The LINNEAN SOCIETY of London

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THE LINNEAN SOCIETY OF LONDON

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Editorial

This edition of *The Linnean* contains three articles. The first, by the Executive Secretary, concerns a proposal by the Research Councils for Open Access publication of research. Currently, most authors publish their work at no cost to themselves and the publishers get revenues through journal subscriptions and license fees. Under this system almost two thirds of the Linnean Society's revenues come from a joint publishing agreement with Wiley Blackwell. These revenues support such activities as our scientific meetings, education and career development and offering advice to policy makers. While the Society welcomes Open Access in principle it already makes an enormous amount of digitised material freely available on its website and all three journals offer authors the option to publish their papers through an "OnLine Open Option". Nevertheless, someone needs to pay if we (and other learned societies) are to maintain this high standard of research publishing. To this end, the Society will continue to lobby government and other influential parties while submissions have already been made both to the select committee on Science and Technology and to the Select Committee on Business, Innovation and Skills. Representation has also been made to David Willets, Minister of State for Higher Education. We can only hope that the outcome will be satisfactory.

The second of our articles has three authors and concerns the ornithologist Dr John Latham (1740-1837) and his daughter Ann, who painted both birds and butterflies for her father. The three volumes of her Lepidoptera paintings, dated 1793, were deposited in the Winchester College library. Dick Vane-Wright then wrote the section about their discovery. The article begins by explaining how Dr John Latham FLS reported on the numerous imports of undescribed bird species, numbering over 3,000, from the British Colonies between 1780 and 1828. His daughter assisted him by painting and drawing both birds and butterflies from his own and other naturalists' collections. There is a brief synopsis of Latham's life, including the fact that he took an important part in the founding of our Society. There follows an extended account of Ann Latham's life (1772-1835) including how she recorded the first Australian bird species sent to London. Next, there is a list of her twelve watercolours while a further twelve engraved plates, depicting animals found in Australia, appear in The *Voyage of Governor Phillip to Botany Bay* (by Arthur Phillip 1838-1914). Elsewhere in the article there is an engraving of a Norfolk Squirrel Glider after an original painting by Ann Latham. The article concludes with a plate depicting four West African butterflies from Sierra Leone.

The final article in this issue concerns serendipity in biological research. The author notes that serendipity has played a major part in many scientific inquiries, including the potential and nature of penicillin and the double helix of DNA. He then reminisces on a lifetime of research explaining how he came to the conclusion that millipedes, contrary to popular belief, do posses epicuticles. Other examples where serendipity played a part in his life include the discovery of the salivation reflex in the survival of small desert rodents and of tortoises. His discussion also reminisces about sleep and that it is believed dogs, horses and other mammals may dream, while in our dreams he concludes new serendipitous ideas might present themselves.

BRIAN GARDINER, Editor

Society News

It's official – the 'final step', in the 6-month programme for **lift works** has begun, after 12 years of saving and planning! The Society's rooms in Burlington House are now a building site, dusty, cold and noisy, but will be wonderful when fully restored to glory, especially the main staircase, together with the new lift and ladies/gents cloakrooms/toilets. Victoria Smith, together with Samantha Murphy and Tom Helps, have been stalwarts, sharing covering the building from 8am each day, as well as occasional weekends, and putting up with no heating nor lighting at times – Sam's technique of a hot-water bottle up the jumper works a treat, and my head-torch has come in handy! Thank goodness for **Toynbee House** – the refurbishment of which has been efficiently managed by Victoria and Priya, and is now a relatively warm and tranquil retreat from Burlington House. The Project Conservation, Digitisation, Education and Special Publications functions are now based at Toynbee, so five members of staff are installed there, namely Helen Cowdy, Samantha Taylor (who just joined us in January), Andrea Deneau, Hazel Leeper (who joined in October) and Leonie Berwick, while hot-desks are available for the rest of the team. An initial problem with the newly installed Bruynzeel compactor units has been resolved and around 600 boxes of journals/books have already been decanted onto their shelves (only another 2500 boxes to go!) – Priya's team of students and Gren's granddaughter and friend have been the key packers. Setting up the IT system to provide a seamless connection between Burlington and Toynbee has proved a challenge with time delays causing much frustration but a solution is in hand.

Hazel and Leonie launched the new face of the Society's education initiative, *Linnean learning (Ll)*, at the Association for Science in Education (ASE) conference held at Reading University in January, where 300 resource packs containing worksheets, practicals and posters were snapped up by teachers. Andrea has made excellent progress on digitisation, completing the annotated volumes of Linnaeus and Wallace notebooks, which should be available online shortly.

October proved a hectic month for meetings, with Professor Sir Lesek Borysiewicz delivering the **Darwin Lecture** on papillomaviruses (jointly with the Royal Society of Medicine) on the 8th**,** followed by 3 evening meetings the following 'Biology Week', including the debate on **'Do we need pandas?'**, **Why Darwin changed his mind on the sex ratio**, and an exposé on **Frowhawk**. The last of the **Birkbeck lecture series**, which the Linnean Society supports, was held at the Society, so giving this constituency a chance to sample the delights of our evening meetings. The **Founder's Day lecture** on **Thomas Bewick** was also well attended, and we got into the Christmas spirit with mince-pies and wine. The first lecture in the Royal Astronomical Society's meeting room in January was oversubscribed, there being great interest in **Maxwell Knight**, amateur naturalist and professional spy. No doubt you will have noted that, while we are pleased to be able to use the Royal Astronomical Society's meeting room while the building works are ongoing, we are unable to offer our usual hospitality of tea and Gina's delicious cakes beforehand, nor the wine reception after – so yet more to look forward to when we are back in our rooms!

We extend our congratulations to our former President, Sir Ghillean Prance, who was awarded the Order of the Rising Sun by the Japanese Ambassador in recognition of his invaluable contribution to promoting the relationship between Japan and the United Kingdom in the field of botany and horticulture. Another eminent FLS, Dr George McGavin, together with one of our curators, Dr Mike Fitton, came in to do a recording for Radio 4 in the strong-room, and you may have heard the programme, on the Etymology of Entomology, which was due to be broadcast in early March. While on the subject of eminence, I need to draw your attention to the disappointing fact that we were extremely low on nominations for **medals and prizes** this year – in fact we will not be awarding the Linnean Medal in the field of zoology, nor the Bicentenary Medal, nor the HH Bloomer Award, nor the Jill Smythies Award – *please* make sure you get your nominations in this year for the 2014 awards, details of which can be found on the website.

By the time you read this, we will have had a day meeting on **Rivers**, an afternoon meeting on **botanical bookplates**, an evening lecture on the **peppered moth**, and a day meeting at the Royal Society on **Sir John Lubbock**, our President from 1881 to 1886, and the polymath who gave us bank holidays. Later this year of course we are commemorating the Centenary of the death of **Wallace**, and have a number of meetings/events planned, including one with the Society for the History of Natural History and University of Bournemouth, to include a visit to Wallace's unusual gravestone, in June and a 2-day meeting at the Royal Society in October which will include an evening lecture at the Society. So lots to come – please do keep an eye on **the website**, especially as we will be launching the Fellows' section shortly, allowing you to find other Fellows in your area, as well as pay your dues online.

ELIZABETH ROLLINSON
Executive Secretary

Library

Preparations got under way over the summer to ensure that the Society's collections would be safe and secure before the major building works started in December. Portraits and busts were removed from the stairwell and the Library Annexe and many vulnerable items were moved away from the areas of maximum disruption to be placed in secure storage. As these preparations continued, November saw a sharp increase in visitor numbers as researchers realised that the Library would be closed to visitors until the completion of the lift works. Once the building was closed, the task of swathing the Library Annexe shelves in plastic sheeting began – not an easy task given the height of some of the Annexe bookcases. The building works began in earnest before Christmas and Library staff are now dividing their time between Burlington House and Toynbee House. An e-mail and telephone enquiry service is being maintained, although enquirers have to be aware that some Library material has had to be packed up for the duration or is inaccessible behind scaffolding.

The new Linnaeus Link system was officially launched in October at the 2012 Partners' Meeting at the National Botanic Garden of Belgium in Meise. The Deputy Librarian gave a detailed presentation on the features of the new and improved system, which was very well received. Several new institutions have recently expressed interest in becoming Partners and they will soon be contributing their records to the Union Catalogue.

A telephone call was received in October from a gentleman who had been doing some research on the name James Edward Smith and had discovered the link with the Linnean Society. The caller had found a bound manuscript diary in his late father's collection which was inscribed by Smith's widow, Lady Pleasance, as a gift to her husband's nephew, Studley Martin. As the description of the item and its contents unfolded it became clear that it could be the original Grand Tour diary kept by Smith. Smith published a record of his travels and the personalities encountered en route in *A sketch of a tour on the Continent in the years 1786 and 1787* but there had never been any suggestion that the original diary might still exist. The owner kindly brought the diary in to the Society and left it with us for examination. It was clearly in Smith's distinctive hand – a spine-tingling moment for the assembled librarians and archivists. A comparison of the manuscript with the published version reveals that many meetings, excursions and comments on political situations, botanists and historical figures were omitted from the latter. The diary has now been purchased for the Society's collections and Tom Kennett, the archivist who has been working on cataloguing the Smith correspondence, will be assessing the material in the diary.

The Society took part in London Open House again this year and on 22 September a record total of 725 visitors toured the Society's Rooms. In November, the Society was one of the venues chosen to participate in the "Treasures Weekend" organised by the Natural History Museum. This involved children and their parents taking a competition sheet to as many museum and library venues as possible over the course of the 2 days and taking a rubbing of an appropriate image. Visitors to the Society were also able to see some of the Linnean treasures on display in the Meeting Room where NHM and Linnean Library staff were on hand to explain and discuss the objects and the collections generally.

The annual book sale on 27 September, the evening of the Edward Lear lecture, raised just over £200 for Library funds.

LYNDA BROOKS
Librarian

Donations

Professor Stephen Blackmore: Blackmore, S. *Green universe: a microscopic voyage into the plant cell*. London: Papadakis, 2012. 256p. ISBN 9781906506216.

Elaine Charwat: Irving, R. and Dawson, T. *The marine environment of the Pitcairn Islands*. 106p. [s.l.]: Dundee University Press and Pew Environment Group, 2012. ISBN 9781845861612.

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Richard Clarke: Clarke, R. *Informal adult education between the wars: the curious case of the Selborne Lecture Bureau*. 50p. London: Birkbeck Faculty of Continuing Education, 2005. ISBN 0907904246.

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Professor R.L.H. Dennis: Dennis, R.L.H. *A resource-based habitat view for conservation: butterflies in the British landscape*. 406p.Oxford: Wiley-Blackwell, 2010. ISBN 9784405199452.

Gina Douglas: *Happy birthday Edward Lear; 200 years of nature and nonsense: exhibition guide*. 32p. Oxford: Ashmolean, 2012. ISBN 9781854442734.

Parkinson, A. *Nature's alchemist: John Parkinson, herbalist to Charles I*. 335p. London: Frances Lincoln, 2007. ISBN 9780711227675.

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Taquet, P. *Georges Cuvier*. 539p. Paris: Odile Jacob, 2006. ISBN 2738109691.
Tort, P. *Fabre: le miroir aux insectes*. Paris: Vuibert/ADAPT, 2002. 350p. ISBN 2711753506.

Dr John Feltwell: Feltwell, J. *Honeybees*. 58p. Battle: Wildlife Matters, 2012. ISBN 9780907970040.

Susan Gove: Newell, G.E. and Newell, R.C. *Marine plankton*. 220p. London: Hutchinson Educational, 1967.

Dr Dennis S. Hill: Hill, D.S. and Abang, F. *The insects of Borneo (including South-East Asia)*. 435p. Kota Samarahan: Universiti Malaysia Sarawak, 2010. ISBN 9839257285.

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Colin Kilvington: *Biographical memoirs of Fellows of the Royal Society*. Vol. 38 (1992) and vol.44 (1998).

Professor Iain J. McDougall: Price, R. and Weber, L. [compilers]. *Linnaeus estate nature guide.* 140p. [Australia]: Linnaeus Education Fund, 2012. ISBN 9780646576626.

Dr Mariette Manktelow: *Linnés historiska landskap*. 22p. Uppsala: Linnés historiska landskap, 2012. ISBN 9789185241040.

Dr Gillian Mapstone: White, G. The natural history of Selborne. 255p. London: Dent & Sons, 1932.
Ibbs, F.W. *Organic chemistry today*. 294p. Harmondsworth: Penguin, 1964.
Bagnis, R. [et al]. *Fishes of Polynesia*. 367p. Melbourne: Lansdowne Press, 1974. ISBN 0701804092.

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Lindsey, J. *Jane Goodall: 40 years at Gombe: a tribute to four decades of wildlife research, education and conservation*. 128p. New York: Stewart, Tabori & Chang, 1999. ISBN 9781556709470.

MacKinnon, J. *The ape within us*. 287p. London: William Collins, 1978. ISBN 0002160269.

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OPEN ACCESS

– a developing story, applauded in principle, but someone needs to pay

Did you know that there is a revolution in publishing that potentially could mean that The Linnean Society would be unviable in its current form, because the Society's main revenues, which come from journal publishing, are under threat? The threat is 'Open Access Publishing' (OAP) – sounds simple, but this is actually quite complex – so to help you through, here is an explanation of some of the many acronyms:

- *'Open Access Publishing' (OAP) –* a new model for publishing whereby research papers are freely available to the end user and can be copied or reprinted by others. There are 2 models of OA, namely 'Gold' and 'Green'.
- *'Gold Open Access' (Gold OA)*: whereby authors pay to publish, and papers are freely available immediately online;
- *'Article Publishing Charges' (APCs)* – the charges that authors pay for publication of their paper under the Gold OA model. £1,725 is the average APC as determined by the Finch group
- *'Green Open Access' (Green OA),* refers to self-archiving, i.e. the deposit, without payment, of the accepted and peer reviewed (but not the final typeset) version of the article in a repository, often after an embargo period, whence the paper becomes freely available.

- *'Embargo period'* – the length of time from first publication online of the final article before a paper becomes freely available.
  The duration of embargo periods is very important – as flagged by Finch: 'We believe that it would be unreasonable to require embargo periods of less than twelve months'. However, this is at odds with the Research Councils UK policy, which specifies no support for publisher embargoes of longer than six months from the date of publication.
- *'RCUK' (Research Councils UK)* – the strategic partnership of the UK's seven Research Councils, covering science and the arts.
  The OA approach in the UK is being driven by RCUK, who (at the time of writing) are mandating from April 2013 that any publications arising from RCUK-funded research must be published Open Access, with a maximum 6-month embargo period, and using a CC-BY licence. The Wellcome Trust (WT) is also mandating OAP.
- *'CC-BY licence'* – the Creative Commons Attribution license, which RCUK is mandating, which allows others to re-use, adapt and distribute the work, including for commercial purposes. The CC-BY licence is of concern *per se*, because an author's work can be adapted, and so risk them being misrepresented, with no comeback.
- *'Finch'* - government enquiry into OA, headed by Dame Janet Finch, which reported in June 2012 on 'Accessibility, sustainability, excellence: how to expand access to research publications' *http://www.researchinfonet.org/wp-content/uploads/2012/06/Finch-Group-report-FINAL-VERSION.pdf* ; this report contains much interesting background information.

Until recently, the research publishing model has largely been one of authors publishing at no/minimal cost to themselves and publishers getting revenue through journal subscriptions and license fees (mainly from institutional libraries). These publishing revenues are then shared with Learned Societies; in the case of the Linnean Society, almost two thirds of revenues are derived through a joint publishing Agreement with Wiley Blackwell, and these revenues underpin our many activities including scientific meetings, education and career development, engaging with the public dissemination of science and offering expert advice to policy makers, so supporting our charitable purpose.

However, the publishing model to date has meant that access to published research has been limited in the Developed World, especially for the public and for those libraries with ever-restricted budgets. So the advent of OA would seem to merit much applause, especially since the government believes (although has no hard evidence) that immediate/free access to research publications will positively drive innovation and economic growth in the UK. However, the devil is in the detail – one size does not fit all!

There is concern about RCUK's implementation of the OAP policy, especially that it does not respect the need for longer embargos where APC funding is not provided (and many authors may not have access to funding for APCs anyway). Short embargo periods will undermine the subscription revenues on which learned societies such as The Linnean Society depend. Other countries (Europe, Australia) are also introducing

OA policies, generally with 12-month embargo periods, the latter being less likely to negatively impact journal subscription uptake, which the Society strongly endorses.

It is pertinent to note that RCUK themselves do not provide access to all the reports that they receive regarding RCUK (taxpayer) funded projects, nor to any data from these projects (which could be made appropriately anonymous to meet ethical and legal requirements).

Furthermore, the mandated application of a CC-BY licence may well breech existing arrangements, where researchers obtain funding from industry partners; this could preclude future partnerships, effectively closing doors to commercial funding of UK science. If learned societies need to spread their sources of revenue generation, an obvious way would be to diversify in the publication arena (e.g. mash-up products, E-books, translations, etc), but the mandated application of a CC-BY licence may well compromise this avenue. Other licensing options should therefore be considered, appropriate to the respective situation. CC-BY licensing should be de-coupled from the OA mandate until the economic implications for the UK are understood through a full inquiry, engaging all stakeholders.

It is important to record that the Linnean Society welcomes OA in principle – the current issue is one of haste of implementation with an inadequately funded, one-size-fits-all-approach, reflecting that little experience and/or evidence has been brought to bear in formulating policy in what is an extremely complex arena – insufficient consideration has been given to the potentially negative economic consequences. The Society does of course already make an enormous amount of digitized material freely available on its website – and all three Linnean Society journals (Biological, Zoological, Botanical) offer authors the option to publish their papers open access through the OnlineOpen option and have done since 2006. Authors can choose to take up the OnlineOpen option following acceptance of their paper or post publication. The cost for OnlineOpen is US$3,000, which can be paid by the author, the author's funding agency, or the author's institution. All three Society journals will be fully compliant with RCUK policy by the time the mandate is in force. To put this into context, across the three journals, only about 8% of published papers are from UK based authors and, of these, not all are RCUK funded.

The concept of Article Processing Charges (APCs) is an excellent alternative model to journal subscriptions, provided that authors across all disciplines can access the required funding equably. This is not always so, particularly in the field of taxonomy & systematics and evolutionary biology (which are fundamental to understanding and maintaining biodiversity), where researchers generally have less access to funding and/or are publishing lengthy monographs, at infrequent intervals. The half-life of many of the Society's publications can be measured in decades rather than weeks compared with the world of medicine for instance.

The bottom line is that someone needs to pay if you want to maintain the high standard of research publishing, the sophisticated systems for online access of this output, and the considerable contribution of Learned Societies such as The Linnean Society to the research community and to the wider public.

It is vital that these impacts are addressed and the Society is, and will continue,

actively to lobby government and other influential parties in this regard. Submissions have been made already to the Select Committee on Science & Technology and to the Select Committee on Business, Innovation and Skills in the UK, as well as directly to David Willetts, Minister of State for Higher Education and Science, while responses have also been sent to the Office of Science and Technology in the USA. The Society is pleased to note that RCUK propose to review implementation of the policy in 2014 to make any appropriate mid-course corrections – and is urging the RCUK to widen the breadth of stakeholders that it consults, especially including the Learned Societies within this review, to listen to their views and to embrace their suggestions.

ELIZABETH ROLLINSON

Executive Secretary

Correspondence

From: Laurence Cook Hon FLS *School of Life Sciences, University of Manchester*

Fryer's new look at industrial melanism in moths – a comment.

In Yorkshire and Lancashire during the 19th century many moth species showed an increase in frequency of melanic forms varying from dark brown to black in colour, in contrast to the paler typical patterns. Many of these species, although not all, exhibited novel variants, not seen before by collectors. The changes were very rapid and occurred during the period of major industrialization and atmospheric pollution. Geoffrey Fryer (2012) is interested in the experiences of George Porritt and fellow Yorkshire naturalists, who recorded first sightings and frequency increases, noting the striking example of the peppered moth *Biston betularia* and speculating on the reasons why the changes took place. It is generally now concluded that the central driving force was selective predation, notwithstanding the diversity of response and the difficulties in demonstrating cause and effect in individual cases. Like Porritt, Fryer is sceptical and has views on other aspects of the now accepted story as well.

Although at first non-committal on the subject, the entomologist JW Tutt later stated emphatically that melanism in peppered moths was favoured in industrial regions because it concealed the bearers from predators in the smoke-blackened environment (cf. Tutt, 1891; Tutt, 1896). Owen (1997) felt his contribution was unfairly overlooked by later investigators, perhaps to increase the novelty of their own work. Fryer (2012) considers that, likewise, Porritt has been overlooked, in his case because he takes the opposite view. Porritt was invited to present a review to the British Association for the Advancement of Science meeting in York in 1906 on the state of melanism among Yorkshire moths. In this he writes, "But do birds feed to any extent on moths? My own experience certainly does not warrant any such conclusion". This was a very widespread position at the time. It was the conclusion of Punnett (1915), seeking to explain mimicry in butterflies, and of McAtee (1932) in the United States, who, starting

before 1910, examined the stomach contents of thousands of birds in pursuit of his contention that they exert no selective pressure. In 1911 in Manchester, HS Leigh wrote "On the other hand, I do not think we can press the theory of 'protection' too closely at present, for there are many well known cases in which dark varieties of moths are found in localities far removed from the influence of smoke and where they most probably rest upon light-coloured objects." (see Cook, 2000). Porritt and Tutt would have been well known to readers of entomological journals at the beginning of the century, when scepticism about bird predation on Lepidoptera was widespread. They were part of the background of those whose systematic surveys (e.g. Cott, 1940), theoretical genetic studies (Ford, 1937) and experimental investigations (Kettlewell, 1955, 1973) led to acceptance of the general importance of selective predation, so that "industrial melanism in the peppered moth is still one of the clearest and most easily understood examples of Darwinian evolution in action" (Majerus, 2009).

Fryer proposes that "neither orthodox random mutation nor natural selection" is involved in producing change in melanic frequency in industrial melanic moths. Instead he argues that the response is due to an induced heritable process brought about by exposure to pollutants in the environment, which happen to have caused melanisation in places where the background has been blackened, although there is no causal relation between black moth and black city. A variant on this argument was introduced by Heslop Harrison in the 1920s and has been written about from time to time since (e.g. Lambert, Millar & Hughes, 1986, and see Rudge, 2009) but no evidence at all for induction in peppered moths and no subsequent good evidence from any species has been produced after Harrison's time. If we allow it to be a possibility, however, Fryer then says induction is the preferred explanation because the rates of change observed during the period of rising frequency were "vastly greater than those at which random mutations are even generated. Selection takes longer". He also says that there could be no non-visual difference in fitness between melanics and non-melanics, a suggestion he describes, without evidence, as fallacious. Thus, living in an urban environment induces production of black offspring in the progeny of typical moths. This is not simply a phenotypic response to the provoking agent on the part of the insect but the result of an enhanced rate of mutation directed specifically at the melanic locus. That would certainly change frequency efficiently. At its simplest, the argument suggests that an allele at frequency $q_o = 1$ converts to a dominant melanic form at rate m per generation, leaving (1-m) typical alleles. After n generations the typical allele frequency q_n has become $(1-m)^n$, and the typical phenotype frequency $(1-m)^{2n}$. To get the observed responses in the times they took in the different species involved would require mutation rates of at least several per cent per generation. If high rates of induced change did occur, they would presumably have come to the attention of breeders, yet no such evidence has ever been noted among thousands of moths bred up to the 1970s while urban environmental conditions were highly polluted.

It is unclear how Fryer explains the decline in melanic frequencies after the 1970s, which occurred at rates roughly as fast as the earlier increase (e.g. Cook, 2003; Saccheri *et al.*, 2008). He refers to a reduction in mutagen as soot-production declined, but that would not affect the mutants already there. In the absence of selection how could they become lost – through the appearance of a new kind of non-melanic inducing agent?

Fryer refers to migration between industrial and non-industrial areas. This would lead not to the disappearance of melanics, rather to their spread throughout the country. In fact, melanics are now absolutely very rare in the peppered moth and it is difficult to pick them up in the wild for research purposes. It is also the case that while the black *carbonaria* form was declining in frequency the intermediate *insularia* sometimes increased in frequency initially, followed by a decline. This result is easily understood in terms of selection on a Mendelian 3-allele system in which *insularia* has intermediate fitness (Cook & Grant 2000; Cook Dennis & Dockery, 2004, 2011) but makes no sense on the induction principle alone.

Fryer then reports evidence of Van't Hof *et al*. (2011), derived from analysis of disequilibrium along the linkage group bearing the melanic gene, which indicates that in Britain only a single black mutation spread through the country during the 19th century. He also speculates that the mutation might be a single amino acid substitution, presumably facilitating its induction, though without mentioning work by the same group showing that the gene is related to pattern rather than to melanisation genes in other Lepidoptera (Van't Hof & Saccheri, 2010). If there is only one mutant haplotype, how could it have changed in frequency without selection to become the predominant phenotype over much of the country, and how could the repeated mutation-by-induction theory be correct?

Notwithstanding these problems Fryer claims support for his proposal from work on drug and pesticide resistance, which, he says, is likewise due to single amino acid substitutions and brought about by induction. Those working in the field would not agree. A classic case is the study of antibiotic resistance in bacteria by Cavalli-Sforza & Lederberg (1956) in which they used replica plating to demonstrate that resistant colonies had the mutant form in the absence of the antibiotic. Similarly, pesticide resistance in insects is complex, shown not to be induced in cases that have been analysed and has occurred in response to all known pesticides (e.g. Crow, 1957; Wood, 1981). In his review, Crow (1957) comments, "For all these reasons the preadaptation hypothesis seems well established, and we may assume that the sole effect of the insecticide is as a selective agent. It may seem to be beating a dead horse to have emphasized this point, ….". Fryer argues that the mechanism he imagines is not Lamarckian, meaning that the induced mutation is not a response to a specific need. Even if melanic phenotypes in moths experiencing a newly darkened environment were sheer coincidence, how could each new pesticide elicit a response to the particular chemical concerned without the implication of response to need?

Fryer criticizes observations on bird predation as being "confined to un-natural situations". He says that attribution of change in melanic frequency to selection via predation is unjustified and describes "experiments", presumably the selective predation experiments, as of questionable significance. He also says that "others argue that important elements of the work on this species are flawed". This must refer to a view, expressed particularly among creationists, that disagreement over how best to demonstrate selective predation shows that the experiments conducted have been misleading. That is not so. Since the time of Kettlewell there have been a number of consistent independent trials showing an advantage to melanics in industrial areas, where the prevailing melanic frequency was 80 per cent or more, and progressively

increasing disadvantage in increasingly rural locations (see e.g. Cook 2000, 2003). Disagreements were related largely to ways in which the measurements could be improved (Majerus, 1998). At stake were questions about whether moths were presented in the most natural positions, whether their density of exposure was too high and whether the frequencies presented were representative of the locations. All of these factors could affect the result. What Fryer fails to mention is that Majerus, who was responsible for some of the criticism and discussed it in his book, then set himself the task of conducting an experiment which took full account of the reservations. This lasted 7 years, and involved over 4500 moths which were presented at the natural ambient frequency and density and allowed to find their own settling places on trees. He observed 9 species of birds attacking the moths. The new data answer criticisms of earlier work and validate the methodology employed in the previous predation experiments. Majerus made preliminary reports, including the experimental protocol so that no-one could take issue with the design after the event (Majerus 2005, 2009), but died before he was able to publish the full results. This has now been done (Cook *et al*., 2012). It is unprincipled to criticize by innuendo while ignoring evidence which has been acquired conscientiously by hard experimental work.

The experiences of George Porritt and other Yorkshire naturalists in the 19th century, when melanic frequencies increased dramatically, should certainly be remembered. They provided valuable observations on a range of different species. Melanism in species other than the peppered moth has only been studied more fully in a handful of species, which display parallel but interestingly different patterns of change (e.g. Cook, Sutton & Crawford, 2005). They would repay further attention. Peppered moths, and industrial melanic moths in general, continue to inform and provide new insights (e.g. Grant, 2012; Cook & Saccheri, 2013) but not as presented by Fryer.

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Dr John Latham, F.L.S., and his daughter Ann

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Introduction

New information about Dr John Latham, F.L.S., the famous ornithologist who recorded the numerous imports of undescribed bird species from the British colonies between 1780 and 1828, has thrown further light on his personal and professional life.

Unacknowledged and previously unknown, Latham's daughter Ann made significant contributions to both ornithology and entomology. She assisted her father by drawing and painting both birds and butterflies, from his own and other naturalists' collections of drawings and specimens. The watercolours were made before her marriage in 1795 to a surgeon in Winchester. After 1795 Ann stopped helping her father and together with her husband William Nicholas Wickham became the founder of a remarkable dynasty of physicians and surgeons, clergymen, lawyers, and headmasters of public schools.

John Latham 1740-1837

John Latham, who was to become England's foremost ornithologist and recorder of new bird species at the end of the 18th and beginning of the 19th centuries, was born on 27 June 1740 at Eltham in Kent, the son of a physician. He was educated at the Merchant Taylor's school and then studied anatomy under the eminent Dr William Hunter and in London's medical schools. At the age of 23 he set up a practice in Darenth, a village two miles southeast of Dartford in Kent. When he was well established in his post he devoted more time to the study of natural history, for which he built up a library and a collection of specimens. In 1771 he published his first article, on a medical subject, in *Philosophical Transactions* (Latham, 1771). Latham became acquainted with other naturalists, including Thomas Pennant, Sir Ashton Lever, Sir Joseph Banks, Sir James Edward Smith and other members of the Linnean Society. In 1788 he took a prominent part in the founding of the Linnean Society (Mathews, 1931: 468) and was admitted a Fellow later the same year. John Latham's reputation rested on the remarkable achievement of having recorded some 3,000 species of birds by 1800. Carl Linneaus had listed 444 bird species in 1758. Latham's volumes *A General Synopsis of Birds*, 3 volumes 1781–85 plus supplements in 1787 and 1801, included 139 coloured plates. This was followed by *A General History of Birds* in 10 volumes with an index, published 1821–28 with 193 plates that had been drawn, etched and coloured by himself.

Ann Latham was born at Darenth in Kent, in 1772, the daughter of John Latham and Ann Porter of Bexley whom he had married on 12 September 1763. The couple had three daughters: Elizabeth baptised 18 June 1766 (who died in infancy); Mary baptised 4 November 1767 (who died in infancy); Ann baptised 26 August 1772; and one son, John, baptised 26 May 1769, at Darenth, Dartford (International Genealogical Index: Kent). When Latham retired as a physician in 1796, he and his wife Ann went

to live in Romsey, Hampshire, where he bought a large house near the abbey church. John's wife, Ann, the mother of Ann Latham, died and was buried in the Romsey Abbey Church on 23 January 1798 (Romsey Abbey Church, burial registers). Latham married again that same year, on 10 September 1798, in London at St Margaret Lothbury, his second wife being Ann Delamott of Ealing (I.G.I: Middlesex).

Over the 23 years that he lived in Romsey, John Latham devoted much of his time to researching the history of Abbey Church and prepared seven quarto volumes for publication (British Library, Add. Ms. 26777) – but they were never published because of the tragedy that unfolded as a result of the poor business acumen of his son.

Latham's son, John (1769–1822) – he is not the Dr John Latham, 1761–1843, quoted by some authors – married Althea and they had four sons and two daughters, baptised in Romsey between 1794 and 1807 (I.G.I.; Hampshire). John (junior) went to live in Romsey at the start of the 1790s and acquired a brewery before buying a succession of inns in the neighbourhood. They were mortgaged and he became heavily indebted to bankers and other creditors, including his father, who signed deeds leaving

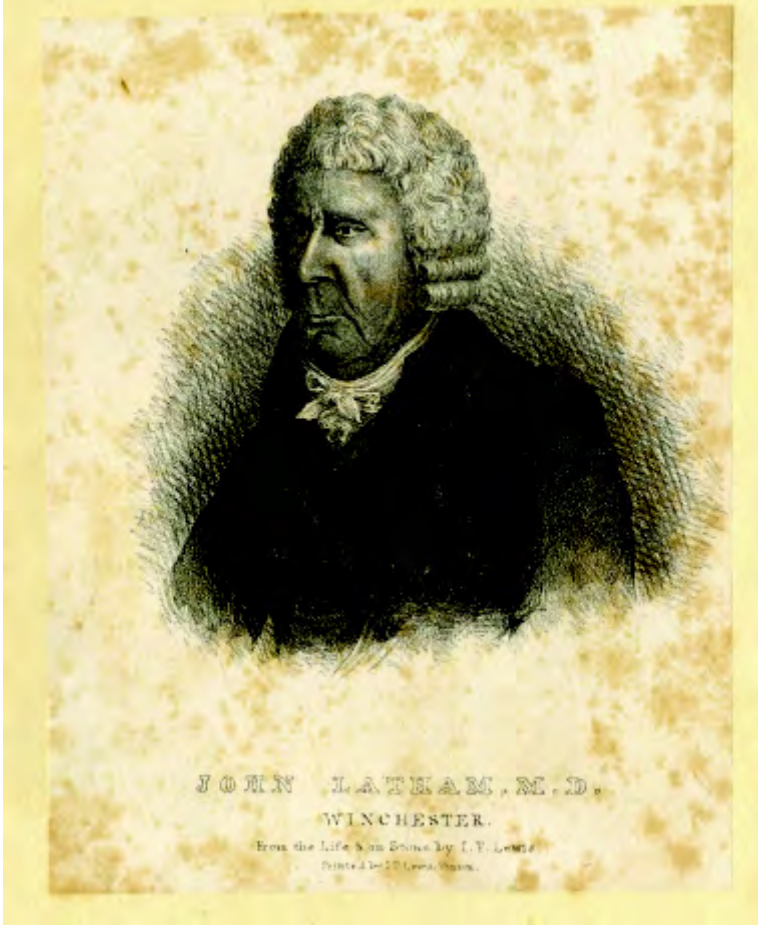

Fig. 1. John Latham. By I.T. Lewis of Winton, [1819]. 13 x 10.2 cm (cropped). Ann Latham Butterfly drawings, Vol. 3. Reproduced 'With permission of the Warden and Scholars of Winchester College'.

him personally liable for potentially over £15,000. Latham also made private loans to his son for £7–8,000. Latham had sold his valuable ornithological collection in 1795 before moving to Romsey in 1796, when a further demand for £1,400 to enable his son to purchase more inns would require Latham to raise this from the trust set up as part of his own first marriage settlement in 1763 (intended to be shared between John and Ann) against the security of two public houses, together with John junior's own house. John the brewer had seriously overstretched himself by running his business on mortgages, loans and unpaid interest. He was finally called to account and ordered to appear before the Commissions of Bankrupt. All his assets were prepared for sale when he was declared bankrupt in 1817 (Burbridge, 1994).

Latham not only lost much of his wealth in supporting his son, but found he had been deceived over the securities. His daughter Ann also lost her share of the trust money set up in 1763. A final blow for Latham fell when his son John committed suicide on 25 October 1822 by discharging a pistol at his head (Burbridge, 1994). The after effects of the bankruptcy rumbled on, with Dr Latham having to act as administrator of John's affairs and involved Ann's husband William Nicholas Wickham and his son William John Wickham, both surgeons of Winchester, when they were drawn in to stand surety against John's goods and chattels for the sum of £1,600 on 10 February 1823.

In reduced circumstances, Dr Latham had already been obliged to sell his house, to leave Romsey, and take his wife to live with his daughter Ann and her husband, William Nicholas Wickham, at Winchester, in 1819. He lost his second wife in 1821 and took her back to Romsey for burial (Romsey Abbey Church, burial registers). It was in order to recoup some of the loss that Latham embarked on the publication of *A General History of Birds* in 1821. His engraved portrait, taken in Winchester, depicts a stoical man who has suffered a good deal.

Dr John Latham died on 4 February 1837 in Winchester, at the age of 97, and was buried in Romsey Abbey Church. His memorial tablet is in the north aisle.

Ann Latham 1772–1835

Little has been known or written about Ann Latham, the daughter of Doctor John Latham the famous ornithologist for whom she made some valuable drawings of birds and butterflies. The drawings of birds are included in a large collection of John Latham's drawings in the Natural History Museum, London and the butterfly paintings are held in the library of Winchester College, Winchester, Hampshire. Both sets of drawings are of some significance scientifically.

Ann had married William Nicholas Wickham, a surgeon of Winchester in 1795 (I.G.I. Middlesex. The recorder forgot to place the entries under William Nicholas's surname, Wickham: "Latham, Ann married William Nicholas 2 May 1795 in St Paul Covent Garden Church, London, and Nicholas, William, married…" Many errors occur in the I.G.I. and this appears to be yet another.) Sadly, as was the custom at the end of the 18th century, when a woman married she frequently ceased to paint and draw, and Ann appears to have followed this practice. However, her move from her family home in Kent to Hampshire would also explain this. Ann's bird drawings date from the late 1780s and the two volumes of her butterflies are dated 1793. It is greatly to be regretted

that Ann found it necessary to cease recording the exciting new species that were flooding into Britain, many passing through her father's hands for 30 years after she married during which time there is no indication that she assisted him.

Ann and William Nicholas Wickham had five sons and two daughters: Althea, and Ann who was baptised 14 November 1796 at St Swithun over Kingsgate, Winchester. Four of their boys were also baptised at this church: William John on 8 January 1798; Henry on 5 July 1799; Edward on 17 March 1801; and Robert on 1 May 1802. A fifth son, Frederick, was baptised at St Michael, Winchester, in 1805 (I.G.I. Hampshire).

Ann's husband, William Nicholas Wickham, was noted as being "for half a century or so the medical attendant" of Winchester College. He was an eminent surgeon at the Winchester hospital where he worked from 1819 until his retirement. He also had a lucrative private practice as a physician in the town. He died in 1846. His son William John (1798–1864) followed in his footsteps and was the medical attendant at the school for nearly forty years as well as being a senior surgeon at the hospital. When he died a memorial to him with a marble portrait was placed in Winchester Cathedral on the wall of the south aisle of the nave. Another son, Frederick William (1805–1862) became second master at Winchester College (from 1845–1862) after being educated there and at New College, Oxford. Edward (1801–1862), their second son, was an assistant master of Winchester school, then of the Preparatory School at Eagle House, Hammersmith, but is perhaps of greater interest for being the father of the Reverend Edward Charles Wickham (born 1834) who became headmaster of Wellington College in 1873 and married the daughter of the Right Honourable William Ewart Gladstone (1809–1898) in the same year. Gladstone was the liberal statesman who was Prime Minister from 1868–1874, 1880–1885, and 1886–1894. Robert, their third son was a clergyman, a canon and archdeacon of St Asaph but also the first of the branch of the Wickham family to become headmaster of Twyford preparatory school. Twyford, the little village 2 miles east of Winchester had had a preparatory school since the latter part of the 17th century. Following Robert's tenure of the headship there (1833–47), five of his descendants or their close relations were also headmasters of the school. (Winchester College: A Register, 1907–74, 5 vols.).

William Nicholas and Ann's sons, then several grandsons, became doctors, clergymen, teachers or solicitors, most of them after being educated at Winchester College (there are two instances of four generations of Wykemist Wickhams) then Oxford or Cambridge universities. There was a Wickham surgeon/physician in Winchester from the time when William Nicholas moved to Winchester (having been appointed surgeon, provided he made Winchester his constant residence on 12 January 1790: Turner, 1986), until his great grandson George William retired in the 1920s. Ann and William's son William John, and grandson Charles Thomas, lived in a beautiful Georgian house at 12 St Thomas Street and served Winchester as physicians as well as surgeons in the local hospital. Dr Charles Thomas retired to Sutton Scotney hamlet in the parish of Wonston and was the inventor of the famous fishing-fly "the Wickham fancy". Ann and William Nicholas's legacy in terms of highly gifted children successful in their careers is very impressive.

Ann Latham died in the parish of St Thomas, Winchester where she had lived with

her husband at 17 St Thomas Street (Pigot, 1831–32) and was buried on 27 January 1835 in the Wickham family chest tomb in the village churchyard of Barton Stacey, six miles northwest of Winchester. Her husband, William Nicholas Wickham was buried there on 7 April 1846 (Barton Stacey burials register).

Ann Latham's watercolours

In her teenage years and during her early twenties, Ann's talents were employed to illustrate specimens of birds when she was closely involved with the recording of the first Australian bird species sent to London. She painted in watercolours, and made studies of birds brought back from the voyage of the First Fleet to Australia to illustrate the first Governor, Arthur Phillip's account of *The Voyage to Botany Bay*, published by John Stockdale in the last months of 1789. She had access to these specimens by virtue of being the daughter of her highly regarded father who was entrusted with writing the text of the natural history part of Phillip's book and describing the new species. Several of her watercolours with the plates etched after those drawings for the Voyage to Botany Bay are conserved in the Natural History Museum, London (John Latham Collection, 888 watercolours in 6 volumes with 1030 sheets, including some prints).

In this collection, the etched plates after the watercolours have the John Stockdale imprint showing them to have come from *The Voyage to Botany Bay*, "Chapter XV. Some specimens of animals from New South Wales" and "Chapter XXII. Supplemental account of animals". Legends on each of the plates stated that they were published by J. Stockdale of London, and on which day, month and year they were published.

The illustrations had been drawn and painted when Ann was aged seventeen. The ten bird and two mammal plates prepared from her drawings for Governor Phillip's book were:

'Wulpine (sic) [= Vulpine] Opossum. A Latham del P Mazell sculp Publish'd Aug. 31, 1789, by J. Stockdale'. [Pl. 16 opp. p. 150]. = Common Brush-tail Possum, *Trichosurus vulpecula* (see Pigott, 2001, note 12).

'Norfolk Island Flying Squirrel. A Latham delt. P Mazell sculpt Publish'd Aug. 6, 1789, by J. Stockdale'. [Pl. 17 opp. p. 151]. = Squirrel Glider, *Petaurus norfolcensis* (see Pigott, 2001, note 16).

'Pennantian Parrot. A Latham delint. P Mazell scup. Publish'd Aug. 6, 1789, by J. Stockdale'. [Pl. 20 opp. p. 154].

'Norfolk Island Petrel. A Latham del. P. Mazell sculp. Publish'd Aug. 6, 1789, by J. Stockdale'. [Pl. 25 opp. p. 161].

'Bronze winged Pigeon. A Latham del. P Mazell sculp. Publish'd Aug. 6, 1789, by J. Stockdale'. [Pl. 26 opp. p. 162].

'White fronted Heron. A Latham del. S Edwards sculp. Publish'd Aug. 19, 1789, by J. Stockdale'. [Pl. 27 opp. p. 163].

'Wattled Bee eater. A Latham delt. S Edwards sculp. Publish'd Aug. 19, 1789, by J. Stockdale'. [Pl. 28 opp. p. 164].

'Psittaceous Hornbill. A Latham delin P Mazell sculp. Publish'd Aug. 31, 1789, by J. Stockdale'. [Pl. 29 opp. p. 165].

Fig. 2. Norfolk Island Squirrel Glider. Engraved by P. Mazell after an original painting by Ann Latham. Published in A. Phillip (1789) The voyage of Governor Phillip to Botany Bay, Pl. 17. 28.2 x 22.5 cm. Reproduced 'By permission of the Trustees of the Natural History Museum'.

'Bankian Cockatoo variety. A Latham delt. S Edwards sculpt. Publish'd Sept. 11, 1789, by J. Stockdale'. [Pl. 40 opp. p. 267].

'Red shouldered Parrakeet A L del. P Mazell sculp. Publish'd Nov. 2, 1789, by J. Stockdale'. [Pl. 41 opp. p. 269].

'New Holland Goatsucker. A L del. P Mazell sculp. Publish'd Oct. 20, 1789, by J. Stockdale'. [Pl. 42 opp. p. 270].

'White Gallinule. A L pinx. P. Mazell sculp. Publish'd Oct. 20, 1789, by J. Stockdale'. [Pl. 44 opp. p. 273].

The captions, in inverted commas, are taken from the plates. On some plates the wording differs slightly from a 'List of the plates' at the beginning of the book. The 'List' also provides plate numbers, as well as page references (both absent from the plates), which are here inserted in square brackets, [ ].

The voyage of Governor Phillip to Botany Bay by Arthur Phillip (1738–1814) is the authentic official record and single most important book to describe the journey to New South Wales of the First Fleet in 1787–88 and the foundation of the first settlement in Australia. It was put together by an anonymous editor for publisher John Stockdale who had access to the governor's journals and despatches and those of some other officers. The book's appeal was enhanced with 54 engraved plates, many depicting animals found in the colony and of these 12 were credited to Ann Latham. Copies of Phillip with the engraved plates hand-coloured are much rarer than copies in the uncoloured state. In Phillip's Voyage three Lathams are named as subscribers – John MD, John junior and Ann.

Latham gave common English names to the animals he described and illustrated in Phillip. Some of them were new to science and of great interest but, because Latham omitted to assign scientific names to them in accordance with the binominal nomenclature scheme of Linnaeus, he forfeited the opportunity to be credited with naming any of the new species. For this reason Phillip's Voyage is not recognised as the source for any original zoological descriptions. The Norfolk Island Squirrel Glider, illustrated, is an example. The name given to it by R. Kerr in 1792, *Petaurus norfolcensis*, Squirrel Glider, takes priority even though he described it three years later than Latham.

In 1789 Nathaniel Portlock (c1747–1817), a naval officer and fur trader (Laughton, 2004), wrote *A voyage round the world* which was published by John Stockdale. The book has fewer plates than Arthur Phillip's Voyage and its natural history content is of less importance than that of Phillip. There is evidence from the John Latham collection of original bird drawings in the Natural History Museum that Ann Latham may have been responsible for two bird plates, although this is not confirmed by the plate captions in Portlock, quoted below:

'Rusty Crown'd Plover, male. P. Mazell sculp. Publish'd May 1, 1789, by J. Stockdale & G. Golding'. [Pl. opp. p. 36].

'The Rusty Crown'd Plover, male, from Falkland's Islands. J Hogan del P Mazell sculp Publish'd May 1, 1789, by J. Stockdale & G. Goulding'. [Pl. opp. p. 37].

The attribution of the plates is discussed by Pigott (2001: notes 2 and 4).

Another illustrated book with descriptions of Australian birds, plants and some mammals, was published early the next year, but all the plates in this, John White's *Journal of a voyage to New South Wales*, were dated 29 December 1789, some months later than those published from drawings by Ann Latham. The majority of White's birds were etched after drawings by Sarah Stone. That Ann Latham's printed illustrations predated those of her fellow lady illustrator was an important factor because eight species were new to science and being recorded for the first time. These were: Norfolk Island Petrel, Bronze-winged Pigeon, White-fronted Heron, Wattled Bee-eater, Banksian Cockatoo variety, Red-shouldered Parrot, New Holland Goatsucker and White Gallinule. The dates on which each lady painted the watercolours from the specimens are not known.

Sarah Stone married John Smith on 8 September 1789, and painted far more species than Ann, so she probably worked on her plates both before and after this date. Unlike Ann Latham, Sarah Stone/Smith continued to paint after her marriage. The specimens sent by John White from New Holland on 19 November 1788 arrived in England some time in early 1789. Some specimens were exhibited at a meeting of the Society for Promoting Natural History on 6 July 1789, then several of Sarah Stone's water-colours of these specimens were exhibited before the SPNH on 5 October 1789 and also at Debrett's publishing premises in Piccadilly. The birds were given to George Shaw to describe, the mammals to Dr John Hunter, but when the *Journal of a voyage to New South Wales* was advertised some time in August 1789 it was clear that "The Birds &c from which the drawings were taken are deposited in the Leverian Museum." Some of the illustrations of the birds painted by Ann bear dates in August and September of that year. The mammals for Phillip's book were being copied from drawings sent from Australia as early as June 1789, but prints from Ann's bird drawings from specimens are dated 6 August 1789 onwards, suggesting she used specimens that had been deposited in the Leverian Museum. It would appear, therefore, that the two lady artists were at work at the same time. Ann Latham signed her watercolours "AL". Among John Latham's 888 drawings, some of Ann's watercolours and the plates etched from them are present:

Key to the captions: The initial number for each entry refers to the sheet number. '…' denotes printed captions; "…" denotes manuscript entries. Most manuscript caption names, both common and scientific, and references to published works, would appear to have been written by John Latham. All the annotations prefaced [At top of sheet:] "Latham II, p. 176" (for example) were made by F.C. Sawyer, the Natural History Museum Zoology Librarian, possibly in the 1940s, when he was researching the collection (Sawyer, 1949). They are references to John Latham (1821–28), *A general history of birds*..10 vols.

The plates in Phillip's *Voyage* (1789) are unnumbered but, at the front of the book, is a 'List of the plates' from which the numbers have been obtained and are included in square brackets [ ]. For some plates there are differences in the spellings of the animal names on the plate captions and in the contents 'List'.

111. 'Pennantian Parrot. A Latham delint. P Mazell scup. Publish'd Aug. 6, 1789, by J. Stockdale'. (The etching. Published in A. Phillip (1789) *The voyage to Botany Bay*, [Pl. 20, opp. p. 154]). = *Platycercus elegans*.

112. "Psittacus Pennantii Ind. orn. 1. p. 90. Pennantian Parrot. Gen. Syn. 1, p. 61". [At top of sheet:] "Latham. II p. 131". (The watercolour (unsigned) of 111 which was published in A. Phillip (1789) *The voyage to Botany Bay*, [Pl. 20, opp. p. 154]). = *Platycercus elegans*.

132. 'Red shouldered Parrakeet A. L. del. P Mazell sculp. Publish'd Nov. 2, 1789, by J. Stockdale'. (The etching. Published in A. Phillip (1789) *The voyage to Botany Bay*, [Pl. 41, opp. p. 269]). = *Lathamus discolor*.

133. "Psittacus discolor. Ind. orn. Sup. p. xxi. Red-shouldered Parrakeet, Gen. Syn. Sup. 2. p. 90". [At top of sheet:] "Latham.II. p. 176". (The watercolour (unsigned) of 132 which was published in A. Phillip (1789) *The voyage to Botany Bay*, [Pl. 41, opp. p. 269]). = *Lathamus discolor*.

143. “Psittacus Banksii. Ind. orn. p. 107 & Banksian Cockatoo, Gen. Syn. Sup. 2. p. 91”. [At top of sheet:] “Latham. II, p. 200”. (The watercolour (unsigned) of 144 which was published in A. Phillip (1789) *The voyage to Botany Bay*, [Pl. 40, opp. p. 267]). = *Calyptorhynchus lathami*

144. ‘Bankian Cockatoo variety. A Latham delt S Edwards sculpt Publish’d Sept. 11, 1789, by J. Stockdale. (The etching. Published in A. Phillip (1789) *The voyage to Botany Bay*, [Pl. 40, opp. p. 267]). = *Calyptorhynchus lathami*.

166. ‘Psittaceous Hornbill. A Latham delin P Mazell sculp Publish’d Aug. 31, 1789, by J. Stockdale’. (The etching. Published in A. Phillip (1789) *The voyage to Botany Bay*, [Pl. 29, opp. p. 165]). = *Scythrops novaehollandiae*.

168. “Scythrops novae Hollandiae, Ind. orn. 1, 141 New Holland Channel Bill, Gen. Syn. Sup. 2. p. 96”. [At top of sheet:] “Latham II p. 300”. (The watercolour (unsigned) of 166 which was published in A. Phillip (1789) *The voyage to Botany Bay*, [Pl. 29, opp. p. 165]). = *Scythrops novaehollandiae*.

380. ‘Wattled Bee eater. A Latham delt. S Edwards sculpt. Publish’d Aug. 19, 1789, by J. Stockdale’. (Pencil mss. note added to caption “Acanthochaera carunculata H.B.M.”). [At top of sheet:] “Latham IV p.158”. (The etching. Published in A. Phillip (1789) *The voyage to Botany Bay*, [Pl. 28, opp. p. 164]). = *Anthochaera carunculata*.

381. “Merops carunculatus, Ind. orn. 1. 276 / Anthophagus / Wattled Bee-eater, Gen. Syn. Sup. 2. 150 (Honey Eater)”. (Pencil mss note added to caption: “Acanthochaera carunculata H.B.M.”). [At top of sheet:] “Latham. Hist. IV. p.158”. (The watercolour (unsigned) of 380 which was published in A. Phillip (1789) The voyage to Botany Bay, [Pl. 28, opp. p. 164]). = *Anthochaera carunculata.*

687. ‘New Holland Goatsucker. A L del. P Mazell sculp. Publish’d Oct. 20,1789, by J. Stockdale’. [At top of sheet:] “Latham VII p. 341”. (Pencil mss note: “Bristled” added to caption). (The etching. Published in A. Phillip (1789) *The voyage to Botany Bay*, [Pl. 42, opp. p. 270]). = *Aegotheles cristatus*.

688. “C.n. hollandiae. I.O. 588.18. Custed Gost”. (The watercolour (unsigned) of 687 which was published in A. Phillip (1789) *The voyage to Botany Bay*, [Pl. 42, opp. p. 270]). = *Aegotheles cristatus*.

699. ‘Bronze winged Pigeon. A Latham del. P Mazell sculp Publish’d Aug. 6, 1789, by J. Stockdale’. [At top of sheet:] “Latham VIII p. 31”. (The etching. Published in A. Phillip (1789) *The voyage to Botany Bay*, [Pl. 26, opp. p. 162]). = *Phaps chalcopetra.*

700. “Columba chalcoptera, Ind. orn. 2. p. 604 Bronze-winged Pigeon. Phil. Bot. Bay, pl. in p.162”. [At top of sheet:] “Latham VIII. p. 31”. (The watercolour (unsigned) of 699 which was published in A. Phillip (1789) *The voyage to Botany Bay*, [Pl. 26, opp. p. 162]). = *Phaps chalcopetra*.

855. “Ardea novae hollandiae, Ind. orn. 2. 701 White-fronted Heron, Gen. Syn. Sup. 2, 304”. [At top of sheet:] “Latham IX p. 127”. (The watercolour (faintly signed “AL”) of 856 which was published in A. Phillip (1789) *The voyage to Botany Bay*, [Pl. 27, opp. p. 163]). = *Egretta novaehollandiae*.

856. ‘White fronted Heron. A Latham del. S Edwards sculp Publish’d Aug. 19, 1789 by J. Stockdale’. [At top of sheet:] “Latham IX p. 127”. (The etching. Published in A. Phillip (1789) *The voyage to Botany Bay*, [Pl. 27, opp. p. 163]). = *Egretta novaehollandiae.*

902. ‘Rusty Crown’d Plover, male. P Mazell sculp. Publish’d May 1, 1789, by J. Stockdale & G. Goulding’. [At top of sheet:] “Latham IX. p. 333”. (The etching. Published in N. Portlock (1789), *A voyage round the world*, pl. opp. p. 36). = *Charadrius falklandicus*.

903. ‘The Rusty Crown’d Plover, male, from Falkland’s Islands. J Hogan del P Mazell sculp Publish’d May 1, 1789, by J. Stockdale & G. Goulding’. [At top of sheet:] “Latham IX. p. 333”. (The etching. Published in N. Portlock (1789), *A voyage round the world*, pl. opp. p. 37). = *Charadrius falklandicus*.

904. “Charadrius falklandicus, Ind. orn. 2. 747 Rusty-crowned Plover, Gen. Syn. Sup. 2. 318 Male”. [At top of sheet:] “Latham IX. p.333”. (The watercolour (signed “A.L.pinxit”) of 903 which was published in N. Portlock (1789), *A voyage round the world*, pl. opp. p. 37). = *Charadrius falklandicus*.

905. “Charadrius falklandicus. Ind. orn. 2. 747 Rusty-crowned Plover, Gen. Syn. Sup. 2. 318 – female”. [At top of sheet:] “Latham IX. p. 333”. (The watercolour (signed “A.L. delin.”) of 902 which was published in N. Portlock (1789), *A voyage round the world*, pl. opp. p. 36. = *Charadrius falklandicus*.

920. “Gallinula alba, Ind. orn. 2. 760 White Gallinule, Gen. Syn. Sup. 2d. 327”. [At top of sheet:] “Latham IX. p. 428”. (The watercolour (unsigned). Published in A. Phillip (1789) T*he voyage to Botany Bay*, [Pl. 44, opp. p. 273]). = *Porphyrio albus*.

All the Ann Latham bird paintings are watercolours, and each depicts a single bird, either perched on a branch or standing on a raised mound. Most sheets have a ruled, double-lined, black ink border filled in with either black or yellow watercolour. The drawing sheets, paper measuring 20.9 x 16.5 cm minimum – 22 x 18.5 cm maximum, have been neatly tipped into mounts that are bound into the volumes.

The plates in the copies of Phillip and Portlock examined are sharp, dark etchings, without hand-colouring. In contrast, the same prints in the John Latham original drawings collection in the Natural History Museum are comparatively light in tone (but otherwise identical) suggesting they may have been proofs passed to John and Ann Latham for their approval by the publisher.

A letter from John Latham to Thomas Pennant, dated 16 August 1789, states that he had assisted Stockdale with several drawings which were “done either by my Daughter or Self but in respect for those done for Phyllip Voy. I find he has put A. Latham delin to all which he had from me”. (Pigott, 2001) The list above of etchings and drawings confirms that both John and Ann Latham were responsible for the illustrations on these plates.

The drawings were purchased for the Natural History Museum on 24 November 1920 from Mrs E. Wickham, Rimmersfield, Liverpool Road, Chester. At Twyford village a burial on 4.4.1944 recorded that “Robert Townshend Wickham of 7 Blackfriars, Chester after cremation was buried at Twyford by the officiating minister

Fig. 3. Cream-coloured Courser, *Cursorius cursor* (Latham, Gen. syn. birds suppl. 1, 1787 : 293). Painted by Ann Latham. 20.5 x 15.5 cm (approx.) Reproduced 'By permission of the Trustees of the Natural History Museum'.

Robert G. Wickham." Mrs E. Wickham was Elinor, wife of Robert Townshend Wickham, land agent and chapter clerk of the firm Barker, Coppack and Wickham, land agents of St Werburgh Chambers, St Werburgh Street, Chester. Robert Townshend Wickham was born in 1860 and married Elinor Edwards in 1898. He was the son of the Reverend Latham Wickham of Twyford who was the first, but not the last, Wickham to bear the name Latham as a forename.

A framed watercolour painting by Ann of the "Courvite", a cream-coloured courser, shot near Wingham in Kent by John Hammond in 1785 was deposited in the British Museum and is now conserved in the Natural History Museum, Library.

One other deposit of watercolour paintings by Ann Latham is held in the Warden and Fellows' Library, Winchester College, Winchester. These are drawings of exotic Lepidoptera, mostly butterflies, painted before 1793. Whereas the drawings for John Latham's bird books have long been known and studied, Ann's butterfly paintings have lain un-investigated in the Winchester College Library until recently. One of us (RIVW) is assessing these in conjunction with his studies of 18th century entomologists, their collections of insects, drawings and publications. There follows below a preliminary report on the importance and value of these hitherto unknown drawings.

Arthur Phillip (1789: Advertisement, ii, iii) paid a generous tribute to John Latham in his Voyage, 'The publisher … return thanks to the following noblemen and gentlemen for their kind assistance and free communications. …. To Mr Latham particularly the most grateful acknowledgements are due, for having furnished many drawings and accurate descriptions, which stamp a value on the natural history contained in this work, and must for ever render it an object of attention to all lovers of that science'.

Latham was exceptionally busy at this time for not only did he contribute to Phillip's Voyage, he was also named as one of three experts engaged in the preparation of a checklist, The Indian Faunula, for publication in the second edition of Thomas Pennant's Indian zoology (1790–1791). According to Pennant, 'The more laborious part, relative to the insects, fell to the share of Mr Latham…' ('Advertisement', p. iii). It is interesting that Latham had acquired the reputation as a competent entomologist and for Pennant to engage him for this demanding task (Foote, 2004).

Ann Latham's *Drawings of rare and uncommon non-descript butterflies*

The Ann Latham butterfly paintings are bound in two volumes, with printed title pages dated 1793. The 144 figures in volume 1 are arranged on the recto faces of 56 leaves, with a further 21 leaves blank or essentially so. Volume 2 has 276 figures on the recto faces of 71 leaves, and 13 blanks. Many images have brief annotations, usually with more extensive captions on the facing, verso sides, linked by a name or a number.

The insects came from North and Central America, Surinam, French Guinea, Brazil, Patagonia, Jamaica, Madeira, Scotland, Siberia, Sierra Leone, Guinea, Nigeria, South Africa, India, Thailand, Java, China, Australia, New Zealand and the Pacific. Although dubbed 'non-descript', the majority were identified according to leading accounts of the period. A few day-flying moths are included, but all were then in Linnaeus's 'omnibus' *Papilio*. The sources are the collections of Joseph Banks, British Museum, Dru Drury, John Francillon, William Hunter, William Jones and James Edward Smith, with a few from John Latham's own cabinet. In some cases paintings by William Jones (see below) and John Abbot (whose work was then owned by Francillon) appear to have been copied rather than original material.

The image quality varies widely, from crude to good or even very good. The explanation surely lies in the "learning curve" – Ann was only 16 when she started this work. Set butterflies, flat and almost two dimensional, appear deceptively easy, but to get the quality that evokes the feeling you can "lift the insect off the page" is only achieved by the best artists.

Figure 4 is typical of Ann Latham's work, with the images in this example distinctly better than her poorest but not as good as her best. Depicted are four West African

Fig. 4. Latham volume 2, plate 22, Four African *Euriphene* and *Euryphura* butterflies. Reproduced 'With permission of the Warden and Scholars of Winchester College'.

butterflies from the Dru Drury collection, probably collected in Sierra Leone by Henry Smeathman, belonging to the endemic Africa genera *Euriphene* and *Euryphura*. All are either copies of paintings made by William Jones from Drury's collection (long ago dispersed and mostly lost), or made independently by Latham through direct access to material from the Drury collection. Because *Jones' Icones* have never been properly published, and Ann Latham's work has until now been unknown, their iconotypes spell potential trouble for the nomenclature of some African butterflies. One of the nominal species depicted, *Papilio hesperus* Fabricius, 1793 (lower left), currently known as *Euryphura chalcis* (C. & R. Felder, 1860), is already the subject of a proposal for its suppression (Larsen *et al*., 2011). Similar actions or adjustments may be needed to take account of the Jones / Latham iconography, including some of the other taxa shown here. In most of these cases, however, the so-called "100 years rule" (ICZN, 1999: Article 23.9) should be sufficient to protect existing usage.

An important link is with "William Jones of Chelsea". Jones (1745–1818) was a wealthy London merchant who pursued a passion for butterflies. During the 1780s and 90s he made about 1500 paintings from the great butterfly collections in and

around the capital, including all those listed above. His images were studied by Fabricius, who based some 200 new species on his work (Fabricius, 1793). The Latham volumes give new evidence of close links between John Latham and Jones, and suggest the possibility that Jones tutored Ann in Lepidoptera iconography. This could not only explain any improvement in quality, but also the very "Jones-like" style of many of the plates – and the existence of "Volume 3."

The slim and rather mysterious third volume lacks a title page, but it includes three incomplete, annotated plates of night-flying moths undoubtedly by William Jones, a few moths without legends and in different styles, a fine painting of the giant Jamaican swallowtail *Papilio homerus* Fabricius, 1793, together with a venation diagram, an image of a trap-door spider with its tube, a lithograph portrait of John Latham and the silhouette of an unidentified gentleman. This curious assemblage has been investigated separately (Vane-Wright, Honey & Day, in press).

Ann Latham's paintings appear to offer some independent information about species represented in the eight collections listed above, several of which have long been damaged, rearranged, dispersed or lost. Those that survive largely intact, most notably the William Hunter and Joseph Banks collections, give the opportunity to compare Ann's paintings with the originals. The extent to which the Latham paintings are 'second-order' copies based on others, also needs to be investigated – and is possible because of the survival of the Jones and Abbot artwork in, respectively, Oxford and the NHM. However, before doing so, it would seem prudent to undertake the full inventory of all Jones' images proposed by Vane-Wright (2010), as well as a thorough exploration of the butterfly material of J.E. Smith in the Linnean Society, and of Jones in Oxford. In parallel, an assessment of John Latham's collection should be attempted, based on Donovan's (1814) sale catalogue and Latham's annotations to Ann's paintings.

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Serendipity in Biological Research

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Introduction

The term 'serendipity' was coined by Horace Walpole (1717-97; 4th Earl of Oxford and son of the Prime Minister Robert Walpole) in September 1754. It was suggested by a fairy tale, The Three Princes of Serendip. Serendip is the old name for Ceylon, and serendipity means the occurrence and development of events by chance, in a happy or beneficial way. As the Princes travelled they were constantly making 'discoveries, by accident and sagacity, of things they were not in quest of'. No discovery of a thing you are looking for comes under this description (Richard Boyle, 2000 *http://livingheritage.org/three_princes.htm*). In the fairy tale, the Princes used a considerable amount of common sense in the application and development of their discoveries. (For a detailed account of serendipity and chance, see Harvie, 1973.) Serendipity has played a major part in many important scientific discoveries, including the potential and nature of penicillin and the 'double helix' of DNA. It was by a very happy coincidence that Charles Darwin embarked with Captain FitzRoy in H.M.S. Beagle. He might well have become a member of the medical profession had he not developed an antipathy to the blood and screams that accompanied surgical operations before the days of anaesthetics! So his father sent him to Cambridge to study for a degree in theology. Here he enjoyed his passion for hunting, shooting, and collecting Lepidoptera. He made many friends including Professor Henslow, the botanist, who introduced him to Robert FitzRoy. Doubtless serendipity will have helped in many lucky breaks during the lives and researches of recent and current biologists of lesser calibre including the present writer. Indeed, but for a good deal of serendipity in my youth I might well not be alive today (Cloudsley-Thompson, 2006).

Personal Examples

I realise that this account must seem egotistical, but experiences of serendipity cannot avoid being self-centred. Towards the end of World War II, I returned to Cambridge with my wife Anne, and worked for a degree in the Natural Sciences Tripos. One of my supervisors was Michael (later Lord Swann F.R.S.) whose recommendation many years later was, I understand, a key factor in the award of a Leverhulme Emeritus Fellowship at University College, London (when I retired from a Chair of Zoology at Birkbeck College in 1997). After the Supervisions at Cambridge, Mike Swann and I used to drink a beer together at a pub called The Bun Shop. For a while, Anne thought this must have been a branch of the Dorothy Café, but she soon 'twigged'. (I did not tell her that The Bun Shop was a pub because I knew she would be amused when she found out!).

It was not long before there was an aquarium on one of the bookshelves in the living room of our 'digs'. It was immediately apparent, when I introduced some diminutive colourful water-mites (Hydracarina) into the aquarium, mainly to look interesting, that a number of potential piscine predators would bite, and then reject them. This accidental observation of aposematic coloration was the subject of my

exhibit at one of the Annual Conversaziones of the Cambridge Natural History Society where it attracted the favourable attention of Dr V.B. Wigglesworth (later Sir Vincent Wigglesworth F.R.S.) who subsequently agreed to become the Supervisor for my Ph.D. (My observations were first described by me in 1947. Several years later, however, I discovered that C.S. Elton F.R.S had, in 1922, published a paper on aposomatic coloration among water-mites). I did not find any water-mites during the Cambridge Iceland Expedition 1947 although I looked for them carefully and made a collection of arachnids for the Natural History Museum, London. This engendered an interest in Arachnida which served me well in subsequent years.

The subject of my thesis was 'The ecology and physiology of myriapods'. In those days, it was generally believed that millipedes did not possess epicuticles. One evening I was thinking about this and, out of curiosity, cut a frozen section of the cuticle of *Paradesmus* now *Oxidus gracilis* (Diplopoda), one of the species on which I was working. When I placed this under a coverslip in concentrated nitric acid, I could see under oil immersion that, as the exocuticle and endocuticle dissolved, a colourless epicuticle, less than 1μ in thickness, remained briefly in place before falling over. It dissolved on heating to form oily droplets, but other pieces of epicuticle were insoluble in gluconic acid. I obtained similar results with a number of different millipede species. It took less time to do so, sketch the sections with the aid of camera lucida, and draft a letter to *Nature* (1950), than it did to type the letter! At my Ph.D. exam, the External Examiner, Prof Ralph Dennell of Manchester, greeted me with a very pleasant remark; 'May I congratulate you on this careful and painstaking work? A student of mine is working on the same problem, and you have "pipped him at the post".' (That student was Gordon Blower who subsequently became a well-known expert on British Diplopoda). During the following decade I was a lecturer in Zoology at the University of London King's College. In alternating years I conducted the King's B.Sc. courses

Fig. 1. Flat-backed millipedes, *Oxidus gracilis* (slightly enlarged).

Fig. 2. Large centipede from Southern France, *Scolopendra cingulata*. These are extremely fast. I was lucky to find it beneath a rock, early in the morning before it had warmed up.

in marine biology at Port Erin, Isle of Man. One year Prof Dennell likewise took a party of his own students from Manchester University to the same hotel and strongly approved of the course on which I was teaching my students. Was serendipity at play that he should have been a member of the Appointments Board of the University Council when I applied, successfully, for the Chair of Zoology in the University of Khartoum, Sudan? (The marine biology course rotated annually with a terrestrial ecology course at Juniper Hall Field Centre where John Sankey, the Warden, became one on my closest friends).

At King's I shared a large room with Dr Sidnie Manton F.R.S. who proposed me for Fellowship of the Linnean Society: I was elected on 26 April 1951. As far as I can remember, in those days membership was limited and had to be supported by published work. During the Easter Vacation 1954, I took part in a joint university expedition to Southern Tunisia. This provided an early opportunity to measure microclimates in arid regions (Cloudsley-Thompson, 1956). I brought back a collection of myriapods (Turk 1955), arachnids and insects, both preserved and living. Dr Manton's eyes lit up when she spotted a writhing specimen of *Orya barbarica* (Geophilomorpha), the largest centipede in the world which can measure up to 178 mm in length and have as many as 125 pairs of legs (Lewis, 1981). It was just what she wanted, she said, for her research on the locomotion of terrestrial arthropods. (This work was published in 9 parts of *J. Linn. Soc. Lond*. between 1950 and 1956 (see Gray, 1968 Chapter 12 pp 333-376 and Lewis, 1981). The brief encounter with Sidnie Manton did not bring much joy, but it did have repercussions in which serendipity could well have played a part. The relations between the Manton sisters (*The Linnean*, 1993, 9(3):13) may well have encouraged

Prof Irene Manton F.R.S., when she was President, to appoint me Vice-President of the Linnean Society (1975-76 and 1977-78).

At the 1955 Meeting of the British Association, Section D (Zoology) in Liverpool, I got to know James Kennaway. He was representing a well-known publisher and had a room in the same hotel as I did. After my lecture on the physiology of terrestrial arthropods, he encouraged me to write a book about these animals. A few years passed before I felt sufficiently confident to do so. James' publishers did not accept my M.S., but later invited me to write a book with John Sankey (1961) on the identification of British terrestrial worms, molluscs and arthropods (excluding insects). This became a key work at the various Centres of the Field Studies Council. Meanwhile, in replying to a question in Country Life about cephalopods, I became acquainted with Frank Lane – author, photographic and literary agent – who negotiated a contract for my book on terrestrial arthropods. But, when Dr Manton came to hear of it – a strange case of negative serendipity* – Frank Lane was informed by the potential publishers that they were no longer interested. A similar reception was accorded by a couple more publishers and it became obvious that they must have all consulted the same referee! At this point my Professor, Jim Danielli F.R.S. put in a word on my behalf and the book was finally published in 1959, with a revised edition ten years later (James Kennaway's own book, *Tunes of Glory*, appeared about the same time. It was extremely successful, as was the film of the same name. (Unfortunately, after he had written the scripts for two more films, James was killed in a car accident).

Realising that, by now, I was able to write, Jim Danielli invited me to contribute to a series that he was editing for Academic Press with a book about biological rhythms (Cloudsley-Thompson, 1961b). In 1960, I was invited to contribute to the Cold Spring Harbor Symposium of that year (Cloudsley-Thompson, 1961a) shortly before moving to Khartoum. There I worked for 11 years, while Anne established a Department of Physiology in Omdurman General Hospital. British members of the Faculty of Medicine, University of Khartoum, were accorded unofficial precedence at the British Embassy over those in other Faculties and were regularly awarded O.B.Es etc. One year, by chance or serendipity, I got to know the Ambassador rather well. Here's my opportunity, I thought, to get one too even though I was not in the Medical Faculty. But I realised that this would mean that Anne and I would be unable to go on 'trek' to carry out field work during the following vacation – and this was the more exciting option. On our return we learned that the British Ambassador had resigned and been awarded a Chair in an English University. So I would not have got an O.B.E. anyhow, but Anne and I would certainly have missed our trek! During our numerous travels in various regions of the Sudan, Ethiopia, East, West and Central Africa as well as a trans-Sahara crossing in 1967, Anne became fascinated by the scenery and the trees – when there were any! On our final return to England in 1971 she gave up Physiotherapy and obtained a degree in art at Byam Shaw. In 1983 she published her acclaimed book Women of Omdurman, London: Ethnographica. We have both benefited by serendipity on numerous occasions. By far the most important of these was our chance meeting at a dance in Oxford. We were married shortly afterwards, less than 6 months before D-day.

* Are serendipitous events sometimes interspersed by their opposites – unluckily or foolishly pursued actions?

Perhaps the most striking example of serendipity to come my way was in 1968 at Khartoum. I had acquired a newly hatched African spurred tortoise, *Testudo* (now *Geochelone*) *sulcata*. Later I was to breed them in considerable numbers (1970). While a movable wooden enclosure was being constructed in the Works Department for 'Abdel Gadir' (as the Sudanese laboratory staff called him), I used to put him under a transparent plastic microscope cover in the shade of a palm tree. Here he would graze on the dicotyledons that grew up between the blades of grass. One morning, driving home for breakfast, I suddenly remembered Abdel Gadir. I had forgotten to move the microscope cover that kept him in the shade. I went back immediately and found the baby tortoise in blazing sunlight and salivating, apparently in distress. So I took him into my lab and gave him a long drink of water. On the way home again, I remembered that small desert rodents such as jerboas (*Dipus aegyptius*) salivate onto the fur under their chin and throat. This can only provide a temporary defence against a rise in body

Baby giant tortoise (*Geochelone sulcata*) and egg (very slightly reduced).

temperature, but its biological significance may lie in the fact that it can enable an animal to survive if it is unable to retreat into its deep burrow (Schmidt-Nielson, 1964). First thing next morning, Abdel Gadir was weighed and placed in an incubator at 55°C. Surely enough, his temperature rose sharply until it reached 40.5°C. At that point it stabilised, but Abdel Gadir began to froth and salivate on his head, neck and front legs – as he had the day before. Once again, he drank fresh water as he would not do when kept in the shade all day.

During the following year, I became a Natural Sciences Foundation Senior Research Fellow at the University of New Mexico, Albuquerque. Here Bud Riedesel worked enthusiastically with Anne and me, investigating thermoregulation in the local box turtle *Terrapene ornata*. This species began to salivate and froth from the mouth at temperatures between 32.3°C and 40.5°C. Unlike the young *Geochelone sulcata*, *T. ornata* showed little precision in the temperature at which salivation began. In addition, however, *T. ornata* also urinated on its back legs. We thought that this might account for the hitherto unexplained enlargement of the bladder. Its function is probably to store urine for emergency thermoregulation. We also found out that rates of heart beat were correlated with the temperature of the body rather than with that of the head, but that salivation was initiated by both (Riedesel *et al*, 1971). After Anne and I had left the University of New Mexico, Bud instructed several of his Ph.D. students to follow

up this research. I, too, investigated physiological thermoregulation in the Mediterranian spurred tortoise (*Testudo graeca*) (Cloudsley-Thompson, 1974).

Whilst I was drafting this essay (March 2011), I received a copy of *The Biologist* in which John O'Brien (2011) explained the problems of refining a gene-gun powered by a pulse of helium gas. The bulky apparatus damages the target cell and all the other cells surrounding it, instead of firing fluorescent dye into a single cell. One day, a retired firearms police officer mentioned to O'Brien that the angle of the baffle holes of a W.W. II Spandau machine gun had been 30° to the horizontal. This had enabled the hot air to escape more quickly than it would have if the holes had been at right angles. It also reduced recoil. Dr O'Brien then experimented further with his gene-gun and determined the optimal angle for the discharged helium gas – which caused minimal tissue damage. This was identical with that of the baffle holes of the German machine gun. Surely it was serendipity that resulted in me coming across this new example of serendipity whilst I was actually writing about the subject!

Discussion

There can be little doubt that serendipity visits most frequently, minds that are prepared to receive it, but there is probably more to it than that. Recipients need to be alert and not have their ideas too firmly fixed. One of the few advantages of old age is that people tend to be kinder and more helpful than one could have expected. The reverse also occurs: younger people often benefit from the ideas gained from conversation with members of older generations – ideas that might well be tinged with the colours of serendipity (Cloudsley-Thompson, 2003). With the passage of time, one comes to realise that surprisingly few events take place exactly according to plan or expectation. I first comprehended this, with a flash of intuition, at Khartoum Airport in the mid-1960s. Anne and I were dining at the Restaurant of the Departure Lounge, after seeing a friend off. The plane, a Fokker Friendship, taxied to the end of the runway beyond one of the hangars. We could hear the engine revving up when it was ready to take off. I had a feeling of anti-climax as we had seen it all many times before. But this time, just before the plane appeared, a tractor with a trolley drove round the corner of the hangar!

Another example is presented when one is expecting an important letter. It seems, frequently, often to arrive a day early or perhaps late. When it does appear in the letter box on the expected date, it usually does not look quite as expected. Possibly this is one of the secrets of serendipity and why it plays such an important part in biological research?

Since the time of Lucretius (Titus Carus c. 98-55 B.C. De Rerum Naturae Lib. IV) it has been believed that sleeping dogs, horses and other mammals may dream. The dreams of human beings play an important rôle in the physiology of sleep, and are associated with rapid eye movements (REM). Although people could not survive without dreaming, they vary considerably in their ability to remember what they have dreamed about, or even that they have dreamed at all (Kleitman, 1963). The functions of dreams have also been investigated and are often concerned with relief from everyday problems. Occasionally, however, a completely new serendipitous idea may present itself in a dream. Serendipity appears in all walks of life and we may all benefit from it.

I would like to acknowledge with warmest thanks the advice and help I have received in this from Anne Cloudsley L.G., my wife for over 67 years, and my friends Dr Dave Butt F.L.S. and Mrs Lynda Brooks F.L.S.

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The Linnean Society
Programme

2013

April 18th	Thurs 6pm	Agricultural Biodiversity – will *Homo sapiens* live up to its name? Mr Julian Hosking FLS Science Policy Lecture – joint meeting with the Systematics Association Royal Astronomical Society, Burlington House
May 24th	Thurs. 4pm	Anniversary Meeting. Fellows only. Plants invade the land! What happened next? The President Prof Dianne Edwards CBE FRS PLS Following the Anniversary Meeting, Fellows and their guests are invited to accompany the President, Officers and Medal winners to dinner.
June 20th	Thurs. 6pm	Life without light: the natural history of Movile Cave, Romania – from microbes to arthropods Dr Rich Boden FLS
June 22nd – 23rd	Sat/ Sun.	Annual Field Trip to North Wales. Registration opened 2nd April. Fellows only.
July 21st	Sun.	Conversazione at Hergest Croft Gardens, Herefordshire. Fellows only.
Sept. 19th	Thurs.	Evening Meeting, details TBC but intended topic 'Ash die-back disease'
Oct. 17th	Thurs.	Day meeting followed by evening lecture on mycolocy.
Oct. 21st- 22nd	Mon./ Tues.	2-day meeting on Wallace, to be held at the Royal Society.

† organiser(s) ** Registration required
* Election of new Fellows [a] Admission of Elected Fellows

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