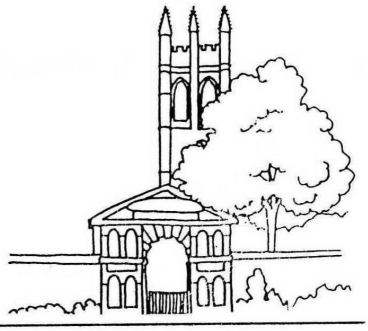
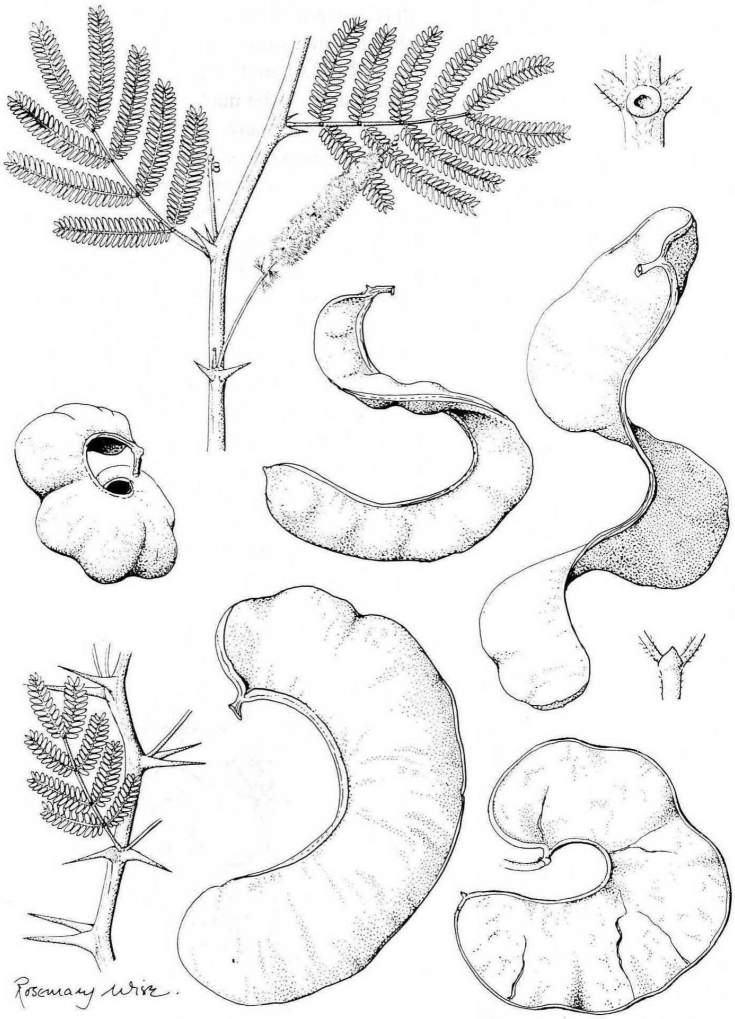
Oxford Plant Systematics



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

OPS 2 December 1994



Faidherbia albida (Del.) A. Chev. is a large, leguminous tree used in farming systems throughout the dry zones of Africa. It sheds its leaves in the rainy season, favouring crop production beneath its canopy and reducing the need for a fallow period on poorer soils. Formerly known as *Acacia albida* Del., recent molecular evidence places this monospecific genus in the tribe *Ingeae*. Variation and forestry potential of this and several African *Acacia* species are the subject of a collaborative research programme in this Department being undertaken by the Forest Genetics Group. Isozyme studies conducted in the new molecular systematics laboratory have revealed the Horn of Africa to be a key area of diversity of this species. Pod morphology is the most variable character, as illustrated here from different trees in a single population.

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Review

The past year has been an active one for Plant Systematics at Oxford, well illustrated by the different activities reported in this newsletter. The broad range of interests and the number of collaborative research projects now underway reflects the importance of systematics in the Department.

Considerable thought has been given to the development of a longer term strategy for the Oxford University Herbaria, and their relation to systematics research within Plant Sciences. The herbaria have attained provisional registration as a museum with the Museums and Galleries Commission, hopefully to be made permanent, further stabilizing and securing their future. The rearrangement of the Druce Herbarium according to D.H. Kent's *List of Vascular Plants of the British Isles* has been a major undertaking. The library has completed the transfer of all pre-1850 taxonomic books to basement storage, paving the way for improved, central herbarium access to Floras and Monographs. These and other activities documented in the newsletter have strengthened the herbaria, helping to prepare a robust infrastructure for the future.

The new Church Laboratory was officially opened on 2 December 1994. As well as creating badly needed work space, the laboratory has already brought together research students and longer term visitors working in systematics, creating a fertile focus of research activity directly adjacent to the Daubeny Herbarium.

A notable trend this year has been the closer integration of the largely ODA-funded Forest Genetics Group with the systematics research community as a whole, the highly applied work being undertaken by the former benefiting from the new laboratories and herbarium facilities, *vice versa*. The potential for wider Departmental collaboration remains high.

The new molecular systematics and population genetics laboratory, opened at the end of last year, has developed rapidly, providing excellent backup facilities to many research projects in the Department as well as offering training facilities for students and visiting scientists.

Sadly, we have lost a revered colleague. Frank White Sc.D., born in 1927, appointed University Demonstrator in 1948, Curator of the Forest Herbarium in 1961 and the Fielding-Deuce in 1971, appointed Distinguished Research Curator in 1992, died on 12 September 1994.

Denis Filer, Editor

News items

University Lecturer in Plant Systematics and Biodiversity

Applications are invited from plant scientists with a proven record of modern systematics teaching and research for the above post tenable from 1 October 1995. The post carries responsibility for teaching in the general areas of systematics, morphology and evolution, in addition to biodiversity issues such as conservation. Knowledge of the European flora would be an advantage as the successful candidate would be expected to contribute to organizing and leading field courses. The successful candidate would have a key role in co-ordinating Oxford's research efforts in plant systematics and biodiversity.

Further particulars may be obtained from Professor C.J. Leaver at this Department.

Staff

David Mabberley was elected Professor Extraordinary in the University of Leiden from 1 January 1994.

David Harris received three years funding from the Leverhulme trust to investigate the distribution of plant knowledge of the Aka in the Central African Republic. He has been working with Aka since 1987 and has been impressed by their detailed knowledge of the forest. David now plans to investigate botanical knowledge in other members of Aka society and examine how it is transmitted. His aim is to suggest ways in which they can benefit from this knowledge and to ensure it is not lost.

Mark Large (Royal Society Endeavour Fellow) left in the summer to take up a lectureship at the University of Massey in Palmerston North, New Zealand. Mark keeps us up to date with letters and Email messages. We were sorry to see Mark depart for the southern hemisphere and wish him all the best in his new position.

Quentin Cronk (Departmental Lecturer and Acting Curator of the Herbaria from 1 April 1994) is leaving to take up a position as Lecturer in Vascular Plant Systematics at the RBG, Edinburgh and the Institute of Cell and Molecular Biology, University of Edinburgh. Quentin will be greatly missed and we hope he will visit regularly.

Rare Plant Group

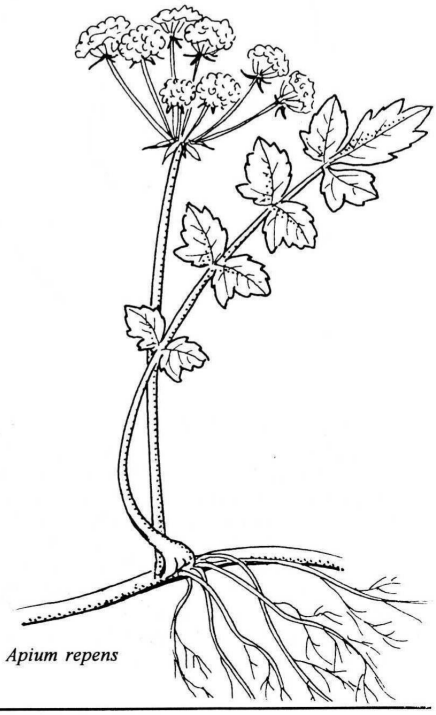
This Group was set up in January 1994 to monitor the populations of endangered plants in the Oxford area, and if possible to prevent the extinction of their genotypes. Only if we can maintain biodiversity on a local scale, can there be hope for the global situation.

Data from herbarium specimens is being used to trace rates and possible causes of species decline, and to locate sites where the seed bank may still be viable even if the plant has gone. Priority is being given to species which are widely threatened, for instance *Apium repens*, which has its only UK station at Oxford, and is also endangered in Europe. A contract from English Nature, awarded to Quentin Cronk, for a molecular investigation of this population using RAPD analysis, has allowed a detailed study to be made. The results have already solved many long-standing problems surrounding this species in Britain.

Where populations are very small, or the site unstable, seed is being taken by the Oxford Botanic Garden for bulking up and possible re-introduction. Re-introductions to demonstration sites will be made so that genetic recombination between the currently isolated genotypes can occur. This may be essential for long term viability for the taxa.

The Rare Plant Group (address the Plant Sciences Department) is a branch of the Ashmolean Natural History Society of Oxfordshire which was established in 1828. Volunteers in the group are working closely with the appropriate statutory, voluntary and professional bodies.

Camilla Huxley-Lambrick



Apium repens

The molecular systematics laboratory

The molecular systematics/forest population genetics laboratory in the Department has been functional since the start of the year. The upgrading of the laboratory benefited from a grant from the E.P. Abrahams Research Fund and facilities are now available for isozyme analyses, restriction fragment length polymorphism analyses (RFLP), polymerase chain reaction (PCR)-based analyses and immunological analyses. In addition, a recent Royal Society Research Grant has allowed DNA sequencing equipment to be purchased for the study of the nuclear ribosomal DNA internal transcribed spacer in *Leucaena* (Leguminosae).

Initially five staff members, two D.Phil. and three other students are currently using the laboratory to investigate a variety of systematic and population genetics problems. Quentin Cronk is studying arabinogalactan protein (AGP) plant gums and conserved cell surface AGP glycoproteins using immunological markers. Stephen Harris is studying isozyme diversity within and between populations of East African *Faidherbia albida* (Del.) A. Chev. (Leguminosae) and the identification of taxon-specific randomly amplified polymorphic DNA (RAPD) markers to investigate the origin of *Leucaena* Benth. (Leguminosae) polyploids and naturally occurring *Leucaena* hybrids. Joanne Chamberlain is characterizing isozyme variation in the genus *Calliandra* Benth. subgroup *Racemosae* (Leguminosae). David Boshier is investigating isozyme variation in hardwood species from fragmented Central American forests, whilst Tony Simons is studying RAPD variation within and between populations of *Bertholletia excelsa* Bonpl. (Lecythidaceae).

Julie Hawkins and Rebecca Rowe are using the laboratory in part of their D.Phil. programmes. Julie is using taxon-specific RAPD markers to investigate hybridization between *Parkinsonia* L. (Leguminosae) and *Cercidium* Tul. (Leguminosae) and PCR amplification of specific DNA fragments to reconstruct a phylogeny of the genera. Rebecca is studying isozyme and RAPD diversity in the St Helena endemic genus *Trochetiopsis* Marais (Sterculiaceae).

At the undergraduate level Neil Brummitt is using chloroplast DNA (cpDNA) to reconstruct a phylogeny of the genus *Ravenea* Bouché & Wendland (Arecaceae), whilst Hieke Culmsee has been studying cpDNA variation in species of the genus *Strobilanthes* Blume (Acanthaceae). Nick Grassly used RAPD markers to investigate variation between *Apium nodiflorum* (L.) Lag. and *A. repens* (Jacq.) Lag. (Apiaceae).

The laboratory has recently benefited from a grant from CIFOR-ODA to develop and apply molecular assays to tree populations, allowing the appointment of Martin Billingham, as a research technician. This grant will enable us to: investigate the effects of forest fragmentation on population genetic diversity and dynamics; synthesise genetic and ecological perspectives on forest stand structure and dynamics; and develop our strength in the molecular systematics of woody genera. As part of this programme, we will be training three developing country scientists a year in laboratory techniques.

Stephen Harris

Tropical trees as invasive species

There is increasing concern amongst foresters, ecologists and conservationists about the threat of invasion of natural and semi-natural ecosystems posed by continued introduction of aggressive tree species in tropical forestry programmes. In response to these concerns, a one-day workshop entitled "Tropical Trees as Invasive Species - the Benefits and Risks of Species Introductions" was held at the Oxford Forestry Institute on 18 May 1994 under the auspices of the UK Tropical Forest Forum. The meeting was organised to promote greater dialogue between foresters and conservationists in the UK involved in species introductions and invasive plants, and to seek such middle ground as may exist between the often opposing views on the advisability of species introductions.

The meeting was divided into two parts, with a series of presentations in the morning followed by an afternoon of discussion. The issue of invasive plants and the conservation problems they cause was introduced by Quentin Cronk from Oxford and Alan Hamilton from WWF. Colin Hughes, Oxford, discussed the benefits and risks of species introductions in forestry, advocating a more cautious approach to introductions in the future. A case study by Tom Goodland and John Healey from Bangor on *Pittosporum undulatum* in Jamaica, examined one example of an invasive plant and the research underway to attempt to control the problem. Alan Pottinger, Oxford, outlined the lessons learned from the OFI tree seed distribution programme, and a case study on use of an indigenous species, *Parkia biglobosa* in West Africa, was presented by Helen Tomlinson from Bangor. Finally ideas for a database on invasive species were presented by Phil Bacon, Oxford and Pierre Binggeli, Northern Ireland.

With around 50 participants from a diverse range of organizations there was ample scope for useful discussion which focused on two topics: development of draft guidelines and procedures for tropical tree species introductions, and research needs and priorities in relation species introductions and invasive species. A clear need for better knowledge on weediness hazards and methods to predict risks was identified and there was much discussion about how this should proceed. The value of comparative studies of species across large genera that include invasive species was suggested. It was widely agreed that all organizations involved in new introductions need to adopt procedures to evaluate weediness hazards into their programmes. Draft guidelines for species introductions were drawn up (based on those of IUCN), discussed and broadly endorsed by the meeting. A full account of the discussion was recorded by Jane Thornback of the UK Tropical Forest Forum.

Colin Hughes

Tree Flora of Sabah and Sarawak

This project was conceived as a logical continuation of the work of Whitmore and Ng's "Tree Flora of Malaya: a guide for foresters". This four-volume work was written over a period of twenty years and was prepared as a field guide to all the tree species in Peninsular Malaysia with descriptions and diagnostic keys. Treatments in *Flora Malesiana* are unwieldy when applied to most tree genera and a broad-based revision for the Tree Flora of Malaya proved valuable for field botanists and foresters alike. The Tree Flora of Sabah and Sarawak follows the same format and it is being prepared as a working tool for field scientists. Funding for the project has come from the Government of Malaysia via the Forest Research Institute of Malaysia (FRIM) which hosts the project and supporting funds are provided by the UK Overseas Development Administration and also by the International Timber Treaty Organization. Prof. E. Soepadmo, formerly of the University of Malaysia, was appointed full-time executive editor in 1993 but there has been activity since the middle of 1992. Unlike many similar Flora writing projects, the centre of the activity is in the region actually being served by the study. Training and teaching are integral to the project and a team of highly motivated, experienced plant taxonomists is being assembled to serve both the immediate needs of the Tree Flora and also the broader needs of plant scientist in the Malesian area.

ODA support for the TFSS is part of the larger programme of research which forms the Memorandum of Understanding between FRIM and ODA, currently managed by the Oxford Forestry Institute. Specifically under the TFSS, OFI has assisted with a visit to the UK by the executive editor, the establishment of a liaison office at the Royal Botanic Gardens, Kew and various training inputs. This has included the placement of two Malaysian candidates on doctoral programmes, one on an M.Sc. course, and providing funding and support for two students on the UNEP course on taxonomy for conservation run at the University of Reading.

Collaboration with the Department of Plant Sciences at Oxford has included support for a workshop in Sarawak to introduce TFSS staff to the database package Brahms (Botanical Research and Herbarium Management System). Brahms is being adopted by all three regional herbaria closely involved with the study (Kepong, Kuching and Sandakan). Several additions to Brahms have been made following suggestions made by workers involved with the TFSS. Taxonomic revisions of families for the project are being undertaken by David Mabberley (Meliaceae) and Philip Bacon (Convolvulaceae). Rosemary Wise will be running a workshop in Botanical Illustration at Sepilok, Sabah, in January 1995 for artists involved in the Tree Flora Project.

Support for the TFSS project from the ODA under the FRIM memorandum is scheduled to continue for five years (from May 1992) and this will fund the liaison officer post at Kew, post-graduate training in Britain and specified running costs for the project in Malaysia. It is anticipated that the first volume will be published in April 1995.

Philip Bacon

The A.H. Church laboratory

The refurbishment of our old morphology teaching laboratory has been completed providing additional working space near the Daubeny Herbarium for systematics research. This has been made possible due to a generous donation towards the cost by Mr Peter Placito, a benefactor of the University with a great interest in botany. It has been named in honour of Arthur Harry Church, a most original and stimulating scholar and teacher of botany in pre-war Oxford.

Alison Strugnell

Botanic Garden wins gold medal

Congratulations to the University Botanic Garden for being awarded a gold medal by the Royal Horticultural Society at the Chelsea Flower Show. The award was for their exhibition in the Scientific and Education section of the Great Marquee entitled "Ferns as you have never seen them before". The exhibit was largely paid for by Friends of the Botanic Garden. The Garden is very grateful for their support.

The Erasmus programme

We were pleased to welcome over the summer our first two Erasmus project students, Giuseppe Fusco from Padua and Verena Meyer from Bonn working on the topology of phylogenetic trees and pollen morphology of the Acanthaceae respectively. Currently, a further student, Helena Eriksson is studying the infraspecific classification of the *Lantana camara* complex.

Darwin Initiative Biodiversity course

Under the terms of a grant from the Darwin Initiative, the Oxford Forestry Institute and Natural History Museum ran a joint training course (20 August to 30 September), examining techniques for exploring, evaluating, monitoring and conserving genetic resources. The ten participants included scientists from collaborating institutions in India, Kenya, Malaysia and Sri Lanka. The course will be repeated in 1995.

Student progress

Julie Hawkins (D.Phil. third year). Systematics of *Parkinsonia* and *Cercidium* (Leguminosae). Supervised by C.E. Hughes, R.W. Scotland and S.A. Harris. ODA studentship. Work on the delimitation of the genera comprises the major part of the study. To date a preliminary morphological data set has been used to indicate species relationships. Sources of molecular data are being investigated. In addition, the status of a putitive intergeneric hybrid has been clarified using morphometric and molecular marker data.

Colin Hughes (D.Phil. second year). Systematics of *Leucaena* Benth. (Leguminosae: Mimosoideae). Supervised by D.J. Mabberley and R.M. Polhill (K). Morphological analysis of the small New World genus *Leucaena* is progressing towards a taxonomic account of the genus. Species delimitation, species relationships and interspecific hybridization in relation to indigenous domestication are being investigated.

Rogier de Kok (D.Phil. first year). A taxonomic study of the genera *Oxera* and *Faradaya* (Labiatae). Supervised by D.J. Mabberley. These genera are endemic to South East Asia and the Pacific region. During the year, the pollination biology of *Oxera* was studied in New Caledonia for two months and work progressed on the revision of this genus.

Rebecca Rowe (D.Phil. third year). The population biology of *Trochetiopsis*: a genus endemic to the island of St Helena. Supervised by Q.C.B. Cronk, J. Burley and S.J. Owens (K). *Trochetiopsis erthroxylon* and *T. melanoxylon* are both rare endemics to the island of St Helena. The techniques of isozymes and random amplified polymorphic DNA (RAPD) are being used to assess the genetic diversity within and between the two species. RAPD analysis in conjunction with morphological data will be used to assess the degree of hybridization and introgression that has occurred within the plantings of the two species and their hybrids on St Helena.

Karen Sidwell (D.Phil. second year). A revision of the genus *Brillantasia*. Supervised by R.W. Scotland and K. Volleson (K). Morphological characters suggest the genus *Brillantasia* P. Beauv has thirteen species. The widespread and variable *Brillantasia owariensis* P. Beauv needs to be investigated in greater detail. Anatomical studies of pollen, seed and leaf surface morphology may reveal useful taxonomic characters. Fieldwork in tropical Africa will enable full species descriptions to be written and collection of samples for molecular studies to investigate the relationships between these species.

Dorothy Steane (D.Phil. third year). Molecular Systematics of *"Clerodendrum* and *Cyclonema"*. Supervised by R.W. Scotland and D.J. Mabberley. Despite numerous attempts in the past two centuries, consensus has failed to emerge about the classification of *Clerodendrum, Cyclonema* and related taxa. Data sets comprising chloroplast restriction site data and nuclear ribosomal DNA sequence data have provided evidence for polyphyly of *Clerodendrum s.l.*

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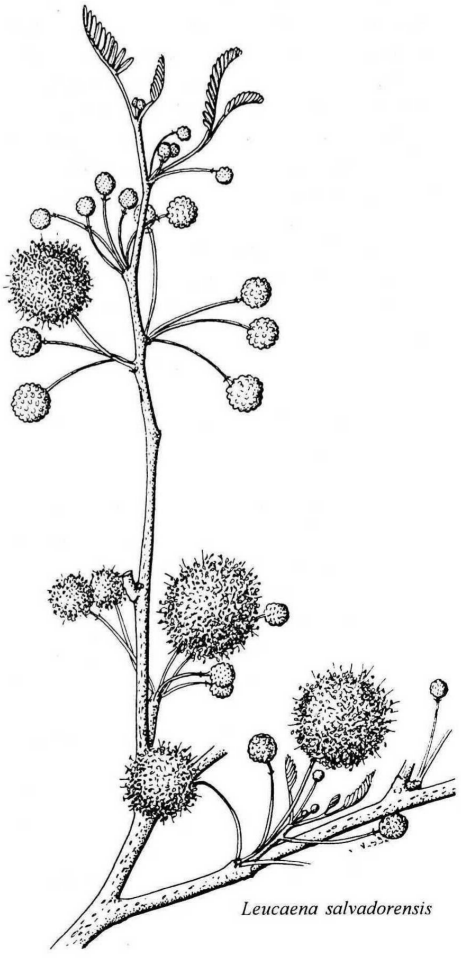
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Leucaena salvadorensis

Herbarium

Visitors to the Herbaria (OXF & FHO)
Between October 1993 and September 1994, we were pleased to welcome 131 visitors to the herbaria (not including the 150 visitors from the B.S.B.I. - see below). Many of our visitors came from other parts of the British Isles, some from Europe but others came from much further afield (Australia, Brazil, India and the USA). Eleven students taking part in "the Kew International Diploma Course in Herbarium Techniques" also visited the herbaria on 19 July 1994.

Fielding-Druce (OXF)

The Druce Herbarium
Over the past year, there has been much activity associated with these most renowned of British collections. About 150 members of the Botanical Society of the British Isles visited the herbarium on 14 May during their AGM, which was held in the Department of Plant Sciences. The theme of the meeting was aptly chosen as George Claridge Druce and displays of Druceana from the Druce archives and herbarium were exhibited. Several meetings of the newly formed Rare Plants Group of the Ashmolean Natural History Society of Oxfordshire took place in the herbarium on cold winter evenings, a few members of which earnestly extracted records from the Druce collections.

During the summer the specimens in the Druce Herbarium were re-arranged according to D.H. Kent's *List of Vascular Plants of the British Isles* (1992) in accordance with the *New Flora of the British Isles* by C.A. Stace. A very enthusiastic undergraduate (Daniel Barker) from the Biology Honours School was employed to do this work.

We are very grateful to the Rev. Anthony Primavesi from Leicester who gallantly determined all the *Rosa* specimens in the herbarium. This involved him in annotating over 2,000 determinavit labels in the space of three weeks. Many interesting records for roses in Oxfordshire were discovered in the collection. This work led to the revival and lectotypification of the name *Rosa rothschildii* Druce, now known to be of hybrid origin. A note on *Rosa* X *rothschildii* by Quentin Cronk, Serena Marner and Anthony Primavesi will appear in *Watsonia*.

Work is in progress on the typification of Druce's names for infraspecific taxa as published in the literature, but which so far have not been linked to extant specimens in the Druce Herbarium. This is an on-going project as several hundred taxa are involved and the initial aim is to produce a complete catalogue of Druce names.

The historic herbaria of OXF
Many enquiries were received in connection with specific specimens in the historic herbaria especially those in the Morisonian, Sherardian, Dillenian and Sibthorpian collections. For those taxonomists who could not visit the herbarium to examine particular specimens relevant to their research, a number of photographs were sent to individuals at botanical institutions widely scattered around the world, including B (Berlin), C (Copenhagen), CANB (Canberra), Ward Herbarium, Durban, ICN (Porto Alegre), L (Leiden), PR (Praha) and PRE (Pretoria). The Inter Documentation Company, IDC, from the Netherlands have expressed an interest in microfiching a number of the historic collections held by OXF and discussions on this matter are now taking place.

The display area in the Fielding-Druce Herbarium was the venue for a special exhibition on "Botanical Artists of the Department, past and present". Many treasured books and paintings from the Special Collections in the library associated particularly with the Sherardian, Dillenian and Sibthorpian collections were exhibited, including the unique, unpublished *Flora Graeca* topographical sketches.

The famous Dampier collections, including the first properly documented plants to be collected from Australia, were specially boxed to facilitate their display.

Accessions and mounting
71 British specimens were presented and accessed to the Druce Herbarium. The material included 5 holotype specimens of *Taraxacum* and 52 miscellaneous species presented by Richard Palmer. Another 600 sheets of Humphrey Bowen's specimens collected from various parts of the British Isles were mounted.

Loans
During the period from 1 October 1993 to 30 September 1994, a total of 2,437 specimens were sent out on loan from the OXF collections to other institutions, plus another 134 specimens lent to internal Departmental workers. These loans included the following genera and families: *Strobilanthes*, Acanthaceae; *Dicoma*, Asteraceae; *Basella*, Basellaceae; *Crassula*, Crassulaceae; *Hieracium*, *Pluchea*, *Taraxacum*, Compositae; *Eragrostis*, Gramineae; *Parvatia*, Lardizabalaceae; *Pleurothyrium*, Lauraceae; *Cullen*, Leguminosae; *Pavonia*, Malvaceae; *Tibouchina*, Melastomataceae; *Toona*, Meliaceae; *Heisteria*, *Liriosoma*, Olacaceae; *Bletia*, *Tetramicra*, Orchidaceae; *Polygonum*, Polygonaceae; *Rosa*, Rosaceae; *Hydrangea*, *Saxifraga*, Saxifragaceae plus specimens of *Marchantia* and *Selaginella*. The borrowing institutions included AAU, B, E, GB, GH, ICN, LDS, LCR, LTR, MO, NCE, NY, RNG, SANT and TEX. A total of 2,198 specimens were returned to OXF from loan during the same period.

Serena Marner

Daubeny (FHO)

The first stage in the update of our facilities has commenced in that the laboratory adjacent to FHO (the Church laboratory) is being refurbished to suit the requirements of taxonomic work. The future refurbishment of the herbarium itself is being planned in order to accommodate all the material we have in the collection at present and to allow some room for expansion. Future additions to the collection will necessarily have to be selective (see future accessions policy for FHO) in order that the rate of expansion is not too great.

We had hoped to mark the 70th anniversary of FHO with a paper on its history written by Frank White.

Accessions
The 668 specimens accessed to the FHO collection during the academic year October 1993 to September 1994 included Vitaceae specimens collected by David Mabberley in Sri Lanka, Meliaceae collected by David Mabberley and Matthew Jebb in Papua New Guinea and *Ficus semicordata* collected by S. Amatya in Nepal. These latter represent a taxonomic study of the subspecies used by local farmers as a fodder crop and their distribution. The data were presented in an M.Sc. thesis.

Further Meliaceae specimens of *Aglaia* from the Flora Malesiana region, *Guarea* from the Flora Neotropica region and *Walsura* from Sri Lanka were added along with Rubiaceous ant-plants from Papua New Guinea and Gymnosperms from Honduras.

Distribution of duplicates
A total of 1,104 duplicate specimens were distributed including recent collections by Colin Hughes and Aljos Farjon from Central America.

Loans

Over 4,000 specimens were obtained on loan over the academic year for various new research projects, especially *Brillantaisia* (Acanthaceae) by Karen Sidwell, *Strobilanthes* (Acanthaceae) by Robert Scotland and *Oxera* and *Faradaya* (Verbenaceae) by Rogier de Kok.

Smaller amounts of material have been borrowed for the final stages of the following publications: *The Evergreen Trees and Shrubs of Malawi* by Frank White, Françoise Dowsett-Lemaire & Jim Chapman; *The Pines of Mexico, Central America and the Caribbean* by Brian Styles & Aljos Farjon and The Flora Malesiana account of the Meliaceae by David Mabberley (with genera contributions by Caroline Pannell, Jennifer Edmonds & Terry Clark).

Over 2,500 specimens on loan were returned or transferred to other herbaria including *Toona* (Meliaceae) to Leeds (LDS) and *Andira* (Leguminosae) to Edinburgh (E) for continued study in their new work places by Jennifer Edmonds and Toby Pennington respectively.

In addition nearly 500 FHO specimens were sent on loan.

***Aglaia* (Meliaceae)**

During the course of her work on the taxonomy and reproductive biology of *Aglaia* (Meliaceae), Caroline Pannell collected series of developmental stages of male and female flowers and fruits from several species of *Aglaia* which occur at Kuala Lompat, Krau Game Reserve, Peninsular Malaysia. The most extensive of these is for *Aglaia elliptica* Blume, but *Aglaia odoratissima* Blume and *Aglaia rufibarbis* Ridley are also represented. These collections are in ethanol-based preserving fluid and are available for loan to anyone who wishes to carry out an anatomical or morphological study of flora and fruit development in these species. In addition, there are spirit collections of flowers and fruits of several more species from Peninsular Malaysia and Sumatra, also available for loan or study in Oxford.

Alison Strugnell

Future accessions policy for FHO

The Daubeny Herbarium (FHO) expanded its remit 2 years ago, following the review in Taxonomy at Oxford, from the restraints of being a forest herbarium only. This is a useful time to redefine the role of FHO now that certain changes have already been set in place, long-term research projects are finished or coming to an end and new ones beginning. The appointment of a permanent Curator in 1995 will also mark a new phase in the herbarium's history.

During the last two years provisional registration as a Museum collection has been obtained for the holdings of FHO & OXF which we are hopeful will be converted into full registration in the near future. The Department and University are committed to maintaining the collections built up from previous research studies as reference collections which include many specimens cited in publications as well as type material. The following taxa are included in this category and these are not likely to be extensively added to in the near future *e.g.* Meliaceae, Chrysobalanaceae, Ebenaceae, Neotropical *Pinus* and Myrtaceae. The production of a comprehensive database for some of these collections using Brahms is on the agenda for the near future.

It is intended that the collection in FHO is one with a bias towards research and teaching. Past, present and future research should be the main indicator of what is housed here as the herbarium is not big enough to encompass everything. However, it is also intended to maintain a reasonable range of families in the collection to support teaching requirements.

Future research collections will need to be restricted to elite sets of specimens which will include all unicate material, types of new taxa and material of rare or underrepresented taxa. Limited space for expansion, even in a newly refurbished herbarium, will now allow us to retain large quantities of commonly collected or sterile material unless for a specific purpose.

For the same reason, we will need to exert a selective policy for incoming accessions and will be unable to accept general collections or large quantities. However, gifts of named duplicates of plants with biogeographical or systematic interest will be most welcome as would isotype material and underrepresented families.

Being a herbarium of moderate size will not allow us to undertake identifications of general collections unless a prior special arrangement has been made with a specific research worker. We shall, however, be pleased to continue to supply determinations for small-scale collections in which there is an active research base here.

The collection will continue to be available for reference either through personal visits or through loans. Over the next few years we intend, through curation and additions, to produce a collection of interest and worth to the wider taxonomic community.

Quentin Cronk
Alison Strugnell



Aglaia elliptica (top left) and *A. lawii* (bottom right). Reproduced with permission from the Forest Research Institute Malaysia. Illustration taken from: C.M. Pannell (1992). A monograph of *Aglaia* Lour. (Meliaceae). Kew Bulletin Additional Series XVI, London: HMSO. 379pp.

Expeditions and visits

Quentin Cronk gave invited lectures at RBG, Edinburgh, the Department of Biochemistry, University of Lund and at Upsalla University. He also attended the Erasmus meeting at Trinity College, Dublin to discuss further exchanges of students between Oxford and Europe.

Chris Fagg spent the first quarter of the year collecting *Faidherbia* and *Acacia* in the eastern highlands and rift valley of Ethiopia with the National Tree Seed Project. This is a key area of diversity of *F. albida.* At the end of March he and Steve Harris attended a *Faidherbia* research workshop in Senegal, evaluating isozyme and trial studies, as well as finding a new *Leucaena* hybrid. In August, he continued collecting both genera in Mozambique with the Centro de Experimentacao Florestal, where collecting was sometimes frustrated by the threat of landmines. Returning to Northern Kenya, he joined a PCPU team (EA) collecting rare species of *Acacia* and investigating the *A. senegal/circummarginata* complex. Gums and seeds of this complex were also collected for chemotaxonomic studies back at Oxford. The excursion north west of Isiolo was provided with an armed escort by the District Commissioner.

Denis Filer spent three weeks at the East African Herbarium working with the Plant Conservation and Propagation Unit. The PCPU is using Brahms to prepare check lists for selected study areas in Kenya and to log herbarium collections for families targeted for conservation and/or economic importance. The logging of all the Orchid collections at EA has now been completed.

David Harris spent ten months in the Central African Republic carrying out a botanical inventory for WWF (US) in the Dzangha-Sangha Dense Forest National Park. He spent two months identifying collections at Kew.

Colin Hughes spent two months in Mexico, Guatemala and Honduras collecting *Leucaena*, mainly in southern Mexico where the greatest diversity of *Leucaena* species occurs. A large amount of botanical material was collected and a number of interspecific hybrids investigated. A visit was made to the MEXU herbarium. In January 1994, he attended a *Leucaena* workshop in Bogor, Indonesia and carried out a preliminary collection of introduced *Leucaena* material in western Java.

Rebecca Rowe spent five months on St Helena studying the reproductive biology and hybridization of *Trochetiopsis sp.*

Karen Sidwell is currently visiting the Limbe Botanic Garden and herbarium in South West Cameroon. The Botanic Garden is part of the Mount Cameroon Project and has an excellent biodiversity study centre. It is an ideal base for research on tropical African plants with full facilities for visiting scientists. Karen is collecting samples of Acanthaceae in Cameroon during research for her D.Phil. With excellent staff, equipment and accommodation in Limbe the work to date has been successful and hassle free. The Mount Cameroon Project is currently drawing up research agreement to improve collaboration with visiting scientists. Anyone interested should contact: Nouhou Ndam, Conservator, Mount Cameroon Project, Limbe Botanic Gardens and Herbarium, PO Box 437, Limbe, South West Province, Cameroon.

Rosemary Wise visited Malaya (FRIM) and Sabah in April. For 10 days, she joined a collecting expedition to Bukit Tawai, Sabah, led by Prof. E. Soepadmo (FRIM) and Dr K.M. Wong, Sepilok.

Farjon afield

On the evening of 10 April I arrived in Siguatepeque, Honduras. After preparations (and annotating the conifer holdings in the herbarium) we set off in a Landrover with two assistants, Dario Mejía (technician) and Donaldo Andino (tree climber) for a five week journey. The itinerary went through the highlands of Honduras, with a stop especially at Mt. Celaque, and Guatemala, with several stops. Emphasis here was on the rarer pines, including the doubtful species *Pinus nubicola* J.P. Perry, of which we found a few trees both in Honduras and Guatemala.

In Mexico a round trip through all the southern states up to Zacatecas, then westward to Jalisco and again southeastward back to Guatemala formed the main part of the journey. The goal was to find rarer taxa, taxa of doubtful status and good examples of these as well as common taxa for field photographs. For several species, we should now have more and better material at FHO than before. Much work went into making each collection as comprehensive as possible, including young leaf material for chloroplast-DNA research in our new molecular systematics laboratory.

A visit was paid to the University of Guadalajara, where we met Ing. Jorge Perez de la Rosa, a pine specialist of western Mexico. He showed interest in the molecular possibilities with pines and later, came to Oxford to do an initial study with the material I collected. He also accompanied us to the type location of *P. jaliscana* Perez de la Rosa in western Jalisco.

I also visited herbaria in the USA, Mexico and several European countries, looking primarily for type material of Mexican pines. On 16 May I returned to England.

Scotland in Sri Lanka

Strobilanthes s.l. (Acanthaceae) including *Aechmanthera, Stenosiphonium* and *Hemigraphis* was split by Bremekamp in 1944 into 54 genera. Currently, *Strobilanthes* containing *c.*450 species, remains one of the great taxonomic problems within Acanthaceae. The Bremekamp system has not been widely adopted although many of his names are in current use. The Bremekamp system contained over 100 species which were classified as "*genus adhuc incertum*". As part of my world-wide monograph, a field-trip was organized to Sri Lanka and Southern India for 3 months from October 1994 - January 1995. Today, is Wednesday 7 December 1994 and I have returned prematurely to Oxford after failing to obtain collecting permits for Southern India, but more of that later.

The Sri Lankan part of the trip started with my arrival in Colombo coinciding with a Tamil Tigress, with semtex strapped to her chest, blowing herself and 40 political opposition candidates into pieces. The next 4 days of curfew, provided exactly the right amount of time needed to get my equipment (blotters) through the Sri Lankan customs. I had my piece of paper signed by 52 (fifty-two) people, half of whom received some financial inducement. God, these blotters (Kew) were turning out to be the most expensive cardboard in the history of botany. The blotters were also scrutinised by an over zealous customs official when I travelled to India. So keen was the fellow that he took a bite out of a blotter, chewed it and spat it out. I said, "please, stop eating my equipment".

The next month in Sri Lanka was spent charging around the central mountain area (wet zone) looking for *Strobilanthes*. The local name for Strobs is "Nelu" and on occasions we had twenty or so children as guides taking us to small remnants of inaccessible forest in the middle of tea estates. We climbed one leach infested gully after another and began to recognize a pattern that was repeated on a daily basis, leaches prefer Scottish blood to Sri Lankan. In the end, we visited the following districts: Matale, Kandy, Nuwara Eliya, Badulla and Rathnapura.

Many species of *Strobilanthes* are plietesial plants, flowering after many years of

vegetative growth and then dying. The great worry, in organizing any field-trip, is whether any will flower to coincide with field-work. Fortunately, this year was a good one for Sri Lankan Strobs with nine species collected during the course of the trip: *S. anceps, S. punctata* (endemic), *S. walkeri, S. sexennis, S. calycina* (endemic), *S. hookeri* (endemic), *S. viscosa* (endemic), *S. lupulina* and *S. pulcherrima* (endemic). Photographs, silica dried samples and field collections were made for all species. The pick of the crop was *S. punctata* which has been collected only 3 times before and was last collected by Alston in 1927. This species and several others had not been collected since the building of the tea estates and was thought to be possibly extinct. Finding it at Adam's Peak was a fine moment. At two places, Horton Plains and Adam's Peak, 7 species of *Strobilanthes* dominated the vegetation. At these places the montane forest is suffering from "die back", and the forest is clearly dying. It is in these areas that *Strobilanthes* was dominant and it appears that *Strobilanthes* is actively invading these fragile habitats and behaving as a weed. This situation needs some critical research.

I left Sri Lanka feeling satisfied and headed for Coimbatore in S. India, in the hope that my collecting permits had arrived. I had been writing to the Botanical Survey of India in Calcutta and the Ministry of Environment and Forests in Delhi for over a year but had received no reply. I thought, wrongly as it happens, that I could sort something out on the ground. The following two weeks involved a lot of sweet tea, meetings, letters, faxes and ten hour bus journeys across India to Pondicherry. Despite my overtures regarding *Strobilanthes* being the largest genus of plants in the Western Ghats with at least 40 endemic species and very little known about current distribution patterns, permits were not forthcoming. In the end I decided that my bank-balance, sanity, and remaining non-grey hairs would all be a lot healthier enjoying a cold Oxford Christmas. Next year I will try again.

AETFAT Congress 1994

Karen Sidwell attended the 1994 AETFAT congress held in Wageningen, The Netherlands. AETFAT meets every three years, usually in Africa, and is a key forum for botanists specialising in African plants. The central theme in Wageningen was "The Biodiversity of African Plants". In his key note speech, Gren Lucas (RBG, Kew) emphasized the need for systematics to formulate a clear mission statement and objectives in order to increase awareness of and funding for systematics research.

Posters and papers ranged from computerization of the East African Herbarium to the vegetation of the southern Karoo and the molecular systematics of the genus *Aloe*. With 111 African botanists from 26 African countries, non-Africans were outnumbered for the first time. Wageningen was, as all AETFAT meetings are, an exciting and friendly place to exchange ideas and meet new people. The next AETFAT congress will be in Harare, Zimbabwe in 1997.

Library conservation programme

The most significant of the Library's early works are grouped in the Sherard Collection, details of which have been published (New Library World, (1991). v.92 no.1097, pp.4-5). These mostly taxonomic works form an integral part of the Oxford University Herbaria, now being extensively restructured and modernised as a resource for taxonomic teaching and research.

The Sherard Collection was deposited in the Bodleian in 1957, but the high level of its use and the need for the material to be consulted alongside the relevant herbarium specimens and related works which remained in the Department, prompted its return to Plant Sciences in 1987. Funds had already been raised to install a rolling stack in an air conditioned secure stackroom so that the Collection could be suitably housed. The Department was now responsible for its future conservation.

Wishing to maintain the Collection in a state suitable for its regular use as a research tool, the Department embarked on Stage 1 of its preservation and conservation programme. In 1988 it successfully won a British Library grant for £4,000 over a 5 year period, matching Departmental funds. This grant has enabled work to be carried out on one of the treasures of the manuscript collection - Ferdinand Bauer's 966 original drawings for John Sibthorp's *Flora Graeca*, published 1806-40. The published work, which the Library also holds, has been described as the most costly and most magnificent flora ever produced; according to the *Oxford Chronicle* (12 October, 1917) the original drawings are "as works of art, superior to anything of the kind in existence, and constitute one of the most valuable treasures of the University of Oxford". Work has also been completed on Bauer's 293 drawings for the *Fauna Graeca* and his 131 *Mediterranean Scenes*, neither of which were ever published.

Also in the Collection are manuscripts relating to Sibthorp's botanical expedition through Greece, during which the drawings were made, and his plans for publication, while related specimens collected on the journey are held in the Department's herbarium. Because of the international interest in this unique collection, a contract has now been signed by world experts in the field for publication of an academic monograph on the Greek voyage; publication is planned for 1998. It is anticipated that this increased publicity will arouse interest in the whole of the Sherard Collection. An exhibition concurrent with publication of the monograph is now being considered.

Stage 1, the British Library-funded part of the project, was completed last summer with a survey of the entire Collection. "First aid" treatment including cleaning and in-situ repairs were carried out and a report prepared on the remaining outstanding work required. This formed the basis for Stage 2 of the conservation programme for which funding was then sought.

Among the items involved are several manuscripts relating to Sibthorp's Greek voyage, including diaries and notes concerning his publication plans and the disputes involved. The Sherard Collection also contains many other works of major importance, including copies of Bauhin's *Pinax* dated 1623 and 1671, a third copy of the latter edition being interleaved and bound in two volumes, with abundant additional notes. The Sherardian *Pinax*, continuing Bauhin's work, runs to 16 volumes and lists all named plants with later synonyms and discoveries. Examples of other significant manuscripts are *Herbarium Capense*, 139 coloured drawings of African plants with names entered in Sherard's hand, and some beautifully illustrated *Watercolours of Japanese Plants* with inscriptions in Dutch by N. Witsen, dated 1700. These have been shown at international exhibitions in Japan (1990) and the Netherlands (1992). Other rarities include a copy (one of only four known) of the famous Dioscorides manuscript at Vienna (*Codex Vindobonensis c.*512) given by Jacquin to John Sibthorp - *Plantarum Dioscorides*, icones 412; and a superb copy of Rudbeck's *Campi Elysii* which consists of a lithograph copy of volume 1 and an original of volume 2 bound as one volume

(most copies including the woodblocks were destroyed in a disastrous fire in Uppsala, Sweden).

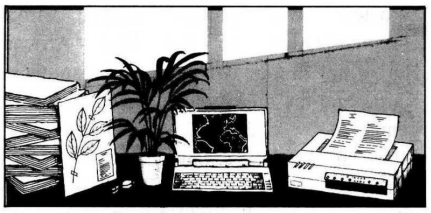
In Stage 2 funds were sought to ensure a rolling programme on the Sherard books and manuscripts which would include rehitching boards, rebacking, assessing spine damage and loose text-blocks, and boxing as required. A total of 200 books and manuscripts were identified as requiring attention; about 50% of this work involved detached boards. The estimated conservation work was £12,000.

In January 1994, the Department successfully won a grant from the Hulme University Fund for £6,000 over a 5 year period, matching Department funds for Stage 2 of the project. A five year programme was required as this is a realistic rate of work that can be progressed by library staff and conservationists.

Funding for Stage 3, covering the conservation requirements of the Department's other historic material outside the Sherard Collection will be considered after 1999.

Anne-Marie Townsend

The Brahms project



Considerable headway has been made with the ODA-funded Brahms database project this year. Work has been carried out in close collaboration with herbaria and projects in several countries, each with different research objectives and data management requirements.

A key area of activity has been the strengthening of capability to store and process nomenclatural information. This work has been carried out with assistance from Aljos Farjon, currently using Brahms to monograph the Latin American pines. As a result, Brahms can now prepare a full nomenclature for taxonomic treatments (for a species, genus or family), assembling accepted names, authors, protologue citations, synonyms, types and other details, formatting these, along with uncertain and excluded names, to near journal-specific standard. Synonyms can be presented chronologically or in homotypic groups. Facilities to handle homonyms, illustrations as types and original material have been included.

Earlier in the year, work was completed on the module for preparing specimen citation lists. This was driven along by Colin Hughes, currently preparing a revision for *Leucaena*. As with the nomenclatural output, citation lists can be sorted and formatted to match specifications of most journals. Specimens can be explicitly tagged for inclusion in lists (and/or maps).

Facilities to prepare annotated species checklists and related output were extended with help from David Harris with his collections from the Central African Republic and also by staff working with Tim Pearce at the ODA-funded Plant Conservation and Propagation Unit based at the East African Herbarium. Taxa in checklists can now be sorted within family groups (Bryophytes, Monocotyledons, *etc.*) and lists can include species descriptions specific to the checklist area, rather than the species as a whole.

Nomenclatural output, specimen citation lists and annotated species checklists are examples of output that are generated by selecting the new Brahms Report Generator (BRG) option. The BRG module can be used to prepare reports on taxa with or without reference to collections, drawing together data from throughout the system. As with labels, users can store up to five separate report designs.

The data input utility RDE (Rapid Data Entry) has been advanced. New data fields have been added and the F9 *lookup* key, enabling users to backload data from their main data files into the RDE file, operates in more fields. New file list, copy, merge, export and backup options have been added.

The RDE file import process has been improved by adding a greater number of import control options and with the creation of a new Import Control Reporter (ICR) to monitor the import process. One of the ICR tasks is to itemize all additions to the main data dictionaries. An example use is preventing the addition of rogue family and genus records, assuming reliable lists of these names are already stored within Brahms (*e.g. Vascular Plant Families And Genera* compiled by R.K. Brummitt, RBG, Kew, 1992 - also obtainable on disk). Warnings are given for genera/families in the RDE file that do not match those found in the main system. Alternative families are listed if appropriate. The value of the new ICR module was first demonstrated at the East African Herbarium where pre-checks on RDE files holding their entire Orchidaceae and Apocynaceae collections and collections from several checklist areas, enabled all incorrect or doubtful names to be checked prior to loading.

A new option to import a list of determinations from an RDE file was developed with encouragement from Martin Cheek and Stewart Cable at Kew. In their case, this will ease the task of supplying determinations to an Overseas Development Administration project in the Cameroon, receiving botanical advice from Kew.

Having entered one's data, the challenge is to present the output in stimulating and convenient ways. In the botanical and biogeographical context, this often boils down to maps. The new map-drawing and map transformation modules being developed by William Hawthorne are nearly completed. By March, Brahms will be linked to facilities to create local or global maps, with a wide choice of projection, symbol sets, summary charts, *etc.* It will be possible to handle, summarize and display plots, subplots and related areas using the same software.

The heavy schedule of development work this year has delayed the completion of the Brahms manual. In lieu of this, a 28 page Pocket Introduction and Demonstration Guide has been prepared and the on-line help facilities have been further extended.

Denis Filer

The endemic flora of the granitic Seychelles

The Seychelles are unique in being the worlds only granitic oceanic islands. These fragments represent the break-up and subsequent drifting of the supercontinent Gondwanaland some 60 million years ago and support an interesting flora and fauna with a high degree of endemism.

There are *c.*76 plant species found only on these 32 small granitic islands, many on the I.U.C.N. endangered list and some very close to extinction. Several recorded 100 years ago have not been collected since and are almost certainly extinct. Most of the remaining "specialities" cling on tenuously to existence in places too rocky, too inaccessible, or too high for man to cultivate.

Although Arab traders had certainly visited the islands for many centuries, the first recorded landing was not until 1609, when the East India Company expedition, led by Alexander Sharpeigh visited Mahe and North Island. Many of the larger hard wood trees, previously growing at low altitude, for example, the dipterocarp *Vateriopsis seychellarum,* were all but eradicated by early settlers, being felled for boat building or furniture making.

But a threat far greater than man has come on the scene - the seemingly unstoppable invasive plants have arrived.

In 1772, French settlers attempted to create a spice garden in the south of Mahe, at Anse Royale, with imports including nutmeg, clove and cinnamon. Due to the unsettled political situation of the day, with a cat and mouse game for ownership of the islands between the French and the English, the garden was eventually abandoned. While occasional isolated trees of nutmeg and clove can still be seen, cinnamon is everywhere, from sea level to the highest peaks on most islands. The blue grey fruits are attractive to and distributed by indigenous birds. Some decades ago, the production of cinnamon oil was a major source of income and many large trees, often endemic species, were indiscriminately felled for the insatiable appetite of the distillery furnaces. Now, with the distilleries long since redundant, and a much reduced trade in cinnamon powder and "quills", the trees and bushes are spreading unchecked.

Parts of Mahe are covered with impenetrable thickets of *Memecylon floribunda* while the creeper, *Merremia peltata* is also spreading rapidly, blanketing trees and shrubs. Fortunately, these two species appear to know their place, at present, and remain at low altitudes, away from the majority of the endemics.

Paraserianthes falcatera (formerly *Albizia falcatera*) is another offender. Its flat-topped, wide spreading crowns can be seen colonising valleys, in some places becoming the dominant species.

But Silhouette Island presents the most tragic story of all. This small, almost circular island, *c.* 3 miles across, has the second highest mountain in the Seychelles, Mount Dauban, 750 m (Morne Seychellois on Mahe is 905 m). Silhouette is a naturalists paradise with new species of insects and plants still being described. Here, among exceedingly steep slopes, rocky peaks and an almost impassable boulder field, is a small area of primary forest, supporting no less than six of its own endemic plants.

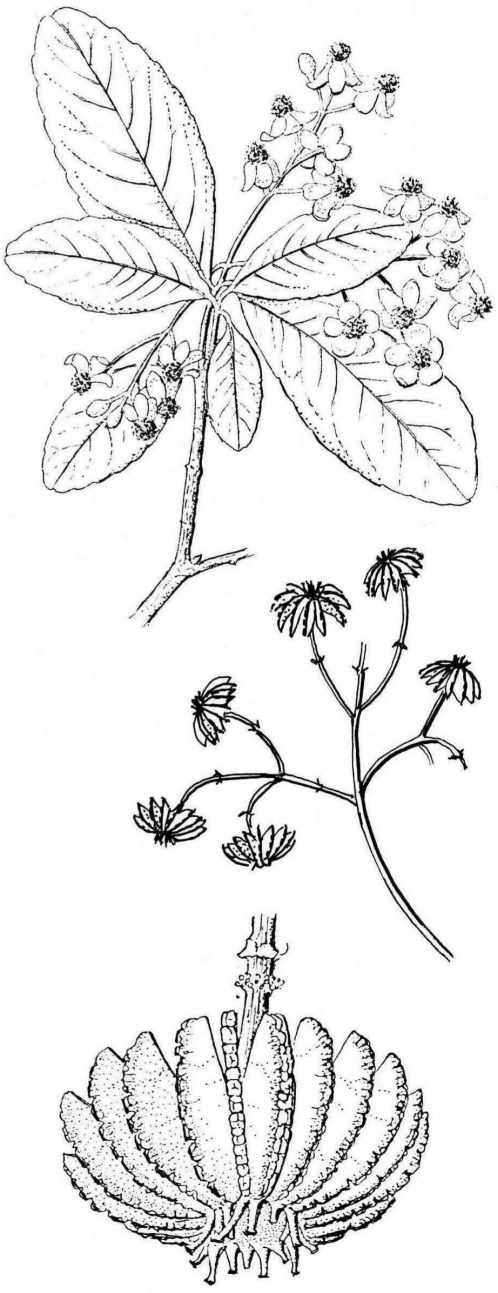
The South American melastome, *Clidemia hirta* was first recorded on Silhouette in 1986. In 1990, members of an Oxford University expedition noted its distribution over the higher parts of the island, including this rather special forest area. In November 1993, on my third visit, I was appalled to see that this plant is now widely spread, from summit to sea level, in great numbers. Where dense carpets have formed, nothing else can germinate. At high altitude it is actually growing on the endemics. Several botanists who have visited the islands recently agree that the picture is dire, especially on Silhouette. It appears too late to control the spread of *Clidemia.* Many of the endemic plants look unhealthy and in some cases, very few plants remain.

For a different reason, the future of the jelly fish tree, *Medusagyne oppositifolia*, the sole surviving member of the family *Medusagynaceae*, is also uncertain. This curious tree was thought to be extinct until a few trees were found in 1971. Since then, no seedlings have been sited in the wild and attempts at propagation have only been partially successful. *Medusagyne* is a plant of unknown genetic possibilities, having no close relations and could be called a "living fossil". Many other species have equally interesting stories.

In 1986 I decided to search for all of these precarious plants and to record them in detailed water colour paintings with comprehensive descriptions before they disappear for ever. Each plate has flowering and fruiting habits, life sized where possible, and dissections if necessary. The collection, which is now virtually complete, will be a unique record of a threatened flora. It is very unusual for a Flora to be prepared in the field, and in full colour. The text is now progressing favourably and should be ready for publication early in 1995.

All specimens collected, (with full permission), have been pressed, labelled and incorporated into the Fielding-Druce Herbarium, Oxford. Viable seeds and occasional living plants have been collected on request, for Oxford Botanic Garden and for The Royal Botanic Gardens, Kew and it is very reassuring to see healthy plants flourishing, especially in cases where they look far from healthy in the wild.

Rosemary Wise



Medusagyne oppositifolia

The rare pines of Mexico

Introduction

The genus *Pinus* L. is the largest of the family Pinaceae, with over a hundred species widely distributed across the northern hemisphere. Only one species reaches and crosses the equator: *Pinus merkusii* in northern Sumatra, but several species have been widely planted and some have become naturalized in a number of southern countries. Mexico, a country rich in conifers generally, has the highest diversity of pines, with nearly 2/5 of all species: 44, and in addition about 10 infraspecific taxa (Farjon & Styles, in prep.). Many of these have extensive ranges; some of the varieties are rather scattered and sympatric in at least a part of the range of the species to which they are related. Their occurrence may be more common than we have been able to map from the herbarium collections as they are often overlooked; none of these will be discussed here. In the north of Mexico, a number of taxa, with distributions essentially in the United States, reach across the border and are therefore not rare as such; these, too are excluded here. None of the species of *Pinus* occurring in Central America are absent from Mexico and since none are rare pines, I shall not discuss them either. So we are left with those pines, which occur only in Mexico and have very restricted ranges. It must be said here, that forest depletion, especially in southern Mexico, has its negative effects on the abundance of several species and may well be expected to push some pines into rarity in the foreseeable future. One candidate for this may be *Pinus strobus* var. *chiapensis*, nevertheless, it is not a truly rare pine now and besides, I want to focus on the naturally narrow endemics in this paper. The following 9 pines can be listed in this category:

Pinus cembroides subsp. *lagunae* (Rob.-Pass.) D.K. Bailey
Pinus cembroides subsp. *orizabensis* D.K. Bailey
Pinus culminicola Andresen & Beaman
Pinus jaliscana Pérez de la Rosa
Pinus juarezensis Lanner
Pinus maximartinezii Rzed.
Pinus nelsonii Shaw
Pinus pinceana Gordon
Pinus rzedowskii Madrigal & M. Caball.

The rare species

With the exception of *P. jaliscana*, all these are more or less related and have been classified in *Pinus* section *Parrya*, which has traditionally encompassed both the taxa in the *P. cembroides* group - here besides *P. cembroides* also *P. culminicola* and *P. juarezensis* (the latter not universally accepted as species and indeed closely related to *P. quadrifolia*) - as well as the others listed except *P. rzedowskii* (recently discovered and now included), and further a few pines from the USA as well as China and the Himalaya. The heterogeneity resulting has recently led to proposals to remove some of them from the section altogether and classify them as a section (or even subgenus) all by themselves. Although most of these proposals are hardly based on thorough phylogenetic research, they nevertheless express the unique characters that some of the rare pines of Mexico have. I should like to focus on a few of these pines here in particular, and only briefly mention the others.

Pinus cembroides Zucc. is a widespread, bushy pine in the drier parts of Mexico, and the two recognized subspecies are primarily genetic variants with constant, but small differentiating characters occupying restricted ranges. *P. cembroides* subsp. *lagunae* (also classified as a species and a variety!) is a good example of disjunction: it occurs only in a limited part of the Sierra de la Laguna near the southern tip of Baja California. There it is the only pine, about one thousand km away from other pines on the peninsula, and several hundred km from those on the mainland (*c.*500 km from the nearest *P. cembroides*). It differs from that species in its longer leaves and some other minor characters. We do not know how it became so isolated, but the most likely explanation would be disjunction both by range restriction and simultaneous movement of southern Baja, with the Sea of Cortez constantly widening the gap between it and the mainland. *P. cembroides* subsp. *orizabensis* is restricted to Puebla, Veracruz and Tlaxcala in an area surrounded by Mexico's highest volcanos and the coastal mountains of Veracruz. It is the southernmost "piñon", which may have increased its range with the drying of the climate, which is still moister than in most of the range of *P. cembroides*.

P. culminicola, closely related to *P. cembroides* but somewhat more distinct than its subspecies, most conspicuously in habit and leaf number, was described from the summit of Cerro Potosí in Nuevo León. Further searches both in the field and in herbaria have revealed that it occurs on other high mountains in the region. On Cerro Potosí it forms above the tree line spectacular, dense thickets (matorral) only 1-1.5 m high, but elsewhere it has been found among other trees (mostly pines) where it remains a multistemmed shrub up to 5 m tall. Fires can destroy large portions of the populations, which are mostly very disjunct.

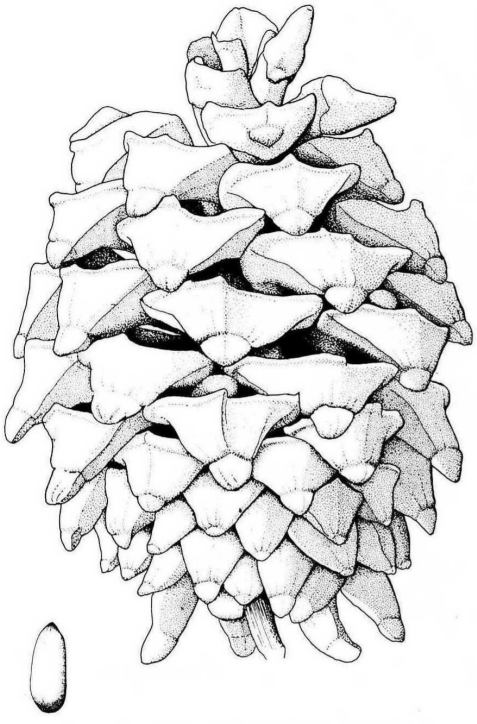
Pinus juarezensis is closely related to *P. quadrifolia*, which latter species is believed to be a product of hybridization between *P. monophylla* and *P. juarezensis*. Its differences with *P. quadrifolia* are slight, mainly in the leaves which are more slender and more often in fascicles of 5, rather than 4. It is most common in the Sierra de Juarez of Northern Baja California, where it has virtually the same range as *P. monophylla* and *P. quadrifolia*, but unlike the two others, only barely reaches into the USA, where it is only known from San Diego County, California. More exact molecular methods, such as cpDNA comparison, are much wanted to research the relationships and taxonomic status of these pinyons of northern Baja.

Pinus jaliscana is an interesting species with affinities to *P. patula*, which does not occur in its area, and *P. oocarpa*, with which it is sympatric, but from which it is easily recognized as distinct both in the field and from herbarium specimens. There may be other relationships with taxa which belong in this alliance, such as *P. tecunumanii*, but none of these occur anywhere near Jalisco.

I now come to the four remaining Mexican endemics, which are very much the more interesting, since they are highly distinct, not only between each other, but also from all other Mexican pines. As a generalization, it can be assumed that each of them represents one of the older evolutionary lines in the genus, as they all have one or several plesiomorphic characters shared with pines to which they are unlikely to be closely related. At that, they are almost certainly palaeorelicts, but since their habitats are such, that deposits of fossil-bearing sediments are extremely unlikely, it is doubtful that related fossils will ever be found to substantiate this theory. Phylogenetic research, using cladistic analysis, is another possible approach, and a preliminary study of their cpDNA is presently undertaken here at OFI.

Pinus maximartinezii is probably now the best known of them, mainly due to its massive cones, among the largest and heaviest in pines, its consequently large seeds, which are wingless and edible as in the "true pinyons" (*P. cembroides et al.*). It is restricted to the southern part of the

Sierra Morones, above the village of Juchipila in Zacatecas, where it occupies an area of several square km. Perhaps it may occur on some other mesas or mountains in the area, but no one has reported it from any of these since it was discovered in 1963. Its cones are very similar to those of *P. gerardiana* from the western Himalaya, with which it shares some further characters, but differs in others. Its single fibro-vascular bundle in the leaves has a distinct (functionally partitioning?) median wall of enforcement cells, which perhaps is an evolutionary remnant of the transition phase between haploxyl and diploxyl pines, whereby it is assumed that the former were derived from the latter. But, it also shares characters with *P. cembroides* and its allies, such as the peculiar fascicle sheaths, which recoil before they are shed shortly before fascicle abscission.



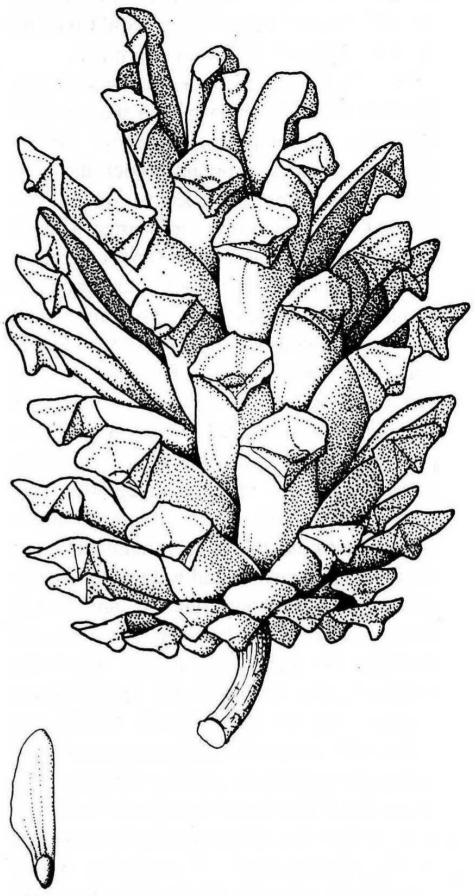
Seed cone and seed of *Pinus maximartinezii*. Adaption to bird dispersal of the seeds has led to the evolution of a very large, woody cone and large seeds which shed the rudimentary wing and do not leave the cone.

Pinus nelsonii is a rare small pine with a combination of characters making it very dissimilar to other pines. It has a nearly white, smooth bark, which only breaks into small plates on the lower trunks of the largest trees. Its leaves, in fascicles of two, remain connate throughout their development, yet they are amphistomatic, *i.e.* with stomata on both the abaxial and the adaxial face, so that the ones on the adaxial faces of the leaf pair are not exposed. The sheaths of the fascicles are persistent. The cones are very long pedunculate, the peduncles are curved positioning the cones in a pendant situation, yet the scales do not part wide enough for the large, wingless seeds to be released. Instead, the scales, being only weakly attached to the rachis, break off easily and the cone thus disintegrates when it falls from the tree. The cone scales resemble those of the true pinyons (*P. cembroides* s.l.) only superficially, and the cones are much longer. This shrubby pine is restricted to small and scattered localities in hills and mountains above the desert valleys of NE Mexico, mainly in SW Tamaulipas, S Nuevo León and Central San Luis Potosí.

Pinus pinceana is also a shrubby pine of the hills and mountains above the deserts of NE Mexico, but with a much wider range, occurring from Hidalgo to N Coahuila. It has drooping, slender branches but rigid, straight leaves in fascicles of 3, rarely 4. The sheaths of the leaf fascicles recoil as in *P. cembroides*. The cones are glossy red-brown or orange-brown, the scales have very thick and hard apophyses, but they are extremely weakly attached to a very thin rachis, so that they are easily (re)moved and indeed, the cones disintegrate to release the wingless seeds, as in *P. nelsonii*. However, differences between them are considerable and there is no sound evidence that the two are closely related.

Finally, *Pinus rzedowskii* may well be the rarest pine of Mexico, counting trees, although it has been found in three different localities in the state of Michoacan. This pine grows to a medium sized tree, in one of its localities to 20-25 m tall. It resembles in many characters pines of widely separate relationships, even across the two subgenera. Nevertheless, from its leaf anatomy it should appear to be a member of the subgenus *Strobus*, but whether it belongs in section *Parrya* as has been proposed, seems quite doubtful. The leaves are finely serrate (not found in pinyon pines), in fascicles of 4-5, which have the typical recoiling fascicle sheaths of the pinyons. The cones are similar in their structure of the scales to those of the subgenus *Pinus*, including the small seeds with well developed articulate wings. This pine, probably more than any other species in the genus, merits a molecular approach (investigating its DNA structure) in order to clarify its genealogical relationships with other pines. Material for such research has been collected by the author in May 1994. Its habitat is also peculiar, as it occupies steep limestone talus slopes, where it finds a footing among large limestone blocks. In two of its localities no other pines grow with it, although the rocky slopes are in areas with extensive pine forest. Peculiarly, other rare and endemic conifers, presumed to be relicts of formerly much larger populations, occur on limestone outcroppings or other base-rich rocks surrounded by other soil types now occupied by apparently more successful species. Ecophysiological research focusing on the mechanisms of such relationships may be well worth the effort as they may throw some light as to how some of the rare and possibly ancient relict conifers managed to survive.

Aljos Farjon



Seed cone and seed of *Pinus rzedowskii*. Adaption to wind dispersal of the seeds has led to the evolution of pendant cones with thin scales, from which the small, winged seeds fall easily. DNA study of these pines points to a close relationship. Drawings by Rosemary Wise.

Parkinsonia and *Cercidium*

Together the genera *Parkinsonia* L. and *Cercidium* Tul. contain about ten species of small trees and spreading shrubs found mainly in arid regions. Three species are East African and one Southern African; the remainder are American, distributed from the Southern United States and Mexico to Argentina. The greatest number of species are to be found in the Sonoran desert. Past attempts to delimit *Parkinsonia* and *Cercidium* have produced conflicting results. Different authors have identified differing generic groupings, and some have chosen to unite the genera. Carter (1974) reviewed a century of controversy and concluded that "the question of generic relations cannot be resolved without first making extensive comparative studies of these trees (biology, morphology, cytology and genetics) from seedling stage to maturity". Interspecific and intergeneric hybrids have been described within the group (Carter, 1974b; Carter and Rem, 1974; Dimmit, 1987). Any extensive comparative study would include the investigation of putative hybrids.

Over the last two years a systematic investigation of the genera has been started as an Overseas Development Agency funded doctoral research program under the auspices of the Forest Genetics Group. The Forest Genetics Group is concerned with all aspects of the conservation and utilization of forest genetic resources, including systematics, documentation, exploration and collection, reproductive biology and improvement of woody species. The investigation of *Parkinsonia* and *Cercidium* was initiated since *Parkinsonia aculeata* in particular is perceived as being a valuable species in the rehabilitation of marginal, degraded and erode lands. This species has been introduced pantropically as an ornamental and for fencing, firewood and fodder. A systematic study can contribute to any future development of *Parkinsonia aculeata* and provides the framework within which the potential and status of the lesser-known species may be investigated. Whilst the utility of *P. aculeata* is a consequence of its outstanding ability to survive and grow well under harsh environment conditions of soil and climate, this characteristic has resulted in the development of extensive weedy populations in many of the areas to which it has been introduced. The author would be extremely interested receiving any accounts of naturalised populations of *P. aculeata.*

The project commenced with an examination of specimens at K, MEXU, TEX, and UC herbaria and four months field work in Mexico, Guatemala, Honduras, Nicaragua and Costa Rica. Seed and silica-dried leaf material and insect pollinators were collected in addition to botanical material. A cladistic analysis of morphological and anatomical characters is in progress in Oxford. The investigation of the status of putative hybrids between *P. aculeata* and *C. praecox* has involved the morphometric assessment of morphological intermediacy, as well as an investigation of the distribution of randomly amplified polymorphic DNA (RAPD) markers. Currently work is underway on the acquisition of molecular data to be used in a further cladistic analysis. It is hoped that chloroplast and nuclear DNA sequence variation can be considered in the context of relationships suggested by the morphological/anatomical cladogram and in the context of documented interspecific hybridization events. The work will contribute to a resolution of the longstanding taxonomic confusion surrounding the generic delimitation of *Parkinsonia* and *Cercidium.*

Carter, A.M. (1974). The genus *Cercidium* (Leguminosae: *Caesalpiniodeae*) in the Sonoran Desert of Mexico and the United States. Proc. Calif. Acad. Sci., 40 pp.17-57

Carter, A.M. (1974b). Evidence for the hybrid origin of *Cercidium sonorae* (Leguminosae: *Caesalpiniodeae*) of North-West Mexico. Madroño, 22 pp.266-72

Carter, A.M. and Rem, N.C. (1974). Pollen studies in relation to hybridization in Cercidium and Parkinsonia (Leguminosae: *Caesalpiniodeae*). Madroño, 22 pp.303-11

Dimmit, M.A. (1987). The hybrid Palo Verde "Desert Museum": A New, Superior Tree for Desert Landscapes. Desert Plants, 8(3) pp.99-103

Julie Hawkins



Parkinsonia aculeata. This species shows a pantropical distribution following introduction. Infestations result from efficient water dispersal of the indehiscent pod. Dense spinescent rachises and stipules contribute to its status as a troublesome weed. The author would be interested to learn of any infestations of *P. aculeata.*

Thomas Kirk: His collections at Oxford

Thomas Kirk was born on 18 January 1828, in Coventry, Warwickshire. He spent his early life in Britain and was educated by his parents. In 1862 he emigrated to New Zealand with his wife and four children. He soon began a life of botanical exploration, becoming curator of the Auckland Institute and Museum in 1868, lecturer in Natural Sciences at Wellington College, University of New Zealand, in 1874 and later Chief Conservator of State Forests (see Desmond 1977, Stafleu & Cowan 1979, Sampson 1985).

In the years until his death in 1898, Kirk collected widely and described many new taxa. Cheeseman (1906, 1925) notes that Kirk's herbarium was purchased after his death by the New Zealand government. This purchase comprised only a small part of the collections he made during his lifetime, but at least contained the types of his new species. Unfortunately it did not include his botanical papers and manuscripts. His specimens of New Zealand plants are now held by AK, WELT, NY, BM (NH), K, and the Fielding-Druce Herbarium, Oxford (OXF) which contains some 500 specimens covering *c.*180 genera, including Bryophytes, Pteridophytes, Conifers and Angiosperms, of wide New Zealand distribution.

How Kirk's specimens came to Oxford is not recorded. OXF holds many early New Zealand specimens including collections by A. & R. Cunningham, J.D. Hooker, W. Stephenson and W. Colenso. It is known that Professor Marmaduke Alexander Lawson (Sherardian Professor of Botany from 1868-1882) incorporated several collections from his relation John Lawson and Sir James Hector and who both visited New Zealand in the mid nineteenth century. However, given the dates of Kirk's work and death in 1898, it is likely that the Kirk specimens arrived during the period of curation by George Claridge Druce (Druce became Special Curator in 1895). Although Druce travelled widely in the late nineteenth and early twentieth centuries, there is no record of him ever having visited Australasia. However, he is known to have organised the presentation or purchase of several sets of "well identified specimens" (Clokie, 1964). Many of the Kirk specimens are annotated "Herb T. Kirk, Wellington" and are probably duplicated in AK or WELT. Many are of specimens he collected himself and maintain labels in his hand.

The Forest Flora of New Zealand, (Government printer, Wellington) is probably Kirk's greatest completed work and was commissioned by the New Zealand government in 1889. It contains some 108 taxa and was illustrated by D. Blair, A. Hamilton, H. McKean, H. Boscawen, E.J. Graham and W. de R. Barclay with some 142 lithograph plates (some of which are in three to four parts). The material held in OXF includes most of the species covered in this text. There are also several fine specimens of *Nothofagus, N. fusca* and *N. menziesii* as well as a good collection of *Metrosideros*, dated from the late 1860s.

T.F. Cheeseman (1906). Manual of the New Zealand Flora. Government Printer, Wellington

Manual of the New Zealand Flora, 2nd edition (1925). Edited by W.R.B. Oliver. Government Printer, Wellington

Desmond, R. (1977). Dictionary of British and Irish Botanists and Horticulturists. Taylor Francis Ltd, London

Clokie, H.N. (1964). An account of the herbaria of the department of Botany in the University of Oxford. Oxford University Press, Oxford

Sampson, F.B. (1985). Early New Zealand Botanical Art. Reed Methuen, Auckland

Stafleu, F.A. & Cowan, R.S. (1979). Taxonomic literature. W. Junk b.v. Publishers, The Hague

Mark Large

Systematics paper discussion group

The fortnightly paper discussion group has had a lively and thought provoking year. A wide-ranging choice of papers provoked an amicable exchange of views, sometimes over-running the allotted hour with continuing debate during the fortnight. Papers concerning species concepts, biogeography, hybridization, extinction, molecular data, fossils and character delimitation have been selected. Guest "debaters" have joined us for certain papers, for example we benefitted from the expertise of Rod Page when we discussed Kare Bremer's 1992 paper, Ancestral Areas: A Cladistic Reinterpretation of the Centre of Origin Concept. Syst. Biol., 41(4) pp.436-45. The following have also been discussed:

Baldwin, B.G. (1991). Chloroplast DNA evidence for a North American origin of the Hawaiian silversword alliance (Asteraceae). Proc. Natl. Acad. Sci USA, 88 pp.1840-3

Bremer, B. (1991). Restriction data from chloroplast DNA for phylogenetic reconstruction: is there only one accurate way of scoring. Pl. Syst. Evol., 175 pp.39-54

Darwin, C. (1859). Mutual affinities of organic beings: Morphology: Embryology: Rudimentary organs. Chapter XIII in On the origin of the species by means of natural selection.

Demeke, T., Adams, R.P. and Chibbar, R. (1992). Potential taxonomic use of random amplified polymorphic DNA (RAPD): a case study in *Brassica*. Theor. Appl. Genet., 84 pp.990-4

Doyle, J.J. (1992). Gene Trees and Species Trees: Molecular Systematics as One-Character Taxonomy. Syst. Bot., 17(1) pp.144-63

Nixon, K.C. and Carpenter, J.M. (1993) On outgroups. Cladistics, 9 pp.413-26

Patterson, C. (1981). Significance of fossils in determining evolutionary relationships. Ann. Rev. Ecol. Syst., 12 pp.195-223

Stevens, P.F. (1991). Character states, morphological variation, and phylogenetic analysis: A review. Syst. Bot., 16(3) pp.553-83

Wilson, P. (1992). On inferring hybridity from morphological intermediacy. Taxon, 41 pp.11-23

Julie Hawkins

Frank White



Frank White, Sc.D., Distinguished Research Curator, Oxford University Plant Sciences Department, a leading expert on the flora of tropical Africa, died on 12 September aged 67. He was born on 6 March 1927.

The world of Botany is deprived by the loss of Frank White, a major authority on the plants and vegetation of tropical Africa, author of many important theoretical and practical papers and editor and compiler of the definitive vegetation map of Africa.

Although born and brought up in a small town house in Sunderland without a garden, he began to take an interest in plants and nature at any early age. When two, he pleaded with his mother to leave intact his windowsill garden which consisted of a matchbox of chickweed. By the age of six, before he had a bicycle, he used his roller skates as transport to the nearest park in order to watch birds. This passion for natural history developed and, to the amazement of his family, in 1945 he obtained a scholarship to Cambridge to study botany. After graduating, because of the shortage of university teachers after the war, he was exempted from national service and took up a position at Oxford University in 1948. His career began as forest botanist in the Commonwealth Forestry Institute and later he also became Curator of the Forest Herbarium and the Fielding-Druce Herbarium of the Plant Sciences Department of Oxford. During his career he made several extended field trips to Africa to study the vegetation. Beginning as a plant taxonomist he soon became the world expert on the ebony family or Ebenaceace, but his field work led to a much broader interest in the vegetation as a whole and to the co-ordination of a definitive map of the African vegetation for UNESCO, for which he also wrote the text. He is also known for his division of Africa into vegetation regions termed phytochoria. He was the creator of the term "ochlospecies" that has now been adopted by taxonomists around the world.

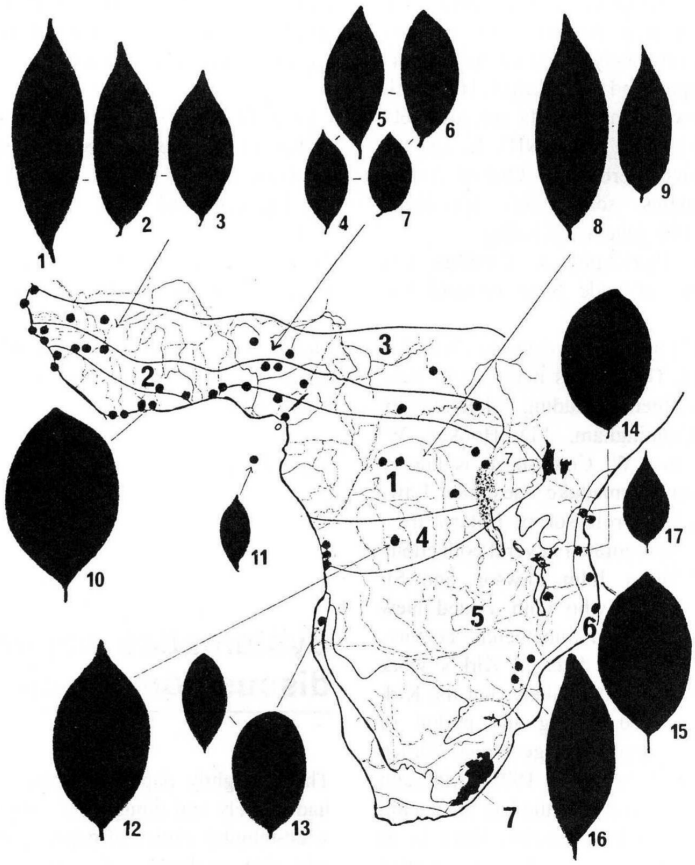
In addition to being a scholar and an intellect White will be remembered as a humorist and raconteur. He had the capacity of embroidering a grain of truth about his experiences in Africa or about a fellow botanist into a witty saga. Some of his stories such as that of being chased by an ostrich while on a motor scooter in South Africa will long be recounted by his colleagues.

White was also the archetypal host, symbolised by his choice of the name Firkin's for his cottage in the Oxfordshire village of Taston. He was a gourmet cook who was always a generous, bountiful host and was full of enjoyment himself.

As a university teacher White inspired many students and his work will continue because of their work around the world. From the Royal Botanic Gardens, Kew to Kuala Lumpur and Malawi, White's ex-students continue to explain the world of botany, using his methods, inspired by his perfectionism and still telling either his stories or stories about him.

Despite a long and brave struggle with emphysema during the last ten years of his life, he continued to work and produce some of his most significant publications during that time. In 1991 he received a Sc.D. from Cambridge University in recognition of his publications. He is survived by his sister, Audrey Nichol.

Ghillean Prance



An illustration taken from *The taxonomy, ecology and chorology of African Ebenaceae I: The Guineo-Congolian species*. F. White (1990). Bulletin du Jardin Botanique Nationale de Belgique.

Diospyros ferrea (Willd.) Bakh. pictorialized distribution map showing variation in leaf-shape in Africa: 1 Guinea-Bissau 2 Guinée 3 Ghana 4-7 Nigeria 8-9 Zaïre 10 Côte d'Ivoire 11 S. Tomé 12-13 Angola 14-15 Tanzania 16 Zimbabwe 17 Tanzania.

Regional phytochoria: 1 Guineo-Congolian Region 2 Guinea-Congolia/Sudania transition zone 3 Sudanian Region 4 Guinea-Congolia/Zambezia transition zone 5 Zambezian Region 6 Zanzibar-Inhambane Region 7 Afromontane Region (only the larger massifs are indicated).

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