The SymBiont

News from the Department of Biodiversity and Systematic Biology (BioSyB)

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Editorial

The Biodiversity Department cares for around four million specimens spanning botany, zoology and vegetation history. Natural history collections are the core tool for taxonomic research and, combined with our taxonomic expertise, are a valuable resource in support of conservation biology, phylogenetics and our understanding of global biodiversity past and present. Through fieldwork and research projects our collections are continually expanding. This issue of *Symbiont* includes examples of two such collecting expeditions, to the Falklands and Chile. The outcomes of both of these partnership ventures will be the addition of further reference specimens to the collections and a better knowledge of present-day patterns of biodiversity.

Making our collections, research and expertise more readily accessible, nationally and internationally, is an ongoing function of the Department. Dissemination via peer-reviewed journals and conference presentations is now augmented by blogs, our new *Insight* gallery with displays explaining our research, articles on Amgueddfa Cymru's Rhagor web pages, and more face-to-face contact with the public via open days, workshops and collection visits. This *Symbiont* also highlights two other avenues. The production of a new identification guide will fill a gap in resources available to scientists and others in the UK, and the launch of a new online database will make valuable type collections more readily accessible to international researchers. It is the expertise of staff and the credibility and quality of the museum collections that underpin the success of these and our other projects.

Deborah Spillards, Department Manager

Preserving plant portraits from the past

As part of a continuing series of lunchtime 'activity visits', members of the public are invited to come behind the scenes in the Department. In March 2012 a group of visitors viewed a selection of botanical prints and drawings and gained hands-on experience of the techniques used to conserve these beautiful illustrations.

Amgueddfa Cymru – National Museum Wales holds a collection of more than 7,000 botanical prints and drawings. The collection encompasses a wide range of works; from eighteenth-century hand-coloured prints by the outstanding botanical artist Georg Dionysius Ehret, to watercolours by enthusiastic Victorian amateur artists such as Gwendolen Crowley and Louisa Twamley. Welsh artists, including

Carica papaya by G.D. Ehret (1708-1770)

Sydenham Edwards, Harold Drinkwater, Juliet Regan and Gillian Griffiths, are well represented in the collection.

The departmental conservators, notably Victoria Purewal, have an important role. They use a wide variety of techniques to maintain the collection, for example constantly monitoring the temperature and humidity of the store rooms. They also advise on essential factors such as light intensity and exhibition length, to ensure that colours do not fade when illustrations are displayed. More routinely, the conservators make minor repairs, clean and mount the works, and ensure that they are mounted and stored using acid-free board and paper.

Considerable progress has been made to improve the storage of this collection. Recently, the botany store room has been reorganised to improve access to the collection and to raise health and safety standards. Gradually old wooden boxes have been replaced by the latest high-quality Solander boxes and a comprehensive catalogue was produced in 2003. Work will continue on this collection to ensure that the superb plant portraits continue to inspire and delight future generations.

Slugs of the British Isles

A new project on the slugs of the British Isles aims to resolve long-standing questions over which species are present, and to make the often tricky job of identification easier.

Ben Rowson (Research Curator, Terrestrial Mollusca) and colleagues from Cardiff University and the Conchological Society of Great Britain & Ireland have been awarded a two-year Research Grant from the Leverhulme Trust. The project will link the appearance, anatomy and DNA of live slugs to those in museum collections and produce a new identification guide to the species. This will be user-tested and published in the Field Studies Council's respected AIDGAP imprint.

Britain's climate and history mean slugs are a part of everyday life, and some are deservedly unpopular. Some £10 million is spent annually by British agriculture on molluscicides alone, yet only a minority of slug species are pests. Others are good indicators of habitat history and play a role in semi-natural habitats as well as urban and cultivated ones. Some native slugs are declining, while some non-natives are spreading fast. Some are attractively marked, even beautiful, but many can be difficult to distinguish, a problem compounded by the lack of an up-to-date guide and taxonomic questions concerning some species.

The work requires professional photography of hundreds of slugs from throughout Britain and Ireland under standardised conditions - a task more difficult than it sounds! Critically this must include different colour and geographic variants of all species, and juveniles as well as adults. DNA sequencing of the photographed specimens will allow their identity to be checked and ensure that the correct scientific names are applied. It will also shed light on the patterns of geographic variation and each species' native status, and potentially allow previously unrecognised species to be detected.

Some colour varieties and a juvenile of the slug *Limax cinereoniger* from various localities in Britain and Ireland. All scale bars = 10 mm

Winter wild flowers in Cardiff

The mild winter of 2011-2012 ended the second warmest year on record. The mild weather allowed many wild flowers to continue flowering into winter when they would normally have finished in the autumn.

On New Year's Day 2012, a three hour wild flower hunt around Cardiff, led by Tim Rich (Head of Vascular Botany) and Dr Sarah Whild (University of Birmingham), showed quite how unusual the winter was: 63 wild flowers were found in flower, more than double the expected number. This was in complete contrast to 2010-11 when only gorse was flowering frozen under a blanket of snow.

The story received national coverage in the newspapers, radio and TV in January. The public response showed that many garden plants were also flowering at unusual times.

Fly Hunting in the Patagonian Bosque

Late in 2011, Adrian Plant (Research Curator, Diptera) joined a team of colleagues from the Muséum national d'Histoire naturelle, Paris on a three week entomological expedition to Chilean Patagonia. With generous financial support from CAFOTROP (CAnopée des FOrêts TROPicales) the researchers explored the remote temperate rainforest between Puerto Montt and Coihaique, travelling overland by 4X4 with numerous ferry crossings. The expedition's objectives were to collect specimens to support ongoing descriptions of the region's biodiversity, but more especially to search for insects that have survived as relicts of a time, more than 100 million years ago, when South America, Africa, Australia and Antarctica were joined in one massive southern super-continent - 'Gondwana'. Relating the position of these relict insects in their evolutionary trees to the sequence by which Gondwana fragmented and the continents drifted to their present-day positions will help the scientists better understand present-day patterns of biodiversity.

Polychaetes of the Falkland Islands

In November 2011, Teresa Darbyshire (Research Curator, Marine Biodiversity) travelled to the Falkland Islands for a month to collect polychaetes (marine bristleworms) from the shores and shallow seabed around the islands. The polychaetes from this region are poorly known and little has been published on them for nearly 100 years.

Syllid polychaete collected from a rock on the seabed while diving

A variety of shores were sampled, with habitats ranging from muddy inlets to sandy bays and rocky headlands, to maximize the collection of as many different species as possible. The opportunity to join the local Shallow Marine Surveys Group in their offshore diving survey work extended the sampling even further.

Access to local laboratory facilities at the Fisheries Department meant that animals could be viewed alive and preliminary notes made. A camera microscope enabled photographs of many of the animals to be taken, a useful documentation of colour and other features that are sometimes lost during specimen preparation. Although most specimens were fixed in formaldehyde for identification, many were separately preserved in 100% ethanol for possible molecular analysis.

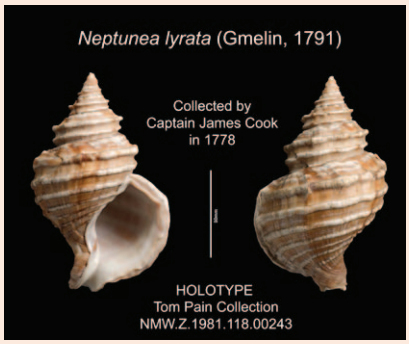
The project, which will run over several years, was part-funded by the Shackleton Scholarship Fund (part of The Falkland Islands Trust charity). Each year grants are awarded to encourage research into the natural or social sciences of the region. Products from the project will include a full reference collection of species returned to the Islands to aid accurate identification of the group.

Digging for polychaetes on a Falklands shore

For Teresa's Falkland Islands blog go to: www.museumwales.ac.uk/en/blog/?cat=1557

Type your way into our Mollusca collections

The 'type' specimens of any natural history collection are among the scientific gems that need to be safeguarded above all others. A 'type' is the specimen to which the name of a taxon (species, genus, family etc) is permanently attached and it is essential that scientists are able to study them if those names are to be correctly used.



The Mollusca collections held at Amgueddfa Cymru contain some 3,200 type specimens, spanning nearly 200 years of collecting. Two-thirds come from the famous Melvill-Tomlin shell collection, illustrating its scientific depth and historical importance. Our earliest holotype is a large cold-water whelk from Alaska (see image above), collected in 1778 by Captain James Cook during his third and last voyage. This and many others were described by some of the great collectors and taxonomists of their time, including William Evans Hoyle, a cephalopod expert and the Museum's first director.

With many collection-based enquiries hinging on type material, we were keen to develop a tool to make them accessible across the world and so the Mollusca Types Catalogue was born. The project began in 2009 when the focus was on isolating our 350 holotypes and lectotypes from the main collection. All of these specimens and their labels have since been photographed and references for the original species descriptions and type designations have been checked and scanned. The information will soon be available via an online database, but this is only the beginning. The many remaining types will be added periodically, with staff continuing to research unrecognised types within our collections. New type specimens will also be added whenever new species are discovered by our taxonomists.

Type specimen(s) – the selected specimen(s) of a taxon, to which the name of the organism is attached.There are different categories of type specimen, including:-
Holotype – the single specimen clearly designated in the original description as the name-bearing type for that taxon.
Syntype – any two or more specimens listed in an original description for a taxon, where no holotype is designated.
Lectotype – the single type specimen later selected as the name-bearing type of a taxon, originally described from a series of syntypes.

Please see 'Recent Publications' section for more information

News in brief

- Sarah King, a CASE (Collaborative Awards in Science and Engineering) student jointly supervised by Chris Cleal (Head of Vegetation History) and Jason Hilton (University of Birmingham), has been awarded her PhD. This was based on biodiversity studies on Carboniferous tropical wetland vegetation of South Wales, North America and China. The aim was to show how these wetland habitats had responded to changes in landscape and climate. In addition to her work at our Museum, she studied collections in Beijing, Washington DC, Stockholm, Brussels and London.
- The results of a three year study by Tim Rich (Head of Vascular Botany), looking at which dandelion species (*Taraxacum*) are present in Cardiff, has just been published on the Museum website. One hundred and two different species have been recorded in Cardiff, including some for the first time in Wales. The study is continuing and new species will be added as they are discovered. www.museumwales.ac.uk/3585
- The scale insect family, which includes the mealybugs, was previously considered to consist of a single family. However, recent work by Chris Hodgson (Research Fellow, Entomology) based on adult male morphology has shown that there are two families. One family includes the minute species mainly found feeding on plant roots and the other contains those that feed on the above-ground parts of their host plants. Adult male scale insects have rarely been studied as, unlike the females which can live for several months, the males only survive as adults for three to five days, and are therefore difficult to collect. Nonetheless, the few studies that have been undertaken using adult males have clarified several classification problems.

Professor Elis Wyn Knight-Jones FLS

One of Britain's most eminent marine biologists, Professor Elis Wyn Knight-Jones FLS, died in February 2012 aged 95. Wyn and his wife Phyllis (d. 2009) were both Honorary Research Fellows at the Museum. Throughout their long careers Wyn and Phyllis accumulated a significant collection of specimens and research material, some of which is now lodged for perpetuity at the Museum. Wyn's enthusiasm for fieldwork and taxonomy continued into his 80s, and he and Phyllis accompanied the Marine Biodiversity section on a fieldtrip to Salcombe and Looe in November 2003.

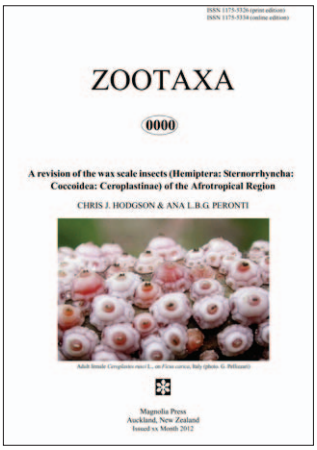
Wyn received a 1st Class Honours Degree in Zoology at University College of North Wales (1939), completed his D.Phil. at Oxford after war service, and worked at the Ministry of Agriculture & Fisheries' shellfish laboratory at Burnham-on-Crouch. In 1950, he helped to establish the Marine Biology Station in Menai Bridge, moving to Swansea University in 1956 as the first Head of the Department of Zoology. A Linnean Society meeting and Zoological journal publication in his honour celebrated his retirement in 1981.

Recent publications

The Mollusca Types Catalogue

This new website, launching in June 2012, is a searchable database for our Mollusca 'type' specimens - these are the specimens upon which new scientific names are attached. The website allows the user to view images of the specimens and, their information labels and to obtain the full reference of each scientific name. The initial focus has been on our 350 holotypes and lectotypes but will continue with our syntypes, of which there are nearly 3,000.

Available online at: http://naturalhistory.museumwales.ac.uk/molluscatypes/Home.php



Wax Scale Insects of the Afrotropics Monograph

Scale Insects, related to aphids, are one of the major insect groups that suck sap from plants and can cause serious damage to crops of all types. One economically significant subfamily, particularly in the tropics, is the wax scales or Ceroplastinae, named after their thick tent-like covering of wax. As part of a world-wide study of this subfamily, Chris Hodgson (Research Fellow, Entomology) and Dr Ana Peronti (São Carlos University, Brazil) have revised the group for the whole of the Afrotropics and the nearby islands in the Atlantic and Indian Oceans, including Madagascar. This group has not been properly revised for about 100 years.

This monograph of 60 species covers all but two of the previously described species, re-describes and illustrates about 50 species, 9 of them new, and synonymises 18 species. Keys are provided for their identification and there are appendices of known host plants and distribution maps for each species.

Hodgson, C.J. & Peronti, A.L.B.G. (In press). A revision of the wax scale insects (Hemiptera: Sternorrhyncha, Coccoidea: Ceroplastinae) of the Afrotropical Region. *Zootaxa* (due June 2012).

Rhagor is the website for our national collections and the stories behind them. A rich selection of articles, image galleries, videos, interactives and more bring the collections alive.

English: www.museumwales.ac.uk/en/rhagor **Contact us: www.museumwales.ac.uk/en/biosyb/staff**