



Free Public Lecture Series, Autumn 2009
‘What’s in a Name? -Taxonomy and Biodiversity’
Saving our Experts from Extinction
Linnean Society of London / Ecology and Conservation Studies Society
Joint Lecture Series

in conjunction with
Birkbeck Institute of Environment, University of London

This series of lectures focuses on the importance of being able to define and identify the natural world, with examples of the need and uses of giving species a name, and organising them into systems of classification.

The introductory overview will review uncertainty in the numbers of species on Earth and their extinction rates, and survey how resulting problems can be addressed for effective conservation action. Subsequent lectures will highlight the importance of taxonomy to fungi, forensics, invertebrates, and control of illegal use of endangered species. In the final session a panel of experts will review how the next generation of naturalists can be inspired, and will discuss how to encourage more people to enter the field of taxonomy, where there is a critical shortage.

Join the debate. All welcome. Free admission but booking essential.

The lectures will be held in Birkbeck, University of London, WC1

E-mail: environmentevents@FLL.bbk.ac.uk for booking and venue details. (tel: 020 7631 6473)

All lectures are from 6.30pm to 8.30 pm on the following Fridays. Doors open at 6.00pm.

- 16 October ‘Taxonomy, Systematics and Conservation Biology’
Professor Lord Robert May of Oxford, past President of the Royal Society
- 23 October ‘Out of Sight, Out of Mind: our lives depend on the hidden kingdom – Fungi’
Professor Lynne Boddy, President of the British Mycological Society
- 30 October ‘Illegal Use of Endangered species and the use of miss-identified plants’
Professor Monique Simmonds, Deputy Keeper, Jodrell Laboratory, RBG, Kew
- 6 November ‘Botany, palynology, and mycology: powerful weapons in the forensic armoury’
Patricia E.J. Wiltshire, Forensic Ecologist, University of Aberdeen
- 13 November ‘Taxonomy, Natural History and the Digital World’
Dr Malcolm J. Scoble, Keeper of Entomology, Natural History Museum
- 20 November Panel Presentation and Discussion: Inspiring New Naturalists and Taxonomists
Working with Children Gail Bromley, Education Development Manager, RBG, Kew
Higher Education David Streeter, Reader in Ecology, University of Sussex
Professional Taxonomy Dr Mike Fay, Head of Genetics, Jodrell Laboratory, RBG, Kew

The Linnean Society of London and the Ecology and Conservation Studies Society both welcome new members.
Details of the Societies and application forms will be available at the door, and are on their websites at:

<http://www.linnean.org/>

<http://www.bbk.ac.uk/environment/prospective/ecss>

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Notes on the Contributors and their Lectures

16 October ‘Taxonomy, Systematics and Conservation Biology’

Robert McCredie May, Lord May of Oxford, OM AC Kt FRS, holds a Professorship jointly at Oxford University and Imperial College, London and is a Fellow of Merton College, Oxford. He was until recently President of The Royal Society (2000-2005), and before that Chief Scientific Adviser to the UK Government and Head of the UK Office of Science and Technology (1995-2000). His career includes a Personal Chair in Physics at Sydney University aged 33, Class of 1877 Professor of Zoology and Chairman of the Research Board at Princeton, and in 1988 a move to Britain as Royal Society Research Professor. Particular interests include how populations are structured and respond to change, particularly with respect to infectious diseases and biodiversity. He was awarded a Knighthood in 1996, and appointed a Companion of the Order of Australia in 1998, both for “Services to Science”. In 2001 he was one of the first 15 Life Peers created by the “House of Lords Appointments Commission”. In 2002, The Queen appointed him to the Order of Merit (the fifth Australian in its 100-year history). Honours include: the Royal Swedish Academy’s Crafoord Prize (bioscience and ecology’s equivalent of a Nobel Prize); the Swiss-Italian Balzan Prize (for “seminal contributions to [understanding] biodiversity”); and the Japanese Blue Planet Prize (“for developing fundamental tools for ecological conservation planning”). He is a Foreign Member of the US National Academy of Sciences, an Overseas Fellow of the Australian Academy of Sciences, and an Honorary Fellow of various other Academies and Learned Societies. In 2007 he received the Royal Society’s Copley Medal, its oldest (1731) and most prestigious award, given annually for “outstanding achievements in research in any branch of science”.

His lecture will cover the following themes:

Over the past century, documented extinctions in well-studied groups have been at rates one hundredfold to one thousandfold above the average extinction rates seen over the half billion year sweep of the fossil record. But for most groups, particularly invertebrates, we are very uncertain how many species there on Earth today, much less rates of extinction.

His talk will survey several aspects of the resulting problems for effective conservation action, along with current efforts to address these problems. These include: current levels of investment in the underpinning disciplines of taxonomy and systematics (for the UK in the light of the recent House of Lords Select Committee Report, and elsewhere); potentially helpful advances in using IT to consolidate existing information; speeding up acquisition of new information by “parataxonomists” and other techniques of collecting and cataloguing, along with DNA barcoding. Finally, he will discuss the use of such information to assign conservation priorities more on a basis of maximising the preservation of “independent evolutionary history” and/or ecosystem services than – as present – more on a basis of sentimentality (useful tool though it is in fund raising).

23 October ‘Out of Sight, Out of Mind: our lives depend on the hidden kingdom – Fungi’

Lynne Boddy is Professor of Mycology at Cardiff University, and is also President of the British Mycological Society. With over 30 years research experience and over 250 scientific publications, including several books, Lynne is one of the world’s leading fungal ecologists. Her work focuses largely on the ecology of wood decay basidiomycete fungi (those commonly seen fruiting as toadstools, brackets etc.) that play crucial roles in recycling nutrients in forests. She has been foremost in investigating how fungal communities change in wood, how fungi interact with one another and with invertebrates, and how fungi grow out of wood in search of new resources.

Lynne is currently the chief (and founding) editor of Fungal Ecology and is or has served on the editorial boards of the journals Fungal Biology Reviews, Mycological Research, Microbial Ecology, FEMS Microbiology Ecology and Ecological Informatics. She has served on a variety of committees of the Natural Environment Research Council, organised numerous scientific meetings for the British Mycological Society, and is becoming increasingly involved in fungal education and outreach activities, including this year’s gold medal winning British Mycological Society exhibit at the Chelsea show.

Her lecture will cover the following themes:

Fungi are often thought of as ‘those organisms that poison us if we eat them, rot our food and homes, cause diseases of our plants and even us’. However, without them we would not exist. Plants first colonized land 600 to 800 million years ago, with the aid of mutualist fungi. Now, about 90% of terrestrial plants obtain their nutrients and water from soil through fungi associated mutualistically with their roots (mycorrhizas). These same fungi offer protection from pathogens and allow plants to colonize polluted sites. Furthermore, fungi are the main garbage disposal agents and nutrient recyclers of the natural world. By rotting dead

organic matter they make nutrients available to plants and animals alike, and provide important sources of nutrition including to humans. Obvious examples are bread, beer and wine, cheese, non-soya meat substitutes, such as Quorn. Less obvious is that fungi are essential for chocolate production, actually producing the characteristic flavour; they also make the acidity regulator citric acid used in soft drinks and pharmaceuticals. Almost unrecognised are the anaerobic chytrid fungi that enable herbivorous animals to thrive on the plants they eat; without fungi - no meat, no milk, no wool, no leather and no herbivores. Fungi have also provided us with antibiotics, e.g. penicillin, and many other 'wonder drugs' of the twenty-first century including the statins, to control cholesterol (the most widely used pharmaceuticals in the developed world), and cyclosporine, which prevents transplant tissue rejection. Fungi also contribute to the production of steroid contraceptives and anti-inflammatories.

Of a predicted 1.5 million species, so far only about 100,000 have been described and named. This fact in itself indicates the crucial need for fungal taxonomists. The relative neglect of fungal science, including taxonomy, means that there is insufficient expertise in areas of direct and indirect concern to humans, including biodeterioration, food safety, plant diseases, human health, discovery of novel chemical compounds, conservation and ecosystem function.

30 October 'Illegal Use of Endangered species and the use of miss-identified plants'

Monique Simmonds is Deputy Keeper & Head of Sustainable Uses of Plants Group (Biological Interactions Section and Centre for Economic Botany), Jodrell Laboratory, Royal Botanic Gardens, Kew; Head of Kew Innovation Unit. She studied Agricultural Zoology and Pure Zoology at Leeds University and then went onto undertake a PhD with Prof Wally Blaney at Birkbeck College, University of London. She was then employed by Kew to study animal-plant interactions and has remained at Kew since. She is a visiting Professor at Birkbeck College & School of Pharmacy, University of London and Greenwich University. At Kew she co-ordinates research into the economic uses of plants/fungi, their potential as pharmaceutical, cosmetics and agrochemical leads, and as sources of new sustainable crops. She has extensive experience of working in developing countries, investigating the uses of plants for control of pests as well as improving wellbeing (treatment of HIV, TB and malaria) and poverty alleviation (plants-derived products as sources of income).

Her lecture will cover the following themes:

More and more land is being lost to agriculture and urban development, so the pressure on biodiversity increases with many plants becoming endangered. Those species with commercial uses can also be over-harvested. This talk will cover a range of issues associated with the trade of endangered species and the need for more information about the identification of plant-derived products entering the trade. In an age of increased interest in "naturals" as food, in cosmetics and medicines, we need to have the skills to be able to identify the plants we are using. The talk will be illustrated by research projects being undertaken in different parts of the world and highlights the need to maintain skills such as taxonomy along with embracing modern analytical and DNA-barcoding technologies.

6 November 'Botany, palynology, and mycology: powerful weapons in the forensic armoury'

Patricia Wiltshire is an ecologist, botanist, and palynologist. She started her research and teaching career at King's College London. She later worked in environmental reconstruction in archaeology at University College London. Her experience of the difficulty of archaeological palynology meant that she was pre-adapted to work in the forensic context.

In the last 15 years, she has developed the disciplines of ecological (environmental) profiling and forensic palynology. She has worked very closely with crime scene managers, senior investigating officers, forensic advisors, and other forensic scientists, and has established many of the standard crime scene protocols for obtaining environmental evidence. She has worked on over 200 cases, many of which have been very high profile. She has worked with every police force in England, Northern Ireland, the Republic of Ireland, and Wales. She has also worked with four of the Scottish Police forces. She is an experienced expert witness.

She set up an M.Sc. in Forensic Archaeological Science at University College London and was responsible for much of the teaching in this course for 5 years. She has taught at police training colleges in Britain, and runs specialised courses for individual police forces. She has contributed to, and continues to participate in, M.Sc. courses in a number of universities including those at Strathclyde, King's College London, Dundee, Bournemouth, Cranfield, and the Jill Dando Institute. She is a Research Fellow at the University of Aberdeen and University of Gloucestershire. She has published extensively in ecology, botany, palynology, and archaeology - and in the forensic aspects of these disciplines. She was Secretary of The British Association for Human Identification between 2005 and 2007. She has professional status as a forensic scientist, and is a Fellow of the Linnean Society.

Her lecture will cover the following themes:

In Britain over the last fifteen years, ecology has proved to be a critical forensic tool in investigation of murder, rape, abduction, and grand theft. In particular, the use of botany and palynology (the study of pollen, plant and fungal spores, and other microscopic remains) have been particularly useful in (a) linking people, objects, and places, (b) search and location of hidden remains, and (c) estimating times of body deposition and death. She has used these disciplines in more than 200 criminal cases.

Almost any place has a unique biological profile, traces of which can be picked up by anything that comes directly into contact with it. These traces are proxy indicators of that place and, if they are identified and quantified accurately, the experienced forensic ecologist/palynologist can envisage the place in question.

When estimating the time that a body (or other object) has lain *in situ* on the surface of the ground, the changes in local flora and fauna, particularly below the body, can provide useful temporal information. From such changes, it is also possible to track the routes taken by offenders to and from the deposition sites. The identification of such offender pathways is of critical importance to investigators since they are able to minimise their search efforts. Fungal growths on cadavers are also being used to estimate time since death.

Palynomorphs (pollen, plant and fungal spores) can be picked up from any palyniferous surface by any object, and they can remain for long periods of time. In vehicles, and on clothing and footwear, there will be multiple depositions of palynomorphs over time; there will also be a loss of palynomorphs over time. Thus, the palynological profile on any object can be mixed. However, with careful evaluation of all sites pertinent to a case, a skilled palynologist can determine the palynomorph assemblages that reflect the crime scene. It is necessary to carry out detailed vegetation surveys of all relevant places and obtain comparator samples of soils and vegetation from them. After comparison of the various palynological profiles from places and objects, locations may be implicated or eliminated.

Case histories showing the power of the technique in linking people and objects with places, and in the location of deposition or burial sites of victims, are presented. The limits to the use of palynological information in forensic cases are the abundance and variety of palynomorphs present, the high level of scientific experience necessary to distinguish and identify rare or unusual pollen and spores, and the familiarity of the forensic palynologist with plant communities and plant distributions. Consequently, a scientist wishing to use these techniques to their fullest potential must have a strong background in plant ecology and palynology, and have good identification skills.

13 November ‘Taxonomy, Natural History and the Digital World’

Dr Malcolm Scoble is an entomologist with research interests in the taxonomy of the Lepidoptera and in Web-based taxonomy. In the last decade he and his colleagues have specialised in the taxonomy of Geometridae, the moths with ‘looper’ caterpillars, and in using this family as a model group to assess patterns of species description and regional richness. Another area of interest is in developing new approaches to improve access to information in natural history collections. He has held appointments at the Transvaal Museum (Pretoria, South Africa), Oxford University Museum of Natural History, and the Natural History Museum, London, where he is currently Keeper (Head) of the Entomology Department. He received a PhD from Rhodes University and a DSc from the University of London. He is currently Zoological Secretary of the Linnean Society

His lecture will cover the following themes:

The Internet provides an increasingly powerful medium for connecting taxonomists and the information they produce with a very wide audience. Numerous projects and initiatives have developed over recent years and the international *e-Biosphere* conference, held in London in June 2009, has shown that the field of Biodiversity Informatics has come of age. Our capacity to digitise natural history specimens and other taxonomic information and to distribute the resultant products online has great potential and some pitfalls.

Malcolm will explore and illustrate selected developments in this field and their implication for taxonomists and for the future of taxonomy. Traditional skills of identification, species description and natural history are declining as the current cohort of practitioners’ age (at least in the developed world): younger taxonomists are enthused more by the power of molecular systematics for resolving phylogenetic pattern. But many are being attracted by the potential and the methods for democratising taxonomic information through online distribution. A further consideration is that taxonomic data can now be made available not only by professional taxonomists, but by anyone moderately Web-literate. Wider involvement is beneficial, although the issue of data quality arises. This democratisation means that taxonomists will lose some control of what was a somewhat closed domain often with impenetrable jargon. Instead of fighting the inevitable, taxonomists should perceive themselves more as information synthesisers and brokers. While such a change in perception may blur the edges of taxonomy, it should attract a wider community to understand, enjoy and help conserve the natural world.

20 November Panel Presentation and Discussion: Inspiring New Naturalists and Taxonomists

This session will have short presentations by three speakers, followed by a panel Question & Answer discussion

1. Working with Children. ‘A rose by any other name?’

Gail Bromley is Education Development Manager and International Consultant for Biodiversity Education at Kew. She has been there for 33 years, working for the first 12 years as a plant taxonomist, specialising in Brazilian Plants. Gail joined the education team in 1987 and became Head of Department in 1994. She developed and managed the education provision at Kew, including higher education and professional training, adult education, interpretation / informal education provision, schools programmes and Kew’s first volunteer programme. She significantly built the learning team at Kew and introduced a volunteer guide force of over 50 to Kew.

Gail moved on from formal education provision to develop her role as national and international advisor and consultant for Kew on botanic garden and biodiversity education and to explore programmes that support sustainable community outreach. She is responsible for the management of new community education projects and initiatives and for capacity building programmes at home and abroad on education for biodiversity and sustainability. Currently she is additionally supporting a number of individual Kew projects, such as the The Great Plant Hunt programme for schools and the new interpretation programme for the restored Marianne North Gallery at Kew.

Gail remains passionate about both plants and people and expends a great deal of energy working to encourage communities worldwide to recognise the vital importance of plants and their habitats and to support organisations that deliver plant science and support conservation.

Gail was awarded the MBE in Jan.2003 for 'services to education'. She is a Fellow of the Linnean Society

Her lecture will cover the following themes:

Since the demise of 'whole organism' biology in favour of biotechnology and molecular biology at universities and research institutes, taxonomy has become less available as a subject and is fast disappearing out of school curricula across the world. And yet taxonomy is as important today as ever, supporting forensic work, the search for new medicinal compounds, the fight to combat climate change and the development of many new everyday products.

As huge repositories of diverse species, botanic gardens, and similar natural history organisations offer the ideal site for the teaching of taxonomy to a number of audiences - inspiring a passion for plants, developing observation skills and ultimately building capacity for environmental action and conservation work globally. This talk will highlight some of the current activities and programmes that encourage people, in particular children, to recognise, identify and understand plant relationships.

2. Higher Education

David Streeter MBE is reader in Ecology at the University of Sussex where he was formerly Dean of the School of Biological Sciences and a Pro-Vice-Chancellor and where he designed and convenes the MSc in Biodiversity Survey. He is a plant ecologist but with interests in all aspects of natural history. He has been particularly involved with the link between ecology and conservation policy. He is a past member of the Countryside Commission and the Advisory Committee for England of the Nature Conservancy Council. He is currently a member of the Conservation Panel of the National Trust and is president of the Sussex Wildlife Trust.

His lecture will cover the following themes:

His lecture will touch on three inter-related aspects of the problem of how to encourage more taxonomists: stimulation, training and opportunity. To many, that there is a problem at all is surprising given the unprecedented number and popularity of high profile natural history programmes such as the Attenborough series and *Spring Watch*. Indeed, are these part of the problem? At what point is the life-long interest in natural history borne and what is the spark? If the spark is no longer being ignited, how do we light it? Part of the problem is often laid at the door of the universities who, it is claimed, no longer teach formal systematics and taxonomy. Is this criticism fair and if it is, what is the reason for it? How much should be laid at the doors of the research councils who increasingly determine national research priorities? How does the graduate with appropriate skills and interests actually find the job market? Rather than a lack of taxonomists, is not a lack of opportunities also a problem?

3. Professional Taxonomy

Dr Mike Fay has worked at Kew since 1986, and for the last 15 years he has worked in the Jodrell Laboratory, where he is Head of Genetics. In this position, he is involved in a range of projects using genetic techniques to investigate questions relating to taxonomy, phylogenetics, evolution and conservation. He is Editor in Chief of the Botanical Journal of the Linnean Society and is currently a Vice President of the Linnean Society. He is particularly interested in orchids, and he is Chair of the Orchid Specialist Group of the Species Survival Commission of IUCN.

His lecture will cover the following themes:

The impacts of taxonomy go far wider than simply the application of names. This talk will be illustrated with a range of examples to show how taxonomy and the accurate naming of plants are fundamental to scientists working in a range of subjects including phylogenetics, conservation and forensics. Taxonomy is not the dull subject it is painted to be, and with the aid of these examples, he hopes to persuade the audience that this is a vibrant, interesting field of research with a real relevance in the 21st century..

The Linnean Society of London is the world's oldest active biological society. Founded in 1788, the Society takes its name from the Swedish naturalist Carl Linnaeus (1707–1778) whose botanical, zoological and library collections have been in its keeping since 1829. As it moves into its third century the Society continues to play a central role in the documentation of the world's flora and fauna – as Linnaeus himself did – recognising the continuing importance of such work to biodiversity conservation.

The Society uniquely embraces the entire sweep of natural history. It promotes the study of all aspects of the biological sciences, with particular emphasis on evolution, taxonomy, biodiversity and sustainability. It encourages and communicates scientific

advances in these and associated fields through its three world-class journals, special publications, meetings and website. At the same time, the Society reaches out to future biologists through schools and educational programmes.

Web site : <http://linnean.org>

The Ecology and Conservation Studies Society aims to foster interest in conservation based on sound ecological principles by arranging lecture courses, field visits and meetings, and by keeping its members up to date on literature, new concepts, research and practical field studies techniques. Membership is open to all who have relevant experience or interests. Non-members are most welcome at these lectures series.

Web site : <http://www.bbk.ac.uk/environment/prospective/ecss>

The ECSS Spring 2010 Free Public Lecture Series will be run in collaboration with **Birkbeck Institute of Environment**. It will be held on six Friday evenings from **12th February - 19th March 2010 inclusive**. Watch our website, - details will be posted in late autumn.

This lecture series

‘Soil - a basis for life on earth’

will explore the immense diversity of soil types derived from varying geology, topography, climate and organic material and their importance to the continuance of life on earth. The vital role of micro and macro organisms of the soil will also be included. The function of soil as a medium for plant growth in natural habitats and modifications to soil fertility necessary for agriculture and horticulture will be covered, as well as reclamation of soils damaged through such activities as mining.