

# A SURVEY OF THE WORK OF THE ROYAL BOTANIC GARDEN EDINBURGH IN 1974

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## GENERAL REVIEW

The Edinburgh Garden continues to attract an increasing number of visitors. In 1974 over 550,000 entered, an increase of 10% over the previous year. It is interesting that botanic gardens in general have very little knowledge of the composition of their visitors. In 1974 we took the first step to correct this lack of information by conducting a survey to determine the sources, interests and opinions of visitors. This first exercise was carried out at the height of the tourist season in August. Firm opinions must await a parallel survey to be conducted in March 1975 at an off-peak period.

Visitor attendance at the Younger Botanic Garden, Benmore, in Argyllshire and Logan Botanic Garden in Wigtownshire held more or less steady—all outlying gardens in Scotland were affected by petrol shortages in the early part of the year and higher petrol prices towards the end. Logan fell slightly from 31–30,000; Benmore rose from 31–34,000. In order to spread knowledge of Benmore to the tourist industry in Argyllshire a small Open Day was held there in March. Local hoteliers, foresters, farmers, publicity agents and Dunoon officials were shown round the estate, the Edinburgh Garden prepared a display on scientific and horticultural activities, and hospitality was provided by the Benmore Trust.

Since 1960 the Edinburgh Garden has been rebuilding its over-crowded and out-dated buildings: herbarium and library (1964); exhibition glass-houses (1967); exhibition hall (1970). The final part of the present programme, the rebuilding of service and research glass-houses started in the autumn. When completed, these will give essential supply to horticultural activities, space for research collections and a section open to the general public. The content of the present glass-houses, and their use by the public, has been examined in some detail during the year. The main exhibition range already shows many of the principal growth forms and ecological groups of the plant kingdom. In these houses a policy of deliberate removal and replacement rather than drastic pruning is being evolved so that individual specimens are always worthy of display. The contents of the palm-houses have been reassessed: they will now contain a selection of palms and palm-like plants with a carefully chosen group of climbing plants on the metal and stonework pillars. This house should thus be more biologically interesting and, with informal well-spaced plantings, more generally attractive. The finalisation of

the palm-house lay-out still awaits the replacement of the unsatisfactory hot-air heating with conventional pipes in the tropical section.

Plans have been evolved for the use of that quarter of the glass at present under construction which will be open to the general public. This will display plant groups of which Edinburgh has strong collections as a result of research projects, including tropical rhododendrons and relatives, the gesneriads and the ginger family—all spectacular plants but little seen in botanic gardens today.

Large collections of plants—Edinburgh grows at least 12,000 species—pose problems of scope and content. Movement towards a more deliberate policy relating to the content of the living plant collection has started. The collections of birches, conifers and some groups of orchids have been examined in detail. The computer print-out of living plant collections is invaluable for this work. This process reveals duplicates and omissions in the collection and relates the collections in Benmore and Logan to those in Edinburgh. It also identifies plants requiring special attention. It should probably lead to a common policy on plant collections with other British gardens and perhaps further afield as well. The need for conserving at least parts of the world's flora in botanic gardens is likely to be a live issue within the next decade; international collaboration will impinge on plant collection policy in Edinburgh as elsewhere, but present activities will place the Garden in a good position to respond to this coming challenge.

Whilst new developments are exciting, the more mundane task of *maintaining* a garden of the highest quality is of prime importance. This involves a continual programme of rejuvenation. In the year of the report, as in previous years, areas of the rock garden, the shrubberies, the cycad-house and the nursery were reseeded, fertilised, rotated and the plants spaced out. This continuous process of good housekeeping occupies at least 50% of total man-hours input into the Garden by the industrial staff.

The activities of a large research herbarium fall into a number of roughly delimited parts. Not the least important is the background maintenance of the collections involving the mounting of new specimens, their intercalation in the collection, the up-dating of the collection in the light of work published elsewhere, the loan of material to workers in other institutes and aid to research workers visiting Edinburgh; the herbarium added 19,000, borrowed from elsewhere 3,600 and sent on loan 3,600 specimens. This maintenance uses much staff time but is essential for the field of international science in which the Garden operates.

There was also a continual flow of specimens to be named from outside correspondents and from the Edinburgh, Benmore and Logan Gardens. The number of identifications of living plants alone approached 1,000.

The research work of the botanists continues on long-term projects. Fortunately in taxonomy it is often possible to complete and publish a major taxonomic work in parts. Some of these appeared in 1974: there have been further contributions to the revision of the large family Gesneriaceae in the Old World and a further part of an Old World revision of the sage genus, *Salvia*. Two considerable portions of the revision of the horticulturally important genus *Rhododendron* were completed. The Garden continued to help with the SRC/Edinburgh University Flora of Turkey project with a major contribution to the enormous and very complicated family Com-

positae. Work on conifers has explored the use of scanning electron microscopy in clarification of generic relationships within this group. There is also some promise of useful results using the same instrument with some of the work on Ericaceae. The time is not long distant when scanning equipment will be required as a standard in-house tool for taxonomy. At present we have to rely on borrowed time at other, sometimes distant, institutes.

## TAXONOMIC RESEARCH

### GESNERIACEAE

The fundamental revision of this large tropical family has been continued by Mr B. L. Burt and his widespread collaborators. A paper on the vegetative structure of *Streptocarpus* was completed (with Dr K. Jong, Aberdeen) and has been submitted to the *New Phytologist*. This work, and correspondence with other students of Gesneriaceae, indicated the urgency of completing the taxonomic revision of *Monophyllaea*, one of the genera showing anomalous growth patterns. The outline was virtually complete when a visit to Leiden permitted the examination of exciting new material just in from Sumatra. It is hoped that certain problems raised will be solved in Sarawak in 1975; in any case the work will be written up after that expedition.

In the latter half of the year dormant problems on *Boea* and its allies suddenly seemed capable of solution. The new approach has led to a complete remodelling of the genera: 6 genera and about 100 species are involved. Much of this work was written up by the end of the year but finalisation will be withheld till after the 1975 visit to the Singapore herbarium and Sarawak.

Professor G. W. Gillett (Riverside, California) worked in the herbarium in April and May. Mr Burt had previously agreed to hand over to him his notes on *Cyrtandra* in the Solomon Islands for inclusion in his own work which also covered the Bismarck Archipelago. They worked over this material together and we understand that Gillett has now completed his revision of the group in the combined area. Mr Burt's own work on Bornean *Cyrtandra* made limited progress. The visit to Leiden was made chiefly to check that species it is proposed to describe from Borneo were not already known from Sumatra or other islands in the old Dutch East Indies.

The first paper towards a revision of *Aeschynanthus* (with Mr P. J. B. Woods) was completed. Additional interesting information on *Streptocarpus* continues to come to hand and a new species (in cultivation at Edinburgh) was described. A revision of the small Sino-Himalayan genus *Loxostigma* was prepared.

### ERICALES

Work on this group of plants has developed steadily during the year. Dr J. Cullen has continued work on *Phyllodoce* and the lepidote rhododendrons, and primary revisions of a number of groups have been made. *Phyllodoce* was the subject of a lecture given by Dr Cullen to the Scottish Rock Garden Club's autumn meeting and the text will appear in their journal. Dr D. Chamberlain has also continued work on the elepidote rhododendrons and has completed a revision of the large and complex *Taliense* group. Dr G. Argent has begun work on the large genus *Vaccinium*, including Stereoscan-electron-micrography of leaf surfaces and pollen. Dr B. Burbidge has

continued preliminary work on *Gaultheria* and has been heavily involved in preparations for his visit to Colombia (December 1974–March 1975), where he will make both living and pressed collections of tropical Ericaceae.

Dr Cullen continued as a member of the NATO Eco-Sciences Working Party on Electronic Data Processing and herbaria and attended meetings at the Museum d'Histoire Naturelle, Paris, and the Rijksherbarium, Leiden. Together with Miss McLuckie he organised and carried out a pilot scheme to test the feasibility of the production of a register of type specimens in European herbaria; this was satisfactorily concluded during 1974, and the results will be presented at the International Botanical Congress in Leningrad in 1975.

Dr Chamberlain continued studies on *Pottia* (Bryophytes) and the Bryophyte Flora of the Lothians. He also began the account of *Ferula* (Umbelliferae) for *Flora Iranica*. Dr Argent continued to work towards completion of work on *Musa* (bananas) outstanding from his previous appointment.

#### FLORAS OF SW ASIA, LABIATAE, CRUCIFERAE

Mr I. C. Hedge made further progress towards a monographic revision of E Asiatic *Salvia* with the eventual aim of revising all the Old World species of the genus. Routine editing and seeing through press papers for publication in the Garden's scientific periodical took up a considerable amount of time. At the start of the year he gave a paper at the Linnean Society symposium on the Cruciferae; in the autumn, he spent four weeks at the Ariamehr Botanic Garden in Tehran working in the herbarium and making collections, mainly of Chenopodiaceae, in the field.

Miss Lamond spent some time finishing off various problems connected with the Compositae accounts for the *Flora of Turkey*—mainly concerning the multi-access key to the genera. With Mr Hedge, the account of the Umbelliferae-Echinophoreae was written up and sent to the editor of *Flora Iranica*. A start was made on some of the other genera of Umbelliferae which are being prepared for the same Flora. Routine naming of collections from SW Asia took up more time than usual during the year under review. Miss Meadows was involved in several of the activities listed, particularly those dealing with publications.

#### CATALOGUE OF THE NAMES PUBLISHED BY LÉVEILLÉ

Mr. Lauener continued to make good progress with this long-term project on a major herbarium collection of plants from China. During the year, accounts of the following tribes of the Compositae were completed: Astereae, Heliantheae, Inuleae and, in collaboration with Dr D. K. Ferguson (Antwerp), the Senecioneae and Cardueae. Only three tribes remain to be worked up to complete the family. Mr McKean has also been involved in this Léveillé work but much of his time has been taken up with the ever-increasing work connected with the loans of herbarium specimens both from and to Edinburgh.

#### COMPOSITAE OF TURKEY

During the early part of the year Mr A. J. C. Grierson drew up keys to the 11 tribes and 129 genera of Turkish Compositae. This task was made easier by the simultaneous production by Miss Lamond of a multi-access key to

the same genera. In collaboration with Dr Davis of the University of Edinburgh Botany Department, a lengthy review of structural variation and usage of terms in the family has been prepared. This has called for some basic rethinking of established terminology. The work of revising and standardising accounts of genera for the *Flora of Turkey* has continued. A further note on the nomenclature and taxonomy of some Turkish species has been published.

#### FINE STRUCTURE OF FUNGAL SPORES

This work has continued at a slower rate due to the Keeper's other commitments. Some genera of tropical African rust fungi were examined but progress is still limited by the techniques of embedding and fixation available. Even within the rust fungi, however, yet another route of development of surface ornamentation of the resting spores has been found in the rusts of Umbelliferae. The ultrastructural approach will certainly lead to a useful reclassification of the group.

#### BASIDIOMYCETES

Dr R. Watling spent six weeks in January and February in the United States lecturing and completing a study on the genus *Leccinum*; a manuscript of 400 pages has resulted. Whilst in the United States the opportunity was taken to prepare six papers on various aspects of the Bolbitiaceae. Soon after, nine weeks were spent in Australia at the invitation of the British Council to study aspects of agaricology; about 600 specimens were collected. After his return, studies on the Bolbitiaceae continued, including the preparation of a catalogue of all known species, although supporting cultural work has been disappointing with problems of delivery and/or breakdown of apparatus. With Professor B. Kendrick (Waterloo), visiting mycologist, Watling undertook a review study of conidial states of Basidiomycetes and with Dr D. Largent (Humboldt), visiting mycologist in 1973, a review has been prepared on the agaric pileipellis. A further step forward has been made in mycological aspects of the ericaceous project: successful treatments for diseased rhododendrons were devised in conjunction with the horticultural staff.

Mr P. D. Orton and R. Watling are in the final stages of compiling the account of *Coprinus* for the *British Fungus Flora*; Watling has prepared the foundation material for the part covering the Bolbitiaceae.

#### ASCOMYCETES AND LICHENS

Mr B. Coppins joined the staff in January in order to start new projects on the lichenised and non-lichenised Ascomycetes. He has conducted ecological and taxonomic studies in connection with the Lichen Distribution Map Scheme and has studied fresh material from central and SE Scotland, Northumberland and E Anglia. He read a paper at Bristol University during the symposium on Progress and Problems in Lichenology, and is preparing articles on aspects of his Ph.D. work.

Dr J. Sheard (Saskatoon), visiting lichenologist, joined the laboratory in July; he is studying the ecology and chemotaxonomy of coastal *Ramalina* species and *Dimelaena oreina*.



## CYTOLOGY

Detailed studies by Dr J. A. Ratter on the cytology of Ericaceae, primitive angiosperms and Gesneriaceae have continued during the year: two papers on the cytology of the Gesneriaceae are in the course of publication.

A new project on Papaveraceae (particularly *Hypecoum*), in collaboration with Dr Cullen, was started during the year. Particular attention is concentrated on floral morphology and cytology.

Work on chiasma-frequency in inbreeding and outbreeding species of *Senecio* has continued in collaboration with Dr P. Gibbs (Department of Botany, University of St Andrews).

Dr Ratter has also continued to work on the collections made during the 1972 Brazilian expedition; a number of papers arising out of this are in an advanced state of preparation and the specimens are almost completely identified, and are being split into sets for distribution.

## THE HERBARIUM

## ACCESSIONS, LOANS AND SPECIMENS MOUNTED

Among the more important accessions through exchange during 1974 were over 2,000 New Guinea specimens from Lae, 817 Himalayan and cultivated plants from the British Museum (Natural History), 300 Japanese Ericaceae from the Makino Herbarium in Tokyo, 298 Himalayan specimens from Tokyo University, 144 Ceylon specimens from the Smithsonian Institution, Washington, and 600 Romanian fungi from Bucharest. In addition to these exchanges we received as gifts 700 southern African specimens collected by B. L. Burt & O. M. Hilliard, 507 Yemeni and Somalian specimens from J. J. Lavranos, 600 Australian fungi collected by R. Watling, 170 Iranian specimens, mostly Chenopodiaceae, collected by I. C. Hedge & P. Wendelbo, and 500 hepatics collected by Dr Milne-Redhead, via Mrs J. A. Paton. Purchases accounted for 315 specimens.

	1973	1974
Accessions	6,673	9,944
Distributions	5,108	4,963
Loans: In	3,866	3,673
Loans: Out	9,960	3,693
Specimens mounted	12,500	19,000

On the outgoing side, major distributions were of J. Sinclair's Malayan and Indian duplicates, of which 2,102 were sent to the Smithsonian Institution USA. Other sendings included 1,059 Asian and cultivated specimens to Munich and a special selection of George Forrest's aquatic plants to the Bailey Hortorium, USA. Miscellaneous collections of 600 cultivated specimens were sent to five institutes.

## PHOTOGRAPHY

In January 1974 the photographic slide collection was transferred from the library to the working room of one of the botanists. Approximately 400 slides were added during the year. The work of curating the collections is now more than half completed. The use of large format colour film was started both for the Garden in general and rhododendrons in particular.

## VISITORS

Mr S. Abedin (Karachi); Mrs A. Ala (Tehran); Mr P. Babakhanlou (Tehran); Mr K. Bahadur (Dehra Dun); Dr K. Browicz (Poznan); Dr R. Brummitt (Kew); Mr P. Cox (Glendoick, Scotland); Father L. Cramer (Ceylon); Dr D. Ferguson (Antwerp); Dr G. Gillett (University of California); Mr C. Grey-Wilson (Kew); Prof. H. Hara (Tokyo); Dr O. M. Hilliard (Pietermaritzburg); Dr Kanul (Kashmir); Dr H. Kanai (Tokyo); Prof. K. Karamanoğlu (Ankara); Prof. B. Kendrick (Canada); Prof. Khan (University of Sind); Dr E. Köhler (Berlin); Dr S. Kurosawa (Tokyo); Mr J. Lackey (Iowa); Dr S. Oyewole (Nigeria); Dr S. Panigrahi (Kew); Mr M. Qaiser (Karachi); Mme Z. Raffi (Marseilles); Mr Santisuk (Copenhagen); Mr P. Shakya (Katmandu); Dr J. Sheard (Saskatoon); Miss B. Smith (New York); Dr J. Vidal (Paris); Dr F. Yaltirik (Istanbul).

## EXHIBITION HALL

Seven exhibits were prepared during the period, one in conjunction with the Nature Conservancy, and three further exhibits are in various stages of preparation. The educational side of the work has increased considerably with in-service training and advice to various groups expanding. Dr C. Wood has been involved in replanning the demonstration garden and order beds and, with Mrs Purves, in redesigning garden signs and notice-boards.

## THE LIBRARY

During the year the library has continued to serve all aspects of the work of the Garden. 1,696 volumes have been added to the stock; the number of current periodicals received is now 1,070. Inter-library loans continue to be an important part of the library activity: 437 volumes were borrowed and 616 lent. Members of staff and students of Edinburgh, Heriot-Watt, Aberdeen and St Andrews Universities consulted the library regularly, as did staff of DAFS Agricultural Scientific Services, East Craigs, the Nature Conservancy and the Forestry Commission. 266 members of the public consulted the library and groups of students of librarianship from Liverpool, Sheffield, Aberystwyth and Telford College, Edinburgh, visited the library as part of their training.

## PUBLICATIONS

## NOTES FROM THE ROYAL BOTANIC GARDEN EDINBURGH

Two parts of the Garden's research journal were published during the year; vol. 33 pt. 1:1-206 and pt. 2:207-339. The first part was devoted to two fairly major revisions: *Salvia* in Africa (I. C. Hedge) and *Chirita* (D. Wood—former Civil Service Research Fellow at the Garden). The second part contained a variety of papers which included, other than those of members of staff, contributions by former and post-graduate doctorate students jointly supervised by the Garden and University staffs, and by colleagues abroad. About 350 copies of each part of *Notes from the Royal Botanic Garden Edinburgh* are currently distributed from the Garden.

## GARDEN GUIDES

New editions of the garden guides to our west-coast adjuncts at Benmore and Logan were eventually published in the autumn after a long delay due to paper shortage and the results of the three-day week earlier in the year.

Because of the paper shortage in 1974, Her Majesty's Stationery Office withheld production of the semi-popular information leaflet *The Garden*; it will start again in the spring of 1975.

A new colour pamphlet was produced for us by HMSO and made its appearance in late summer.

## PUBLICATIONS BY MEMBERS OF STAFF DURING 1974

BURTT, B. L. Studies in the Gesneriaceae of the Old World xxxvii: Schizoboea, the erstwhile African Didymocarpus. *Notes R.B.G. Edinb.* 33:265-267.

COPPINS, B. J. Changes in the British Lichen Flora. In Hawksworth, D. L. (ed.), *The Changing Flora and Fauna of Britain*, 47-48. Academic Press, London & New York.

COPPINS, B. J. & LAMBLEY, P. W. Changes in the Lichen Flora of the parish of Mendlesham Suffolk, during the last fifty years. *Suff. Nat. Hist.* 16:319-335.

EVANS, A. *The Peat Garden and its Plants*. 164 pp. Dent, London.

GRIERSON, A. J. C. Anthemis in Davis, P. H., Materials for a Flora of Turkey XXX: Compositae I. *Notes R.B.G. Edinb.* 33:211-217; Inula, *op. cit.*, 248-251; Matricaria, *op. cit.*, 252-253; Pulicaria, *op. cit.*, 255; Tanacetum, *op. cit.*, 259-262.

— Critical Notes on the Compositae of Ceylon II. *Ceylon Journ. Sci.* 11:12-22.

HEDGE, I. C. A revision of Salvia in Africa including Madagascar and the Canary Islands. *Notes R.B.G. Edinb.* 33:1-121.

— *Echinops*, in Davis, P. H., Materials for a Flora of Turkey XXX: Compositae I. *Loc. cit.*, 33:237.

— A further note on Salvia tetradonta. *Loc. cit.*, 33:295-299.

HENDERSON, D. M. & HIRATSUKA, Y. Ontogeny of spore markings on aecidiospores of Cronartium comandrae. *Canad. Journ. Bot.* 52:1919-1921.

LAMOND, J. M. Crepis, in Davis, P. H., Materials for a Flora of Turkey XXX: Compositae I. *Notes R.B.G. Edinb.* 33:234-237.

LAMOND, J. M. & MATTHEWS, V. A. Chondrilla, in Davis, P. H., Materials for a Flora of Turkey XXX: Compositae I. *Loc. cit.*, 33:231-234.

PAGE, C. N. Morphology and affinities of Pinus canariensis. *Loc. cit.*, 33:317-323.

WATLING, R. Notes on some British Agarics IV. *Loc. cit.*, 33:325-331.

— Dimorphism in Entoloma abortivum. *Bull. Soc. Linn. Lyon.* 1974: 449-470.

— Macrofungi in the Oak woods of Britain. In Morris, M. G. & Perring, F. H. (eds.), *The British Oak*, 222-234. Cambridge.

— Notes on eight species of Coprinus. *Icefield Ranges Research Project: Scientific Results* 4:361-364.

WATLING, R. & SWEENEY, J. Larger Fungi from Iran. *Notes R.B.G. Edinb.* 33:333-339.



## THE LIVING COLLECTIONS AT EDINBURGH

## ARBORETUM DEPARTMENT

In this department there has been particular development of a long-term maintenance programme. For instance, the area of the south border, for long rather crowded with quite noteworthy plants, was remodelled and the first plantings of a new scheme, relying on members of the family Rosaceae, was started. Although the Edinburgh Garden has considerable bands of shelter, the large numbers of semi-tender shrubs, especially rhododendrons, require even more shelter than is at present available. East winds in early spring prove particularly damaging. On the hill to the east of Inverleith House, new plantings of windbreaks have been started in order to enclose a protected area in the region of the old Rhododendron Walk. The first stages of examining the content of the collection in detail were taken with a survey of the conifer collection in collaboration with Dr Page. This survey will result in the removal of poor and surplus conifers in Edinburgh where many of them grow with difficulty. Those most suitable for Benmore will be grown there and only a representative of those species which perform well in Edinburgh will be retained. The *Rhododendron* programme has allowed certain parts of the collection to be collected and renamed. All those of the *Taliense* series were sent for checking to the herbarium during the year. The expertise of the department was used by Logan Botanic Garden when a garden supervisor and three students removed dead and dangerous trees in the confined space of Logan.

Although the advantages of the computer print-out of the plants in the Garden have been recognised for several years now, considerable time has to be spent in keeping it up-to-date when there are alterations of plantings in the Garden.

## GLASS DEPARTMENT

The genus *Rhododendron* (*Maddenii* Series) received attention in this department. A comprehensive collection was introduced to the remodelled temperate palm house (now open to the public) where specific palms selected for their botanical and ecological interest dominate the landscape. Many superfluous plants were removed to achieve this effect. Similar treatment was applied to other parts of the glass department where specimens were removed because they had outgrown their allotted space.

The temperature of the fern house was increased during the year to allow the cultivation of a wider range of ferns, but the results have been only partially successful. An exceptionally dull and wet winter may have had some bearing on the limited response to the change.

Other reductions in plant numbers were made by disposing of commonly grown hybrids and species of unknown origin, but the plant-houses continued to attract and interest lay and professional visitors alike.

## HERBACEOUS AND ALPINE DEPARTMENT

Apart from maintenance, the department carried through two major changes. The first was a complete change in the presentation of the Order Beds area. The new scheme is intended to show, in simple stages, a few major facets of plant evolution. The second operation, the construction and planting

of a dry limestone wall, is the first phase of a much-needed alpine area (raised beds, troughs and an alpine house) to replace the West Range and its formal terrace.

Mr A. Evans completed his comprehensive book on peat-gardening, a garden feature initiated at Logan, Wigtownshire, and considerably developed at Edinburgh. The book was published in October.

#### PROPAGATION DEPARTMENT

Amongst an assortment of plants, seeds and cuttings received in 1974 by the department were plants of *Findlaya apophysata*, the only Trinidad representative of the Ericaceae, and *Campynemanthe*, the New Caledonian equivalent of *Rhodohypoxis*. Seeds received from outside institutes showed a regrettable falling off of cleaning and storage standards.

Rebuilding of plant-houses has disrupted the work of the department although it was still possible to conduct some interesting trials with soil-less composts and explore the advantages of container grown shrubs and trees. Equally useful, but as yet inconclusive, have been the responses in propagation trials on ephemeral and permanent branched trees and shrubs.

#### PUBLIC ATTENDANCE

The attendance figures for 1974 indicate a continued overall increase in the numbers of visitors to the Garden although the pattern of increase is not consistent. Probably most significant is the increase in attendance for January which has almost doubled since 1972 (from 12,578 to 22,869). Conversely, there have been fewer visitors in October, November and December. On one day (14 April) 13,706 visitors entered the Garden.

#### TRAINING SECTION

Eleven students gained Diplomas in Horticulture (two with Honours) during the year. The awards were presented by Mr C. D. Brickell, Director of the Royal Horticultural Society's Garden at Wisley.

As in previous years, most of the students completing the course obtained posts in local authority work. There has been a significant increase in the number of such posts available this year, perhaps due to local government reorganisation in England and Wales.

An internal industrial staff-training scheme was initiated during the year; 16 garden staff have so far received training.

#### YOUNGER BOTANIC GARDEN, BENMORE, ARGYLLSHIRE

With six years of restoration work behind it, following the disastrous gale of 1968, the Garden has been turning towards longer-term plans. All the major plants at Benmore are now on the computer print-out and it is possible to relate the Benmore collections more closely to those at Edinburgh and Logan. Preliminary work started with Dr Page in planning the eventual collection of conifers to be developed at Benmore.

The weather at Benmore can severely affect both the work of the Garden and the number of visitors—particularly in the past year when the rainfall was 97.28 in. (2496 mm)! Only in April and June was the ground reasonably workable. Gales in January and December brought down some mature trees

but otherwise there was little damage to the collections. Attendance figures continued to rise in spite of the weather. A small part of the rise is attributable to the opening of the Garden in October as an experiment in 1974. The good weather and brilliant colours of Argyll in autumn suggested that this would be worthwhile, although the number of visitors (c. 1000) was only moderate. General garden work to improve access, increase the plant collection and make it more interesting and colourful has continued; planting of ornamental trees and shrubs and a collection of species azaleas commenced in the Younger Memorial Walk and a gravel road was constructed through the area; the old saw-mill site was cleared, levelled and seeded; paths in the vicinity of the pond were re-aligned and widened; a path was constructed between the *Grande Series* rhododendrons and the Golden Gates bank; a number of diseased trees, mainly beeches, were felled and many rhododendrons were transplanted from the nursery to their correct places in the taxonomic plantings.

#### LOGAN BOTANIC GARDEN, WIGTOWNSHIRE

When Logan was gifted to the Department of Agriculture and Fisheries for Scotland for the Edinburgh Botanic Garden in 1969, many of the shelter trees were in poor condition; the concern felt at that time has been proved all too correct. Over the last six years many of the old hardwoods have had to be felled or have been blown down by the wind; shelter to the south west is now fragmentary. In January, a severe gale blew out some two dozen Douglas firs and, more serious, some large specimen plants of considerable botanical interest. The plants put in over the last ten years to replace the failing shelter are growing well but will take several years yet to be effective. The acquisition of Deerhill from the Logan Estate, and its planting-up, would, however, solve many of these problems on a long-term basis; negotiations about this are now nearly completed.

The idea of a garden feature built of peat blocks, a peat garden, was first developed at Logan by its earlier owners, the McDoualls. Ever since, a peat garden has been on the site of their first efforts but in recent years the peat has decayed considerably. New peat walls were constructed during 1974 with peat of suitable quality obtained from Forestry Commission drainage operations. In the west part of the garden, many stumps were removed to enable the grass to be maintained by motor-mowers; other mature and rotten trees were removed. Some of the recent plantings in this area have responded poorly, due possibly to waterlogged patches. The drainage was probably disrupted by the extraction of large trees some four years ago.

Logan has for long suffered from completely inadequate glass-houses and workroom/offices. The new glass-house and service buildings were completed in autumn and have proved very satisfactory. In early winter, the staff tenants of Henknowe Cottages moved to the newly constructed Pine Cottages within the boundaries of the Garden. These two building operations have resulted in much extra work in clearing up after the tradesmen. The areas round the cottages and the service buildings both required considerable attention.

During the year the plant collection has been augmented by 279 accessions mostly supplied by the Propagation Department in Edinburgh. The Garden supplied research material on a greater scale than in previous years. Edinburgh University received 22 species of *Salvia* for studies of essential oils; the large plants of the primitive dicotyledon *Drimys winteri* enabled us to supply Professor Boulter of Durham University with a large batch of leaves sufficient for nucleic acid analysis; Glasgow University received samples of five *Ligularia* species for chemical study. It is noteworthy that all these provisions of research material from Logan are possible because in its mild climate large quantities of the plants required are grown out-of-doors; in most other parts of the United Kingdom considerable glass-house space would have to be used to meet the same sort of request.

# STAFF LIST

(December, 1974)

<i>Regius Keeper</i>	Mr D. M. Henderson	
<i>Assistant Keeper</i>	Dr J. Cullen	
<i>Senior Principal Scientific Officer</i>	Mr B. L. Burt	
<i>Principal Scientific Officers</i>	Mr A. J. C. Grierson Mr I. C. Hedge	Dr J. A. Ratter Dr R. Watling
<i>Senior Scientific Officers</i>	Dr G. C. G. Argent Dr R. B. Burbidge Dr D. F. Chamberlain	Mr L. A. Lauener Mr J. M. Marshall Dr C. N. Page
<i>Higher Scientific Officers</i>	Mr G. Anderson Mr B. J. Coppins Mr R. Eudall Miss J. M. Lamond	Miss R. M. Smith Mrs H. Thomson Dr C. C. Wood Mr P. J. B. Woods
<i>Scientific Officers</i>	Mr D. R. McKean Miss G. A. Meadows Mr A. G. Miller	Miss C. Milne Mrs R. A. Purves Miss D. E. Purves
<i>Assistant Scientific Officers</i>	Mrs D. Brunton Mrs N. M. Campbell Miss G. F. Chamberlain Mrs L. A. Gibb	Miss E. M. Hamlett Mrs H. Hoy Miss L. McLuckie Miss M. A. H. Paul
<i>Laboratory Attendants</i>	Miss M. Bryce Miss E. R. Crichton Miss M. McLaren	Mrs G. Millar Mrs G. Young
<i>Curator</i>	Mr R. L. Shaw	
<i>Assistant Curators</i>	Mr S. J. Armstrong Mr L. Bisset Mr J. M. Colledge (Logan)	Mr A. Evans Mr A. Hall (Benmore) Mr A. Snoddy
<i>Garden Supervisors</i>	Mr G. G. Broadley Mr L. Buchan Mr R. Cranston Mr J. M. Gardiner Mr J. A. R. Kerby Mr G. Kirkpatrick Mr G. Knott	Mr J. Main Mr P. J. Maudsley Mr W. Tait Mr B. Unwin (Logan) Mr M. Welsh (Benmore) Mr J. Wilson
<i>Librarian III</i>	Mr M. V. Mathew	
<i>Librarian IV</i>	Mr D. R. Parker	
<i>Higher Executive Officer</i>	Mr T. C. Dobbie	
<i>Clerical Officers</i>	Mrs H. S. Boyes Mr G. Erskine	Miss J. Renwick
<i>Clerical Assistants</i>	Mrs E. C. Stevens Mrs G. B. B. Thompson	Miss J. Thomson



<i>Senior Paperkeeper</i>	Mr A. E. Pantling	
<i>Sergeant Park-Keeper</i>	Mr J. Y. Thompson	
<i>Park Constables</i>	Mr A. W. Brown Mr N. Campbell Mr P. Castle Mr W. B. Conacher Mr M. Fitz	Mr P. N. Fletcher Mr D. C. Hogg Mr T. Maxwell Mr G. Sinclair Mr R. Stevenson
<i>Gardeners Special</i>	Mr J. B. Brown Mr T. Y. A. Brown Mr W. R. Caldwell Mr G. C. Drawbridge	Mr J. McCluskey (Benmore) Mr B. N. M. Menzies Mr A. J. Paxton
<i>Gardeners I</i>	Mr A. M. Cameron (Benmore) Mr R. T. Newlands Mr J. Reid (Logan) Mr J. Stewart	Mr E. F. Young Mr J. Newton Mr W. Kocz
<i>Gardeners II</i>	Mr T. R. Burnett Mr W. A. Crowe (Benmore) Miss L. R. Cunningham Mr G. Godbert (Benmore) Mr H. Holman Mr D. Lumsden (Benmore)	Mr C. C. McCormick (Logan) Mr G. Murdoch (Logan) Mr R. M. Robertson Mr G. M. Potts (Benmore) Mr E. Smith Mr H. R. Wallace
<i>Assistant Gardeners</i>	Mr A. D. Elliot Mrs G. Godbert (Benmore) Mr T. D. Grieve Mr J. Henderson Mr A. S. Jackson (Benmore) Mr J. K. Matthew	Mr J. McElroy Mr C. R. Rodger Mr G. Smith Mr F. Trower Mr R. Waddell
<i>Junior Gardeners</i>	Mr A. Currie (Logan) Mr S. W. Knott Mr J. Urquhart	Mr M. R. Curzon Mr D. M. Stewart
<i>Labourers</i>	Mr M. Fletcher (Benmore) Mr J. R. Wright	Mr R. S. Waddell Mr T. L. Sutherland
<i>Storeman</i>	Mr G. Roddex	
<i>Driver</i>	Mr P. Burns	
<i>Male Cleaner</i>	Mr F. Middlemiss	
<i>Nightwatchmen</i>	Mr P. F. Banks Mr G. Brady	Mr W. Pringle Mr J. K. Macrae