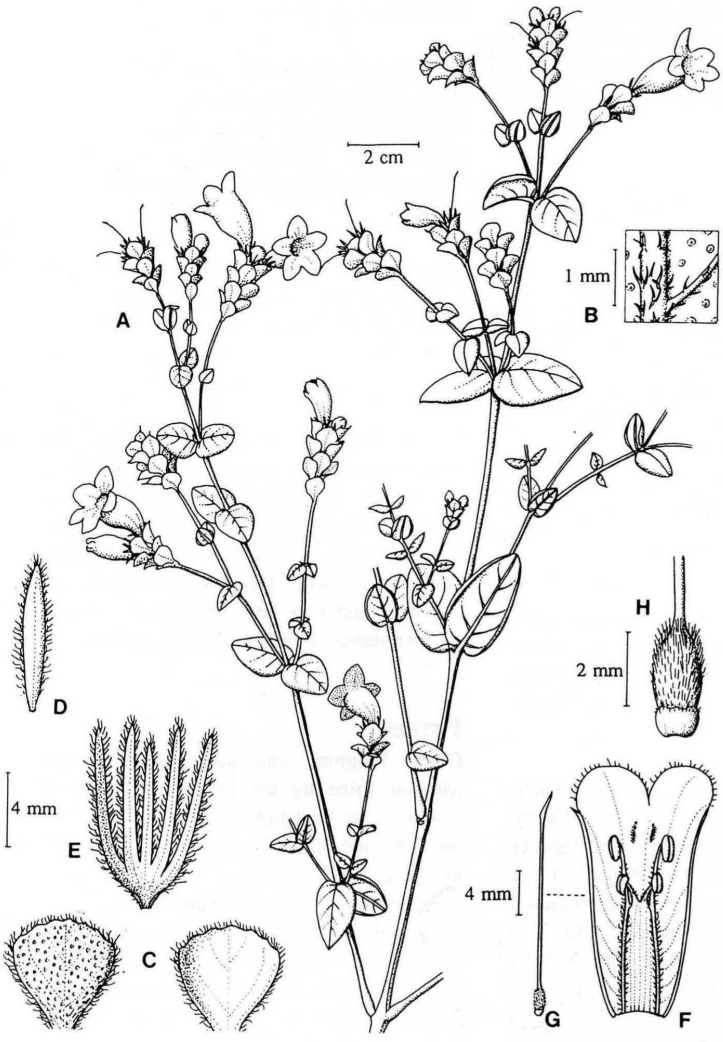
Oxford Plant Systematics

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

OPS 5 December 1997



Strobilanthes punctata Nees was until recently known from only four collections. The most recent of these was collected by A.H.G. Alston in 1927. It was rediscovered in 1994 (Scotland and Jayasekara 54, 55, 56, 65). *S. punctata* is a Sri Lankan endemic, confined to Adams Peak, Kandy District.
A. Habit. B. Detail of abaxial leaf surface. C. Bracts. D. Bracteole. E. Calyx. F. Flower. G. Gynoecium. H. Ovary.

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Editorial

This year has been a busy time for systematics at Oxford Plant Sciences. The Systematics Association inaugural biennial conference which we hosted in August [see news item] was a great success. Thanks to everyone who helped out, to Serena Marner, Alison Strugnell and especially to Cynthia Styles who provided invaluable secretarial support. From our department papers were presented by Mark Carine [*Strobilanthes*], Denis Filer [data bases], Julie Hawkins [primary homology], Colin Hughes [choosing between multiple trees] and Robert Scotland [primary homology]. Two D.Phil. vivas were successfully defended during the year [pages 3-4 for abstracts] by Karen Sidwell and Rogier de Kok who have now left to take up systematic positions elsewhere [news items]. We also say goodbye to David Harris and Julie Hawkins who have moved onto post-docs in Edinburgh and South Africa. An important part of this year's research activity has been the submission of Dr Colin Hughes' monograph of *Leucena*. Soon after winning the Irene Manton Prize for his thesis, Colin finished the monograph which is now in press in the Systematic Botany monograph series. The monograph combines alpha taxonomic descriptive botany with systematic analysis of the highest standard. It is a brilliant piece of systematic botany. Also, just published is the excellent monograph and associated field guide of *Pinus* by Aljos Farjon and Brian Styles [see publications]. Aljos completed this work in Oxford after the sudden death of Brian Styles.

Thanks to Serena Marner for all her efforts in putting together OPS 5.

Robert Scotland

News Items

Oxford Plant Sciences hosts International Conference

From August 19-21 1997, the Systematics Association held their inaugural conference [which is to be a biennial event] in Oxford at St Anne's College and the University Museum. The conference was attended by more than 250 people with delegates from many countries including Spain, HongKong, Canada, U.S.A., Korea, S. Africa, Brazil, Australia, Israel and Tazmania. The conference was the first attempt in the U.K. at providing a forum for all those interested in systematics to present their work through an open programme of fifteen minute presentations. The number of student presentations of high quality was evident and the conference was widely viewed as a great success in that it managed to fulfil its principal aim of attracting many young systematists to come and join discussion and present their work. Dr. Julie Hawkins from Oxford Plant Sciences won the award for the best student paper. In addition to the open programme the conference contained thematic sessions on : analyzing large molecular data sets; primary homology and character delimitation; disseminating taxonomic information. The conference was notable for the absence of any papers on species concepts. The session on primary homology will be published by Chapman and Hall and edited by Robert Scotland and Toby Pennington. The next conference in 1999 will take place at Glasgow University.

Robert Scotland

General news

Julie Hawkins having completed her D.Phil. thesis and a short post-doctoral fellowship, left Oxford in August to take up the Smuts Memorial Botanical Fellowship held jointly at the University of Cape Town and the National Botanical Institute Kirstenbosch in South Africa. Julie is planning to work on the systematics of the large Papilionoid legume genus *Aspalathus* which is endemic to South Africa.

Congratulations to **David Harris** who has recently left Oxford Plant Sciences to take up a post-doc at Edinburgh Botanic Garden. David will monograph *Amomum* Roxb. (Zingiberaceae).

Karen Sidwell on leaving Oxford has taken up a new position at The Natural History Museum, London working as a researcher on the Flora Mesoamericana Project. Flora Mesoamericana is the first major regional flora ever written in Spanish, and is a collaborative effort between The Natural History Museum, London (BM), the Instituto de Biologia of the National Autonomous University of Mexico (UNAM), the Missouri Botanical Garden (MO) and numerous specialists worldwide. She is currently writing Oxalidaceae and Basellaceae for the Flora as well as editing taxonomic accounts and contributing to the constantly updated web site. See Karen's thesis abstract on page 4.

Rogier P.J. de Kok has accepted a position as a Post Doctoral Fellow at the CSIRO in Canberra. The project is for two years and nine months. The main aim will be to resolve taxonomic problems in *Pultenaea* (Fabaceae) at species level and below, with particular reference to eastern Australian taxa.

Julian Robinson started as a post-doc working on a project on the molecular systematics of the genus *Malus* Mill. (Rosaceae), in collaboration with Dr. B. Juniper, funded by the Leverhulme Trust.

M. Dolores Llèdó started as a post-doc working on a project on the molecular systematics of the genus *Pinus* L. (Pinaceae) funded by the EU Framework IV Biotechnology programme.

Welcome to **Jamie Gordon** who started a three year research position, funded by D.F.I.D., working on a project entitled: Conservation through use of tree species diversity in fragmented Mesoamerican dry forests.

Elizabeth Moylan is working in the Church Laboratory for Dr. Robert Scotland for a period of several months. Elizabeth is databasing *Strobilanthes* specimens from Sri Lanka and Southern India.

Joseph Pao, a botanical artist from The Forest Research Centre, Kuching, Sarawak visited the Daubeny Herbarium for ten weeks, supervised by Phil Bacon and Rosemary Wise. Joseph is one of the main contributors to the Tree Flora of Sabah and Sarawak and was here for further training on techniques of botanical illustration.

Prizes

Colin Hughes was awarded the Irene Manton Prize by the Linnean Society of London, for best botanical Ph.D. thesis in the UK submitted in 1996 for his thesis entitled 'Systematics of *Leucaena* (Leguminosae: Mimosoideae)'. The prize consisted of a Grecian pot and a cheque for £1000. Colin was also awarded jointly with **David Harris** the Brian Thomas Styles Memorial Prize of £150 of books by the University of Oxford.

Brian Thomas Styles Memorial Prize

Cynthia Styles, the widow of the late Dr. Brian Styles, presented the Memorial Prize to Colin Hughes and David Harris:

"This is the first time that the Prize has been awarded since Brian died in September

1993, and it gives me enormous pleasure in congratulating both **David Harris** and **Colin Hughes** on sharing the Memorial Prize for the best thesis in Brian's beloved subject, *Taxonomy*. I know that if Brian were alive today he would have been very proud of you both.

Brian supervised David's DPhil. thesis to its conclusion, but with Colin's thesis he was responsible only for planting the seed - encouraging him to do his DPhil., but due to his untimely death, was therefore unable to be his supervisor.

I was very moved when Colin told me that he had dedicated his thesis to Brian, and the late George Gibson. As you well know, George met a tragic end to his life when he fell to his death on Ben Nevis in 1994, the year after Brian died.

May I wish you, David, every success in your new post at the Royal Botanic Garden Edinburgh, and many many congratulations, and to Colin may your future hold lots of exciting career prospects in store."

News from Oxford Botanic Garden

The Botanic Garden staff produced a Biodiversity Display & Posters in Spanish, Chinese and Indonesian for use in China, Indonesia, Mexico and Africa. These were aimed at pre-University students and paid for by the Darwin Initiative.

This year the Botanic Garden was awarded the only gold medal (again) in the Science and Education section of the Chelsea Flower Show. The display centred on the use of plants in modern medicine.

Timothy Walker

Student progress

Jonathan Bennett (D.Phil., first year). A systematic study of *Strobilanthes* Blume (Acanthaceae) from Java and Sumatra. Supervised by Robert Scotland. BBSRC studentship. *Strobilanthes s.l.* comprise a major part of the flora in the mountainous regions of Indonesia. The most recent Flora of Java lists 36 species belonging to *Strobilanthes*, although the limits to these species have been questioned by some authors. Work has begun on the problems of species delimitation and will lead to a re-examination of the generic limits of *Strobilanthes*. Initially a morphological approach is planned, although, following field work in Java and Sumatra next year, molecular techniques may be employed to help define the exact generic limits of *Strobilanthes*.

Mark Carine (D.Phil., third year). Systematics of *Stenosiphonium* Nees in relation to *Strobilanthes* Blume. Supervised by Robert Scotland and Tony Cox (Kew). BBSRC Studentship. *Stenosiphonium* and *Strobilanthes* are closely related genera in the Acanthaceae. Work revising *Stenosiphonium* and investigating species relationships and genetic delimitation using morphological and molecular techniques is continuing. A field trip to southern India was undertaken during February and March of 1997, working in collaboration with TBGRI, Palode, Kerala and with the Botanical Survey of India, Coimbatore, Tamil Nadu. Several species of *Strobilanthes* were collected from the Silent Valley National Park and Kerala High Ranges.

Augustine Chikuni (D.Phil., third year). A taxonomic study of *Brachystegia* Benth. (Caesalpinioideae-Leguminosae). Supervised by Stephen Harris and Brian Schrire (Kew). Sponsored by the Commonwealth Scholarship Commission. For the past two years I have concentrated on surveying useful morphological characters for the systematic analysis of *Brachystegia*. The current classification of *Brachystegia* was based upon morphological characters which show a complex pattern of variation; thus most species share similar characters. The pollen morphology, the bark and wood anatomy are being investigated to see if they can provide useful information for delimiting closely related species. During field work undertaken in Malawi, Zambia and Zimbabawe (Oct.-Dec. 1996) I managed to identify field key characters often not included on herbarium specimens. I am very grateful to Trapnell Fund (Oxford UK) for sponsoring my field work. The complex pattern of morphological variation in *Brachystegia* is thought to be due in part to hybridization. A molecular approach is being followed to characterise some hybrids. Taxon-specific RAPD markers for the putative parents have been identified and additivity of these markers may confirm hybridization in *Brachystegia*; hybridization in *Brachystegia* is being tested rigorously for the first time in this research programme.

Julian Starr (D.Phil., first year). A phylogenetic study of *Uncinia* Pers. (Cyperaceae). Supervised by Stephen Harris and David Simpson (Kew). Commonwealth Scholarship. This small genus (60-70 species) is one of six genera in the taxonomically complex tribe Cariceae. Tradition and the absence of reliable morphological characters has been a source of confusion in *Uncinia* and the Cariceae. Traditional characters (morphology, achene micromorphology, anatomy and chromosome numbers) combined with DNA sequence data will be used to clarify specific and generic limits, and construct a phylogeny for *Uncinia*.

Abstracts of systematic theses submitted in 1997

The following two D.Phil. abstracts by Drs. Rogier de Kok and Karen Sidwell were submitted during this year and successfully defended. We wish Karen and Rogier all the very best with their future careers.

Rogier de Kok

The Biology and Systematics of *Oxera* Labill., *Faradaya* F. Muell. and *Hosea* Ridl. (Labiatae)

Abstract

Oxera Labill. with twenty one species, *Faradaya* F. Muell. with three, and the monotypic *Hosea* Ridl. belong in the Family *Labiatae*. *Oxera* is endemic to New Caledonia, with one species in Vanuatu, *Faradaya* is found from Tonga and Samoa to North Queensland and North Borneo, and *Hosea* is endemic to Sarawak and Brunei. The placing of these closely related genera in the systematic system has been problematic in the past. The existing classification of these genera is reviewed using cladistic methods.

The taxonomic history (chapter 1) and morphology (chapters 2 & 5) are discussed. Distribution of certain flavonoids in *Oxera* (chapter 3) and the 5.8S and flanking internal transcribed spacer regions of the nuclear ribosomal DNA (chapter 4) are analyzed. Variation within these character sets are analyzed using cladistic methods.

The resulting patterns are compared with one other and a "total evidence" analysis is preformed. All three genera form separate monophyletic clades and the whole group also forms a monophyletic clade.

The pollination biology is discussed (chapter 8) and the most likely evolutionary hypothesis of pollinator preference and soil preference of *Oxera* (chapter 7) is analysed.

Karen Sidwell
A Revision of *Brillantaisia* P. Beauv. (Acanthaceae)

Abstract
Morphological data from herbarium, living and field collections were used to revise the tropical African genus *Brillantaisia* across its entire geographic range. Previous estimates of the number of species in the genus have ranged from 13 to 40, whilst relations between *Brillantaisia* and the rest of the Acanthaceae are unresolved. In addressing the criticism that taxonomists often do not explicitly state the protocol adopted in their work, this monograph of *Brillantaisia* focuses on concerns about methodology in botanical systematics.

Application of Nelson and Platnick's (1981) character-based species concept enabled recognition of twelve species within *Brillantaisia*. The main taxonomic changes are that *B. stenopteris*, is new to science; *B. riparia* is raised from a variety of *B. pubescens* to species level and *B. grotanellii* is recognised as distinct from *B. madagascariensis*. *B. ulugurica* and *B. cicatricosa* are considered conspecific. Results from principal components analyses of *B. owariensis* supported the reduction of many previously recognised species into a single widespread and variable ochlospecies (*sensu* White 1963).

Cladistic analyses of 23 taxa (including the 12 species of *Brillantaisia* and 11 outgroup taxa) and 48 morphological characters showed *Brillantaisia* to monophyletic. Two subgeneric groups within *Brillantaisia* were identified, one of which corresponds to section Stenanthium of Lindau (1895a). The tribe Hygrophileae, containing *Brillantaisia* and *Hygrophila*, is monophyletic. *Hygrophila* formed a paraphyletic sister group to *Brillantaisia*, and is considered to be in great need of revision. The sister group to *Brillantaisia* is unresolved.

An illustrated taxonomic account of *Brillantaisia* is provided.

Recent publications

Farjon, Aljos and Styles, Brian T. (1997). *Flora Neotropica Monograph* **75**: *Pinus (Pinaceae)*. With accounts of wood anatomy by Ian D. Gourlay, pollen morphology by Marie H. Kurmann and monoterpenes by Jacqueline S. Birks. Illustrations by Rosemary Wise. 293pp. The New York Botanical Garden, New York.

Farjon, Aljos, Perez de la Rosa, Jorge A. and Styles, Brian T. (1997). *A field guide to the pines of Mexico and Central America*. 147pp. Royal Botanic Gardens, Kew.

Farjon, Aljos, Perez de la Rosa, Jorge A. and Styles, Brian T. (1997). *Juía de campo de los pinos de México y América Central.* 151 pp. Royal Botanic Gardens, Kew.

Harris, D. and Godyer, D.J. (1997). A new record of *Neoschummania kamerunensis* (*Asclepiadaceae*) from the Central African Republic. *Kew Bulletin* **52(3)**: 733-735.

Harris, S.A. and Abbott, R.J. (1997). Isozyme analysis of the reported origin of a new hybrid species, *Epipactis youngiana* (Young's Helleborine), in the British Isles. *Heredity* **79**: 402-407.

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Marner, S.K. (1997). Druce and the Ashmolean Natural History Society of Oxfordshire. In Watkins, Frances & Marner, Serena (eds.) *The Memorial Day held for George Claridge Druce 18th May 1996*, Ashmolean Natural History Society of Oxfordshire, 3-4, 12.

Marner, S.K. (1997). Lectures given by G.C. Druce to the Ashmolean Natural History Society of Oxfordshire. In Watkins, Frances & Marner, Serena (eds.) *The Memorial Day held for George Claridge Druce 18th May 1996*, Ashmolean Natural History Society of Oxfordshire, 14-17.

Pannell, C.M. (1997). A new cassowary-dispersed species of *Aglaia* (*Meliaceae*, section *Amoora*) from Papua New Guinea. *Kew Bulletin* **52(3)**: 715-717.

Scotland, R.W. (1997). Parsimony neither maximizes congruence nor minimizes incongruence or homoplasy. *Taxon* **46**: 743-746.

Expeditions and visits

Denis Filer visited herbaria in Belgium (BR), North Brazil (IAN, MG), Kenya (EA), the Netherlands (L, WAG) and Portugal (LISC) in relation to BRAHMS database project work. Presentations on BRAHMS were given in June at the Forestry Research Programme (FRP-DFID) Taxonomy Day (Kew) and in August at the First Biennial Systematics Association Conference held in Oxford, the former focusing on applications for biodiversity projects, the latter on monographic work.

Stephen Harris made a presentation, to the 'Advances in Molecular Systematics' Conference held in Glasgow in August 1997, on the value of randomly amplified polymorphic DNA data in systematics.

Colin Hughes visited the island of Kauai in Hawaii, U.S.A. in June to attend a one-week workshop entitled *Appropriate and Inappropriate Introductions of Non-Native Species*, hosted by the Institute of Pacific Islands Forestry of the United States Forest Service.

Rosemary Wise spent four weeks at the Forest Research Institute of Malaysia, producing drawings for revisions and for Volume 3 of the Tree Flora of Sabah and Sarawak Project, which at present receives funding from ODA U.K. This trip was in August, during a drought and at the height of the widespread forest fires in Kalimantan and Sumatra which have caused catastrophic pollution over much of South East Asia. Kuala Lumpur was enveloped in an eery greyish-yellow haze for the duration of her visit, obliterating the sun completely.

Rarity of *Strobilanthes* Blume and *Stenosiphonium* Nees

Strobilanthes is a large genus (350-450 species) distributed widely over south and south-east Asia. In southern India and Sri Lanka there are 74 species found mainly along the Western Ghats of southern India and in the Sri Lankan Hill Country.

Stenosiphonium, a genus closely related to Strobilanthes, comprises three species and is confined to southern India and Sri Lanka.

The lack of herbarium material for many species of the two genera is striking. Wood (1995) noted that three Sri Lankan species of *Strobilanthes*, namely *S. caudata* T. Anderson, *S. hypericoides* J.R.I. Wood and *S. nigrescens* T. Anderson are only known from the type collections and that a further six species are only known from a few collections, all of which were made over 60 years ago: *S. arnottiana* Nees, *S. deflexa* T. Anderson, *S. gardneriana* (Nees) T. Anderson, *S. punctata* Nees, *S. thwaitesii* T. Anderson and *S. zeylanica* T. Anderson. Thus, nine species out of a total of 30 in Sri Lanka are rare i.e. known only from type or from few collections made more than 60 years ago.

A BRAHMS database of *Strobilanthes* herbarium specimens at BM, K, MH, OXF, is currently being produced by Elizabeth Moylan. From this we can provisionally extend the list of 'rare' species (i.e. those known from only a few collections) to include the following from southern India: *S. amabilis, S. andersonii, S. anamallica, S. bolampattiana, S. canarica, S. ciliata, S. circarensis, S. decurrens, S. dupeni, S. gracilis, S. meeboldii, S. papillosa, S. reticulata, S. scorbiculata, S. urceolaris*.

Additionally, whilst *Stenosiphonium cordifolium* (Vahl) Alston has been widely collected, *S. wightii* Bremek. and *S. setosum* T. Anderson are known from five and seven collections respectively. Thus together, the two genera comprise 77 species in southern India and Sri Lanka, of which 26 may be considered rare.

Strobilanthes is often the dominant shrub in upland forests of the southern Indian and Sri Lankan hills. However, large areas of such vegetation in southern India and Sri Lanka were cleared for plantations during the last century, and in the forests of southern India, *Strobilanthes* were cut down to encourage the growth of young tree seedlings (Gamble 1888). The destruction of habitats, and the selective cutting of *Strobilanthes* may have led to some species becoming extinct.

Recently however several rare species have been rediscovered: *Strobilanthes punctata* Nees, rediscovered after 67 years; *S. dupeni* Bedd., previously only known from the type specimen collected by Beddome in 1881; *S. arnottiana* Nees, last collected by Beddome; *S. decurrens* Nees, again previously known only from Beddome collections; *Stenosiphonium setosum* rediscovered by botanists from TBGRI, Palode, Kerala (see Thomas et. al. 1995) 78 years after the last collection. It would appear that the destruction of habitats alone does not account for the rarity of so many species of *Strobilanthes* and *Stenosiphonium*.

Another factor that may contribute to the apparent rarity of some species is the plietesial flowering cycle which has been recorded for several *Strobilanthes* (Matthew 1970; Wood 1994, 1995). Plietesial plants grow for a number of years, flower gregariously, set seed and then die.

In southern India the most famous plietesial *Strobilanthes* is *S. kunthiana* (Nees) T. Anderson. Robinson (1935) recorded a twelve year flowering cycle for this species from the Nilgiri Hills between 1838 and 1934, based on the diaries of one of the earliest European families to settle in the Hills. Matthew (1970) reported a twelve year flowering cycle for the same species in the Palni Hills. Nilgiri means "blue mountains" and it is suggested that the gregarious flowering of the blue flowered *S. kunthiana* gave the hills their name.

The flowering cycle of *S. kunthiana* and of a handful of other *Strobilanthes* species is well documented. However, for the majority of *Strobilanthes* and for *Stenosiphonium* there are no detailed records.

During early 1996, I spent two months in Sri Lanka and southern India collecting *Strobilanthes* and *Stenosiphonium* and visiting herbaria. I visited several localities where *Stenosiphonium cordifolium* had been collected flowering in abundance one or two years earlier, and found a small flowering population at just one of the localities. At all others there were abundant seedlings. Whilst this is certainly not conclusive evidence for a plietesial flowering cycle, it does at least suggest that after gregarious flowering of *S. cordifolium* the plants die, and are followed by the rapid germination of seedlings of the next generation.

I returned again to southern India in 1997. I had already collected *Stenosiphonium cordifolium* and *S. setosum* (the latter from the living collection at TBGRI), and on my return trip I was keen to collect the third species of *Stenosiphonium* - *S. wightii*.

S. wightii is known only from the following collections (herbaria given in brackets):

R. Wight - no date (K)
E. Barnes - no date (K)
E. Bowden - Feb 1947 (K)
P.D. Kamath - Feb 1958 (PCM)
K. Rajasekaram - Feb 1958 (PCM)
F. Blasco - Jan 1971 (HIFP)
N. Pathasarathy - Jan 1984 (MH)

All were collected from the Mundanthurai Forest area which has been extensively botanized since the time of Robert Wight in the early 1800's. The paucity of specimens of this species was therefore surprising.

Five of the collections are dated - 1947, 1958, 1971, 1984, and the intervals between them are 11, 13 and 13 years respectively. The apparent rarity of *Stenosiphonium wightii* therefore might be because it is plietesial, with a 13 year cycle. If so then 1997, 13 years after 1984, should have been a year of mass flowering.

Soon after my arrival in India early in 1997, I visited Mr Chellandurai, Government Botanist at the Survey of Medicinal Plants Unit in the Sidha Medical College, Palyamkottai. He had visited the Mundanthurai Forest during February of 1997 and had collected *Stenosiphonium wightii* which was flowering gregariously over a long distance along the roadside. *S. wightii* known previously from only seven collections was growing in abundance in 1997. The apparent rarity of this plant is a reflection of it's flowering cycle. To collect *S. wightii* you need to be in the right place at the right time - Mundanthurai, every 13 years.

There is however a potential flaw in this story. The interval between the 1947 and 1958 collection is only 11 years. Further, the Sidha Medical College herbarium contained another specimen from 1987 (the label of which described it as 'rare'). Neither specimen fits in with the 13 year cycle, but nor do they disprove the plietesial idea. Both Wood (1994) and Matthew (1970) have observed that in plietesial species of *Strobilanthes* a number of individuals in a population flower asynchronously. These are most abundant in the years immediately preceding and following a mass flowering. The 1947 specimen (two years out of synchrony), and the rare 1987 specimen (three years out) are probably asynchronous individuals. I visited the Kerala High Ranges in 1997, three years after a mass flowering of *S. kunthiana*. Whereas the hillside was covered in blooms in 1994, I

found, after a lot of searching, a single specimen in 1997.

The *S. wightii* example would suggest that there are more plietesial species than have so far been recorded in the literature. If so, could data from herbarium specimens be used to predict the next mass flowering of other species? *S. wightii* with such a restricted distribution and sufficient specimen details allowed us to generate a hypothesis to explain its apparent rarity. Luck, doing this in 1997, a year of mass flowering, allowed us to at least partially test the idea, and conclude that the apparent rarity of *S. wightii* is a reflection of its plietesial life cycle [it is of course important to collect data on abundance of flowering specimens etc. during the coming years, and any information on this would be very welcome].

Unfortunately, the *S. wightii* example was the exception rather than the rule. The age of collections of most other rare species means that they lack locality details and dates. Even if they have this information, determining flowering cycles can still be problematic. In the *S. kunthiana* example, including the rare flowering specimen from 1997 in the sequence of dates, and taking no account of the abundance of the plant during that year would totally obscure the twelve year plietesial flowering cycle of this species. For specimens to be of any use they must include precise locality details, date and abundance, and few rare species are known to this level of detail.

The destruction of the natural vegetation of the hills of southern India and Sri Lanka for plantations etc. must surely have threatened the survival of some species, and for those, it might be too late. However, other under-collected species might be plietesial, and the fact that considerable populations of several species have recently been rediscovered after many years adds some weight to this idea.

Collecting *Strobilanthes* and *Stenosiphonium* involves being in the right place at the right time. Further botanical explorations might yet show other apparently rare species to be locally abundant, if only periodically.

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Mark Carine

If anyone has observed gregarious flowering in *Strobilanthes* I would be interested to receive details.

Pollen morphology in *Brachystegia* Benth. (Leguminosae - Caesalpinioideae)

Brachystegia shows a complex pattern of morphological variation (Hoyle & White, 1962). Unfortunately, the existing classification of the genus was based upon such variable morphological characters. Despite the utilisation of pollen in systematics, pollen variation amongst *Brachystegia* species has not been investigated in detail. Published data on *Brachystegia* pollen is scattered and limited to a few species. Sowunmi (1973) investigated pollen grains of *B. nigerica* Hoyle *et* APD Jones and *B. eurycoma* Harms as part of a broader study of pollen grains of Nigerian plants and noted that the pollen was coarsely reticulate and that the apocolpia were sharply delimited from the mesocolpia since the apocolpia appeared to be finely reticulated. Graham & Baker (1981) in their classification of Caesalpinioideae pollen reported that *Brachystegia* pollen was largely coarsely reticulate and was unique in the Tribe Amherstieae since the apocolpium region had irregular granulate aggregations (Figs. A & B). Hoyle's (1955) segregation of a monotypic genus *Librevillea,* based on a species originally placed in *Brachystegia* (*B. klainei* Pierre *et* Harms) was supported by the morphology of pollen. Hoyle (1955) and Graham & Baker (1981) appear to have concluded independently that the pollen morphology across *Brachystegia* was homogeneous, although apparently on the basis of limited data.

Whilst searching for characters for inclusion in the cladistic analysis of species relationships in *Brachystegia*, pollen of all recognised species of *Brachystegia* were investigated using both light and scanning electron microscopy. Pollen morphology of three genera related to *Brachystegia* (*Julbernardia* Pellegr., *Monopetalanthus* Harms and *Librevillea*) were also investigated. Pollen was prepared for SEM and light microscopy using standard acetolysis methods. For SEM the acetolysed pollen was sputter-coated with platinum and examined in a Hitachi S2400 SEM machine at an accelerating voltage of 18KV.

The present study recorded tricolporate pollen with coarsely reticulate mesocolpia ornamentation in most *Brachystegia* species. Using Erdtman's (1952) classification of shapes, *Brachystegia* pollen is spheroidal. The polar length (P) ranges from 40-64μm, whilst the equatorial length (E) ranges from 43-57 μm, giving a P:E ratio of 0.900-1.135. *Brachystegia* pollen has characteristic apocolpium ornamentation composed of irregular granulate aggregation (Fig. B). The present study agrees with earlier observations (Graham & Baker, 1981) that the pollen morphology of *Brachystegia* is homogeneous. However, the pollen morphology of *Brachystegia cynometroides* Harms differs remarkably from all other species in that the mesocolpium region is composed of incomplete reticulation or irregularly granulate aggregations and the apocolpium region has no granulate aggregations (Figs. C&D). *Brachystegia cynometroides* appears to be rhombic and the equatorial outline is triangular with straight edges. The colpi margins are thick and shapely raised as opposed to the thin, slanting margins in other *Brachystegia* species (Figs. C&D).

The apocolpium ornamentation of *Brachystegia* pollen has not been recorded in other Caesalpinioideae and it is interesting to note that Graham *et al* (1980) excluded *Brachystegia* pollen from their account of unique pollen types in Caesalpinioideae. *Julbernardia* pollen is predominately punctate with wide colpi (Fig. E) whilst *Librevillea* pollen is predominantly striate (Fig. F). *Monopetalanthus* pollen varies from striate (e.g. *M. richardsiae* J. Leon.) to punctate (e.g. *M. ledermannii* Harms and *M.*

pectinatus A. Chev.). Graham & Baker (1981) described three pollen types in the Amherstieae a) tricolporate, striate pollen; b) punctate pollen; c) large, coarsely reticulate pollen. *Librevillea* falls into the striate pollen category, whilst *Julbernardia* and *Monopetalanthus* are in the punctate pollen category. Graham & Barker (1981) assigned *Brachystegia* pollen into the coarsely reticulate pollen but *B. cynometroides* appears to be the odd-one out in the genus. *Brachystegia cynometroides* is the only *Brachystegia* species with petiolulate leaflets. The pollen results and occurrence of petiolulate leaflets appears to disagree with traditional placement of *B. cynometroides* in *Brachystegia.*

Acknowledgements
I am thankful to the authorities of Royal Botanic Gardens, Kew for their permission to use the Kew facilities, especially to Dr. I.K. Fegurson for the use of the SEM facilities and Hannah Banks for her generous assistance in the preparation of the pollen. Further thanks are due to Dr. S.A. Harris and Dr. B.D. Schrire (Kew) for supervision and the Commonwealth Scholarship Commission for sponsoring my research.

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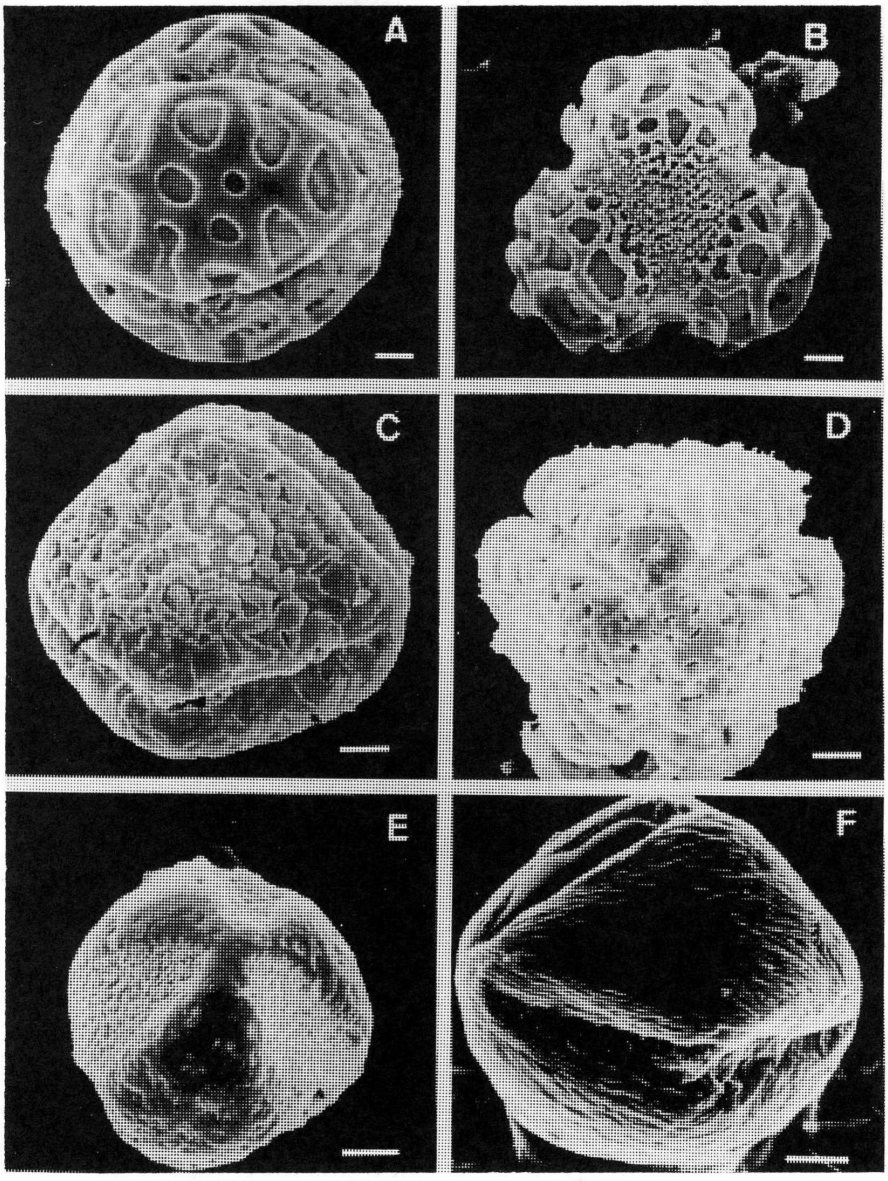


Fig. A. *Brachystegia stipulata* De Wild.; Fig. B. *B. longifolia* Benth.; Figs. C. & D. *B. cynometroides* Harms; Fig. E. *Julbernardia globiflora* (Benth.) Troupin; Fig. F. *Librevillea klainei* (Pierre & Harms) Hoyle.
Scale bar= 5μm.

Augustine Chikuni

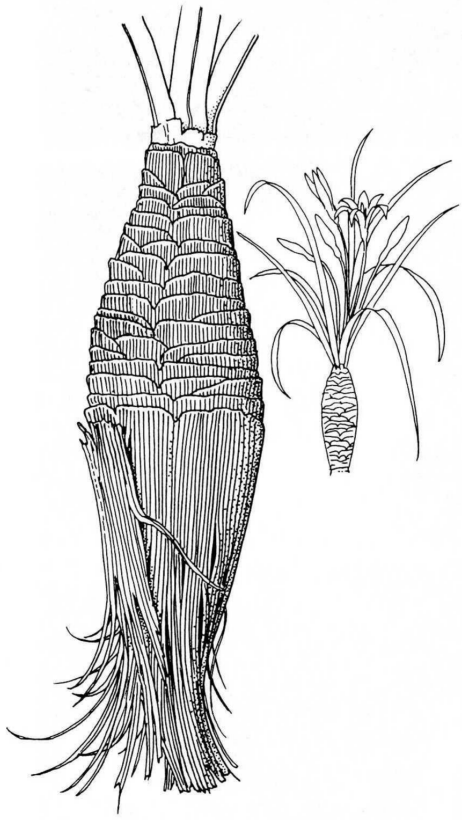
Check-list of the Flora of Mt. Mulanje, Malawi as known from the collections of J.D. Chapman held in FHO

The floristic diversity and phytogeographical importance of Mt. Mulanje, a massif in south-eastern Malawi, has been of on-going interest since it was first highlighted by Alexander Whyte (Whyte 1892; Brenan et al. 1953/54 and Groombridge 1992). It was, however, through the continued efforts of Jim Chapman that the mountain came into prominence on the African scene (e.g. Chapman 1962, 1994 & 1995).

Jim Chapman, accompanied by his wife Betty, made collections of the Malawian flora on several occasions from the 1950s until the late 1980s, but the most prolific and comprehensive collections of Mulanje were made in the 1980s. Over a period of three decades he became increasingly familiar with the Mulanje flora and increasingly concerned about its survival, referring to it as "a mountain under seige" (Chapman pers. comm.). The great affection they have for Malawi and its people has increased their concern over the degradation of this particular environment and the long-term effect that this would have on the prosperity of the area. Proposals for an integrated conservation and management plan, compiled by the Department of Forestry and the National Herbarium (MAL) and Botanic Gardens, were submitted to the Malawian Government in 1990.

Some Chapman numbers are housed at E, K, MAL, MO and SRGH but the bulk of his collections are in FHO. It seemed important to publish a check-list based on these collections, not least to highlight the dedication that Jim and Betty have given to publicising the botanic, economic and social importance of this massif (Chapman 1994). I felt we had a responsibility as a herbarium to make constructive use of such collections and to publicise their existence in order that re-collections of a threatened flora are kept to a minimum. We believe that an annotated check-list of the Mulanje flora would be a useful tool for any future development on the mountain. The check-list is evolving from an identification list of Chapman numbers, compiled as the specimens were received by FHO from Malawi during the time that Frank White was producing his account of the evergreen trees and shrubs of Malawi in Oxford (White et al. in prep.).

Malawi is situated approximately mid-way along the chain of mountains extending, with intervals, from the Ethiopian Highlands to South Africa (Chapman & White 1970). Mt. Mulanje is an isolated mountain block surrounded by plains and has all the attributes of an inselberg (Porembski 1996). The flora of Mt. Mulanje is important botanically because of its endemics, its affinities to the South African flora and the occurrence of montane species. It has been estimated (Chapman 1994) that there is in excess of 800 species, of which 30 are strict endemics (but this may be an underestimate). Vegetation types include miombo woodland, evergreen forest (lowland relics, mid-altitude and montane), montane grassland, high-altitude shrubland and thicket, lithophytic and unique *Xerophyta* high-altitude communities.



Xerophyta splendens: persistent leaf bases sheath the stem below the flowering shoot.

The Mulanje Cedar (*Widdringtonia whytei* Rendle, Cupressaceae), recently designated as Malawi's National Tree, is one of the endemics of the mountain. It is highly prized for its strong, easily-worked timber that is resistant to termites, borers and fungal diseases. Until recently it had been assumed that there was only one (widespread) species of *Widdringtonia* on Mt. Mulanje, with a great variation in growth form, which has led to erroneous management decisions. Pauw & Linder (1997) have suggested that there are two species on Mulanje, *W. nodiflora* (L.) Powrie, an economically useless, multi-stemmed shrub or small tree widespread in southern Africa, and *W. whytei*, the economically desirable, tall forest tree, which is now an endangered species.

The only other large, forest tree species endemic to Mulanje is *Rawsonia burtt-davyi* (Edlin) F. White, Flacourtiaceae (Dowsett-Lemaire & White 1990). The endemics, *Protea caffra* Meisn. subsp. *nyasae* (Rendle) Chisumpa (Proteaceae) and *Rhus monticola* Meikle (Anacardiaceae), are small, non-forest trees or shrubs (Chapman & White 1970).

The endemic tree-lily, *Xerophyta splendens* L.B. Smith & E.S. Ayensu (Velloziaceae), forms a habitat type unique to Mulanje. Dense stands of individuals reach a height of up to 4m at high altitudes (2200m). Their fibrous 'stems', composed mainly of adventitious roots, provide a specialized habitat for epiphytes, some of which are Malawian endemics, e.g. the orchid *Polystachya johnstonii* Rolfe (La Croix et al. 1991).

Of the remaining endemic species, some are shrubs, e.g. *Euphorbia mlanjeana* Leach, *Clutia brassii* Brenan, *C. conferta* Hutch. and the sub-shrub *Phyllanthus confusus* Brenan (Euphorbiaceae), but the majority are herbaceous. It is the herbs which make the Malawian inselbergs rich in endemics, especially Mt. Mulanje (Porembski 1996). To date I have found that there are, for instance, five *Helichrysum* species as well as four or five other Compositae, three *Streptocarpus* species (Gesneriaceae), two *Plectranthus* species (Labiatae), two *Impatiens* species (Balsamiaceae), one other Euphorbiaceae, two Ericaceae and several monocotyledon species endemic to Mulanje.

Several tree species on Mulanje do, however, fall into the category 'Afromontane endemic' (species confined to montane regions but sub-alpine), e.g. *Cussonia spicata* Thunb. (Araliaceae) and *Xymalos monospora* (Harv.) Baill. (Monimiaceae).

Most Afromontane endemic tree species have a widespread but disjunct distribution (Chapman & White 1970). *Restio mahonii* (N.E.Br.) Pillans (Restionaceae) is a herbaceous Afromontane endemic showing a similar distribution (Linder 1994). Even Afromontane endemic tree species with a restricted range usually occur on several isolated mountains, e.g. *Faurea racemosa* Farmar (Proteaceae) found only in southern Malawi (including Mulanje) and Mt. Namuli in Mozambique (Marner 1989). The Afromontane species, *Turraea holstii* Gürke and *Lepidotrichilia volkensii* (Gürke) Leroy (Meliaceae) reach their southern limits on Mulanje whereas others reach their northern limits on Mulanje, e.g. *Vaccinium exul* Bolus (Ericaceae) and *Pterocelastrus echinatus* N.E.Br. (Celastraceae) (Chapman & White 1970).

Some plants that are found on Mulanje have affinities with the South African flora, e.g. *Kniphofia mulanjeana* Blackmore (Liliaceae) closely resembles *K. ichoepensis* Bak. *ex* Schinz from Natal (Blackmore 1980), whilst others are tropical representatives of mainly South African genera, e.g. *Restio mlanjiensis* Linder and *R. mahonii* (N.E.Br.) Pillans.

The check-list is already well on its way to completion, the time being mainly spent on obtaining accurate identifications for all specimens. I would like to acknowledge the great help already given me by staff of the Kew herbarium.

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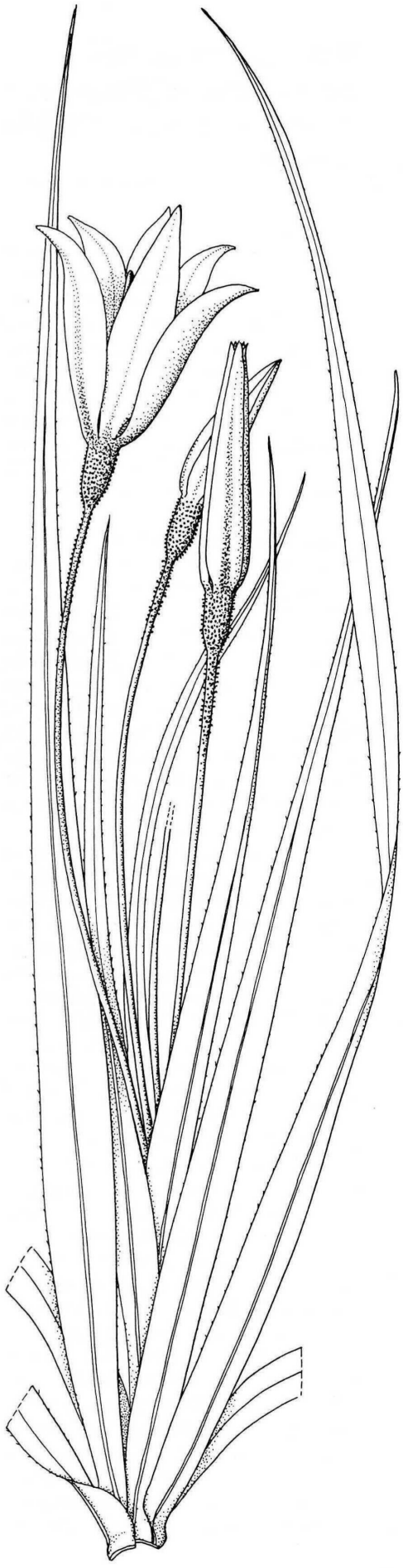
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Alison Strugnell



Xerophyta splendens L.B.Smith & E.S.Ayensu (Velloziaceae): young leaves and flowers borne at the end of each branch.

References to the collections of Engelbert Kaempfer (1651-1716) in Oxford

I. Introduction.

During our researches into Engelbert Kaempfer's botanical works we came across a reference by H.N. Clokie (1964) mentioning that "at least one specimen from Kaempfer" can be found in the Sherardian Herbarium at Oxford (OXF). On further checking through the collections we were able to discover more unexpected traces of Kaempfer in the herbarium of William Sherard (1658-1728), thus showing here his influence on early 18th century botany.

II. Biographical notes on E. Kaempfer.

Engelbert Kaempfer, German scientist, physician, linguist and artist (1651-1717), is best known as one of the greatest travellers of the baroque period, and as an explorer of Japan. His "Geschichte und Beschreibung von Japan" was translated into several languages (e.g., English: "The History of Japan [...]", London 1727) and reprinted many times. He also travelled to Russia, Persia and the Cape of Good Hope, accompanying the Dutch East-India Company as a surgeon.

He left behind an enormous amount of manuscripts, drawings and objects from these travels, which Sir Hans Sloane (1660-1753), founder of the British Museum, acquired at the beginning of the eighteenth century and incorporated in his famous collection, which was to form the basis of the British Museum. Kaempfer's manuscripts are still kept in the British Library's Department of Manuscripts, while his herbarium is preserved in the Department of Botany of the Natural History Museum in London. The major portion of Kaempfer's work was never published, apart from the descriptions he wrote about Persia (e.g. Persepolis) and Japan, which he published in his famous "Amoenitatum exoticarum" (1712). There he also gave a very detailed description of the Palm tree, of which a manuscript "Palmae Persicae Historia" can be found in the library of the Department of Plant Sciences at Oxford (MS. Sherard 187). Apart from this, Sir Joseph Banks published a small but substantial selection of Kaempfer's plant drawings from Japan in London in 1791. This will change as the works will soon be published as a historical-critical edition in Germany, including the extensive botanical manuscripts concerning Japanese botany.

III. Kaempfer and botany.

Kaempfer gained importance in the botanical world, especially with respect to the Japanese flora, because of the fifth fascicle of his "Amoenitatum". In this work he describes about 500 Japanese plants collected during his travels in Japan in 1690 and 1692 at some danger to his life. Twenty-six of them were illustrated by Kaempfer himself. He classifies these Japanese plants in five categories, not only as trees, shrubs and herbs but as follows : 1. plants bearing berries and plums; 2. plants bearing apples and nuts; 3. vegetables and fruit bearing plants; 4. plants with striking blossoms; 5. miscellaneous plants (e.g., coniferous trees, ferns etc.). For every plant, Kaempfer first writes the Chinese characters followed by the Latin transcription(s) of the Japanese plant name and the Latin description. The species were described before the introduction of the Linnean system of nomenclature.

Kaempfer was the first to describe the Ginkgo tree to the Europeans though he did not transcribe the name correctly: instead of "Gingyo" he wrote "Ginkgo" which is still the established term in botany. He described this tree as "Arbor nucifera folio Adiantino" (nut bearing tree with the leaf of Adiantum) in a very detailed way and made a drawing of a female Ginkgo tree branch.

Kaempfer posthumously gained the high esteem of Linnaeus (1707-1778) himself, Sir Joseph Banks (1743-1820), Carl Pehr Thunberg (1743-1822) and Philipp Franz Siebold (1796-1866), who all used Kaempfer's botanical work in the publication of their own names for the plants Kaempfer described and illustrated.

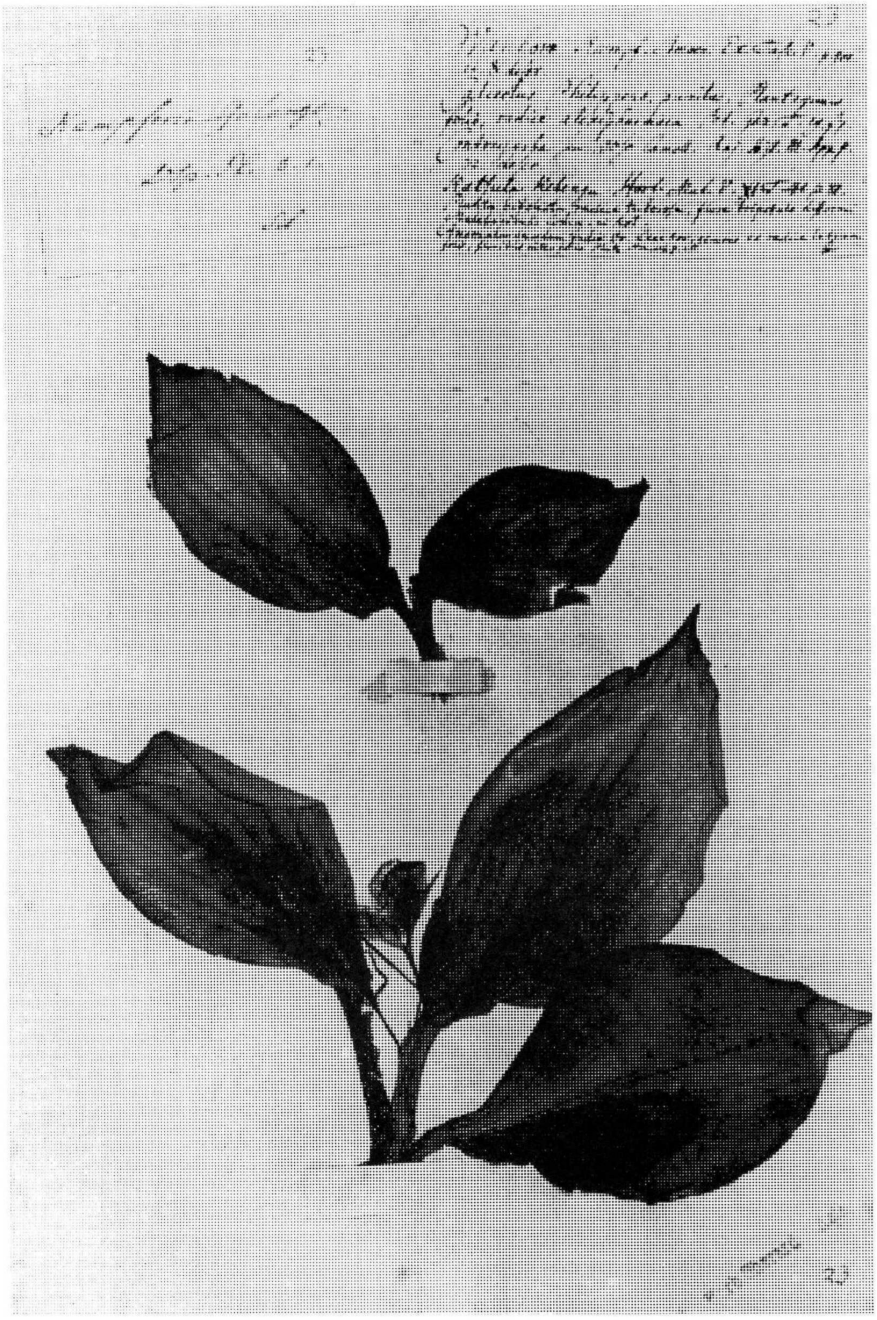
IV. Kaempfer and Oxford.

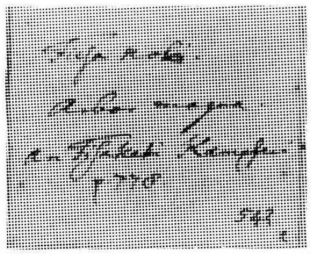
The importance of Kaempfer's "Amoenitatum exoticarum", especially fascicle 5, can also be seen in the herbarium of William Sherard. Our search in Oxford began with looking for a specimen of *Sium ninsi* L. on which Clokie (1964) says "Sherard has written 'a Kaempfero'". Unfortunately we have not been able to find this particular specimen. However we discovered about thirty specimens in the folders of Asian material which were determined with the help of Kaempfer's work. On labels, many possibly in the handwriting of Johann Jakob Dillenius (1684-1747), the first Sherardian Professor of Botany at Oxford, and a few in the handwriting of Sherard himself, Kaempfer is quoted word for word as "Kæmpf. Am. Ex. Fasc. V." usually followed by the specific page or at least "Classis". We shall mention two examples to show the style of determination, e.g. "*Kotai, vulgo Gommi, it[em] Fon Gommi, i[d] e[st], Olea montana legitima, vere florens, seu Olea sylvestris, Zizypho Cappadociæ J[ean] B[auhin] vulgo Oleæ Bohemicæ similis; folio duro, subtus argenteo, badiisque punctis verrucoso; floribus pari modo variegatis, figuram referentibus Caryophyllorum aromaticorum, in 4 labella crenatis; fructu (subnascente) Olivæ minori simili, per maturitatem rubente, argenteis(que) verrucis asperso, pulposo; nucleo albo, in longitudinem striato, saporis tetrici subamari. Kæmpf. Am. Ex. Fasc. V. p. 789*", specimen numbered 126. [Brackets mean a small deviation from Kaempfer's printed version (1712).] Or "*Laurus camphorifera, literatis (Japonicis) nomine characteris Ssio, vulgo Kusnoki. aliis Nambok Kæmpf. Am. Ex. Fasc. 5. Cl. 1*" (= p. 770, BR), specimen numbered 445. Other smaller labels attached to some of the sheets quoting Japanese names could be in the handwriting of Johann Philipp Breyne.

In several cases the plants could only have been determined with the help of Kaempfer. Others, which are also mentioned in books of Cleyer (a "forerunner" of Kaempfer), Ray or Plukenet etc., were determined by using their books and as well Kaempfer's book. At least two of the specimens were sent to Sherard from Jacob Breyne which were probably collected by W. ten Rhyne, a friend of Kaempfer. Sherard also documented his interest in Asian plants by publishing Paul Hermann's manuscript of the "Paradisus Batavus" 1698 and by acquiring numerous specimens from Hermann's herbarium. As already mentioned, Sherard owned a Kaempfer manuscript concerning the palm tree. Although Clokie writes that Kaempfer visited China, we now know he never visited China, but visited Java and Japan. Kaempfer also travelled around Ceylon, the Coromandel and Malabar Coast.

Further determinations of plants with references to Kaempfer can be found by John Sibthorp (1758-1796), e.g. *Kæmpferia galanga* (specimen numbered 23), a plant named by Linnaeus after Kaempfer. The original label on this specimen begins with "Wanhom. Kaempf. Amoen. Ex. Fasc. V ...." exactly as it is cited by Linnaeus in Species Plantarum (1753).

These very few examples demonstrate the importance of Kaempfer's botanical work and his impact on leading botanical scientists in the eighteenth century. This investigation has also highlighted some unexpected discoveries of early Japanese material, some possibly attributed to Kaempfer, in the Sherardian Herbarium at Oxford.





Above: specimen of *Kæmpferia galanga* L. from the Sherardian Herbarium determined by John Sibthorp.
Left: an example of a label possibly in the handwriting of Johann Philipp Breyne.

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Original source: Kaempfer, Engelbert (1712). *Amoenitatum exoticarum politio-physico-medicarum fasciculi V. quibus continentur variae relationes, observationes & descriptiones rerum Persicarum & ulterioris Asiae, multa attentione, in peregrinationibus per universum Orientem, collecte [...].* Lemgo: Meyersche Buchhandlung.

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Origin of the cultivated apple

The cultivated apple, *Malus* x *domestica*, is one of the most important temperate fruit crops (Janick *et al.* 1996). Like other important temperate fruit crops such as *Pyrus communis* (pear) and *Prunus* spp. (plum, apricot and cherry) it belongs to the Rosaceae. Apples are a crop of great antiquity with evidence of collection from the wild as early as 11,000 BP, and evidence of cultivation from about 1,000 BC (Hopf, 1973; Zohary and Hopf, 1994).

Malus is widely distributed across Europe and Asia, with a few species reaching into North America. There are 25-35 species within the genus. The primary centre of diversity is thought to be within the region which includes Central Asia, Western China, Himalayan India and Pakistan, Asia Minor and the Caucuses (Watkins 1995; Way *et al.* 1990).

Janick *et al.* (1996) suggested that the area around Alma Ata (the name means father of apples) in Kazakhstan is the centre of origin and diversity of the cultivated apple. *Malus sieversii* is found within this area and is considered to be the primary progenitor of *M.* x *domestica* (Morgan and Richards, 1993). This species, *M. sieversii*, forms large wild stands on the Tien Shan and surrounding mountains. *M. sieversii* displays a large range of forms, colours and flavours, some of which are very similar to *M.* x *domestica* cultivars. Other species that have possibly contributed to the domesticated apple include *M. orientalis* and *M. sylvestris* and from eastern Asia, *M. baccata*, *M. mandshurica* and *M. prunifolia* (Janick *et al.* 1996; Way *et al.* 1990; Watkins 1990).

Despite the importance of the genus *Malus*, relatively little rigorous work has been conducted into relationships between the close relatives of the domesticated apple. This is probably due to the complex patterns of quantitative morphological variation that are found within the genus; phylogenetic analysis of gene sequences may overcome these problems. Such data have been successfully used to determine species relationships in major groups of economically important plants, e.g. *Phaseolus* (Beccara Velásquez and Gepts 1994), *Arachis* (Paik-Ro *et al.* 1994) and *Triticum* (Hsiao *et al.* 1995; Kellogg *et al.* 1997). Molecular data will be collected from both the nuclear and cytoplasmic genomes to eliminate possible problems associated with hybridisation and within lineage sorting of ancestral polymorphisms. A comparative analysis of both genomes has provided evidence concerning reticulate evolution in both *Paeonia* (Sang *et al.* 1997) and Triticeae (Kellogg *et al.* 1997).

The study, funded by the Leverhulme Trust, is divided into two parts; the construction of an evolutionary tree for the diploid *Malus* species and then on the basis of this tree, the identification of putative DNA donors to *M.* x *domestica*. Analysis of the chloroplast genome will provide information about the maternal evolutionary relationships of the diploid species and the maternal parentage of *M.* x *domestica*. An analysis of the nuclear DNA will provide an independent data set from which to infer evolutionary relationships between the diploid species and, in the case of *M.* x *domestica*, the identity of potential paternal genome donors. The choice of which areas of the genome to sequence is an important one. At present we are assessing whether sequence analysis of two regions, the *trn* L (UAA) 3'exon-*trn* F (GAA) (Taberlet *et al.* 1991), and the internal transcribed spacers (ITS) of nuclear ribosomal DNA (Campbell *et al.* 1995; Baldwin *et al.* 1995), are adequate to distinguish Maloid taxa, and identify the donors of germplasm to *M.* x *domestica*. Both regions, on the basis of work so far completed, indicate the potential to discriminate *Malus* taxa.

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Julian Robinson

Oxera, Faradaya and *Hosea*, a D.Phil. thesis

In October this year, after three years of hard but enjoyable work, I passed my D.Phil. examination. I would like to thank everybody in Oxford and abroad who made this project possible, and especially those who made it enjoyable.

The first aim of my research was to revise the genera *Oxera* and *Faradaya*. The genus *Hosea* was later added to these two genera. In this revision of *Faradaya*, which has never been revised before, most names found in the literature are put into synonymy of three recognised distinct and variable species. The monotypic genus *Hosea* is maintained as a distinct genus. In *Oxera*, 21 different species and six subspecies are accepted, of which two species are new.

The second aim of my research was to test the monophyly of the group of genera under study and the monophyly of its different genera. Four different data matrixes (flavonoid, cpDNA, nrDNA and morphology) were compiled. The monophyly of the ingroup and of the constituent genera under study is confirmed in the accepted set of trees. In the analyses based on morphology only, the monotypic genus *Huxleya* is included in the ingroup. The monophyly of both *Faradaya* and *Oxera* is supported by all analyses, except the one based on the nrDNA data. The results based on the nrDNA data are markedly different from those based on morphological and flavonoid data.

The subdivision of *Oxera* of both Vieillard (1862) and Dubard (1906 & 1907) are not supported by this research. The genus is instead divided into five distinct informal groups.

One of the difficulties encountered during this research is the current state of knowledge of the systematics of the genus *Clerodendrum s.l.* Although some of the relationships between different groups of species within *Clerodendrum s.l.* have been largely resolved, the relative positions of some smaller species-groups like the *tridens*-group are highly uncertain (Steane 1995). The position of *Huxleya* within the *Labiatae* remains unclear. This is mainly due to the lack of data (morphology, DNA and flavonoid) concerning this taxon.

In order to solve these major problems, it will be necessary to monograph those parts of *Clerodendrum* (mainly Asiatic) not revised on modern lines. To start, specific groups within the genus, notably the *tridens*-group, with putatively closely related taxa like *Huxley, Hosea, Kalaharia, Aegiphila* and *Amasonia* should be selected and their relative position to each other studied with the help of morphological, flavonoid, DNA- and any other suitable characters.

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R.P.J. de Kok

Undergraduate Project

In the 1920s the British Field botanist George Claridge Druce FRS (1850-1932) described numerous infraspecific taxa in the British Flora. These were cited in the then Botanic Exchange Club Reports (now the Botanical Society of the British Isles) and in his Floras of Oxfordshire, Berkshire, Buckinghamshire and Northamptonshire, published between the years 1886 and 1930.

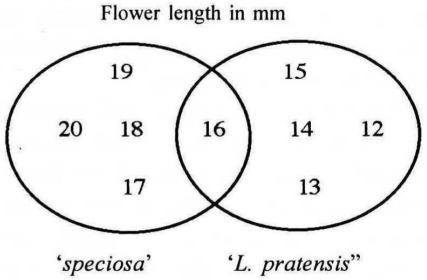
In the summer of 1996 I chose to investigate the validity of one of Druce's named variants within the species *Lathyrus pratensis* L. (Fabaceae). This work formed my FHS project as part of the undergraduate degree course in Biological Sciences.

The variant of *Lathyrus pratensis* was recognised by Druce on the Shetland Islands and was considered distinct on the basis of two morphological characters: number of flowers in the inflorescence and individual length of flowers comprising the inflorescence. It was described in 1922 and named *L. pratensis* var *speciosa* Druce.

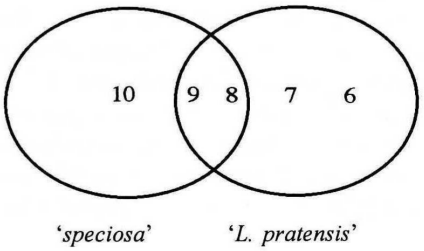
'(The) plant differs from the usual British plant in the much larger flowers measuring 16-20mm against 12-16mm in the English plant, and not only are they longer but they are larger and on average there is a greater number of flowers in the inflorescence 8-10 as against 6-9.'

G.C. Druce

Although he describes a direct relationship between the cited characters and groupings it is apparent that Druce's taxon delimitation is not valid for all values in each character. Flower length "16-20mm against 12-16mm" shows an overlapping value in a continuous character. If a specimen has flowers of length 16mm it could not be placed exclusively into either group as this particular length is common to both groups.



Flower number "8-10 as against 6-9" shows overlapping values in a discrete-meristic character. If a specimen has a total of 8 (or 9) flowers it would not be possible to describe it as *L. pratensis* (defined by 6-9 flowers) or variant *speciosa* (defined by 8-10 flowers).



From the original description alone it appears that Druce has imposed arbitrary boundaries on a continuum of variation in order to 'generate' morphological distinction.

To re-evaluate Druce's original taxonomic work and investigate the variation within *L. pratensis*, I examined specimens of *Lathyrus pratensis* from the Druce collection, OXF, (which holds the lectotype of var. *speciosa* designated by P.D. Sell in 1981) and further loans from BM, E, SLBI (South London Botanic Institute), LIV (Liverpool Museum) and ZCM (Zetland County Museum). To increase the number of specimens from Shetland however, it was necessary to join a geomorphological expedition (with 'Brathay Exploration') to the Shetland Islands. This enabled the collection of plants from the Mainland and the Island of Unst in areas where Druce had previously visited. In total, 245 specimens were gathered which provided a fair representation of the diversity of *L. pratensis* across the geographic range in Britain.

To assess the variation within the species, data was collected from twenty two morphological characters - floral, vegetative and fruiting - of which 'flower length' and 'flower number' were included. The resulting dataset was analysed using multivariate analysis (Principle Components) to efficiently summarise variation into three main components which could subsequently be displayed graphically (applying PNCOMP of the R-Package program).

The first three components accounted for 57.5% of the total variance but failed to identify the groups proposed by Druce. Despite *apriori* knowledge of the distribution of Shetland specimens (which were coded separately) the resulting plots revealed an amorphous scattering of points in which no disjunct groups could be recognised. In each plot the specimen considered to be var. *speciosa* was found amidst the continuum of points. Clines in variation which could correlate with extreme Southern or Nothern localities were not apparent.

In conclusion I was able to show that Principal Components Analysis demonstrates a morphological continuum of variation in *L. pratensis* in which a potential infraspecific taxon shows considerable overlap with *L. pratensis*. It is on this basis that I consider var. *speciosa* an artificially nominal variant entirely unrepresentative of a real group in nature.

Acknowledgements

I would like to thank Dr. Robert Scotland for his invaluable advice while supervising this project and Serena Marner for her help and time. I am grateful to the curators of BM, E, LIV, SLBI and ZCM for loans of specimens and to Somerville College for a travel grant.

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Elizabeth Moylan



The drawing on the left of the picture was made from the lectotype of *Lathyrus pratensis* L. var *speciosa* Druce (OXF). The illustration highlights two extremes of variation which would seemingly indicate distinct variants. No variants can be distinguished, however, when all specimens are investigated. Here, leaflet variation alone reveals a continuum.

Herbaria

Visitors

Between October 1996 and September 1997 we were very pleased to welcome 151 visitors to the herbaria. A group of 13 students attending the Kew International Diploma Course in Herbarium Techniques made an external visit to OXF and FHO during their course. Another group visit was made by 16 students and their tutor from AERDD (Agricultural Extension & Rural Development Department) at Reading University.

Fielding-Druce (OXF)

The historic herbaria of OXF

Many visitors came to study or research specific material within the historic collections. Amongst these were Beatrice Rauschenbach and Professor Brigitte Hoppe from the University of Munich who made some unexpected discoveries of early Japanese material with reference to Englebert Kaempfer in the Sherardian Herbarium (see article on page 10).

Collections of particular interest this year again included those of William Dampier in the Sherardian Herbarium. Dr Reeves, Executive Director of the Western Australian Museum, visited the UK especially to see the specimens collected by Dampier in 1699 from Western Australia.

Material collected by the English naturalist Mark Catesby between 1722-26 from Carolina, Florida and the Bahama Islands was the reason for visits by Henrietta Ryan, Deputy Curator of the Royal Collection at the Print Room Windsor Castle, while researching a book to accompany an exhibition of Mark Catesby's 'Natural History' watercolours. Mark Catesby was sponsored in his travels by William Sherard (amongst others) who received a set of specimens from him, now to be found in the Sherardian Herbarium. Margaret Pritchard and Virginia Lascara from the Colonial Williamsburg Foundation Virginia also visited Oxford especially to see specimens collected by Catesby.

The Morison collections were the focus of visits by Anne Becher-Hancock from Bristol University. Anne was specifically interested in the compilation of the plates used in Robert Morison's published works (*Plantarum Historiae Universalis Oxoniensis*) of 1680 and 1699.

David Tarver from Leicestershire was interested to see early cultivated specimens, including those of auricula, in the Bobartian Herbaria while researching the history of the introduction and cultivation of the plants.

Material from the historic collections is not available for general loan but when researchers are unable to visit the herbarium, photographs of specific sheets can be sent for taxonomic purposes when necessary.

The Druce Herbarium

The collection continued to be consulted by members of the Rare Plants Group of the Ashmolean Natural History Society of Oxfordshire in connection with extracting records for various species now under threat in the wild. Material accessed to the herbarium this year included several sheets of *Lathyrus pratensis* collected by Elizabeth Moylan during field work for her undergraduate project (see article on page 13).

The Fielding Herbarium

A start has been made on a Type Register for the herbarium as type specimens in the collection are identified by visitors, in the literature or returned from loan. A type specimen data-base for OXF has recently been set up. A programme of placing type material in special acid-free red folders is now well under way. This curatorial activity will continue for many years to come as there is such a large amount of type material in the herbarium as yet unidentified as such. A search has also been made for possible type specimens collected by William Roxburgh (1751-1815) from India in collaboration with Mr L. Forman of Kew. Visiting specialists are always welcome to look through material in OXF, especially in the Fielding Herbarium (worldwide collection 1796-1992).

Loans

Loans sent out from OXF (the Fielding and Druce collections) during the year from 1 October 1996 to 30 September 1997 included material from the following genera: *Acacia*, Leguminosae: Mimosoideae; *Cologania*, Leguminosae: Papilionoideae; *Cremastosperma*, Annonaceae; *Cuphea*, Lythraceae; *Digitalis*, Scrophulariaceae; *Diospyros*, Ebenaceae; *Geranium*, Geraniaceae; *Holcus*, Gramineae; *Marcgravia*, Marcgraviaceae; *Melampyrum*, Scrophulariaceae; *Pseudoxandra*, Annonaceae; *Sideritis*, Labiatae; *Siparuna*, Monimiaceae; *Souroubea*, Marcgraviaceae. Material of the following bryophytes and hepatics were also sent out on loan: *Barbilophozia, Bryum, Drepanocladus, Grimmia, Homomallium, Hypnum, Lescuraea, Leskea* and *Tayloria.* 388 specimens were returned to OXF from loan and, of those, c. 18% are types. From one returned loan of *Inga* (Leguminosae, Mimosoideae) from the Fielding collections, type material comprised 52 of the total of 167 sheets.

Serena Marner

Daubeny (FHO)

The emphasis this year has been on continuing the curation and overhaul of the collection in order to improve the accessibility of specimens. We are also looking at ways to produce a data-base of the FHO holdings. Limitations of funding prevent systematic documentation of the collection but we hope it will soon be possible to provide information on FHO specimens in genera used in recent studies.

Accessions

During the year October 1996 - September 1997, 818 sheets were accessed to the FHO collection. This number includes the Central American collections of Colin Hughes (*Leucaena*, Mimosoideae and other legumes) and Julie Hawkins (*Cercidium, Parkinsonia* and other Caesalpinioid legumes) as well as Rogier de Kok's *Oxera & Faradaya* (Labiatae) from the Pacific region.

Loans

A large number of sheets (1047) were returned to other herbaria and a small amount of loan material (275 sheets) was received. This latter included some additional specimens for Mark Carine (*Stenosiphonium*, Acanthaceae) and Augustine Chikuni (*Brachystegia*, Caesalpinioideae) although most was received for undergraduate projects or for illustration by Rosemary Wise and our visitor, Joseph Pao from Sarawak.

An increased amount of material was sent out on loan (924 sheets), the three largest loans comprising Neotropical Ebenaceae to W, African Anacardiaceae to BOL and African *Tarenna* (Rubiaceae) to BR.

Distribution of Duplicates

Nearly 900 specimens were sent to other herbaria as gifts. This number included the following collections: 532 sheets of Julie Hawkins' Central American legumes were sent to K, TEX, UC, CAS, NY, EAP & AA; 65 sheets of Rogier de Kok's *Oxera* & *Faradaya* were sent to L, P, NSW, FRIM, SUVA & BISH; and 111 sheets of David Mabberley's Verbenaceae & Meliaceae collections from Papua New Guinea were sent to L, NSW, CANB, FRIM, SAN & BISH.

Curation

The curation of the FHO collection continued throughout the year. The Ebenaceae was completed but a large residue of indet. material remains. Dr. Cynthia Sothers from K and Dr. Bruno Wallnöfer from W are now working on the neotropical Ebenaceae. Sections of other families were completed as material returned from loan, studies finished or unincorporated material was dealt with. They were *Leucaena* from Central and South America; African Graminae and Cyperaceae; African *Senecio* (Compositae); *Oxera* & *Faradaya* (Labiatae); *Pycnanthus* (Myristicaceae); *Ixora* (Rubiaceae); *Ocotea*, *Nectandra* & *Rhodostemonodaphne* (Lauraceae); African *Protea* (Proteaceae); African *Impatiens* (Balsamiaceae); African *Asparagus* (Liliaceae) and several small genera in the Caesalpiniodeae and Mimosoideae.

During the summer vacation, a temporary assistant (Angie Harris) was employed to start the overhaul of the carpological collection. Fruits were checked against herbarium specimens and labelling updated. The part of the collection completed is now in an excellent usable state and a data-base of these specimens is available.

The spirit collection is being dealt with in a similar manner, as a precursor to moving it out of the herbarium into purpose-built storage.

Alison Strugnell

EXHIBITION AT THE PITT RIVERS MUSEUM

School of Antropology and Museum Ethnography, South Parks Road, OXFORD, OX1 3PP

BRAVING THE ELEMENTS Conserving plant-fibre from around the world

OPENS NOVEMBER 22, 1997, ADMISSION FREE

How do people survive a tropical rainstorm without a plastic mac or an umbrella? How can you protect your eyes and skin without sunglasses or sun screen?

BRAVING THE ELEMENTS, the new special exhibition at the Pitt Rivers Museum, answers these questions by bringing together fascinating and ingenious garments from around the world to show a wide selection of clothing specially designed to beat the weather. All the garments are made from barely modified plant fibre and many have never been on public display before.

The garments range from an enormous Portuguese riding cape, measuring 8' x 9', to sunhats, snow goggles and over-shoes. A shaggy rain cape from the Naga Hills in Assam is shown alongside a photograph of it being worn by its original owner. Another coat, made from the spathe of the palm *Trachycarpus fortuneii*, was recommended by Robert Fortune in 1847 as providing excellent protection from wind and rain, despite its 'comical' appearance.

These garments are now in need of protection if they are to be preserved for the future.

The exhibition will explain the dangers posed to these objects by light, heat and moisture, the very elements they were designed to protect against.

The nature of decay, both in the natural and made world, will be explored through a series of hands-on items that visitors will be encouraged to investigate for themselves.

Key concepts in museum conservation work will be explained, with a short video providing information on the background to the exhibition, including some of the work carried out on the objects on display.

An education programme of events and trails for school visits, in association with Oxford Botanic Garden, has been arranged. In addition there will be meetings and visits arranged for interested museum professionals. The theme of Museums Week 1998 is to be Conservation, and the Museum aims to include the exhibition in a larger programme of conservation events being organised in and around Oxford. The exhibition will run for approximately one year.

For more information contact the Museum on 01865 270927

It is also possible to contact the Conservation Department on 01865 270941