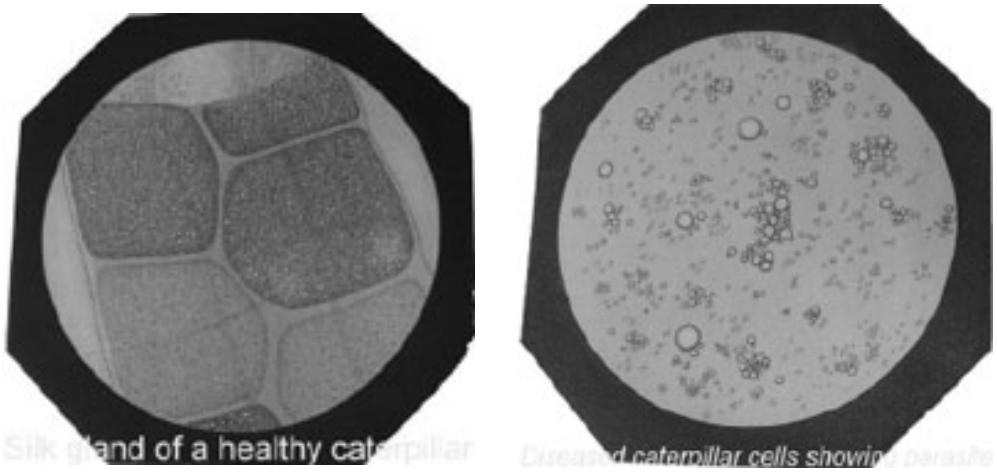

Figure 2: Silk gland of a healthy caterpillar. Figure 3: Diseased caterpillar cells showing parasite. (Photos David Pescod)

A healthy silkworm caterpillar. (Photo Pat Morris)

One thing that Pasteur always found was that even in the worst situations, a few healthy moths could still emerge. In his experiments on feeding healthy caterpillars with sick ones he also noted the emergence of a very few healthy adults. He attributed this to the failure of some of the healthy caterpillars to eat the infected material on the leaves. He advised silk worm breeders to ensure that any eggs being retained for the following years were checked for the absence of *pébrine*. This could be done by sacrificing the female moth after egg-laying and microscopically examining the tissues of the moth for corpuscles.

So what might be a modern explanation of all this? First of all, the corpuscles. In the growing caterpillar particularly, the silk glands become filled with the precursor of silk fibroin and another protein with which fibroin forms the silk fibre. These are contained in *secretion granules*, Guérin-Méneville and Leydig's corpuscles. It would have been difficult at the time to distinguish between these and the cells of the parasite, which we now know as a microsporidian, *Nosema bombycis*. They are much the same size. Guérin-Méneville reported the corpuscles, which we assume to be secretion granules, as having a diameter of 2.5μm; a recent report illustrates a *Nosema* spp having a diameter of 5μm (Dunn & Smith 2005). When the caterpillar pupates, it has used up all the fibroin, so the corpuscles corresponding to the parasite become visible in the pupae and in the adult moths. Pasteur had thought that most of the corpuscles were waste products.

Pasteur's advice on only breeding from healthy females is self-evident. However, there is probably a rather better explanation for the emergence of healthy adult moths from a diseased stock. Successful parasites do not eliminate their hosts in their entirety, since that would also spell the end of the parasite. An equilibrium exists between parasite and host whereby some hosts either escape attack or are insufficiently debilitated not to breed. An aside here is that this might have been predicted from Darwin's *Origin of Species* which first appeared in 1859 and in a French version in

1862. Pasteur was unconvinced by the *Origin*; he was in the modern argot, a Christian and a creationist. Despite losing three of his five children to infectious disease before they reached adulthood, Pasteur remained a Christian to the end of his life, in contrast to Darwin, the death of whose daughter Annie from tuberculosis caused him to become agnostic. And Pasteur saw himself as a man of action; he might have had little time for someone who might be dubbed an "armchair scientist". Pasteur might have felt, too, that his own humble origins – he enjoyed a close and loving relationship with his father, a tanner, who made considerable sacrifices for his son's career – contrasted with Darwin's privileged upbringing.

Nosema bombycis has been placed in the protozoan class Microsporae of the phylum Cnidospora. This taxonomy may require revision, since it has recently (Keeling & Fast, 2002) been shown that microsporidia are *reduced fungi*, that is, fungi which have lost much of their characteristic biochemistry and physiology during their evolution. They contain no mitochondria, but do possess enzymes of mitochondrial origin, and are more than usually dependent on their host for their survival. A parallel here is *Mycobacterium leprae*, the leprosy bacillus, which has defied growth in culture. Sequencing of the genome revealed the absence of biochemical processes essential for an independent existence; much the same has been found from the molecular taxonomy of microsporidia. There are some 800 described species; they cause disease in plants, in invertebrates and in higher animals such as man, where they can infect the cornea, and more recently, have been implicated in human gut disorders in Latin America. Clearly, given their lacunae, they might be vulnerable to appropriate drugs; more interestingly they might be considered for specific biocontrol of pests, e.g. locusts infected by *Nosema locustae*. Transmission of these parasites may be horizontal, vertical or, as in *N. bombycis*, both. Because sperm have virtually no cytoplasm and very restricted biochemistry, vertical transmission of *Nosema* spp. is invariably via the female and microsporidia transmitted in this way can, by a variety of mechanisms, bias the sex ratio of the offspring of their hosts towards females.

The cracking of the *pébrine* problem did not mean that the world of the silk worm was a place where every prospect pleased. Pasteur recognised another disease, *flachérie*, which also attacked the caterpillars. This disease was not associated with corpuscles; Pasteur thought that the disease was caused by *Vibrio* spp, which brought about the rapid death of the caterpillars, which turned black. This subsequently transpired to be secondary infection; the primary assailant was a virus (Peigler & Naumann, 2003). Pasteur showed that *flachérie* was ingested by silk worms from the mulberry leaves on which it was present. *Flachérie* was a particular problem when the leaves were wet. Pasteur recommended that the mulberry leaves be gently dried before being fed to the caterpillars. He found that *flachérie* did not overwinter in the way that *pébrine* did but that susceptibility to it was increased by poor ventilation and temperature control.

Sericulture has been very much the province of the Chinese (the word *seri* means Chinese) who had developed it earlier than 3500 BC. In Britain, James I became anxious to join his contemporaries on other European thrones benefiting from the production of their own silk, rather than buying such an expensive luxury in from abroad. From 1608, he encouraged the growing of mulberries in England, in Ireland and in the New World, where he persuaded refugee French Huguenots, familiar with the techniques of

sericulture, to settle (Grieve, 1931). Over the long term his efforts were uniformly unsuccessful due, it was said, to the use of the Common, or Black, Mulberry, *Morus nigra*. It is more likely that the cold weather in the more northerly countries was the culprit. Black Mulberry was, in fact, used by early European sericulturalists and those in Asia Minor, but in the 15th century the White Mulberry, *M. alba*, already in use in China, was introduced into Italy as superior to its black cousin. An early reference to mulberries is to be found in the Babylonian tragedy of Pyramus and Thisbe, reworked by Shakespeare in *A Midsummer Night's Dream.* Thisbe, on her way to a secret tryst with Pyramus (their parents having naturally forbidden any match), encounters a lion. In making good her escape, she drops a garment which the postprandial lion soils with blood. Pyramus discovers the bloody garment and, fearing the worst, tops himself under a mulberry tree. Thisbe finds her lover dead and does likewise. Their combined gore imparts to the mulberry its red richness. Regrettably, Shakespeare omits all reference to the mulberry tree in *A Midsummer Night's Dream*, nor does the author of the classical tragedy disclose the species of mulberry thus endowed.

The Chinese had remained sore about the theft of the secrets of commercial silk production by Nestorian monks based in Constantinople during the reign of the Emperor Justinian in the 6th century AD, whence the technology had spread to Asia Minor and southern Europe. As the silk industry recuperated in the late 19th century, largely thanks to Pasteur, they and the Japanese dealt European production a final blow – they flooded the market with cheap silk. Little of the European silk industry remains. As they say in Brussels, *plus ça change plus c'est la même chose!*

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I am grateful to the Society's Librarian, Gina Douglas, for generously providing the opportunity to stay in her former *magnanerie* in the Cévennes and for finding various articles used in the paper and also to Mrs. Belinda Knowles of CABI at Silwood Park for details of the work on *Nosema locustae.*

JOHN MARSDEN

The still-born concept of a Bureau of British Marine Biology (1910)

P. G. Moore, F.L.S.[1] and Jacqueline Carpine-Lancre[2]
[1] University Marine Biological Station Millport, Isle of Cumbrae, Scotland, KA28 0EG (pmoore@millport.gla.ac.uk) and [2]"La Verveine", 7, square Kraemer, F-06240 Beausoleil, France (jacala@libertysurf.fr)

In a recent publication (Moore, 2006), one of us has expounded in some detail the acrimonious story behind the brief period (1905–1907) that Stephan Ion Pace spent as Director at the Marine Station at Millport. Pace's messy removal from that post led to him and his wife, Rose Mabel, seeking to establish an independent Bureau of British Marine Biology to take forwards his ideas about structured biological survey work. The result of PGM's having sent a copy of the accepted MS of the above paper (pre-publication) to JC-L was to discover that she knew of further relevant information on the Paces relating to the period immediately post-dating their abrupt exit from Millport. That material is considered herein. It extends the Pace's publication list beyond that already presented by Moore (2006).

Moore (2006) referred readers to the "unconventional diatribe" directed at his former employers that was represented by Pace's footnote to the title page of his paper in *Zoologischer Anzeiger* (Pace, 1907). JC-L brought a consequential notice, in a later issue of that journal (31 March 1908), to the attention of PGM (Anonymous, 1908). That rebuttal of Pace's contentions, clearly sent officially on behalf of the Marine Biological Association of the West of Scotland, provided a stark counterpoint to Pace's version of events thus:

> "With reference to these averments we find that it is right to point out that the real trouble in the Association prior to the Annual Meeting referred to by Mr Pace was one of business management. The membership was in point of fact scarcely affected by the resignation of a few office-bearers who resented what was practically a vote of censure upon them. Many of the original members of the Association doubled their subscriptions for 1907 in sympathy with the change of management which resulted from the appointments made at said Annual General Meeting of the subscribers".

When Pace left Millport in June 1907, searching for an alternative role in life, he had mooted the idea for the formation of a Bureau of British Marine Biology to several correspondents (E. T. Browne, E. J. Allen, W. C. M'Intosh and, possibly, many others), with the hope of eliciting their support (see Moore, 2006). Indeed, on 8 July 1907, Stephan Pace had written (from Hounslow; letter marked "Private") in like vein to none other than Prince Albert of Monaco[1] (whom he had met earlier in the year when the latter had visited Millport on 19 January 1907; see Anonymous, 1907), as follows:

> "H.S.H.. The Prince of Monaco
> Your Highness,
>
> You will no doubt have heard that the long-standing dis-agreement regarding the Millport Marine Station has culminated in the resignation in a body of the scientific members of the Association and that the faunistic research I had planned

has now been abandoned and that the Marine Station is in future to be devoted to elementary education and popular entertainment. This is not only a great disappointment to me (I had been looking forward to carrying on faunistic work at Millport in a more systematic and detailed manner than has yet been possible, so far as I am aware, at any Marine Station), but it also places me in financial difficulties as I have for some few years past been without any private means. I am therefore venturing to ask if there is any possibility of my finding temporary employment in connection with your Highness' oceanographical investigations.

I am hoping that I may ultimately be able to found a small Marine Station of my own (to be devoted solely to faunistic research) and I would therefore also take advantage of this opportunity to enquire whether I might anticipate any assistance (either financial, or by the gift or loan of equipment and books) from your Highness if I find myself in a position to carry out the plan I have in view. I am at present working at the details of the proposed scheme but of course I will not trouble your Highness with these at this juncture, – although I shall of course be most pleased to submit full particulars should your Highness so desire.

Trusting that I may be pardoned the liberty I am taking in writing

I am
Your Highness' most obedient servant

S. Pace"

Unfortunately, no trace can be found of the Prince's reply in the Monaco archives. During the summer of 1907, Prince Albert went to Svalbard for the fourth, and last, time. Perhaps Pace's letter had been forwarded to him there, or maybe it had been retained in Paris or Monaco? Prince Albert had returned to France in mid-September. One thing that is obvious, however, is that the Prince did not feel impelled by these overtures to offer Pace a job. Not uncharacteristically (see Moore, 2006), the 'spin' on events at Millport given by Pace in the opening paragraph of his Royal entreaty contrasts markedly with the view of the same events expressed by the Association (see above).

PGM had discovered no evidence that Pace's proposition for a Bureau of British Marine Biology had ever progressed beyond such exploratory probings. Further information from JC-L, however, revealed that the Bureau did exist, if not in any permanently established physical form then at least in an isolated printed manifestation, if only for a transient period. Housed in the reprint collection in the library of the Musée océanographique in Monaco there is an 18-folio document dated 1910 by Stephan and Rose Pace (Fig. 1) of which JC-L was aware (*Contributions from the Bureau of British Marine Biology*, Series 2, No. 1) arising from a publication series that, hitherto, had been unknown to PGM. Interrogating the COPAC website (of U.K. University library holdings) for this title revealed that this little-known publication has only a limited availability in U.K. academia. According to this source, copies are only available in the British Library and in Cambridge University. The fourth edition of the *World List of Scientific Periodicals* (Brown & Stratton, 1963), however, lists two other London holdings (the British Museum and the Natural History Museum) and the Royal Society of Edinburgh, as libraries possessing copies. Enquiries at the Natural History Museum brought to light a subsequent number in the series (Pace & Pace, 1910b).

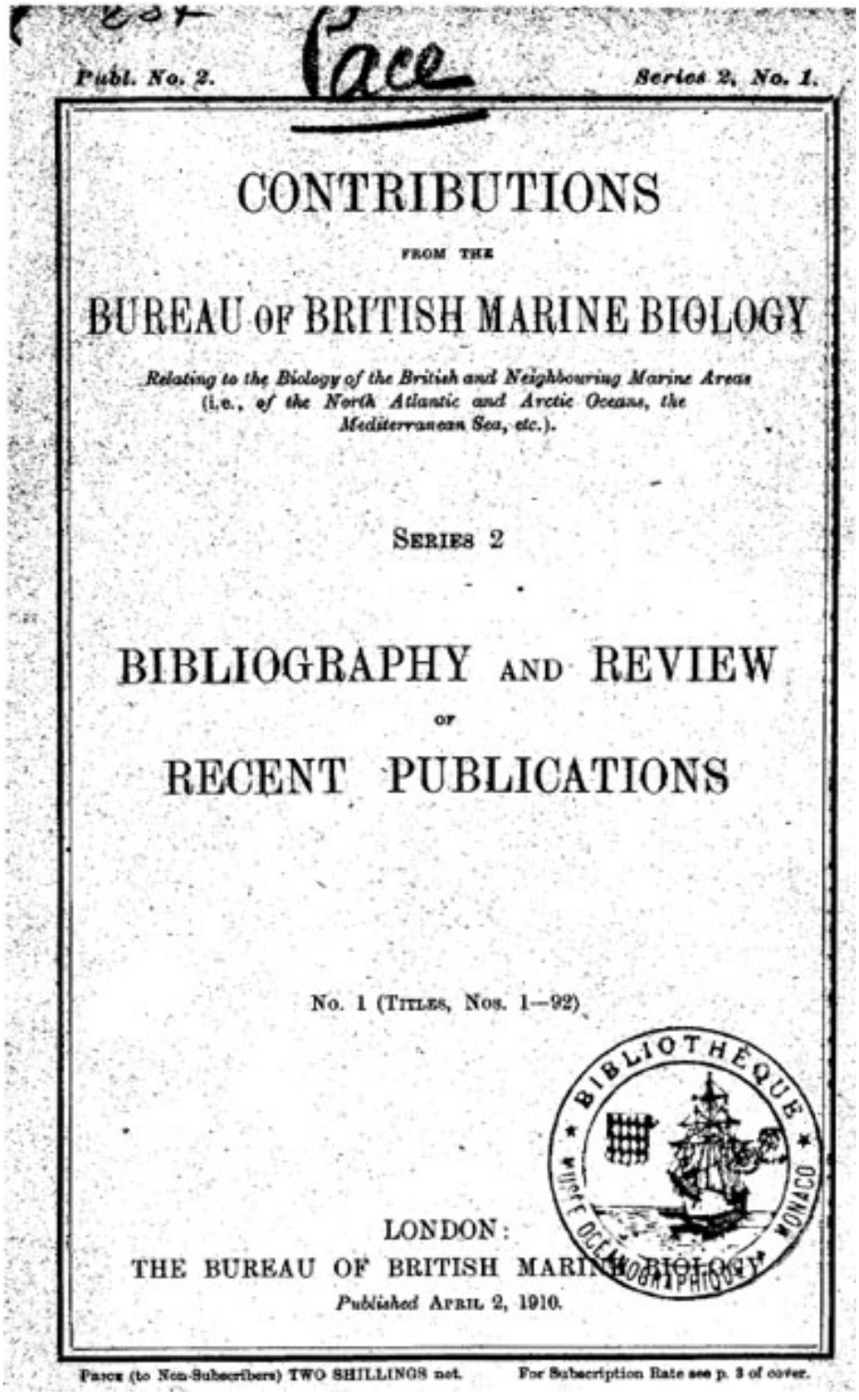
These publications (Pace & Pace, 1910a,b) are interesting because they testify to at least three years of perseverance during which Stephan Pace and his wife sought to make real their ecological ideals from London, after their exit from Millport. It seems, therefore, as if their hopes evaporated sometime between 1910 and the beginning of the First World War (note Moore, 2006). The strain of his situation eventually told on Pace and he suffered a prolonged nervous breakdown around this time, although he recovered sufficiently to be commissioned into the Army in 1915. His physical and mental health, however, was never the same thereafter, as he returned from France – as so many did – suffering from shell shock (Winkworth, 1946; Moore, 2006).

Under the heading "Terms of subscription to the Contributions from the Bureau of British marine biology", Pace & Pace (1910a,b) revealed that their intention was to publish various types of papers under separate Series headings (Series 1–6). For instance, Series 1 was intended to accommodate papers dealing mainly with the techniques of marine biology. There is no reason, therefore, to suppose that any Series 1 papers necessarily appeared prior to the Series 2 publications listed herein. According to the fourth edition of the *World list of scientific periodicals* (Brown & Stratton, 1964), 1910 was the only year that the title appeared. The cover of the compendium by Pace & Pace (1910a) includes a printed "Publ. No. 2" at its top left corner (see Fig. 1). The subsequent contribution (Pace & Pace, 1910b) is labelled "Publ. 3" at that position, suggesting that a "Publ. 1" (presumably in another Series?) ought to exist somewhere. Both of the known Pace & Pace contributions of 1910 had appended a specimen page indicating the arrangement of material for the proposed Series 3 (their so-called "Analytical Index" of taxa) which seems never actually to have materialised.

The objects of the Bureau of British Marine Biology were nothing if not grandiose and were set out in Pace & Pace (1910a,b) thus:

> "The Bureau of British Marine Biology has been founded, under the Directorship of Mr S. Pace, with the object of promoting the *organized* and more systematic study of the Fauna and Flora of the British Marine Area by:
>
> (a) Conducting an exhaustive and continuous systematic Biological Survey of one or more selected small areas on the British Coast.
>
> (b) Investigating the individual members of the local biotas at such selected stations in the greatest possible detail, and instituting critical comparisons between these various forms and allied ones from other localities, British and foreign.
>
> (c) The formation and preservation of a full Reference Collection of specimens and preparations of British marine animals and plants.
>
> (d) Functioning as a Central Bureau for the co-ordination and revision of published work relating to the British Marine Fauna and Flora.
>
> (e) Providing (gratuitously) working facilities, information and material to Students of Marine Biology.
>
> (f) Generally co-operating in the faunistic work of other institutions and individuals, both professional and amateur."

As Pace & Pace (1910a,b) themselves admitted ruefully "the above programme is a somewhat extensive one, and with the resources at present at the disposal of the Bureau it is not yet possible to attempt to carry it out in its entirety". No litotes here



Publ. No. 2. Pace Series 2, No. 1.

CONTRIBUTIONS

FROM THE

BUREAU OF BRITISH MARINE BIOLOGY

Relating to the Biology of the British and Neighbouring Marine Areas (i.e., of the North Atlantic and Arctic Oceans, the Mediterranean Sea, etc.).

SERIES 2

BIBLIOGRAPHY AND REVIEW

OF

RECENT PUBLICATIONS

No. 1 (TITLES, NOS. 1—92)

LONDON:

THE BUREAU OF BRITISH MARINE BIOLOGY

Published APRIL 2, 1910.

PRICE (to Non-Subscribers) TWO SHILLINGS net. For Subscription Rate see p. 3 of cover.

Fig. 1. The cover of the little-known publication by Pace & Pace (1910a), reproduced from the copy housed in the Musée oceanographique in Monaco.

then. Such objectives represented a 'wish list' of enormous proportions, i.e. in effect taking over and amalgamating the roles of the national natural history museums and the academic biological societies so far as marine biology was concerned. There was no way that this was likely to happen in the face of other vested interests, whether '*organized*' or not, unless the Paces had been as rich as Croesus. It is true, as Allen (1977) so cogently put it, that "the private patron has the eternal asset of not having to pay heed to the current public consensus" but the Paces seemingly had no such monetary cushion behind them. Patently, the fanciful notion of such a Bureau still floated in the 'cloud-cuckoo land' of Stephan Pace's unrealistic approach to financing that had been at the root of his downfall at Millport (note their continued insistence about the 'gratuitous' provision of facilities and compare that with his similar impractical ideas (Moore, 2006) that had floundered previously at Millport).

Perhaps understandably, in the light of his previous cataloguing experiences at Plymouth (Moore, 2006), Stephan Pace began the putative Publication Series (Series 2) with bibliographical reviews (jointly with his wife). That starting point would have been facilitated by their on-going experiences of collating the Mollusca sections of the *Zoological Record* (for 1906 and 1908), given their incomparable access to literature resources in London while helping out part-time at the British Museum (Natural History) (see Winckworth, 1946). Interestingly, under the auspices of the Challenger Society, a 'retrospective bibliography' of publications appearing between 1846 and 1900 had been assembled in the form of a card index. "For zoologists the best path is the card-catalogue prepared by the "Challenger" Society; by this means it is possible to find all that has been published on the marine fauna of a region, or even of a lonely island" (Fowler, 1912, p. 435). The Pace's Series 2 publications, by contrast, referred to recent publications. It is not clear whether or not they received payment for this work at the Natural History Museum or whether it was done on a purely voluntary basis (Moore, 2006). Pace never had any salaried position at the Museum in the period following his departure from Millport. During the correspondence (referred to above) at the time of their departure from Millport, Rose Pace had written (11 October 1907) to E.T. Browne stressing their impecuniousness: "we have had to invoke legal aid in order to get time to pack and recover at least a part of our salary!".[2] Pace had complained similarly about lack of personal funds also in a letter to W. C. M'Intosh[3] (see also the letter to Prince Albert; above) and it is clear that their financial position had not improved noticeably by 1910, as this quotation from the common rubric in Pace & Pace (1910a,b) confirms.

> "It has not yet been possible to make definite arrangements for initiating the intensive BIOLOGICAL SURVEY contemplated by the Bureau, but so soon as these have been completed a small Marine Laboratory will be equipped and will be devoted exclusively to *scientific research*. Suitable premises are at present under consideration; but difficulties, mainly of a financial nature, have still to be overcome before this part of the work can be actually started."

Just where these "suitable premises" for a small marine laboratory might have been is presently anyone's guess. It is interesting, in the light of his fracas at Millport (Moore, 2006), that Pace foresaw no apparent conflict of interest between devoting his Bureau "exclusively to scientific research" and the encouragement of amateur

involvement (see (d) above). Kofoid's choice of words (1910) to describe the Marine Station at Millport under the stewardship of Pace's successor, the genial Richard Elmhirst, included the following statement that would probably have sent shivers down the spine of Stephan Pace:

> "In addition to its contributions to research the Millport station has undertaken a unique public service, without parallel among other European stations, namely, the *scientific entertainment* of classes from the public schools, colleges, and universities, and of field clubs and naturalists' societies, and even to excursions of railway employees" [our italics]

The Pace's Bureau of British Marine Biology was administered from a temporary office in urban surroundings at 6 Provost Road, Haverstock Hill, London, N.W. – a semi-detached rented house on the Eton College estate – described by Pace & Pace (1910a,b) as being "close to Chalk Farm stations on the '*Hampstead Tube*'; and *L. & N. W. Ry*" (Fig. 2). In 1902, the area was considered less genteel and cheaper than now (C. Plouviez, pers. comm. to PGM). The house at 6 Provost Rd was then occupied by a Mrs Eggleton. It seems that the head lease of the house, along with those of several neighbouring properties, was owned by the Eggleton family throughout this period. The ground landlord was Eton College. The house had lain empty, however, before Stephan Pace moved in on 13 January 1908. According to the rating records, he left at Christmas 1915 (see above also). The house was still empty at the end of June 1916 (Maggie Plouviez, pers. comm. to PGM). The telegram sent to W.C. M'Intosh on 23 June 1913 (see Moore, 2006) had been sent from the 'Regent's Park Road office'. This is the local post office to Provost Road (C. Plouviez, pers. comm. to PGM). Clearly, the Paces were operating their Bureau from their rented home.

Fig. 2. The site of the offices of the Bureau of British Marine Biology at 6 Provost Rd, London as it appears today.

Rose Pace (1877–19??)[4] had returned to school teaching in 1908 (at Campden School) to support the family (they had one daughter) while all these financial un-certainties, which had contributed to her husband's pre-war breakdown, swirled about them. Indeed, she taught on there until 1932. She was a visiting teacher[5] from 1934–1945 (Girton College, 1948). Campden is not far away from Provost Rd. The Hounslow address (to which they had flitted from Millport) may, perhaps, have been the home of Pace's parents

(Rose's family was from the English midlands; see Girton College, 1948). The Pace's final known (1941) London address was 80 Priory Rd, NW6 (Moore, 2006), which is also not far (to the west) from Provost Rd.

What remains abundantly clear is that the capacity for self-delusion that so characterised Stephan Pace at Millport (Moore, 2006) remained quite undiminished on his exit from the Directorship here. Sadly, like A.J. Cummings from the Natural History Museum (publishing in 1923 under the pseudonym W.N.P. Barbellion) – though for very different reasons – he too ended-up a disillusioned man (Moore, 2006). Having suffered the 'slings and arrows' at Millport, Stephan Pace's visionary plans were always destined to be wrecked on the *terra incognita* of inadequate fortune.

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We are grateful to Professor P.S. Rainbow and Mr B. Smith (Natural History Museum, London) for supplying copies of the Pace's two 1910 contributions. Mr Steve Parker is thanked for electronic preparation of the figures. Ms Emma Woodason (National Marine Biological Library, Plymouth) is thanked for copying the letter in the E.T. Browne archive. The ever-welcome insights of Professor A.J. Southward (Marine Biological Association, Plymouth) were much appreciated. PGM wishes to record his thanks to Mr & Mrs Charles Plouviez, the current occupants of 6 Provost Rd, London, not only for kindly consenting to his photographing their house (and our reproducing the image herein) but also for the warmth of the welcome they afforded PGM, and for delving further into the Hampstead rating records relating to their property (stored at Holborn Library, Theobald's Rd) on our behalf. We thank the Archives du Palais Princier de Monaco for facilitating access to their records by J. C-L.

NOTES

[1]Letter from Stephan Pace to H. S. H Prince Albert of Monaco dated 8 July 1907 (Archives du Palais Princier de Monaco, C.800 bis (2)).

[2]Letter to E. T. Browne, dated 11 October 1907, from Mrs R. M. Pace written on Marine Station, Millport headed notepaper [the 'N.B.' in the address standing for North Britain; a Victorian euphemism for Scotland (Southward, pers. comm.)] overwritten with the address Milneholme, Hounslow (National Marine Biological Library Plymouth Archives).

[3]A 3-page letter from S. I. Pace (addressed from "Milneholme", Hounslow, Middlesex) to W. C. M'Intosh, dated 19 November 1907. W. C. M'Intosh archive, St Andrews University (MS37098/108).

[4]Rose Pace graduated from Girton College, Cambridge (1897–1901) where she had been Goldsmiths' Exhibitioner, taking the Natural Sciences Tripos Pt I, Class I in 1900 and Pt II, Class II in 1901 and graduating M.A. in 1923. Prior to their marriage in 1904 she had been teaching science at Roedean (Girton College, 1948), the prestigious independent girls' boarding school in Brighton. She also is recorded as having had an affiliation with "Plymouth High School" in 1902 (M.B.A., 1903, p. 640), presumably Plymouth High School for Girls (Southward, pers. comm.).

[5]According to the file card held on Pace in the Mollusc section of the Natural History Museum in London (J. Taylor, pers. comm. to PGM), Rose Pace taught at Highgate School for Girls. Perhaps this was during her later stint as a 'visiting teacher' from 1934–1945 (see Girton College, 1948). Highgate is a bit further away from Provost Rd than is Campden, to the north rather than the southeast. Mr and Mrs Plouviez (pers. comm. to PGM), however,

did not know of any Highgate School for Girls (though they confirmed it would be different from Campden School). The existing Campden School was only founded just pre-W.W. II, when the North London Collegiate School moved to Canons Park.

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The Snake in the Glass: C.H. Braad as the Swedish Philosopher at Calcutta in 1755

Aged 26, Christopher Henric Braad received orders in Canton from his masters in Sweden, the directors of the Swedish East India Company, to proceed to India and, disguising his intentions, investigate on their behalf the prospects of profitable trade. In Canton, a friendly Scotsman, Mr. Raitt, the supercargo of the English-owned *Success Galley*, arranged his passage to Calcutta and introduced him there. The rest of this account is a lightly edited translation from the Swedish of two of Braad's letters and of an autobiographical account.

"As no-one aboard the Success Galley understood more French than I did, the French Company pilot who took her up the Hughly addressed himself to me. It struck him as strange that the Swedes should have abandoned their trade with Bengal. I said that the company had probably lost its inclination but instead of leaving the subject, he remarked 'You may seek as much as you will to hide your purpose, but I see as far as the next man, and you have certainly come here for some *affaires de consequence*. M. Gadheu, the French Company's director, also travelled incognito in India as a youth *sans consequence* and this has taught us to be attentive to unknown knowledgeable travellers.' With great difficulty I led him onto another subject."
(From *Curriculum vitæ*, written in 1781)

"Governor Drake and his principal councillors have met me with the greatest courtesy, and I have had the honour on numerous occasions of being in their company at Fort William and in their houses. Englishmen more polite than these I have never met and I do not know what they think. They may mean whatever they will, but I have decided to forestall them: whenever they air any questionable proposition, I talk of flora and fauna and people who dwell on the planets. I thought at first a philosophical character would be quite ridiculous but I see that people here really do think differently."

(February 3, 1755; letter to Abraham Grill, a director of the Swedish East India Company, Göteborg, Sweden.)

"It caused the governor always to call me 'the Swedish Philosopher'."
(From *Curriculum vitæ*)

"I wrote in my last letter about my favourable reception in Calcutta. I can now assure you that the English are always courteous and treat me most politely despite suspicions about my real intentions, which I have tried where possible to stifle, so if they do not believe them to be as I represent them they have no reason for coldness. I have remarked spies about me on all sides, although this has served only to keep me all the more on my guard." (February 27, 1755; letter to the board of directors.)

[Braad receives a second unannounced visit from Ganeshan, a Banian merchant.]

"He called the next day to oblige me to accept some customary presents. I was annoyed and as Mr Raitt chanced to be present, I told him everything that had happened. With a serious look he told me I would do well to confer with no Banian, for the governor had begun to think I was but a spy, and he reproached Ganeshan, who had visited me unasked. I asked Mr Raitt to ask him to leave us but to assure him he could

have no reason to reproach me for slighting his courtesy. Mr Raitt told him to refrain from any further visit and that he would err if he thought me a Swedish company agent. Having heard this he went away displeased. I put a good face on it, for I heartily desired to talk to him without reserve for some hours, but security forced me on this occasion to sacrifice my wishes. I soon found I had been prudent, for I remarked spies followed me everywhere."

"To throw dust in their eyes, I summoned one of the itinerant snake charmers who for small sums show off their tamed snakes' tricks, and bought two from him. I preserved a cobra capelle in spirits of wine but the other that was much larger I had him skin. This was done in the courtyard in view of all whose curiosity had drawn them in, among them two young Indians whom I recognized from their red turbans as having been constantly on my heels. Suspecting them to be the governor's spies, I made a great fuss of preserving my snakes, as if it were a major concern, and kept at it until long after dark."

Contemporary version of C.H. Braad's trophy. Courtesy of Eva Tamm, San Francisco

"I called next morning on the governor, whom I had not visited for some days. Unusually cordially he expressed on behalf of the community its pleasure over my presence. Perceiving my intrigue had succeeded, my reply was to say it was indeed a pleasure for a foreigner who, having received such courtesy, was in a position to show his appreciation, but as I knew my inability all too well, I could not flatter myself with the good fortune of being able to do more than show my gratitude wherever I might be by praising to the skies the English nation's hospitality and especially the courtesy towards foreigners of its present governor of Bengal. Smiles greeted my compliment and I was told that 'yes, indeed, if you keep on as you have begun we shall soon be freed from the great trouble we have with the snakes that thrive here, but as you are satisfied with so few, your extermination of them would be a slow Herculean labour, so I must wish your collection could be enlarged by many species that rarely occur here.' On behalf of Natural History I thanked him and assured him that such encouragement could immortalize his name among the devotees of this branch of knowledge."

"He then invited me to dinner, when the greater part of table talk was of catching snakes. I later saw no more of the spies but could go freely wherever I liked and ask whatever I wanted without anyone paying attention to my doings."

"Relatively young, Governor Drake owed his appointment over the heads of older, more deserving men less to his own talents, although he was gifted, than to an uncle's and some directors' recommendations. He spent more time in cheerful company than on the company's interests, which the well-known rupture with the Nabob the following year[1] would have ruined if the courage and good fortune of Admiral Watson and Colonel Clive had not restored them so firmly that the English have since played the masters of India. His carelessness may have preceded an advantageous conclusion but made not the least contribution to it. His responsibility for all the harm and delusions he brought about was seemingly discharged by only his recall to England."
(*Curriculum vitæ* 1781).

Braad travelled in India until 1758; he was shipwrecked on Ireland on his homeward voyage. Passing through London in 1759, he called on a former shipmate, later Sir William Chambers, architect of the Great Pagoda at Kew, who introduced him to some of his acquaintance. Thus before leaving for Sweden, Braad could attend the court of George II and visit the Royal Society, some London bookshops, a circulating library, Vauxhall Pleasure Gardens, Hampton Court and the libraries at Oxford. His last (1760–62) eastern voyage embroiled him with the English in western India, but thanks to his skill in dealing with an unsavory character in their service, and undercover work by his friends in the Capuchin mission in Surat, all ended well. The voyage as a whole was a great trading success and his first-supercargo's share brought him enough to retire on.

JEEREMY FRANKS

[1.] i.e. the principal events before, during and after the battle of Plassey in 1757.

Review

Vane-Wright, R.I. & Hughes, H.W.D. (2005). The Seymer Legacy: Henry Seymer and Henry Seymer Jnr of Dorset and their entomological paintings, with a catalogue of Butterflies and Plants (1755–1783). Forrest Text, Tresaith, Ceredigion. ISBN 0 9550740 2 9. Price £165.

This is a lavishly illustrated book showing a fascinating selection of 72, 18th century insect and plant drawings by two Dorset naturalists, father and son, who were both named Henry Seymer. Their associations with other well-known naturalists such as the Duchess of Portland and Richard Pulteney are explored in historical chapters, and the butterflies are identified with great scholarly accuracy. Hanford House, which survives almost unchanged from the Seymer era, is also described. The graphic designs appear to have been partly inspired by a tradition of Moghul-era Indian art, in which the plants and insects are crammed onto the page with great ingenuity and decorative flair.

The story of how these long overlooked drawings came to be created involves a close examination of the genealogy of this family of moderately wealthy Dorset gentry, several of whose members had a love of nature (and the leisure to pursue its study) reminiscent of Gilbert White of Selborne. Henry Seymer senior was related by marriage to Viscount Mayo, whose daughter Bridget was the mother of a neighbouring Dorset landowner and naturalist Aylmer Bourke Lambert. His father Edmund was married successively to two ladies by the name of Bridget, the second being Henry Seymer

senior's daughter (who became Aylmer's stepmother). Thus the family was well known to Lambert, who presented a memoir 'Anecdotes of Henry Seymer' in The Linnean Society on 5 February 1811, reproduced in the preliminary pages of *The Seymer Legacy*. Bridget Seymer's brother Henry junior was one of the founder members of the Linnean Society, but it is the portrait of his father that hangs on the staircase at Burlington House.

Although neither Seymer has a publication record, their surviving diaries have enabled the authors to piece together a convincing record of their activities. This throws new light on the leisured pursuit of natural history in the 18th century, a refreshing alternative to the Gilbert White phenomenon, as well as on the Seymers' contacts with contemporary naturalists and artists. These include Richard Pulteney of Blandford, author of *A general view of the writings of Linnaeus*, the physician Dr John Fothergill, and the entomological artists Dru Drury and Thomas Davies, the latter now being identified as the creator of three of the insect images.

The detailed captions to each of the drawings, which are here reproduced in high quality landscape format, provide identifications of each of the butterflies, moths and other insects as well as of the plants. Though the latter are not interpreted in as much detail, they are just as diverse in geographical origin as are the Lepidoptera. In addition to the captions, there are 40 pages of notes on the drawings giving further evidence for the identifications, citations of relevant literature and other taxonomic notes. Such a level of detail is almost unprecedented in a catalogue of natural history art, and adds significantly to the value of the work to future researchers.

Four further plates (73–76) are provided showing photographs of several of the butterflies and moths illustrated in the drawings, allowing a close comparison of both. This is followed by an analysis of the geographical origin of the figured species. The final chapter evaluates the artistic and entomological significance of the collection of drawings, postulating an interesting stylistic connection with the work of Thomas Robins and Georg D. Ehret. The discussion of the originality of the graphic design of their layouts is particularly interesting, a theme which was also touched on by Dr Henry Noltie in his recent Hooker Lecture at The Linnean Society with reference to the work of Robert Wight. *The Seymer Legacy* is available in both standard and collectors' editions (the latter has the ISBN 0 9550740 3 7) and is a great credit to the two distinguished entomologists, professional and amateur, who have collaborated in its production as well as to the artistically talented amateur entomologists of Hanford, Dorset.

JOHN EDMONDSON
National Museums Liverpool

The Linnean Society
Programme

2006

26th April NB Wednesday	6pm	POLLEN – PARTICLES OF PROLIFIC VIRTUE Madelaine Harley FLS and Rob Kesseler
11th May	6pm	A PASSION FOR TREES: JOHN EVELYN'S LEGACY Maggie Campbell Culver FLS to coincide with publication of the Tercentenary biography of John Evelyn
24th May	6pm*	**Anniversary Meeting** speaker to be announced
8th June	6pm	CURASSOWS AND THEIR CONSERVATION Nigel Hughes FLS
22nd June	6pm	National Insect Week Lecture: ENTOMOLOGICAL ENLIGHTENMENT Quentin Wheeler FLS
13th July	6pm	TILAPIA IN AQUACULTURE Roger Pullin to celebrate publication of the autobiography of Rosemary Lowe-McConnell FLS
4th August Day meeting NB Friday		ADVANCES IN ECONOMIC BOTANY † Plant Anatomy Group To mark the retirement of Barbara Pickersgill FLS
15th Sept. Day meeting	Fri.	BIOMATERIALS MEETING † Paul Hatton
16th Sept. NB Saturday	.	LONDON OPEN HOUSE

Please note that the day meeting on Genomics, previously listed as taking place in May, has now been postponed to 2007.

† organiser * Election of new Fellows

Unless stated otherwise, all meetings are held in the Society's Rooms. Evening meetings start at 6 pm with tea available in the library from 5.30. For further details please contact the Society office or consult the website – address inside the front cover.

Typesetting and layout by Mary J Morris, West Mains, London Road, Ascot SL5 7DG