NOTES

FROM THE

ROYAL BOTANIC GARDEN,

EDINBURGH.

VOL. I.

Including Numbers I.-V.

1900-1901.

GLASGOW:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE
By JAMES HEDDERWICK & SONS,
AT "THE CITIZEN" PRESS, ST. VINCENT PLACE.

SOLD AT THE GARDEN,
And to be purchased, either directly or through any Bookseller, from
OLIVER & BOYD, EDINBURGH.

[*All rights reserved.*]

Dates of the several Numbers of this Volume.

Part I., pp. 1-24 for January, 1900.
Part II., pp. 25-40 for November, 1900.
Part III., pp. 41-134 for December, 1900.
Part IV., pp. 135-192 for August, 1901.
Part V., pp. 193-246 for December, 1901.

List of Contents to Vol. I., 1900-1901.

	PAGE.
Prefatory Note.	
The Royal Botanic Garden	i
List of Staff	ii
Rules and Regulations	iii
Historic Notice	v
Features of the Garden. With Key Plan	ix
Teaching in the Garden	xi
Life-History and Habits of Diaxenes dendrobii, Gahan. With Plates I. and II. By R. Stewart MacDougall, M.A., D.Sc.	1
Torsion of the Leaves in Picea, Abies, Tsuga, and Pseudotsuga. With Zincographs 1-10. By A. D. Richardson	13
List of Seeds collected in the Royal Botanic Garden, Edinburgh, during the year 1900	25
Observations on the Girth-increase of Trees in the Royal Botanic Garden, Edinburgh. By David Christison, M.D.	41
Life-History and Habits of Clerus formicarius, Linn., with 11-14. By R. Stewart MacDougall, M.A., D.Sc.	121
Life-History and Habits of Rhizophagus depressus, Fowler, with 15-17. By R. Stewart MacDougall, M.A., D.Sc.	127
Enumeration of Visitors to the Royal Botanic Garden, Edinburgh, during the years 1889-1900	134
The Cultivation of Fruit under Glass. By James Whytock	135
Observations on the Girth-increase of Trees in the Royal Botanic Garden, Edinburgh. Part II.—Coniferæ. By David Christison, M.D.	173
The Diameter-Increment of Trees. By A. W. Borthwick, B.Sc.	193
Hints on Propagating Mistletoe from the Berry. By William Paxton	212
Notes on Museum-Methods in use at the Royal Botanic Garden, Edinburgh. With Plate III. By H. F. Tagg, F.L.S., Assistant in the Museum	213
Title and List of Contents to Vol. I., 1900-1901.	

NOTES FROM THE ROYAL BOTANIC GARDEN, EDINBURGH.

IT is proposed to issue from time to time, under the title of "NOTES FROM THE ROYAL BOTANIC GARDEN, EDINBURGH," reports upon the condition and progress of the Garden, records of scientific investigations carried on in the Garden, and notices of points of interest relating to plant-life which come under the observation of the Staff. To this first number there is prefixed a brief notice of the Botanic Garden itself.

The "NOTES" will be available in exchange for publications of kindred institutions, and will also be on sale to the public.

ISAAC BAYLEY BALFOUR,
Regius Keeper.

January, 1900.

THE ROYAL BOTANIC GARDEN, EDINBURGH.

THE Royal Botanic Garden, Edinburgh, is one of the three Gardens maintained by the State in the United Kingdom, the others being the Royal Gardens at Kew in England, and the Glasnevin Garden at Dublin in Ireland. It occupies an unequally-sided quadrilateral area of 57·648 acres (bounded upon all sides by public roads and dwelling-houses) on the North side of Edinburgh—about a mile from the shore of the Firth of Forth. Its highest point, at Inverleith House (**R**)—the official residence of the Regius Keeper of the Garden—towards the North-west, is 78 feet above sea-level, and thence the ground falls away on all sides. The lowest point—a depression 30 feet above sea-level, with an east and west trend through the middle of the Garden—is the site of an old bog, and the ground rises again to the south of the depression. The surface soil is generally alluvial sand resting on clay at considerable depth. In the lower part of the area the clay comes to the surface.

There are two entrances—one upon the east side from Inverleith Row into the Garden, the other upon the west side from Arboretum Road into the Arboretum. The Garden is open daily from 8 a.m. on Week-days and from 11 a.m. on Sundays until sunset. The Plant-Houses are open from 1 p.m. until 5.30 p.m., or until sunset if this be earlier. The Museum is open on Week-days from 10 a.m. until 6 p.m., on Sundays from 1 p.m. until 5.30 p.m. The Herbarium and Library are open on Week-days from 10 a.m. until 6 p.m., excepting on Saturday, when they are open until 1 p.m.

Staff of the Royal Botanic Garden, Edinburgh.

Regius Keeper, ...	Isaac Bayley Balfour, M.A., M.D., F.R.S.
Assistant in Museum, . .	Harry Frank Tagg, F.L.S.
Assistant in Herbarium, . . .	John Frederick Jeffrey.
Clerk, ...	Henry Hastings.
Head Gardener, ...	Adam Dewar Richardson.
Assistant Head Gardener, . . .	Robert Lewis Harrow.
Foreman of Herbaceous Department,	William Henry Waite.

RULES for the Royal Botanic Garden and Arboretum in connection with the Regulations prescribed by "The Parks Regulation Act, 1872."

1. No unauthorised Person may ride or drive in this Garden or in the Arboretum, and no Wheelbarrow, Truck, Bath-chair, Perambulator, Cycle, or other Vehicle or Machine, is allowed to enter, except with the written permission of the Keeper. Children under ten years of age are not admitted unless accompanied by a Parent or suitable Guardian.

2. No Horses, Cattle, Sheep, or Pigs are allowed to enter.

3. No Dogs are admitted.

4. No Bags, Baskets, or Parcels, no Flowers, and no implements for Games may be brought in; Artists and Photographers may not bring in their Apparatus without written permission from the Keeper.

NOTE.—*The foregoing Rules shall not apply to persons going to or leaving Inverleith House by the road leading from the Arboretum Road Gate to the House.*

5. Visitors are to enter and leave the Plant Houses by the Doors according to the Notices affixed thereon.

6. Smoking is not allowed in the Plant Houses.

7. No Person shall touch the Plants or Flowers.

8. Pic-nics and luncheon parties are not allowed.

9. No unauthorised Person shall Drill or practise Military Evolutions or use Arms or play any Game or Music, or practise Gymnastics, or sell or let any Commodity.

10. No unauthorised Public Address may be delivered in the Garden or Arboretum. No Performance or Representation either spoken or in dumb show shall be given in any part of the Garden or Arboretum, unless by permission of the Commissioners

of Her Majesty's Works and Public Buildings. No Person shall use any obscene, indecent, or blasphemous words, expressions, or gestures, or do any act calculated to provoke a breach of the Peace, in the course of, or in connexion with, any speech, address, performance, recitation, or representation. No money shall be solicited or collected in connexion with any performance, recitation, or representation, except by permission of the Commissioners of Her Majesty's Works and Public Buildings.

11. Large parties must be broken up to prevent crowding.

12. Climbing the Trees, Railings, or Fences is forbidden.

13. Birds' nesting, and taking, destroying, or injuring Birds or Animals are forbidden.

14. The distribution of Handbills, Advertisements, and other Papers by the Public is forbidden.

Dated the 4th day of August 1896.

Sealed with the Common Seal of the Commissioners of Her Majesty's Works and Public Buildings.

REGINALD B. BRETT,
Secretary.

Seal

Historic Notice.

In the year 1670 a portion of the Royal Garden around Holyrood House was occupied by two eminent Edinburgh physicians, Andrew Balfour and Robert Sibbald, for the making of a Physic Garden, and James Sutherland was appointed to the "Care of the Garden." This was the foundation of the Royal Botanic Garden of Edinburgh, which is therefore, after that of Oxford (founded in 1632), the oldest in Great Britain. The stocking of the Garden with plants was effected from the private Garden of Dr. Andrew Balfour, in which for some years he had been accumulating medicinal plants, and also in great measure from that at Livingston in West Lothian, the laird of which, Patrick Murray, was much interested in the growing of useful plants.

In 1676 the same physicians acquired from the Town Council of Edinburgh a lease of the Garden of Trinity Hospital and adjacent ground for the purpose of a Physic Garden in addition to the Garden already existing at Holyrood, and they appointed the same James Sutherland to be "Intendant" of this Garden. The site of this Garden, which for convenience of reference may be called the Town's Botanic Garden, was the ground lying between the base of that portion of the Calton Hill upon which the prison is built and the North Bridge, and it is now occupied by a portion of the Waverley Station of the North British Railway. The name Physic Garden attached to a street in the vicinity is a reminiscence of the existence of the Garden at this spot.

About 1702 another Botanic Garden was established in Edinburgh in the ground immediately adjacent to the College Buildings, apparently on the site of the present South College Street. This was the College Garden, and of it James Sutherland became also custodian.

Thus in the early years of the eighteenth century there were in Edinburgh no less than three distinct Botanic or Physic Gardens—one at Holyrood, the Royal Garden; one around Trinity Hospital, the Town's Garden; and one beside the College, the College Garden. All these were at first under the care of James Sutherland.

Sutherland from the first made use of the Royal Garden for giving "instruction in Botany to the Lieges," and received a royal warrant appointing him Botanist to the King in Scotland, and empowering him to "set up a Profession of Botany" in this Garden. When the Town's Garden was created the Town Council appointed him to lecture on Botany as Professor in the Town's College, now the University of Edinburgh. In 1683 he published his "Hortus Medicus Edinburgensis, or a Catalogue of the Plants in the Physical Garden at Edinburgh," from which and from other published notices of the Town's Garden we learn that between two and three thousand plants were in cultivation. There is no means of determining how these plants were distributed between the several Gardens at the date of publication of Sutherland's catalogue.

In 1706 Sutherland resigned the care of the Town's Garden and the College Garden as well as his Professorship in the University, but, remaining King's Botanist, he retained the care of the Royal Garden at Holyrood. Charles Preston was appointed his successor by the Town Council, and there were thus established rival Gardens and rival Professors of Botany in Edinburgh. Charles Preston died in 1712, and was succeeded in his offices by his brother George Preston. Neither of the Prestons had ever the care of the Royal Garden.

In 1715 Sutherland died, and his successor as King's Botanist, Keeper of the Royal Garden, and Regius Professor of Botany was William Arthur, who, however, for political reasons did not hold the offices long, and was succeeded in 1716 by Charles Alston.

In 1724 the College Garden, having fallen into disorder, was turned to other uses; and in 1729, George Preston having retired, the Town Council appointed, as his successor in the charge of the Town's Garden and as Professor of Botany in the University, Charles Alston, who as King's Botanist had already

the charge of the Royal Garden and was Regius Professor of Botany. Through him, after separation for a quarter of a century, the Royal Garden and the Town's Garden were again combined under one Keeper, and the Regius Professorship of Botany and the University Professorship were similarly united. They have so continued to the present time.

In 1763, the Royal Garden and the Town's Garden proving too small and otherwise unsatisfactory, John Hope, who had succeeded Alston in his offices in 1761, proposed a transference of the two to a more congenial site in which they could be combined. At first it was intended to secure ground to the south of George Watson's Hospital—the area upon which much of the present Royal Infirmary is built—but this not being possible, five acres of ground on the north side of Leith Walk, below the site now occupied by Haddington Place, were chosen. As Hope proposed to transfer the collections in the Royal Garden to the new Garden he was able to secure the support of the Treasury to his scheme, and the selected ground was leased in name of the Barons of Exchequer. At the same time the Town Council agreed to contribute £25 annually to the support of the Garden, this sum being the amount of rent expected from the letting of the old Town's Garden. The plants from both Gardens were transferred to the ground at Leith Walk, and from this date there has been only one Botanic Garden in Edinburgh.

The site thus secured for the Garden proved, however, only a temporary one. Daniel Rutherford, who in 1786 succeeded Hope in his offices, cast about him for a spot in which more ground would be available for the extension of the Garden; and eventually in 1815 nine and a half acres of the land lying to the east of Holyrood Palace, and forming the ground of Belleville or Clockmill, was fixed upon as a site in every way desirable; but Rutherford dying before completion of the arrangements for the transference of the Garden, his successor, Robert Graham, appointed in 1820, preferred the more open site of the Inverleith property which the Garden now occupies, and fourteen acres of the Field or Park of Inverleith, known as Broompark and Quacaple-sink, were purchased by the Barons of Exchequer from Mr. James Rocheid, its owner, in 1820, the lease of the Leith Walk

Ground being sold. By 1823 all the plants had been transferred to the new Garden.

In 1858, during the Keepership of John Hutton Balfour, who succeeded Graham in 1845, a further addition, by purchase from the proprietor of Inverleith, of a narrow belt of two and a half acres was made to the Garden on the west side; and in 1865, the Caledonian Horticultural Society having resigned to the Crown its lease of the ten acres of adjoining ground which it had occupied since 1824 as an experimental Garden, this ground was also made part of the Botanic Garden. Finally the present area of the Garden was completed in 1876, when the Town Council purchased from the Fettes Trustees twenty-seven and three-quarter acres of the Inverleith property on the west side of the Garden and transferred it to the Crown for the purpose of making an Arboretum in connection with the Garden; the Crown at the same time purchased Inverleith House and two and a half acres of additional ground.

In 1879, on Balfour's retirement, Alexander Dickson became Queen's Botanist, Regius Keeper and Professor, and held these appointments until his death in 1887. During his term of office the Arboretum was thrown open to the public.

Surrounded as it now is on all sides by public roads, no further extension of the Garden upon its present site can be made.

Features of the Garden.

The method through which the Garden was built up by successive additions resulted in an absence of combination between its several parts, in great measure a consequence of want of adequate funds to make the necessary alterations in the grounds. During the past decade, in which the Garden has been wholly under the administration of the Commissioners of H.M. Works, the bringing about of this combination has been in progress. The work is not yet completed, and the Plan of the Garden which is attached to this sketch shows the area of the Garden as it is laid out at this date—January, 1900. Future editions will show further changes as the work of reconstruction proceeds.

From its foundation the Botanic Garden has been devoted to the teaching of Botany, and its usefulness in this respect has determined the laying out of its area.

Herbaceous Garden.—A considerable space is occupied by a collection of herbaceous plants arranged for study in natural orders after the "Genera Plantarum" of Bentham and Hooker.

Rock Garden.—There is an extensive rockwork upon which alpine and rarer herbaceous plants are cultivated.

Arboretum.—The whole of the western area of the Garden will be eventually utilised as an Arboretum of trees and shrubs, with the exception of the Conifers, which are now placed in the ground adjacent to the Rock Garden.

The **Plant-Houses** are still in process of reconstruction. So far as they have been rearranged at the present time they consist of a long range to the north of the herbaceous collection, composed of a Central Green-house, from the sides of which two Corridors run east and west (**H**). In the Entrance Porch to the Central Green-house is a collection of Insectivorous Plants (**I**). From the Eastern Corridor two houses project to the south—one occupied by Plants of Dry Regions (**F**), the other containing

Economic Plants of both Tropical and Temperate Regions (**G**). The House terminating the Eastern end of this Corridor is one of the old and decayed plant-houses, to which visitors are not admitted pending its reconstruction. To the south side of the Western Corridor are attached two houses—one for Orchids (**J**) and one for Plants of Tropical and Warm Regions (**K**). The house at the western end of the Corridor is one of the old plant-houses, and is temporarily, and until reconstruction, filled with Tropical Ferns (**L**), and opening from it is a small house for Filmy Ferns. Behind the western end of the Front Range there is a Temperate House for Palms, Tree-Ferns, and Coniferæ (**O**), and a Palm-House (**P**). Between these and the Front Range at its western end is a suite of houses (now nearing completion) which will be devoted to Monocotyledonous Plants of Tropical and Warm Regions, specially Aroids, Scitamineæ, Bromeliads, Liliaceæ, and Amaryllidaceæ; Pitcher Plants are also provided for in one of these houses (**M**, **N**). The central Heating Station (**Q**) for the Plant-houses lies behind the Front Range.

Adjoining the Entrance from Inverleith Row is a group of buildings including the **Office of the Garden** (**A**), the **Museum** (**B**), the **Laboratories** (**C**), and the **Lecture Hall** (**D**).

The **Museum** contains a series of exhibits illustrating the form and life-history of plants, and these are arranged so as to facilitate their use in teaching.

Herbarium and Library.—In the southern portion of the Garden is the Herbarium and Library (**S**). It contains a fair representation of the Floras of the world, and the herbarium of plants belonging to the University of Edinburgh is deposited here.

The **Ladies' Cloak-Room** is on the left hand of the path leading into the Garden from the Entrance from Inverleith Row (**E**).

From the higher ground of the Arboretum—at the point marked **V** on the plan—a fine panoramic view of the City of Edinburgh, flanked on the east by Arthur's Seat, and on the west by the Pentland Hills, is obtained.

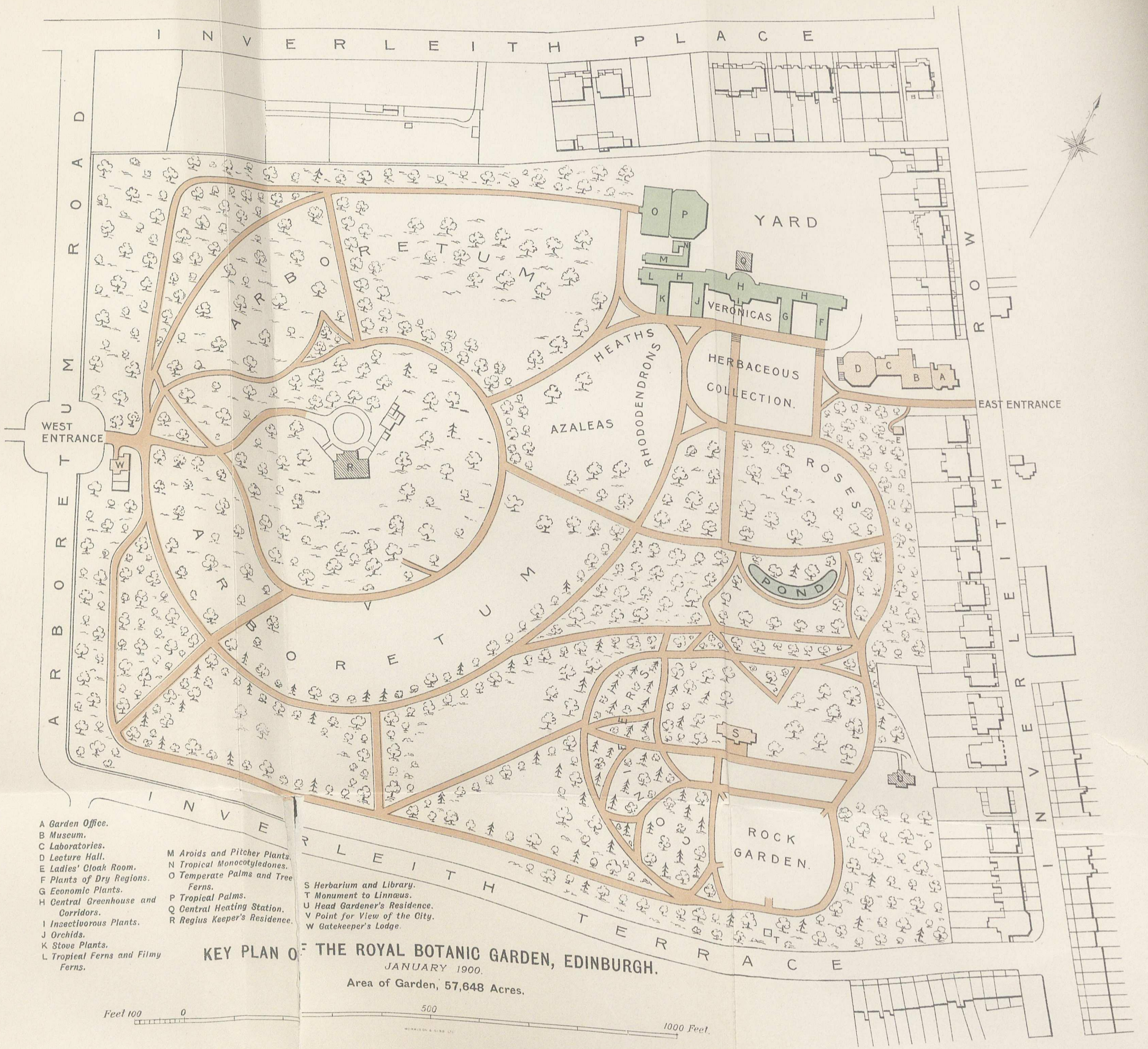
Teaching in the Garden.

Special instruction in the sciences underlying the practice of Horticulture and Forestry is provided for the Staff of the Garden. The course of instruction is spread over three years, and consists of lectures upon, and practical instruction in, the sciences taught. A Reading-room and Library is also provided for members of the Staff going through the course. Young Gardeners or Foresters desiring admission to the Staff and the course of instruction should make application to the Regius Keeper.

The Regius Keeper from time to time gives lectures which are open to the Public. The Laboratories are open to any one desirous of undertaking Botanical Research.

In recent years a School of Rural Economy has been established in Edinburgh, and a considerable part of the botanical teaching in connection with it is carried on in the Garden.

For a century and a half the offices of Regius Keeper of the Botanic Garden and Professor of Botany in the University of Edinburgh having been held by the same person, it has become the custom that the students of the University come to the Garden for instruction in Botany.


INVERLEITH PLACE
ARBORETUM ROAD
WEST ENTRANCE
ARBORETUM
PINETUM
HEATHS
RHODODENDRONS
AZALEAS
HERBACEOUS COLLECTION.
ROSES
POND
YARD
VERONICAS
EAST ENTRANCE
ROCK GARDEN.
INVERLEITH TERRACE
INVERLEITH ROW
A Garden Office.
B Museum.
C Laboratories.
D Lecture Hall.
E Ladies' Cloak Room.
F Plants of Dry Regions.
G Economic Plants.
H Central Greenhouse and Corridors.
I Insectivorous Plants.
J Orchids.
K Stove Plants.
L Tropical Ferns and Filmy Ferns.
M Aroids and Pitcher Plants.
N Tropical Monocotyledones.
O Temperate Palms and Tree Ferns.
P Tropical Palms.
Q Central Heating Station.
R Regius Keeper's Residence.
S Herbarium and Library.
T Monument to Linnæus.
U Head Gardener's Residence.
V Point for View of the City.
W Gatekeeper's Lodge.
KEY PLAN OF THE ROYAL BOTANIC GARDEN, EDINBURGH.
JANUARY 1900.
Area of Garden, 57,648 Acres.
Feet 100 0 500 1000 Feet.
MORRISON & GIBB LTD