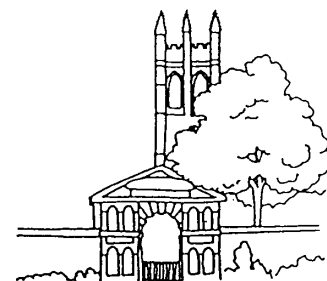


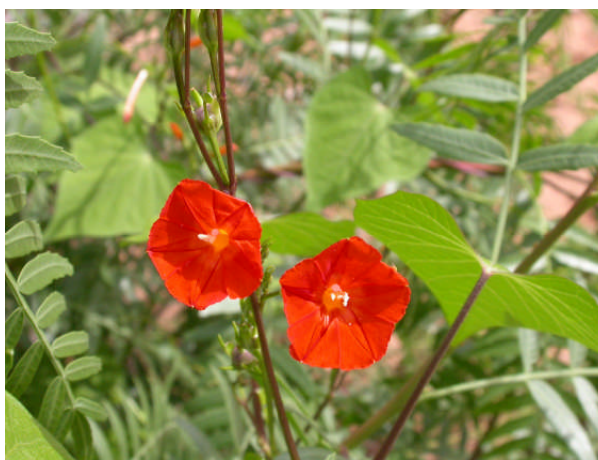
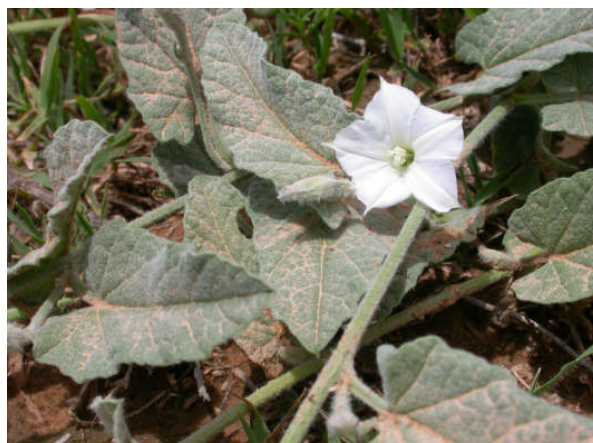
Oxford Plant Systematics



With news from Oxford University Herbaria (OXF and FHO), Department of Plant Sciences, Oxford

OPS 18

June 2012



Different species of *Convolvulus* and *Ipomoea*, some new, from Bolivia and the Azores

Foreword

Welcome to the eighteenth edition of *Oxford Plant Systematics*.

The importance of getting out into the field and collecting plants is a core part of the articles in this edition. John Wood recounts the rediscovery of poorly known *Strobilanthes* (Acanthaceae) species in the wild, whilst Steven Heathcote and Elizabeth Cooke describe their search for *Cardamine* (Brassicaceae) in the Carpathians. In Öland, Rosemary Wise brings a personal perspective to a route which follows in the footsteps of Carl Linnaeus. Away from field work focused on specific plants, William Hawthorne and Cicely Marshall describe their work on the rapid collection of field data from the world's botanical hotspots.

Rapid collection of field data allows one to state where a species is found. However, the detection and identification of species requires effective identification keys and global taxonomic treatments. The Foundation Monographs initiative, described by John Wood and Robert Scotland, aims to plug this gap by developing a novel method to accelerate the overhaul of the taxonomy of large, poorly known groups. The work of Robert and his colleagues has also highlighted that approximately half of the plant species awaiting discovery are already sitting, unidentified or misidentified, in herbarium cabinets.

Some of the results of historical field work by Oxford-based botanists, most significantly John Sibthorp's explorations of the eastern Mediterranean at the end of eighteenth century, are now available on-line. Away from dead plants, Alison Foster describes how the living collections at the Oxford Botanic Garden are now being managed using BRAHMS. In addition, the first steps have been made by Elizabeth Atkinson in the long process of making George Claridge Druce's vast personal archive readily available for botanical research.

Stephen A. Harris

Curator of Oxford University Herbaria

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Cover images:

Species of Convolvulaceae from Bolivia and the Azores to illustrate article on page 5.

Top row: left – an apparently new species of *Ipomoea* from the Andes of Bolivia; right – *Convolvulus erosus*, a trailing herb from Bolivia, frequently misnamed *C. hermanniae*.

Middle row: left – a red-flowered *Ipomoea* provisionally named *I. hederifolia* but part of a complex in need of revision; right – three colour variants of the Morning Glory, *Ipomoea purpurea*. (All the above photographed for Darwin Initiative Project 162/11/010.)

Bottom row: left – *Convolvulus caput-medusae*, a spiny undershrub from the Canary Islands (photo by Fred Rumsey); right – an apparently new species of *Ipomoea* from the cerrados of Bolivia (photo Darwin Initiative Project 16-004).

Typesetting and layout of this issue of OPS by *Serena Marner*

News items

Congratulations to **Robert Scotland** who has been elected as President of the Systematics Association from 2012 until 2014.

Robert Scotland was interviewed by BBC radio on St David's Day 2011 to explain some of the mysteries of the daffodil. He also appeared on BBC television, followed by a broadcast on Radio 4 (Material World, 10 March 2011).

Staff retirement



Anne Sing retired from the Department of Plant Sciences in March 2011 after 34 years service. Anne joined the University in 1977 as a graduate of Portsmouth Polytechnic, now the University of Portsmouth. Initially, Anne worked as a research technician for David Mabberley, working with him on his interests in south east Asian Meliaceae and the *Plant Book*, the second edition being dedicated to Anne. In these activities Anne revealed her concern for academic rigour. Anne was also involved in organising the annual undergraduate field course to the Algarve, Portugal. She demonstrated empathy and concern for students. After David Mabberley moved to Sydney, Anne gave technical support to various staff members of the Department in their research, also continuing to help with the field course to the Algarve, and carrying out bibliographic research in which she had considerable expertise. Latterly she helped in herbarium curation tasks taking responsibility for mounting herbarium specimens. Many thousands of examples of Anne's work are to be found throughout the herbarium. We wish Anne a long and happy retirement.

Prizes

Tiina Särkinen was awarded the Irene Manton Prize for her D.Phil. thesis entitled "Historical Assembly of Seasonally Dry Tropical Forest Diversity on the Andes" which she completed in 2010 (see abstract in *Oxford Plant Systematics* 17: 5 (2011)). The Irene Manton Prize is awarded by the

Linnean Society for the best doctoral thesis in botany examined at a UK University during the previous academic year. Tiina is currently working as a post-doctoral researcher at the Natural History Museum in London.

Congratulations to **Elizabeth (Lizzie) Cooke** for winning second prize for her presentation, 'Systematics and phylogeography of the emerging model plant *Cardamine hirsuta*' at the Young Systematics Forum held at the Natural History Museum, London in December 2011. The event was attended by 150 delegates from 20 countries. Lizzie Cooke also won second prize for her presentation on the Systematics of *Cardamine hirsuta* at the Natural History Museum Student Association Annual Conference that took place at the Natural History Museum on 14 and 15 April 2011.

Fellowship awarded

Caroline Pannell spent five weeks in November and December 2011, with a Fellowship from the Forest Research Institute of Malaysia. She carried out fieldwork in three areas of Peninsular Malaysia. These were Pasoh Forest Reserve, previously unexplored limestone hills of Perak and Endau Rompin National Park. She completed her account of *Aglaia* for the *Flora of Peninsular Malaysia*, gave a lecture on the taxonomy and biology of the genus and ran a workshop on using the key to the 50 species in Peninsular Malaysia. The key relies partly on characters of the indumentum that require magnification and it worked well after some modification based on feedback from the workshop participants. She commenced an account of the former Flacourtiaceae, now Salicaceae and Achariaceae, for *Flora of Peninsular Malaysia* and gave a lecture on her initial findings. During the field work she also gathered information from living plants for an interactive key to genera of Peninsular Malaysian plants using vegetative characters. She is most grateful to the botanists at FRIM for the help and enthusiastic support they gave her in all of these activities.



Imin Kamin (FRIM), and Caroline making a collection in Pasoh Forest Reserve. Photograph by Chew M.Y. (FRIM).

The general collecting and interactive key are to contribute to the plant diversity hotspot assessment for Peninsular Malaysia, as part of the series of studies being carried out by OPS staff and students. The Peninsular Malaysia project will be done in collaboration with Saw Leng Guan and his staff at FRIM.

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Student reports

Elizabeth Cooke (D.Phil. 3rd year) Systematics and phylogeography of *Cardamine hirsuta* L.

Supervised by Dr Robert Scotland (Oxford), Dr Mark Carine (Natural History Museum) and Professor Miltos Tsiantis (Oxford). BBSRC-funded.

Cardamine hirsuta L. (Brassicaceae) is an emerging model system in developmental genetics, developed by Professor Miltos Tsiantis here in Oxford, which is proving useful for investigating the genetic basis of morphological traits. My D.Phil. attempts to put this model organism in a systematic and phylogeographic context. The specific aims are to: a) describe the geographic and phylogenetic structure of molecular variation in *C. hirsuta*, in order to construct a phylogeographic hypothesis for *C. hirsuta* in its native range; and b) identify the closest relatives of *C. hirsuta*.

C. hirsuta or Hairy Bittercress as it is more commonly known, is a familiar garden weed in most of the temperate world. Humans, particularly the horticultural trade in recent times, have accidentally helped *C. hirsuta* to expand out of its original native range of Europe, the Middle East, North Africa and the East African High Mountains. Anthropogenic dispersal has also moved *C. hirsuta* about within its native range making the reconstruction of its phylogeographic history a challenging prospect.

This project uses Sanger sequencing of multiple chloroplast and nuclear regions to construct infraspecific phylogenies. Markers were selected according to the levels of infraspecific variation found in a pilot study. Individual sampling has predominantly come from herbarium specimens, allowing excellent coverage of *C. hirsuta*'s native range, plus my own collections from a few targeted field trips (see the field trip report on pages 9-10). Sampling is nearly complete. This strategy has revealed clear geographic structuring of genetic variation within *C. hirsuta* with congruent patterns between chloroplast and nuclear markers. The next aim is to investigate how the phylogeographic structure of *C. hirsuta* relates to geography and climate, past and present.

Currently, the closest relatives of *C. hirsuta* are unknown due to the lack of phylogenetic resolution and taxon sampling within *Cardamine*, a large genus of some 200 species. The second aim of the project is to determine the closest relatives of *C. hirsuta*, test their monophyly and resolve their relationships using multiple chloroplast and nuclear regions.

Zoë Goodwin (D.Phil. 1st year) Revision of *Drypetes* Vahl

Supervised by Dr Robert Scotland (Oxford) and Dr David Harris (Royal Botanic Garden Edinburgh). NERC-funded

Drypetes is a large, pantropical genus of small trees in the Putranjivaceae, notable for the presence of mustard oils (also found independently in the Brassicaceae). Along with some other much smaller genera (*Putranjiva*, *Sibangea* and *Lingelsheimia*), these plants have been segregated from Euphorbiaceae as Putranjivaceae in recent APG classifications.

Drypetes, published in 1807, was considered to be strictly a neotropical group until the Old World genus *Cyclostemon* was sunk into *Drypetes* by Hutchinson (1912). Currently, there is considered to be just over 200 species worldwide, with about 115 species in Asia and the Pacific, 77 species in Africa and 18 species in the Neotropics (Govaerts *et al.*, 2000). Centres of diversity of the genus seem to be located in Central Africa and South East Asia. *Drypetes* is characterised by simple, alternate distichous leaves, stipules, often coriaceous leaves with an asymmetric leaf blade base, and toothed, occasionally entire margin. The genus is dioecious with flowers fasciculate in the leaf axils or on old branches, occasionally cauliflorous. The flowers have a nectiferous disk (intrastaminal in male flowers, between the sepals and the gynoeceum in female flowers) and have no petals. The drupaceous fruit usually possesses a pair of distinctive, persistent, flattened stigmas.

The aims of this project are firstly, to revise this difficult and taxonomically neglected genus, and to verify the monophyly of the group. Secondly, to investigate the process of species discovery by examining datasets of large, well revised taxa.

Drypetes has been chosen as a study group for developing a novel, innovative and fast approach for overhauling the taxonomy of species-rich, widespread, taxonomically neglected groups of plants, termed a Foundation Monograph. Traditionally, the monographic approach is associated with more or less comprehensive treatment for the phylogeny, biogeography, ecology and evolution of a particular group and therefore monographs are generally long-term and expensive (often a life-time of work from a single dedicated botanist). The Foundation Monograph approach is proposed to develop a fast method for large scale taxonomic revisions, that is monographic in scope, i.e., including a global synthesis and specimen sort, but doing so within a re-aligned more limited and focussed set of aims that are essential for meeting global biodiversity targets. By undertaking a global specimen sort for large groups of plants, within focussed and re-aligned monographic priorities, combined with full use of

contemporary electronic resources, it is considered that it is possible to overhaul the taxonomy of large species-rich taxa in a short period of time. In contrast to modern global monographs, the Foundation Monograph approach aims only to: (i) establish taxon circumscription (define species); (ii) resolve nomenclature; (iii) provide brief descriptions and diagnostic keys to species; and (iv) test monophyly of study group.

This year a skeletal molecular phylogeny will be developed and revision of the African species of *Drypetes* will begin using herbarium material at BM, BR, E, FHO, K, L and WAG.

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Foundation Monographs, a new initiative from Oxford Plant Sciences

There is worldwide concern at the loss of biodiversity and widespread popular support for efforts to conserve diversity before it disappears. However, efforts to prioritize individual species for conservation as well as areas rich in biodiversity are hampered by our lack of knowledge of what species exist and where they are found. Current estimates of the number of described species of flowering plants range between 230,000 and 420,000, the uncertainty surrounding these figures being largely the result of unknown levels of synonymy in many groups of plants. In addition, there are estimated to be about 70,000 species of flowering plant yet to be described of which, it has been estimated, more than half have already been collected and await discovery in herbaria. Major impediments to the detection of these new species include the high levels of synonymy, lack of keys to recognized species and, in the case of most large genera, lack of any global treatment. In addition, for many groups of considerable size there is a vast but disparate literature as well as massive quantities of collected specimens that remain unstudied in the world's herbaria. This has led to the current situation where many larger groups are viewed as too difficult and too time-

consuming to tackle because of their size and taxonomic complexity.

The Foundation Monograph concept is an approach to developing a novel but, effective method to accelerate the pace of overhauling the taxonomy of these large, poorly known, mainly tropical, groups of plants in a relatively short timeframe of a few years at modest cost, thus making a significant contribution towards conservation efforts. In contrast to standard modern global monographs, which are few in number due largely to the amount of time needed in their preparation, the Foundation Monograph has the more limited aims of: (i) delimiting taxa, establishing taxon circumscriptions and providing brief descriptions; (ii) resolving nomenclature; (iii) providing identification tools, specifically, diagnostic keys and DNA barcodes; (iv) providing basic distribution data; and (v) testing the monophyly of the study group, thus ensuring it is a natural group.

Proposals for funding were prepared by and submitted from Oxford's Department of Plant Sciences during 2010-11. From its start the project involved collaboration between scientists from the Natural History Museum in London, the Royal Botanic Garden, Edinburgh and the Royal Botanic Gardens at Kew and representatives of all four institutions form a monitoring committee for the project. Initially we secured "pump-priming" funding from BBSRC /SynTax, which is administered by the Linnean Society with the object of providing short-term funding for novel proposals with a strong systematics or taxonomy element. This was to work on *Convolvulus*, a genus of around 200 species with a nearly cosmopolitan distribution although centred on the Mediterranean and Irano-Turanian regions. This was planned as a pilot project in preparation for tackling a larger, more strictly tropical genus.

Work began on *Convolvulus* in July 2011 with species delimitation and description being carried out by John Wood from Oxford with visits to the other three participating institutions and with DNA barcoding being carried out at the Natural History Museum by Mark Carine and Beth Williams. Progress at both key elements in our work is advancing well. It is hoped that almost 75% of species will be sequenced for *rcbL* although coverage for the genes *matK* or *ITS* which discriminate more successfully at species level will be lower. Already this is confirming that previous classifications of *Convolvulus* are not natural. At the level of alpha taxonomy we have largely completed descriptions and keys of the Southern Hemisphere groups and are making substantial inroads into the Middle East species where the genus is most diverse. Here many species are small undershrubs, sometimes spiny, and adapted to arid conditions, so very different in appearance from the common bindweed of gardens, *Convolvulus arvensis*, which is nearly

cosmopolitan in distribution. Here too we face a common problem for monographers – the paucity of adequate material. Many species are only known from the type collection or one or two inadequate additional specimens. This makes species delimitation difficult but experience is showing which characters are of greatest value for delimitation. Inflorescence branching, stigma structure and the direction of the fruiting pedicels proving more reliable than ovary and capsule indumentum, which has been relied on by previous authors.

Near the end of 2011 funding for three years from the Leverhulme Foundation was confirmed to prepare a Foundation Monograph of *Ipomoea*, the largest genus in Convolvulaceae with in excess of 600 species. It is distributed throughout the tropical and subtropical regions of the world and its colourful flowers are a prominent feature of many different habitats. Some species are worldwide in distribution, particularly a group found on sea shores, but the greatest diversity is found in dry savannah habitats, the cerrados of South America being especially rich. There are problems about the limits of the genus as several related genera including *Argyrea*, *Astripomoea*, *Turbina* and others may not be distinct. *Ipomoea* has never been tackled from a global perspective and will constitute the principal challenge for our approach. Several species are cultivated as ornamentals and the genus includes the important food crops Sweet Potato (*I. batatas*) and Water Spinach or Kangkong (*I. aquatica*). Images of a selection of species of *Ipomoea* and *Convolvulus* appear on the front cover of this issue.

As our approach to monographing is different from current practice, we are using our preliminary study of *Convolvulus* as a way of refining our methodology. This is being carefully recorded for subsequent analysis to inform our work on *Ipomoea* and similar work on *Drypetes* by Zoë Goodwin as part of her D.Phil. research. The aim with all three genera is to produce a geographically comprehensive and user-friendly account of each group within a relatively short period, much as the *Flora Europaea* project did for the flora of a continent. However, we see the development of an efficient methodology for rapid monographing work to be as important as the initial monographs themselves.

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John R.I. Wood, Research Associate
& **Robert Scotland**, Reader in Systematic Botany

Rapid Botanic Survey inside and outside the world's botanic hotspots

2011 has been a busy year for Rapid Botanic Surveys (RBS), under the Plants for the 21st Century umbrella. RBS is a method for sampling and classifying vegetation, mapping hotspots of globally rare plants, and is an ideal basis for managing rapidly dwindling genetic resources. RBS is associated with a conceptual framework for plant biodiversity assessment, which includes the notion of bioquality. Bioquality is a measurable attribute of plant communities calculated from the concentration of globally rare species, where rarer species contribute more to a high bioquality score than widespread species. It is distinct from diversity measures, which are based on numbers of species that are all treated as equals. Since its development in the 1990s by William Hawthorne, working in the Department of Plant Sciences and for DFID in the Ghana Forestry Department, RBS has been used in many vegetation types and geographic regions: across Africa in Cameroon, Gabon, Senegal, Guinea, Sierra Leone, Liberia and Ivory Coast; the Americas, in Chile, Trinidad & Tobago, Honduras and Mexico; and in Malaysia. 2011 has seen the RBS spotlight turning on parts of South America and Asia.

Nodoka Nakamura is developing RBS to investigate the pattern of bioquality hotspots across Japan for her D.Phil. in the Department of Plant Sciences. Japan is one of the world's 34 major hotspots according to Mittermeier *et al.* (2005), whose continental-scale criteria are less precise and



Recording how each species is used as part of an RBS is an efficient way to gather ethnobotanic data and helps to establish a balanced view of the vegetation's importance.

scaleable than the bioquality hotspot definition allows. Nodoka's RBS fieldwork results are analysed within a large database she has assembled from published data. She has created the first detailed map of the Japanese hotspot, revealing a pattern of both coldspots and hotspots within the country. Nodoka is currently helping the Oxford Botanic Garden with their Japan hotspot seed collection project, and is due to complete her thesis, 'Dissecting the Japanese hotspot', in Autumn 2012.

In May 2011, William Hawthorne and research assistant Cicely Marshall went to Brunei, hosted by the British High Commission, to demonstrate RBS and to develop a plan for a national RBS project with Brunei's Ministry for Industry and Primary Resources (Forestry Dept). The

project, hopefully to start in 2012, would fulfil part of Brunei's 'Heart of Borneo' conservation commitments, a programme agreed by the three Bornean national governments working with WWF. Besides mapping species distributions, vegetation types and bioquality hotspots, the Oxford RBS project would provide training opportunities for Bruneian students and herbarium staff in botanic survey methods and database (BRAHMS) management, and showcase Brunei's well-stewarded but often under-recognised biodiversity.

We have completed several Rapid Botanic Surveys in Liberia in recent years, the least well explored country and reputedly the hottest part of Upper Guinea (tropical African forest zone, west of Benin). We surveyed the Putu Range, S.E. Liberia



The RBS team at the top of Mount Nimba (minus William Hawthorne – photographer!).



The herbarium in Yekepa was established, housed 20,000 specimens, and was dismantled again all in the survey duration of 7 weeks.

(ridges to the north of Sapo National Park) in late 2010; and in October 2011 a small team from the Department of Plant Sciences (William Hawthorne, Steven Heathcote and Cicely Marshall), together with West African botanists (Patrick Ekpe from Ghana, James Kpadehyea from Liberia, Ouo-Ouo Haba and David Bilivogui from Guinea), surveyed the Nimba and adjacent mountains of northern Liberia as part of ArcelorMittal's baseline Environmental Impact Assessment. Iron mining in the Nimba Mountains, and across the region, threatens the impressive diversity of the area but cannot be moderated, mitigated or offset without information derived from complete and scientific surveys of the plant communities.

More than a hunt for novelties, RBS provides a comprehensive and up-to-date synopsis of the local ecology and distribution of all species. This approach makes RBS collections and datasets useful not just for stocking herbaria and keeping taxonomists busy, but for many other researchers. In 2011 a D.Phil. in the Department by Shobha Maharaj found the RBS data from our Darwin project on Trinidad and Tobago much more useful than a complete herbarium database of the islands for climate change modelling. Other researchers have used the data for mapping food-plants of animal species, building ecological profiles of vulnerable species and species useful for mine restoration, and for assessing ecological services. RBS datasets

have also allowed us to assess the plant community from the perspective of people living around the forests. In Yekepa and Putu, ethnobotanic studies were integrated with the RBS, highlighting the use value of different species and vegetation types to local users. In Yekepa, a workshop was held with 14 key 'Zos' (herbalists) to prioritise the most useful species among almost 1000 plant names for which we recorded some use, and to develop action plans for their conservation in the face of mining developments.

Complementing typical herbarium databases, RBS datasets are particularly useful for their breadth and depth, precisely located data from one point in time, and the botanical training and local conservation awareness that accompany a project. One of our long term RBS goals, along with the applied and academic reports and papers, is to make this information about plants and plant communities available in an accessible 'map-zoomable' format. Towards this end, The Oxford Plant Observatory (TOPO) is being developed to handle these and other data, programmed by Andrew Liddell (web aspects) and Denis Filer (BRAHMS aspects). It is due to be completed later this year and will improve on and replace the Virtual Field Herbarium described in earlier OPS newsletters

(<http://herbaria.plants.ox.ac.uk/TOPO/>).

TOPO will feature improved links to BRAHMS Online; better mapping and zooming on focal RBS areas, and areas with published check-lists; and the option to see the Bioquality of plant communities mapped at various scales, calculated directly from the raw data.

Anyone interested in learning more about TOPO or training in RBS should contact William Hawthorne

(Will.Hawthorne@btopenworld.com).

The RBS manual can be downloaded from <http://herbaria.plants.ox.ac.uk/TOPO/Content/docs/RBS.pdf>.

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William Hawthorne & Cicely Marshall
Research Associates



A 'Zo' workshop was held with 14 top herbalists to identify and develop management plans for 70 key useful species, from 1000 species for which use and local name was established.

Strobilanthes rediscovered

Although botanists from The Department of Plant Sciences have been working on *Strobilanthes* (Acanthaceae) for almost twenty years, they have had few opportunities to see these plants in the field. This is partly a problem of funding but also reflects the fact that the genus is most diverse in areas which are both physically and politically difficult to visit. The genus is probably most interesting along the Tibet-India, Myanmar-India border areas and in the Golden Triangle, where Laos, Thailand, China and Burma meet. Much of our study has consequently been based on the examination of herbarium specimens collected by the handful of explorers and plant hunters who have visited these areas over the last two hundred years. Of these the most important is, without doubt, Frank Kingdon Ward who travelled through these areas on a series of expeditions over the first fifty years of the 20th century. Kingdon Ward was not particularly interested in *Strobilanthes*, focussing his attention on plants of horticultural importance, especially the Blue Poppies of the genus *Meconopsis*, and this makes his contribution all the more remarkable. At a rough count he collected over 25 new species from this genus, of which at least 15 were based on holotypes he collected. He is probably, therefore, the most significant collector of *Strobilanthes* ever.

Despite Kingdon Ward's outstanding success at finding new species of *Strobilanthes*, his material mostly languished in different herbaria for many years, a fate encountered by many collections (Bebber *et al.*, 2010). It is only in the last twenty years that most of the species he discovered have been described as new (Wood, 1994, Wood & Scotland, 2009). Making taxonomic decisions and, especially, describing new species based on limited material, often a single specimen collected many years before, is always a challenge for the taxonomist, from which many shy away. It requires confidence to take a risk combined with a fine judgement of what characters are important or not. And mistakes can be made. *Strobilanthes calvata* described by me (Wood, 1994) based on a Kingdon Ward collection from Myanmar turned out to be an extreme but not unique variant of the widespread and variable *S. echinata* Nees (Bennett *et al.*, 2008), to give one example.

However, most of the new species described from old specimens have stood the test of time and it has been gratifying to receive photographs from correspondents in India of a number of species, which were only known from old dried collections. Three such rediscoveries were made in 2011. The first of these was *Strobilanthes clarkei* (Wood, 1994) rediscovered and



Fig. 1 *Strobilanthes clarkei* found near Manipur in India.
Photo: Deshworjit Singh

photographed by Deshworjit Singh near Manipur (fig.1). This was first found by C. B. Clarke in 1885 and had not been seen again since 1949 when Kingdon Ward found it near Zakhoma. The second was also found by Deshworjit Singh in the same general area. This was *Strobilanthes asymmetrica* described by Wood *et al.* (2003) based on a collection by Kingdon Ward made in 1948. This is a remarkable species with asymmetric leaves, a unique pollen and an unusual cream-coloured corolla (see figs. 2 and 3). Apart from Kingdon Ward's collection it had only been found once in the 1920s by an Anglican missionary working in the Lushai Hills. The third rediscovery was made by Dr M. K. Pathak of the Kolkata herbarium in a quite different area, in the north east of Arunachal Pradesh in the Himalayan foothills. This was *Strobilanthes parvifolia* described by Wood & Scotland (2009) based on a single collection made by Kingdon Ward in 1928 in the same remote area of India. This is a white-flowered species (most *Strobilanthes* have blue flowers) and is unusual for being hairy on the inside of the corolla and with flowers scattered in opposite pairs along the branches of the inflorescence (see fig.4).

Receiving colour photographs of species such as these, which you have only known from old dried specimens is a very satisfying experience. It brings to life something you have only known from dead material and it is reassuring that entities based on dried specimens are diagnosable when alive and that your original decision to describe them as new was not mistaken. Perhaps more importantly, it is reassuring to know the plants are not extinct. Obviously much work will be needed to assess their true conservation status but at least they have not disappeared. Many *Strobilanthes* species are plietesial and only flower once

every ten or twelve years. We have no idea whether the three species rediscovered this year are plietesial or not. I have vivid memories of *Strobilanthes accrescens* J.R.I.Wood in Bhutan, a species known from four collections before I saw it in its flowering year of 1992 when it covered the hillsides over 25 kilometres with its blue flowers. A small number of collections does not necessarily indicate rarity in *Strobilanthes*!



Fig.2 (above) Leaves of *S. asymmetrica*, found near Manipur, India. Photo: Deshworjit Singh



Fig. 3 A flower of *S. asymmetrica*
Photo: Deshworjit Singh



Fig. 4 Flowers of *S. parvifolia*. Photo: Dr. M.K. Pathak

There is one other important observation based on the rediscoveries in 2011 – the importance of collaboration between biologists, especially at an international level. I am, of course grateful to Deshworjit Singh and Dr. M.K. Pathak for the photographs that accompany this text and believe that collaboration between those who can observe plants in the field with those who do monographic research is essential to advance our knowledge of complex tropical plant genera. In any case collaboration brings benefits to both sides in our common task of advancing our knowledge of the world's biodiversity.

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John R.I. Wood
Research Associate

Hunting Hairy Bittercress and other Carpathian *Cardamine*

Cardamine hirsuta is native to Europe, the Middle East, North Africa, and the East African High Mountains. However, few collections of *C. hirsuta* have previously been made in eastern Europe, so Spring 2011 found Elizabeth Cooke and Steven Heathcote tracking down the elusive *C. hirsuta* in the Romanian and Ukrainian Carpathian Mountains in an effort to rectify the geographic gap in sampling (see page 4). Since the Carpathians are known to have been a glacial refugia during the Pleistocene and are recognised as an area of endemism, there was every reason to be excited about looking for *Cardamine* in the Carpathians.

This account details some of the plants encountered on a two-week trip through the stunning Carpathian Mountains, starting in Bucharest and ending in Kiev. Travel was mainly by public transport, which in the Ukraine required mastery of the Cyrillic alphabet in order to find the correct bus or train for our intended destinations, adding to the traditional difficulties of negotiating the public transport system of a foreign country. Here in a backwater of rural life, abandoned Communist infrastructure and some of Europe's most spectacular scenery, we trekked through a wide variety of habitats to find plants to collect for sequencing in Oxford. We successfully collected 99 specimens, representing 12 species, which will be added to the Brassicaceae collection in OXF.

Cardamine hirsuta

Unable to target sampling effort due to a paucity of existing distribution data for *Cardamine hirsuta* in Romania and Ukraine we were compelled to travel widely and search in an extensive range of habitats; from disturbed ground and garden edges in towns and villages of varying sizes, to more attractive locations, such as montane meadows and paths. The search started in a small village on the edge of Bucharest, in familiar *C. hirsuta* habitats in western Europe; roadsides, field edges and wasteland. Although there was plenty of potentially suitable habitat, *C. hirsuta* appeared to be absent. Following a hunch that dampness was important for determining the distribution of *C. hirsuta* we decided to abandon the lowlands and head for the wetter Carpathian Mountains. Near the southern Carpathian town of Braşov, we wandered through forested mountains looking for *C. hirsuta* in woodland clearings, one of its known habitats in Romania. However, no *C. hirsuta* was forthcoming so we moved on to the beautiful Apuseni Mountains, cradled within the bend of the main Carpathian arm. Finally, by the side of a cart track, on the



Cardamine hirsuta in the Ukraine

outskirts of a remote village, we found our first *C. hirsuta* plant of the trip. Joyful celebrations ensued and thankfully there was no one else around to witness. Further up the same valley we struck gold again. Over the next couple of days we made many more collections across the Apuseni Mountains. It was really great to find *C. hirsuta* growing in 'natural' habitats, such as meadows and grassy stream banks, as opposed to the roadside setting of western Europe, though even in the Carpathians *C. hirsuta* was found on verges. Further success followed near Suceava on the outer eastern edge of the Carpathians, where *C. hirsuta* was found in similar rural habitats.

Our first find on the Ukrainian side of the border came after jumping off the local bus in the middle of nowhere, and following a newly surfaced road along a river valley. Here we found a small patch by the side of the road. Despite walking for a further eight hours, ascending and descending a mountain into another valley, we had no further success that day. Another find came on the outskirts of the town of Rakhiv, on the edge of a cobbled track that was winding its way up a hill past houses and fields. Extensive searches showed that although locally abundant in three patches within 50m of each other on a large soil mound and in disturbed ground, no further populations were found in or around the town.

Before going to the Carpathians we had thought that the paucity of occurrence records there reflected a lack of sampling effort but it seems that this is only partly the case. Intriguingly, seemingly suitable *C. hirsuta* habitat was observed in abundance yet *C. hirsuta* was only present occasionally. Thus, factors other than the availability of habitat must determine the abundance, and consequently, the geographic range of *C. hirsuta* in the Carpathians. A myriad of interrelated factors may be responsible for determining



Elizabeth Cooke collecting *C. hirsuta* on the mound (of unknown origin) on the outskirts of Yaremch

the range of a species from history to climate and while no doubt environmental factors, such as climate play an important part in influencing the abundance of *C. hirsuta* in the eastern edge of its range, we venture to suggest that the lack of human dispersal via the horticultural industry is an important factor. Somewhat surprisingly *C. hirsuta* does not appear to be a horticultural weed in the Carpathians; despite extensive searches of parks and gardens no *C. hirsuta* was found. The abundance of *C. hirsuta* in western Europe is very likely artificially inflated by garden escapes and thus the lower abundance of *C. hirsuta* in the Carpathians is partly because it is not a horticultural weed there.

Other *Cardamine*

Despite the local paucity of *C. hirsuta* we found plenty of other *Cardamine* species to keep us interested. Perhaps the most attractive, partly due to its picturesque habitat, was *C. glanduligera*, which we found growing in moist, open places in forests. *C. glanduligera* has leaves with three narrowly elliptic, toothed leaflets, and large (for *Cardamine* at least), delicate purple flowers. Another weedy *Cardamine* present in the Carpathians, *Cardamine flexuosa*, was frequently the cause of mis-



C. amara has purple stamens

identifications as *C. hirsuta* by Steven which required correcting by Elizabeth. *Cardamine amara*, a species of damp habitats, was often found on the sides of drains on the edges of town as well as rural streams. *C. amara* was easily identified by its purple stamens which stand out against its white petals. We were excited to find the appropriately named *C. bulbifera*, an uncommon species in the UK, which reproduces by bulbils in the leaf axils. Another species found was *C. impatiens*, similar to *C. hirsuta*, but larger with more toothed leaflets. Several other as yet unidentified *Cardamine* species and other Brassicaceae were also collected.



The appropriately named *C. bulbifera*

Other Carpathian Plants

Thankfully the Carpathians were not just filled with brassicas; we were treated to a fascinating range of plants and habitats.

Exploring the large areas of ancient beech and conifer forests was a great treat. There were also large areas of species-rich hay meadows, owing to the predominance of low-input agriculture. Having made the trip in late April, not long after the snow had melted at higher altitudes, we found many of the spring species in flower. A personal favourite of Steven was the dense patches of *Viola tricolor*, often interspersed with orchids, including *Anacamptis morio* (Green-winged Orchid) and *Orchis mascula* (Early-purple Orchid), *Gentiana acaulis* (Trumpet Gentian), and some interesting *Carex* species. Also eye-catching was a parasitic *Lathraea* growing at high altitude in the coniferous forest. Unfortunately we didn't have time to visit the famous fields of *Narcissus angustifolius*, a spectacle popular with both locals (who launched a campaign to save the fields from conversion to agriculture) and tourists.



Conifer forest in the Carpathians with an understory of newly expanded, bright green, beech leaves in spring.

Carpathian future

The future of nature in the Carpathians in Romania and Ukraine would appear to be secure, with large areas, including unique habitats protected by National Parks as well as a designated UNESCO World Heritage site. This area is one of the strongholds of many large mammals in Europe and the largest virgin beech forest in Europe. We were lucky enough to visit the headquarters of the Carpathian biosphere reserve in Rakhiv, where there is a museum which attempts to educate and inform people of the value of this UNESCO World Heritage area. However, the Ukrainian Carpathians are an increasingly popular ski destination and so we witnessed a lot of development, with large, luxury hotels and houses being constructed along quiet side-roads in attractive countryside. While the influx of money and infrastructure improvements will hopefully improve the locals' quality of life, the areas remote, timeless feeling will no doubt slowly be eroded. Despite this, the area remains one of outstanding beauty and a fantastic place for botanists to visit.

Steven Heathcote, Postdoc.
& **Elizabeth Cooke**, D.Phil. student

Following Linnaeus's journey through Öland, via southern Sweden

With wonderful memories of the Linnean Society expedition to the Baltic island of Gotland four years previously, Serena Marner and I flew to Copenhagen in May 2011. We took a train across the Öresund Bridge from Denmark to Sweden and up to Älmhult where we joined our fellow enthusiasts on an expedition to the sister island of Öland. Again, our guides were Professors Roland Moberg, Bengt Jonsell and Eva Willen from Uppsala and the object was to visit localities recorded by Carl Linnaeus during his 1741 journey. Again, as on Gotland, we had days of perfect weather (Wise, 2008).

Linnaeus had attended the school in Växjö, in southern Sweden, where he had studied Latin, Greek, rhetoric, theology and maths. Here we were shown his notebook, full of jottings on various topics including his school timetable, natural history observations and a story of a maid who had mistaken Henbane for Horseradish and poisoned the family for whom she worked! One section was written in ink that he had made from *Sambucca* which still retains its green colour. Linnaeus had a theory that he could ascertain which girls were virgins by getting them to smell the flowers of *Malva crispa* and whether they fainted or not, which leads one not to be too surprised to find that his final exam marks showed him to be eleventh out of sixteen pupils! The final destination on this first full day was the city of Kalmar on the Baltic shore and our base for the rest of the trip.

The following day we travelled over the mirror-smooth Baltic to Öland via the 6072 metre long bridge. The geology here differs from Gotland with the limestone being far older, more similar to that of Estonia. We visited the plant and mosquito-rich woodland and the meadow area around the ruins at Ismanstorpborg. In the woods we saw Herb Paris, *Paris quadrifolia*; Wild Pansy, *Viola mirabilis*; Dogwood, *Cornus sanguinea*; Dog's Mercury *Mercurialis perennis*; Wood Anemone, *Anemone nemorosa*, and many other species while the orchids, (predominantly Military, *Ophrys militaris*; Fly, *Ophrys insectifera* and Burnt Tip, *Orchis ustulata*), were prolific and at their best in the open landscape. The "borg" was probably built about 400 B.C. and is thought to be a communal area where local people could shelter from Viking raiders. Very little excavating has taken place here and no artefacts found.

The quarrying of Öland limestone began in the twelfth century and many of the fine churches date from this time. Slabs were originally polished by laying a perfectly level circle of limestone, a centrally-tethered animal then trudged round towing the fresh



Karoliner House in Växjö where Linnaeus went to school from 1716 to 1727.
Photo: Serena Marner

slab which was polished by the grinding action. This method was in use until 1851 when the first windmills were constructed and wind power took over. Some stone from here was taken (probably illegally) to London and used in the construction of St. Paul's Cathedral. At one quarry, blocks of limestone full of 500,000 year old fossilised shells of *Orthoceratites*, octopus-like creatures, caused quite a stir and a lot of photography.

The mosquitoes attacked us again with great gusto in the sand dune area at Byrum. (Linnaeus wrote that they too were plagued with mosquitoes the whole night as if they had been in Lapland). Outside the oldest medieval church on Öland at Gärdslösa we heard the Nightingale Thrush, *Luscinia megarhynchos*, singing.

The third day started with a visit to the Ecological Research Station Linné, an insight into their projects and a lecture on pheromones and the pollination of *Ophrys insectifera*. This centre, just south of Skogsby, can be called the Gateway to Stora Alvar, the largest area of limestone pavement on the island. (The Alvars are characterised by a layer of very thin soil on top of the limestone bedrock, fluctuating water supplies and extremes of climate. This combination has led to a unique flora.) Stora Alvar, or the Great Alvar, covers 26,000 hectares and is the largest such area in the world. Different plant communities colonise exposed bedrock and soil-covered habitats, where it is said that up to 42 species can be recorded from a square metre.

At first glance, the flat expanse of the Alvar looked rather bleak and uninteresting but flowers of every colour were soon seen. The feathery fruiting heads of the Pasque flower, *Pulsatilla vulgaris* were swaying in the breeze – it must have been a stunning vista a month or so before our visit when the Alvar would have taken on a purple hue. We saw a few endemics; the brilliant sunshine-yellow Öland Rock Rose, *Helianthemum oelandicum*; Alvar Worm-

wood, *Artemesia oelandica* and even the Chive, *Allium schoenoprasum* var. *alvarense*, growing in swathes of mauve, is a speciality, found only on Öland and Gotland.

Our guest speaker, Professor Eje Rosen, picked several plants to show us and as soon as he discarded them, I quietly retrieved them and carefully put them in a polythene bag to paint in the early hours of the morning. As on Gotland four years before, we had perfect weather and the light was ideal for painting at 4.00 a.m.! This day we saw too many plants to list here but I noted the beautiful blue Common Globularia, *Globularia vulgaris* which is widespread in Andalusia; Spring Cinquefoil, *Potentilla tabernaemontana*; *Erodium caryophylla*; *Bromus vacellus*; Ladies Bedstraw, *Galium verum*; *Alopecurus pratensis*; Bulbous Buttercup, *Ranunculus bulbosus*; Herb Robert, *Geranium robertianum*; Dropwort, *Filipendula vulgaris*; Wild Pansy, *Viola tricolor*; White Stonecrop, *Sedum album*; Wild Strawberry, *Fragaria vesca*; *Carex flacca*; Elder-flowered Orchid, *Dactylorhiza sambucina*, and the antler-like lichen *Thamnolia vermicularis*. A Little Plantain, *Plantago tenuiflora*, which originates from the steppes of Russia, was also seen. The grazing and trampling of sheep and cows are essential to maintain the balance of this unique vegetation, otherwise tall grasses and shrubs would soon take over.

The highlight of the next day was a visit to the Ottenby Royal Demesne, a 1200 hectare area of mainly nature reserve on the southernmost tip of the island, originally the hunting park of King Charles X Gustav. In 1653 he had a 5 kilometre wall built across the island which separated the demesne from the southern part of the Great Alvar and which retained the native deer. Linnaeus recorded that this wall was as high as a man on horseback and more than an ell broad. We visited the bird sanctuary where migratory birds are mist-netted and ringed daily. Our guide, a young and very



This house at Råshult is a reconstruction of the house where Linnaeus was born, complete with grass covered roof, as the original house burnt down in 1740. Photo: Serena Mamer

enthusiastic ornithologist, showed us a tiny White Throat which had just arrived from the Sahara. By the degradation of the wing feathers he could tell that it was a two year old bird and very undernourished after the long flight. The home of the leaseholder at Ottenby is a very imposing residence but almost more so is the cow shed - we had never seen anything so grand outside as a farm building and so enormous and almost cathedral-like inside.

Our final day, always sad! From Kalmar, on mainland Sweden, we had a long coach journey inland to Stenbrohult, where Linnaeus's father had been pastor. Although the church had been rebuilt since his father's time, several artefacts had survived and were installed in the new building. Linnaeus wrote of his time living there, "This garden, which my father planted had more kinds of herbs than any garden in Småland had had, and this garden has inflamed my senses with an unquenchable love of herbs". The statue of Carl, looking towards the church, had troughs of the flower that was named for him, the Twinflower, *Linnaea borealis*, at his feet. The guide presented the party with one of the troughs and gave rather complicated instructions on how to propagate this little plant and I am thrilled to say the few tiny pieces I took are flourishing!

At Råshult, the birthplace of Linnaeus, we had a splendid buffet lunch with dishes made from the herbs and vegetables grown in the garden and locally sourced cold meats. The temperature was 30°C and after a long walk round the meadow area, it was refreshingly cool inside the house. (The original building has been replaced with one typical of the time.) Before we left we were treated to a culinary speciality of the area which was translated as cheese cake. I asked the guide "How is it made?" He had cooked it himself and said "First you must take 5 litres of milk..." This was then

separated with rennet, the curds cut up and mixed with sugar, almonds, bitter almonds and "many eggs" and baked in a bain-marie. Some liked it, others weren't too sure.

Back to the Ikea hotel again in nearby Älmshult, a formal farewell dinner and goodbye to our wonderful guides who were driving back overnight to Uppsala and a departure for the rest of the group the following morning.



Statue of Linnaeus outside the church at Stenbrohult. Drawn by Rosemary Wise.

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Rosemary Wise
Botanical Artist

Historic herbaria – going on-line

Within the Oxford herbaria the working definition of an old specimen is anything collected before 1796. This date marks the death of John Sibthorp, third Sherardian Professor of Botany, and a hiatus in the acquisition of material for the collection. The hiatus came to an end in 1851 with the donation of Henry Borron Fielding's vast herbarium to the University.

The historic herbaria in Oxford are those of Gregorio da Reggio (c. 300 specimens), Bobart the Younger (1641-1719; 2,202 specimens), Bobart the Elder (1599?-1680; 2,584 specimens), John Wynne (1665?-1743; c. 2,000 specimens), Robert Morison (1620-1683; c. 6,500 specimens), William Sherard (1659-1728; c. 21,000 specimens), Charles du Bois (1656-1740; c. 13,000 specimens), Jacob Dillenius (1684-1747; c. 4,000 specimens) and John Sibthorp (1758-1796; 2,976 specimens). The vast majority of specimens are pre-Linnean, and remain identified only with their pre-Linnean polynomials.

The Gregorio da Reggio herbarium (dated 1606) comprises some 300 specimens collected in northern Italy and has been described elsewhere (Mamer, 2006). Bobart the Younger's *Hortus Siccus* comprises 2,202 specimens arranged on individual sheets according to Morison's *Sciagraphia*. The contents of this collection have been briefly described by Harris (2006). The date of this collection is unknown; Vines and Druce (1914), based on circumstantial evidence, suggest that the collection may have been made around 1666.

Bobart the Elder's herbarium is a single, leather-bound, elephant-folio, book herbarium of 2,584 specimens glued and/or strapped to 297 pages. The specimens are arranged alphabetically by polynomial name. The specimens are labelled or annotated by at least three primary hands, of which one is Bobart the Elder and another Bobart the Younger. The herbarium is extensively annotated and name changes have been made; at least one of the specimens is labelled by John Ray. This collection was unknown to previous commentators on the Oxford herbaria since it only came into the possession of University in the early 1950s (Savage, 1948). On the pastedown of the inside back cover is a note stating 'Octob: 6: 1687 the number of Plants in this was 2577'.

Bishop Wynne's herbarium is a single, leather-bound, elephant folio, book herbarium of some 2,000 specimens glued and/or strapped to about 280 pages. The volume is identically bound to that of Bobart the Elder, and the specimens arranged alphabetically by polynomial name. The title page of the volume states 'Hortus Siccus Plantarum & Arboreu[m]. Tam Anglicarum quam exoticarum Ichoatus

Deo favente Oxonii Vto. Martii. MDCLXXXVI', above an engraving of the Sheldonian Theatre. In addition, there are hand-coloured engravings of birds and garden flowers taken from Dutch sources. A single hand appears to have labelled most of the specimens, although Bobart the Younger has labelled many of the specimens and annotated others. Ray's hand appears in the herbarium. The University acquired this collection in June 1976 by private sale.

Despite its name, the Morisonian Herbarium was put together by Jacob Bobart the Younger to support Part III of Morison's *Historia* (which Bobart the Younger completed in 1699) and is arranged according to Morison's *Sciagraphia*. The collection comprises some 6,500 specimens arranged on single sheets. This collection has been documented in detail by Vines and Druce (1914).

The Sherard herbarium comprises the collection of William Sherard, and the general collections of the Department of Botany made before 1796. Disentangling the different collections is made more complex by the rearrangements undertaken by Dillenius in the mid-1700s and George Druce in the late-1800s. The collection comprises some 21,000 specimens made from around the world. Generally locality information is limited and collector information must be inferred from the identification of handwriting. The majority of the specimens are only labelled with polynomials. Many pre-Linnean collectors are represented among Sherard's collection. Clokie (1964) provides a summary of the contents of this collection.



Sheet of *Dryas octopetala* from the Sherard herbarium. Specimen collected by Edward Lhuys (1660-1709).

Charles Du Bois was a London merchant and friend of many early eighteenth century

botanists. During the period covered by his herbarium (c. 1697-1724), Du Bois was Treasurer of the East India Company. The Du Bois Herbarium, with its c. 13,000 specimens, was originally bound into books but these were split up by Druce in the late 1800s on the orders of the then Professor of Botany. The current arrangement of the collection reflects the geographic groupings used by Druce. Sherard and Du Bois exchanged many specimens, hence there is likely to be overlap between the two collections. Generally, the herbarium of Du Bois has been less well studied than that of Sherard. Clokie (1964) provides a summary of the contents of this collection.

The Dillenian herbarium comprises three elements: (i) the *Synopsis* herbarium, collected by Dillenius after the publication of the third edition of Ray's *Synopsis Methodica Stirpium Britannicarum*; (ii) *Hortus Elthamensis* herbarium; and (iii) *Historia Muscorum* herbarium. The *Synopsis* Herbarium includes the collections made by Dillenius, Samuel Brewer and Littleton Brown to Wales in 1726. The *Hortus Elthamensis* and *Historia Muscorum* herbaria are associated with Dillenius's *Hortus Elthamensis* (1732) and *Historia Muscorum* (1741), respectively. This collection has been documented in detail by Druce and Vines (1907).

There are three parts to Sibthorp's herbarium: (i) specimens associated with the Sibthorp and Smith's *Flora Graeca* (1806-40) and *Prodromus* (1806-16); (ii) miscellaneous specimens; and (iii) specimens associated with Sibthorp's *Flora Oxoniensis* (1794). There are 2,462 specimens labelled as associated with the *Flora Graeca* and these are arranged according to the *Prodromus*. These specimens often have labels in James Edward Smith's hand; none of the specimens are labelled in Sibthorp's hand. This part of the Herbarium includes the specimens purchased by Sibthorp from an apothecary in Zacynthos in 1794. See Lack (1997) for a guide to the use of this part of the Herbarium. There are 444 miscellaneous specimens covering all groups from fungi and lichens through marine algae to angiosperms. The vast majority of the specimens are from Greece, although a significant number of the specimens are labelled as being from Dacia. Many of the lichen specimens are labelled in Sibthorp's own hand and appear to be mounted in the original collecting packets; none of the other specimens are labelled in Sibthorp's hand. The final part of the herbarium comprises 70 specimens (many lichens) associated with Sibthorp's *Flora Oxoniensis*.

Specimens in the historic collections are rarely sent on loan, so researchers must visit Oxford. Such policies have frustrated some researchers, who argue that access is limited and research curtailed. The desire to enhance the research value of these collections has been the driver for making images of all of the specimens in the historic

collections available on-line. Two widely-consulted herbaria are available on-line: Dillenius's herbarium associated with the *Historia Muscorum*

(<http://herbaria.plants.ox.ac.uk/bol/historiamuscorum>); Sibthorp's herbarium, including that associated with the *Flora Graeca* (<http://herbaria.plants.ox.ac.uk/bol/sibthorpherbarium>). Jacob Bobart the Younger's herbarium (*Hortus Siccus*) is also available (<http://herbaria.plants.ox.ac.uk/bol/bobart>).

The next collection to go on-line will be the Sherard herbarium. It is hoped that over the next few years all of the pre-1796 collections will be available on-line for researchers.

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Stephen A. Harris
Druce Curator of Oxford University
Herbaria

News from the Herbaria

Fielding-Druce (OXF)

During 2011 we welcomed an abundance of visitors! Having the Sherardian Librarian now within the Fielding-Druce Herbarium has been invaluable for dealing with visitors who need to consult herbarium specimens together with associated books, particularly when groups and researchers want to view different historical collections. 185 visitors

approximately came to view specific collections within the herbaria and these included visits by eight groups. There were four general tours of the herbaria, one for curatorial staff from the Natural History Museum in London, one for a group who signed up for an Oxford Botanic Garden Education course, another group of Botany Alumni from the University, and members of the Horspath Garden Club. A group from the Oxford Conservation Consortium came to see a display from the *Flora Graeca* holdings from our Special Collections and Alumni from St Edmond Hall, Oxford, came to see the collections of Robert Morison and Johann Jacob Dillenius. Another group came with Professor Sue Johnson from Maryland University studying 'The History of the Book' and they viewed some of the collections made by Robert Morison and Mark Catesby amongst a selection of other material. A display of books and specimens used for a Bodleian Library publication *Planting Paradise: Cultivating the garden (1501-1900)* written by Stephen Harris and published in March 2011, was shown to members of the Bobart Group from the Oxford Botanic Garden plus a number of staff from the Radcliffe Science Library.

Many individuals also visited the herbaria to study specific genera or to look for plants from particular regions. Paul Harmes and Jessica Turner made regular visits searching through the Druce Herbarium for plants collected in East and West Sussex gathering records for a proposed new Flora. Their listings of the Druce Herbarium material from Sussex are helping us to identify and database these collections. Other visitors came from various parts of the UK and some from as far afield as Bulgaria, Barbados, Brazil and South Africa.

The Royal Society at Carlton House Terrace London borrowed a specimen of *Cochlearia officinalis* (Brassicaceae) for their exhibition entitled *Frederick Gowland Hopkins and the Chemistry of Life* which ran from 14 December 2010 to 31 May 2011. In September, a temporary exhibition was launched at the Bodleian Library which included two items from the historical collections in the herbarium. One of the items was the Gregorio da Reggio Book Herbarium, the earliest collection of specimens held in OXF. The second item was a specimen from the *Flora Graeca* collection of *Mandragora* (Solanaceae) which was shown with Ferdinand Bauer's original painting of the plant (in a bound book). The exhibition was entitled "Treasures of the Bodleian" and ran from 30 September to 23 December 2011.

Accessions to OXF during 2011 included a collection of beautifully pressed duplicates of vascular plants of the Flora of Oregon, USA sent from Oregon State University, plus an isotype specimen of *Convolvulus carrii* sent from the Lundell Herbarium at the University of Texas. We also received a small box containing about 90 mounted and

named specimens labelled 'Flora Helvetica' collected around the early 20th century which was donated from Somerville College Oxford. 103 miscellaneous British plants collected by John Killick (co-author of the *Flora of Oxfordshire*) were databased and incorporated, this accession including 3 new vice county records. A small box containing approximately 100 pathological specimens, on which there is reference to the Oxford Botanic Garden, possibly being William Baxter's duplicates, were sent from Reading University Herbarium.

During 2011 an almost equal number of specimens were sent out on loan from OXF as were specimens returned from loan during the same period. The number of sheets digitally photographed and sent in the form of electronic loans via the website exceeded sheets sent by post for the first time. Most of the electronic loans were small and included very specific specimens (many types), but there were some larger loans comprising all of the OXF (and FHO) holdings of *Hermannia* (Sterculiaceae) and all of the South American Lauraceae material. This has the advantage of the material being databased at the same time and any re-determinations sent back by email can be attached to the specimens quickly and the database updated.

Daubeny (FHO)

Since the transfer and return of several thousand specimens of *Lupinus* (Leguminosae) in 2010 which were on loan to FHO for study by Colin Hughes, the boxes and shelving on which they were held has been removed and much needed bench space in FHO liberated. This space has now been turned into another 'work station' and has been used by Caroline Pannell for much of the time. Over the past year, FHO has been a hub of activity in the sorting and naming of collections made in West Africa (especially from Liberia and Sierra Leone) during Rapid Botanic Surveys (RBS) by William Hawthorne and Cicely Marshall. Every inch of space available has been utilized for this work as the collections made during RBS are extensive (see article on page 6). After naming the specimens, material will be sorted into specimens that provide interesting or new records for various regions and those will be retained in the FHO collections. This will enhance the wealth of African material already held in FHO which was the focus of research of former Foresters and Curators. All the specimens from the RBS are being digitally photographed.

Other activities in FHO centered on processing loan material, specimens received on loan for research staff and students and the return of other material to various herbaria on which work had been completed. A further 445 specimens of *Cardamine* (Brassicaceae) were received on loan for study by Elizabeth Cooke. The material requested was very specific to a

number of regions of the world where very few or no specimens had been seen previously, and for some of them permission for DNA extraction was sought. Several smaller loans of specimens of *Convolvulus* (Convolvulaceae) were also received for study by John Wood. Loans received in previous years of *Desmodium* (Fabaceae), *Aglaia* (Meliaceae), *Cedrela* (Meliaceae), *Bretschneidera* (Akaniaceae), *Jacquemontia* (Convolvulaceae) and *Ruellia* (Acanthaceae) were returned to lending institutions. A box of unmounted duplicates of specimens of *Mimosa* (Fabaceae) collected by Marcelo Simon was sent as a gift to CEN, Brazil.

Accessions to FHO during 2011 included specimens of *Amicia* (Fabaceae) collected by Tiina Sarkinen in Peru and Bolivia, Mimosoid legumes collected by Marcelo Simon in Brazil for the *Flora do Distrito Federal* plus miscellaneous species collected in the Putu Hills in Liberia by William Hawthorne with his team of collectors. A student, Katie Anders, came to work in the vacations to help with mounting new specimens and did a very able job with some challenging specimens.

In April 2011 we were very saddened to hear of the death of one of our old collaborators J.D. Chapman. Jim Chapman had been a Forest Officer based in Nigeria and in Malawi for many years and collected extensively specimens of trees, shrubs and lianas from these countries. FHO holds a large number of his collections and these were invaluable to research on the *Evergreen Forest Flora of Malawi* carried out by the former Curator of the Herbaria, Dr Frank White (1927-1994), also in collaboration with Dr Françoise Dowsett-Lemaire. Without Jim's extensive knowledge of the forests in Malawi and work based on his collections, the book would not have come to fruition (see *Oxford Plant Systematics* 9: 12(2002)). The Chapman collections also made possible work on compiling a *Checklist of the Spermatophytes of Mount Mulanje, Malawi* published in 2006 by Alison Strugnell, our colleague in FHO, now retired. On a personal note, Frank White arranged for me to stay with Jim and his wife Betty in Malawi in 1986, while they were based at the foothills of Mount Mulanje, when I was to carry out fieldwork on the genus *Faurea* (Proteaceae). This was a wonderful time! Jim and Betty took me on an expedition up Mount Mulanje and Jim showed me many *Faurea* trees comprising four different species. He seemed to know each tree individually and was so enthusiastic about everything, especially about conserving the whole mountain ecosystem. I shall never forget the kindness and help shown me. Jim Chapman is very much missed by everyone who knew him here.

Serena Marner
Herbarium Manager

The archive of George Claridge Druce

George Claridge Druce (1850-1932) was an influential botanist with strong links to Oxford's Department of Botany. He was an energetic and successful man, always involved in an assortment of activities, though known for being opinionated and hasty (Allen, 1994).

Born and raised in Northamptonshire, he showed a keen interest in botany from a young age. He was apprenticed to a firm of retail chemists in Northampton at the age of 16 and by the age of 22 was fully qualified, having excelled in his pharmaceutical exams, and was acting manager of the chemist's shop (Perring, 1995). Then in 1879 he moved to Oxford, leaving Northamptonshire behind to open his own chemist's shop on Oxford High Street. The business was very successful and by 1905 he was able to retire to concentrate on his other activities.

Soon after moving to Oxford he began working on organising the university's various early herbaria and he held the position of Fielding Curator of the herbarium from 1895 until his death. He published books on the Dillenian and Morisonian herbarium collections and Floras of Oxfordshire, Berkshire, Buckinghamshire and Northamptonshire. In 1878 he joined the Botanical Exchange Club, now the Botanical Society of the British Isles, and from 1904 was its Secretary. His house in Oxford became the closest thing the Club had to a headquarters and he was responsible for changing the Club into a national botanical society and considerably increasing its membership (Perring, 1995). He helped to found the Northamptonshire Natural History Society in 1876 and the Ashmolean Natural History Society of Oxfordshire in 1880, was on the council of the Pharmaceutical Society, President of the British Pharmaceutical Conference in 1901-1902 and was a freemason. He also served on Oxford City Council from 1892 until his death, where he was Chairman of the Public Health Committee for thirty years, Mayor of Oxford in 1900-1901 and made an Alderman in 1920.

Upon his death Druce left all his personal papers, along with his house, herbarium, library and a considerable sum of money, to Oxford University (Allen, 2004). This collection of papers forms the Druce archive now housed in the Sherardian Library of Plant Taxonomy. Druce squirreled away a huge amount of paperwork and there are around 150 boxes in the archive! A project is currently underway in the Sherardian Library to catalogue the contents of this archive. Previously there was no record of the contents of the archive and its existence was not widely known. The result of this project will be a searchable spreadsheet of



A box from the Druce archive.

the contents of the archive and an improvement in its storage conditions. We will also be able to assess whether any material requires conservation. Once the project is completed the spreadsheet will be made publicly available.

To improve the storage conditions, the archive has been re-boxed into acid-free archival quality boxes, old wrappings and envelopes are removed from bundles of items and put into acid free envelopes, items are tied into bundles using unbleached cotton tape and rusting paperclips are removed where possible. Each bundle of material is numbered and details about the contents of each bundle are entered into an Excel spreadsheet. Particularly interesting items, such as portrait photographs and book manuscripts, are put into a folder rather than tied into a bundle and are recorded separately. The spreadsheet records box number, bundle number, item number, dates (if known), a brief description of the contents and the types of material contained. Where the majority of items in a bundle are correspondence from or writings about one person or where the subject of a photograph is known their name is also included. There is also space for a general note, for example if the material is not in English, and a conservation note for material which may require further attention, such as botanical specimens and deteriorating photographs.

The majority of the material is correspondence, but the archive also includes photographs, glass slides, maps, newspaper clippings, diaries, botanical specimens, botanical lists, book manuscripts, invitations, menus, reports, tickets and receipts. Personal correspondence and correspondence relating to the Botanical

Exchange Club feature heavily. There are ephemera relating to various Oxford University Societies, Oxford County Council, the Pharmaceutical Society, Freemasons, the Northamptonshire Natural History Society and the Midland Union of Natural History Societies. Most material relates to Druce's life in Oxford, but some comes from further afield. For example, one box contains correspondence, photographs, maps, menus, leaflets, advertisements, newspaper clippings and the program of events relating to a visit Druce made to Czechoslovakia in 1920 as part of a deputation of British Press representatives. This project is uncovering some fascinating items, which will hopefully be of use to researchers not just of Druce's life, but also of organisations he was associated with, people he was in correspondence with and life in Oxford during the late 1800s and early 1900s.

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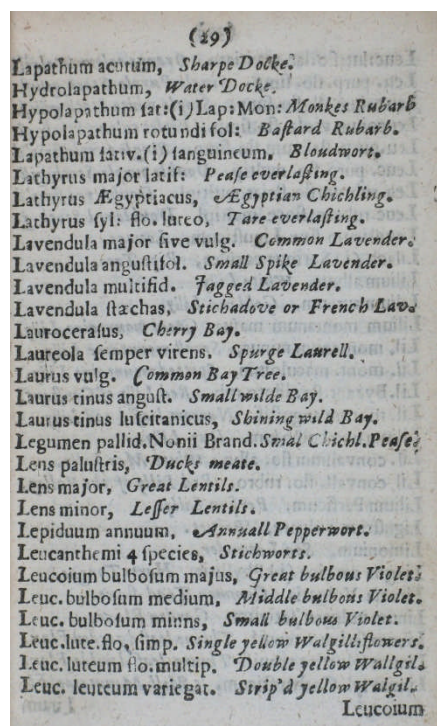
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- Elizabeth Atkinson**
Graduate Library Trainee

Managing living collections at the Oxford Botanic Garden



As with other botanic gardens and arboreta, the Oxford Botanic Garden together with the related Harcourt Arboretum (OBGHA) maintains detailed records about all its plants. These records are kept up to date and are easily accessible to those looking after the collection.

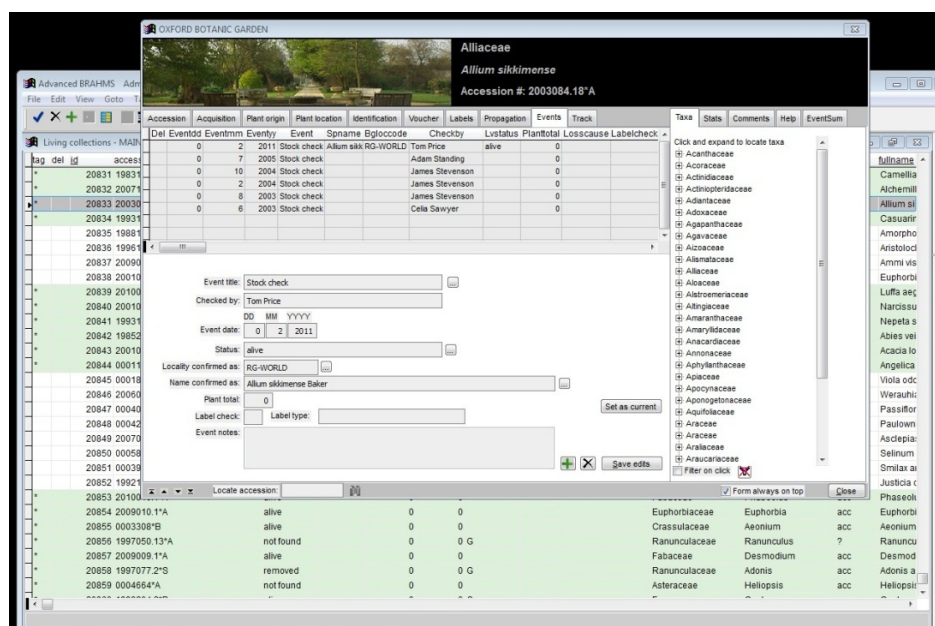
The Botanic Garden at Oxford has kept records in some form or another since it began, including a catalogue listing all plants at the Garden, published in 1648.



A sample page from Bobart the Elder's *Catalogus Plantarum* published in 1648.

As computers became common in the workplace, the record keeping system moved to an electronic format. The first such system, in 1986, used a simple database filing system. In the mid-1990s, the records were moved to another system called BGBase. This software was developed at the Royal Botanic Gardens, Edinburgh and is widely used.

Over the past few years, as the Botanic Garden has worked ever more closely with



Living collection records can be edited in spreadsheet mode or using the tabbed form as shown here.

This example shows the Events tab which tracks stock-checks, species name and location changes and other editing updates. The right-side tree view can be used to navigate to and filter on a selected family, genus or species.

the Oxford University Herbaria (FHO and OXF), it seemed sensible to investigate whether the Oxford Botanic Garden and the Oxford Herbaria could use compatible data management systems, allowing closer integration of herbarium and botanic garden data; a key part of our future strategy. Given that Denis Filer had been working with Gerda van Uffelen at the Leiden Botanic Garden to develop a new Living Collections module for BRAHMS, it seemed a natural choice to make the move to BRAHMS to facilitate this integration.

In early 2011 we began the project to transfer the data from BGBase to the BRAHMS Living Collections module and by mid-2011, BRAHMS was up and running at the Botanic Garden. Since then, we have been actively using and developing the module, suggesting new functions as we go. In February 2012, we starting using BRAHMS as a multi-user system running over terminal services and I'm pleased to say we can now access the database from different locations using Mac and PC workstations.

In addition to being able to work closely with the herbarium there are several other advantages that compelled us to make the change. Data searching is straightforward and powerful and all members of staff can easily interrogate the database to find out what they need to know. For example, we can easily interrogate our records to generate lists and statistics on how many different species and accessions we have in any taxonomic group. A typical query would be to list how many different species and accessions we have of *Euphorbia*. We can also filter search results using multiple

parameters, for example 'last stock-check date' or 'growing in Family Bed SWC-5'.

Whilst these queries may seem trivial, they are a powerful source of data and statistics that enable us to analyse our collections and further develop their diversity and breadth of utility.

BRAHMS also allows us to record considerable additional data about the plants in our collection, for example, images, flowering times, propagation events and species texts. We can format these and other data into labels, stock-check lists, seed lists, species reports for garden visitors, students and schools, or export the data to Excel, word processors or elsewhere to create more elaborate outputs.

It is not often that you can honestly say that a group of people get excited about a new work-related computer programme! But BRAHMS has genuinely generated that feeling amongst the staff at OBGHA. They feel empowered to look up the plant records and to update the database on a daily basis. The more data and the better data we add to the database the more we will be able to use its various tools.

The use of BRAHMS is really only just beginning at OBGHA. There are plans now to map the collections at Harcourt Arboretum, to add a comprehensive set of images of the flowering plants along with phenology details and to publish these data via BRAHMS online, providing useful data to all of those interested in our collections both within and beyond the scientific community.

<http://herbaria.plants.ox.ac.uk/bol/>

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