

A SURVEY OF THE WORK OF THE ROYAL BOTANIC GARDEN EDINBURGH IN 1979

CONTENTS

	Page		Page
General Review	527	The Younger Botanic Garden	538
Taxonomic Research	528	Logan Botanic Garden	538
The Herbarium	531	The Arboretum, Dawyck	539
The Library	532	Horticultural Training	539
Public Education	532	Annual Rainfall	540
Publications	533	Staff List	540
The Garden, Edinburgh	535		

GENERAL REVIEW

Although 1979 was in many respects a 'quiet' year in the Garden's activities, some exciting new growth points were fostered or established. In June we were happy that our Minister, Lord Mansfield, visited the new acquisition at Dawyck and formally accepted the arboretum from the Balfour trustees. In times of restraint progress may be slow at Dawyck but Mr Binns and his minute staff have already shown what potentials are there.

Collaboration with our sister taxonomic institutes in Britain seems set to produce timely and useful pieces of work in the next few years. Increased accessibility of Arabia and the need to provide a workable Flora to aid economic land development there, has led to collaboration of the three British institutes (Edinburgh, Kew and British Museum (Nat. Hist.)) with botanists and administrators in Arabia: a firmly based project has been established and research groups in the field are already making collections for it. This is a natural extension of Edinburgh's expertise in the botany of SW Asia.

The European Garden Flora is also underway in collaboration with Kew, the British Museum (Nat. Hist.), the Universities of Cambridge and Dublin, the RHS and the National Botanic Garden of Ireland. The programme of course will produce not only a much needed definitive work on plants in cultivation—above varietal level—but also result in the checking of a large part of our own holdings of living plants.

During the past year we have all been heartened by the quickening of interest in collaborating closely again with botany in China. One of the Garden's greatest developments was associated with exploration of the Chinese flora at the beginning of this century. We welcomed four visitors from Chinese institutes and it was clear that this enthusiasm for renewed contact augurs well for the future.

Whilst these research programmes are easily identified signposts they occupy in total only a small part of the staff. The Garden is far from being a totally research-orientated organisation. The care of living and preserved collections occupies most man hours. The provision of the Gardens to the public as informative amenities is also responsible for much of the staff

load. Within the organisation, however, there is great reticulation of responsibility, confusing to a formalistic administrator but a source of strength and great economy to the Garden.

TAXONOMIC RESEARCH

SOUTH WEST ASIA: FLORISTIC STUDIES

Several members of staff with commitments to *Flora of Turkey* vol. VII completed their accounts during the year. Miss J. Lamond, in addition to Turkish Flora work, continued to work up some genera of Umbelliferae for *Flora Iranica*.

Mr A. G. Miller was mostly involved with Arabian studies, both in the herbarium and in the field; in September–October he spent a very successful six weeks collecting in the Sultanate of Oman (Dhofar). The possibility of undertaking a Flora of the Arabian peninsula jointly with Kew and the British Museum (Nat. Hist.) was considered and meetings took place between botanists from the three institutes. In the autumn a start was made on separating our Arabian specimens as a subdivision of the 2A (Orient) collections in the herbarium; some preliminary family check-lists were also prepared. A good foundation is thus being laid for future floristic studies in this region of SW Asia.

The close links with Professor P. H. Davis and his Flora of Turkey team continued. Drs Edmondson and Mill were 'regulars' in the herbarium. In the latter part of the year three Turkish botanists worked in the herbarium for 3–6 months on their collections: Professor H. Peşmen (Ankara), Dr A. Çirpici (Istanbul) and Dr M. Koyuncu (Ankara). Mr. M. Doğan (from Ankara) working on the grasses for his PhD, was another who made good use of the herbarium and library. Dr Kit Tan was also a regular user of the herbarium collections.

Mr Anton Doroszenko started work in the autumn on a PhD thesis (the *Satureja* complex of Labiatae) with the support of a CASE studentship.

LÉVEILLÉ CATALOGUE (& RANUNCULACEAE)

Mr Lauener completed Gesneriaceae (with Mr Burt) and Verbenaceae for Part XIII of the *Catalogue* which is now ready for press. Mr McKean has almost completed his work on Labiatae involving some 170 taxa described by Léveillé.

A short paper was prepared on the many species from Hawaii described by Léveillé and based on collections by Faurie.

ERICALES, ETC.

Work on the production of the taxonomic revision of the genus *Rhododendron* is now almost complete; Dr Cullen has submitted for publication the revision of subgenus *Rhododendron* (the scaly species), and Dr Chamberlain has a manuscript awaiting final editing which will be submitted during 1980. Various peripheral studies (anatomy, cytology, a study of the relationships of the tropical species, etc.) remain to be done. Dr Argent has continued research on tropical Ericaceae, and the main bulk of collections from the Royal Geographical Society's expedition to Mulu (Sarawak) has been processed and distributed. Dr Argent presented a paper entitled 'Ericaceae of the Mulu National Park' at the Expedition Sym-

posium held in London in September. He also visited the Rijksherbarium in Leiden to study material there, and to discuss matters of common interest with Professor H. Sleumer.

Several new Ecuadorean Ericaceae flowered during the year, and drawings and descriptions have been prepared for publication.

Dr Cullen continued to serve as secretary to the editorial committee of the *European Garden Flora*, and work has begun on the preparation of accounts of various Orchidaceae. Dr Chamberlain again supervised a botanical survey in the Breadalbane area for the Nature Conservancy, and was involved in several bryophyte surveys in central Scotland.

ZINGIBERACEAE

Synoptic and annotated keys to the genera of Hedychieae and Alpineae (part 1) were completed by Miss R. M. Smith. Two other short papers are in press ('Stadiochilus—a new Burmese genus', and 'Miscellaneous notes on Zingiberaceae').

Work continues towards a revision of the family in Australia: three new species have been described and will go to press shortly.

Zingiberaceous collections (mainly Bornean) have been determined for Aarhus and Berlin.

BHUTAN FLORA PROJECT

Between May and July an expedition of almost three months' duration was made to Bhutan by Mr Grierson and Mr Long. The country was traversed roughly along a line from the capital, Thimphu, in the west to Tashigang in the east and several excursions were made to southern border towns. Valuable collections were made principally in the subtropical forests and in the montane coniferous forests. A total of 2,150 flowering plant collections were made and, in addition, 1,100 bryophyte collections were made by Mr Long. Numerous photographic studies were made of plants collected and a list of common names of plants in various dialects was compiled. The visit was extremely useful in the exchange of views which took place with the Bhutanese Forestry department on the progress and aims of the Flora. The Department is anxious to set up a herbarium in Thimphu, where a nucleus of specimens already exists, and advice on this was given.

In September a meeting with the Overseas Development Administration was held in London at which plans for the project were discussed and evaluated. The assurances of continuing support for the project by ODA are gratefully acknowledged.

CONIFERS

Continued development of the use of experimental glasshouse facilities has begun to give valuable taxonomic returns. Extensive cultivation of various stages of the life-cycle of conifers is yielding material not normally available in herbaria. Dr Page has completed a taxonomic study of *Agathis*, a genus of fast-growing softwood trees of considerable commercial potential in the tropics, using glasshouse and SEM facilities. In this and other taxonomic areas, close collaboration with the Commonwealth Forestry Institute (Oxford), Institute of Terrestrial Ecology Tree Biology Unit (Penicuik), and the Forestry Commission continues.

PTERIDOPHYTES

Demand for taxonomic expertise on pteridophytes continues to outweigh time which can be apportioned, but reflects a rapidly growing requirement for information on this group. In addition to Dr Page's continuing editorial work for the *Fern Gazette*, a recently introduced final honours 'Fern Biology' lecture course and a week of fieldwork with the second year students of the University of Edinburgh Botany Department were particularly successful. University extra-mural and Scottish Field Studies Council (Kindrogan) courses on British ferns have also proved popular. Taxonomic studies on British and Australian genera using experimental cultivation facilities continue. It is hoped that some promising areas for further experimental study could eventually be taken over by post-graduate students, should opportunity offer in the future.

CYTOLOGY (& BRAZILIAN FLORA STUDIES)

There has been little time available for cytology since Miss Milne left the service earlier in the year but some work on Ericaceae has been undertaken by Mrs Brunton.

Dr Ratter's research time has been spent in preparing data for publication from his 1976 and '77 visits to Brazil.

BRITISH AND EUROPEAN FLORA

After the resignation of Mr P. Harrold, responsibility for the British herbarium was taken over in May 1979 by Mr D. McKean assisted by Miss H. Paul. In addition to general curation of the collections and dealing with queries from the public, both continued their work on the Breadalbane (Perthshire) survey for the Nature Conservancy Council.

The gift of Robert Mackechnie's British herbarium of c. 11,000 specimens in 1978 is a very important acquisition, although its sheer bulk presents considerable space problems for our already bulging herbarium cabinets.

CRYPTOGAMIC HERBARIUM

The bryophyte and lichen herbarium of Dr Ursula Duncan (Arbroath) was donated to the Garden in autumn; it comprises about 20,000 specimens from Britain and abroad.

BASIDIOMYCETES

Studies on agarics (Dr Watling), particularly those in the Bolbitiaceae, have continued; papers covering certain small groups of species in this family have been prepared.

The year was spent completing a study of the agarics collected during 1978 in Kashmir, and on an account of the genus *Armillaria* in collaboration with Mrs N. Gregory and Dr G. Kile, Victoria, Australia. Dr A. Chandra, University of Moscow, joined Dr Watling for four weeks during the summer in order to examine the types of Indian species of *Armillaria*. Lists of larger fungi have been prepared for incorporation into publications on the natural history of Kirkcaldy, Stirlingshire and Yorkshire.

Dr Watling organised extramural courses on larger fungi at Birmingham and Sheffield Universities and a field course at Kindrogan Field Centre,

Perthshire. During the year he retired as General Secretary of the Botanical Society of Edinburgh after sixteen years' service.

Inquiries from the public included the first British record of poisoning by *Cortinarius speciosissimus*.

Mr Bennell continued electron microscope studies of spore ontogeny in the Uredinales, particularly in the genera *Phragmidium* and *Cronartium* and undertook taxonomic work in both the Ustilaginales and Uredinales. He also worked with Mr Henderson to produce a full compilation of additions and corrections to the *British Rust Flora* of 1966, and, in addition commenced a revision of the genus *Anthracoidea* in Britain.

ASCOMYCETES & LICHENIZED FUNGI

Mr Coppins has continued taxonomic and phytogeographical studies, especially on *Micarea*. A check-list of British lichenized, lichenicolous, and allied fungi has been completed in collaboration with Mr James (British Museum, Nat. Hist.) and Dr Hawksworth (Commonwealth Mycological Institute). An article on the new lichenicolous genus *Skyttea* has been prepared with Dr Hawksworth and Dr M. Sherwood (Liverpool University).

Mr Coppins visited Denmark in August as guest at the Nordic Lichen Excursion, and in July led a meeting of the British Lichen Society in the Penrith area, obtaining data for several nature reserves and other important sites. Several lists and reports have been prepared for sites in Mid-Perthshire and the Loch Lomond and Kirkcaldy areas.

Dr Watling in collaboration with Dr Whalley (Liverpool Polytechnic) has investigated the distribution and culture of selected members of the Xylariaceae in connection with the British Mycological Society Recording Scheme. A paper on *Daldinia* is in press and a second on *Hypoxylon udum* is ready for submission.

THE HERBARIUM

ACCESSIONS, LOANS AND SPECIMENS MOUNTED

Exchange accessions in 1979 came from 22 institutes and totalled c. 2,850 specimens; the largest collections were from Lac, Leningrad, Peking, Tokyo (Makino Herb.), Utrecht and Washington (Smithsonian Inst.).

Gifts and specimens collected by staff members came to c. 9,700: c. 3,300 from Bhutan (A. Grierson & D. Long); c. 1,300 from the Arabian peninsula (incl. c. 800 from Dhofar by A. G. Miller); 700 from S Africa (B. L. Burtt & O. Hilliard); 600 from Sarawak (B. L. Burtt); 450 Schaerer's Lichenes Helvetici Exsicc. gifted by Paisley Museum.

There were 144 'loans-in' from 54 institutes; as usual many of these were concerned with the preparation of *Flora of Turkey* accounts. Outward loans totalled 152 to 89 institutes.

	1978	1979
Accessions	10,199	12,550*
Distribution	4,499	4,773
Loans: in	12,451	8,368
Loans: out	6,813	4,941
Specimens mounted	15,739	14,696

* excluding the U. Duncan herbarium

CURATION

Detailed curation of the re-organised Gramineae continues.

PHOTOGRAPHIC SLIDE COLLECTION

About 800 slides were added to the collection and additional storage cabinets obtained. Some 200 slides, taken by Dr Margaret Stone and covering a wide range of plants, were received from Cornell University.

VISITORS

Dr H. Brock (Glasgow); Dr R. K. Brummitt (Kew); Miss E. Bullard (Kirkwall); Dr A. Chandra (Moscow/India); Dr S. C. Chen (Peking); Dr. A. Çirpici (Istanbul); Mrs S. Collenette (Hants); Miss J. Cowley (Kew); Mr Z. Feng (Shenyang); Miss L. Fenn (Vancouver); Professor W. Frey (Giessen); Dr P. Gibbs (St. Andrews); Dr Harrison (Strathclyde); Dr Harvey (Reading); Dr H. Heine (Paris); Mr R. Henderson (Kew/Brisbane); Dr O. Hilliard (Pietermaritzburg); Miss S. Hooper (Kew); Dr C. C. Huang (Kwangtung); Mr C. Jarvis (Reading); Mr K. Kenneally (Perth); Dr M. Koyuncu (Ankara); Dr W. Kramer (Tübingen); Mr H. Kürschner (Tübingen); Dr J. McNeill (Ottawa); Mr Y. Nasir (Islamabad); Dr M. Ono (Tokyo); Mr D. Palmer (Wisley); Mr R. Palmer (Oxford); Professor H. Peşmen (Ankara); Mr D. Philcox (Kew); Mr R. Press (BM); Mr T. Reeve (Papua New Guinea); Professor J. Rogers (Washington State Univ.); Dr A. Sarbhoy (New Delhi); Professor E. A. Schelpe (Cape Town); Mr Airy Shaw (Kew); Mr J. Sousa Silva (Brasília); Dr F. Sorger (Vienna); Dr A. Stork (Geneva); Mr D. Sutton (BM); Dr M. Tamura (Osaka); Mr N. Taylor (Kew); Dr. S. Taylor (Connecticut); Mr A. Thomson (Christchurch); Mr C. C. Townsend (Kew); Mrs McCallum Webster (Moray); Mr R. Whitcombe (Oman); Dr G. Wickens (Kew); Dr G. Wigston (Plymouth); Dr C. C. Wilcock (Aberdeen); Dr M. Coburn Williams (Utah); Dr C. Grey-Wilson (Kew); Professor C. Y. Wu (Kunming).

THE LIBRARY

The acute problems in library staffing noted in 1978 continued and were exacerbated in 1979. Both assistant librarians left during the year, one on maternity leave and the other at the end of a temporary contract, and neither was replaced; changes also occurred in the clerical staff.

Despite this Mr Mathew by working hundreds of extra hours managed to maintain a creditably high standard of service, although inevitably the level of some activities such as cataloguing and indexing were significantly lower than in the previous year. Accessions, photocopying and binding remained at similar levels to 1978, but in the case of binding this was only achieved by Miss D. Purves, Plant Records Officer, spending 12 days working in the library.

Available space for expansion in the library is even more restricted than previously but the planned provision of mobile shelves in the store should ease the problem considerably.

The situation of the library is now critical and present services cannot be maintained unless the small staff is enlarged.

PUBLIC EDUCATION

Exhibits on tropical conifers and forestry in the landscape (on loan from the Forestry Commission) were erected in the Exhibition Hall. An exhibit 'The R.B.G. at Inverleith' was prepared for a local church display.

Two Interlink programmes were held—'Deserts' in collaboration with Edinburgh Zoo and 'Southern Africa' in collaboration with the Zoo and the Royal Scottish Museum.

The film 'Capital Garden' is proving very popular and has been shown over 40 times at the Garden. It was well received when shown by the Regius Keeper at a meeting of directors of botanic gardens in Berlin in September

and has subsequently been seen in Ghent, Lund and Naples. The copies held by the Bank of Scotland are in constant demand both at home and abroad.

Dr Wood was invited to address a conference on environmental education at Merlieux in France on the Interlink projects and other educational services offered by the Garden.

The Garden was featured in the television programmes 'Gardeners' World' and 'Pebble Mill at One'.

During the year the Garden hosted parties of Leisure and Recreation students from the United States, two groups from Glasnevin Botanic Garden, an Argentinian gardening group, a large party from the Royal Horticultural Society of the Netherlands, two groups from the 1979 British Association meeting, a party from the annual conference of University Horticultural Officers, and many smaller groups.

PUBLICATIONS

Two parts of *Notes R.B.G. Edinb.* were published during 1979: vol. 37, 2:237–386, and 37, 3:387–518 (+ general index to vol. 37:519–538). These contained a total of 17 papers and 9 book reviews. In addition, two parts were sent to press during the latter part of the year: vol. 38, 1 and vol. 39, 1—the latter devoted to a revision of lepidote rhododendrons by Dr J. Cullen.

Part 2 of the *British Fungus Flora*, consisting of a 149 page account of *Coprinus* by Mr Orton and Dr Watling appeared in the late summer. A new guide book to the Younger Botanic Garden, Benmore, written by Dr Burbidge was also published; it conforms to the colour format established in the previous year's Logan guide.

PUBLICATIONS BY MEMBERS OF STAFF IN 1979

ARGENT, G. C. G. The Systematics of tropical mosses in CLARKE, G. C. G. & DUCKETT, J. G. (ed.) *Bryophyte Systematics*. Systematics Association special volume No. 14:185–193.

—The New Guinea Bananas: a problematic genetic resource. *Trans. 5th Aberdeen-Hull Symposium on Malesian Ecology*, 57–70.

BENNELL, A. P. & HENDERSON, D. M. Spruce and Rhododendron Rust (*Chrysomyxa rhododendri*). *Plant Pathologists Quarterly Record* 79/4.

COPPINS, B. J. & BENNELL, A. P. Thallus surface features in *Agonimia tristicula*. *Lichenologist* 11:107–108.

—& FERRY, B. W. Lichen transplant experiments and air pollution studies. *Lichenologist* 11:63–73.

—& GILBERT, O. L. George Johnston's lichen herbarium at R.B.G. Edinburgh. *Notes R.B.G. Edinb.* 37:381–385.

—& —Field meeting at Melrose, Roxburghshire. *Lichenologist* 11:97–101.

—& JAMES, P. W. New or interesting British Lichens III. *Lichenologist* 11:27–45.

—& —New or interesting British Lichens IV. *Ibid.* 11:139–179.

—& —A British species of *Dictyonema*. *Ibid.* 11:103–108.

—& —Key to British sterile crustose lichens with *Trentepohlia* as phycobiont. *Ibid.* 11:253–262.

- CULLEN, J. & CHAMBERLAIN, D. F. A preliminary synopsis of the genus *Rhododendron*: II. *Notes R.B.G. Edinb.* 37:327–338.
- & DAVIS, P. H. *The identification of flowering plant families*. Ed. 2. Cambridge University Press.
- EVANS, A. Viburnums, The heather family, Alpine primula, Mountain flowers, Autumn cyclamen, Plants for hedges, & 12 short plant notes—articles in *The Scotsman*.
- Alpines at Edinburgh. *The Garden* 104:87–92.
- A herbaceous daphne. *Ibid.* 104:220–221.
- Some lily species at Edinburgh. *Lilies* 1978/9:33–38.
- GARDINER, J. M. Silverswords & greenswords from Hawaii. *The Garden* 104:50–54.
- GRIERSON, A. J. C. & LONG, D. G. Notes relating to the flora of Bhutan: II. *Notes R.B.G. Edinb.* 37:341–354.
- HENDERSON, D. M. & BENNELL, A. P. British Rust Fungi: additions and corrections. *Notes R.B.G. Edinb.* 37:475–501.
- LAUENER, L. A. A synopsis of *Aconitum* subgen. *Lycotconum*: II. *Notes R.B.G. Edinb.* 37:431–466.
- LONG, D. G. The Bhutanese itineraries of William Griffith and R. E. Cooper. *Notes R.B.G. Edinb.* 37:355–368.
- Some noteworthy bryophytes from La Palma, Canary Islands. *J. Bryol.* 10:211–212.
- Some additions to the bryophyte flora of Iraq. *Revue bryol. lichen.* 45:103–105.
- Hepatic types of James Dickson in the Edinburgh herbarium. *J. Bryol.* 10:241–244.
- A reassessment of the systematic position of *Tortula stanfordensis* Steere and *T. khartoumensis* Pettet. *Ibid.* 10:377–381.
- Hepaticae from Bhutan, East Himalaya. *Lindbergia* 5:54–62.
- , CRUNDWELL, A. C. & DURING, H. J. Some additions to the bryophyte flora of Tenerife. *J. Bryol.* 10:103–111.
- MCBEATH, R. Five Days in the Cantabrian Mountains. *Journ. Scot. Rock Gard. Club.* 16:299–302.
- PAGE, C. N. The diversity of ferns. An ecological perspective. Chapter 2 (pp. 10–56) in DYER, A. F. *The Experimental Biology of Ferns*. Academic Press.
- Experimental aspects of fern ecology. Chapter 15 (pp. 551–589) in DYER, A. F. *Ibid.* Academic Press.
- *Equisetum variegatum* new to Turkey. *Fern Gaz.* 12:56.
- *Equisetum* × *trachydodon* in Western Scotland. *Ibid.* 12:57–59.
- The herbarium preservation of conifer specimens. *Taxon* 28:375–379.
- Macaronesian heathlands. Chapter 5 (pp. 117–123) in SPECHT, R. L. *Heathlands and related shrublands of the World*. Elsevier Publishing Co.
- & BENNELL, F. M. Preliminary investigation of two south-west England populations of the *Asplenium adiantum-nigrum* aggregate and the addition of *A. coneifolium* to the English flora. *Fern Gaz.* 12:5–8.
- & ROBERTS, R. H. A second British record for *Equisetum* × *font-queri*, and its addition to the English flora. *Fern Gaz.* 12:61–62.
- TAIT, W. Summer flowering herbaceous plants. *Roy. Cal. Hort. Soc. Year Book and Journal* 1978:27–38.

- WATLING, R. Observations on the Bolbitiaceae 17. *Sydowia Beih.* 8:401-415.
- Studies on the genera *Lacrymaria* and *Panaeolus*. *Notes R.B.G. Edinb.* 37:369-379.
- The morphology, variation and ecological significance of anamorphs in the Agaricales. In KENDRICK, W. B. (ed.) *The Whole Fungus* Vol. 2. 453-472.
- , COPPINS, B. J. & GILBERT, O. L. Lichen Ecology on St Kilda. *Lichenologist* 11:191-202.
- & KENDRICK, W. B. *Osteomorpha* Arnaud—a validation. *Naturalist* 104:1-4.
- & —Mitospores in Basidiomycetes. In KENDRICK, W. B. (ed.) *The Whole Fungus* Vol. 2. 473-546.

THE GARDEN, EDINBURGH

The total admissions to the Edinburgh Garden were 517,867—an increase of more than 32,000 on the 1978 figure.

ARBORETUM DEPARTMENT (Mr L. Bisset)

In January 1979, when Mr Armstrong retired, Mr Bisset was transferred from the Propagation Department to the Arboretum; he was also given responsibility for the horticultural activities of the Dawyck arboretum which had been gifted to the nation by Col. A. N. Balfour in October 1978.

Several beeches, each about 200 years old, were removed, including the specimen dominating the Azalea Lawn which blew down during a gale on the night of 12 September. All specimens showed butt rots in various stages and the anchor roots of the Azalea Lawn tree were badly infected with *Meripilus (Polyporus) giganteus*.

In the autumn the outer Yew Hedge at the Viewpoint, which had been in poor condition for some years, was uprooted and the area graded and turfed. The hollies surrounding the Copse had become too dense and were thinned to encourage growth nearer the ground and to reduce wind resistance.

In the early autumn, Mr Bisset, accompanied by Mr C. M. Erskine, his opposite number at Kew, visited arboreta during a study tour of Denmark, Holland and Belgium.

GLASS DEPARTMENT (Mr L. Buchan)

The south border of the Cactus House was reconstructed to create better drainage and raise the rock level to obscure and break the line of the concrete wall behind. This was duly planted in April with the *Gasteria* and *Haworthia* collection. A few large specimens had to be removed from the Cactus House as they had reached roof level and were suppressing plants below; they included *Yucca guatemalensis* var. *lemairiana* and *Agave heteracantha*.

Both the Tropical and Temperate Aquatic Pools were drained and cleared out and the leak in the latter was rectified by PSA. A crack in the viewing chamber window of the Tropical Pool appeared in April and the chamber has been closed to the public until PSA can carry out repairs.

A thinning programme was carried out in the Temperate Palm House to allow greater penetration of light from the south side. Removal of the large trees of *Symingtonia populnea* and *Araucaria bidwillii* gave the desired effect, while taking out duplicate palms of *Trachycarpus* and *Chamaerops* reduced the overcrowding of some of the beds.

During January extremely low temperatures were recorded in the Stevenson Screen (-11.9°C air minimum and -19.1°C on the ground thermometer) and many tender plants growing in the shelter of south-facing walls in the glasshouse area perished. These included South African species of *Macowania*, *Glumicalyx*, *Zaluzianskya*, *Senecio* and *Helichrysum*.

In September Peter Seabrook and the BBC Television Outside Broadcast Unit visited the Glass Department to record part of their weekly programme 'Gardeners' World'. The Fernery, Tropical Aquatic and Peat House were featured.

HERBACEOUS & ALPINE DEPARTMENT (Mr A. Evans)

In the Rock Garden an area including locations R13, R14, X14 and X49 which had received no major attention since 1918 was reconstructed. Elsewhere a number of smaller adjustments have been made to reduce the number of replicated plants and hybrids and to improve the vigour and health of plants that can only be attended to occasionally. During the same period a stock check of the plants in the Rock Garden was completed.

A collection of alpine plants was exhibited at the Scottish Rock Garden Club's Edinburgh show in Pollock Halls in the spring.

The construction of some dry-stone retaining walls in the vicinity of the back-up frames completed the work in the Alpine House area. The extreme drainage in the high level beds resulting from this work has been used to advantage in the cultivation of less common plants.

Tennis Court Area. This project received priority over all other work so that the time lost through contractor's activities and prolonged inclement weather could be regained. Levelling and the laying of slabs and a very large area of turf made up much of the work. Most of the planting must await the spring of 1980.

Plant Records. Following a meeting with SOCS at the beginning of the year, a revised form of geographical coding was introduced. In addition, over 3,000 numbers were altered so that every species now has a unique number. This information together with symbols denoting 'wild' and 'threatened' material and 'species verified', has been submitted to SOCS for incorporation in the computer print-out.

PROPAGATION DEPARTMENT (Mr J. A. R. Kerby)

Mr Kerby moved to the Propagation Department from the Glass Department in January, taking the place of Mr Bisset who moved to the Arboretum. The department lost the services of Mr Kirkpatrick, Garden Supervisor, who left at the beginning of June to take up a post in the United Arab Emirates.

There was a marked increase in requests for temperate woody material from the Arboretum Department, mainly as a result of the acquisition of Dawyck. A number of interesting plants were raised during the year,

including seedlings of *Acer pycnanthum* from North Honshu, Japan (perhaps not otherwise in cultivation), *Simmondsia californica* (the 'Jojoba' of Mexico) and *Physostigma venenosum* (the 'Ordeal Bean of Calabar'). The use of the closed case principle for softwood cutting propagation continued with difficult subjects such as *Acer*, *Sorbus*, *Hamamelis*, *Corylopsis*, *Betula*, *Magnolia*, etc.

In the nursery the main operation was the re-siting and re-erection of the EVA (polythene) house which was accomplished very competently for a first attempt. Seep hose irrigation on sand beds was installed inside to mechanize watering during the summer months.

In the Research Block cases were constructed using 'Dexion' frame and 'Correx' for the sowing and growing-on of fern spores, and for use as growing cabinets and simple propagation cases. The cultivation of ferns and conifers continues as part of Dr Page's research work.

Trials were carried out with replicate sets of plants using different watering techniques and different capillary mattings. So far useful comparisons have been made using easily propagated species but it is intended to extend the experiment to more difficult stocks in the future.

Notable Plants. *Muschia aurea*, a sub-succulent member of the Campanulaceae, endemic to Madeira has flowered for the first time, from seed received from RBG Kew and germinated in 1976.

Rooted cuttings of *Leschenaultia biloba* and *L. formosa* were received from Canberra Botanic Garden, Australia, and the resultant plants have flowered successfully—particularly *L. biloba* which produces vivid blue flowers. The plant appears short-lived and requires frequent propagation from cuttings which root easily if inserted in fine sand in a closed case.

Lafoensia pacari, an interesting member of the Lythraceae collected by Dr Ratter in Brazil in 1968, flowered for the first time. Unfortunately the white flowers produced by the plant open at night and do not last long, thus making photography very difficult.

Argyroxiphium kauense, the silversword, again flowered but not so well as last year. However a large number of seedlings were raised to carry on the next generation.

Accessions. The total number of items in the form of seed, cuttings and plants was 3,298, consisting of 2,515 of wild origin and 783 of non-wild origin.

Early in the year we had 168 accessions from the 'Plants of Nepal Expedition' organized by three ex-students of the Garden, Mr R. Mason, Mr D. Binns and Mr G. Wright. A further large donation of wild origin Nepalese seed was made by Mr Jackson of Sevenoaks.

Other accessions included a batch of seeds collected by Mr A. Grierson and Mr D. Long of the R.B.G. on their visit to Bhutan. This included seed of the rare *Bryocarpum himalayicum* (Primulaceae), *Buddleia bhutanica*, and *Cycas pectinata*.

The total number of items despatched during the year was 9,317, consisting of 361 seed lots, 1,361 plants, 7,345 cuttings, 178 bulbs, and 72 scions. The publication of the Garden Catalogue was the main reason for this more than threefold increase in the number of despatches.

YOUNGER BOTANIC GARDEN, BENMORE, ARGYLL
(Mr. A. Hall)

Weather conditions were poor throughout the year with snow and frost in the early months followed by prolonged periods of rain for the rest of the year. Rain fell on 252 days.

Work continued throughout the year on the development of Benmore Hill Wood. After the Special Temporary Employment Programme scheme was completed in January, a machine was hired to bury large stumps which remained. Some planting of conifers was possible in areas which had been cleared in 1977. A programme of spraying with brushkiller to control regrowth of woody subjects was attempted but little progress was made because of the frequent rainfall. A third period of clearing began on 24 August, using the STEP labour with considerable assistance from Garden staff, and concentrating on the removal of rhododendron thicket and storm debris from one of the steep slopes on Benmore Hill Wood above the Massan Valley. Whilst the STEP men worked reasonably well when present, absenteeism was high, probably because of the difficult terrain, heavy work and extremely wet weather—45 inches of rain fell in the four months September to December.

The Garden staff were also engaged on clearing a new area for the section *Taliensia* rhododendrons, clearing unwanted regeneration in various parts of the garden, and completing the alternative entrance at the Golden Gates. Planting was again mainly confined to the spring season when over 300 specimens of 36 genera and 116 species were planted. Most of the time of the Garden staff, however, was taken up with routine maintenance.

Six trees on the hillside behind Benmore House were blown down in January gales. In December storm force winds caused slight structural damage to buildings and blew down twenty trees in the Glen Massan and Golden Gates areas.

Modifications were made by PSA to roof and gables of Redwood Cottages to remedy chronic dampness.

Attendance figures fell by 4,700 to 37,790, possibly due to reported petrol shortages and increase in cost of motoring.

LOGAN BOTANIC GARDEN, STRANRAER, WIGTOWNSHIRE
(Mr. J. M. Colledge)

During the first quarter of 1979 Logan suffered the hardest winter weather since 1963: in this period frost was recorded on 63 days. The lowest temperatures were air -9°C and ground -10.5°C , on 1 January. Freezing air driven in by an easterly gale caused extensive damage to the plant collection. Over 300 taxa suffered losses, the saddest of which was a group of fifteen young *Dicksonia antarctica*. The main avenue and other groups of *Cordyline australis* were severely damaged and later in the year a great deal of dead wood was removed from them. Plans have been made to replant all the *Cordyline* groups over the next ten years.

The new planting on Deer Hill is growing slowly. An area of marsh near the entrance was drained with 'Wavenflow' pipe. All the ditches crossing the sides have been bridged with piping and infill. A section of old hardwoods on the western boundary was cut out and replaced with *Quercus ilex*.

In the spring, seventeen conifers of wild origin, part of Dr Page's project, were planted. *Puya berteroniana* (Chile) flowered for only the second time in twelve years. It had a spectacular spike of over a thousand green flowers. Surprisingly *Tropaeolum tricolorum* (Chile) survived the winter in the open against a wall and flowered in the spring. Of the several species of New World *Salvia* received from Edinburgh, *Salvia involucrata* (Boutin 3451) and *Salvia leptophylla* (Breadlove 39901) have high horticultural merit. *Cordyline indivisa* (New Zealand) flowered and fruited better than it has done for a decade.

The tearoom and public toilets were closed during the summer for reconstruction and extension by PSA contractors who also rebuilt an old lily pond and renovated a potting shed.

Mrs Boyd, wife of a member of staff, supplied refreshments and sold publications from a caravan in the car park.

Visitor numbers fell by 7,322 to 34,746 due no doubt to the poor summer.

THE ARBORETUM, DAWYCK (Mr L. Bisset)

The Arboretum near Stobo, Peeblesshire, contains the remains of a good collection which has suffered two disastrous gales and a planting gap of about 35 years. It was officially accepted on behalf of the Secretary of State for Scotland at a ceremony on 25 May by the Earl of Mansfield, Minister of State at the Scottish Office, and a tree of *Tetracentron sinense* was planted to mark the occasion.

Due to staffing restrictions it was not until September that Mr D. Binns was appointed Garden Supervisor at Dawyck and given two industrial staff to tackle the overgrown arboretum. They have embarked on a programme of removal of woody weeds (mainly *Rubus spectabilis*) from the more valuable collections and areas of high amenity, and considerable progress has already been made. The large stands of raspberry will be removed immediately before new plantings are made, but before planting can take place measures will have to be taken to control herbivorous vermin.

Plans are in hand to provide within the next few years not only public and staff accommodation and facilities at a site near the car park, but also three staff houses.

HORTICULTURAL TRAINING SECTION (Mr G. Anderson)

The new system of awards operated for the first time this year and on 11 July the awards and prizes were presented by Mr. G. Sheard, formerly of the Glasshouse Crops Research Station. Fifteen students gained Diplomas (two with Honours and ten with Credit), and one was awarded the Certificate in Horticulture. Although the amenity sector within local authority parks and landscape sections continued to attract the highest number of students, it was encouraging to see the appointment of four students to positions in teaching and instruction. The involvement of R.B.G. horticultural and scientific staff in student teaching continued to increase, and over the year the links between R.B.G., Edinburgh University and Heriot Watt University were strengthened.

The volume of enquiries received concerning horticultural education continued to increase, and the number of completed applications received for entry to the 1979/82 course was higher than previously experienced.

ANNUAL RAINFALL

Edinburgh	650 mm (25.5 in)
Benmore	2311 mm (91.1 in)
Logan	968 mm (40.3 in)

STAFF LIST
(December 1979)

<i>Regius Keeper</i>	Mr D. M. Henderson	
<i>Assistant Keeper</i>	Dr J. Cullen	
<i>Principal Scientific Officers</i>	Dr D. F. Chamberlain Mr A. J. C. Grierson Mr I. C. Hedge	Dr C. Page Dr J. A. Ratter Dr R. Watling
<i>Senior Scientific Officers</i>	Mr G. Anderson (Hort. Train.) Dr G. C. G. Argent Dr. R. B. Burbidge Mr B. J. Coppins	Mr D. G. Long Mr L. A. Lauener Miss R. M. Smith Dr C. C. Wood
<i>Higher Scientific Officers</i>	Mr R. Eudall Mr D. R. McKean Miss V. A. Matthews Mr A. G. Miller	Miss D. E. Purves Mrs J. M. Woods Mr P. J. B. Woods
<i>Junior Research Fellow</i>	Mr A. P. Bennell	
<i>Scientific Officers</i>	Mr F. M. Bennell Mrs. N. M. Gregory Miss E. M. Hamlet	Miss M. A. H. Paul Mr D. A. H. Rae
<i>Assistant Scientific Officers</i>	Mrs D. Brunton Mrs L. A. Gibb Mr K. N. Grant Mrs H. Hoy	Mrs S. J. Jones Miss R. A. King Miss D. M. Taylor
<i>Laboratory Attendants</i>	Miss M. Bryce Mrs E. A. McAllan Miss M. McLaren	Mrs G. Miller Mrs G. Young
<i>Curator</i>	Mr R. L. Shaw	
<i>Assistant Curators</i>	Mr L. Bisset Mr L. Buchan (Acting) Mr J. M. Colledge (LBG)	Mr A. Evans Mr A. Hall (YBG) Mr R. Kerby
<i>Garden Supervisors</i>	Mr G. Broadley Mr D. Binns (DA) Mr R. U. Cranston Mr J. M. Gardiner Mr G. Knott	Mr G. J. Lewis Mr J. D. McBeath Mr W. Tait Mr B. Unwin (LBG) Mr M. Welsh (YBG)
<i>Librarian</i>	Mr M. V. Mathew	

<i>Assistant Librarian</i>	Mrs L. Clark	
<i>Higher Executive Officer</i>	Mr J. Sinclair	
<i>Executive Officer</i>	Miss J. R. S. Renwick	
<i>Clerical Officers</i>	Mr K. Brodie	Mrs R. Bell
<i>Clerical Assistants</i>	Mr J. S. Burnett Mrs A. J. Black	Mrs M. O'Brien Mrs D. Mackay
<i>Senior Paperkeeper</i>	Mr J. Clelland	
<i>Sergeant Park-Keeper</i>	Mr J. Y. Thomson	
<i>Corporal Park-Keeper</i>	Mr A. W. Brown	
<i>Park Constables</i>	Mr N. Campbell Mr W. S. Connachar Mr M. E. Fitz Mr D. C. Hogg	Mr T. A. Nisbet Mr R. Stevenson Mr P. N. Fletcher
<i>Gardeners Special</i>	Mr T. Y. A. Brown Miss L. R. Cunningham Mr C. G. Drawbridge Mr G. W. Lawson Mr J. McCluskey (YBG)	Mr A. J. Paxton Mr J. Stewart Mr C. J. P. Taylor Mr E. F. Young
<i>Gardeners I</i>	Mr S. Boyd (LBG) Mr T. R. Burnett Mrs J. E. Currie (LBG) Mr G. Godbent (YBG) Mr J. Henderson Mr W. Kocz	Mr G. Murdoch (LBG) Miss B. C. Morrison Mr I. M. Potts Mr R. M. Robertson Mr B. N. Rogers Mr I. W. J. Sinclair
<i>Gardeners II</i>	Mr M. Fletcher (YBG) Mr I. Herks Mr S. Macpherson Mr P. D. Mathys	Mr D. Parker (DA) Mr J. Smith Mr T. L. Sutherland Mr R. Waddell
<i>Assistant Gardeners</i>	Mr G. A. Bain (YBG) Mr J. Fernie Mr K. M. McFarlane Mr N. McIntyre	Mr K. Stables Mr P. Turner Mr G. D. Wilson (DA) Mr J. Urquhart
<i>Engraver</i>	Miss M. Laing	
<i>Labourers</i>	Mr J. B. Henderson	Mr R. S. Waddell
<i>Storeman</i>	Mr G. Roddex	
<i>Female Lavatory Attendants</i>	Mrs C. Horner	Mrs J. Higgins
<i>Male Lavatory Attendants</i>	Mr J. Innes	Mr J. Martin
<i>Male Cleaner</i>	Mr G. Thomson	
<i>Nightwatchmen</i>	Mr J. Brady Mr J. Duffy	Mr J. McKenzie Mr W. Pringle