THE LINNEAN

Newsletter and Proceedings of
THE LINNEAN SOCIETY OF LONDON
Burlington House, Piccadilly, London W1J 0BF

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THE LINNEAN SOCIETY OF LONDON

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Newsletter and Proceedings
of the Linnean Society of London

Edited by B G Gardiner

ANNIVERSARY MEETING

TUESDAY 24th MAY 2005 at 5.00pm

AGENDA

1. Welcome to members and guests
2. Admission of Fellows
3. Apologies for absence
4. Minutes of the meeting held on 5th May 2005, which have been posted in the Society's Rooms
5. Third Reading of Certificate of Recommendation for a Fellow *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 (green) (*Eric Francois Smets FLS, Loutfy Boulos FLS* and *Judith E Winston*)
   (c) Ballot for a Fellow *honoris causa* (pink) (*John Christopher Marsden FLS)*
   (d) Ballot for Officers (yellow): *no change to current Officers list.*
   (e) Ballot for Fellows and Associates (white)
8. Citations and Presentations of Medals and Awards
   Linnean Medal for Botany *Paula Jane Rudall FLS*
   Linnean Medal for Zoology *Andrew B Smith FLS*
   HH Bloomer Award *Peter John Chandler*
   Bicentenary Medal for a botanist under 40 *Peter M Hollingsworth*
   Irene Manton Prize *Alexandra H Wortley*
   Jill Smythies Prize for botanical illustration *Lesley Frances Elkan*
9. Treasurer's Report
10. Motion to Accept Accounts for 2004
11. Appointment of Auditors for 2005
12. Presidential Address
13. Vote of Thanks
14. The Future of the Society*
15. Result of Ballots and any casting votes
    (a) Council (b) Foreign Members (c) Fellow *honoris causa* (c) Officers
    i President ii Treasurer iii Zoological Secretary
    iv Botanical Secretary v Editorial Secretary vi Collections Secretary
    (e) Fellows and Associates
16. Names of Vice-Presidents
17. Any other valid business
18. Close

* Members will be aware that the Society, along with four others, has been involved in establishing the terms of its occupancy of New Burlington House. By the time of the Anniversary Meeting matters should have been resolved and this item will provide an opportunity to report on the terms of the Society's lease, and the way forward.

ADRIAN THOMAS
March 2005

Nominations for Council 2005

For President-elect Council is nominating **David Frederick Cutler (1962)**, who has been Editorial Secretary of the Linnean Society since 1991 and a Vice President since 1994. He is also Visiting Professor in Botany, Reading University and an Honorary Research Fellow at the Royal Botanic Gardens, Kew. After gaining his BSc (Hons) he went on to do a PhD, and his research interests include pure and applied plant anatomy, including systematic anatomy of angiosperms, functional aspects of plant structure and identification of fragmentary plant material. He is currently supervising 4 PhD students.

From 1962 David worked as a plant anatomist at Kew, retiring in 1999 as Deputy Keeper and Head of the Plant Anatomy Section, Jodrell Laboratory. He has lectured and run courses all over the world and has published over 125 scientific papers, books and popular articles. David first served on the Linnean Society Council in 1966 and was Botanical Secretary from 1978 – 84. He is one of only two people who have been awarded the Gold Medal of the Linnean Society. He was also awarded the Kew Medal.

The following members of Council are standing down on 24th May 2005: Stephen Blackmore, Paul Kenrick, Alex Rogers and David Simpson. To succeed them Council has nominated:

Tim Littlewood (1992), who is a Wellcome Trust Senior Research Fellow at the Natural History Museum and works on the evolution of parasitism. He has further interests in wider metazoan phylogenetics, mitogenomics, and echinoderm evolution. For his PhD at the University of the West Indies (Jamaica) Tim studied oyster physiology and aquaculture, and then conducted post-doctoral work in the USA. He is currently Chair of the joint Systematics Association/Linnean Society Systematics Research Fund and was on the Linnean Society Council when this fund was initiated.

Peter Davis (1980), currently Head of the School of Arts and Cultures at the University of Newcastle. He trained as a marine zoologist and ecologist, and was with English Nature and the Peak District National Park before becoming a curator; he worked in museums for 20 years before moving to the University of Newcastle to found the MA in Museum Studies in 1992. He has diverse research interests, having written extensively on marine biogeography, the history of natural history, and on the reaction of museums to environmentalism. He served for several years on the Linnean Society's Curatorial Committee.

Sandra Diane Knapp (1988), a specialist in the taxonomy and evolution of the Solanaceae, especially the large tropical genus *Solanum*. She received her BA from Pomona College, Claremont, California and her PhD from Cornell with a thesis on the taxonomy of a large Neotropical group of solanums (*Solanum* section *Geminata* (G. Don) Walpers). She studied plant ecology for a year at the University of California at Irvine and spent nearly three of her six years at Cornell in the Neotropics collecting plants. She took up her current post at The Natural History Museum in London in 1992 as one of the editors of the international project *Flora Mesoamericana*.

Dr David John Nicholas Hind (1986), who joined the staff of the Herbarium, Royal Botanic Gardens, Kew in 1985, from the University of Reading, and gained his PhD in 1989. He became Head of the Compositae Sub-section in 1994. He has a global overview of

the family but his greatest interest is in the New World, especially Brazil (and Bahia State). Nicholas has published several flora accounts and many new taxa from several other geographical regions. He has been a member of the Linnean Society's Collections Curatorial/ Biological Collections Committee since 1994, and has been on the Linnean Plant Names Typification Project Steering Committee since its inception. He has been Secretary of the Linnean Club since 1997.

Editorial

This issue contains the second of three articles on a little known Swede called Christopher Henrik Braad (1728–81) who from 1748 until 1762 travelled more extensively in Asia than any Linnean apostle. The first of the three appeared in the last issue (21-1) of *The Linnean*.

Braad was employed as a ship's clerk by the Swedish East India Company and during his second voyage he meticulously recorded in his Journal, during a sojourn in Surat, invaluable information on the natural history and resources of the area (37 chapters with maps and illustrations). Also on the voyage was Olof Torén, the ship's pastor and an apostle of Linnaeus, whose unedited letters to Linnaeus he published in 1767, but, as Franks remarks, Braad's "travels in Asia were more extensive in time, space and documentation that those of any Linnean apostle" (viz.. Torén)

There is little doubt that Braad was the Swedish East India Company's most scholarly servant and it is fitting that his last voyage earned the company over 40 barrels of gold, and himself and some others a reward for salvaging the trading funds of the Company's *Fridric Alpha*, abandoned as a write-off near Canton. Together these rewards provided Braad with sufficient funds on which to retire.

After retirement he completed 5 volumes in manuscript entitled *Ostro Gothia Litterata* or man of letters.

In essence, these three articles on Braad are critical of Linnaeus' apostle Olof Torén and, as you are well aware, in Sweden one simply does not criticise Linné. Nevertheless, Linnaeus did refer to the text of Braad's Journal and he was well aware of Braad's orders from the Swedish East India Company to gather as much natural history data as possible. Armed with this background knowledge I am certain you will enjoy all three articles on Braad by Jeremy Franks.

This issue also includes an article on Marie Carmichael Stopes, founder and first President of the Society for Constructive Birth Control and Radical Progress. Marie Stopes was also the first woman appointed (1909) to the Science Department of Manchester University. Besides her scientific publications she also wrote novels and plays. In 1906 she published *A Study of Plant Life for Young People* and she was one of the first women elected a Fellow of the The Linnean Society. It is appropriate that this article is preceded by one on another of the first women Fellows. Both Lilian Clarke and Marie Stopes were pioneers of practical, outdoor teaching of botany.

Finally, those who have not already noticed it may be amused to know that the Christmas edition of *New Scientist* carried a detailed and amusing account of what it termed "A palaeontological pantomine" set in southern Germany, which, in essence, is the story of

Berringer's iconoliths. At the end, the author recommends that further information on this topic can be gleaned from the article by Paul Taylor in *The Linnean* 20(3), July 2004 [entitled *Berringer's iconoliths: palaeontological fraud in the early 18th century*] from which no doubt she obtained the basis for her excellent article.

BRIAN GARDINER

Society News

The Society's Premises. I am pleased to report that there has been progress since I last wrote on agreeing a lease with the Government. After a great deal of technical and legal discussion all five of the Burlington House Courtyard societies have accepted the basic form of the lease, which will give them security of tenure at a reasonable rent for several decades to come. Individual leases are now being prepared for each society. However, we cannot sign a new lease until we have been granted a Supplemental Charter to remove the restriction in our 1802 Charter which prevents us from paying a rent of more than £1,000! Our Petition is now being progressed through the Privy Council and I hope that when I next write I shall be able to report that the premises issue has finally been settled.

Reaching agreement has enabled the Government to start its programme to catch up on the maintenance of New Burlington House. Scaffolding is now going up. During 2005–06 the building will be cleaned and the stonework, windows and railings restored.

Within the building we too will be implementing a refurbishment programme. That has already started with the replacement of the air-conditioning system for the Linnaean Collection. Our plant room has been transformed and we feel confident that the Collection will now be kept safely at the right temperature and humidity for many years to come.

We hope that we can soon start work on the next phase of the programme, which will be to refurbish our Council Room and flat on the second floor. We plan to have a modern suite of well-equipped meeting rooms to improve what we can offer to other societies. However, I must stress again that all this building work will be very disruptive and we ask for your patience if any of our programmes or activities are disrupted.

The Byelaws. At the same time as seeking a new Charter we are revising our Byelaws. That is all part of improving access to the Society. Part of the purpose of the proposed changes is to make the conditions for becoming a Fellow less restrictive, and to make the Society more welcoming and participative. The new Byelaws will be presented at two general meetings before being put to the vote.

Our membership has been static for some time and we hope that we shall now be able to recruit more Fellows. I would like to appeal to all Fellows to encourage their colleagues and friends to join the Society, particularly those from the younger generation. We are now building up the momentum for celebrating the Linnaean Tercentenary in 2007 and we very much hope that the extra publicity will encourage more people to join the Society.

Development Programme. As you will see we are developing a coherent strategy for the future but we shall need additional resources to implement it. We have therefore established a Development Committee whose overriding purpose will be to improve access to the Society

and its collections. This will involve seeking funds to make our collections available on line, to install a lift to improve the physical access to the building, and to provide more support to research and scholarship. It will be a major campaign and we hope that all Fellows will support the efforts of the Development Committee.

Meetings. The normal activities of the Society are of course continuing. Since I last wrote we have had the Brogdale Lecture, a very enjoyable Conversazione at the Natural History Museum, and the first two lectures of the 2005 programme. On 25th January Pat Morris gave a fascinating talk on taxidermy to an almost full house, and on 17th February Guy Clarke gave a wide ranging presentation on Wildlife Crime. We are particularly grateful to Guy as he spoke at less than 24 hours notice after the planned speaker had to go on an investigation.

The List of the Linnean Society. Thanks to all of you who have completed the form for the new List of the Linnean Society – it is particularly useful to have so many more e-mail addresses. If you have not filled in the form please do so – even if it arrives after the deadline we will do our best to make sure that the information you send gets into the List.

Lastly, we were all saddened to lose two of our most senior Fellows at the start of this year. **The Hon Dame Miriam Rothschild** remained active to the end of her long life – the Society accepted one of her papers for publication in January 2005. She held a unique position in the world of biology which no one else will be able to fill. **Professor Ernst**

The previous Executive Secretary, Dr John Marsden being admitted as a Fellow by Vice-President Dr Jenny Edmonds at a meeting in October 2004. (Photo David Pescod)

Mayr remained equally active, and spanned an extraordinarily wide field of knowledge. He was one of the most distinguished of our Foreign Members and his death is a real loss to the international biological community.

ADRIAN THOMAS
Executive Secretary

Library

This report on the Society's Library covers the period from the beginning of October to the end of December. The next issue will include updates from January 2005. In the last quarter of 2004, the Library was open for 61 days during which 204 visitors (130 FLS) were recorded. This gives a visitor/day figure of 3.34 a day as compared to the previous figure of 2.21. The percentage of Fellows among those using the library was 63.7%, considerably higher than previously (56.5%). Loans during this period were 46 and the usage slip records tell us that 35 readers consulted 139 items comprising 69 books, 28 journals and 7 manuscripts. These are records for items not borrowed but consulted in the Reading Room. Visits to access manuscripts numbered 7, including visitors from Australia, Sweden and USA, notably Karen Reeds who is closely involved in plans for "Linnaeus in America" at the American Swedish Historical Museum, Philadelphia.

General Library use included displays for Society general meetings, especially the Irene Manton meeting and the Kamchatka meeting, as well as the book launch for Mrs Christian Lamb FLS. The Society also participated in The Big Draw on 15th October, with Sandy Sykes Ross and Rebecca Jewell helping as facilitators. Visitors included an adult art group and some individuals. A modest budget was spent on purchasing coloured pencils (which will be available for use in future years) but paper off cuts were free from John Purcell Paper and the facilitators gave their time freely. A quantity of ornamental gourds, shells (supplied by the Zoological curator) and other natural history objects provided subject materials. Although the numbers were small the response of those participating was very positive. Pre-booked 2 hour sessions are planned for October 2005 participation.

Group tours and pre-booked visits were made by the Anglo Swedish Society, Aslib Biosciences group, the Circle of State Librarians, and the Warwickshire Natural History Society, with the usual display for the students at the English Garden School, Botanical Illustration course. The Library was also the venue for a celebratory party by the NCCR, organised by Ylva Player-Dahnsjö from the Conservation Unit at Dundee, where the Linnaean Letters are currently being conserved.

The book sale on the evening of the Irene Manton meeting resulted in an addition of *c.*£400 to the Library budget. The Linnaeus Link partners met on 14 and 15 October, with the Society being the host for the 15 October meeting. A private visit to Philadelphia in late November provided an opportunity to present some missing copies of the Society's journals to the Library of the Academy of Natural Sciences and to the Brooklyn Botanic Gardens. The Librarian also attended the meeting of the London Learned Society Libraries Group on 16 December.

Donations: November to the end of December 2004

We are still working our way through many useful additions to the Library extracted from donations to the Book Sale and none of these are listed here. We are always grateful to those who send us reprints, especially when they are from journals we would not normally hold, and we would like to acknowledge the recent receipt of a number of publications on arthropods from Dr Louis A. Somma. [Names of donors are shown in bold.]

Academy of Natural Sciences, Philadelphia: Mc Court, Robert & Spamer, Varle, *Jefferson's botanists, Lewis & Clark discover the plants of the west.* Unpaged, col. illustr. Philadelphia Academy of Natural Sciences, 2004. ISBN 0-91006-59-8.

Dr John Akeroyd and Hugh Synge: Arora, Rajeev, ed., *Adaptation and responses of woody plans to environmental stress.* Conference proceedings (*J. of Crop Improvement*, Vol. 10 parts 1 & 2) 311 pp., illustr., some col., Binghamton NY, Food Products Press, 2004. ISBN 1-56022-110-0.
Pierrel, R. & Reduron, J-P., *Les herbiers:- un outil d'avenir* (Conference proceedings, Lyons, November 2002). 357 pp., illustr., some col., Villiers les Nancy, AFCEV, 2004. ISBN 2-9514620-2-6.
Rettenbacher-Höllwerth, Barbara & Robl, Ferdinand *Tauern-bleame.* 123 ppp., col. illustr, maps, Neukirschen, Tauriska, 1999. ISBN 3-9012578-12-8.
Vlèko, Jaroslav, Dítì, Daniel & Kolñik, Mark *Ustavaèovité Slovenska: Orchids of Slovakia.* 120 pp., col. illustr., Zvolen, ZO SZOPK, 2003. ISBN 80-85453-45-2.
Walther, Michael, *A Guide to Hawaii's coastal plants.* 120 pp., col. illustr., Honolulu, Mutual Publ., 2004. ISBN 1-56647-653-4.

Janet Ashdown: Krashennikov, S.P., *The history of Kamtschatka.* Translated by James Grieve, new edition and facsimile. 280 pp., illustr., maps, Richmond, Richmond Publishing, 1973. ISBN 055 46 176 4.

John Burton: Johnson, Magnus, *The Genus Clematis*. 896 pp. illustr., some col., Södertälje, privately, 2001. ISBN 91-631-1030X.
Hermansen, P., *Svalbad Arctic land.* 200 pp. col. illustr., map. Oslo, Orion, 2003. ISBN 82-458-0596-3.

Gina Douglas: Goro, Fritz, *On the nature of things, the scientific photography of Fritz Goro.* 132 pp., col. illustr. New York Aperture, 1993. ISBN 0-89381-542-X.

Hunt Institute for Botanical Documentation: Bridson, Gavin D.R.(compiler), *BPH-2, Periodicals with Botanical content.* 2 vols 1470 pp., Pittsburgh, Hunt Institute for Botanical Documentation, 2004. ISBN 0-913146-78-9.
White, James J. & Lugene, Bruno, *Eleventh International Exhibition catalogue*. 170 pp. col. illustr., Pittsburgh, Hunt Institute, Carnegie-Mellon University, 2004. ISBN 0-913196-79-7.

Dr John Marsden: Flannery, Tim, *The future eaters, an ecological history of the Australasian lands and people.* 432 pp., illustr., maps, New York, Grove Press, 1994. ISBN 0-8021-3943-4.
Hahn, Daniel, *The Tower menagerie.* 260 pp., illustr. some col., London, Simon & Schuster, 2003.

IUCN: Baillie, Jonathan, Hilton-Taylor, C. & Stuart, Simon, N., *A global species assessment, 2004 IUCN Red List of threatened species.* 191 pp., col. illustr., maps, Gland, IUCN, 2004. ISBN 2-8317-0826-5.

Prof. H.W. Lack: Lack, H.W., *Victoria & Co. in Berlin* (Exhibition catalogue), 32 pp., illustr. some col., Berlin, Bot. Museum Berlin –Dahlem, 2004. ISBN 3-9218051-X.

John Spedan Lewis Foundation: Milliken, William & Bridgewater, Sam, *Flora Celtica.*328 pp., col. illustr., maps, Edinburgh, Burlinn, 2004. ISBN 1-84158-303-0.

Dr Nancy Pick: Pick, Nancy, *The rarest of the rare, treasures from the Harvard Museum of Natural History,* 178 pp., col. illustr., New York, Harper Collins, 2004. ISBN 0-06053718-3.

Royal Botanic Gardens, Kew: Demissew, Sebsebe, Cribb, Phillip & Rasmussen, Finn, *Field guide to Ethiopian orchids.* 300 pp., col. illustr., maps, Kew, Royal Botanic Gardens 2004. ISBN 1-684264-0714.
Lock, J.M. & Ford, C.S., *Legumes of Malaysia, a check list.* 295 pp., Kew, Royal Botanic Gardens, 2004. ISBN 1-84264 051.
H. Noel McGough (and others), *CITES and succulents, an introduction.* 49 pp. illustr., (with CD-ROM), Kew, Royal Botanic Gardens, 2004. ISBN 1-84246-095-1.
H. Noel McGough (and others) *CITES and plants, a user's guide*. 68 pp. illustr. (with CD-ROM), Kew, Royal Botanic Gardens, 2004. ISBN 1-18426-094-3.
Taylor, Nigel & Zappi, Daniela, *Cacti of Eastern Brazil.* 499 pp. col. illustr., maps, Kew, Royal Botanic Gardens, 2004. ISBN 1-84246-056-0.
Burkill, H.M. *The useful plants of West Tropical Africa, Vol. 6 General index.* 1263 pp. Kew, Royal Botanic Gardens, 2004. ISBN 1-900347-660.

Dr Satish Srivatsava: Loeblich, J., Alford, R. & Tappan, Helen, eds. *Foraminiferal genera and their classification.* 2 vols., 970 ppp + 847 pl., New York, Van Nostrad Reinhard, 1988. ISBN 0-442-25937-9.
Tappan, Helen, *The paleobiology of plant protists.*1028 pp., illustr., San Francisco, Freeman, 1980. ISBN 0-7167-1109-5.

Systematics Association: Hirt, Robert P. & Horne, David S., *Organelles, Genomes and Eukaryote Phylogeny.* Systematics Association Special Volume No. 68. 388 pp., illustr., figs., Boca Raton, CRL Press, 2004. ISBN 0-415-29904-7.

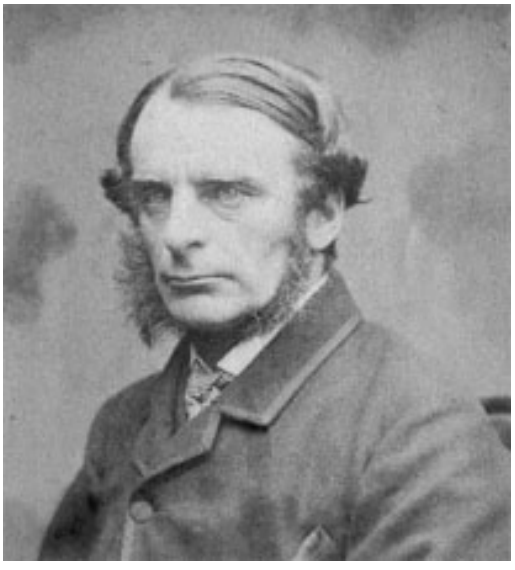
Dr B.A. Whittle: Guy, G.W. , Whittle, B.A. & Robson, P.J., *The medical uses of Cannabis and cannabinoids.* 488 pp., illustr., London, Pharmaceutical Press, 2004. ISBN 0-85369-517-2.

GINA DOUGLAS

Picture Quiz

Charles Kingsley 1819 – 1875

Charles Kingsley, eldest son of the Rev. Charles Kingsley and Annie Lucas, was born at Holne Vicarage on the borders of Dartmoor on June 12th 1819. He was a precocious child, said to have started writing poetry at the age of four. His initial education was at Clifton School, Bristol where he boarded but in 1832 he was sent to Helston Grammar School in Cornwall. After a brief sojourn there he attended King's College in the Strand, whence he passed to Magdalen College, Cambridge (1839). At the end of his first year he won a scholarship as well as prizes for his Latin and English essays. His early interest in geology stemmed from attending Adam Sedgwick's lectures during his second year. Eventually he read classics, obtaining last place in the first class of the 1842 classical tripos after having previously gained a mathematical tripos! Upon graduation he decided to study Law and lived with his parents in Chelsea, his father at that time being rector of St. Lukes. A few months later, probably as a result of parental pressure, he gave up his law studies and took Orders. Eventually he was appointed curate in 1843 to the parish of Evesley on the border of Windsor Forest (of which he remained the rector until he died). Having now secured his future, the following year he married Fanny Grenfell with whom he had corresponded since his undergraduate days.



Clue: Wrote on botanical gardens and bio-geology.

In 1869 Kingsley was appointed Canon of Chester, where he started a botany class which developed into the Chester Natural History Society. He also published in 1872 a *Town Geology*, and regularly led both geological and botanical excursions or field trips. He admired Darwin, Huxley and Lyell and was a firm believer in Darwinism, holding that it was in full accordance with theology.

His first contribution in the province of fiction was *Alton Locke, Poet and Tailor, an autobiography* published in 1850, and in which he becomes a chartist. *Yeast* followed in 1851 to be immediately supplemented by a pamphlet entitled *Application of Associative Principles and Methods of Agriculture*. *Alton Locke* and *Yeast* show his sympathy for the plight of the agricultural labourer. Thus, in *Yeast* he uses the ballad of the poacher's widow to denounce the gamekeeper. Meanwhile, during 1848 he had contributed 17 papers to the *Politics for People* and some 20 contributions to the *Christian Socialist*. In 1853 he wrote *Hypatia*, a romance based on the attempted pagan Alexandrian revival, in which he dealt with an analogous period of intellectual fermentation to that witnessed in the 1850's. During 1853–54 he stayed with his wife in Torquay where he spent his time studying the seashore. This led to his publication in 1855 of *Glaucus or the Wonders of the Shore*, essentially a collection of marine studies. Earlier that year he wrote *Westward Ho!* which dealt with the

Clue: Had a propensity for penguins, the geology of Skye and swallow-tail butterflies.

religious influences of Elizabethan Protestantism on political freedom. His love of tobacco is expressed in this book which is dedicated to Bishop Selwyn and Rajah Brooke. Around this time (1856) he published his first great children's book – *The Heroes or Greek Fairy Tales* followed by *Water Babies* in 1863.

It was a few years later in 1864 that he entered into a most acrimonious debate with Dr John Henry Newman as the result of an article in *Macmillans Magazine*, in which he commented on Newman's sermon on *Wisdom and Innocence*, pointing out that "Truth for its own sake has never been a virtue of Roman Catholic clergy". Newman protested and Kingsley replied in a pamphlet – *What does Dr. Newman mean?* which elicited Newman's famous *Apologia*. Kingsley for his part firmly believed that Christianity might welcome the advances of scientific inquiry, nevertheless it is clear that in his debate with Dr Newman he showed little inductive reasoning.

In 1866 Kingsley published what proved to be a best-seller, *Hereward the Wake*, while a few years later his real interest in botany became apparent when in 1872 he wrote *At Last: a Christmas in the West Indies* which included a chapter on the Botanic Gardens of Trinidad. At the same time he contributed a short paper on Bio-geology to our *Journal of Botany* 1872: 53-57.

May 1860 saw his appointment to the Chair of History at Cambridge while in 1869 he was appointed Canon of Chester, which he vacated in 1873 upon his elevation to Canon of Westminster.

About this time he entered into correspondence with J.S. Mill, the founder, with Jeremy Bentham, of the Unitarian philosophy. Like Mill, Kingsley believed in universal suffrage and franchise and women's emancipation, including their right to be able both to study and practice medicine.

In 1874 his son, who was a railway engineer in the USA, persuaded him, for the sake of his health, to take a sea-voyage and accompany him to America. Here he travelled over much of the United States and Canada on a grand lecture tour. However, on return his condition rapidly deteriorated.

He died on the 23rd January 1875 at Evesley and was buried in his churchyard, a cross erected by his wife marks the grave: a bust by Woolner was placed in Westminster Abbey. **He was elected FLS** on 16th December 1856. His form bears the signatures of William Yarrell, Thomas Bell (President), Joseph D. Hooker, Lovel Reeve and Edward Rigby.

BRIAN GARDINER

Correspondence

From: JOHN CLOUDSLEY-THOMPSON Hon FLS London N1 1TE 25 Sept. 2004

Poison Maidens

Vegetable toxins evolved primarily as defences against attack by herbivorous animals – principally insects, as well as browsing and grazing vertebrates (Crawford, 1989). Some of these toxins are lethal to human beings and, along with inorganic poisons, such as arsenic, have been used by poisoners since the dawn of human history. In this context, I devised the following quiz: Which is the odd one out and why? Lakmé, Tormentilla, Sélika, Adriana Lecouvreur. The clue: the answer is *not* 'Sélika because she has a mezzo role while the others are sopranos'. The correct answer is 'Tormentilla'. Lakmé (Délibes), daughter of a Brahmin priest, committed suicide by eating a poisonous datura petal when her lover, an English officer, had to return to his regiment. Sélika, in Meyerbeer's *l'Africaine*, breathed the perfume of the poisonous manchineel tree (*The Linnean* **16** (4): 13-14) when Vasco da Gama sailed for Europe with his fiancée. Inez. Adriana Lecouvreur (Ciléa) died when she smelled a poisoned bunch of faded violets, sent by her jealous rival, the Princess. In contrast, Tormentilla in Vaughan Williams' *The Poisoned Kiss* was brought up on poison by a sorcerer so that, when she fell in love with Amaryllus, the son of his enemy the Empress, Amaryllus would die.

Vaughan Williams' opera (1906) is set to Evelyn Sharp's libretto after a story by Richard Garnett in a collection of pagan tales, *The Twilight of the Gods* (1888). Poisoning has always been a favoured method of political assassination and murder in India, both in myth and history. One of the more ingenious methods described in Sanskrit literature was to send a desirable gift in the form of a Poison Maiden. In the *Katha Sarit Sagara*, a collection of Indian lore compiled by the poet Somadera (*c*.1050) King Brahmadatta sent poisonous damsels, as dancing-girls, into the army of his enemy. Poison Maidens were despatched as secret weapons. 'A touch, a kiss, or sexual intercourse with one of these ravishing but deadly damsels brought sure death' (Mayor, 2003).

Both Alexander the Great of Macedonia and his Indian rival, King Chandragupta, whose Mauryen Empire was centred around Pataliputra (Patna) on the Ganges, were, according to Arabic and Hindu legend, the intended victims of Poison Maidens despatched by their enemies to one another. The one from Alexander was diverted to an opponent of Chandragupta: the gifts sent to Alexander by the Indian king, 'a maiden who had been fed on poison until she had the nature of a venomous snake' was almost successful. Smitten by her beauty, Alexander rushed to embrace her. Had he done so he would most certainly have died; but he was prevented from so doing by his trusted adviser, Aristotle. In fact, Aristotle never visited India (Penzer, 1952). Moreover, Chandragupta and Alexander regarded each other with respect, and neither would have resorted to such a dishonourable trick.

Poison Maidens were, of course, invariably beautiful. Although they lived in dismal woods and forest, and were seldom visited except by potential clients, most were not unhappy with their lot – according to Ranajit Pal (on the internet). Some did, however, seem to express a degree of melancholy: they ate nothing but the most noxious and toxic herbs and fungi. Furthermore, they allowed themselves to be repeatedly bitten by venomous snakes and spiders so that they acquired immunity to all natural poisons and venoms. In addition, they used to fight with daggers coated in lethal, caustic, venom.

To compare beautiful girls with snakes may reflect the idea that snake charmers gained immunity by ingesting small doses of venom. Penzer (1952) pointed out that there was a popular notion in past times that the bites of snake charmers might be as venomous as those of the snakes they handled. He also investigated the possibility that the poison transmitted by intimate contact with deadly maidens might really be venereal disease or some other fatal infectious illnesses, such as smallpox, which are transmitted by personal contact. In 1494, many years later, the Spanish not only poisoned French wine with contaminated blood but, according to the medical writer Gabriele Falloppia, they also 'intentionally chased beautiful, infectious prostitutes into the French army camp' (Mayor, 2003).. Perhaps the amplification of my quiz is more interesting than the quiz itself.

CRAWFORD, R.M.M. (1989) *Studies in Plant Survival. Ecological Case Histories of Plant Adaptation to Adversity.* Oxford, London, Edinburgh, Boston, Melbourne: Blackwell Scientific Publications.

MAYOR, A. (2003) *Greek Fire, Poison Arrows and Scorpion Bombs. Biological and Chemical Warfare in the Ancient World.* Woodstock, New York, London: Overlook Duckworth.

PENZER, N. (1952) *Poison-Damsels and other Essays in Folklore and Anthropology.* London: Sawyer.

From: PAUL HOLLIDAY FLS Uppingham, Rutland 14 January 2005

The Germ Theory of Disease

In the piece on Johann Christian Fabricius (*The Linnean* 21(1):9) no mention is made of his important contribution to plant pathology and this theory. Virtually all Biology, English, one volume texts, if indeed they ever refer to the theory, never refer to the diseases of plant crops. They may only refer to Louis Pasteur (born 1822) and Robert Koch (1843). But those who gave written evidence in support of the theory mostly studied plants. They are all described in the series: *Phytopathological Classics* published by the American Phytopathological Society. No 1 is on Fabricius (1745) who wrote a paper on diseases of plants. This gives the identical protrait that is reproduced in *The Linnean* article.

Other workers who studied the same or similar diseases are all described in this series. They are: Targioni (*c.*1730), Prevost (1755), Bassi (1773, silkworms), Berkeley (1803) and de Bary (1831). The literature on the evidence in support of the theory almost always confines itself to citing Pasteur and Koch on man and other animals. Only Large has pointed out this anomaly: p321: "...it was well that the medical profession should be reminded from time to time that one of the commonest diseases of wheat was attributed to the parasitism of a living organism over a hundred years before Pasteur". The complex investigations in support of the germ theory of disease rank with the work of Darwin, Mendel and Wallace in the growth of biological knowledge.

AINSWORTH, G. C., 1981. *Introduction to the history of plant pathology*. Cambridge University Press.
HOLLIDAY, P., 1998. *A Dictionary of Plant Pathology*. Edition 2, paperback 2001. CUP.
LARGE, E. C., 1940. *The Advance of the Fungi*. Jonathan Cape (reprinted with a new introduction by the American Phytopathological Society, APS Press, 2003).
RAVN, M. K., 1926. English translation: *Attempt at a dissertation on the diseases of plants.* By Johann Christian Fabricius 1774 (supplement by Ernst Gram). *Phytopathological Classics* No. 1.

From: SIR PETER LESLEY FLS, Ascott-under-Wychwood, OX7 6AQ October 28th 2004

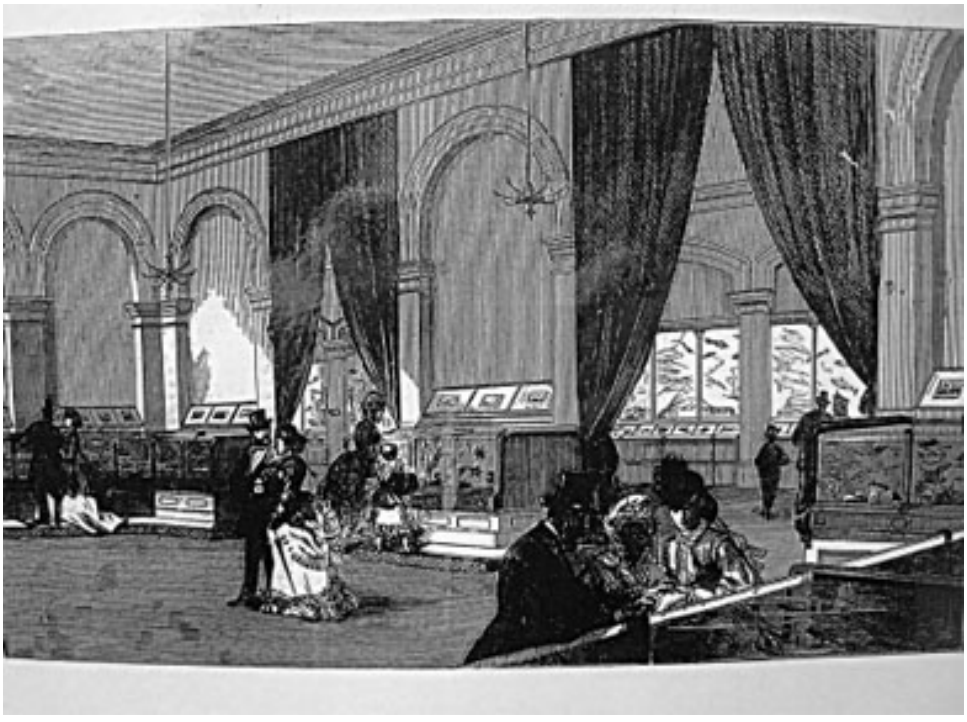
The most recent *Linnean* refers to Alexander McLeay and his entomological collection and, in particular, to the Jamaican Swallowtail. One of McLeay's descendants has reminded me that some of his collection is still extant in Sydney and in this connection I enclose a note on Elizabeth Bay House.

PS. I expect that the Society is perfectly well aware of this, but enclose the note just in case.

From: DAVID PESCOD FLS Maida Vale, London 10th February 2005

I read with interest the article on *Joseph Paxton and the Crystal Palace* (Gardiner and Pye *The Linnean* 21(1). Although no mention is made in the text of the aquarium at the Crystal Palace, one of the photographs purports to show the remains of Paxton's aquarium. I very much doubt if Paxton had anything to do with the aquarium, as it was not constructed until five years after his death in 1865.

Although most people are aware of the great fire, which destroyed much of the Crystal Palace in 1936, this was by no means the first. Within twelve years of its reconstruction at



Interior of the Crystal Palace Aquarium *c* 1880.
(Photo David Pescod from a display boarrd at the excavation site.)

Sydenham in 1854 there were a number of fires that severely damaged the North Transept. The lack of funds meant it was impossible to rebuild the north end of the Palace leaving the area a charred, desolate wilderness.

In 1870 a plan was put to the directors for the building of a salt-water aquarium on this site. The aquarium was duly erected and opened on 22nd August 1871 having been designed by the British engineer W. Alfred Lloyd, who had been responsible for the construction of the Hamburg aquarium in 1867. The size was 122 metres long by 22 metres wide, whilst the frontage of the tanks amounted to 120 metres. Sixty large tanks were on public view and contained 90,000 litres of seawater with a further 450,000 litres held in reservoirs below ground. The largest tanks were 6 metres in length with a capacity of 18,000 litres. In addition to these tanks, a further twenty smaller tanks, ranging in capacity from 180 to 1,200 litres, stood in two side rooms where the animals could be viewed from above. In addition, there were twenty-two special tanks in which was kept live food, including fish, shrimps, and crabs. The introduction of this live food into the show tanks by the assistants was 'always an animated sight'. The water for the storage tanks was brought by a relay of trains from the sea at Brighton. The naturalist and author Dr John Ellor Taylor FLS (1837–1895) wrote, "We may regard the establishment of the Crystal Place Aquarium as an important epoch in the history of the great public aquaria in this country **. . .** The number of fish, zoophytes, annelids *(sic)*, &c., kept alive in this splendid aquarium is very great, the sea anemones alone amounting to several thousand. Every one of the latter has to be fed separately by means of wooden forceps."*

**The Aquarium. Its Inhabitants, Structure and Management* by J. E. Taylor, PhD, FLS, FGS, Etc. 1876.

Right: View of the aquarium site: The black bags contain rubbish and vegetation removed from the half-acre site. The large storage tanks are below ground; to the right is one of the arches over the Attendents Gallery; behind the wall is the rest of the aquarium site. Entrance to view the site is via Old Cople Lane, off Crystal Palace Parade.
The notice on the wall reads "The Remains of once the World's largest marine aquarium".

Shown below are the remains of two small aquaria.
Photos by David Pescod.

The aquarium proved an immense success for the next twenty years. However, public interest in marine life eventually declined, leading to the closure of the aquarium in the 1890's. The enormous tanks were subsequently used to house a menagerie of monkeys!

The 1936 fire left the north-end relatively undamaged but because it was thought that Brunel's north tower would act as a guide to the Luftwaffe it was dynamited in 1941. The explosion completely destroyed the remainder of the north section including most of the aquarium. The area was then used as a dump for rubble from the London Blitz.

The remains of the aquarium shown in the photograph in the last issue of *The Linnean* occupy about half an acre. The remainder of the site having been in-filled and stabilized to

supply part of the base for the BBC's 270 m television transmitter mast which was erected in the 1950's. The half-acre site became completely overgrown. The vegetation and trees were cleared in the 1980's when it became possible to survey the area. However, work on the site was suspended during the 1990's to enable the excavation of the foundation of the south tower. (also dynamited in 1941). Finally in 2002 permission was granted to three dedicated archaeologists to resume the clearing of vegetation, which had grown during the intervening decade, and, at last, begin a systematic investigation into the remains of one of the country's first public and largest inland marine aquaria.

You may also be interested to know that a blue plaque marks the site of the house where Camille Pissarro resided from 1870–1. It is on the wall of the present building at 77a Westow Hill, Crystal Palace, immediately to the left of the Bluebottle Pub.

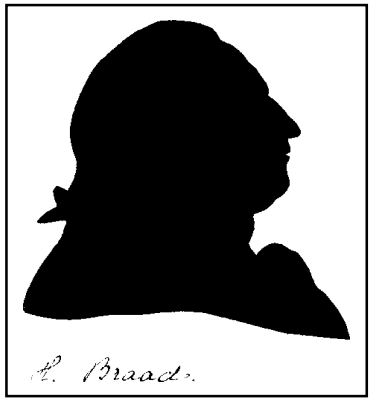
Above: The President, Professor Gordon McGregor Reid and Mrs McGregor Reid with a guest at the Conversazione, held in December at the Darwin Centre of the Natural History Museum. Below: Professor Joe Cain, who spoke at the Conversazione, with his wife Rita. On the right, our new Executive Secretary, Mr Adrian Thomas, welcomed guests to the Conversatzione.

Photos by David Pescod.

Reports to the Swedish East India Company: The Indian & eastern years (1748–62) of Christopher Henrik Braad

2. The posthumous apostle and the clerk: Olof Torén and C.H. Braad, 1748–53.

Lutheran by necessity, Swedish Linneans had to think cautiously after 1735, when legislation provided that imputed unLutheran thought justified interrogation of the thinker as to religious belief, and that an improper believer might be exiled.[1] This suggests the question of whether Daniel Solander liked London because an untrammelled Lutheran life was possible there, but it is addressed neither here nor in Edward Duyker's biography.[2]



Silhouette portrait of Braad, courtesy of the National Museum of Finland.

Nor could a Linnean pastor in a Swedish East Indiaman enjoy much of the freedom of the seas. He might see exotic East Indian flora and fauna but under the Swedish flag might not let his thoughts about them, nor those of his flock on board, not least those of his literate social equals, stray into similarly exotic mental territory. On land even the mightiest would heed the local bishop's visitation but who, however excited by the exotic at sea, would bother about an isolated ship's pastor, however upright, downright, or forthright?

Under such conditions Olof Torén sailed as ship's pastor in *Hope* (Captain Pettersson) on a round voyage to Canton in 1748–49, then in *Götha Leijon* via Surat to Canton in 1750–2. The ship's clerk on both voyages was C.H. Braad. His papers reveal much more about them than Torén's letters to Linnaeus. I have inferred that, in preparing them for publication, Linnaeus referred to the text of Braad's journal, but his manuscript notebook of his reading on the first voyage came to light in 1928.

Its provenance is obscure; the 51-page list of the contents of his library in 1781 contains nothing like it. Its absence may reflect his wish to veil its testimony to offences against the 1735 legislation or censorship regulations by Captain Pettersson or himself, as well as a great deal of unpleasantness for Olof Torén. After the voyage, Braad may have confided it to a discreet friend.

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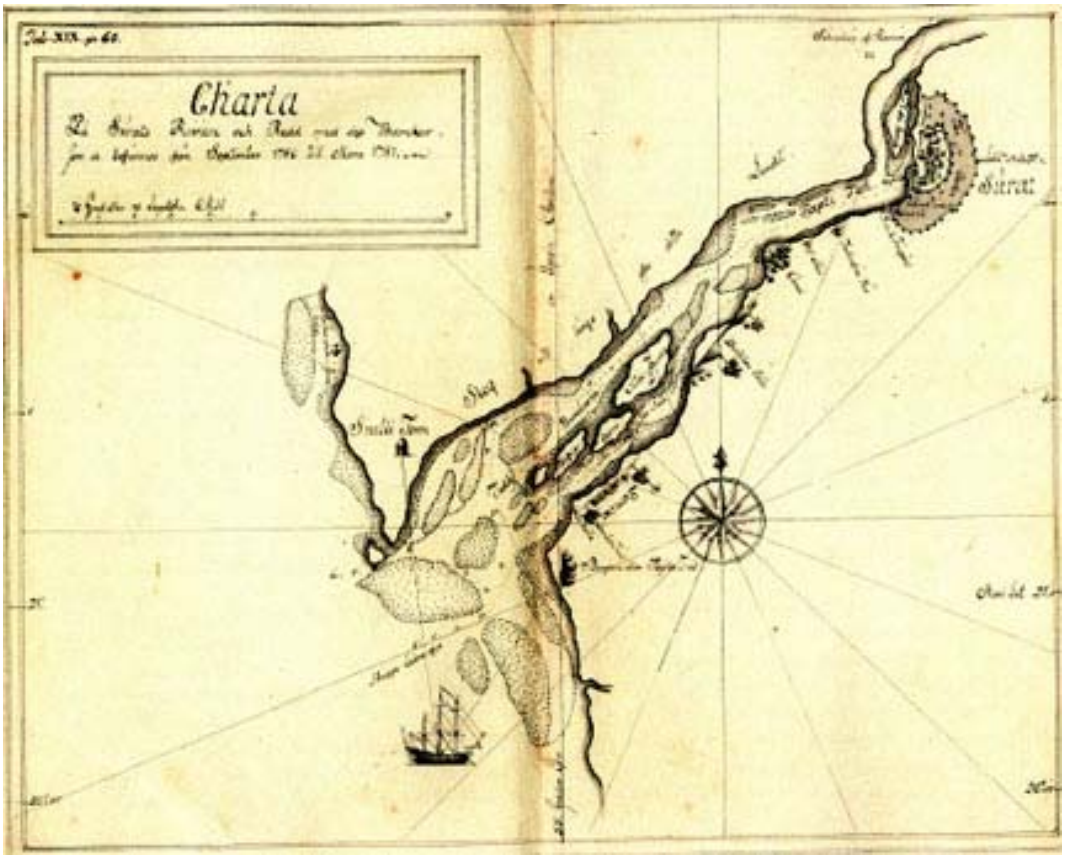
1. The legislation of 1735 was "the most severe" in Swedish history, according to Berndt Gustafsson *Svenska kyrkohistoria* 'History of the Swedish church' (Stockholm, 1957, 3rd ed. 1966), 132ff. It permitted "persons suspected of unLutheran opinions [to] be apprehended and subjected to questioning." The first instance of forced expulsion from Sweden for religious reasons had occurred in 1734; the last, of six women who had embraced the Catholic faith, took place in 1858. (216) "Since 1687 the censor institution [was] a protective wall ... supervised the import of books and inspected book shops ... In 1708 [it] established a list of books [printed in Sweden] that should not be offered for sale." (119) The instructions for the first *censor librorum* were, *inter alia*, to ensure that "harmful books from other countries were not brought into the kingdom"; Otto Sylwan "Nils von Oelreich såsom censur librorum" 'Nils von Oelreich as *censur librorum*' in *Historisk Tidskrift* 1893, 123.
2. Melbourne, 1998.

Joining *Hope* probably at the last minute when the first appointee as ship's clerk failed to show up, Braad would have had no time to collect (nor arrange room on board to store) the 106 books he read on the voyage. They had probably been brought on board the newly-built *Hope* in boxes or the like and his reading order was probably what lay uppermost. Had they been on shelves, this bookish young man approaching Canton would not have read ninety works before the four volumes of du Halde on China (numbers 91 to 94). A legendary Swedish cook is said to have followed rather the same principle: 'you take what you have.'

Captain Pettersson had taken on board, among much else, some pornographic works in French or German, but Braad had read 42 inoffensive titles before reaching *Cupido als ein Rabbine, oder Wahrhäfftige Begenenheit Zweyer bekehrten Christlichen Judinnen, der curieusen und galanten welt in einem anmuthigem Roman* (Hall, 1723). Maybe his German was not as advanced as his French, for he makes no note under this title. However, he described *La vraye Histoire comique de Francoin* (Leiden, 1685) as "the most shameful and obscene of the sort I have ever read or seen ... a listing or representation of all the debauches and disorders that an unbridled youth can ever fall into. NB all described according to nature." He sounds disgusted enough to have told anyone who might listen and had he spoken within earshot of the ship's pastor, or had his words reached him indirectly, would not this have put Torén on the horns of a nasty dilemma? Only a bishop's presence could allow a fool to reprobate a captain, so Torén probably kept quiet but goaded himself for being morally so supine.

For the rest of the voyage and all that of 1750–52, Braad's mere presence, let alone his activity on shore, would have been a perpetual goad for his depressing failure as a pastor. When he wrote to Linnaeus of his discouragement (by processions on Madeira), inertia (on land for 23 days in 5½ months at Surat), disinterest (in events affecting the ship at Surat), fear (of marauders in Surat, tigers at Mangelor, snakes and scorpions at Mahée, crocodiles in Malaya), and penny-pinching (on account of the cost of living on shore) was he not – unknowingly – describing the symptoms of a profound long-lasting hypochondria or depression? He died in August 1753, and it may have hastened his death. Supposing Linnaeus noticed these subjective responses that add nothing of botanical or similar value to Torén's account, it is odd that he did not edit them out of the text which he published in 1757 to establish Torén as one of the 'apostles'.

Seen in retrospect, Torén is close to the fount of the essentially Lutheran Swedish, Linnean tradition that was carried into the 19th century by Samuel Ödmann (1750–1829), one of the last of Linnaeus' students and later a pastor on land who, it is said, 'saw the finger of God in everything'. The belief of the tradition linked it to the philosophy of the Swedish Plato, as generations of Uppsala students called Christopher Johan Boström (1797–1865). Boström's methodology was to prepare compendia for his students that contained only citations and the like, that supported his own views. The treatment of Braad's work in the biographical dictionary referred to in the previous article exemplifies its wider application. Boström's 'rational idealism' included the almost Linnean assertion that the Swedish *Riksdag* of Four Estates owed its existence not to human beings in history but, like the unchanging species of the world's flora and fauna, to the creative powers of the Deity. Boström naturally opposed every attempt to reform the *Riksdag* – as if Man can improve a Divine creation! – but it is astonishing that his 'idealism' should later have become "literally *the official ideology of*



Braad's chart of the Tapi River from the sea to Surat.

Sweden as it has been brilliantly and maliciously portrayed by August Strindberg in his great novel *Röda Rummet* (the Red Room, 1879). [It was] a blend of airy religiosity, antimaterialism, homily, and a highly hierarchical view of society".[3]

At about that time, many new streets, and so on, in Stockholm (*Linnégatan*), Göteborg (*Linnégatan, Linnéplatsen*) and elsewhere, commemorated Linnaeus, while for his part Strindberg named Braad in the context of *"des oeuvres manuscrites, ensevelies dans les Bibliothèques de la Suède, qui seraient, pour les sciences, d'une importance beaucoup plus grande encore à publier."*[4] He was then employed in the Royal Library but the brilliance of his recent novel and its comic hierarchy of porters idling in a public office was unpersuasive as far as it concerned Braad. Perhaps fortunately, he lacked every attribute of idealism.

Privately-tutored, like Linnaeus, Braad was enviably well-read, linguistically fluent enough to understand pornography, and a classicist for whom India had been known to

3. S.E. Liedman "The Swedish Philosopher C.J. Boström and His Influence", in C. Cho & N. Runeby (eds.) *Traditional Thought and Ideological Change. Sweden and Japan in the Age of Industrialisation* (Stockholm, 1988), 24. Emphasis in original. Boström's 'idealism' was more likely than not what Alfred Nobel had in mind when he created the annual award for distinguished writing, which August Strindberg understandably never received.

4. August Strindberg *"Les Relations de la Suède avec la Chine et les pays Tartares"*, in Revue de l'Extrème Orient, 1, (1882), 513.

Megasthenes and other writers from antiquity onwards. If he thought about himself, he would have seen only one of the latest of innumerable travellers to India during the past two thousand years or more. His observations confirmed what he had read of a semi-continent full of very various faiths and their faithful. Some were older than Christianity, others younger; one seems to have been in gestation: the Musei, a sect in Surat following the laws of Moses and the Koran in 1750–51, may have become the Ba'hai faith founded in the 1840s. Some were odd. The public nakedness of fakirs was at first sight startling if not unnatural in the tropics, unlike the Christian (Discalced Carmelite) practice of wearing wigs during divine service. Braad called it, as well he might, French flightiness; but he, if not also the Carmelites, did not know it was already prohibited in France.[5] One senses he was a Lutheran who thought, as a detached 'philosopher' or scientist might, or as a merchant thinks, for whom the probity of the individual is decisive, that whatever the faithful may say, no religious faith is absolutely superior to another, let alone to all others, especially in the face of the flora and fauna of the world.

JEREMY FRANKS

5. As Joachim Smet, O. Carm., Rome, kindly informed me, citing *Acta capitulorum generalium*, ed. Gabriel Wessels, O. Carm. (2v., Romae, 1912-1934), II, 391.

Erratum and attribution: In our January account of Braad we published his drawing of the Dutch burial ground at Surat. The photograph of Braad's plate was taken by L.C. Rookmaaker FLS in 1985. Ed.

From the Radicle to the Radical: biology education and the first women Fellows of the Linnean Society of London

A perceived lack in the provision of biological fieldwork, particularly in secondary schools, is much debated at present, both within learned societies and educational organisations such as the Field Studies Council, (see for example Barker *et al*., 2002; Rickinson *et al*., 2004; www.linnean.org). Concern has also been expressed for the limited range of biological specimens studied in school classrooms and laboratories, as Tranter has observed, 'in too many schools, the wealth of living or once-living organisms which pupils are required to study is often reduced to little more than the geranium and the potato' (Tranter, 2004, p. 104).

Alongside this impoverished educational background, humanity lives in an era where the biological diversity of the world is rapidly diminishing and the human populace is expanding (see for example Hopper, 1997). The role of biological education in this social context is an important one for; 'Biodiversity cannot be managed, unless it can be understood, and it cannot be understood unless its components are identified' (Radford, 1998, p. 11). In response to these social and educational challenges there is a need for a biology education which transcends the current view that school biology is 'dull, lifeless and boring' (Tranter, 2004, p.104).

Dr. Lilian Clarke (1866–1934)
Source The James Allen's Girls' School archives.

Referring to history can give us examples of radical innovators in botanical and zoological education, innovators who can offer inspirational pedagogical models. Linnaeus himself felt strongly that students should experience living organisms rather than purely interacting with words extracted from the tomes of the period. He led students on botanising walks; 'in order that I can spur others on to an examination and explanation of nature rather than the reiteration of perceived ideas' (Linnaeus, 1748)

Aside from Linnaeus, there are key characters in botanical education represented in the personal histories of previous Fellows of the Society. One such Fellow being Dr. Lilian Clarke (1866–1934), elected in one of the first swathes of women Fellows during the period 1904–1905 following the announcement to admit women (*Proceedings of Linnean Society*, 1904–5). In 1885, at the age of nineteen, Lilian received a Gold Medal for Botany awarded by The Society of Apothecaries. The award to young women was initiated in 1878, in order to 'induce young women under the age of 20 years of age to adopt the study of botany – it being one of those branches of knowledge, deemed by the society, to be fitted for the female mind!' (Dee Cook, Apothecaries' Society Archivist, pers. comm., 2001.) Lilian completed her BSc. Degree in 1893 after studying botany under Professor F.W. Oliver at University College London (Brenchley, 1934).

Botany gardens

In 1896 Lilian began teaching at James Allen's Girls' School, South London where she stayed as a teacher until 1926. In her first year at the school, Clarke started to develop botanic gardens, which became known as 'The Botany Gardens'. This was the first time that such an experiment was undertaken by a school in this country. The Botany Gardens became an outdoor laboratory where subjects such as plant growth and pollination could be observed. According to the School's history, girls were encouraged to abandon textbooks and make their own books. When the ecology of plants took precedence over knowledge of 'the natural orders' in examinations, Lilian Clarke, supported by the eminent British ecologist Arthur George Tansley, created a new series of beds in her garden to replicate examples of British habitats, such as salt marsh and pebble beach.

View of the James Allen's Girl's School pond 1915

Tansley was not the only supporter of Clarke's work at the school, the curator of Chelsea Physic Garden at that time, William Hales gave invaluable support to Lilian's work. Support which is documented in Clarke's publication, *The Botany Gardens of the James Allen's Girls' School, Dulwich: Their History and Organisation* (1922) published by the London Board of Education. In this publication, Clarke describes the plants at the edge of the pond: 'we have Forget-Me-Knots, Brooklime, Musk, Water-Mint, Yellow Iris, Water Plantain, Arrowhead, etc. A little farther in are partially submerged plants such as Water Lilies, Floating Pondweed, and totally submerged plants such as Elodea. Some of the pond plants were given by Mr. Hales, Curator of the Chelsea Physic Garden, to whom many thanks are due for valuable help in designing the pond and in other matters' (Clarke, 1922, pp. 23–4.)

Clarke goes on to say that: 'the pond has proved a great success and of the utmost value in our lessons.' (Clarke, 1922, p. 24). The booklet lists the water plants, both by English and Latin names, and contains a transect of the pond in 1915, two years after William Hales provided his support.

During her teaching career at the James Allen's Girls' School Lilian Clarke made a significant impact on educational practices; contributions which have resonances for educators today. The key elements of her contributions were:

- an early use of the 'outdoor classroom'
- a proactive view of learners as authors of their own texts
- a recognition that learners and teachers contribute to the pace of lessons
- an example of a teacher documenting her own teaching practices (Clarke, 1922 and 1935)
- an affirmation of the importance of educators forming partnerships with external agencies and institutions.

In her book *Botany as an Experimental Science in Laboratory and Garden* (Clarke, 1935), which was published posthumously by Oxford University Press, Clarke highlights two key elements of her philosophy on botany teaching, elements which are particularly pertinent to the challenges of botanical education today. She observes that 'since the end of the last century more importance has been paid at the James Allen's Girls' School to the plant as a living organism than to any other branch of botany' (Clarke, 1935, p. vi). Crucially, she considers that 'the experimental method of studying Botany has been greatly helped by the development of botany gardens. The gardens have been made gradually in response to the needs of the work. They have become, in many cases, out-of-door laboratories, and the work indoors and out of doors is one' (Clarke, ibid, p. vii). Clarke was not the only woman Fellow of this period to be concerned with botanical education; Marie Stopes F.L.S. (elected 1909) in her publication *Ancient Plants* (1910) wanted to make sure that people were not intimidated by the 'medium of petrifying technicalities' (Stopes, 1910, p. 3) that the paleobotanical writing of the period was enshrouded in. Importantly, for biology education, prior to *Ancient Plants* she published a *Study of Plant Life for Young People* (1906) in which she supported the notion of living specimens for botanical study and extolled the virtues of taking young people 'to the plants themselves and asking them to teach us' (Stopes, 1906, p.196).

Access by children to the natural environment, both within formal education and during

Girls at work in the botany gardens during Lilian Clarke's time as teacher
Source The James Allen's Girls' School archives.

informal play, is under threat. In a recent report (Thomas and Thompson, 2004) the authors, in response to in-depth interviews with forty British children from diverse backgrounds, suggest that 'out of classroom learning should not just be about one-off excursions to established learning institutions such as museums or galleries', but instead consist of 'school safaris' which 'reconnect to children's innate delight of secret spaces and self-discovery' (*ibid*, p.12). In their botanical education work, Clarke and Stopes believed in young people experiencing plants as whole organisms and encouraged them to create gardens and experiment with plants in outdoor laboratories. Clarke especially inspired her pupils to write about those experiences and experiments in their own words. Indeed, she thought the creation of this documentation more important than the use of conventional textbooks. Among the reminiscences of ex-pupils of Lilian is a story that she once said to a class 'girls this lesson is getting boring – change the pace'. In her emphasis on the girls being the authors of their own botanical texts and the choreographers of the pace of a botany lesson Lilian was an early instigator of an outdoor learning which had self- discovery at the heart of its practice.

The Linnean Society is considered a learned society because of the role of its Fellows in their contributions to the science of biology. As a botanical educator and researcher I would suggest that it has also made Fellows of important contributors to the practice of biological education. A practice in which the early women Fellows, such as Lilian Clarke and Marie Stopes, were imaginative and active protagonists.

DAWN SANDERS FLS

REFERENCES

BARKER, S., SLINGSBY, D. & TILLING, S., 2002. *Teaching biology outside the classroom: is it heading for extinction? A report on biology fieldwork in the 14-19 curriculum* (FSC Occasional Publication 72). Shrewsbury: Field Studies Council.

BRENCHLEY, W., 1934. Dr. Lilian Clarke (Obituary). *Nature*, March 24.

CLARKE, L., 1922. *The botany gardens of James Allen's Girls' School, Dulwich: their history and organisation*. London: London Board of Education.

CLARKE, L., 1935. *Botany as an experimental science in laboratory and garden.* London: Oxford University Press.

HOPPER, S.D., 1997. Future plant conservation challenges. In: Touchell, D.H. & Dixon, K.W., eds. *Conservation into the 21st century. Proceedings of the 4th International Botanic Gardens Conservation Congress, Perth, Western Australia*. West Perth, WA: Kings Park and Botanic Garden.

LINNAEUS, C., 1748. *Systema naturae*. Cited in: Knapp, S., 2002. Fact and fantasy: the zoology created by our imagination is far outstripped by that of reality. *Nature*, 415: 479.

LINNEAN SOCIETY. *Proceedings of the Linnean Society of London 1904-1905*. London: Linnean Society.

RADFORD, T., 1998. Analysis: biodiversity – tearing up the map of creation. *The Guardian*, 11 August: 11.

RICKINSON, M., DILLON, J., TEAMEY, K., MORRIS, M., CHOI, M., SANDERS, D. & BENEFIELD, P., 2004. *A review of research on outdoor learning.* Shrewsbury: Field Studies Council.

STOPES, M., 1906. *The study of plant life for young people*. London: Alexander Moring.

STOPES, M., 1910. *Ancient plants*. Glasgow: Blackie and Son.

TRANTER, J., 2004. Biology: dull, lifeless and boring? *Journal of Biological Education*, 38 (3): 104-105.

THOMAS, G. & THOMPSON, G., 2004. *A child's place: why environment matters to children.* London: Green Alliance and Demos.

Marie Stopes and a century of seed ferns

The celebrations of our entry into the third millennium and the other aspects of having chosen base ten arithmetic can be traced back to the late Devonian period. At about the same time as our Palaeozoic progenitors opted for paired pentadactyl limbs, certain vascular land plants crossed the boundary from having heterosporous reproduction to displaying the seed habit. Around then too, the drive for greater efficiency in photosynthesis resulted in the parallel evolution of what are often called fern-like leaves or pinnate fronds, both in the early gymnosperms and in some of their free-sporing contemporaries (Galtier, 1981). As a result, most fossil botanists who investigated Palaeozoic and Mesozoic floras were misled into supposing these were eras of great abundance and diversity of ferns.

By the nineteenth century the idea that "the present is the key to the past" had resulted in the Carboniferous period in particular often being known as the "Age of Ferns" (Andrews, 1980). The fragmentation of the bodies of most of these ancient plants led to the discovery of isolated sterile fronds much more often than of fern-like fronds bearing more informative sporangia, ovules, seeds or pollen organs. Eventually, about a hundred years ago, one of the major advances in palaeobotany came about with the widespread recognition of distinct ferns and seed ferns, or pteridosperms as they were called, first in 1904.

The 1903 and 1904 papers published by Prof. F.W. Oliver, FLS of University College, London and Dr. D.H. Scott, PPLS of the Royal Botanic Gardens, Kew, are justifiable benchmarks in the history of botany (Taylor & Smoot, 1984). It would be unfair to certain researchers in mainland Europe, such as the Austro-Hungarian Dionys Stur, (who had queried the true-fern affinities of many sterile Palaeozoic fronds about twenty years earlier) to suggest that Oliver and Scott alone are to be praised for unveiling the seed ferns. Indeed, Oliver and Scott (1904) gave due recognition to the German Henry Potonie for establishing the class Cycadofilices (or cycad ferns) in 1897. This supra-familial taxon was set up by Potonie to incorporate fern-like sterile fronds, stems and roots with structures indicative of both true fern and cycad affinities. However, it was by providing evidence for the partial reconstruction of a seed-like organ (ovule) on a fern-like frond that Oliver and Scott found justification for their coining of the term Pteridospermae for what they considered a new class of plants.

But where does Marie Stopes FLS* fit into this picture? It would be an exaggeration to equate her role in pteridosperm recognition with that of Rosalind Franklyn in elucidating the structure of DNA. Nevertheless, it is fair to state that since the original acknowledgements made to her efforts by Oliver and Scott (1903, 1904) only one author (Andrews,1980) has subsequently written a single sentence about her contribution in exposing pteridospermy.

Marie Stopes (1880–1958; Fig.1) is best known for her work in bringing greater sexual equality (especially access to birth control) to women in many western cultures and she has been the subject of several biographies (*e.g.*. Briant, 1962; Hall, 1977; Rose, 1992). Her book *Married Love* (Stopes, 1918) was banned at times in parts of the USA and the fact that she gained her Ph.D. at the University of Munich in 1904 resulted in additional criticism of

*She became a Fellow of the Linnean Societty in 1904. Her Certificate of Recommendation was signed by: F.E. Neiss, F.W. Oliver, E.L. Thomas, E.A.N. Archer and J.E. Fritch. Ed.

her during both First and Second World Wars throughout the British Empire. Notwithstanding her work that led to this social notoriety, Briant (1962, Appendix B) lists over thirty scientific publications by Stopes in the period 1903–1923. Chaloner (1995) has added to the biographical remarks of Andrews (1980) in evaluating the advances that she made in coal science, in extant cycad anatomy and in fossil botany, especially on Carboniferous and Cretaceous plants from around the world. As already stated, Andrews (1980, p.164) is the only one to remark in his chapter devoted to *Francis Oliver and the Pteridosperms* that "It is appropriate to mention that they (*viz.* Oliver & Scott, 1903,1904) acknowledged the assistance of Marie Stopes in searching through the Williamson and other collections". This comment closely follows the wording of the acknowledgement made to the then Miss Marie Stopes in the note received by the Royal Society on March 19th 1903 from Oliver & Scott and read on 7th May that year.

Figure 1. Marie Carmichael Stopes, *ca* 1904, focussing the gas-lamp light with a glass flask of water.

However, the details of her contributions in recognizing the pteridosperms only appeared in the subsequent paper they submitted to the Royal Society on 15th December 1903 and published in their *Philosophical Transactions* on 17th August 1904. In the longer and illustrated second paper, Marie Stopes drew figures 27, 28 and 34 of Plate 10 (see fig. 2). The last of these was based on a microscope slide kept in the Botanical Department Collection of University College, London (now transferred to the Natural History Museum at South Kensington). As Andrews (1980) recounts, this particular slide (R13) was twice nearly consigned to oblivion before its palaeobotanical value was apparent. James Lomax, a Lancashire coal miner who founded the Lomax Palaeobotanical Laboratories in Bolton, first made the thin sections of this specimen from an English coal ball. He considered it, along with thousands of other similar sections, to be "rubbish" of negligible commercial value. Happily, Francis Oliver persuaded Lomax to pass on many of these rejected slides for further scrutiny in London, with about 0.1% of them being of interest subsequently.

Oliver too almost destroyed slide R13 after first examining it microscopically before a last glance with his naked eye revealed "this beautiful object – a real treasure". In 1903, Marie Stopes graduated at University College, London, and was fortuitously researching coal ball plant anatomy with both Oliver and Scott when critical specimens of the pteridosperms came to light. Her illustrations of R13 show a longitudinal section through an ovule (*Lagenostoma lomaxi* O.& S.) connected to a cupule and pedicel that bear peculiar cupular glands. In her examination of coal-ball slides in the W.C. Williamson Collection, Stopes discovered essentially the same kind of glands on a small, vegetative frond she called *Lyginodendron* (now *Lyginopteris*). Combining the evidence of these epidermal features with that of association of the fronds and ovule within the same coal ball, Stopes was therefore able to furnish Oliver and Scott with some of their most important arguments for both partially reconstructing a Carboniferous plant and presenting it as a representative of a major, newly-recognized and extinct group.

In Edwardian Britain, the hunt for possible evolutionary intermediates or "missing links" was as keen amongst botanists as amongst zoologists following the publication of Darwin's *The Origin of Species* and the discovery of *Archaeopteryx* some forty years earlier. So, it is not surprising that the decade following Oliver and Scott's 1904 publication witnessed something of an avalanche of publications on further instances of seed-bearing, fern-like fronds in the fossil record across the globe. In her textbook *Ancient Plants*, Stopes (1910) devoted the twelfth chapter to the pteridosperms and concluded that part with a comparative table of the group's salient characters, being a melange of the "Gymnospermic" and "Fernlike".

Nowadays, about eight orders of seed ferns are commonly recognized, ranging in age from the late Devonian to the Cretaceous. Although most cladists would now grant these higher-ranking taxa of seed ferns plesion status (Kenrick & Crane, 1997), these extinct plants nevertheless remain of great significance in the wider field of palaeobotany. In

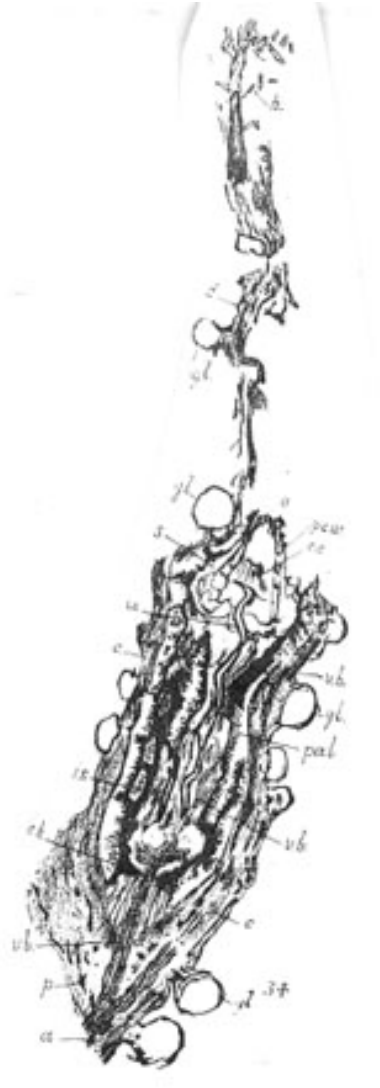


Figure 2. One of the drawings (Fig. 34 of Plate 10) made by Marie Stopes for Oliver & Scott (1904) of the pteridosperm ovule *Lagenostoma lomaxi* O.& S. from an English Carboniferous coal ball. The epidermal structures marked "gl" are the glandular hairs that Stopes observed both on this ovule and on vegative material of *Lyginopteris oldhamia* (Binney) Potonie. The original slide, R13 of University College London, is now at the Natural History Museum, South Kensington.

many Upper Palaeozoic floras, pteridosperm fronds outnumber those of true ferns. The Gondwanan distribution of *Glossopteris* is one of the key lines of evidence for supporting the theory of continental drift. Rather ironically, Taylor (1980) wrote of the Lyginopteridales: "Despite the historical importance of this group in the recognition of the pteridosperms, it today probably represents the least-understood order of Carboniferous seed ferns." Given her research into Cretaceous angiosperms, Marie Stopes might today be interested that the seed ferns she helped to circumscribe a century ago still include some of the prime contenders for the title of angiosperm ancestors.

Acknowledgements

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References

ANDREWS, H.N., 1980. *The Fossil Hunters.* Cornell University Press, Ithaca and London. 421pp.

BRIANT, K., 1962. *Marie Stopes – A Biography.* Hogarth Press, London. 286pp.

CHALONER, W.G., 1995. Marie Stopes (1880-1958): The American connection. *In* LYONS, P.C., MOREY, E.D. & WAGNER, R.H., Historical perspectives of Early Twentieth Century Carboniferous Paleobotany in North America: *Geological Society of America Memoirs* **185**: 127-134

GALTIER, J., 1981. Structures foliaires de fougères et ptéridospermales du carbonifère inférieur et leur signification évolutive. *Palaeontographica* **B180**: 1-38..

HALL, R., 1977. *Marie Stopes: a biography.* Andre Deutsch Ltd., London, 351pp.

KENRICK, P. & CRANE, P.R., 1997. *The Origin and Early Diversification of Land Plants – A Cladistic Study.* Smithsonian Institution Press, Washington and London, xi + 441pp.

OLIVER, F.W. & SCOTT, D.H., 1903. On *Lagenostoma lomaxi*, the Seed of *Lyginodendron. Proceedings of the Royal Society* **71**: 477-481.

OLIVER, F.W. & SCOTT, D.H., 1904. On the Structure of the Palaeozoic Seed *Lagenostoma lomaxi,* with a Statement of the Evidence upon which it is referred to *Lyginodendron. Philosophical Transactions of the Royal Society* **197 B**: 193-247.

ROSE, J., 1992. *Marie Stopes and the Sexual Revolution.* Faber and Faber, London and Boston, xiii +272pp.

STOPES, M.C., 1910. *Ancient plants.* Black & son Ltd., London, Glasgow and Bombay, viii +199pp.

TAYLOR, T.N., 1980. *Paleobotany: An Introduction to Fossil Plant Biology.* McGraw-Hill, New York *etc.*,xiii +589pp.

TAYLOR, T.N. & SMOOT, E.L. (eds) 1984. *Paleobotany, Part1: Precambrian Through Permian.* Benchmark Papers in Systematic and Evolutionary Biology, Volume 7. Van Nostrand Reinhold Company Inc., New York *etc*., xv + 409pp.

Book Review

Evo Devo

Jacob's Ladder, by Henry Gee. Fourth Estate, London and New York 2004. 272pp. ISBN 1-84115-734-1. Price £20.

Thousands of years hence, aliens land on planet Earth. They find the land to be a gigantic, silent, deserted ossuary, the main constituents of which are the bones of a bipedal creature with a large head. Many of its bones are damaged and amongst them are crude weapons, sticks and stones with occasional metallic items. One of the aliens picks up one of these and tinkers with it. There is a sudden explosion and one of his colleagues is killed by an unexhausted bullet from a gun. They are viewing the last great battlefield on Earth, one on which there was no winner. Life on land had been ended by the excessive breeding and greed of this bipedal creature. With the demise of animals, such plants as survived the global warming failed for lack of pollinators. The only life that remained was in the seas. It would be another 400 million years before a latter-day *Acanthostega* lumbered out of the water to begin the recolonisation of the desert.

The aliens persevere with their search; they find evidence of sophisticated devices for transport, a major reason for the collapse of terrestrial life on Earth, ruins in which the bipedal creature might have sought shelter and devised all manner of artefacts. They find books, paintings, the remnants of a once-fine civilization. They take a rather random selection of smaller items with them back to their spacecraft. One is a book called *Jacob's Ladder* by a distinguished scientific journalist, Henry Gee. The aliens' technology makes short work of rendering the book comprehensible to them, and they stand astonished that a creature with such an amazing understanding of its own evolution and development could have extinguished itself.

But it did. Henry is a professional science writer and it shows in this well- indexed book, a feast of facts, beliefs, anecdotes, theories and reading lists, chiefly about the biological rise and rise of *Homo sapiens*. The aliens, incidently, might be as puzzled as I am about the title; rereading *Genesis* **28** xii-xiv (obligingly given on the second page), my impression is of a property contract being arranged. Henry sees our genetic endowment as being on the Jacobean nail, and suspects we shall make a mess of the deal, much as we have, indeed, of that property contract.

It is hard to fault Henry's development of his theme. His first item is the birth of a human being, from egg and sperm to foetus and newborn and the evolutionary path that this has taken over some 600 million years. One defect of the book is that it is not illustrated – it is always nice to see a picture of some particularly obscure creatures, e.g. lancelets, which nevertheless have important evolutionary features in this case, traces of a backbone.

Aristotle (384–322 BC) had deduced from the absence of menstruation during pregnancy that embryonic development came from blood and was triggered by some factor in sperm. Only in the 17th century AD was William Harvey, of blood circulation fame, able to refute this, but could put nothing else in its place. Harvey coined the term *epigenesis* for early embryonic development, a term still in use today for the strictly female contribution to early embryogenesis. There then followed a series of remarkable experiments by, e.g. Marcello

Malpighi and Antony van Leeuwenhoek, demonstrating the cellular nature of living tissues and the motile properties of sperm. Others made the misleading interpretation that sperm were parasitic worms and that human ova were rather like supernatural onions containing an infinite number of layers of preformed homunculi.

Entomological observations of parthenogenesis in aphids provided support for this theory. Religious proscription having ended the experimental use of human sperm, Lazzaro Spallanzani in the 18th century was able eventually to show that male frogs "wearing little taffeta trousers of Spallanzani's own design", were unable to fertilize eggs from females. Finally, the birth and acceptance of the atomic theory of matter put a rapid end to any vestiges of preformism. Matter had its limits.

For Henry, Charles Darwin and Alfred Russel Wallace's ideas on the origin of species by natural selection are something of a diversion from the main theme of development and he reminds us that many naturalists as late as a hundred years ago had severe reservations about them. Mainly this had to do with variation. Whence came the individual variations within a species, let alone those acted upon by natural selection? William Bateson collected examples of "monsters" found in the wild – insects with legs where their antennae should have been, as well as details of more evident human freaks. He noted that the changes – mutations – were often large (Darwin had said they should be small) and "of a kind" – missing, misplaced, but not totally absent vertebrae, missing, or extra, segments in arthropods. Sometimes segments were inverted in the insect body. He could hardly have guessed at the importance in modern developmental biology of these phenomena and his term *homeosis* for them.

It was Gregor Mendel who came partially and belatedly to the Darwinians' rescue by providing a reasonable explanation for inheritance. In connection with the delayed appearance of Mendel on the scene, Bateson noted "at the time of publication (*of Mendel's paper in 1866*) the announcement of the principle of Natural Selection had almost completely distracted the minds of naturalists from the *practical* study of evolution." Perhaps some of Bateson's vexation was due to the fact that the rediscovery of Mendel's 1866 paper in 1901 undoubtedly "scooped" him. Bateson had in the late 1890s set up a research programme in Cambridge under the Evolution Committee of the Royal Society (chaired by Sir Francis Galton) to "conduct statistical enquiries into the Measurable Characteristics of Plants and Animals" which must surely have come up with something similar to Mendel's rules. Meantime the idea of heritability having something to do with chromosomes grew in the early years of the 20th century, although identification of the molecule responsible – DNA – had to wait another 40 years and the results of the work of Oswald Avery on pneumococci.

The second part of *Jacob's Ladder* deals with the molecular end of the business. After James Watson and Francis Crick's 1953 revelation of the structure of DNA, that structure's suitability for roles in cellular reproduction, in providing a source of cellular information via linear arrangements of genes and, at last, an explanation for the microvariability sought so long by Darwin became clear. Within ten years, details of the control of the synthesis of proteins in *Escherichia coli* via operons was established. But other mysteries remained, notably those monsters described by Bateson. Why do mutations affect development in the way described by Bateson, such that whole features of organisms are affected in an apparently systematic way?

The last 25 years have begun to provide answers to this question and *Jacob's Ladder* is especially lucid in this complex area. There are hierarchies of genes in organisms. At the base of these hierarchies are the structural genes, such as those responsible for the protein haemoglobin in our blood. Such genes can undergo a single mutation leading to flawed haemoglobins, causing, e.g. sickle-cell disease. Within vertebrates the DNA sequences of the structural genes do not generally vary much across groups of organisms. Switching the synthesis of haemoglobin on and off is the prerogative of other genes. And way above the fray are genes which control the development of the living organism. Mutations in these affect whole areas of an organism – an arthropod segment, or a primate hand. As we have seen, such mutations are known as *homeotic* and because they occur in particular small regions of the overall genome called boxes, the clusters of genes in this box is known as *Hox*. *Hox* clusters are common to all animals and plants and are also rather similar in their DNA sequences.

But this poses an additional problem. If the structural genes are so similar across groups of organisms and the *Hox* clusters are also similar, how come there are so many different organisms around? It's all to do with networks of genes. Using a well-researched organism, *Drosophila melanogaster*, it has been possible not only to map structural and other genes on the continuous thread of DNA, but also to demonstrate the existence of interacting genes in networks controlling development. Unfortunately, measurement of the directions and strengths of most of these interactions is very difficult. Enter Garrett Odell – appropriately enough from the home of Microsoft, Seattle – who attempted to model a *Hox* network on a computer. After much trial and error, he was able to build a good virtual approximation to the interactions within a particular *Hox* box in *Drosophila*. The question for me (which has arisen in reviewing another book in recent weeks[1]) is whether such computer simulations constitute reductionism. Given the need to take into account not only the complexities of interacting genes, but also organisms' evolutionary histories, Henry (and Professor Dupré[1]) regard reductionism as having had its day in biology. One is entitled to ask what is to replace reductionism in biology. Or shall we have a Holistic Biology to complement Holistic Medicine? *Jacob's Ladder* itself shows just how to provide an intelligible review of a complex topic for the non-specialist.

The closing part of the book also considers so-called junk DNA, something with which the reviewer has concerned himself in these pages over the past decade. Crick regarded it as an evolutionary relic, but nowadays that junk DNA has function seems not in dispute. What that function is remains a mystery, given the absence of a consistent pattern in the occurrence of junk DNA across the animal kingdom.

In the book, Henry mentions Theodor Boveri, who, post-Mendel, saw the significance of chromosomes as genetic material a century ago. A friend and colleague of Wilhelm Röntgen, whose discovery of x-rays was instrumental in determining the structure of DNA, Boveri noted that in some parasitic worms, somatic cells suffered chromatin diminution – the programmed loss of up to 25% of the full diploid complement of DNA. There are clearly controlled mechanisms for "losing" DNA which is surplus to requirements.

Modern biology is bringing about clear transformations in our lives. Most recently, frozen excised ovarian tissue has been reintroduced into a woman whose ovarian function had been destroyed by chemotherapy, allowing her to conceive and give birth. Children with

severe inborn errors of metabolism are receiving implants of healthy tissue. Plants and animals are being genetically modified to produce valuable drugs. Those aliens who read *Jacob's Ladder* would share Henry's concern that notwithstanding knowledge of all these things, Man remains an enigma. Most worrying is his insouciance as the life support systems of his spaceship, planet Earth, malfunction around him. Can we really be straining at gnats and swallowing camels? Only time will tell and, by then, remediation may be too late.

JOHN MARSDEN FLS

[1.] **Darwin's Legacy: What Evolution Means Today,** by John Dupré. Oxford University Press, Oxford UK 2003.

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The new rates were set out in *The Linnean* 21-1 (p.3) and are inside the back cover of the Annual Report 2004 which accompanies this issue.

The Linnean Society
Programme

2005

6-8th April		THE PALMS: AN INTERNATIONAL SYMPOSIUM ON THE BIOLOGY OF THE PALM FAMILY With RBG Kew † William Baker FLS
14th April	6pm	POTENTIAL IMPACTS OF CLIMATE CHANGE ON BRITISH FLORA AND FAUNA John Good
26th April		The Linnean Society Paleobotany Group THE STUDY OF FOSSIL PLANTS † Jason Hilton FLS
27th April		Linnean Society Palynology Group † Carol Furness
28th April		ARE SNAIL BORNE DISEASES STILL A THREAT TO GLOBAL HEALTH? (With the London Malacological Society) Russell Stothard FLS
5th May	6pm	CURRENT PRIORITIES IN TROPICAL FOREST MANAGE- MENT AND CONSERVATION Jane Thornback
24th May	5pm	Anniversary Meeting; election of new Fellows.
9th June	6pm	THE INTELLIGENT MICROBE: INGENUITY IN ANIMALS PLANTS AND MICRO-ORGANISMS Brian Ford FLS
23rd June	6pm	HARVESTMEN ARE AN UNUSUAL BUNCH COMPARED WITH OTHER ARACHNIDS Paul Hillyard (Evening meeting to coincide with publication of 3rd edition of the Synopsis)
9th September		A CELEBRATION OF GRASSES † Dave Simpson FLS (Part of a two-day meeting jointly organised with RBG Kew)

Unless stated otherwise, all meetings are held in the Society's Rooms. For further details please contact the Society office or consult the website – address inside the front cover.
† organiser

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