# Editorial

This autumn we have been celebrating the bicentenary of the birth of Charles Lyell (b. 14 November 1797) whose greatest contribution to the advancement of science was his *Principles of Geology* which first appeared during 1830–33 and subsequently went through 13 revisions. Although this work inspired both Darwin and Hooker and furnished Wallace

"with the main features of the succession of species in time"

– Lyell could never bring himself to accept

"the descent of man from the brutes".

Picture taken by Dr R. Spearman on the occasion of the Lyell Bicentenary lecture 31 July 1997.
Left to right: G. Prance, W. Stearn CBE, W. Challoner, Jim Secord, S. Berry, M. Claridge, J. Hawkes
(two extant PPLs missing, A. Cave & B. Gardiner).

Lyell entered the great debate on man's origins in 1863 with his book entitled *Geological Evidences as to the Antiquity of Man*, coincidentally the same year that T. H. Huxley published his work on the *Zoological Evidence as to Man's Place in Nature*. Huxley's book brought him notoriety whereas Darwin was somewhat distressed to find that Lyell's book gave him no stronger support of the mutability of species than a sentence beginning

"If it should be rendered highly probable that species change by variation and natural selection....".

Darwin further confided (1863) to Hooker

> "I must say how much disappointed I am that he hasn't spoken out on species, still less on man..... The whole certainly struck me as a compilation, but of the highest quality, for when possible the facts have been verified on the spot, making it almost an original work. The Glacial chapters seem to be best and in parts magnificent."

The following year Wallace wrote a paper in the *Anthropological Review*, 2: 158 entitled "Origin of human races and the antiquity of man deduced from Natural Selection". In it he determined how natural selection could have operated on man* and decided that bipedalism preceded the increase in intelligence (and brain size). He further argued that man needed time to evolve and put his origins back in the Miocene of Africa. Lyell disagreed and wrote to Wallace (May 22, 1864) protesting that natural selection could not have done it all! He further objected to Wallace's suggestion that man possibly originated as early as the Miocene – telling Wallace that man was more likely no older than the Pliocene. Wallace replied to Lyell (May 24 1864) pointing out that *Hylobates* existed in the Miocene.

Sadly five years later, Wallace under the influence of spiritualism (see *The Linnean*, 13 (2):1) had changed his mind on man's origins: Wallace was reviewing Lyell's 10th edition of *Principles of Geology* – in the Quarterly Review, April 1869. His review was entitled "Geological time and Origin of Species". In it Wallace notes

> "If for no other reason than that Sir Charles Lyell in his tenth edition has adopted it, the theory of Mr Darwin deserves an attentive and respectful consideration from every earnest seeker after truth".

Wallace also gave an excellent synopsis of natural selection, however, towards the end of his review he deals with the origin of man's intellectual nature

> "while admitting to the full extent the agency of the same great laws of organic development in the origin of the human race as in the origin of all organised beings, there yet seems to be evidence of a Power which has guided the action of these laws in definite directions and for special needs... and we must therefore admit the possibility that in the development of the human race, a Higher Intelligence has guided the same laws for nobler ends."

This was just what Lyell needed – a Supreme Will and Power. He wrote to Wallace congratulating him (April 28, 1869) – and then to Darwin himself (May 5 1869):

> "I quite agree with you that Wallace's sketch of natural selection is admirable. I wrote to tell him so after I had read the article, and in regard to the concluding theory, I reminded him that as to the origin of man's intellectual and moral nature I had allowed in my first edition that its introduction was a real innovation, interrupting the uniform

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* He introduced the idea of kin selection: "tribes in which such mental and moral qualities were predominant, would therefore have advantage in the struggle for existence over other tribes in which they were less developed, would live and maintain their numbers, while the others would decrease and finally succumb."
Earlier Darwin in the *Origin of Species* had noted while dealing with ants: "Thus, as I believe, the wonderful fact of two distinctly defined casts of sterile workers existing in the same nest, both widely different from each other and from their parents, has originated. We can see how useful their production may have been to a social community of insects, on the same principle that the division of labour is useful to civilised man."

course of the causation previously at work on the earth. I was therefore not opposed to his idea, that the Supreme Intelligence might possibly direct variation in a way analogous to that in which even the limited powers of man might guide it in selection, as in the case of the breeder and horticulturist. In other words, as I feel that progressive development or evolution cannot be entirely explained by natural selection, I rather hail Wallace's suggestion that there may be a Supreme Will and Power which may not abdicate its functions of interference, but may guide the forces and laws of Nature. This seems to me the more probable when I consider, not without wonder, that we should be permitted to give rise to a monstrosity like the pouter pigeon, and to cause it to breed true for indefinite number of generations, certainly not to the advantage of the variety or species so created."

At the same time I told Wallace (April 28, 1869) that I thought his arguments, as to the hand, the voice, the beauty and the symmetry, the naked skin, and other attributes of man, implying a preparation for his subsequent development, might easily be controverted; that a parrot endowed with the powers of Shakespeare might dictate the 'Midsummer Night's Dream,' and that Michael Angelo, if he had no better hand than belongs to some of the higher apes, might have executed the statue of Lorenzo de' Medici.

In reply to this and other analogous comments, Wallace said:

'It seems to me that if we once admit the necessity of *any action* beyond "natural selection" in developing man, we have no reason whatever for confining that agency to his brain. On the mere doctrine of chances, it seems to me in the highest degree improbable that so many points of structure, all tending to favour his mental development should concur in man, and in man alone of all animals. If the *erect posture*, the freedom of the *anterior* limbs from *purposes of locomotion*, the *powerful* and *opposable* thumb, the naked skin, and *the great symmetry of form*, the *perfect organs of speech*, and his mental faculties, *calculation of numbers*, *ideas of symmetry*, of *justice*, of *abstract reasoning*, of *the infinite*, of a *future state*, and many others cannot be shown to be each and all *useful* to man in the very lowest state of civilisation, how are we to explain their co-existence in him alone of the whole series of organised beings? Years ago I saw a Bushman boy and girl in London, and the girl played very nicely on the piano. Blind Tom, the idiot *Negro*, had a *musical ear or brain*, perhaps superior to that of any living man. Unless you can show me how this rudimentary or latent musical faculty in the lowest of races can have been developed through *survival* of the fittest, can have been of *use* to the individual or the race, so as to cause those who possessed it to win *the struggle for life*, I must believe that some other power than natural selection caused that development, and so on with every other especially human characteristic. It seems to me that the *onus probandi* will lie with those who maintain that man, body and mind, could have been developed from a quadrumanous animal by natural selection.'

After receiving the page-proofs of Wallace's : *Contributions to the Theory of Natural Selection : A Series of Essays* sadly Darwin wrote to Wallace (Jan 26, 1870)

"But I groan over man – you write like a metamorphosed (in retrograde direction) naturalist, and you the author of the best paper that ever appeared in the Anthropological Review! Eheu! Eheu! Eheu! – your miserable friend, C. Darwin.

Two months later (March 31, 1870) he wrote again

"I was excessively pleased at your review of Galton, and I agree to every word of it. I must add that I have just re-read your article in the *Anthropological Review*, and *I defy* you to upset your own doctrine. – Ever yours very sincerely,
CH. Darwin

The following year (1870) Darwin's *The descent of man, and selection in relation to sex* was published (2 vols. John Murray). In the preface to the second edition Darwin notes that he had avoided the logical outcome of the general theory of evolution, that is of bringing man into the scheme for 12 years – by which time it had been so much accepted that there was no great opposition. Except perhaps from Wallace and Lyell.

This issue contains an article on human credulousness which seems eminently appropriate.

## A Portrait of Alfred Russel Wallace

A note from the President Sir Ghillean Prance FRS

Discussions in the Society have led Council to agree to fill a serious gap in the Society's portrait collection. The gap is that created by the lack of a portrait of Alfred Russel Wallace. Wallace was the co-author of the theory of evolution by natural selection which was delivered at a meeting of the Linnean Society on the 1st July 1858. We have in our meeting room the portrait of Darwin by Collier and we have agreed that it is appropriate to have one of Wallace so that both the proponents of evolution are represented in our rooms. The approximate cost of the portrait and its frame is £3000. The artist, Roger Remington, who painted the portrait of the late Irene Manton, has agreed to paint the portrait of Wallace for us. With this note I am asking Fellows of our Society to contribute towards the cost of this long overdue work. If you would like to help please send your cheque made out to *The Linnean Society of London*, marked *Wallace Portrait*. I hope that many Fellows will help to give Wallace his correct place in our Society.

## Society News

Our congratulations go to Professor W.T. Stearn Hon. F.L.S. for the richly deserved CBE in the Queen's Birthday Honours List earlier in the year. A tribute to Professor Stearn will appear in the Christmas issue.

An 1839 commentary on the affairs of the Linnean Society* (A Stranger's Intellectual Guide to London for 1839–40 by A. Booth, London: Henry Hooper) noted that "....the meetings of the Linnæan (*sic*) Society are well attended, but the proceedings are rarely possessed of interest, the communications being upon the more technical details of scientific enquiry, and never of a very popular character. The chair is generally taken at eight o'clock, and the proceedings last but one hour." In the last issue, concern was

* This was drawn to our attention by Mrs. Ruth Stungo FLS. The original is in the Wellcome Library.

expressed over the matter of attendances at evening meetings. Three such meetings have been arranged for this session, all in January and February. On 15th January, Colonel James Baker will be considering *Nature Conservation on the Ministry of Defence Estate*; on 12th February, Dr. Peter Forey FLS will talk on *Coelacanths*; finally on 26th February, Dr. Henry Gee FLS will ask *Why do Scientists Shoot Themselves in the Foot?* There may be scope for grammatical argument about this last title. These meetings will start at 6pm, preceded by tea at 5.30pm. Hopefully, the revised timing and the subject matter will improve both the attendance and the interest. On 12th February, there is also a book sale after Dr. Forey's presentation. Proceeds from this go to the Library and any books are welcome, preferably beforehand so that they can be marked up. For all other meetings, additional fliers will be circulated. The Palaeobotany Specialist Group had sadly to abandon its usual field trip this autumn, but will be meeting in the Society's rooms on 2nd April 1998. Further details on this meeting will follow. The Programme Card contains details of meetings which were correct at the time of going to press, this year in the third week of June. Given that the card runs for the next fifteen months to September 1998, it does not seem sensible to regard the list of meetings for 1997–98 as closed and members will be notified of any additions (or occasional deletions) hopefully in good time. One such meeting is planned for the afternoon of Friday, 12th December 1997 at the Chelsea Physic Garden and will be entitled *400 Years of Continuous Publication of Gerard's Herbal*, which will bring together scholars of the man, his work and times. It will be followed by a seasonal celebration in the Society's rooms. Other meetings which may be of interest to members include:

*Horticulture Research International – Genetic & Environmental Manipulation of Horticultural Crops.* 30–31st October 1997 (HRI Conference Secretariat, Horticulture Research International, Wellesbourne, Warwick CV35 9EF).

*New Perspectives on Nocturnal Primates.* 3rd December 1997 (Primate Society of Great Britain: Dr. Paul Honess, phoness@brookes.ac.uk).

*Third International Conference on Life Support and Biosphere Science.* 11–15th January 1998 (Florida, USA; tallyho475@aol.com).

The World-Wide Web (www) is increasing its hold on imaginations. No self-respecting organisation can afford to be without its www site these days, although evidence that it is actually worth the not inconsiderable effort is at best elusive. That www may become really indispensible remains a matter of faith rather than substance. It is, as *The Linnean* has intoned previously, rather easier to be a historian after the event than a prophet before it. At present, however, it seems that the devil might take the hindermost and in such a diabolical race the Linnean Society is, if not well to the fore, at least running with the pack. www.linnean.org.uk contains details of meetings of the Society, including changes, its aims, its Officers, its publications and details of Membership. Separately, Academic Press have done a great job of putting the Society's journals on www and persuading UK universities (and one or two overseas) to subscribe to these journals, access to which is restricted. Journal contents and abstracts are unrestricted. Council has decreed that *The Linnean* should henceforward appear unrestricted on www and that the Society should move to putting such details as it

has on its collections on www.

At present access to www is said to be available to around 20M people in the UK. This seems an incredible figure on the face of it and, given the difficulties of setting up an internet connection at home, it seems likely that most of these use www via their work. A recent *Scientific American* provided evidence that www use in the UK was well behind its European partners. If, as seems likely, www becomes a great deal more accessible with the imminent advent of digital television, www activity could become important to learned societies. Some already see www as a threat to their membership, as publishers and others set up bulletin boards, discussion groups, conferences, and completely electronic journals, all dignified by the adjective virtual, so taking over many of the traditionally real rôles of the learned society. One of the advantages of www is the ability to send messages on it by electronic mail (e-mail). The Society would be happy to try to compile a list of e-mail addresses of its members as part of the next issue of *The List*, next year. Those recommending new Members should try to include e-mail addresses and others could, perhaps, drop a line to the e-mail address of the Society's Membership Officer – maria@linnean.demon.co.uk.

The Programme Card, which was circulated with the last issue, omitted the Council meeting dates – 16th October 1997, 22nd January 1998 (to which nominations for medals, awards, office and Council should be made), 19th March and 28th May (Anniversary Meeting). The Programmes Committee meets on 4th November 1997 and 5th May 1998.

The Society records with gratitude a bequest of £209.11p from the late Mr. L.C. Leach FLS, of Pietersburg, South Africa.

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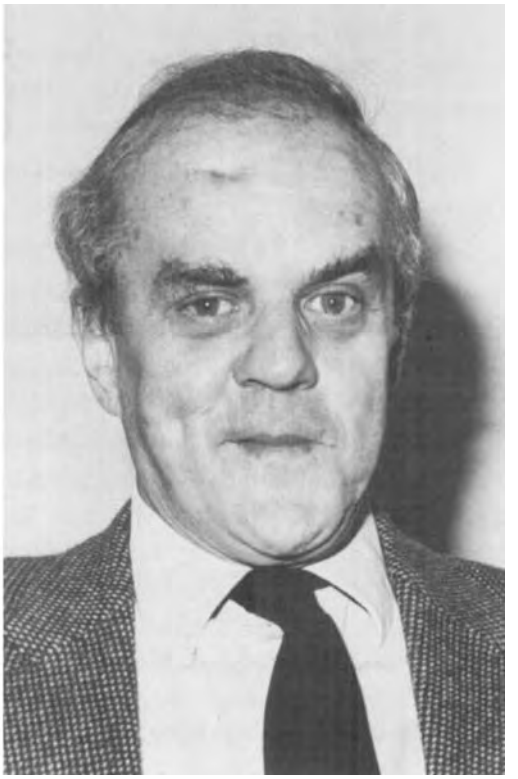
*Trewavas-Greenwood Fund*

Ethelwynn Trewavas (1900–1993) and Humphry Greenwood (1927–1995) were ichthyologists whose service in the British Museum (Natural History), now the Natural History Museum, spanned most of this century. Both were best known for their research on African freshwater fishes, cichlids in particular; both were also renowned for the help they gave to generations of students and colleagues.

The aim of the Trewavas-Greenwood Fund is to commemorate these two outstanding scientists, and to continue their tradition of support, by making awards for work on the systematics of African freshwater fishes.

Ethelwynn Trewavas took her first degree at Reading, and was the first postgraduate student at King's College for Women (later Queen Elizabeth College, now again part of King's). She joined the BM(NH) in 1928 as research assistant to Charles Tate Regan, and was appointed to the permanent staff in 1935. Although she retired in 1961, she continued to attend the museum daily until well into the 1980s, and her major work on African cichlids was not published until 1983. Ethelwynn was elected to the Linnean in 1944, was Vice-President 1963, was awarded the Linnean Gold Medal in 1968, and was elected Fellow Honoris causa in 1991 (see obituary notice, by Humphry Greenwood, *The Linnean*, 10 (2):44–47).



Humphry Greenwood was born in Cornwall (like Ethelwynn) but raised in South Africa, where his father was a mining engineer. After war service in the Royal Navy, he graduated from Witswatersrand and first came to London in 1950, with his wife Marjorie, on a Colonial Office scholarship to study under Ethelwynn. Humphry then worked in fisheries in Uganda for several years, and finally joined the museum staff in 1957. He was elected to the Royal Society in 1985, and retired in 1989. Thereafter he divided his time between the museum in London and the J.L.B. Smith Institute in Grahamstown, South Africa. Humphry was elected to the Linnean in 1953, served on Council 1964–71, as Zoological Secretary 1967–70, Vice-President 1970–71, and President 1976–79. Like Ethelwynn, he was a Linnean Gold Medallist (1982).

After Ethelwynn's death in 1993, Humphry was working towards funding an award in her memory. His own early death, in London in March 1995, has led the Linnean Society to establish a fund to commemorate both of them. Donations from Humphry's family form the initial fund, and further contributions from friends, fellow scientists, or anyone else are earnestly solicited, and should be sent to the Society, payable to the *Linnean Society of London* marked *Trewavas-Greenwood Fund.*

# Record of the Proceedings of the Linnean Society of London for the 209th Session (1996–97)

## Anniversary Meeting of the Society held at Burlington House, Piccadilly, London W1V 0LQ on Thursday, 29th May 1997.

The President took the Chair and welcomed some one hundred members and their guests to the meeting.

Apologies were received from Mr. Austwick, Dr. Clack and other Fellows.

The following signed the Obligation in the Roll and Charter Book and were admitted Fellows: Sir John Harrison Burnett, Christopher John Clifford, Mary Frances Ramsay Clifford, Trevor Duke, Zowie Keating, Arthur Maurice Lucas, Ross David McKinnon, Christina Vina Herbon and Arno Wörz.

The Minutes of the Meeting held on 24th April 1997 were taken as read and signed.

The Executive Secretary read for the third time the Certificates of Recommendation for the election of Foreign Members and Fellows *Honoris causa*. The President appointed as scrutineers Dr. Gillian Mapstone, Dr. Anne Palmer and Mr. Campbell Smith.

The following were elected Foreign Members: Michael Philip Austin (Australia, Botanist), Théodore Monod (France, Zoologist) and John Patrick Rourke (South Africa, Botanist). The following were elected Fellows *Honoris causa*: David James Bellamy, John Leonard Cloudsley-Thompson and Laurence Martin Cook.

The following were elected to Council: Frank A. Bisby, Pamela M. Green, David B. Norman Andrew B. Smith and David M. Williams. Details of the new Council members have been circulated to Fellows and can be found below:

Dr. Frank A. Bisby (1971). Dr. Bisby is a plant taxonomist and taxonomic information specialist who leads the Biodiversity Informatics Research Group at the University of Southampton. His group coordinates the ILDIS World Database of Legumes with ten centres worldwide. He is currently Royal Society/Leverhulme Trust Senior Research Fellow chairing the Species 2000 programme. He was Botanical Secretary of the Systematics Association before becoming Botanical Secretary of the Society (1984–90) and Vice-President (1987–90) during the Bicentenary.

**Mrs. Pamela M. Green** (1979). Mrs. Green graduated from the University of Hull in Botany and Zoology, followed by a Postgraduate Certificate of Education. Her secondary school teaching career took her to Head of Science and A Level Examiner in the University of London. She joined the teacher training unit of the University of Warwick, where she is responsible for the coordination of science curriculum training courses for postgraduate and undergraduate trainee teachers. She has taught undergraduates in microbiology and systematic biology, as well as MSc, MEd and in-service courses for teachers. Mrs. Green has organised ecology days for sixth formers, competitions in primary science and has advised on the environmental education curriculum.

**Dr. David B. Norman** (1982). Dr. Norman graduated from the University of Leeds

in Microbiology and Zoology, followed by a PhD from the University of London (King's) in vertebrate palaeontology. He held a Royal Society Research Fellowship in Brussels at the Royal Institute of Natural Sciences, before taking up teaching posts in London (QMC: biology and geology) and Oxford (zoology). Dr. Norman was Head of Palaeontology in the Earth Sciences Division at the late Nature Conservancy Council before his present appointment as Director of the Sedgwick Museum in the University of Cambridge, where he teaches in both the Earth Sciences and Zoology Departments. He is a member of the Systematics Forum and has served as Associate Editor and Editor of the Zoological Journal of the Society. His research interests encompass evolution, systematics, the fossil record, dinosaurs and biomechanics.

**Dr. Andrew B. Smith FRSE** (1993). Member of the Department of Palaeontology of the Natural History Museum, London, Dr. Smith's primary research interests are in echinoderm evolution and systematics, both from palaeontological-morphological and molecular perspectives. Dr. Smith has used his knowledge of the systematics of this group to address wider questions in palaeontology and has written a general textbook advocating sound systematics for unravelling evolutionary patterns. He received the Society's Bicentenary Medal in 1993 and the Geological Society's Bigsby Medal in 1995, becoming an FRSE in 1996.

**Dr. David M. Williams** (1991). Dr. Williams graduated from the University of London (QEC), subsequently joining the staff of the Natural History Museum, London, where he obtained an MSc in Modern Taxonomy and a PhD on the systematics and biogeography of araphid diatoms (Bacillariophyta). In continuing investigations he has described many new taxa (including fossils), which have broad significance for Pacific biogeography. As one of the organisers of the Museum's cladistics course, he has co-authored *Cladistics: A Practical Course in Systematics* (1992) and he has co-edited *Models in Phylogeny Reconstruction* (1994). He is a member of the Council of the Systematics Association.

The Fellows were elected as on the accompanying list. The Officers elected were: President, Professor Sir Ghillean Prance; Treasurer, Professor G. Ll. Lucas; Zoological Secretary, Dr. V.R. Southgate; Botanical Secretary, Professor C.J. Humphries and Editorial Secretary, Dr. D.F. Cutler.

The President presented the **Linnean Medal for Botany** to **Dr. Enrico S. Coen FLS**. The Editorial Secretary read the citation for which he expressed his gratitude to Professor Flavell, of the John Innes Centre, Norwich:
Over the past 10 years Enrico Coen has emerged to be one of the most outstanding plant developmental biologists. He has revealed the principles of how the structure, shape and patterns of flowers are genetically programmed. His successes have come especially from the study of homeotic mutants in *Antirrhinum majus*, the snapdragon.

After an undergraduate degree in genetics in Cambridge, his postgraduate degree focused on the molecular evolution of some multigene families in *Drosophila*, a favourite organism for geneticists interested in revealing the principles of development and differentiation. In 1984 he took up a position at the John Innes Centre, Norwich to exploit the huge reservoir of developmental mutatations, many transposon-induced, in *Antirrhinum*. The *Antirrhinum* resources and especially the stocks containing active

transposable elements offered the opportunity of an integrated molecular, genetic and morphological approach to study flower development. He, his colleague Rosemary Carpenter and his team of numerous talented students and postdoctoral fellows, have exploited this opportunity and produced an outstanding stream of discoveries that now underpin our knowledge of floral development.

In 1990 he published a general model for the genetic control of floral organ identity based on the combinatorial action of hommtic genes. The four whorls of cells in the floral meristem specifying sepals, petals, stamens and carpels respectively, were shown to be programmed by combinations of three genes. Elimination of the function of one of the genes leads to a homeotic change in the organ emanating from the whorl whose development is programmed by the gene. This model has become widely accepted and the research leading to it is a paradigm for plant developmental biology. Also in 1990 he published details of *floricaula (flo),* a gene controlling the fate of meristems. Plants carrying *flo* mutations, have shoots growing in place of flowers indicating that the wild-type *flo* product is needed for the activation of the floral genetic programme in meristems. This was the first meristem-identity gene to be isolated. Subsequently his team showed that *flo* does not act cell-autonomously but can act inductively to promote the expression of other genes in other cells, such as the *fimbriata* gene that in turn activates organ identity genes such as *deficiens* and *plena.* The *plena* gene controls the production of sex organs and was satisfyingly found to be expressed in stamen and carpel primordia. His research has therefore brilliantly demonstrated how floral commitment and then organ identity are specified by a connected sequence of gene activations.

Other studies have led to a model for how dorsoventral asymmetry (zygomorphy) is programmed into flower development. The important model has been supported by studies on mutants with altered floral symmetry. Key genes controlling dorsoventral symmetry have been isolated and shown to be expressed in specific regions of the meristem, consistent with their role in creating the asymmetry.

Inflorescences can be classified into two basic types: "determinate" and "indeterminate". The latter goes on producing flowers while the former is terminated by a terminal flower. Dr. Coen and his team have revealed a principal genetic difference between the two types. They isolated the *centroradialis (cen)* gene which suppresses terminal flower production and showed it to be active just below the apex of the indeterminate *Antirrhinum* apex. Further work revealed that the genes of *flo* and *cen* are exquisitely coupled to ensure the right positional concentration of floral activators and repressors to programme flower development on the inflorescence. He has also focused attention on very early events in floral morphogenesis and shown how lineages of cells in different regions of the floral meristems develop into the concentric whorls.

A thread running throughout Dr. Coen's publications is his ability to dissect the biologically complex into a series of questions that can be addressed by examining genetic variation and genes. He has consistently displayed unusual powers of analysis and interpretation. He also has thought deeply about the comparative biology of flower development in different species and about the evolution of the genetic systems programming development. His papers are published in the top journals and he has

given a plethora of outstanding lectures around the world. In 1988 he was chosen to give the first Balfour Lecture of the Genetical Society, and in 1996 received the EMBO Medal for his outstanding science. He is also a talented artist and often chooses to paint subjects that illustrate his scientific insight.

Presenting the **Linnean Medal for Zoology** to **Dr. Rosemary Helen Lowe-McConnell FLS**, the President said: Ro, as she is always known, is a figure of world renown in tropical ecology, especially of fishes. After graduating from Liverpool, she spent most of the war at the Freshwater Biological Association on Windermere, and in 1945 went to East Africa. There she was first employed on Lake Nyasa, surveying the cichlid fish *Tilapia*, until in 1948 she joined the staff of the newly founded East African Fisheries Research Organization, at Jinja, Uganda, on the northern shore of Lake Victoria. The fishes of Lake Victoria, now so famous as a natural laboratory both for speciation and for the effects of human interference, were then almost unknown. Ro took on all kinds of duties, including acting as Director. For example, in 1949 she made safaris to the Tanganyika and Kenya shores of Lake Victoria, to the crater lakes at Ankole, and to Lakes Albert, Edward and George, so running through much of the royal family. Her main work was surveying *Tilapia*, working out the species, their habitats and life histories, and correlating all this with their importance in fisheries. In 1950 Ro was joined at Jinja by Humphry Greenwood, also a Linnean medallist (1982), and Linnean President 1976–79. Ro and the Greenwoods formed a friendship which has lasted beyond Humphry's untimely death in 1995.

At the end of 1953, Ro married Richard McConnell, a geologist, and because of the "marriage-bar" then in force in the Civil Service, had immediately to resign her appointment as Research Officer. In the 45 years since 1953, Ro has managed to conduct a productive and successful career in science through unemployment, without ever holding a paid position. In 1957, Richard became Director of the Geological Survey of British Guiana, and Ro came by an honorary appointment with the Fisheries Department there which led to plenty of exciting excursions on survey work and gave her the chance to collect fishes at sea as well as from fresh waters.

In 1962 the McConnells came back to England, and Ro began a long association with the Natural History Museum, where she shared a room with another great ichthyologist, Ethelwynn Trewavas, Linnean Medallist in 1969 and later a Linnean Fellow *Honoris causa*. In 1994 Ro and Ethelwynn shared a Festschrift, *Women in ichthyology: an anthology in honour of ET, Ro and Genie,* Eugenie Clarke, the lady with the spear. I have a copy here.

Ro's exploits would fill another book, but I have strength only to mention her part in the 1967 Royal Society expedition to the Mato Grosso in Brazil; her work for IBP, the International Biological Programme, in London, the Far East, and Latin America; her work on man-made lakes; her role in the British Ecological Society and in the International Limnological Society, and so on. She has been a Linnean Fellow since 1967, and has served on Council, as Vice-President, and as Editor of the *Biological Journal*. She has published over 60 papers, written four books and edited four others, and still travels the world to attend scientific meetings.

In her Festschrift volume, Mike Bruton sums up Ro as a scientist with these words:

"Her career has been characterised by an indomitable spirit, a rare ability, and a disregard for personal comfort and well-being. Ichthyologists and fisheries scientists in developed and developing countries will always be grateful to her for combining her extensive field experience and thorough knowledge of theory to produce a series of outstanding books on tropical fishes." Well-deserved praise, and Ro is a most worthy recipient of the Linnean Medal.

Dr. Lowe-McConnell thanked the Society, recognising the work of others in establishing her reputation. She particularly thanked Dr. Barton Worthington Hon. FLS and the late Professor Humphry Greenwood, whose widow, Marjorie, and a daughter, Jennifer, were in the audience, for their support.

The **HH Bloomer Award for Zoology** would be presented at a later date to **Mr. John Richard Ironside Wood**, currently working with the Foreign and Commonwealth Office in Bolivia.

The President presented the **Bicentenary Medal** to **Dr. David Gordon Reid.** The Zoological Secretary read the citation, expressing his gratitude to all those who had written in support of Dr. Reid's nomination. Professor Bryan Clarke, of the University of Nottingham had written as follows:
I am very happy to support Dr. David Reid for the Bicentenary Medal. Indeed I believe that it would be very difficult to find a better candidate. Dr. Reid has achieved more in his 38 years than most zoologists achieve in a lifetime. His work shows a meticulous attention to detail combined with a clear appreciation of, and enthusiasm for, the larger problems of evolutionary biology.

He chose his organisms well. The littorinid winkles not only pose some fascinating evolutionary problems, but also offer excellent material for solving them. After a distinguished undergraduate career in Cambridge, Dr. Reid worked for his Ph.D at James Cook University in Queensland, studying the littorinid species that inhabit mangroves. Using novel anatomical characters, he eventually found 18 species that had hitherto been supposed to be representatives of a single one. He showed how these species partition the habitat, and related their patterns of zoning to predation by crabs. He also studied the striking colour polymorphism found in the foliage-dwelling species, and carried out some elegant field experiments to show that the polymorphism is maintained by visual selection for apostasy and crypsis. The work on mangrove littorinids led him to write an excellent monograph that included one of the first cladistic analyses of a molluscan taxon.

After his stay in Queensland, he spent a year at the Smithsonian Institution, studying some of the lesser known littorinid genera, and then came back to settle in the Natural History Museum.

He then turned his attention to the *Littorina* of the Atlantic and Pacific Oceans. These species had been much studied, but Reid's efforts revolutionised the field. The main fruit of his labours is a brilliant monograph on the genus, recently published by the Ray Society. This involved the study of 7000 samples and a bibliography of 1500 references. It is, I think, the finest work of its kind that I have ever seen, and destined to become a classic. It will be the standard work on the subject for decades to come. In this volume he makes clear the themes of his recent work, the use of cladograms

to test hypotheses about adaptation, the combination of cladistic studies with biogeography, and the reconciliation of morphological and molecular data.

All Dr. Reid's work has the stamp of quality. He has already been given two awards in the field of malacology. I certainly think it is time that his exceptional talents were recognised in the wider field of zoology. He should be awarded the medal.

The **Jill Smythies Prize** for published botanical art was awarded to **Mrs. Celia Elizabeth Rosser** of Melbourne, Australia. The Treasurer read the following citation before the President presented the Prize:

The Jill Smythies Award for botanical illustration was established in 1987 by our Honorary Fellow, Mr. BE Smythies, who is in our audience this evening, in honour of his wife whose career as a botanical artist was cut short by an accident to her right hand. The Award is made annually to an artist for published illustrations of high quality aiding plant identification.

We are delighted to welcome as the 10th recipient of this prestigious award Mrs. Celia Elizabeth Rosser from the state of Victoria, Australia. Mrs. Rosser began her career by studying fashion illustration in Melbourne, she then worked for an advertising agency there. Much of this citation is due to Professor William T. Stearn, also with us this evening, to whom we are grateful for this and so much else.

A later stay of about 11 years in rural Victoria led her to illustrate its plants and to publish an illustrated book on *Wild Flowers of Victoria* in 1967. That year she began to paint species of the Australian genus *Banksia,* which our Past-President and Honorary Fellow, Professor William Stearn, has described as "an intimidating task demanding infinite patience and skill".

One example of that patience may suffice. Banksias are among the most conspicuous and distinctive Australian shrubs. When Joseph Banks and Daniel Solander, whose portraits hang in our Library, landed with Captain Cook at Botany Bay in May 1770, they collected material of an extraordinary new genus and species later named *Banksia ericifolia.* Mrs. Rosser painted this in 1978. You will see a copy of the this painting in front of you.

It has small heather-like leaves and she has represented approaching 3000 of them on her painting. That certainly demanded patience. This painting also portrays a dense orange flower head, indicating possibly 500 crowded flowers, as well as two fruiting heads. Whereas most botanical artists can portray an ordinary plant in about three days, it will surprise no-one acquainted with *Banksia* that Mrs. Rosser may have to spend two months on a single *Banksia* painting from its collection of specimen to final painting.

She was appointed Science Faculty Artist at Monash University in 1970 and she began in 1974 the task of portraying the species of Banksia, of which there are at least 70. The first volume of the of the work *The Banksias* appeared in 1981. Two volumes have so far been produced. They are among the most outstanding works published in Australia for beauty and scholarship. Each illustration is a work of art in its own right. Their grace and accuracy entitle them to be placed alongside the superb Australian flower paintings of the great Ferdinand Bauer. No botanical artist can receive higher praise than that.

Sir Joseph Banks has been designated "the Father of Australia". It is, therefore, most appropriate that an Australian-born artist, Mrs. Rosser, should have portrayed so magnificently the spectacular plants named after him. In awarding the Jill Smythies Prize to Mrs. Rosser, the Linnean Society fittingly recognises her grand Banksia achievement.

The **Irene Manton Prize** for a PhD in Botany was awarded to **Dr. Colin Edward Hughes** of the University of Oxford. The Botanical Secretary read the following citation before the President presented the Prize:
The Irene Manton Prize is presented to the best botanical thesis submitted to the society within a year of completion. Six theses were finally selected for the 1996–97 Irene Manton Prize committee and competition was very hot between these top contenders. Nevertheless, the committee had no real difficulty in deciding that this years prize should be awarded to Dr. Colin Hughes of the University of Oxford for his thesis on the Systematics of the genus *Leucaena* and its allies.

I am grateful to Dr. David Mabberley FLS and Dr. Robert Scotland FLS for their help in compiling this citation. Colin Hughes came to systematics during the ten years or so that he worked as a seed collector in Latin America. By all accounts Colin seemed the archetypal pioneer botanist combining a free and easy lifestyle with beans, tortillas and tequila. Collecting in Central America led to many adventures, including having to tackle at one stage an overprotective machete-wielding father, so one wonders what he was doing at the time. His more sober pursuits include climbing the highest peaks in Central America, and these days playing the piano and tending his allotment. He undertook his PhD studies with Dr Mabberley then at Department of Plant Sciences, Oxford and Dr Roger Polhill FLS of the Royal Botanic Gardens, Kew. Colin graduated with flying colours in the summer of 1996.

Colin's thesis tackled head-on one of the most perplexing of leguminous genera, and utilised the whole gamut of tools available to the systematist, combined with extensive and detailed field work. *Leucaena* is remarkable for the ease with which inter-specific hybrids arise; its species and hybrids are of enormous importance in Central America and the plants have moved around, or the people making use of them have moved around to gain access to them. Disentangling the story of the relationships amongst the taxa was a most intriguing detective story. The thesis presented a new morphological data set of forty-one taxa. Colin used this, through cladistic methods, to analyse sister group relationships of the genera of the informal *Leucaena* and *Dichrostachys* groups of Leguminosae (Mimosoideae), and species relationships within *Leucaena*. Comparative morphology included detailed studies of bark anatomy, nyctastic leaf movements, anatomy of extrafloral nectaries, seedlings, inflorescences and their arrangement on the pods, fruit dehiscence mechanisms, anther morphology and pollen anatomy. Novel methods for assessment of homologies and for character coding of qualitative characters, continuous variables and missing values led to interesting new theoretical insights in the determination of homologies from recalcitrant plant structures. The thesis contained a full taxonomic account of *Leucaena*; all taxa are illustrated and distribution maps supplied. One species, two subspecies and two hybrids were described as new, and a new hypothesis of species relationships submitted. Other novelties included grappling with the problems of whether one should undertake simultaneous or separate analyses of morphological characters and

chloroplast DNA data sets. Lack of congruence between molecules and morphology led to the conclusion that the total evidence approach was for the birds.

All in all the findings are of broad significance for plant taxonomy and they were exceptionally well presented. For these reasons the Irene Manton Prize for the best thesis of 1996–7 is awarded to Dr Colin Hughes.

**The Treasurer** presented the Accounts for 1997. He noted that the format was different from previous years, due to guidelines issued by the Charity Commissioners during the past year, which sought to ensure that charity accounts reflected the balance of administrative costs and charitable purpose. This had involved the Society in much extra work, since the accounts for 1995 had had to be reworked to provide a basis for comparison. He paid tribute to Mr. Kevin Lally, of Knox Cropper, the Society's Auditors, and Mr. Priya Nithianandan, the Society's Finance Officer, for all the extra work which they had carried out to achieve this. The Accounts showed a relatively healthy state of affairs, although he reitereated his warning of 1996, that the costs involving the building were unpredictable and potentially large. It had also become clear that the costs of providing *The Linnean* and the scientific journals to Members had risen significantly in the five years since the last increase in Contributions, a cost which would have to be borne by the Membership in future. Significant unbudgeted expenditure had been incurred in one large international meeting, which had led to a tightening of financial controls of such meetings, and substantial costs had been expended on the refurbishment of the basement area, which remained to be completed.

Dr. Alan Brafield, a member of the Audit Review Committee, noted that the examination of the Accounts by the Committee had been rigorous and fair. He then moved the acceptance of the 1997 Accounts, which was carried unanimously.

The Treasurer then moved that the firm of Knox Cropper, of 16 New Bridge Street, EC4V 6AX, be appointed in accordance with Bye-Law 13.5, which was accepted unanimously. He further gave warning of the following Annual Contributions from May, 1998:

| | |
|---|---|
| Fellows without any journal | £35 |
| Fellows with one journal | £50 |
| Fellows with two journals | £75 |

**The Executive Secretary** paid tribute to the work of the Society's staff during the 1996/97 year and asked the Meeting to approve the Society's banking arrangements as a private client of Lloyds Bank, which was agreed without dissent.

**The President** then gave his address on crocodiles. A motion of thanks was moved by Prof. Claridge, who also thanked the President for his three years of office. This was seconded by Dr. Worthington, who noted that he had once pitched his tent on a crocodile's nest and had survived to tell the tale. The President then handed over to his successor, Professor Sir Ghillean T. Prance FRS, who nominated as his Vice-Presidents Professor Gardiner, Professor Lucas, Dr. Scoble and Professor Seaward. The new President drew Members' attention to forthcoming meetings of the Society before declaring the meeting closed.

JOHN MARSDEN
Executive Secretary.

*Picture Quiz*

The July Quiz (**13**(2):10) featured Joseph Dalton Hooker (1817–1911), the younger son of William Jackson Hooker (1785–1865). He was born at Halesworth, Suffolk, on June 30, 1817.

His grandfather (Joseph Hooker) lived in Norwich and was related by marriage to the Baring brothers, the Bankers (whose youngest son Francis, was Director and later Chairman of the East India Company).

His father, William Hooker had inherited landed property and was able to devote himself to natural history and travel. William Hooker soon developed an intimate acquaintance with such early Linneans as Alexander McLeay, Spence and Kirby and through the influence of the two latter gentlemen initially became a good entomologist. He was also a keen sportsman and had formed a fine collection of local birds. One day (December 1805) while out shooting he came across a rare moss (*Buxbaumia aphylla*) which he took for identification to our Founder, James Edward Smith. Smith by this time had the Linnean Collection with him in Norwich and after naming the moss suggested Hooker devote himself to botany. More importantly, Smith put him in touch with Dawson Turner and William Borrer (with whom Hooker later collected mosses and lichens). Through Dawson Turner, Hooker also became a friend of Charles Lyell senior.

Dawson Turner's principle interest was cryptogamic botany, but with the death of his father in 1796 he took over the management of his bank in Great Yarmouth. Much of the money that the bank accrued was from the East India Company, who by the 1750's was using Yarmouth as one of its main ports.

Dawson Turner, like William Hooker was a friend and confident of our founder – James Smith and was delighted when the Linnean Collection arrived in Norwich.

Charles Lyell senior (1767–1849) lived for most of the year in the New Forest (Stoney Cross) where he collected Jungermanniae (R. Brown named *Lyellia* after him).

In the summer of 1814 the Dawson Turners took Charles Lyell senior and William Hooker on a nine month botanical tour in France, Switzerland and northern Italy (Lyell records the cost for the trip, including servants as £259-7s-0d).

In the following year William Hooker married Maria, Dawson Turner's eldest daughter and on their honeymoon they stayed with the Lyells at their country seat of Kinnordy.

I emphasise this intimate relationship between the founder of our Society, the Hookers, Dawson Turners, and the Lyells because of its bearing on Joseph Hooker and the development of the theory of evolution.

In 1820 William Hooker was appointed Regius Professor of Botany at Glasgow University and in early 1821 he moved his family from Halesworth to Glasgow.

Joseph was sent to the local grammar school for three years, then had a tutor at home – and then to the University (which he entered at 15) where he studied moral philosophy and medicine. He graduated MD in 1839.

An early passion for collecting and drawing insects was fostered by Mrs Lyell

Clue: A proponent of actualisme.

senior who sent him in 1832 a specimen box containing some 50 insects collected near Kinnordy (the country seat of the Lyells – not far from Glasgow). Nevertheless Joseph had apparently inherited his father's passion for botanical research and in the summer of 1832 we find him at home studying Orchidae *most zealously*, while in 1836 he complied with his grandfather's (Dawson Turner) request to go to Yarmouth and arrange his herbarium.

In his final year as a medical student, Joseph Hooker applied for the position of naturalist/assistant surgeon with James Ross and was accepted (see *Linnean* **13**, (2):7). Meanwhile in 1838 Darwin had sent the first set of proofs of the voyage of the Beagle (vol **III** *Journal and remarks – 1832–36 – Southern position of South America, Keeling Islands*) to Charles Lyell junior who showed them to his father, who in turn showed them to William Hooker. William Hooker then passed them to Joseph who read them just prior to sitting his MD.

Although Darwin's volume of the Narrative was finished and in page proof by early 1838, publication was delayed until July 1939, awaiting Fitzroy's volumes. However, Darwin's volume III was almost immediately published separately under the title: *Journal of researches into the geology and natural history of the various countries visited by H.M.S. Beagle* etc.

Charles Lyell senior subsequently persuaded his son to procure an early copy of the voyage of the Beagle (vol. III) which he then presented to his friend William Hooker who was able to pass it over to his son just before he was due to sail for the Antarctic with Ross (see letter – C. Lyell to C. Darwin Sept. 6 1838). Joseph also took with him a fifth edition (1837) of Lyell's *Principles of Geology*.

The Antarctic voyage lasted four years during which time Hooker was able to become familiar with the floras of Tasmania, New Zealand and the Falkland Islands. The results of his studies were published in six quarto volumes (1844–60) collectively entitled: *The Botany of the Antarctic Voyage of H.M. Discovery* ships *'Erebus' and 'Terror' in the years 1839–43*, pp 2214, 528 pls. Two are devoted to the flora of the Antarctic Islands (*Flora Antarctica* 1844–7), two to that of New Zealand (1852–4) and two to Tasmania (1855–60).

Joseph wrote long letters home to his father and family during the voyage, many of which were shown to the Lyells who in turn showed them to Darwin. Darwin first wrote to Hooker in December 1843 congratulating him on his return and offering him his own collection of plants from Galapagos, Patagonia and Fuegia for examination. Thus began a lifelong correspondence and the intercourse of the two particularly during the next fifteen years is a memorable page in scientific history. Moreover Hooker was the first person to whom the theory of natural selection was confided when Darwin wrote to him on January 14, 1844

> "I think I have found out the simple way by which species become exquisitely adapted to various ends".

It is generally agreed that both Darwin and Hooker were ultimately inspired by Lyell. Darwin's problem was how species originate – Hooker's how they are distributed over the earth. Since both problems are central to any evolutionary theory it is interesting to find that Darwin (like Wallace) believed that dispersal created areas of endemism (dispersal across barriers) whereas Hooker believed that dispersal accounted only for widespread or cosmopolitan species and that the individual appearances of island taxa were due to the influences of isolation – that is the appearance of barriers dividing formerly continuous habitats and species ranges. In other words Hooker was offering not a dispersal but a vicariance explanation.

That Hooker had arrived at this explanation as early as 1845 is apparent from his letter to Darwin of September 1st.

"I have been thinking more & more upon Forbes'* Botanico Geological remarks. I can

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* Hooker was referring to Forbes' paper 1846: on the Distribution of Endemic Plants, more especially those of the British Islands, considered with regard to Geological Changes. *Report Brit. Ass. Cambridge, 67-68.* "But if such plants be found in areas disconnected from their centres by considerable intervals, some other cause than mere influence of soil or climate must be sought to account for their presence. ....This cause the author proposes to seek in an ancient connextion of the outposts or isolated areas with the original centres, and the subsequent isolation of the former through geological changes and events, especially those dependent on the elevation and depression of land".
However, Hooker had probably first come across the idea of geological causes through de Candolle's "Essai Elémentaire Géographie Botanique" (pp 359-422) in Cuvier: *Dictionnaire des Sciences Naturelles*, **18**, 1820 - cited in Lyell *Principles of Geology* 1832, 2:68. de Candolle actually presented

account in no other way for the similarity of the Irish & Portuguese floras, or of the Cape Horn & Kerguelens Land; Migration as an agent is all very well, but it has been ridden to death, in attempts to account for such similarities in vegetation.....Cunningham long ago remarked that some Tasmanian plants suddenly appeared on the Blue M$^{ts.}$ but not (I think) at an elevation analogous to the differences of Latitude. If we are to account for these things geologically what an antiquity it gives to vegetation & how eminently true it must be that the Geological changes must have been slow & gradual not to have obliterated all traces of vegetation during the removal of the intervening land."

These ideas were elaborated in his *Flora Novae-Zelandiae* (1853: xxxvi):

"Enough is here given to show that many of the peculiarities of each of the three great areas of land in the southern latitudes are representative ones, effecting a botanical relationship as strong as that which prevails throughout the lands within the Arctic and Northern Temperate zones, and which is not to be accounted for by any theory of transport or variation, but which is agreeable to the hypothesis of all being members of a once more extensive flora, which has been broken up by geological and climatic causes".

Darwin, however, never accepted Hooker's explanation and in his *Origin of Species* 1859 (pp381–382 surprisingly separated the mechanism of evolution from biogeography:

"I have said that many difficulties remain to be solved: some of the most remarkable are stated with admirable clearness by Dr, Hooker in his botanical works on the antarctic regions. These cannot be here discussed. I will only say that as far as regards the occurrence of identical species at points so enormously remote as Kerguelen Land, New Zealand, and Fuegia, I believe that towards the close of the Glacial period, icebergs, as suggested by Lyell, have been largely concerned in their dispersal. But the existence of several quite distinct species, belonging to genera exclusively confined to the south, at these and other distant points of the southern hemisphere, is, on my theory of descent with modification, a far more remarkable case of difficulty. For some of these species are so distinct, that we cannot suppose that there had been time since the commencement of the Glacial period for their migration, and for their subsequent modification to the necessary degree. The facts seem to me to indicate that peculiar and very distinct species have migrated in radiating lines from some common centre; and I am inclined to look in the southern, as in the northern hemisphere, to a former and warmer period, before the commencement of the Glacial period, when the antarctic lands, now covered with ice, supported a highly peculiar and isolated flora. I suspect that before this flora was exterminated by the Glacial epoch, a few forms were widely dispersed to various points of the southern hemisphere by occasional means of transport, and by the aid, as halting-places, of existing and now sunken islands, and perhaps at the commencement of the Glacial period by icebergs. By these means, as I believe, the southern shores of America, Australia, New Zealand have become slightly tinted by the same peculiar forms of vegetable life".

In 1845 on the recommendation of his father Hooker was appointed botanist to the Geological Survey (which like Kew was under Woods and Forests) by Sir Henry de la

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his essay to Lyell in February 1829 when Lyell visited him in Geneva: "His splendid essay on geographical Botany, the most beautiful generalisation of a multitude of facts which I think was ever produced in natural history".


*Welwitschia mirabilis*. Copy of coloured sketch made by Mr Thomas Baines in Damara Land.

Bèche. During his stay with the Survey, the Museum of Practical Geology was completed as was his *Flora Antarctica.* He also published papers on the structure of *Stigmaria* and *Lepidostrobus* which he had collected from the coal fields of South Wales.

Then in 1847 the Chief Commissioner of Woods and Forests – Lord Carlisle obtained for him a grant of £400 where with to explore for two years the central and eastern Himalaya and Lord Auckland, first Lord of the Admiralty (and a former Governor General) authorised that he be given half naval pay for two years to collect plants for Kew. He was later allowed a third year in India by the Admiralty. Just before departure Joseph got engaged to Frances – the daughter of the Rev. John Stevens Henslow. On 12 January 1848 Hooker reached Calcutta from whence it was recommended by both Falconer and Auckland he set about exploring Sikkim.

Hooker spent most of the following three years in the Himalayan state of Sikkim and in eastern Nepal collecting plants and making detailed meteorological and geological observations (including the terracing of mountain valleys and the formation of glacial lakes). At Patna he saw the complicated manufacture of opium balls and was given not only a set of the implements used in the process but was also presented with several opium balls!

His two expeditions (1848, 1849) in Sikkim yielded some 30 different rhododendrons of which 28 were said to be new to science. Moreover he succeeded in introducing them into cultivation via Kew while at the same time his father edited his descriptions and published his drawings of the various species in *The Rhododendrons of Sikkim – Himalaya* 1849–51 which was completed the year of his return.

Finally in 1850 he left Darjeeling for the Khasia Hills accompanied by his old school friend, Thomas Thomson (who worked for the East India Company) and some dozen or so natives (to help them collect and paper their specimens). They returned with over 3,000 flowering plants and several hundred ferns (Desmond *The Linnean* **9** (1): 27–49, 1993).

Hooker sailed for England on 7 February 1851 taking with him more than a thousand drawings and sketches of places and plants. Hooker's adventures in India are recounted in his *Himalayan Journals* (1854 – dedicated to Charles Darwin). Also in 1854 he published his *Illustrations of Sikkim – Himalayan Plants* which included the gigantic cucurbit *Hodgsonia*, while with Thomson he produced *Flora Indica* 1855 – a work eventually superseded by his seven volume *Flora of British India* 1872–97.

In 1854 he was appointed Assistant Director to his father at Kew and succeeded him 10 years later; many regard his administration of the Gardens from 1855–1885 as his greatest service to mankind.

In the autumn of 1860 Hooker was invited by the naval hydrographer John Washington to take part in an expedition to Syria to study the famous cedars – which he (Hooker) speculated had been once part of a continuous forest at a lower level (he also compared the markings of asses and zebras for his friend Darwin).

Two years later he embarked with George Bentham on that gigantic undertaking – *Genera Plantarum* which was to occupy them for the next 23 years! (First part published 1862, the concluding part 1883).

Meanwhile a strange new plant had been found by Dr Welwitsch, A.L.S. on a plateau 300ft above sea level near Cape Negro and which he sent to William Hooker on August 16 1860.

Welwitsch, formerly the Director of Lisbon's Botanic Garden, believed its scarlet cones showed resemblances both to conifers and to certain Proteaceae (which were also to be found near Mossamedes, Cape Negro, S. Africa).

In 1863 Joseph Hooker published his account of this plant in our Transactions*. He pointed out that the trunk was 2ft in length and could obtain a circumference of 14ft and resembled a round table with a top like a burnt crusty loaf. From this arose two enormous leaves each 6ft long (developed from the original cotyledons) while from its circumference sprang a stout dichotomously branched cyrus (1ft) bearing small erect, scarlet cones, the size of spruce cones. The scales on the cones contained small solitary flowers which in some cones are structurally but not functionally hermaphrodite, in others, female.

Hooker considered that in the inflorescence it closely resembled *Gnetum* – especially the African species of that genus, whereas the hermaphrodite cones resembled the male cones of *Ephedra*. He further supposed that the hermaphrodite flower of *Welwitschia* showed a transition in function and structure between gymnosperms and the angiospermous dicotyledons. He also concluded that *Ephedra* was more advanced than *Welwitschia* in the total disappearance of the ovule in its male flowers, but one step behind it in the retention of functionless stigmatiform disc in its perfect ovule, whereas the female cone of *Welwitschia* closely resembled that of *Ephedra* (viz bilateral venation of the membranous scales and the presence of liber-cells through its wings). He also considered that the female perianth of *Welwitschia* corresponded to the outer covering of the ovule in *Ephedra* and *Gnetum*. Then at the end of his paper he concluded that *Welwitschia* bore a close resemblance to both in *Ephedra* and *Gnetum*.

Hooker later regarded his description of *W. mirabilis* as a triumph in comparative anatomy – Asa Gray called it "the most wonderful discovery (in a botanical point of view) of the century", while Darwin thought of it as "a vegetable ornithorynchus".

Today we are still uncertain of the exact position of *Welwitschia*, but most workers agree it forms an unresolved trichotomy with *Gnetum* and *Ephedra* and that these three genera are the sister-group of the angiosperms.

In 1876 Thomas Phillips Jodrell, a personal friend of Joseph Hooker gave money to Kew to build and equip a special laboratory for the study of plant physiology. Then in January 1882 Charles Darwin sent Hooker £250 to help launch *Index Kewensis* the editorial work for which was entrusted to the Secretary of the Linnean Society, Dr B. Daydon Jackson.

Finally in 1885 Hooker retired and went to live near Sunningdale where he died on 10 December 1911. At his own expressed wish he was interred at Kew.

There was a record number of correct entries including Ole Seberg, D.J.B.White, Jim Green, Joya Steward, Geoffrey Miller, Geoffrey Davison and John Edwards.

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* J.D. Hooker, 1862. On *Welwitschia* (= *W. mirabilis*, ed.) a new genus of Gnetacae. *Trans. Linn. Soc. xxiv : 1-48, 15 pls*

*Photo Quiz*

10 cm

Where was this made? Where was it found?

*From the Archives*

## JAMES MURIE 1832–1925
## The Aggressive Librarian

James Murie, born in Glasgow in 1832, had an interesting and varied background and was, on the one hand enterprising and courageous, but on the other, opinionated, argumentative and dilatory. As Praesector to the Zoological Society, and Librarian to the Linnean Society, he eventually became a thorn in the flesh of both.

After graduating in medicine from Glasgow University, he became a pathologist in the Royal Infirmary, then an assistant in the Museum of the Royal College of Surgeons in London. In 1860 he visited continental anatomical museums, and served on several voyages as surgeon on trans-Atlantic ships; this inspired him to become medical officer and naturalist to Consul John Petherick's expedition to the source of the White Nile where they met the explorers Speke and Grant.

Coming back to England with a collection of plants and fishes he returned to his former occupation in the Royal College of Surgeons to arrange a catalogue of Professor Quekett's microscopic slides. His next appointment was Praesector of the Zoological Society where he made *post mortem* examinations of over 4000 creatures in the zoo, wrote annual reports, seldom delivered on time, and criticized the management (probably justifiably but causing great offence). He failed to write up his notes for scientific meetings and, when coerced, produced savage pathological reports. After

numerous personal quarrels he was allowed to resign on grounds of ill-health.

In 1868 he became a F.L.S. and eight years later was appointed a sub-editor of the Linnean Society at sixty guineas a year, with an annual increase; his title was subsequently changed to Assistant Secretary. He conducted all the current work of the Society including library duties and organising meetings. He received many complaints that the meetings were as dull as ditch-water and the benches empty. The zoologist Edward Alston complained that Fellows' letters were addressed 'Esq' and Associates 'Mr' – "an abominable piece of snobbery". Others objected to his high-handed and incorrect alterations to their papers.

On Kippist's retirement in 1880, in a ballot for the post of Librarian, he defeated W.B. Helmsley by eleven votes to four, and when Council decided, not unnaturally, that the Treasurer should take over the accounts and subscriptions, Murie took affront and became extremely aggressive. Council quailed at the spectacle and suspended the resolution, leaving Murie triumphant. However in 1885, after many unpleasant rows, he sent in his resignation which Council feebly ignored, but two years later, in December, he sent it in again and this time it was accepted, no doubt thankfully, Council agreeing to allow him a pension of £100 a year.

Throughout 1887 temporary library assistants left, one after the other, and not until Murie was given two months leave and £25, to attend the British Association in Montreal, did peace reign in the library. There were, however, Fellows on his side who wrote giving him their support, particularly Robert Brown who declared that the Society was full of treachery and double-dealing.

At a Council meeting after his resignation Murie gave each member a long printed statement immodestly detailing his achievements and making aggressive attacks on the President. Talking of his multiple duties he mentioned the "8,573 parcels carried up and down stairs ... all undone, remade up and corded", and emphasised there were only three to four cheap, easily replaceable books on the Black List (lost books). Finally, Council was stung into action and dismissed him on the spot, but paid him up to the end of May. The pension was still paid. Murie retired to a cottage at Leigh-on-Sea where he remained until his death on Christmas Day 1925, aged ninety-three.

MARGOT WALKER

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MITCHELL, P. CHALMERS, 1929, Centenary History of the Zoological Society of London.
Letters to Murie in the Linnaean Society archives

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## TENERIFE 1855 and 1996

In March 1996 I enjoyed a week's holiday looking at the flora of Tenerife under the guidance of Bob Gibbons, so I was interested to read a lecture, given to the Linnean Society on March 6th and April 1855 by Chas. J.F. Bunbury.

He begins by saying that islands so well-known and so much frequented as Tenerife and Madeira can only justify 'some detached observations' from him and these should be regarded as a supplement to the well-known work of Von Buch, Webb and Berthelot. He gives an interesting account of the habitats of each island and lists altogether 273 species, of which 53 are ferns, 23 mosses and 12 lichens.

Bunbury must have explored on foot or on horse-back, whereas we travelled about Tenerife in the comfort of a minivan. Some parts of this precipitous volcanic island are still very remote and inaccessible and can only be reached by winding, narrow roads. Bunbury seems to have made most of his observations in the areas near Santa Cruz, in the Val Bupadera north-east of the city and in the Oratava valley and Icod area to the north-west. Very few semi-desert species occur in his account, so it seems that he cannot have ventured into many of the very dry southern parts, nor to the higher, arid and snow-covered parts of Mt.Teide, (6500 – 12,00 ft).

However, his observations on the parts which he visited are remarkably comprehensive and it is interesting to compare his lists of species with ours. Our party saw 206 species (mainly higher plants), 45 of which are mentioned by Bunbury. Some of his species may have changed their names since 1855 and we may well have seen more than 45 of his plants. Echium, for example, is a typical and frequently occurring genus: of these we came across: Bunbury mentions:

| | | | |
|---|---|---|---|
| *Echium* | *aculeatum* | *Echium* | *fastuosum* |
| | *bonnetti* | | *giganteum* |
| | *giganteum* | | *strictum* |
| | *plantagineum* | | *violaceum* |
| | *stricum* | | |
| | *virescens* | | |

Tenerife is also famous for its Euphorbias:

| we saw the following species: | | Bunbury lists: | |
|---|---|---|---|
| *Euphorbia* | *aphylla* | *Euphorbia* | *canariensis* |
| | *atropurpurea* | | *dendroides* |
| | *balsamifera* | | *piscatoria* |
| | *bourgeana* | | |
| | *canariensis* | | |
| | *obtusifolius* | | |

*Sonchus* is another very showy genus, with many different species occurring locally. Bunbury mentions only *S. ustulatus* 'and others', whereas we distinguished *S. acaulis, S. capillaris, S. congestus, S. radicans* and *S. virescens.*

Bunbury mentions some distinctive plants of the area north-east of Santa Cruz – *Kleinia neriifolia, Euphorbia (dendroides and piscatoria)* and *Plocama pendula.* We also found these plants frequently. Other plants common to both our excursions are various kinds of lavender, the distinctive *Rumex lunaria, Paronychia canariensis, Fagonia cretica, Myrica faya* and many different laurels and tree heathers. But Bunbury does not mention most of the umbelliferous plants which we found, such as *Astydamia latifolia, Tinguarra montana, Todaroa aurea,* nor the rare endemic plant, *Vieraea laevigata, Ixanthus* (a gentian which grows on the Anaga peninsula) nor any of the

three Orchids, *Gennara diphylla, Habenaria tridactylites* and *Orchis canariensis*, nor the well-known Canary Bells (*Canarina canarensis).* Also missing from his list are most of the unusual shrubs we found in the dryer areas, such as Teno and Barranco del Inferno; these include *Schizogyne sericea, Justicia hyssopofolia, Allagopappus dichotomus, Dicheranthus plocamoides* and *Launaea arborescens* -- further confirmation that he was more familiar with the wetter areas of the island, such as laurel forests and intermediate zones, where ferns and mosses and liverworts grow.

The trees which he saw still flourish, Canary Pines, Tree Heathers, Laurels and various Palms. He describes a very old Dragon Tree in the Villa Oratavo, which he did not think would live much longer. We did not see this, but another one at Icod, thought to be over 1000 years old, seemed to be flourishing. Dragon trees are nowadays seldom found in the wild. We saw many exotic and tropical garden shrubs, as well as cultivated bananas, avocadoes, mangoes, figs, oranges and lemons. Bunbury saw these too, as well as tea and coffee. He also comments on the neat and immaculately kept terraces on which crops were grown in his day. It is sad to see that these and the many little farm-houses, especially in the Masca area, have fallen into disrepair and are nearly all abandoned. The sad statue of the Emigrating Tenerifean at Caraticho confirms the uneconomic nature of this picturesque type of cultivation.

Bunbury would no doubt be amazed at the size and industrial prosperity of Santa Cruz, with its fast and busy motorway and the hordes of tourists in certain areas, but he would certainly have recognised the remoter parts and it is reassuring to think that he would have found so many of the same plants growing. In fact the very useful and informative book by Myrtle and Philip Ashmole, 'Natural History Excursions in Tenerife' mentions a recent check-list of 1,860 plants to be found in the Canaries, of which at least 500 are thought to be endemic. Neither Bunbury nor our party saw as many as one sixth of these.

DIANA D. FURLEY

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## Correspondence

Field Cottage, Church Hill
Merstham, Redhill, Surrey RH1 3BL

14.7.97

Dear Professor Gardiner

**James Clark Ross**

Supplementing the information on Ross given in *The Linnean* 13(2):7–10 there are many interesting details in the books by Barbara and Richard Mearns:-

*Biographies for Birdwatchers* 307-315 (Academic Press, 1988)
*Audubon to Xantus. The lives of Those Commemorated in North American Bird Names.* 373-378 (Academic Press, 1992)

These include two other portraits, a map of his explorations in the Arctic, details of the original discovery and present distribution of Ross's Gull with pictures of it, Joseph Dalton Hooker's assessment of Ross as a naturalist, and much besides.

Yours sincerely, B.E. SMYTHIES

Gothersgade 140,
DK-1123 Copenhagen K
Denmark

1.8.97

Dear Brian!

I guess the young gentleman on p.10 in *The Linnean* 13(2) is no less than Sir Joseph Dalton Hooker (1817–1911), son of Sir William J. Hooker.

Apart from his efforts to promote Darwin's ideas, his treatment of the plants collected by Darwin on the Galapagos Islands, and his contributions to taxonomy (viz. the publication of *Genera Plantarum* together with George Bentham), Hooker, as a young man, participated in J.C.Ross' Antarctic voyages (1839–1843) with the *Erebus* and the *Terror*, and published accounts of the expeditions. The 'Introductory Essay to Flora Novæ-Zelandiæ' in which the idea of a once continuous flora on the Southern Continents is exposed is of particular importance.

Yours sincerely,
O. SEBERG

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29 July 1997

Dear Dr Marsden,

**AG Side Fund Award**

I refer to your letter of 4 June 1996, through which the Linnean Society very kindly awarded me £350 from the AG Side Fund. As you may recall, my application drew attention to several thousand pencil drawings of microfungi made by the great mycologist Carlos Spegazzini. These pencil drawings were never previously published, and are now very old and in need of conservation. Many are the only remaining evidence of type material.

I proposed collaborative work with the Spegazzini Institute of La Plata, Argentina, to examine whether it would be possible to digitize these drawings and, if so, to begin the work with 50–100 of the least difficult of them. It rapidly became evident that this was entirely practicable and, in fact, very nearly 200 of them have now been scanned. All of these have resulted in scientifically valuable images, and some have even been edited to provide interpretations of Spegazzini's spidery handwriting.

To provide access to the electronic versions of the drawings, I produced HTML software with Spanish and English language options, writing the text for both languages myself, and getting the Spanish version checked by a native speaker of Latin American Spanish. I demonstrated this software with some of the pictures during two sessions of the second congress of the Asociacion Latino-Americana de Micologia in La Habana, Cuba, in October 1996, with acknowledgement of the Linnean Society's support, as promised.

I am happy to say that I have also successfully mastered the technique of transferring this information to CD-ROM format. As a result I have now produced several copies

of a demonstration CD-ROM containing the software and scanned drawings. I have pleasure in enclosing a copy for the Linnean Society: another copy has already been sent to La Plata.

If necessary, I can organize a demonstration of the CD-ROM for you, but if you have appropriate hardware, installation should not be difficult. To run this CD-ROM, you will need an IBM-compatible PC, preferably at least a 486 with a CD-ROM drive. Installation instructions are to be found in the README file on the CD-ROM itself. If you have any problems, please contact me at the above address. I would also welcome any feedback you have to offer.

I apologise that this letter comes slightly later than one year after your letter – I hope you will understand that school exams kept me busy during June – and I am not clear whether this letter together with the demonstration CD-ROM constitutes a sufficient report for the Fund. Please advise me if I need to do more. May I finish by again thanking the Linnean Society and the AG Side Fund for their support. I would like to think that a more finished CD-ROM containing a much larger range of these beautiful old drawings could be completed during the gap year I plan to take between school and university.

Yours sincerely,
JAMES MINTER

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Dear Brian, 5.8.97

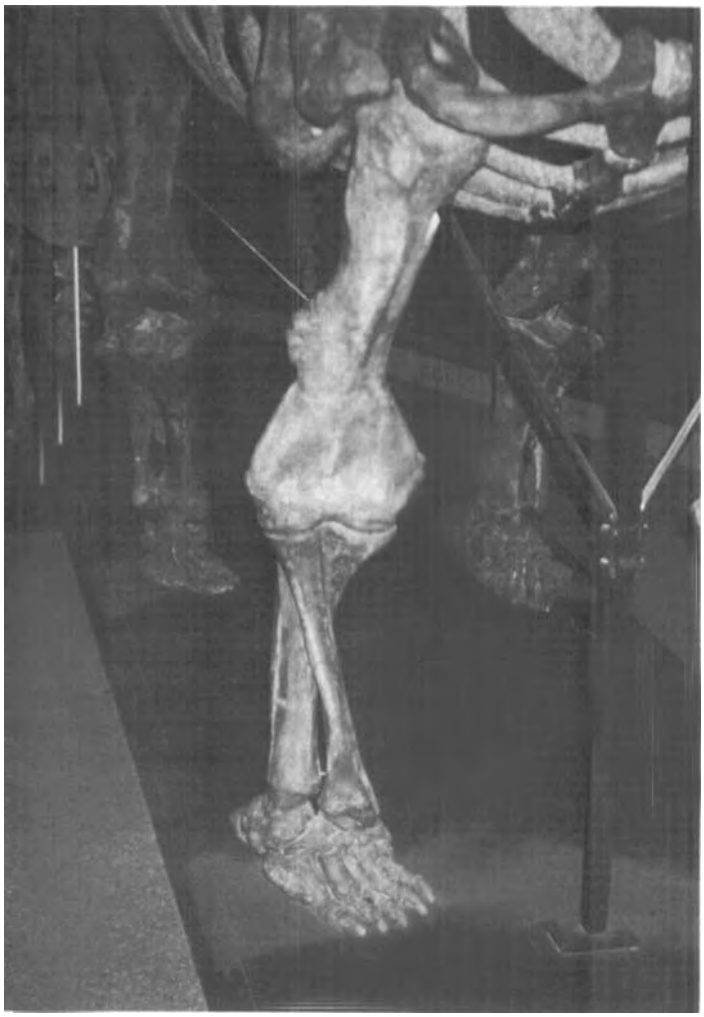
Radial Riddle of the Reconstructed Reptile

One of the remarkable features of comparative anatomy is the extent to which homologous anatomical structures have been preserved over long periods of evolutionary time. We readily recognize the skeletal elements of long-extinct species such as the dinosaurs, and there is, in general, a great similarity between the bones of primitive reptiles and their modern counterparts such as the crocodile. It is therefore of some interest to remark on a specimen on display in the Museum of Natural History in Adelaide which exhibits a most unusual arrangement of the bones of the forelimbs.

As is evident from the accompanying figure (opposite) the ulna is angled so as to cross in front of the radius to become the medial carpal articulation. Such an usual skeletal arrangement might have permitted rapid bilateral eversion of the forefeet, potentially imparting a powerful braking action if the animal were in full flight. In other respects, however, there seem to be no obvious advantages, and a considerable number of drawbacks, to the radio-ulnar circumplection illustrated by the reconstruction. Given the musculo-skeletal difficulties posed by the cruciform arrangement of the bones, is it possible that in the resultant serious impediment to locomotion lies a causal mechanism perhaps ultimately responsible for the extinction of the dinosaurs?

An alternative, though less attractive, hypothesis assuming that the correspondence of the articular surfaces have been correctly identified, might be that the apparent anatomical anomaly could be the result of inadvertent transposition of the feet.

PATRICK A. RILEY



## Eggs and Classification – the Phasmid connection

The study of insect eggs is sufficiently complex and intriguing to have inspired a three-volume study (Hinton, 1981), yet only some eleven pages of this refers to the eggs of my particular speciality – those of the insect order variously called Phasmida, Phasmodea, Phasmatodea, Phasmoptera or Cheleutoptera, and containing the stick and leaf insects. In this study some 14 examples gained text mention and 8 were figured. Such was the sparcity of information on this order a mere 15 years ago, that those selected for illustration included two drawn by Kaup back in 1871.

However since then there has been an explosion of new work on these insects, mainly inspired by the enthusiasm of a group of 'amateurs', with the result that over 170 species are now kept in culture and the number is growing each month. This group, the Phasmid Study Group (based in Britain but with members in many countries) contains as well as those whose only interest is in rearing the various species, a number who have been making serious studies and describing new species. 'Amateur' refers simply to their lack of professional employment in entomology, since they have

published much, three of them producing between them so far over a hundred and twenty papers. Side by side with this has been an increase in physiological, genetic and electron microscopic studies in a number of universities, notably in Bologna in Italy.

In most early studies the egg of the insect was seen to be of little interest in spite of Kaup's pioneering work. It was not until 1976 when I drew together the records from the literature, added my own data and systematised the descriptive system (Clark 1976) that I was able to resurrect Kaup's 1871 idea that *"Vielleicht wird man später die Arten durch die Eier schneller unterschieden lernen als durch die Thiere selbst, und wird man durch ihre nähere Kenntniß möglicherweise veranlasst, getrennte Genera wieder zu Vereinigen, oder die Arten sehr zahlreiche, wie Necroscia, in mehrere kleinere aufzulösen; jedenfalls ein weites and dankbares Feld für viele Naturforscher"* [Perhaps we will later identify species through the eggs more quickly than through the insects themselves and we will through a better knowledge of them perhaps bring about the unification of diverse genera, or for those with very numerous species like *Necroscia,* analyse them into smaller groups; certainly a wide and rewarding field for many naturalists.] Since then an increasing number of authors have made systematic descriptions of eggs, frequently as part of the description of new species.

The phasmid egg has certain features which renders it very suitable for taxonomic work. 1. In very nearly all cases the egg capsule is very robust, preserving its shape and colour when dry for at least a century, eggs of this age being in museum collections. 2. Eggs can frequently be extracted from the bodies of museum dried specimens, and these if near the ovipositor have all the characteristics of laid eggs. 3. The phasmid egg has maintained its basic nature for over 40 million years, specimens being known from the Eocene (Sellick, 1994) (fig.2(d)). 4. Many eggs are so large (up to 12 mm long) and showy that they have been featured in general natural histories. Sometimes the only known details of the egg of a particular species are those preserved by chance in a photograph or figure in a popular publication of local entomology.

The phasmid egg is, I believe, unique in being an ordinal criterion. That is to say, as far as present knowledge goes the particular combination of structures found in the phasmid egg is found in no other order, and all phasmids have eggs with these characteristics. Yet within this framework the egg form is enormously varied (Fig.1).

All phasmid eggs have an operculum, which is lifted by the emerging nymph, a feature shared with a number of other insect groups. The unique feature is the combination of this with what is known as a micropylar plate. This is a region of the egg capsule which combines the function of sperm entry with respiration, and is the only region of the capsule attached to the internal egg membranes. It shows itself internally as a glistening white (because air-filled) area of distinctive shape. In most cases this shape is repeated more or less exactly externally, though in a few cases it is almost indistinguishable from the general capsule surface. The operculum ranges from being smooth and slightly concave to strongly convex or being decorated with a raised capitular structure. The micropylar plate can take up a whole range of shapes as indicated in Fig.1. Fig. 2 shows the general features of the phasmid egg.

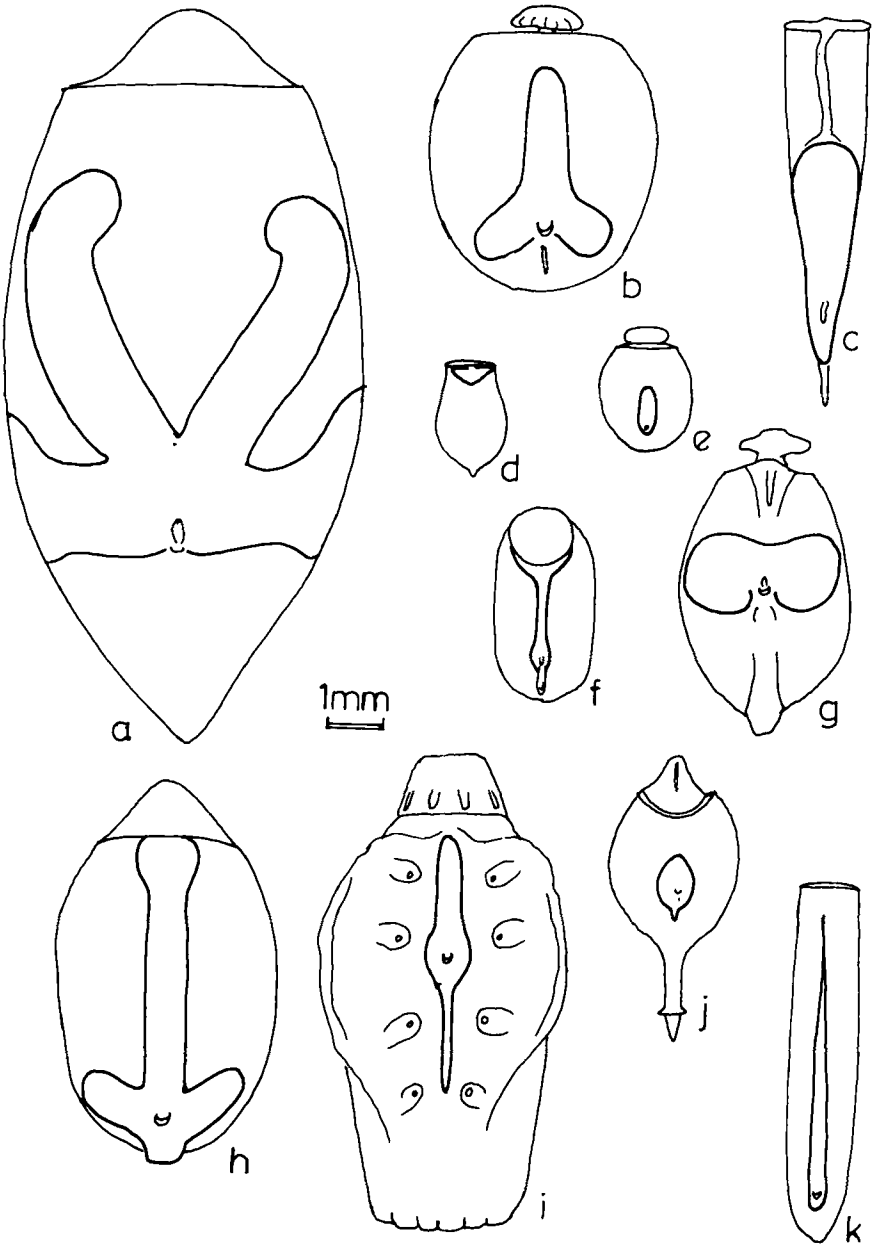



Fig. 1. A selection of phasmid egg forms, seen in dorsal view, anterior at the top. The outline of the micropylar plate has been indicated with a broader line. (a) *Heteropteryx saussurei* (b) *Tirachoidea cantori (c) Prisomera nigra* (d) *Timema chumash* (e) *Carausius morosus* (f) *Marmessoidea marmessus* (g) *Pharnacia acanthopus* (h) *Extatosoma popa* (i) *Phyllium giganteum* (j) *Asceles margaritatus* (k) *Brachyrtacus celatus*

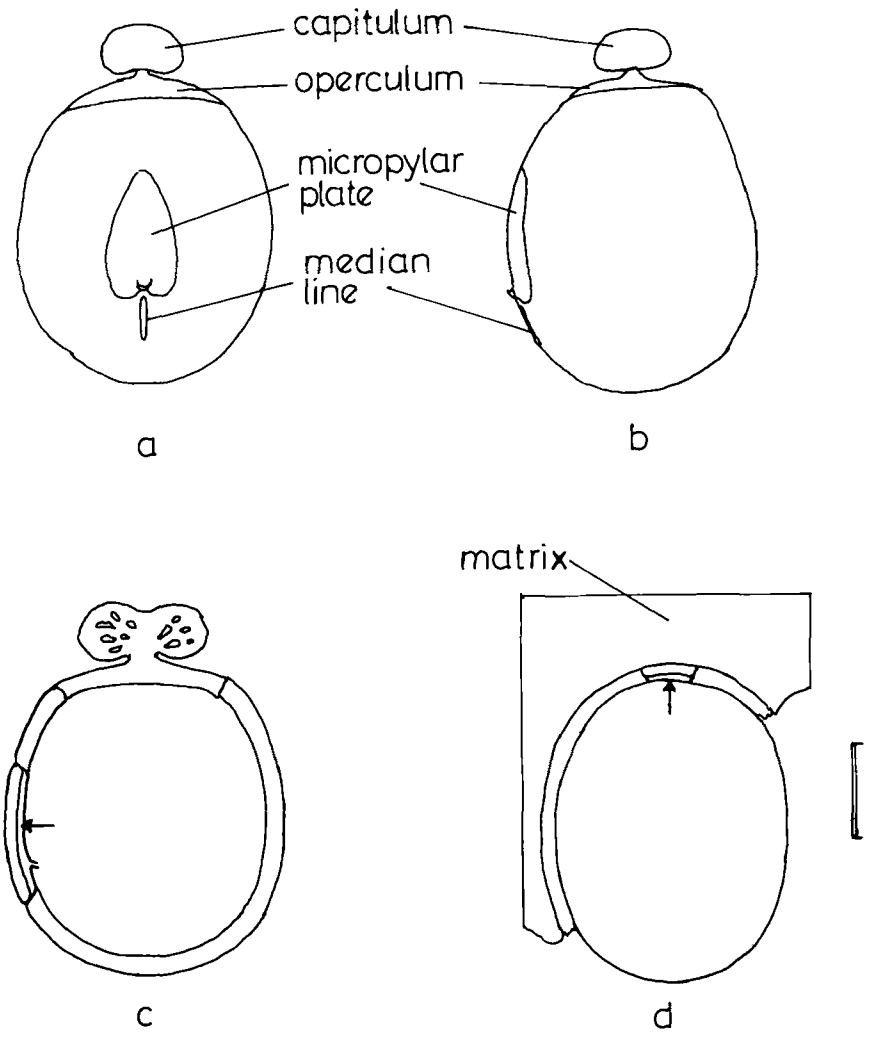



Fig. 2. The general structure of the phasmid egg. (a) dorsal view (b) left lateral view (c) vertical section based on *Carausius* (d) transverse section of fossil *Eophasmodes oregonense*. The full capsule wall is only visible where the fossil is still embedded in the rock matrix. The scale line represents 1 mm. In (c) and (d) the internal micropylar plate is arrowed. In (a), (b) and (c) anterior is at the top, in (d) dorsal is at the top.

Insects are notoriously variable and subject to aberrations, even in those features which have been selected as species-defining (e.g. Clark, 1977, 1978, 1980). The phasmid egg is no exception to this general rule, though aberrations can usually be identified with confidence and discounted when studying the ootaxonomy. Egg variation is usually in either size (common) or colour (relatively rare), neither of which affects the basic form of the egg. So how far has it been possible to realise Kaup's aims? With eggs of some 400 species now known it is certainly possible to identify instantly the tribe of a specimen and (with the exception of two or three closely related genera) to place a specimen in its genus. Within some genera, such as *Heteropteryx*, species identification via eggs is easy; in others such as *Bacillus*, eggs of related

species seem to be indistinguishable. As for Kaup's idea of analysing genera with a large range of species, surprisingly in the genus he chose as an example *(Necroscia)* we still only know the eggs of four species, as against his own knowledge of two. However there are some large genera where it is clear from egg morphology that species of diverse types have been united by a few adult characteristics and that eventually such genera will have to be broken up. An outstanding example is *Baculum,* where no fewer than four distinct egg types exist, so different from each other that from the eggs alone one would suspect different tribes.

An ambition of mine is to be able to use egg morphology to help elucidate the major subdivision of the order, which until recently had been divided into two on the basis of the presence or absence of the *area apicalis,* a triangular structure on the mid and hind tibia (Stahl, 1875 etc.). A number of authors have disputed the validity of this (Key, 1974, Roberts, 1974, Kristensen, 1975). Certainly the selection of this criterion seems completely arbitrary since it may be sclerotised or not, elevated or depressed, and delineated in various ways. A study of egg morphology does not show any consistent characteristics for these two traditional groups. Of the various egg features the one which seems to me to be least susceptible to adaptive change is the nature of the micropylar plate. This has an enormous range of shapes and sizes (see Fig. 1) but may also be classified on the basis of the manner in which it connects to the egg membranes (Sellick 1980,1986). One satisfying outcome has been to examine the placing of the anomalous North American genus *Timema.* This has been gradually advanced to an eventual isolated subordinal status, all other phasmids constituting the second suborder (Kevan 1982). The adult differs from all other phasmids in having tarsomeres reduced from five to three by fusion. When I was finally able to see the egg a couple of years ago I was able to confirm (a) that it was a true phasmid, having the ordinal characteristics of the egg, and (b) that it fully deserved subordinal status, since alone of the genera studies it has no micropylar stalk connecting the plate to the egg membranes.

It is this true, internal, micropylar plate which I believe is the most reliable clue as to the relationship between different species, since it seems unlikely that it is subject to as much environmental adaptation as the external features of the egg. I am encouraged by the fact that the known fossil internal plate seems identical to that present in modern eggs (Fig.2). Externally plates differ in shape and size and in the presence or absence of a median line. This latter is a small bar running posteriorly to the plate. Internally plates can be seen to be of three fundamentally different types – lacking a stalk (*Timema* only), with an open gap posterior to the stalk (an 'open plate') and with the edge of the plate completely surrounding the stalk (a 'closed plate'). Both of the latter are found in the two alleged different groups produced by a study of the *area apicalis.* The open plate category can be further subdivided by the presence or absence of an internal median line and its relationship to the stalk gap. Some apparent external 'median lines' do not exist internally and conversely we sometimes find a clear internal line where there is no external trace.

Anyone wishing to know more about the Phasmid Study Group and its journal Phasmid Studies should contact Paul Brock, 40 Thorndike Road, Slough, Berks SL2 1SR.

JOHN T. CLARK SELLICK

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# A rare braincase of the clupeomorph fish *Spratticeps gaultinus* Patterson, from the Lower Cretaceous Gault clay of Leighton Buzzard, South-central England.

During the summer of 1995, while searching for hexanchid shark teeth in the Middle Albian Gault clays near Leighton Buzzard. a small incomplete teleost skull was collected from the upper *Euhoplites loricatus* Zone of the Lower Gault in Mundays Hill quarry (SP 936279).

Fossils of teleosts (bony fishes) in these clays are rather uncommon except for isolated vertebral centra, those that do occur (apart from unidentifiable microscopic remains) being principally fang teeth of predatory fishes such as *Apateodus glyphodus* (Blake) and, rare in the Leighton Buzzard beds, *Protosphyraena* sp. and *Pachyrhizodus* sp. These have been found by the writer only as isolated specimens, as are small shark teeth, and the discovery of more complete identifiable remains is extremely rare. Indeed, over a period of many years, the only other identifiable fish fossils obtained from the Gault have been two incomplete rostra of *Belonostomus* sp. with six and seven teeth respectively and two palatine plates of the chimaeroid *Ischyodus thurmanni* Pictet & Campiche.

The incomplete teleost skull from Mundays Hill quarry was taken to the Natural History Museum in November 1995, where it aroused considerable interest. It was


Plate 1.
*Spratticeps gaultinus* Patterson. BMNH P. 64019.
Dorsal view of brain case from the middle Albian Lower Gault clay, *Euhoplites loricatus* Zone, Mundays Hill quarry, Leighton Buzzard. Scale bar 5mm.
Photograph – Natural History Museum, London.

determined by Dr. Colin Patterson as a braincase of the clupeomorph fish *Spratticeps gaultinus* and was only the sixth such braincase recorded from the U.K. Gault. Clupeomorphs are herrings and their relatives, a group of about 350 living species, many of great commercial importance. *S. gaultinus* is significant as the oldest clupeomorph in which details of braincase structures are accessible. The species was described (Patterson 1970) from three braincases acquired by the then British Museum (Natural History), and one by the Institute of Geological Sciences, during the 19th century and which had remained unidentified and undescribed in their collections. The locality for the four specimens was the *Euhoplites lautus* Zone of the Middle Albian Lower Gault of Folkestone, a Zone absent from the Leighton Buzzard area due to the partial or entire erosion of some Zones and Sunzones during Cretaceous times.

The four previously described specimens: BMNH 36311 (the holotype), BMNH P.51016-7 and GSM 112223 are in the collections of the Natural History Museum and the British Geological Survey respectively. A fifth specimen, BMNH P.52491,

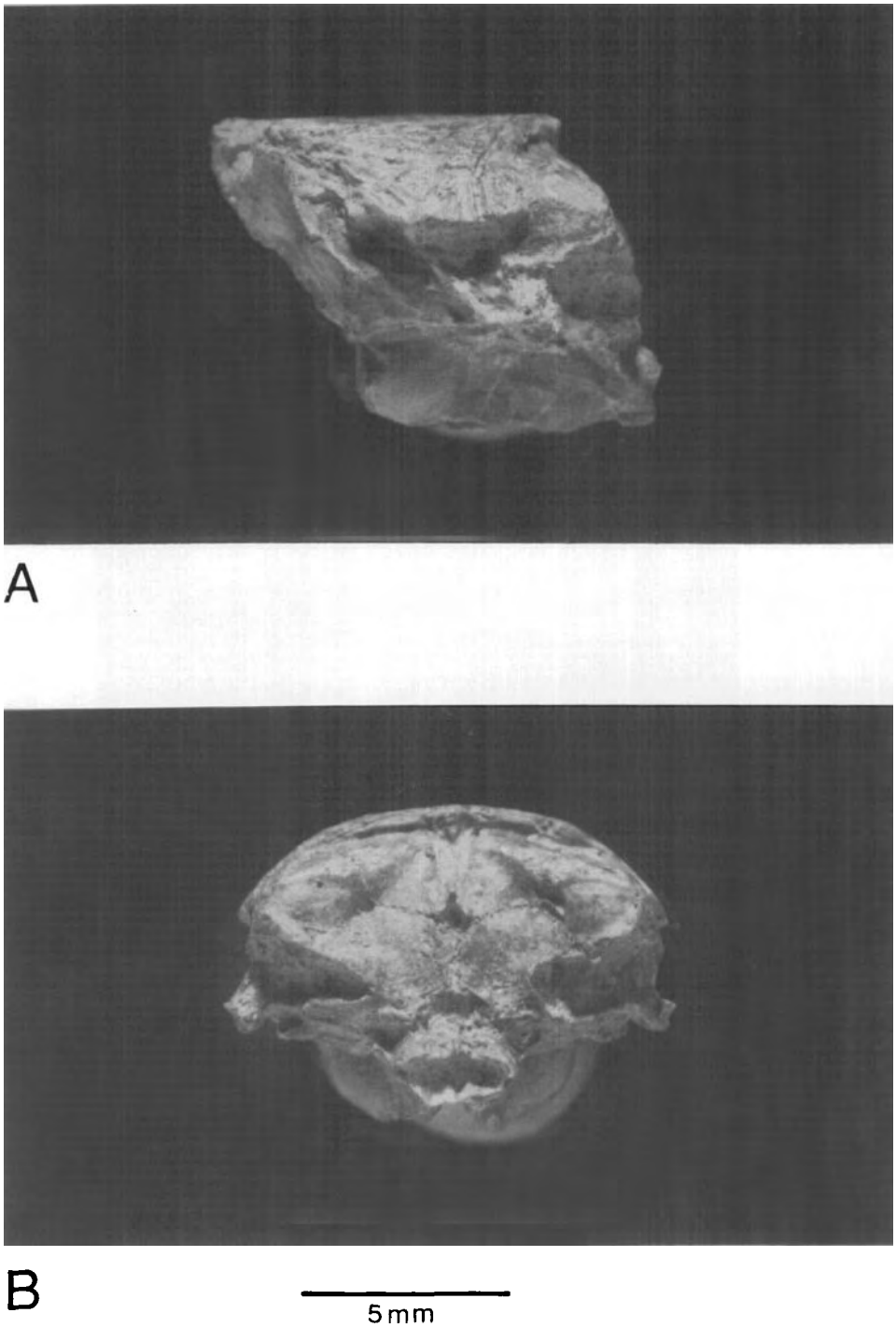


Plate 2.
*Spratticeps gaultinus* Patterson. BMNH P. 64019.
(A) Left lateral view and (B) posterior view of braincase. Scale bar 5 mm.
Photographs – Natural History Museum, London.

from the Gault at Naccolt, Kent, was collected and presented by Dr. A.S. Gale in 1972. The Leighton Buzzard braincase, BMNH P.64910, has also been donated to the collection of the Natural History Museum, London.

ACKNOWLEDGMENTS

My grateful thanks to Dr. Colin Patterson, FRS, of the Department if Palaeontology, the Natural History Museum, for identifying the specimen and for the many very helpful comments. My thanks also to Miss Alison Longbottom of the Department if palaeontology, and to the Natural History Museum's Photographic Unit for the excellent photographs.

My appreciation is also due to CAMAS Aggregates Ltd. (Garside's Sands) of Leighton Buzzard for allowing me access to their various properties.

PETER SMART

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## On Human Credulousness

Saturday, 26th April was Cuckoo Day in Marsden, a small town tucked away under Saddleworth Moor in the Colne Valley near Huddersfield. Legend has it that the good burgers of Marsden, who included my forbears, spotted a link between the arrival of the cuckoo in spring and an improvement in the weather. Actually, that was quite an an achievement since the weather is generally pretty appalling in those parts of the Pennines. Be that as it may, spot the connection they did (without any fancy statistical analysis) and they decided to prolong the sunshine by building a wall around the cuckoo, so that it should be confined for the duration. Sadly the wall was not high enough and the bird flew away. As they said, it were nobbut a course too low! Or, as a participant in the revels said to me thinking me to be a stranger in those parts, they wor' a bit thick round 'ere, like. How unkind! These days you might well get a Ph.D for an embroidered version of little more than the observations of the Colne Valley Cuckoo Laboratory. Nowadays, climate change doesn't need walls to keep cuckoos in. Cheerfully burning all that fossil fuel and generating all that methane from our ruminant livestock, we are all at it. Cuckoos, indeed.

I spent most of my youth not in Marsden but in Gloucestershire, close to a village called Wick. There, it is said, they used to brew a remarkably fine spring wine from last year's broad beans. Then a village maiden, finding herself pregnant, denounced the wine as the culprit. Alas, no more bean wine in Wick! Credulous country bumpkins or common prudence?

In the 19th century numbers of distinguished, well-educated and intelligent people were taken in by the purveyors of so-called psychic phenomena - spiritualism, telepathy, clairvoyance and many others. Universities had chairs in phrenology and the University of London boasted until the 1940's a Council for Psychical Research graced amongst others by the late Professors Cyril Burt and C.E.M. Joad. The Psychical


The Executive Secretary, John Marsden (left).

Research Society attracted the support of numerous Fellows of the Royal Society, including Sir William Crookes, Sir Francis Galton, Sir Oliver Lodge and Alfred Russel Wallace. All these believed in varying degrees in psychic powers and were prepared to testify to the veracity of the rogues who took them in. Some of the cases were laughable. Archdeacon Thomas Colley believed that he had seen a materialised spirit emerge from the side of one Dr. Monck, and used this and other reported supernatural

phenomena to support belief in the Resurrection. Monck was a criminal and an imposter (he had no doctorate) who practised deception. pornography and worse. In 1876, he served a term of imprisonment after being exposed by an amateur conjuror at a seance in Huddersfield (perhaps they weren't quite so thick there after all). The good archdeacon subsequently compared Monck to St. Paul.

The affair was notable not only for the gullibility of the archdeacon but also for the the involvement of a professional magician, Jasper Maskelyne, who with David Devant ran a small theatre in London based on their prowess. These two were increasingly involved by the Psychical Research Society in demonstrating that many of the supposedly supernatural acts could be reproduced by legerdemain. In Monck's case, in 1906, Colley offered to pay £1000 to anyone who could replicate Monck's powers. Maskelyne took up the challenge and later that year carried out the appropriate trick, which with other similar ones he subsequently added to his theatrical repertoire. Colley, however, refused to pay up on the grounds that Maskelyne's performance was not a replica of Monck's effort. Maskelyne questioned Colley's credentials as an archdeacon and was successfully sued for libel by the archdeacon, although the peppercorn damages awarded were much influenced by the court's perception of Colley as being at best a fool.

A key witness for the archdeacon was Sir Francis Galton FRS, rightly regarded as the father of statistics. Sir Francis found nothing odd in Monck's escape through a window on a demand by an audience that he should be searched after a seance. Indeed, he felt the demand to be grossly improper, since Monck was on that occasion a guest in the house.

Those involved in perpetrating the deceptions had good reason. They brought fame and fortune. Most were reasonably educated people and were connected to distinguished figures of the day. In 1868, a medium, Daniel Hore, was seen to float out of a window eighty-five feet above the ground and into an adjoining room seven feet away. The observers of this astonishing feat, two peers of the realm, Lords Adare and Lindsay with one Captain Wynne, corroborated a statement made to the Committee of the Dialectical Society the following year. A detailed investigation subsequently revealed that shortly before the incident, Hore had quitted the party to open the window in the adjoining room and that, on his return, he stood on the window ledge (to the consternation of his hosts) from which he then disappeared, to reappear shortly in the next room. No-one actually saw him "float" out of the window and in the next; the observers had been seated in darkness inside the room and had merely observed the shadow of something move out of the window on the wall of the room. At the time (December), the only light available was that of a new moon. It later transpired that only one observer, Lord Lindsay, had seen the shadow move.

Despite the indications of trickery which were subsequently revealed, the Hore case generated much publicity. Alfred Russel Wallace FRS believed in levitational movement; he was particularly impressed with a medium, Mrs. Guppy, who was a close friend of his sister. She could, apparently, travel in a disembodied state from her home in Highbury to Kensington in a little over two minutes! Her arrivals at seances were, by all accounts, suitably spectactular. This was not all: Wallace believed

that she was capable of producing the "materialised spirits" of plants and, as a botanist, he was doubtless in a position to know, although there is no record of the species involved. Objective investigations into Mrs. Guppy's remarkable powers were prevented by her connections to the rich and famous *(tous ça change, mais c'est la même chose);* others were not so fortunate. Mediums were discovered with pockets filled with false beards, sheets of muslin, scent bottles, bells, spirit lamps *(sic),* masks and luminous preparations of phosphorus which smouldered with a suitable ghostly smoke of phosphorus pentoxide.

The scientific men involved in these bizarre events applied quite different standards to these phenomena to those they used in their own researches. In 1905, the French physiologist, Charles Richet, "set up" a medium, Mlle Martha B., who claimed to be able to produce a materialised spirit in the form of an Arab, Bien Boa. Richet asked Mlle B. to get Bien Boa to blow into a glass filled with liquid and the spirit obliged. The liquid was barium hydroxide solution and turned milky, demonstrating that the spirit, too, used normal mammalian respiratory mechanisms. Yet, even after discovering that the "spirit" was an automaton worked by Mlle B. from behind a curtain, Richet proclaimed his belief in his new-found medium. In his defence, it must be said that Mlle B. had powerful friends in the French establishment and Richet's protestations may have been dictated more by expediency than belief.

Most cases referred to the Psychical Research Society were investigated in detail by less credulous people, such as Richard Hodgson, Taylor Innes, Simon Newcombe and Frank Podmore, not names which crop up in the noble annals of British science. Their contribution to debunking the charlatans and tricksters often faced the strong disapproval of the scientific establishment *(Tous ça change,* etc.). Deceit, auto-suggestion, chance and even mental illness were the stock in trade of those who perpetrated such widespread frauds.

At the same time there were certainly those who put acute powers of observation to good use in persuading others of their supernatural gifts. The stream of professors who "sat" for the clairvoyant Mrs. Piper included Sir Oliver Lodge, who was convinced of her powers. Mrs. Piper was unusual in that she permitted experiments" to be carried out on her psychic skills. She affected an uneducated, disembodied style and was a skilful conversationalist who "fished" very successfully for information from her sitters. An apparently innocent comment "Your mother is very near you – a good mother to you?" might elicit the response "Yes, she was." from which it could be deduced that the mother was dead. Mrs. Piper had a remarkable memory for detail and spiced her performances by assuming the manner of certain other "spirits" of exotic natures – an Indian girl, a French physician, Roman emperors and clergymen. Generally she conducted seances in the homes of her sitters in and around Cambridge. As a guest she was able to deduce much from the home and obtain much information from apparently trivial conversations with children, servants and relatives. Those who sat for her had no experience of experimental psychology and details of conversations and facial and other movements were not recorded, nor their significance appreciated. Nor did most realise just what a goldfish bowl a university community is, although Sir George Darwin, mathematician and son of Charles, noted somewhat cynically that Mrs. Piper made a good living retailing Cambridge gossip!

Today's "psychics" take a different form - advertising gurus, spin doctors, double glazing salesmen, purveyors of glad tiding of dubious joy. If only Goliath had had a Filofax, the course of history might have been so different! But then David would surely have had an electronic calculator to improve his aim. And did he really dispose of the Phillistines?

JOHN MARSDEN

*The commentary by the author, on which this article is based, first appeared in the newsletter of the Thames Valley Branch of the Institute of Biology in 1988.*

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## The Hopkirk Laboratory for Plant Taxonomy and Archaeobotany at Glasgow University

Moved from the old Botany Department, Glasgow University herbarium has been rehoused in completely refurbished, architect-designed premises in the old Zoology Department, now called the Graham Kerr Building, the centre of the Division of Environmental and Evolutionary Biology. Removed from the old, safe but inconvenient cardboard boxes, the specimens are now arranged in 75 top quality, purpose built metal cabinets.

The herbarium has specimens of the following approximate numbers.

| | |
|---|---|
| Algae (British and foreign) | 4,000 sheets |
| Fungi (British and foreign) | 2,000 boxes |
| Lichens (British and foreign) | 5,500 packets |
| Bryophytes (British and foreign) | >40,000 packets |
| Pteridophytes (foreign) | 8,000 sheets |
| Gymnosperms (foreign) | 375 sheets |
| British and Irish Vascular Plants | 41,500 sheets |
| The genus *Ulmus* | 1,500 sheets |
| Macaronesian Vascular Plants (mainly Tenerife, a few La Palma and Madiera) | 4,000 sheets |

Particularly active use is made of the collection of British vascular plants which has been substantially augmented with specimens from the Glasgow area as a result of the recent Flora of Glasgow Survey, the results of which are being published as a book *The Changing Flora of Glasgow* written by J.H.D., Peter Macpherson and Keith Watson. An important addition to the herbarium is a growing collection of at present *c.*1,500 sheets of *Ulmus* used in a microspecies treatment by Dr Jayne Armstrong, NERC Advanced Fellow; see Armstrong and Sell (1996). The genus *Epipactis*, and especially the autogamous species, is under study by Dr P.M. Hollingsworth and J.H.D. as part of the NERC Taxonomy Initiative (Hollingsworth and Dickson 1997)*.

There is very active collaboration with Glasgow Botanic Gardens with regard to the genus *Begonia*. The M.L. MacIntyre Begonia Trusts have provided finance for

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* The authors also have a second NERC grant to investigate the taxonomy of the microspecies of elm (*Ulmus*).

research in Glasgow. Sections *Sphenanthera, Knesbeckia* and *Coelocentrum* of this large and little studied genus are currently being revised in collaboration with Mr Martin Sands of the Royal Botanic Gardens, Kew and with the experts in the botany of China at the Royal Botanic Garden, Edinburgh.

Another especially growing part of the herbarium concerns the specimens from Tenerife. These are prepared by honours botany students who have been taken annually for over 20 years on a short field course by J.H.D. *et al.* for training in plant collecting, taxonomy, plant geography and ecology. There are many alien and weedy species represented including such plants gathered in the Teide National Park. See Dickson *et al.* (1987).

The herbarium, Graham Kerr Building.

Among cryptogams, the bryophytes are especially important both in numbers and worldwide spread, this collection was built up from the 1950s to the 1980s by Alan Crundwell.

The archaeobotanists/palaeoecologists make much use of the herbarium for reference seeds, fruits and pollen in their studies of British (mainly Scottish) sites of prehistoric, Roman and medieval age. A major advance in archaeobotany comes from the better and better identification of plant remains and the recognition of more taxa of difficult groups such as grasses and sedges, many of which are ecologically very significant (Dickson, C., 1989, 1994). This allows more detailed inferences to be drawn about past flora and vegetation, palaeoenvironments and ethnobotany. Only the easy access to a good herbarium makes such work possible to the highest level. An

important current use of the bryophyte herbarium is that by J.H.D. in his work on Quaternary mosses, particularly those found with the Tyrolean Iceman (Dickson, J.H. 1997, Dickson, J.H. *et al.* 1996). There is the large collection of Quaternary bryophyte remains studied by J.H.D. and also separate reference collections of pollen, seeds and fruits and charcoal.

The British vascular plants have been computer catalogued and it is our intention to pursue this cataloguing to cover all the collections. The herbarium needs a curator skilled in plant taxonomy and computing and with a strong desire to carry out research on the collections.

In effecting the transfer of the herbarium, the refurbishment of an old laboratory and the establishment of the Hopkirk Laboratory, the University of Glasgow has already spent £108,000 and regards this development as a significant fulfilment of the commitment to the fostering of taxonomy which the University gave to NERC with regard to the NERC Taxonomy Initiative. As an undergraduate in the 1950s J.H.D. remembers the then Glasgow University herbarium as a dismal place, little used and with little incentive for use. Now the bright, new herbarium is placed in user-friendly space peopled by friendly users. It and the laboratory facilities are available for use by all plant taxonomists and archaeobotanists who, whether on short or long term visits, will also have the benefit of immediately available experts in molecular and cladistic applications to taxonomy.

The name of the new laboratory commemorates Thomas Hopkirk who as a young man in 1813 published *Flora Glottiana A Catalogue of the Indigenous Plants on the Banks of the River Clyde, and in the neighbourhood of the City of Glasgow.* For its time this is a splendid little book. Further details of Hopkirk's botanical work are given in Dickson, J.H. (1992).

Dr J.H. DICKSON

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# Library

We have just said farewell to the student helpers who have been with us for the last seven weeks. This summer the main task has been to bring together all the books on cryptogams and we now have a series of cases at the far end of the Reading Room containing all of these works. Some are not readily "browsable" being up the top of a ladder but at least they are all together and they have all been cleaned and polished. The only problem remains the "displaced" items formerly on these shelves which have become "refugees" located elsewhere in the Reading Room so some items may need extra time to locate as there may be several possible temporary homes depending on the size of the book you want. The Fauna section which was reshelved last year was rechecked to add additional travel accounts and new accessions and it should now be easier to find regional faunistic accounts. The students got through vast quantities of wax polish, book cloth cleaner and dusters and came from a number of different European countries as well as Britain.

Apart from the Donations listed individually we have also received a large number of books from the estate of the late Dr Anne Sleep FLS, mostly on pteridology, and from the late Theo S. Jones FLS, mostly on tropical agriculture. These are being accessioned and catalogued at the moment and will add substantially to our holdings on these subjects.

By the time this issue come out it should no longer be necessary to wear a hard-hat to access the Library. The stairwell and hall are being repainted at the moment and all portraits will also be cleaned before rehanging once the redecoration is complete which should be by the end of September.

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## Book Reviews

**Evolution of hydrothermal ecosystems on Earth (and Earth?)**, edited by Gregory R. Bock and Jamie A. Goode, Ciba Foundation Symposium volume 22, Wiley, Chichester, 1996. xii + 335 pp., line drawings, H/b ISBN 0-471-96509. Price £52.50.

This multiauthored book is the result of a symposium with a similar title held at the Ciba Foundation, London January 30 – February 1, 1996. This was followed by a public meeting which the reviewer attended. The book is divided into blocks of papers by general discussions and each paper is also followed by a short discussion, making what some readers will regard as a degree of unnecessary padding and others as useful commentary. As the title implies the papers cover a wide range of topics, ranging from the suspected high-temperature origin of life on Earth as shown by rRNA trees, through the structure and fossilization of prokaryote communities in terrestrial hot-spring ecosystems, to geomorphological analysis of features on Mars that indicate copious quantities of liquid water once existed on its surface. The papers are arranged into an ordered progression leading one to the suggestion, based on modern and ancient Earth hydrothermal system paradigms, that Mars too had all the pre-requisite elements for the evolution of life early in its history, and that we should go there to find signs of it. With this in mind the note added in proof at the end of the book shows its publication to have been extremely prophetic: in August 1996 a paper in *Science* reported *possible* fossils (reviewers italics) from the suspected Martian meteorite ALH84001. The current debate about this paper follows many of the criteria outlined in this well-written, informative book that anyone with an interest in the evolution of life itself will find interesting.

CRISPIN T.S. LITTLE

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**Ants,** by Gary J. Skinner and Geoffrey W. Allen with plates by Geoffrey Allen and line drawings by Sophie Allington, publ The Richmond Publishing Company, Slough, UK., 1996., 83 pp line drawings and coloured illustrations. P/B ISBN 0-85546-305-8. £8.95., H/B ISBN 0-85546-306-6, £15.

This is the 24th of a series of handbooks, closely maintaining the character and high quality of most of the other members of the series. This particular issue on Ants is written by Gary Skinner, who is head of Biology at a Petersfield School and illustrated by some very fine illustrations by Geoffrey Allan. This combination has produced yet another of this series of very high quality for teachers, amateurs and researchers (and I suspect professional entomologists) alike.

As usual, there are detailed chapters on the biology of representatives of the fifty species of British Ants. Simplified and detailed identification keys are copiously

illustrated by Sophie Allington's line drawings, making tracking down the name reasonably easy, in spite of the lack of any striking physiognomic variation.

One of the fascinating features of this book is the summary of the work of behavioural scientists in unravelling the complex social organisation and caste systems in ant colonies. Although much has been learned about ant colony behaviour, food preferences, mating behaviour etc, there is clearly also a lot of unknowns, as the author points out from time to time, thus suggesting research projects.

One interesting section concerns the different roles of ants who contribute to feeding of plants, dispersing plants, pollination, pruning and weeding. Also discussed are associated predators and parasites. With such paragraph titles as Guest Ants, Thief Ants, Slaver, etc, one can expect and obtain a good read. Interesting techniques, references, useful addresses and a comprehensive index complete another successful booklet.

BRIAN W. FOX

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**Solitary Wasps**, by Peter F. Yeo and Sarah A. Corbet, (with plates by Anthony Hopkins). Naturalists Handbooks 3., publ The Richmond Publishing Co., Ltd., 1995, 68 pp, colour and b/w illustr., P/B ISBN 0-85546-295-7 £8.95., H/B ISBN 0-85546-296-5. £15.00.

Most amateur naturalists like myself confront members of this group during a leisurely lunch in the countryside, sitting on a sundrenched dry bank on a warm summer's day. Usually, one can admire their colours different from the usual confrontational common wasps and only wonder about their name and possible pugnacious tendencies. This handbook is designed to provide a rucksack answer to both, as well as entertaining lunch chat amongst friends. The chances of naming the species from this book is very high as the plates by Anthony Hopkins are beautifully executed. More than that however, the text in the Natural History section (chapter 2) will stimulate a lot of thought and provoke ideas, as stinging, stalking, digging and sleeping postures are discussed and illustrated in some detail. The extraordinary story of *Passaleocus* species who capture aphids, paralyse them, and keep them locked up in cells with burglar proofed door, maintained daily with pine resin, almost defies belief. The mating behaviour of the macho, almost kama kazi *Cerceris*, or the piggy backing *Ammophila* is a good read, as is the extraordinary variety of nestbuilding techniques amongst the squatters, builders, and diggers. In fact such is the variety of behaviour that there is a special inventory to help you to get ready for the identification keys.

As usual with this series, collecting techniques and future research suggestions are covered in detail, and the usual references and index complete this book, a revised second edition of one of the earliest members of this series originally published in 1983 and helped set the scene for this remarkable collection of booklets.

BRIAN W. FOX

**The Gardener's Guide to Growing Ivies,** by Peter Q. Rose. David & Charles Publishers, Newton Abbot, Devon, UK., 1996, 160 pp, colour plates. H/B ISBN 0-7153 0498 4. Price £16.99

*Hedera* is a fascinating, beautiful and surprisingly diverse genus, and author Peter Rose clearly knows it extremely well. It is a genus that one can fairly readily encompass, with fewer than 20 (possibly no more than 10) species and apparently no hybrids, but there are very numerous cultivars (over 500 are mentioned by name under *H. helix* alone).

The reader of this book soon realizes that the author is an expert ivy horticulturist and enthusiast, but no botanist. No key to species or distribution maps are included; no taxonomic opinions are definitely express; there are a number of inexactitudes that a botanist would describe as 'gardeners' errors', e.g. *Orobanche* is misspelt throughout; several of the shapes drawn on page 38 (e.g. orbicular, lanceolate, obtuse) are not as described; and there are ultra-elementary descriptions of such topics as chromosomes and cultivar nomenclature that are appropriate to an unscientific gardener but not to a botanist.

The merits of this "comprehensive view of ivy in all its aspects" must be judged from the horticultural perspective alone; given that caveat, it scores very highly. The bulk of the book (97 out of 160 pages) is a gazetteer of ivy species and cultivars, covering their appearance, origin and horticultural merits. The text is illustrated by many beautiful photographs, which form a major feature of the book, enabling easy identification of the cultivars depicted. Identification of the others (well over a half) is less easy, but the cleverly annotated index gives one a fighting chance of success. Other chapters of value and interest cover the history of ivy (in relation to man), the use of ivy in garden, house and landscape, and methods used in the cultivation and propagation of ivy.

With hindsight, it is fortunate that the author did not debase the text with arguments about the taxonomic status of *H. hibernica* or *H. algeriensis/canariensis,* but instead provided this authoritative and eminently readable essential companion for all hederophiles. It will surely become, as Chris Brickell's Foreword predicts, "the standard work".

C.A. STACE