



The Linnean



Carl Linnaeus
1707–1778

NEWSLETTER AND PROCEEDINGS OF THE LINNEAN SOCIETY OF LONDON

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A forum for natural history

THE LINNEAN SOCIETY OF LONDON

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THE LINNEAN

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Edited by Brian G Gardiner

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Editorial

As was mentioned in the March issue. There will be two further editions of *The Linnean* this year, one in July and one in October. This, the July *Linnean*, includes the Minutes of the Anniversary Meeting as well as two articles, in addition to the usual items and correspondence.

The first article is by way of a eulogy to John Hooper, a pioneer British bat man who died in 2005. As the authors emphasise “he epitomised the tradition of the amateur naturalists contribution to scientific advancement”. He was an enthusiastic caver which he combined with both bat ringing and studies of bat ultrasonics. Hooper, together with his wife, commenced ringing horseshoe bats in 1947. They went on to ring greater and lesser horseshoe bats, as well as other species. In the first ten years they tagged over 3,000 individuals. Finally, by 1960, when the risks of handling and ringing bats had become apparent, John Hooper began to study bats using ultrasonic detectors, equipment he helped to develop.

The second article is in the form of a biography of the botanical explorer of Antarctica, New Zealand, the Arctic and North America – David Lyall (1817-1895). Lyall entered the Royal Navy in 1839 as Assistant Surgeon on HMS *Terror*, which was one of the two ships forming Sir James Clarke Ross’s expedition to the Antarctic (1839-1843). He was then promoted to Surgeon and naturalist on HMS *Acheron* on Captain Stokes expedition to survey New Zealand. On his return he volunteered for, and was appointed Surgeon and Naturalist on HMS *Assistance* in the expedition led by Sir Edward Belcher in search of Sir John Franklin’s ill-fated expedition to the Arctic (in search of the North-west Passage). After serving throughout the Baltic campaign under Captain Seymour he was finally commissioned as Surgeon and Naturalist on HMS *Plumper* under Sir John Hawkins to delimit the sea boundary between Canada and the United States in the Pacific Ocean. In 1858 his services were transferred to the Land Boundary Commission surveying the boundary between Canada and the United States. During this time he built up an extensive herbarium of North American plants (cf those he had already built up of the Antarctic and New Zealand). Indeed, he was one of the most prolific plant collectors of his era.

BRIAN GARDINER

Editor

Society News

I’m writing this as I await my flight after spending five days in Washington DC. The primary reason for my visit was business as I now sit on the board of the JRS Biodiversity Foundation, but there was also a little free time to see the sights! Amongst the many attractions of the city, I simply had to visit the Smithsonian National Museum of Natural History! Currently the second most visited Museum in the world – the first is the Louvre – the Museum is celebrating its centennial year in 2010, and, to quote its website, “has inspired curiosity and learning about the natural world and our place in it”.

As I toured the exhibits, I couldn't help thinking about how our own Society has fulfilled a similar role as part of its core mission over the last 222 years – we celebrated our 222nd birthday with our Anniversary Meeting on May 24th 2010. This was a wonderful occasion, at which six awards were presented; the minutes of this Meeting, including the citations for each of our award winners, are printed within this issue. At the Meeting our President gave a superb lecture on *Schistosomiasis and Environmental Change*. If you were not able to attend, you can listen to the lecture by downloading the podcast on our website. We hope to record a selection of our lectures and make these available on our website so please look out for them.

Our Anniversary Meeting concluded an excellent series of meetings in the Linnaean year 2009-10. We had a distinctly aquatic feel in March with a day meeting and evening lecture on the population of mitten crabs in the Thames, organised by Paul Clark and Gill Mapstone's beautifully illustrated lecture on siphonophores. In April we welcomed Martin Sharman as our speaker for the Annual Biodiversity Policy lecture joint with the Systematics Association entitled *The obvious answer to biodiversity loss – a bigger planet*. This was an extremely thought-provoking component of the range of events in our programme linked to the International Year of Biodiversity. Also in April, we were delighted to welcome Per Wästberg, Chairman of the Nobel Prize for Literature Committee who has recently written a biography of Anders Sparman, one of Linnaeus' apostles. We were joined by the Swedish Ambassador, Mr Staffan Carlsson, his last visit to us before he moved to be the new Ambassador to Germany. We look forward to continuing our close links with the Swedish Embassy and to welcoming the new Ambassador to the Society in the near future.

Of course, our meetings programme is just one way in which we promote the science of natural history; our publications are also a key component of the Society's activity and our three journals continue to attract papers of the highest quality. Recently, *Nepenthes attenboroughii*, a carnivorous pitcher plant, first described in the *Botanical Journal of the Linnean Society*, 159 (2009), was ranked Number 1 in the top 10 species described in 2009 by the International Institute for Species Exploration at Arizona State University.

As I write, a group of our Fellows is in the Brecon Beacons on the Society's Field Trip and we will be returning to Wales in July for the Conversazione. We are conscious that not all our Fellows are able to attend meetings in London and are exploring possibilities for other non-London based meetings or visits; if you have any suggestions of venues or would be happy to host a meeting, please do contact me.

RUTH TEMPLE
Executive Secretary

P.S. Just before going to print we received the sad news that Professor C.T. Ingold an Honorary Fellow, the famous mycologist, died on 31st May, just short of his 105th birthday. He was elected to the Linnean Society in 1927. A private funeral was held in Newcastle on 10th June; a full obituary will follow in a future issue of *The Linnean*.

Field Visit to the Fforest Fawr Geopark, Brecon Beacons National Park June 2010

Twenty five Fellows and guests headed for the Brecon Beacons in the first weekend of June, equipped for every eventuality in this capricious climate of ours. The sun gods, however, smiled on us and we were blessed with two days of glorious sunshine; only on the final morning was the waterproof necessary, and then but briefly.

A varied programme had been arranged by our two leaders, Dr Tony Ramsay and Professor John Good, and to ensure that we kicked off in the right ‘spirit’ we began with a tour of the Penderyn Distillery, where it was possible to see how groundwater from the hills and wash from the Brains Brewery in Cardiff are used to make the first commercial whisky produced in Wales since the 19th century. Having met each other and fortified by a tasting, we set off on a walk which gave us a taste of a different kind – that of the magnificent landscape within which we were to spend the next couple of days, to learn something of how it was formed and how the flora changes according to the alkaline and acid environments.



Tony Ramsay explaining some geological points
at Moel Penderyn.

In the afternoon, along the banks of the rivers Nedd and Pyrddin and towards Sgwd Gwladus Waterfall, we learned much of an area noted for its flora, geology and industrial archaeology, and at the end were well-rewarded with a pint of Real Welsh Ale at a well-sited hostelry.

Sunday commenced with a circular route through woodland to the lovely Sgwd Clun Gwyn Waterfall and then back along the River Mellte to examine features of the Porth yr Ogof cave system. This was followed by a visit to Penwyllt Quarry, where we enjoyed breathtaking views of an upland landscape as red kites soared above us.



The group learning more geology above the Sgwd Clun Gwyn Waterfall.

A walk from the Mountain Centre above Libanus on the final morning afforded splendid views of Pen y Fan, the highest point in South Wales, and took in Traeth Mawr, a wetland once the site of a post glacial lake, and a Roman road.

After luncheon at the Centre we said good bye to each other, but also gave sincere thanks to Tony and John, for their expert leadership and making the Field Trip such a memorable one. I am sure I speak for everybody when I say how much we learned and how much we enjoyed it.

VAUGHAN SOUTHGATE
President

Letters to Linnaeus

Letters to Linnaeus is a fascinating collection of letters written by scientists and admirers of Carl Linnaeus' unique impact on the study of natural science. There are 53 modern authors represented, interwoven with letters from Linnaeus' own correspondence.

Edited by Dr Sandra Knapp (Natural History Museum, London) and Prof Quentin Wheeler (Arizona State University), the result is a beautifully illustrated book that serves as a fitting tribute to Linnaeus and his legacy.

Available now for only £15 plus p&p

Download an order form from
www.linnean.org
 or contact Victoria Smith
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Library

I am pleased to report that the Linnaean item purchased via e-bay has now been personally couriered back to the Society by our Conservator's son. It is a copy of the *List of the Royal Society for the Encouragement of Arts ... 1761-62*, which was probably presented to Linnaeus by Thomas Hollis, who also presented him with a copy of the works of Milton. We have examined the volume closely but are no nearer solving the mystery of its outward transatlantic journey. There is no doubt that it was owned by Linnaeus and the signature on the title-page proves that it was acquired by James Edward Smith, along with the other Linnaean material, in 1784. Sometime during the nineteenth century it was re-bound in a Linnean Society binding. So far we have found no evidence of its sale or theft and no evidence of its having been given away as a gift. Whatever its story, it is now safely back where it belongs, with the other Linnaean volumes in the Society's Collections Store.

One of the major tasks we have been tackling over the past few months has been the transfer of the Society's manuscript and archive material to the newly created Archive Room, part of the suite of accommodation in the renovated Tower Rooms. This material, consisting of numbered and alphabetically arranged manuscripts, Society archives, Society Papers (manuscripts of papers read to the Society) and miscellaneous correspondence, had to be retrieved from various temporary storage areas around the building and, along with nearly 300 new Solander boxes, moved up to the top floor. The move was spread over the course of several weeks, and the exercise involved much toiling up flights of stairs with heavy boxes. Every single member of staff and most of the volunteers helped at some point and I am very grateful to everyone who contributed to achieving this monumental task. The material has now been transferred into the new Solander boxes and the process of labelling everything is now under way.

During February, the Library hosted the display of colourful and informative pull-up banners created as part of the project *Charles Darwin: A Genius in the heart of London*. The display celebrated Darwin and evolution, Darwin in Westminster and his contributions as scientist, geologist, geographer and zoologist. The exhibit had already been on show in Westminster Abbey and at the Royal Society and we were especially pleased to have it here at the Society for the anniversary of Darwin's birth on 12th February.

We have been very busy recently arranging a large number of group tours of the collections or displays of botanical art and archive material. We have had visitors from Hampton Court Florilegium Group, Chelsea Physic Garden volunteers, Archives for London, mature students from Sidcup Arts and Education College, Friends of the Apothecaries Archive, Birkbeck's Ecology and Conservation Studies Society and history of science students from the University of Ulm.

I am delighted to take this opportunity to congratulate Ben Sherwood on his well-deserved promotion to Deputy Librarian. Ben has been our able Assistant Librarian for more than three years and will now take on wider responsibilities in his new role.

LYNDA BROOKS
Librarian

Donations

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Dr David Allen: Allen, D.E. *Books and naturalists*. 495p. London: HarperCollins, 2010. ISBN 9780007240845.

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A Greek Laurel

Visitors to our newly refurbished Library may notice an inscription above the door ahead of them. This note describes the sentiment and provenance of that engraving.

One library-volunteer¹ day in early 2007, I was shocked to learn that Gina was to retire at the end of the year. At that time I was also preparing a paper on my own research in human information processing. Gina and the library staff helped considerably in finding source material for medieval concepts. I have always enjoyed creating aphorisms, and doing so enabled me to express my thanks in my paper²:

Acknowledgement

December 2007 marks the retirement of Gina Douglas, the inimitable librarian and archivist of *The Linnean Society of London*. To Gina, Lynda Brooks and Ben Sherwood, in appreciation of their kindness, knowledge and expertise, an epithet written for them:

... an aphorism whose presence in the library would be a lasting appreciation of the skill and dedication of our librarians, past present and future, and be a token of gratitude to Gina upon her retirement; notions with which Gren Lucas concurred.

Gina's retirement celebrations occurred on January 26th 2008. Gren closed the celebratory meeting with a sparkling eulogy of Gina's myriad achievements. Gren concluded with the remark that he knew *Gina likes wood*. Whereupon he presented Gina with an example of her penchant, upon which, he noted, was ... *some squiggly writing*.



‘If it is there, they will find it’

JOHN ST.QUINTON

1. St Quinton, J. 2006. Musings of a Linnean Volunteer. *The Linnean*, 22(3): 9-11.
2. St Quinton, J. 2007. The Taxonomy of Thought, *Proceedings of the IEEE: Systems, Man and Cybernetics*.

Correspondence

FROM: Professor John McNeill

Royal Botanic Garden, Edinburgh
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Conservation of *Acacia* with *A. penninervis* as type

An article was published in *The Linnean* in April 2008 (vol. 24, part 2, pages 16-20) by Gerry Moore, entitled “Action on the proposal to conserve the name *Acacia* at the Nomenclature Section of the XVII International Botanical Congress in Vienna: Did the ayes have it?”

In this paper the author made the claim that “the Section decided nothing with respect to the proposal on *Acacia*”. This overlooks the fact that, earlier in that Session, the Section had adopted the procedure by which the attempt to overturn the Report of the General Committee recommending conservation of *Acacia* failed. Thereby the recommendation of that Committee that the name *Acacia* be conserved with *A. penninervis* as type became accepted and was correctly incorporated in the *Vienna Code*.

Dr Moore and others have not been prepared to accept that the Section adopted this procedure. They have continued to argue that no valid decision was taken and that, therefore, a proposal could be put forward at the forthcoming International Botanical Congress in Melbourne in July 2011, to “correct” Appendix III of the *Vienna Code* by removing the entry on *Acacia*.

To avoid misunderstanding and perhaps frustration at the next Congress, as Rapporteur-général for the Nomenclature Section of that Congress, I have written a paper, along with the Vice-rapporteur, Nicholas Turland, clarifying what happened in that session in Vienna and suggesting an alternative course of action for those dissatisfied with *A. penninervis* as the conserved type. This was published in the April 2010 issue of *Taxon* (vol. 59, part 2, pages 613–616). It is also available online at <http://www.ingentaconnect.com/content/iapt/tax/2010/00000059/00000002/art00026>

I will be happy to answer any enquiries should further clarification be necessary.

FROM: Professor John Cloudsley-Thompson Hon FLS

Re my article on Spirals, Helices and Vortices in the March issue of *The Linnean* (p25 bottom line) 'the nature or all four' should read: 'of all four ...'. More important, David Pye has pointed out to me a slip on p25 where I wrote (para 3) that flagellates describe spiral patterns. As you correctly stated in your Editorial, these are helical.

FROM: Colin Michie FRCPCH FLS

The causes and functions of Spirals, Helices and Vortices in Nature

The most illuminating article by Professor Cloudsley-Thompson does not relate the very common occurrence of vortices created by motile cilia in the fluid medium around them. The currents produced are a core element of the development of laterality in organisms, as motile cilia on the embryonic plate create critical and directed movements. On a larger scale directed movement is important in mucosal elevators, as found in mammalian respiratory tracts. Cilial vortices are central to the movement and competition between gametes, as well as the feeding paths adopted by many protozoans and multicellular organisms.

One might argue therefore, that although the direction of the spiral vortex is not always known, its effect in creating a current of precise direction and function must be a product of evolutionary selection.

FROM: David Pye FLS

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Spirals, Helices and Vortices

Prof John Cloudsley-Thompson (*The Linnean*, 26, 1:16-27) raised a host of intriguing issues and triggered some further thoughts that may be of interest.

The bathplug and the Coriolis effect story is of course nonsense and yet it persists in folklore. One reason (apart from geography teachers) may be that there are people on the equator (in East Africa at least) who will actually demonstrate it with a bowl of water! It has been on TV several times, for instance with Michael Palin at Nanyuki, Kenya on his 'Pole to Pole' trip, although in his book at least, he uncritically reported the water as going the wrong way! I've never seen it done 'live' but I'm convinced that what happens is this: to get it right, the demonstrator stands astride the 'Equator' line facing East, lifts the bowl and pulls the plug, then TURNS TO HIS LEFT and walks a few paces North – hey presto the water runs out anticlockwise in 'the Northern Hemisphere'; he then TURNS RIGHT ABOUT and walks a few paces across 'the Equator' into the 'Southern Hemisphere' and the water runs out clockwise! Proof! Of course no-one notices the large Coriolis effect of rotations about the demonstrator's own vertical axis. It would be interesting to ask the demonstrator to turn the other way. I wonder whether they realise it is a spoof or whether they are just happy that it proves their point so they don't change the routine. Perhaps, even, Michael Palin's

demonstrator actually did it in the way that produces the wrong result because that's what he mistakenly thought 'should' happen. The demonstration can easily be repeated in a London garden with a large funnel, restricting the outflow a little to make it last longer, and the direction of the final vortex always depends on which way one has just turned. Incidentally it also works with just a wide bowl due to friction and inertia; try holding a plastic bowl with water, turn and stop and the required swirling is initiated – no radial outflow and no evocation of any Coriolis effect!

Incidentally, *pace* Prof. Cloudsley-Thompson, one really should not refer to a Coriolis 'force' since no special force is actually involved (although it may help to think of it that way). The effect is simply due to inertia. As the earth rotates the equator of course moves fastest. Any mass moving to a higher latitude has an excess inertia and 'tries' to maintain its speed, thus gaining over its surroundings and swinging eastwards. A mass moving to lower latitude lags and so falls behind westwards. This causes rotation of atmospheric winds (and oceanic currents) and tornadoes, but has an entirely negligible effect at the scale of a bath plug. Here the difference of latitude on opposite sides of the vortex is trivial and the direction of rotation depends instead on the starting conditions (chaos theory). Even the much larger dust devils are apparently not influenced by Coriolis effects and may rotate either way at any given site.

There is another interesting question to do with 'steering' hot air balloons. They move passively with the wind but can be swung to left or right by changing their altitude. The explanation is that the Coriolis effect on the wind interacts with ground friction to cause wind direction to vary with height (see <http://www.windwisdom.net/tutor2.htm> from University of Michigan – this is currently carrying a viral health warning but I can send a clean photocopy by post on request). It certainly works, even close to the landing spot (and waiting champagne breakfast) right on a narrow road as park regulations insist. I corresponded briefly with the author of the website who assured me that the response is even better close to the equator – but I really don't quite understand that bit.

Prof. Cloudsley-Thompson's consideration of helices interested me too. In my little (2001) book on polarised light I discussed the conventions for describing the direction of helical rotation – always a problem: do you look from in front or from behind? Botanists differ from physicists and both usually find their convention too 'obvious' to require defining (physicists actually use the opposite usage for some phenomena!). Also UK radio-engineers differ from US practice, which led to the first night shambles of the Telstar satellite years ago. Then there's DNA. I'm pedantically irritated (as with the union 'jack' upside down) to see the DNA helix drawn the wrong way, even from authoritative authors – to be charitable, perhaps they have difficulty in telling their artists just what they want. The outcome seems to be about 50% each way I would guess. For my book I asked some molecular colleagues which way DNA twists. Only one offered an opinion off the cuff and when I told him later that he had been wrong, he said "Well, close...!" For the record, it goes the same way as a corkscrew or most 'normal' screws. I call that right-handed but perhaps botanists' might disagree(?). Spirals, helices and vortices can get one into all sorts of issues but internecine quarrels over semantics are better avoided by defining the terms – and recognising that it is not necessarily 'obvious'.

John Hooper - pioneer British batman

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John Henry Dehane Hooper was an industrial chemist working for British Petroleum who epitomised the long tradition of amateur naturalists in Britain. He died in November 2005, but for half a century had pursued his hobby interests, completely unrelated to his 'day job'. He was a keen caver and a founder member of the Devon Speleological Society, but more significantly, he became the pioneer of serious bat ringing in Britain, beginning in 1947. The quality of his studies, and of his record-keeping, deserve recognition as much as their early start. He went on to play a key role in the early development of bat detectors and also took some of the first photographs of British bats in flight.

He had frequently encountered bats during underground explorations and began to investigate their habits and distribution out of curiosity. From this emerged some major advances in the understanding of bat ecology in this country. However, despite being a member of the Mammal Society Bat Group, he rarely attended more general meetings, being a rather shy and private person, focussed on his interest in bats. Consequently, his name is not widely known, although he was featured along with Ted Ellis and Miriam Rothschild in the Sunday Times Magazine reviewing significant British naturalists in 1977.



His work as a pioneer of bat ringing in Britain, forms a major contribution to the study of horseshoe bats and he facilitated the early development of bat detectors and their use in the field. It is important that his self-effacing nature should not allow this legacy to be forgotten. The present note is an attempt to record what he did and serves as a commentary on the papers and materials that he left, which have now been added to the collections of the Linnean Society and the British Library.

John Hooper and his Holgate Mk4 ultrasonic receiver, by a lake near London; Mid-1970s.

In John's early publications he wrote about his caving exploits, mapping the extensive cave systems at Buckfastleigh, where (in May 1939) he was one of the first three people ever to see Easter Chamber of Reed's Cave in its pristine state. Access to the cave has been strictly controlled since then to protect its extraordinary features. A fellow caver, Winifred Burnley, became his very supportive wife of more than 60 years. Early caving articles appeared in the NAFT Magazine of the Anglo-Iranian Oil Company in 1939, although a later list of his publications omits this, and perhaps others too. The list (1941-1994) includes 153 items, all on bats and caves with nothing about his professional work! Many of these papers were quite small, others were truly ground breaking with regard to bat ringing studies and bat ultrasonics. The journals ranged from the *Proceedings of the Zoological Society of London* and *The Naturalist* to *The Listener* and *Shooting Times*. In the house magazine of BP (Hooper, 1963) he linked bats to oil by a deft bit of authorship and (improbably), he even managed an article in *The Lady*. This set out to demystify bats and describe how he and his wife sought to discover the secrets of these animals. He thus contributed to the ongoing campaign by many at that time to bring about a sea change in public attitudes towards these maligned creatures.

Bat Ringing

Ringing of birds started in Britain in 1909, with the primary object of documenting their movements. In the U.S.A, Allen experimented with putting bird-bands on the legs of 5 bats in 1916, and serious bat-banding began both there and in Europe (with rings clipped around the forearm) in 1932. Within ten years, Eisentraut had ringed 11,000 bats in Germany, and D.R. Griffin and his colleagues had banded 13,000 in New England (Anon, 1957). Nothing comparable had begun in Britain until the Hoopers noticed horseshoe bats hanging in caves and tunnels in the 1940s. They realised that nobody knew much about their biology and pondering what they might usefully do, Win wrote to Brian Vesey-Fitzgerald (a well-known naturalist of the day), enquiring what might usefully be investigated (Hooper, 1983). The helpful 4-page reply evidently inspired them to start marking bats. There was little experience to call on in Britain, and no ready supply of numbered rings. Initial experiments, with hand-made rings fitted round the legs, were not very successful. Of 37 bats ringed this way between December 1947 and May 1948, two were recovered in September 1948 with swollen legs, and it was suspected that some bats were shedding their rings because only five were recovered in total. From September 1948, C-section bird rings were used, clipped loosely on the forearm so that they could slide freely over the wing membrane. These proved satisfactory for lesser horseshoe bats (*Rhinolophus hipposideros*), but these early rings were made of aluminium, and some individual greater horseshoe bats (*R. ferrumequinum*) either chewed them so that the number was defaced or, worse, crushed the ring on to their forearm. Sometimes chewing the metal created a ragged edge, causing inflamed wounds. A better design of ring had the end curled back, providing a blunter surface to touch the wing membranes. Modern bat rings have such flanges and are made of monel (a nickel-copper alloy), harder to deface, but also harder to apply or remove if necessary.

In the first ten years the Hoopers tagged 3,000 bats, then weighed them using a twin-pan scale, with loose weights, in the dark, because accurate spring balances were



Hooper's light beam trigger allows a greater horseshoe bat to photograph itself by breaking the light beam. A Cadmium sulphide sensor is inside the box.

not available at that time. The meticulous data (date, site, location within site, species, sex, age, measurements, remarks) were transcribed from muddy notebooks used in the caves to 10 hard-backed ledgers listing the bat rings used and all the recaptures. There were also two loose-leaf folders that documented every site (by grid reference and name), every visit made to it, and the bats recorded there on each occasion. The earliest entry in the ringing logs is for December 1947, and the latest in the site records is February 2002. A dozen or more publications clearly chart the process by which John and Win started bat ringing, their hopes when they began, their progress towards better understanding of bat ecology, and, significantly, their deliberate decision to stop ringing when most of their objectives had been fulfilled. The records are exemplary, perhaps reflecting John's professionalism as an industrial chemist. The data are so voluminous and so complete that they offer opportunities for fresh analysis using previously unavailable statistical methods developed for use in bird ringing studies. This may throw fresh light on survival rates of ringed bats for example, also the population size at different dates.

The frequency with which ringed bats were seen again was reassuring. When a short account appeared in *Nature*, asking for others to report ringed bats, 697 greater horseshoe bats had been ringed, and 388 (55.7%) had been seen again; fewer lesser horseshoes had been ringed (172), but 30% of them had also been relocated (Hooper *et al.*, 1951). This compares very favourably with recovery rates for small birds, typically only 0.5%, highlighting the potential value of such studies on bats. Frequent recaptures also enabled regular checks for ring and wing damage, rings being removed or changed if necessary. When an account was published, covering 2,040 bats ringed by December 1954 (Hooper & Hooper, 1956), these high recovery rates had been maintained, with 62.3% of 1,364 greater horseshoe bats, and 50.6% of 62.3% had

been seen again, and 50.6% of 597 lesser horseshoe bats having been seen again. Only 32 greater and two lesser were recovered dead.

Discovering how far and how often horseshoe bats travelled about was initially the Hoopers' main objective. They quickly registered movements up to 17 miles (27 km), although most were less than 1.4 miles (2.2 km), within the neighbourhood of Buckfastleigh where ringing activity was concentrated. The map published in Hooper & Hooper (1956) shows Buckfastleigh bats ranging over most of southern Devon, across to the Tamar valley. The longest movement recorded later was 40 miles (64 km) to Beer in Dorset, from where the bat subsequently returned. Movements were also recorded in winter, evidence that hibernation was not uninterrupted nor so profound as popularly supposed. As it became evident that the bats dispersed across half of Devon, a large team of helpers was recruited, and by May 1992, 92 caves, 97 mines and 19 buildings had yielded records of horseshoe bats; documented in the two loose-leaf folders, by grid-square and site.

It was soon realised that while lesser horseshoe bats invariably hibernated singly, greater were often clustered. There was no clear pattern in this; an individual might be on its own one day and in a cluster a few days later. Clusters were of both sexes, on average with a slight excess of males (Hooper & Hooper, 1952).

Initially, the Hoopers attempted to measure the wingspan of the bats handled, but soon realised that this was impossible to do reliably. They quickly changed to measuring forearm length, now accepted as a standard measure of bat size. They also weighed bats in the caves to the nearest 0.05 g, persuading them to hang from one of the scale pans of an apothecary's balance. They showed that greater horseshoe bats enter hibernation in November at an average weight of 22.5 g, and lose 5.5 g (24%) to emerge in April averaging 17 g (Hooper & Hooper 1956).

Their early notes suggest that survival and longevity were not a particular topic for investigation, however the prolonged study and thorough searches produced some impressive records. A greater horseshoe bat (no. 918), originally ringed at Buckfastleigh



Probably the first successful colour image of a greater horseshoe bat in flight, c1970.

in March 1949, was seen again at a nearby mine in October 1967, by then at least 19 years old (Hooper & Hooper, 1967). This record was later surpassed, but was never published: female E115 was last seen on 8 February 1981, having had four previous identities (first ringed as 3748 on 5 April 1958, re-ringed as 3765 on 1 November 1958, as B47 on 26 March 1960 and B666 on 10 March 1962 before becoming E115 on 4 March 1967). She was at least 23 years old when last seen, although this record has now been surpassed by others of her species elsewhere, in Britain and Europe; Ransome (2008) suggests 30 years as the maximum lifespan.

The observed longevity of these bats prompted the most modest and far-sighted decision that John and Win Hooper made. In 1960, they ceased to ring new bats for ethical reasons: “...for this very reason, we stopped ringing several years ago, but we shall continue to search for ringed bats for many years to come, so that rings can be checked for tightness and, if necessary, removed.” (Hooper 1964). In fact, they briefly tried a few coloured celluloid rings in three localities, in winter 1962-63, in the hope that a coloured ring in the “wrong” site would quickly draw attention to any bats that had travelled in from elsewhere. In practice, the black numbers wore off within about four years, and the only rings subsequently applied were used to re-ring these and older bats as rings approached illegibility. The last ring was used in April 1977.

The Hoopers never applied mark-release-recapture analysis to their results to estimate population size (MRR statistics were barely available then, and little known outside specialist ecological circles). However, they did accumulate recoveries to create “minimum number alive” tables in which a bat missing one winter but seen later (even 17 years later, in one extreme case) and so known to be alive was added to the bats actually handled each winter. Recapture results were not used to calculate average mortality rates (again probably because suitable methods were poorly developed at that time and perhaps unknown to them), but they did use both the ringing totals and the numbers counted during coordinated counts across the caves of the area to attempt broad estimates. The main population of greater horseshoe bats at Buckfastleigh, counted on one occasion was a cluster of 275 bats in December 1947, plus about 100 at Chudleigh and 80 at Virtuous Lady Mine, suggesting a minimum of 455 greater horseshoe bats in South Devon, plus others scattered among smaller mines and tunnels across the county, implying a total population of around 600.

Concern at the possible effects of too much disturbance, by the ringers themselves, combined with low counts in the 1960s, contributed to the decision to stop ringing. There was also increasing concern for bat conservation, in Devon and more widely. Severe reductions due to accidents and deliberate destruction highlighted that concern. A summer colony at Totnes was destroyed in 1952, and in 1974, vandals killed 30-40 bats at the Chudleigh colony, which also suffered from disturbance by cavers and climbers. The hibernating colony at Virtuous Lady Mine declined from an expected 80 to fewer than 10 in 1966 and had not recovered by 1983 (Hooper, 1983). The Hooper’s regular bat counts provided vital evidence needed to secure legal protection for the greater horseshoe bat in the Conservation of Wild Creatures and Wild Plants Act, 1975, and then for all bats in the Wildlife and Countryside Act of 1981. Continued monitoring in Devon also helped evaluate the success of this legislation, and of other measures such as putting grilles on cave entrances to control access and disturbance.

Bat ultrasounds

As early as 1965 John was pointing out the difficulty of studying bats without disturbing them, establishing this as his principal objective from that time onwards. The potential to do so lies in the fact that flying bats emit ultrasounds, pulses that are too high pitched for humans to hear, offering the prospect of detection and identification in flight if only suitable equipment could be devised.

Human hearing fails to detect sounds with a frequency above about 17-20,000 cycles per second (17 kHz), but bats emit sounds at 20-150 kHz for echolocation and to detect flying prey (for comparison, the top note on a piano is about 3.5 kHz). Bats use these emissions as we would a torch, to sweep a beam of sound to scan the surroundings and listen for echoes to reveal objects to be avoided in flight, or the presence of flying insects. The latter cause the bat to increase the repetition rate of its sound pulses to a sharp buzz, enhancing definition and directionality sufficiently for a flying insect to be snatched in the mouth in total darkness. A special ultrasonic receiver allows these sounds to be detected and translated into sounds audible to ourselves. These receivers are now widely used in bat studies, but it all had to start somewhere.

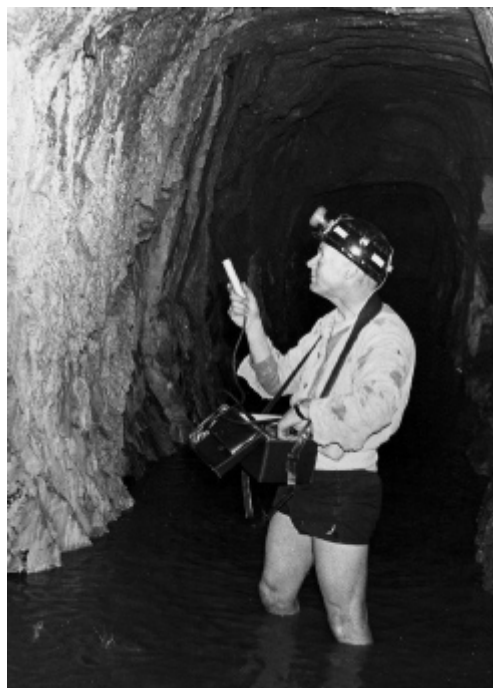
The principle of echolocation by bats was discovered in the USA by Donald Griffin in 1938. He built a portable ultrasonic receiver in the 1950s, but it was valve-operated and not very practical in the field. It would detect ultrasonic sounds, but could not be 'tuned' to different frequencies and was thus unable to distinguish between sounds emitted by different species. John knew about Griffin's work, but saw no possibility of contributing to this type of research until Griffin visited Britain in 1960. The Hoopers took him to Devon to see horseshoe bats (which do not occur in America) and saw the potential for developing equipment to monitor bat sounds in the field. The idea of a tunable detector was being developed by David Pye in Britain in the early 1960s and a friendly exchange of letters began with him in 1961. The aim was to produce a portable machine that would 'translate' inaudible ultrasonics into sounds that could be heard and compared by the human ear.

Portability was essential as bats were likely to behave differently in the wild, compared to the laboratory, and in 1963 Andrew Watson (Secretary of the Mammal Society bat group) discussed with members (including John Hooper) the specification for a desirable bat detector. The idea was put into practice by Eric Brownjohn (managing director of Holgates, an engineering firm based at Totton in Hampshire, with whom John made contact in 1964). He was persuaded to build the first prototype bat detectors. The Mk 1 and Mk 2 instruments used modified transistor radios and John began to test the sole example of the latter in the field in 1963, with its tuning dial calibrated in kilocycles per second rather than naming radio stations. A special capacitance microphone was also needed, based on an extremely thin Terylene membrane. In September 1963, Lord ("Jock") Cranbrooke hosted a bat weekend in Suffolk, organised by Andrew Watson, one objective being to see if bats could be identified on the wing using the early experimental equipment then available.

Field trials were promising and the prototypes led to a Mk. 4 version, the first commercially available bat detector. Fifty of these Holgate Receivers were built and sold, including some in the USA. The Holgate Mk. 4 ultrasonic receiver was 9.5 x 6.5 x 5.5 inches and weighed 8.5 pounds (4kg). Technical descriptions were published (Hooper, 1966, Hooper, 1969a and Hooper, 1969b).

The next objective was to build up a set of recordings to determine how sounds were used by bats in their everyday life and especially how these sounds might enable species to be distinguished as they flew around unseen in the dark. This is made more difficult by the bat's own ability to vary the sounds it emits. It was soon evident that the aim of flight identification might never be fully realised as some bats could not be easily separated and long eared bats could hardly be heard at all. British bats produce two basically different patterns of sound. The two horseshoe bats (*Rhinolophidae*) emit relatively long (50 milliseconds) 'constant frequency' sound pulses that are either around 85 kHz (greater) or 110 kHz (lesser), depending on species. These sounds are heard through the bat detector as barks or warbling noises. The other British bats (*Vespertilionidae*) emit short pulses (about 2 milliseconds each), that are 'frequency modulated' sweeping down from about 80 KHz to 45 kHz, each rendered as a loud click by the machine, repeated about 10-15 times per second. An additional circuit in the detector (a 'beat frequency oscillator') helped to bring out differences in sound quality. The nature of these sounds and the frequency on the detector's tuning dial provide a basis for identification in flight, at least for some species. However, distinguishing by ear, the difference between one burst of short clicks and another is very difficult, so Hooper began to experiment with making visible recordings of the sounds.

He sought advice from John Burton of the BBC natural history sound library regarding a suitable tape recorder, and subsequently bought a reel-to-reel 'Ferrograph'. This recorded sounds on magnetic tape, sections of which were then sprayed with 'Emisquirt' aerosol (colloidal iron) to render the recorded sounds visible, beginning in 1967. The idea was, literally, to see the differences in sound structure and also the repetition frequency of pulses. This rather primitive technique was superseded when John bought a kit to assemble his own oscilloscope, from which photographic images of sound traces could be made and used to study species differences in the nature of their voices, still groping towards the aim of identification in flight. Ironically, despite his pioneering efforts, when John attained the status of runner-up in a sound recording competition run by EMI in 1975, it was merely for hedgehog snuffles in his garden. The prize (some more EMI tapes) was presented by a young Bill Oddie.



John Hooper and his Holgate Mk4 ultrasonic receiver, in a flooded tunnel (?Virtuous Lady Mine), Devon mid-1970s

In 1966 the Nature Conservancy gave a grant of £50 towards the purchase of a Holgate receiver, which cost £98-10s, a lot of money to a part time naturalist in those days. John would come to Royal Holloway College after hours to experiment with recording bats in the teaching labs where there was sufficient space for them to fly freely with a reasonable prospect of being able to catch the bats afterwards. Unfortunately there were confusing echoes from the walls. Nevertheless, he and others gradually gained experience and skill in recognising bat sounds emerging from Holgate detectors and there was regular exchange of notes and tape recordings.

John then set out on summer evenings with his bicycle, bobble hat and bat detector to locate and identify bats in his home area around Staines (Hooper, 1977). Bats were recorded at 195 sites in South West London by the end of 1971, before trying some of the central areas (Hooper, 1981). This was significant because few post-war records existed of bats in London and it was widely assumed that they had largely died out due to serious air pollution in the 1950s. Soon his maps of ultrasonic 'sightings' showed a rash of dots where there had been no records at all for ten years, the most recent being a dead pipistrelle in 1962 in Holland Park. He rediscovered at least four species in central London, but twice found himself locked in to Regents Park after dark and had to climb out over the gate.

Photography

Another field of pioneering activity was in bat photography, especially underground. Using a watchmaker's lens crudely attached to his camera with insulating tape (inexpensive macro lenses for reflex cameras being unavailable) enabled close up images of sufficient quality to be published in the *Illustrated London News* in 1951. Bats in flight were more challenging. Since they fly at several metres per second in the dark, and trying to follow them through a viewfinder or predict where they will be when the shutter is released is almost impossible, the result is large numbers of failed photographs. To overcome these difficulties, John arranged for the bats flying

John Hooper and his Holgate Mk4 ultrasonic receiver, cycling around London to record bats, 1973.



through a small gap to break a focussed torch beam momentarily detected by a home-made photoelectric cell circuit which then triggered a primitive electronic flashgun. This weighed 15lbs (7kg), but its flash lasting 3,000th of a second was brief enough to 'freeze' the action of a bat in flight. A later refinement was to arrange the beam to reflect off a mirror, thus providing two light paths to intercept the flying bat. (The focussed beam being provided by a lecturer's illuminated pointer.) These were probably the first ever photos of British bats in flight in the wild, including some in colour. They showed the extreme manoeuvrability of horseshoe bats in flight, using their elongated digits to control the broad and highly flexible wings. Horseshoe bats were seen to fly with their eyes open and mouth closed, confirming the theory that their ultrasonic sounds were emitted through the nostrils. Photographs revealed how a flying female carries her young, tail first and half her own weight. An article about Hooper's work appeared in *Amateur Photographer* in February 1976, another written and illustrated by himself was published in *Country Life* (March 1956).

Conclusion

It is a feature of John Hooper's studies that they involved both his wife and many volunteers and correspondents. He also contributed a steady stream of articles in a variety of journals, targeted variously at cavers, conservation interests, scientists, naturalists and the general public. The Sunday Times booklet (Hooper, 1962) reached a wide circle of naturalists who had otherwise hardly encountered bats at all. The paper in "PZS" (Hooper & Hooper, 1956) was, and remains, an important scientific review of horseshoe bat ecology, and a glance at the first edition of *The Handbook of British Mammals* (Southern, 1964) shows that it was at that time the only detailed study cited for any bat species based on work in Britain. Papers in *Studies in Speleology* and other Devon-based journals raised awareness among cavers who were likely to encounter bats.

John Hooper also contributed to the development of suitable rings for use on British bats and was one of the first to use them extensively in this country. The adoption of rings with flanges, to minimise damage to the wing membrane, and an agreed national bat ringing scheme, owed a lot to his influence and experience. His strongly expressed advice (Hooper, 1964) was "...banding of bats should be limited to what is strictly necessary and only in cases where a special problem is to be solved", adding "if in doubt – don't". This ethos still applies: bat ringing in Britain depends on the quality of the study, not the quantity of ringing.

Such negative advice seems strange, coming from someone who achieved so much by ringing bats. However, by 1960 the risks of handling and ringing bats had become clear (Stebbing, 1966), and John Hooper began to pursue another objective, the use of ultrasonic detectors to study bats without handling or disturbing them. He played a major part in early development of the equipment and in validating its use in the field. The use of bat detectors is now widespread; owing to reduced costs and increased efficiency, it has enabled new areas to be opened up for extensive ecological study of bats by amateurs and professionals alike. It has also enormously increased the total number of bat distribution records. Formerly these were animals of mystery, flashing past in the darkness, but the distribution and abundance of many species are now better known than for many of their non-volant counterparts among small mammals.

Photographs, sound recordings, distribution maps and extensive published data stand as a permanent record of the activities of a man who was in the best traditions of an amateur naturalist.

Acknowledgements

The authors worked peripherally with John Hooper in the early 1960s, when his interests were moving from bat-banding to bat-detecting. His archives were passed (via Shirley Thompson) to us and have been deposited with the Linnean Society of London (ringing records) and the sound archive of the British Library. We thank Alison Moody (née Hooper) for permission to use the photographs.

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David Lyall (1817–1895): Botanical explorer of Antarctica, New Zealand, the Arctic and North America

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Early Life and Education

David Lyall, MD, RN, FLS, surgeon, botanical explorer and lifelong friend of Sir Joseph Hooker, was born in Auchenblae, Kincardineshire, Scotland on 1 June 1817, the eldest son of Charles Lyall, of Auchenblae and Elizabeth Callum (Desmond, 1994; Hooker, 1895a; Hooker, 1895b; *Cheltenham Examiner*, 1895; *The Times*, 1895). Charles Lyall was the co-owner of a mill and evidently had enough resources to fund his son's education. William Lyall¹, David's grandfather, was a tenant farmer in Wattieson and was known for his pioneering experiments in growing turnips, a crop which had been introduced to the area in 1756. It revolutionized farming practice in Scotland, since for the first time it provided winter fodder for cattle. Until then most cattle, except essential breeding stock, had to be slaughtered each autumn (Lindsay, 2008, p.249). Whether it was tales of his grand-father's farming experiments with the turnip which first stimulated David's interest in botany is matter of speculation, but it may have been so.

David Lyall attended the first three years of an Arts course at Marischal College, Aberdeen between 1831 and 1834 but did not go on to graduate at that time.² Instead, he studied for and was admitted as a Licentiate of the Royal College of Surgeons of Edinburgh, on 8 June 1838.³ The licentiate had been put on a regular footing in 1815 and from then on



Figure 1. David Lyall, carte de visite photograph, by Maull & Polyblank, 1862. © Linnean Society.

candidates were examined in core subjects such as surgery, anatomy and pharmacy and once admitted as a Licentiate were qualified to practice surgery.⁴ It was regarded at the time as a less expensive way of acquiring a medical qualification.

It was not until 31 July 1844 that the degree of MD was conferred on him, by King's College, Aberdeen, which was after he returned from the Ross Expedition of 1839-1843, described in detail below. Under regulations in force since 1840 the degree of MD could be awarded to a person who was a licentiate of RCS and had practised for at least five years. A further period of study was not required.⁵

One can only speculate as to the reason for this course of events. Perhaps, after having spent three years on an Arts degree, and a considerable amount of his father's money, and having found that his interest instead lay in medicine, he felt that he could not impose any longer on his father, and chose the less expensive method of gaining an initial medical qualification.

Hooker noted that, "as was not unfrequently the case with young Aberdonian medical men, he sought to improve his knowledge, and throw himself early on his own resources, by undertaking a voyage to Greenland as surgeon to a whaling ship." (Hooker, 1895a: 210). It is not entirely clear when this voyage took place, but it was evidently sometime between 1834, when Lyall left Marischal College, and his joining the Ross expedition in June 1839. Nevertheless, his initiative was soon to have its reward.

The Antarctic: the British Antarctic Expedition, 1839-1843

David Lyall entered the Royal Navy in 1839 and was immediately appointed, on 6 June, as assistant surgeon on HMS *Terror*, under Captain Francis Crozier (1796-1848), one of the two ships forming Sir James Clark Ross's Expedition to the Antarctic. Lyall's medical qualifications and the fact that he had already acquired experience in the Arctic must have made him an obvious choice. Joseph Dalton Hooker (later to be knighted) was assistant surgeon on the other ship of the expedition, HMS *Erebus*. Sir William Hooker, professor of botany at Glasgow University, had asked Ross to find a place on the expedition for his young son, Joseph, who had just taken his MD degree from Glasgow. Joseph was of course later to become even more famous than his father and one of the leading scientists of the nineteenth century. The voyage was to last four years (Ross, 1847).

The two young men became lifelong friends and collaborators. Both were aged only 22 when they set off on the voyage, the same age as Charles Darwin when he had set sail on HMS *Beagle* eight years earlier. Unlike Darwin, however, neither had parents whose fortunes were sufficient to fund their participation in a civilian capacity. Also unlike Darwin, they had both survived the rigours of a medical education at the time, which was not for the squeamish. Both had therefore joined the Royal Navy and had of necessity to combine their interest in natural history with their official duties as assistant surgeons. David Lyall's letters, written throughout his life, to Sir Joseph and Sir William Hooker are preserved at Kew, as are his herbaria, with duplicates in other collections.

The crews of both ships were all volunteers. HMS *Erebus* and *Terror* were warships and had been chosen because of their strong hulls, having been built as "bomb ships",

designed to fire heavy mortars, and they had also been reinforced at Chatham with extra beams and bulkheads and double copper bottoms. The ships were supplied with the latest equipment and provisions, including early tinned food, enough to last three years. It seems to have proved perfectly wholesome, since Ross recommended its use on all future naval expeditions (Ross, 1847: xxi-xx).

This famous voyage was the first scientific expedition to the Antarctic. The ships were the first to penetrate the Antarctic pack ice and to enter the “lagoon”, later named the Ross Sea, and to encounter the “Great Ice Barrier”, later renamed the Ross Ice Shelf. It was the only voyage to the region ever to be attempted by sail, before or since.

The ships set sail from Chatham in the autumn of 1839 and took a year to sail via Madeira, the Cape of Good Hope and Kerguelen Island to Hobart, Tasmania. From Hobart they proceeded to the Auckland Islands, and Campbell Island. On New Year’s Day 1841 they crossed the Antarctic Circle for the first time. Three days later they encountered the pack ice. Ross had heard stories of a “lagoon” of open water beyond the ice in that area. When the ships reached the pack ice with the lagoon in the distance, Ross manoeuvred the ships repeatedly to strike the ice at the same point. This was in itself a remarkable feat of seamanship, given that the ships were powered only by sail. After a week of attempts, the ice broke and they sailed through into the lagoon, where no humans had ever been before. At the far end was the ice barrier itself. Ross estimated it at 180 to 200 feet high and it disappeared over the horizon in both directions. The ships sailed along it for some 300 miles. Ross discovered Victoria Land, McMurdo Sound, and two volcanoes, which he named after the ships: Mount Erebus, which,



Figure 2. New Year’s Day, 1842, 66° 32′ S, 156° 28′ W. Watercolour by J. E. Davis.
© Scott Polar Research Institute, Cambridge.



Figure 3. Watering in the Pack. Watercolour by J. E. Davis.
© Scott Polar Research Institute, Cambridge.

remarkably, was erupting at the time, and Mount Terror. Other geographical features were named after other members of the expedition, in the Victorian manner, including Cape Hooker and the Lyall Islands ($70^{\circ} 45' S$, $167^{\circ} 20' E$; Ross, 1847: 364; *Geographical Names of Antarctica* p. 199).

Although the expedition was to spend another two seasons in the Antarctic, they did not enter the Ross Sea again. The ships returned to Hobart in April 1841 for a major refit, giving Hooker and Lyall the opportunity to make botanical expeditions into the interior, and visiting Bay of Islands, New Zealand. The ships also spent winter months in Berkeley Sound, East Falkland.

The hazards of such a voyage at the time were immense. The ships encountered fierce gales and giant seas. At one point they collided and *Erebus* lost rigging and spars when it was driven into the face of a huge iceberg. When Ross, Crozier and a small party made a risky landing on Franklin Island in the Ross Sea Hooker was nearly crushed by a boat when he slipped on icy rocks.⁶ A landing was also made on Possession Island. The voyage nevertheless also had its lighter moments. New Year's Day, 1842 was celebrated at $66^{\circ} 32' S$, $156^{\circ} 28' W$ on an ice floe with games and a fancy dress ball. Both captains watched the spectacle seated on "thrones" carved out of the ice by the crews who also thoughtfully provided a bar for refreshments made from the same material. This incident and others were illustrated in watercolours by J. E. Davis, the second master of *HMS Terror*.⁷

Ross's greatest scientific achievement, and the expedition's main purpose, was mapping the earth's magnetic field in the southern hemisphere. He was also instructed by the

Admiralty to locate and reach, “if possible”, the South Magnetic Pole, whose location had been calculated by Gauss.⁸ Ross named Cape Gauss after the great German mathematician and scientist. The expedition reached within 160 miles of what was then calculated to be the magnetic pole, but was prevented again by ice from proceeding further.

Natural history does not seem to have been foremost in the minds of the members of the Admiralty when planning the expedition. That aspect seems to have been an initiative of Ross. Hooker and Lyall were to study the botany, and Robert McCormick (1800-1890), surgeon on *Terror*, the zoology. David Lyall may have developed an interest in botany during his medical studies, given the use of many medicinal plants at the time, but his interest was no doubt stimulated and encouraged by Hooker. Hooker had collected specimens of plants on the way out, via Madeira, Tenerife and Cape Verde (Desmond, 1999: 25-34).

Hooker and Lyall also went botanizing on Kerguelen Island, discovered in 1772 by the French navigator Yves-Joseph de Kerguelen-Trémarec. Today the small group of islands is part of the French Southern and Antarctic Lands (*Terres Australes et Antarctiques Françaises*) and a permanent base and scientific centre, Port-aux-Français, was established in 1950. At present there are about 80 people present in the summer and 40 during the winter.⁹

Lyall had the rare distinction of having a whole genus, *Lyallia*, named after him, by Hooker (Hooker, 1844-60, vol. 1: 548-49). Hooker noted in his *Flora Antarctica*:

“This highly curious genus, coming from the most interesting island visited by the Antarctic Expedition, will serve to commemorate in some slight degree the important services rendered to Botany by my zealous friend and co-operator, Dr. Lyall, R.N.” (Hooker, 1844: 60, vol. 1, p.549).

Charles Darwin, writing to Hooker in 1856, was less impressed and seems to have been in an irritable mood:

“I enclose [an] old note of yours about *Lyallia*; it may refresh your memory: as for this plant and the Pringlea, I should think the Vestiges theory that they were converted algæ, was as good as any! Confound and exterminate them.—” (Darwin to Hooker, 13 July 1856)¹⁰

Exterminate? Darwin as a Dalek? Surely not. Hooker, in *Flora Antarctica*, commented that: “I have placed it [*Lyallia*] provisionally amongst the *Portula[ca]ceæ*, knowing no other order with which it has any equally direct affinity.” A recent study by Wagstaff and Hennion, using DNA analysis, confirmed this and showed that *Lyallia* shares a common ancestor with the New Zealand genus *Hectorella*:

“The monotypic genus *Lyallia* is endemic to the sub-Antarctic Îles Kerguelen. A close relationship with another monotypic taxon, the New Zealand endemic *Hectorella*, was proposed. They share a dense cushion growth habit with small coriaceous leaves that lack stipules. The solitary flowers are bicarpellate with two sepals, 4–5 petals, 3–5 stamens and a bifid style. The fruit is an indehiscent capsule with 1–5 seeds. The flowers of *Lyallia kerguelensis* are hermaphroditic with four petals and three stamens whereas the flowers of *Hectorella caespitosa* are female, male or hermaphroditic, with five petals and five stamens. *Lyallia kerguelensis* is rare on Kerguelen, whereas *Hectorella caespitosa* is confined to the South Island of New Zealand. Our phylogenetic analysis of *trnK/matK* intergenic spacer and *rbcL* sequences provides evidence supporting a

close relationship between *Lyallia* and *Hectorella*. The two species form a well-supported clade that is nested within the Portulacaceae. Divergence estimates suggest they shared a common ancestor during the late Tertiary long after the fragmentation of Gondwana. Such relationships underscore the importance of transoceanic dispersal and extinctions for plant evolution in the Southern Hemisphere.” (Wagstaff and Hennion, 2007)¹¹

The authors agree with Applequist *et al.* (Applequist, Warren, Zimmer, and Nepokroeff, 2006) that the genetic distance between *Lyallia kerguelensis* and *Hectorella caespitosa* justifies the maintenance of two genera, as do their different reproductive characters. *L. kerguelensis* is the only species of the genus.



Figure 4. *Lyallia kerguelensis*, marked “2”, Kerguelen. Photograph, jardin. lautaret / Station Alpine Joseph Fourier.



Figure 5. *Lyallia kerguelensis*. Photograph, Françoise Hennion, 2 January 2006, Île Australia, Îles Kerguelen.

Hooker wrote that David Lyall’s conduct on the expedition was reported to the Admiralty “as meriting the highest commendation” and “to him were due many of the botanical results of the expedition” (Hooker, 1844: 60, 1: xii). He added that “he formed a most important herbarium, amounting to no less than 1,500 species” and that “during the five winter months of 1842 in Berkeley Sound [East Falkland], made a beautiful collection of algae” which formed “an important addition to Antarctic botany” (Hooker, 1844: 60, 2: 215).

The expedition returned to England on 4 September 1843 (Ross, 1847, vol. 2). Unfortunately, given his initial interest in botanical research, Ross never published the natural history findings of the voyage. On Ross’s death, Hooker found the ruined remains of his (Hooker’s) collection from the voyage in Ross’s back garden (Baigent, 2008).

New Zealand: the Voyage of HMS *Acheron*, 1847-1851

After several routine appointments in the Mediterranean David Lyall had the opportunity to embark on his second voyage of botanical exploration. He had been promoted to surgeon on 4 July 1846 and in October 1847 he was appointed surgeon and naturalist on HMS *Acheron* under Captain (later Admiral) John Lort Stokes (1812-1885) on the expedition to survey New Zealand (Natusch, 1995; Glenn, 1950, Chapter 17).

Stokes had served under Robert FitzRoy on the *Beagle* in 1830 and again, from 1831 to 1836, during the time that Charles Darwin was on board as naturalist (Laughton,



Figure 6. *Lyallia kerguelensis*, Plate CXXII in Hooker's *Flora Antarctica* (1844-60).

1, a leaf; 2, bractae, peduncle, and fruit; 3, utricle removed from the calyx; 4, vertical section of the same, showing the ripened and abortive seed; 5, seed and funiculus; 6, seed, with testa removed; 7, embryo (all magnified) (Hooker, 1844-60, pt. I, p.549).

2004b). HMS *Acheron* was an early steamship fitted with both sails and a steam engine and paddle wheels. The object of the voyage was to test the capabilities of the ship and to survey the coastline and flora of New Zealand. Hooker again wrote:

“Here, devoting himself to the collection of the lower orders of plants especially, he amassed the most beautiful and extensive herbarium in these branches of botany which had ever been formed in the islands, besides making considerable discoveries in the phaenogamic plants, and collecting some that had only been previously gathered by Banks and Solander. Among his many important botanical discoveries in this survey was that of the monarch of all buttercups, the gigantic white-flowered *Ranunculus lyallii*, the only known species with peltate leaves, the ‘water-lily’ of the New Zealand shepherds.” (Hooker, 1895a: 210).

When David Lyall first saw the plant and collected it, it was not in flower and he



Figure 7. HMS *Acheron*. Unknown artist.
© National Library of New Zealand.

was not able to identify it at that time. Hooker, writing in 1886, described how it was identified:

“The first specimens of this remarkable plant, which is certainly the monarch of the genus, were procured in Milford Sound, on the west coast of the Southern Island of New Zealand, by Dr. Lyall, when accompanying Capt. Stokes in the surveying voyage of H.M.S. *Acheron* (1847-9); unfortunately they consisted of leaves only. These did not even suggest the natural family to which they belonged, and from their likeness to those of a gigantic *Hydrocotyle vulgaris* were not unnaturally supposed to be referable to an unknown umbelliferous plant. In 1860-1 it was rediscovered by Drs. Sinclair, R.N., and Haast (now Sir Julius Von Haast, F.R.S.), when travelling in the mountains on the eastern side of the Middle Island, in marshy places at elevations of 3000 to 4000 feet (it attains even 5000 in the Lake Ohou district).” (Hooker, 1886)

The specimen collected by David Lyall is held by the Royal Botanic Gardens, Kew and is shown in Figure 11 and does indeed consist only of leaves. The lettering at the bottom right indicates that the large leaf was collected at Milford Sound (then called Milford Haven). The lettering on the small seedling leaf reads ‘Bligh Sound’. The *Acheron* was in Milford Sound and Bligh Sound in February 1851 (Natusch, 1995:154-58). Hooker goes on to quote a local botanist, J.B. Armstrong, of Christchurch, New Zealand, who described the plant at the time:

“It is confined to the Middle Island, extending from Canterbury, where it grows at 2000 to 4000 feet elevation, to Otago, where its limits are 1000 and 3500 feet, and grows on mountain slopes below the snow-fields, where the ground is usually kept moist during the summer from the trickling downwards of the melting snow, and is shaded from the midday sun.

These slopes are perfectly drained by masses of rock beneath, and are covered by peat. It also, however, occurs in sand, and even in shingle. On mountains facing the south Mr. Armstrong has seen it ‘covering the ground for hundreds of acres with one huge sheet of pure white,’ but it more commonly grows in patches of a score or thirty plants among straggling patches of *Olearias*, *Veronicas*, and other shrubs.” (Hooker, 1886)

Hooker added that “the leaves attain a foot in diameter, and the flowers four inches; these vary from snow-white, the usual colour, to creamy and pink.”

Lyall also found *Olearia lyallii* in the Auckland Islands and the Snares. Sir Joseph Hooker named a number of plants for him, including the white-flowered lacebark *Hoheria lyallii*, *Parahebe lyallii*, the alpine *Celmisia lyallii*, and *Viola lyallii* (Glenn, 1950: 120; Metcalf, 1996: 8).

Desmond writes that:

“Hooker could never have tackled this first published account of the New Zealand flora without access to the specimens of more than thirty botanists and collectors. One notable collector, David Lyall the naturalist on an official survey of New Zealand in 1847, had been assistant surgeon on HMS Terror. Hooker dedicated this Flora to his former colleague and two other distinguished collectors – William Colenso¹² and Andrew Sinclair.”¹³ (Desmond, 1999: 204)



Figure 8 (above). *Ranunculus lyallii*. Hooker Valley, Mount Cook National Park, with Lake Tekapo. © Fraser Gunn, 2008.



Figure 9 (right). Peltate leaves of *Ranunculus lyallia*, Arthur's Pass, New Zealand, 17 November 2006.



Figure 10. HMS *Acheron* in Milford Sound, 1851; watercolour by Frederick John Owen Evans (1815-1885), hydrographer to the expedition. © National Library of New Zealand. The *Acheron* is in the distance, dwarfed by the towering mountains of The Narrows in Milford Sound. A large Maori war canoe is in the right foreground. The watercolour was bequeathed to the library by Miss Marjorie Samson, granddaughter of Admiral John Lort Stokes, 1961.

Desmond adds that Hooker's view was that not many new species of flowering plants would be discovered in New Zealand and that collectors could be more profitably engaged in seeking fungi, mosses and other cryptograms. As noted above, Hooker had remarked that it was this "lower order of plants" which had been the focus of much of David Lyall's botanical work in New Zealand. Whether this was at Hooker's suggestion, or a particular interest of David Lyall himself, is unclear. Certainly, as has also been mentioned, Lyall had collected algae in Berkeley Sound on the Ross expedition and collected it later in his career, on the Belcher expedition, discussed below.

David Lyall also provided one of the earliest descriptions of the green New Zealand parrot, the kakapo, *Strigops habroptilus*, mentioning in an article published in 1852 that: "The Kakapo lives in holes under the roots of trees, and is also occasionally found under shelving rocks." (Lyall, 1852)



Figure 11. *Ranunculus lyallii* Hook. f., collected by David Lyall, Milford Sound, New Zealand, 1851. © Royal Botanic Gardens, Kew.



Figure 12. Tab. 6888. *Ranunculus Lyalli*. Curtis's *Botanical Magazine*, Vol. 112, 1886. Drawn by Matilda Smith and lithographed by J. N. Fitch.
© Royal Botanic Garden Edinburgh.

The parrot is unique in being the heaviest of the parrots, being nocturnal or semi-nocturnal and for being flightless, or virtually so. Interestingly, David Lyall did observe the bird making a brief glide:

“The only occasion in which the Kakapo was seen to fly was when it got up one of these hollow trees and was driven to an exit higher up. The flight was very short, the wings

Figure 13. Print from *Birds of New Zealand* by Walter Lawry Buller, 1873.



being scarcely moved; and the bird alighted on a tree at a lower level than the place from whence it had come, but soon got higher up by climbing, using its tail to assist it.” (Lyll, 1852)

Since “flight” implies the ability either to take off under its own power, or to sustain powered level flight, or both, “flightless” seems an apt description. Although David Lyall did not apparently observe them, the kakapo is also noted for its unique breeding habits. The male clears a bowl-shaped depression in the ground and, having settled in it, inflates an air sac in its thorax and emits a low frequency booming sound which can carry for several kilometres across valleys, announcing to any females in the area that he is ready to mate. After 20 or 30 booms they then make a high-pitched metallic call, or “ching” sound. The cycle is repeated for several hours at a time.

The Maori name comes from “kaka”, parrot, and “po”, night¹⁴, suggesting its nocturnal habits. Sir David Attenborough, in his series, *The Life of Birds*, memorably captured it on film (Attenborough, 2000). At the time David Lyall wrote the kakapo was still found occasionally in the mountain areas of North Island and in South Island “it is still found in considerable numbers, inhabiting dry spurs of hills or flats near banks of rivers”. However, he noted that its numbers had been greatly depleted by introduced species, especially dogs, cats, rats and stoats. By 1995 the kakapo was on the verge of extinction with only 50 known individuals surviving.¹⁵ After the failure of some early recovery attempts, in 1998 the New Zealand Department of Conservation set up a Recovery Programme involving the removal of the remaining kakapo to two islands from which introduced predator species had been eradicated, and the numbers have now increased to 90 on the reserved islands. There are plans to establish colonies on other predator-free islands.

The *Acheron* was paid off in Sydney at the end of 1851, worked for a time for the New South Wales Government and ended her days in the service of a Sydney merchant (Natusch, 1995: 170). David Lyall arrived back in England in 1852. Stokes had a plan to publish an account of the voyage, but none was ever produced. When the New Zealand writer Sheila Natusch was researching her book, *The Cruise of the Acheron*, she found a manuscript in the Hocken Library, University of Otago, Dunedin, which

appeared to be an account of the voyage, but which unfortunately started at page 115. The first half was missing. However, she obtained a microfilm of holdings in National Maritime Museum, Greenwich and was able to identify the first half of the manuscript, entitled "The Voyage of the Acheron", which ends at page 114, in their holdings (Natusch, 1995: 15-20).¹⁶ We are indebted to her for this discovery which provides a complete account of one of the most important voyages of discovery in New Zealand history. She also found that the manuscript, although long attributed to Stokes, was not only in the handwriting of George Albert Hansard, a civilian clerk on the *Acheron*, but was almost certainly Hansard's own work. She based her own book mainly on the complete manuscript.

The Arctic: the Belcher Expedition in search of Sir John Franklin, 1852-1854

On his return to England, David Lyall volunteered for and was appointed surgeon and naturalist on HMS *Assistance* in the expedition of (later Admiral) Sir Edward Belcher (1799-1877), in search of Sir John Franklin's ill-fated expedition to the Arctic (*The Times*, 1895). Franklin's expedition had disappeared while trying to find the North West Passage. Because of their fine service on the Ross expedition, the same ships, HMS *Erebus* and *Terror*, had been chosen for Franklin's expedition, although for the Franklin voyage they had been fitted with steam engines and screw propellers. Captain Crozier, who had commanded HMS *Terror* on the Ross Expedition, had again commanded *Terror* in the Franklin voyage. He had in fact taken command of the Franklin expedition after the death of its leader and is presumed to have died later with the remaining members. Several graves were discovered in 1984 and 1986, (Beattie, 1987) but neither Crozier's body, nor that of Franklin, has been found.¹⁷ Loyalty to his old commanding officer, and concern over his fate, no doubt explains why David Lyall volunteered for the Belcher expedition. Furthermore, the officers of the Ross expedition had met Franklin in Hobart, Tasmania when he was lieutenant governor (Ross, 1847, vol. 1: xxiv, 118).

David Lyall was appointed acting lieutenant in charge of the sledge party and senior medical officer of the Belcher expedition. He was also appointed superintending surgeon on the *North Star*, the supply ship to which the crews of the other ships of the Belcher expedition had retreated. Belcher ordered the other ships, which were stuck in pack ice, to be abandoned. At the time it was standard practice for a captain who lost a ship to face a court martial, which resulted in Belcher being reprimanded. It was considered by the Admiralty that his abandonment of the ships had been unduly hasty, a judgment somewhat strengthened by the fact that one of the ships, HMS *Resolute*, later floated free and was picked up by an American whaler. David Lyall gave evidence at Belcher's court martial and stated that in his opinion the insufficient supplies of preserved meat would have had a serious effect on the health of the crews if they had been compelled to spend another winter on the ice (*The Times*, 1854).

There is an extraordinary sequel to the story of HMS *Resolute*. The ship was purchased by the U.S. Congress and returned to the United Kingdom in 1856 as a token of friendship. The ship resumed service in the Royal Navy until 1879 when it was broken up. Its timbers were used to make a desk which was presented by Queen Victoria to President Rutherford B. Hayes in 1880. Known as "The Resolute Desk", it

was used in the Oval Office notably by President Franklin D. Roosevelt, President Kennedy and other presidents since and is currently used by President Obama.¹⁸

Belcher was known to be a difficult man and was not well suited to command, especially in such conditions (Laughton, 2004a). He sailed into areas of heavy ice partly because he ignored the advice of experienced Arctic navigators. On the other hand, his motive in abandoning the ships was the safety and survival of the crews. Despite the loss of the ships, the expedition was not a total failure. Belcher correctly identified the direction Franklin and the survivors took after they abandoned their ships, as being to the south. He rescued various crew members from the earlier Collinson expedition, and a number of scientific experiments were carried out, observations were made of the characteristics and patterns of the Arctic ice floes, and of weather conditions and the geology in the region.

Part of the scientific success of the voyage must also be attributed to the efforts of David Lyall. He made important collections of plants from Disko Bay, the Whale Fish Islands and Cape York, on the coast of Greenland, and in Lancaster Sound, Beechey Island, Wellington Channel and Northumberland Sound in the Polar Islands (Hooker, 1857: 115). This scientific work was carried out in addition to his other onerous duties as surgeon. His botanical work may also, of course, have been a welcome distraction. Hooker published a list of the plants in the *Journal of the Linnean Society* (Hooker, 1857). Hooker commented that “exclusive of Greenland, this is far the largest herbarium ever formed in the American Polar Islands, and exceeds the sum of those of all previous expeditions in the same regions; but, as was to have been expected, no novelties rewarded his labours” (Hooker 1895a: 211). Oswald von Heer (1809-1883), the Swiss geologist and naturalist, wrote an account of the fossil plants collected by David Lyall in Greenland (von Heer, 1862).¹⁹ Lyall Point in the north west of Bathurst Island was named for him in recognition of his efforts (Markham, 1875: 29). The *North Star* returned safely to England in September 1854. He was awarded the Arctic Medal in 1857 (PRO ADM 171/9).

North America: The Boundary Commission of 1857-1862

David Lyall's next appointment was in 1855 under Captain Seymour in HMS *Pembroke*. (Anon., c.1873) He served throughout the Baltic campaign and he was present at the bombardment of Sveaborg (Suomenlinna), a military fort outside Helsinki which was occupied by Russia at the time. The *Pembroke* is also recorded as having visited North America and the West Indies at that time, the crew being discharged in August 1856.²⁰ He was awarded the Baltic Medal in 1856 (PRO ADM 171/21).

After a brief spell at Devonport from October 1856 until November 1857 on the books of HMS *Royal William*, he was commissioned as surgeon and naturalist, on HMS *Plumper* and later HMS *Hecate* under Capt. (later Admiral Sir George) Richards, of the Commission which had been appointed by the Foreign Office, under Col. Sir John Hawkins, RE, to delimit the sea boundary between Canada and the United States in the Pacific Ocean. In 1858 David Lyall's services were transferred to the Land Boundary Commission, surveying the boundary between British Columbia and the United States from the Gulf of Georgia to the Rocky Mountains. A rare personal memoir of David Lyall is found in the report of Lieutenant Samuel Anderson of the



Figure 14 (left). *Larix lyallii*. North Cascades, Washington, USA. August, 2003.
 © Bud Kovalchik Photography. Figure 15 (right). *Larix lyallii*, cone. North Cascades,
 Washington, USA. © Bud Kovalchik Photography.

Royal Engineers, who mentioned in his report of 28 March 1860 that:

“our surgeon Dr Lyall, Royal Navy of Aberdeen, who is a most experienced man. In addition to having been in every ordinary portion of the world, he has been on an Arctic expedition and on an Antarctic expedition and though not a very talkative man, we get curious yarns from him at times.” (Lindsay, 2008: 256-57)

It is a great pity, especially for biographers, that neither Anderson nor David Lyall himself ever committed his “curious yarns” to paper.

During this time he formed a large herbarium of North American species, many of them new to science (Lyall, 1863). This included *Larix lyallii*, a subalpine larch from the Cascade Mountains, British Columbia, and *Anemone lyallii*, the little mountain anemone, also known as Lyall’s anemone, *Calochortus lyallii* (Lyall’s mariposa lily) and many others.²¹ He introduced several of these species into Britain for the first time.

The herbarium was of such importance that Sir William Hooker made representations which resulted in David Lyall being carried on the books of HMS *Fishguard* at Woolwich, from April 1862 to August 1862, ostensibly as staff surgeon²² but in reality on leave and based at Kew (Anon. c.1873.) in order to arrange, report and distribute his collections of plants (Lyall, 1864).

William Harvey, professor of botany at Trinity College Dublin, examined and reported on Lyall's collection of algae in Vancouver (Harvey, 1862). Harvey identified some new species among the collection, naming *Rhodomela lyallii* and *Proionitis lyallii* in his honour (Harvey, 1862: 158).

In November Lyall was granted a further six months leave to complete the project. Sir Joseph Hooker commented that the publication:



Figure 16. *Astragalus lentiginosus* var. *lentiginosus*. Collected by David Lyall. Oregon Boundary Commission, July, 1860. © Royal Botanic Gardens, Kew.

“contains an excellent botanical account of the regions traversed, from the sea to 8000 feet alt. of the Rocky Mountains, where the various zones of vegetation in British Columbia are for the first time indicated and scientifically portrayed.” (Hooker, 1895: 211)

Lyall’s herbarium is still held at Kew. In November 1862 he was elected a Fellow of the Linnean Society.

In 1866 David Lyall married Frances Anne Rowe, daughter of Dr Rowe of Haverfordwest. She was then 28 and he was 49.²³

After he completed his work at Kew, David Lyall was appointed surgeon to Pembroke Dockyard, which at the time was a permanent appointment, but when the regulations of the dockyard were changed in 1868, he accepted home appointments on HMS *Trincomalee* at West Hartlepool and HMS *Dædalus* at Bristol. While at Pembroke Dock he was visited by Hooker but it seems to have been a social visit as he had probably completed arranging his collections from North America by that time.²⁴

Retirement in Cheltenham

On 7 May 1873 he was appointed Deputy Inspector-General of Hospitals and Fleets shortly before he retired in the same year. His last official duty was his appointment in December 1874 to assist the Arctic Committee in storing and victualling the expedition of 1875-76 (Markham, 1875: 29). From 1878 until his death he lived in Cheltenham at what was then No 1 Priory Parade, and is now No. 24 London Road.²⁵



Figure 17. David Lyall’s house from 1878 to 1895, 24 London Road, Cheltenham. Photograph by the author, March, 2009.

Figure 18. David Lyall's gravestone, Cheltenham cemetery. Photograph by the author, March, 2009.



David Lyall died in Cheltenham on 25 February 1895, aged 77. He had survived his wife by some three years but had never fully recovered from her death and a broken arm he sustained some time before his death (Hooker, 1895: 209). He was interred in Cheltenham Cemetery on 2 March 1895. A fine headstone is still there.²⁶ In 1911 Sir Joseph Hooker sent a portrait of David Lyall to an exhibition on the Antarctic which took place in Edinburgh (Huxley, 1918: 477).

David and Frances Lyall had three children, Frances Elizabeth Lyall²⁷, Charles George Lyall,²⁸ and William Hooker Lyall, Sir William Hooker's godson.²⁹ Charles attended Cheltenham College and was commissioned into the army in 1892. He served in the Nile campaign of 1898 and was present at the Battle of Khartoum. He also served in the South African War. He retired from the Lincolnshire Regiment in 1907 with the rank of captain, entering the reserve. He was called up again for service in the First World War, and was killed in action in 1914 (*Gloucestershire Echo*, 1915).³⁰

Conclusion

Until recently the fullest account of Dr David Lyall's life and work was Hooker's obituary of 1895. Apart from occasional entries in works of reference, his work is better known and recognized in New Zealand and North America than it is in the land of his birth. Even the entry for Sir Joseph Hooker in the *Oxford Dictionary of National Biography* makes no mention of him. The relative obscurity into which his memory has sunk since his death is due no doubt to the fact that he was mainly a botanical collector rather than a writer of scientific papers. He was also apparently of a taciturn nature and in retirement he never wrote memoirs of his extraordinarily eventful life. However, his botanical collecting was on an heroic scale, comparable to that of his friend Hooker. Ann Lindsay's chapter on him in her recent book, *Seeds of Blood and Beauty: Scottish plant explorers* (2005, revised edition 2008) is a welcome contribution to the otherwise sparse literature. This article will also, it is hoped, contribute to the recognition of his proper place among the great botanical collectors of the world and bring his contribution to the attention of an audience which shares a commitment to the study of the great diversity of plant life throughout the world. The epitaph on his

gravestone is a reworking of Tennyson's lines on the memorial to Sir John Franklin in Westminster Abbey (Tennyson, 1899: 2.888):³¹

Not here: the cold earth has thy bones, but thou,
 Heroic Sailor Soul
 Art passing on thine happier voyage now
 Towards no earthly pole.

A Personal Note: Researching David Lyall

My father, Donald Lyall was born in Wick, Caithness in 1898. He served on the Western Front in the First World War, and the army of occupation after the end of the war, after which he moved to London where he met and married my mother, Margaret Bailie, in 1928. He took a BSc (Econ.) degree at LSE and became an accountant. My two brothers, David and Thomas, were born in London, but after the family home was damaged in the Blitz, my father's firm transferred the family to Cheltenham, where I was born in 1942. I was brought up and went to school there, unaware, as was the rest of the family, of the details of the connection with David Lyall, FLS, or the fact that he had retired to Cheltenham, and indeed was buried in Cheltenham Cemetery. My father died in Cheltenham in 1949, when I was six years old. My mother had mentioned to us on one or two occasions that my father had told her that there had been a Lyall who had been to Antarctica and that there was an island there called Lyall Island. I thought little more of this, as a child, and did not look into the story until many years later. In 1987, my brothers and I, while on holiday in Scotland, went to visit our uncle Cathel in Monifieth, near Dundee, and for some reason the story re-emerged. My uncle then said that the Lyall who had visited Antarctica had the same name as his father, our grandfather, David Lyall (1869-1933), that our grandfather had met his namesake at some time and that they were related, although exactly how is unclear. I was keen to learn more, but the only other detail my uncle remembered was that David Lyall, FLS, had promised to give my grandfather his gold watch, but never did! I only mention this as it gives credence to the belief that they were related. From their relative dates, it would seem that the surgeon and naturalist may have been quite old at the time, and perhaps forgot. My grandfather would only have been 26 at the time David Lyall (1817-1895), FLS, died. My uncle took us to Auchenblae cemetery where there are gravestones of the naturalist's family. David Lyall's father, Charles, was born in Auchenblae in 1773, and Charles's father, William, died there in May 1794, so the naturalist and my grandfather cannot have been closely related. However, I decided to concentrate on the life of the naturalist and his contribution to science, rather than on family history.

When I got back to London I decided to see what I could find about the David Lyall of the story. In the Library of the Natural History Museum (then the British Library, Natural History) I came across Desmond's *Dictionary of British and Irish Botanists & Horticulturalists* and was excited to see that David Lyall had retired to Cheltenham, although it should have been no real surprise, since Cheltenham was then, and remained for many years afterwards, one of the towns to which members of the services retired.

I could hardly wait to get back to Cheltenham and pursue the story. I had the date of David Lyall's death from Sir Joseph Hooker's obituary and a helpful librarian in the Cheltenham Public Library not only turned up the obituary in the *Cheltenham Examiner* of 1895, but also mentioned that Cheltenham Cemetery had opened by that time and I might try there to see if there was a grave. It seemed rather a long shot, as he might have been buried in a number of parish churchyards, but it was worth a try. I drove round there the next day and was delighted to find that they still had a record card for David Lyall and soon located his headstone. It was indeed strange and moving to see his headstone which had been there all those years, and presumably unvisited. Research into a street directory of the time produced his address during his retirement, No. 1, Priory Parade (*Cheltenham and District Post Office Directory, 1883-84*: 208). I found, after a trip to the Municipal Offices, that it had been renamed, and the house re-numbered, as 24 London Road, and later took the above photograph of the house, which is part of a Regency terrace and is still a private residence.

When back in London, I paid a visit to the Linnean Society and Ms Gina Douglas produced the *carte de visite* photograph made on his becoming a Fellow, reproduced in Figure 1 above. The experience stimulated my interest in natural history, which is certainly that of an amateur, and in the Society, which in 2001 welcomed me as a Fellow, without, I have to say, any discernable merit on my part. My own career has been as an academic lawyer, teaching and writing on law. In my early career I taught at the University of Dar es Salaam, Tanzania, and since 1980 at University College Dublin, from which I retired in 2007. If I have any merit relative to the work of the Society it is in the area of historical biography. I have published, *inter alia*, a number of lives in the new *Oxford Dictionary of National Biography* and the Selden Society volume for 2008. The present article is an attempt to repay, in part at least, the kindness and friendliness, especially on the part of Gina Douglas, David Pescod and the late Dr John Marsden, with which they welcomed me to the Society.

Acknowledgements

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- Figure 4. [<http://www.flickr.com/search/?q=lyallia&w=all>], photograph uploaded, September 17, 2007, site visited 9 February 2009.
- Figure 9. Wikipedia, photograph by Velela. [http://en.wikipedia.org/wiki/File:Ranunculus_lyallii_foliage.jpg], visited 8 February 2009. The photograph is made available under the Creative Commons Attribution and Share Alike licence (CC-BY-SA).
- Figure 13. Wikipedia: [<http://en.wikipedia.org/wiki/Kakapo>], visited 9 February 2009.

Notes

- (1734-1794), according to gravestones in Auchenblae churchyard.
- Information supplied by the University of Aberdeen.
- Information supplied by the Royal College of Surgeons of Edinburgh.
- Ibid.
- Information supplied by the University of Aberdeen.
- For a popular and lavishly illustrated account of the voyage, see *Antarctica: Great Stories from the Frozen Continent* (Reader's Digest, Surrey Hills, New South Wales, 1988), pp. 110-115.
- The watercolours are held by the Scott Polar Research Institute, Cambridge University.
- It was not an easy task and, in any case, since the magnetic pole wanders about over time. Ross calculated the magnetic pole at that time to be at 70° 5' S, 154° 8' E, only 2° 30' south from Gauss's calculation. It was not located again until 1909, by Sir T. W. E. David of Shackleton's Expedition, who located it then at 72° 25' S, 155° 16' E.
- Information supplied by Dr Françoise Hennion, University of Rennes.
- Darwin to Hooker, 13 July 1856, Letter 1924, *The Darwin Correspondence Project*, online, [<http://www.darwinproject.ac.uk/darwinletters/calendar/entry-1924.html>], visited 5 February 2009.
- See also Hennion, 1992.
- William Colenso (1811-99), missionary printer and naturalist. In 1841, during the visits of the ships of Ross's Expedition, he accompanied Hooker on many botanical excursions and afterwards carried on a correspondence with him extending over 50 years. He was present at the signing of the Treaty of Waitangi, and his pamphlet, *The Signing of the Treaty of Waitangi* (1880) gives the best existing eye-witness account of that event. He was elected FRS in 1866: Mackay, 1990; *Te Ara, The Encyclopaedia of New Zealand*, [<http://www.teara.govt.nz/>], visited 18 February 2009.
- Andrew Sinclair (1794-1861), surgeon and naturalist. Sinclair became a surgeon in 1829, and in 1834 was attached to HMS *Sulphur* on a surveying expedition to the South

American coast, under the command of Captain Frederick William Beechey and afterwards of Sir Edward Belcher. He spent some weeks in New Zealand in 1841 with Hooker. In 1843 he accompanied Captain Robert FitzRoy as private secretary, when FitzRoy became governor of New Zealand. On 6 January 1844 Sinclair was made colonial secretary in New Zealand, and he served as such until the establishment of parliamentary government in May 1856. He was elected FLS in 1857. He collected material in New Zealand in 1858 for a supplement to J. D. Hooker's *Flora*: Boulger, 2004.

14. Oxford English Dictionary, "kakapo".
15. See the New Zealand Kakapo Recovery Programme web site:
[<http://www.kakaporecovery.org.nz/>].
16. National Maritime Museum, STK/23 A & B.
17. An expedition in 1986 led by Owen Beattie of the University of Alberta found intact graves on Beechey Island in the North West Territories. The bodies were perfectly preserved in the permafrost: *The Times*, London, 26 September 1986. Two years earlier a similarly preserved body was found in the same area.
18. The British had demanded the return of HMS *Resolute*, but gave up the claim on learning the ship had arrived in New London, Connecticut. HMS *Resolute* was purchased by the U.S. Congress, refitted and sent to Queen Victoria as a good will token in 1856. In 1879 the ship was decommissioned and broken up. Two desks were made from the timbers. One was presented to President Rutherford B. Hayes in 1880 as a gift to the United States. President Franklin D. Roosevelt had the desk modified with a panel door installed in the kneehole, to conceal his disability, but did not live to use it with the panel installed. President Eisenhower did not use it in the Oval Office, but on his election, President Kennedy, who had served in the US Navy in World War II asked Mrs Kennedy to find a desk with a naval association. Mrs Jacqueline Kennedy found the desk in the White House and restored it to the Oval Office. President Kennedy used it throughout his presidency. It featured in a famous photograph in 1962 with his son, JFK Jnr., peeking through the panel door as the President worked at the desk. It was used in the Oval Office by Presidents Carter, Reagan, Clinton and George W. Bush. It is currently used by President Obama: photograph, see [<http://blogs.abcnews.com/photos/>]. At some point the brass plate on the back of the desk was moved to the front, i.e. the President's side, since it is visible on the JFK photograph, but is on the front in later photographs from President Reagan onwards: see the unofficial "White House Museum" web site: [<http://www.whitehousemuseum.org/furnishings/resolute-desk.htm>]. For a fictionalized account, see Matthews, 2007. The other desk, a small writing desk, was made on the instructions of Queen Victoria and has a similar inscription to that on the desk presented to the U.S. President. It was made by Messrs. Morant, Boyd and Blandford and was sent to Windsor in November 1880. It is still in the collection, but is currently on loan to the Royal Naval Museum, Portsmouth: information received from the Registrar, Royal Archives, Windsor Castle, letter, 12 March 2009. Copies of the "Resolute" desk and its counterpart, made for the film, featured recently in a fanciful adventure film, *National Treasure II: Book of Secrets* (2007). On his recent visit to Washington, the Prime Minister, Gordon Brown, presented President Obama with a framed commissioning paper of HMS *Resolute*, and a penholder carved from timbers of HMS *Gannet*, the sister ship to HMS *Resolute*.
19. Unfortunately, the copy of von Heer's article listed in the catalogue of the Royal Botanic Gardens, Kew is missing at the present time.

20. Ibid.
 21. *Calochortus lyallii* (Lyll's mariposa lily, Cats-ear, Lyll's Star Tulip), *Penstemon lyallii* (Lyll's Beardtongue, Lyll's Penstemon), *Astragalus lyallii* (Lyll's milk-vetch), *Saxifraga lyallii* (Red-stemmed Saxifrage, Lyll's Saxifrage), *Haplopappus (Tonestus) lyallii* (Lyll's goldenweed), *Arabis lyallii* (Lyll's rockcress), *Angelica lyallii* (*Angelica arguta*) (Lyll's Angelica), *Cardamine cordifolia* (Heartleaf bittercress, Lyll's bittercress). *Carex lyallii* (Lyll, 1863: 140, 143) (Raynolds' sedge) was later renamed *Carex raynoldsii*.
 22. He was promoted to staff surgeon on 17 November 1861: *The Navy List*, 1870.
 23. The gravestone in Cheltenham cemetery (see below) records that she died on 22 December 1892, aged 54.
 24. Hooker to Darwin, 3 November 1866, Letter 5266, *The Darwin Correspondence Project*, online [<http://www.darwinproject.ac.uk/darwinletters/calendar/entry-5266.html>].
 25. Renumbering certificate A 588, Municipal Offices, Cheltenham.
 26. Borough of Cheltenham Cemetery, grave No. 19797.
 27. Born in Pembroke in 1869: 1881 census.
 28. Born in Hartlepool 28 February 1871 (*Gloucestershire Echo*, 1915); birth certificate, 1871 March, K-Z p. 317, vol. 10a p. 189.
 29. Born in Notting Hill in 1876: 1881 census.
 30. Commonwealth War Graves web site: [http://www.cwgc.org/search/casualty_details.aspx?casualty=856453], visited 10 February 2009. His date of death is given as 18 October 1914 and he is commemorated on the Le Touret Memorial to the Missing. The *Gloucestershire Echo*, 1915 states that he was buried by his regiment at La Cliqueterie Farm, Herties, France. It is not uncommon for the graves of those buried after a battle subsequently to be lost. His name appears on the roll of honour in Cheltenham College. He left a widow, Marjorie Lyll, of The Laurels, Alton Rd., Roehampton, London (Commonwealth War Graves).
 31. Tennyson's original lines are: "Not here! the white North has thy bones; and thou,/Heroic sailor-soul,/Art passing on thine happier voyage now/Toward no earthly pole". Tennyson was Franklin's nephew by marriage.
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222nd Anniversary Meeting of the Linnean Society

held at

**Burlington House, Piccadilly, London W1J 0BF
at 4.00 pm on Monday 24th May 2010**

1. The President took the Chair and welcomed 92 Fellows and their guests to the meeting.

2. Apologies were received from:

Mrs Frances Astor	Mr Stuart Baldwin
Professor Sam Berry	Professor Michael Claridge
Mr John Craven	Dr Janet Cubey
Professor Jeffrey Duckett	Miss Anne-Marie Evans
Mr Neville Fay	Dr Roderick Fisher
Mr Peter Goll	Mrs Jenny Grundy
Mr David Hardman	Mrs Katarina Heldring-Morris
Mr Kenneth Hill	Mr Ray Hutchins
Mr David A Jones	Mr Sonny Larsson
Professor David Mabberley	Dr Ro Lowe-McConnell
Dr Jan Nielsen	Mr Anthony Nixon
Dr Gianfranco Novarino	Professor Simon Owens
Dr Alan Paton	Dr Charles Prion Pansius
Professor David Pye	Dr Elaine Robson
Dr Brian Rosen	Dr Kathy Seddon
Mr Campbell Smith	Dr Sy Sohmer
Mrs Kimberley Stewart	Lady Sue Tunnicliffe
Dr Brian White	

3. Admission of Fellows. The following signed the Obligation in the Roll and Charter Book and were admitted Fellows:

Dr Paul Cannon	Professor Robert Cheke
Mr Markku Hakkinen	Mr Andy Mydellton
Dr Henry Noltie	Dr John Pringle
Dr Stephen Wright	

4. The Minutes of the Meeting held on 29th April 2010 were accepted and signed.

5. The Executive Secretary read for the third time the **Certificate of Recommendation** for the election of a Foreign Member, Dr Sofia Stepanjants.

The citation is reproduced below:

“Dr Stepanjants has arguably been the most enduring mainstay of cnidarians (formerly termed coelenterate) taxonomy in the old USSR region since the passing of her one-time supervisor Donat Naumov, and for many years before that was his “right-hand person”.

She was born on October 8th 1934 in Leningrad (now St Petersburg). She graduated from the Leningrad Pedagogical Institute as a biologist in 1956. From 1956 she worked

in the Zoological Institute of the Academy of Sciences. She has worked there ever since! First she worked as a technician in the Coelenterate Department of the Laboratory of Marine Research, and then as a postgraduate student (her teacher and supervisor was Academician Professor Donat Naumov) and prepared her thesis which was defended in 1968 as the dissertation “Siphonophores of the USSR Seas and the Northern Part of the Pacific Ocean” (*Opredelitel; po faune SSSR*, N 96, 1967, L. 216 p.) . She is now a senior scientist.

She still works at the Zoological Institute of the Russian Academy of Sciences in the Laboratory of Marine Research. She has 162 scientific publications (including 2 monographs). Six of them were published in 2006-2009 in the following journals: *Hydrobiologia*, *Zoologische Mededelingen* (Leiden), *Marine Biology Research*, *Journal of the Marine Biological Association UK* and *Zoological Journal* (Russia). Her interests concern the fauna of Hydrozoa (including Siphonophora) and Scyphozoa in the world's oceans and continental waters, especially the fauna of the Arctic, Northern Pacific and Antarctic regions in connection with bipolarity. Her classification of Medusozoa is now on the website of the Zoological Institute.

In 2002 the Zoological Institute RAS held an International Jubilee Session dedicated to its 170th Anniversary. A collective monograph, *Fundamental Zoological Researches, Theory and Methods*, on the material of this meeting was published in 1994 (editors Academician RAS Alexander Alimov and Sofia Stepanjants).

Sofia Stepanjants was one of the organizers of the Linnean Conference (2007) at the Zoological Institute RAS and an editor (together with Academician Alexander Alimov) of the collective monograph *Species and Speciation. Analysis of new views and tendencies* (*Trudy Zool.Inst.Ross.Akad.Nauk* (2009) Supplement N1).

She has more than 10 publications concerning the history of the Zoological Institute RAS (together with Academician RAS A. Alimov), including a chapter “World Fauna diversity in Zoological Institute RAS Collections” in a collective monograph *Treasures of the Russian Academy of Sciences Collections in St Petersburg* (2003).

Since travel and communication possibilities from her country eased she has been a familiar stalwart on the international conference scene and has made a number of substantial contributions on major taxonomic and zoogeographic topics. She has always been a keen and supportive colleague, and a person who despite personal adversity has always embraced a true scientific ethic of the highest integrity.

We, the undersigned Fellows, highly recommend her for election to Foreign Membership of the Linnean Society of London: E.A Robson, P.R.S. Cornelius, G. Mapstone, E.C. Southward, R.B Williams

6. Appointment of Scrutineers. The following were appointed as scrutineers; Dr Alan Brafield, Dr Paul Clark and Mr David Pescod.

7. Ballots. Fellows voted in the ballots for Members of Council, the Officers, a Foreign Member, and for Fellows and Associates.

8. Citations and Presentations of Medals and Awards

- a. The President presented the **2010 Linnean Medal for Botany** to Professor Dianne Edwards CBE, FRS, FRSE, FLS, and the *Botanical Secretary, Dr Sandra Knapp*, read the citation:

“Professor Dianne Edwards is internationally renowned for her palaeo- and neo-botanical research, particularly her work on the early evolution of land plants. She completed her undergraduate studies in Cambridge in 1964, continuing her postgraduate studies in Cambridge and Cornell before moving to the University of Cardiff in 1970 where she currently holds the post of Distinguished Research Professor.

Professor Edwards’ work on early land-plant evolution has been built on detailed descriptions and taxonomic studies of small plants, some of which were among the first vascular plants to colonise the land surface (c. 400 million years ago). More recently, she has developed techniques to prepare and study three-dimensionally preserved meso-fossils from the Welsh borderlands. These plants continue to inform debate about the nature of the early land plant radiation and allow comparison with the more widely dispersed spore record; this work remains unparalleled. In addition to her Wales-based work, Professor Edwards has published, in a series of collaborations, important early floras from North and South America, Greenland, and especially China, which have transformed understanding of the radiation of early land-plants as a global phenomenon.

Her research has also encompassed plant preservation, plant physiology, wildfire, and the geo-environmental significance of land-plant evolution. This has resulted in the publication of over 150 scientific papers, chapters and scholarly books, a recent one of which intriguingly describes Yellowstone National Park as a Lower Devonian Rhynie analog.

A dedicated professional, Professor Edwards is strongly committed to enabling others to experience the wonder of botany in all its forms. An inspirational supervisor of 15 PhD students, many of whom are now forging their own research careers in botany, she was the Publications Secretary of the Palaeontological Association and Editor of the journal *Palaeontology* from 1982-1993, President of the Palaeontological Association from 1996-1998 and Editor of the *Botanical Journal of the Linnean Society* from 1992-2004. She served on the Board of Trustees of the National Botanic Garden of Wales for 13 years including four years as Interim Director, has been a Trustee of the Natural History Museum and the Royal Botanic Garden, Edinburgh and is currently a Patron of the Oxford University Museum of Natural History. Her commitment to the future of taxonomy has been constant and strong in all of her professional roles.

Elected a Fellow of the Royal Society in 1996, and the Royal Society of Edinburgh in 2001, Professor Edwards was awarded the CBE in 1999 for services to botany. In recognition of her seminal contribution and commitment to the field of Botany, the Society is delighted to present her with a further prestigious award today – the Linnean Medal for Botany for 2010”.

Professor Edwards thanked the Society for the award, commenting that she felt that the Society does more than any other to support natural history and to support the reputation of taxonomists, systematists and even palaeobotanists, around the world.

b. The President presented the **2010 Linnean Medal for Zoology** to Dr Derek Yalden, and the ***Zoological Secretary, Dr Malcolm Scoble*** read the citation:

“Dr Derek Yalden is described by colleagues as “something of a polymath” – a zoologist who has made outstanding contributions to a number of fields, including taxonomy, evolution and biodiversity. His interests and expertise range from the ecology of golden plovers, pygmy shrews on moorland and mountain hare ecology, to the history of wallabies in the Peak District and palaeontological studies of mammals in cave sites, resulting in a publication record of over 160 papers.

Since his school days and throughout his 40-year career, inspiring generations of students

at the University of Manchester, Dr Yalden has devoted much of his time to fieldwork, latterly in the Peak District. His speciality has been the long-term monitoring of the distribution of birds and mammals resulting in 65 publications, many in the *Zoologist* and the *Journal of Zoology*. His work on golden plovers and the common sandpiper have provided some unique long-term breeding data for these species in Britain. These studies, together with his work on mountain hares, are significant in that their long-term nature (over 30 years) has assisted analysis of the effects of climate change in the uplands.

Dr Yalden also has long-standing interests in morphology and Ethiopian zoology. His PhD studies focused on the functional anatomy of the mammalian carpus and he has published a further 15 papers ranging from the locomotory adaptations and dynamics of *Archaeopteryx* to mole locomotion and the feeding mechanisms of cyclostomes. He has participated in four field expeditions to Ethiopia and published a series of 23 papers in a range of journals, including the seven-part *Catalogue of the Mammalian Fauna of Ethiopia*, which will surely be the basic reference for decades to come.

More recently Dr Yalden's attention has focused on completing further seminal publications. He has made a particular study of the origin of the British mammalian fauna resulting in the publication of *The History of British Mammals* in 1999, a widely acclaimed and original work drawing together a mass of archaeological and ecological information. The companion volume *The History of British Birds*, co-authored with Umberto Albarella was published in 2009. His commitment and dedication to furthering knowledge is shown in his thirteen-year term as President of the Mammal Society and, for nearly 20 years, his role as Managing Editor of the *Mammal Review*. These qualities are epitomised in his co-editorship of the fourth edition of *The Handbook of British Mammals*. This massive compilation of 800 pages was published in 2008, with much of the work being undertaken in the first years of his retirement. Involving, as it did, the management of 118 contributors, the completion of this opus is a measure of the respect in which Dr Yalden is held within the mammal specialist community and within the more general field of zoology.

In recognition of his outstanding contribution to many aspects of zoology, the Linnean Society is delighted to award this most-deserved Linnean Medal for Zoology for 2010 to Dr Derek Yalden”.

On receiving his medal, Dr Yalden expressed his thanks to the Society, in particular for recognising a general, non-specialist zoologist in this way. He particularly thanked his wife Patricia Yalden, and Dr Pat Morris for their respective and significant roles in supporting him throughout his career.

- c. The President presented the **2010 Darwin-Wallace Medal** to Professor Brian Charlesworth FRS. The citation was read by the *President, Dr Vaughan Southgate*.

“In a career spanning four decades, Professor Brian Charlesworth's contribution to showing how evolutionary genetics can illuminate and unify diverse aspects of biology has been prolific. One of his nominees, Professor Mohamed Noor, himself a recipient of the Darwin-Wallace Medal, recalls how as an undergraduate he went to see his research supervisor to ask who this “B Charlesworth” person was who was cited in more than half of all the papers in the journal *Evolution*, irrespective of sub-discipline. To date there are over 290 publications in circulation that bear his name and he has applied population genetics theory and experimentation to a wide range of subjects including life history, macroevolution, the mechanisms of speciation, the maintenance of sex and recombination, life history and plant breeding systems.

Currently, Head of the Institute of Evolutionary Biology at the University of Edinburgh,

Professor Charlesworth is best known for his theoretical research. His work on evolution in species with overlapping generations culminated in a book *Evolution in Age-Structured Populations*, the first serious investigation of this subject since the studies of Haldane and Fisher in the 1920s and 1930s. He developed the theory of ‘background selection’, revamping the world of molecular evolution and, together with Deborah Charlesworth he pioneered the theory of plant breeding system evolution constrained by inbreeding depression. Together with other collaborators he also developed an important theory of speciation demonstrating why sex-linked genes should be disproportionately involved in the origin of reproductive isolation.

A significant feature of Professor Charlesworth’s work is the testing of his theories with experiments, primarily using *Drosophila* species as model systems. Together with his students, many of whom are now themselves in faculty positions and continuing to produce high-impact research, he has investigated genetic variation and constraints on aging, conducted and analyzed artificial selection experiments to show that natural populations harbour genetic variation for recombination rate on specific chromosomes as well as the whole genome and quantified molecular polymorphism in relation to chromosomal recombination rates and population breeding systems. Keen to interest the wider public in evolution, Brian has also been active in writing for a general audience.

Professor Charlesworth is eminently respected amongst the scientific community that he has served in a number of roles. He is currently the lead editor of *Biology Letters* and or has sat on a range of other editorial boards including *Current Biology*, *Genome Research* and *Philosophical Transactions of the Royal Society*. He was elected Fellow of the Royal Society in 1991. The Darwin Wallace-Medal is presented for ‘major advances in evolutionary biology’. It is my great pleasure to present the 2010 medal to a man whose deep thinking has had a very significant and broad impact upon this field – Professor Brian Charlesworth”.

Professor Charlesworth responded by thanking the Society for the great honour of this award. He remarked that it was especially pleasing, as someone who had devoted his career to pursuing the ramifications of natural selection, to receive this award, named after the two men who produced the first publications in this field, and to receive it in the Society where their papers had first been read.

d. The President presented the **2010 Bicentenary Medal** to Dr Beverley Glover. FLS.

The citation was read by the *Collections Secretary, Mrs Susan Gove*, as follows:

“Dr Beverley Glover is currently a Senior Lecturer in the Department of Plant Sciences at the University of Cambridge. She graduated with a First Class Honours degree in Plant and Environmental Biology from the University of St Andrews in 1993 and was awarded the Botanical Society of Scotland Prize for the best botanical honours project produced by a student at a Scottish University. She followed this success, three years later, with the award of a PhD from the John Innes Centre, Norwich for her thesis entitled *Cellular differentiation in plants* and then moved to the University of Cambridge to take up a post-doctoral Fellowship which led to permanent employment.

Over the last 12 years, Dr Glover has published 46 peer-reviewed papers. Less than a year into her PhD research, she published a benchmark paper in *Nature* on the developmental-genetic control of flower micromorphology and colour that has to date accumulated 160 citations. She has since published further papers that have attracted high citations; most of these concern floral mechanisms underpinning the surface structure of the flower and its physical, visual and olfactory interactions with pollinators. Dr Glover has recently summarized this work in her textbook *Understanding flowers and*

flowering: an integrated approach. Described by colleagues as ‘a review of remarkable maturity’, this book earned Dr Glover the British Ecological Society Book of the Year Award in 2009.

Dr Glover’s remarkable publication record indicates the quality of her research output. Her innovative, cutting edge research has attracted over £1.5 million in major research grants since 2000 and she been appointed to both the NERC and BBSRC peer-review committees. She has a clear determination to lead from the front; we are told that ‘at a time when all her colleagues were narrowing their research spectra in response to pressure from the Research Assessment Exercise...Beverley was determinedly expanding her horizons beyond the developmental genetics of *Arabidopsis*’. Her research group has increasingly championed the comparative method, developing cutting edge evolutionary-developmental genetic research in a systematic framework. This has led to strong collaborations with staff from RBG Kew, the Natural History Museum and the Cavendish Laboratory at Cambridge and the creation of new botanical and inter-disciplinary projects with colleagues engaged in flower-insect co-evolutionary behaviour studies and biophysics. These are combined in Dr Glover’s latest research project, exploring anatomical, biochemical and physical aspects of physical colour across the angiosperm phylogeny.

Dr Glover sits at the heart of a research network that spans many facets of natural history. For her exceptional academic record, that has earned the respect of all of her students, collaborators and close colleagues, we are delighted to present the Bicentenary Medal for 2010 to Dr Beverley Glover”.

Dr Glover thanked the Society for the honour of receiving the Bicentenary Award, commenting that it was especially pleasing to receive an award from a Society which celebrated the breadth and diversity of natural history. She emphasised that the work relied on a very large collaborative network and thanked all her collaborators. She also thanked all the post-doctoral researchers and PhD students with whom she had been privileged to work, commenting that the award of the Bicentenary Medal reflected their achievements as well as her own.

e. The President presented the **2010 Irene Manton Prize** to Dr Christopher Thorogood.

The citation was read by the *Botanical Secretary, Dr Sandra Knapp*, as follows:

“The winner of this year’s Irene Manton Prize is Dr Christopher Thorogood.

Christopher conducted his doctoral research under the supervision of Professor Simon Hiscock at the University of Bristol submitting his thesis entitled, *Host Specificity and speciation in the holoparasitic angiosperm Orobanche minor Sm. (Orobanchaceae)* [named by our founder James Edward Smith]. This research was largely based on Chris’s own ideas and his passionate interest in parasitic plants, particularly broomrapes. He won a highly prestigious University of Bristol Scholarship in open competition with students from Faculties across the University. His immense potential was recognised at this early stage, together with his unique quest to unravel and explain taxonomic complexity within the Orobanche minor complex in a phylogenetic context.

Chris showed for the first time that patterns of genetic diversification in broomrapes are driven by shifts in host specificity and that taxonomic complexity in the group reflects specificity or preference to particular host plants and that this specificity drives ongoing speciation. Chris developed a bioassay system (‘rhizotrons’) that allowed him to directly measure and compare parasite fitness on different host plants, also finding that these physiological data provided direct support for the phylogenetic groupings he identified by molecular genetic analyses.

His external examiner described Chris's thesis as 'all of a publishable standard' and at the time of submission, one paper was already published, two were in press, two had been submitted and two were in preparation. Chris's work has been published in, among others, *Annals of Botany* and *New Phytologist*.

The thesis was described by one member of the assessment committee as a 'tour de force' and was characterised by another as an example of 'compleat botany'. I personally enjoyed it more than many scientific works I have read recently!

In addition to his scientific achievements, Chris is also a botanical illustrator and has exhibited botanical watercolour and oil paintings at the Bristol Botanic Garden. He used these skills to illustrate parts of his thesis with pen and ink drawings of floral anatomy and other features of parasite morphology; he is currently contracted to write and illustrate a book on the tropical pitcher plants *Nepenthes*. Chris, for your significant achievements to date and with confidence in your potential as a force in botany in the future, we are delighted to award you the Irene Manton Prize for 2010".

Dr Thorogood thanked the Society for the privilege of receiving the Irene Manton prize. He also thanked his sponsors, and in particular his supervisors who had nurtured in him a passion and enthusiasm for plants that he developed into a new and exciting avenue of plant biology.

- f. The President presented the **2010 Jill Smythies Award for published botanical art** to Mrs Susan Sex. *The Editorial Secretary, Dr John Edmondson*, read the citation as follows:

"The winner of this year's Jill Smythies Award is Mrs Susan Sex.

A self-taught artist, Susan decided to specialise in botanical art thirteen years ago and is now one of Ireland's foremost botanical artists. Awarded Royal Horticultural Society Gold Medals in 2000, 2001 and 2002, Susan was commissioned to paint a new definitive series of stamps for the Irish National postal service, An Post, and to date some 30 stamps have been released in five issues of the *Wild Flowers of Ireland*. Susan exhibits her work in the Watercolour Society of Ireland's annual exhibition and is also a tutor on watercolour painting courses, passing on her knowledge, enthusiasm and passion for this medium and for botanical subjects in particular.

In recent years Susan's illustrations have featured in a number of publications including *Curtis's Botanical Magazine*, *The Plantsman* and several books. The Jill Smythies Award however, particularly recognises her significant contribution in producing all the artwork for two major works on the orchids of Ireland: a magnificent large-format book, *Ireland's Wild Orchids*, published in 2004 and the related *Ireland's Wild Orchids – a Field Guide*, published in 2008, both authored by Brendan Sayers, Glasshouse Foreman at the National Botanic Gardens, Ireland. *Ireland's Wild Orchids* was a tremendous success selling out in a matter of weeks and the quality of the illustrations makes this an eminently collectable book both for lovers of art and orchids. The fieldguide is scaled down to fit in a pocket, invaluable as an identification tool in the field and lavishly illustrated with new paintings, causing Michael Viney to comment in the *Irish Times* 'Irish fans have now been provided with the ultimate in field-guides to the island's wild species'.

Susan's eye for detail is well developed and her paintings show the plants as they are seen in the field, even complete with slug damage! In the large-format book she presented each species life-size and included close-up images of flowers and other structures to illustrate those features that are important for identification. Her paintings are not only botanically accurate but are objects of great beauty; members of the judging panel commented on 'lovely paintings, beautiful details and accuracy', and on Susan's

‘outstanding work’ and you will have the opportunity to view some of this work in an exhibition, which she has kindly mounted in the Society’s library for this occasion.

In recognition, therefore, of her significant contribution to botanical illustration, we are delighted to present The Jill Smythies Award for 2010 to Mrs Susan Sex”.

Mrs Sex described the award as an “absolutely huge honour” which she was delighted to receive in such august company. She also thanked her collaborators, Brendan Sayers and her husband Vincent, for all their support.

9. The Treasurer presented the Accounts for 2009. These are to be found in the 2009 Annual Report. In his report, he proposed to the Fellowship that the annual subscription be increased with effect from 24th May 2011 by £5 to £50. This proposal was unanimously accepted by a show of hands.

10. Dr David Frodin, a member of the Audit Review Committee read the following statement. “In accordance with Bye-Law 12.6, I confirm that I attended the Audit Review Committee of the Linnean Society on 12th March 2010 at which the Accounts for 2009 were presented. After a thorough review of the written statement of accounts, together with accompanying notes and opportunities for discussion with other members of the Review Committee (including the Treasurer and a representative of the official Auditors), I am satisfied that the Accounts give a true and fair view of the Society’s finances as at 31st December 2009. I therefore move that they be accepted”. This was carried unanimously on a show of hands.

11.

a. The Treasurer moved that the firm of Knox Cropper, of 16 New Bridge Street, EC4V 6AX, be appointed as auditors in accordance with Bye-Law 12.5, which was accepted unanimously.

b. The Treasurer moved that Barclays PLC, PO Box 13555 Acorn House, 36-38 Park Royal Road, London NW10 7WJ be reappointed as the Society’s bankers and this was accepted unanimously.

c. The Treasurer expressed his thanks to all the staff for their commitment and hard work.

12. The President gave his address on “Schistosomiasis and environmental change”. Schistosomiasis is a parasitic disease of humans, domestic stock and other animals occurring in over 70 countries of the tropics and sub tropics. About 80% of the 200 million people infected inhabit sub-saharan Africa. In his address, Dr Southgate described the effects of environmental change in Senegal on the epidemiology of schistosomiasis and on the prevalence and intensity of infection.

13. On behalf of the Fellows the President was thanked for his talk. Dr Mary Morris moved that the President’s address be published and circulated and the motion was passed.

14. Results of the Ballots

a. The following were elected to Council: Professor Geoffrey Boxshall, Professor Mark Chase, Professor Dianne Edwards, Mr Alastair Land, Mr Brian Livingstone, Ms Sara Oldfield.

Details of these new Council members can be found in The Linnean Society of

London Anniversary Meeting 2010 Council Agenda and Council Nominations, circulated with *The Linnean* in March 2010. These nominations, were for Fellows to replace Professor Pieter Baaas(B), Professor Richard Bateman (B), Dr Andrew Brown (Z), Dr John David (B). Dr Max Telford (Z) and Professor Patricia Willmer (Z) The President thanked outgoing Council members for their services to the Society.

b. The following was elected a Foreign Member: Dr Sofia Stepanjants

c. The Officers elected were: Treasurer, Professor Gren Lucas OBE; Editorial Secretary, Dr John Edmondson; Botanical Secretary, Dr Sandy Knapp; Collections Secretary, Mrs Susan Gove and Zoological Secretary, Dr Malcolm Scoble.

d. The Fellows were elected as on the accompanying list.

15. Names of Vice-Presidents

a. Dr Southgate named his Vice Presidents for the coming year as Dr Mike Fay, Dr Sandra Knapp, Mr N Keith Maybury and Dr Malcolm Scoble

16. Any other valid business

Launch of the digitised images of the Shell Collection

The President announced that he was delighted to begin the new Linnean year with the launch of a further 3,054 digitised images representing the molluscan specimens within the Linnaean collection. Since the launch of the herbarium images in December 2007, the digitised images have attracted over 7 million hits from over 40 countries, so highlighting the relevance of the Linnaean collections to current research.

The President welcomed Ms Julia Fraser, the Society's IT consultant, who demonstrated the use of the Society's website to access the images and displayed some of the key images to the meeting.

The President expressed thanks to Kathie Way, Honorary Curator of the Society's Zoological Collections who had prepared the supporting taxonomic data for the images, to Julia Fraser, the Society's IT consultant, to Harry Taylor, Kevin Webb, Phil Crabb and Phil Hurst, specialist scientific photographers at the Natural History Museum who had digitally imaged each specimen and to Richard Davis and Rory McNicholl from the University of London Computer Centre who developed and host the Society's image repository

There being no other valid business, the President declared the meeting closed, noting the dates of forthcoming meetings. The next Anniversary Meeting will be on Tuesday 24th May 2011 at 4pm.

The Linnean Society Programme

2010

17 th Jul	2:00pm	CONVERSAZIONE** †Professor Dianne Edwards FLS	Afternoon/Evening Event in Cardiff
20 th – 22 nd Jul	9:30am	EARLY EVENTS IN MONOCOT EVOLUTION** †Dr Paul Wilkin FLS	Joint 3-day Meeting with the Royal Botanic Gardens, Kew
Note New Dates			
16 th Sept	6pm	GENETIC CHANGES THAT MAKE NEW SPECIES Mohamed Noor	Evening Meeting
18 th Sept		London Open House	10am – 5pm
7 th Oct	6pm	‘GETTING AWAY FROM THE URBAN LABORATORY’ PROFESSOR FRANCIS OLIVER AND 100 YEARS OF ECOLOGY AT BLAKENEY POINT, NORFOLK John Pearson	Evening Meeting
21 st Oct*	6pm	THE NERC TAXONOMY AND SYSTEMATICS REVIEW Geoff Boxshall	Evening Meeting

* Election of new Fellows † organiser(s) ** Registration required

Unless stated otherwise, all meetings are held in the Society’s Rooms. Evening meetings start at 6.00pm with tea available in the library from 5.30. For further details please contact the Society office or consult the website (address inside the front cover).