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REPORIS







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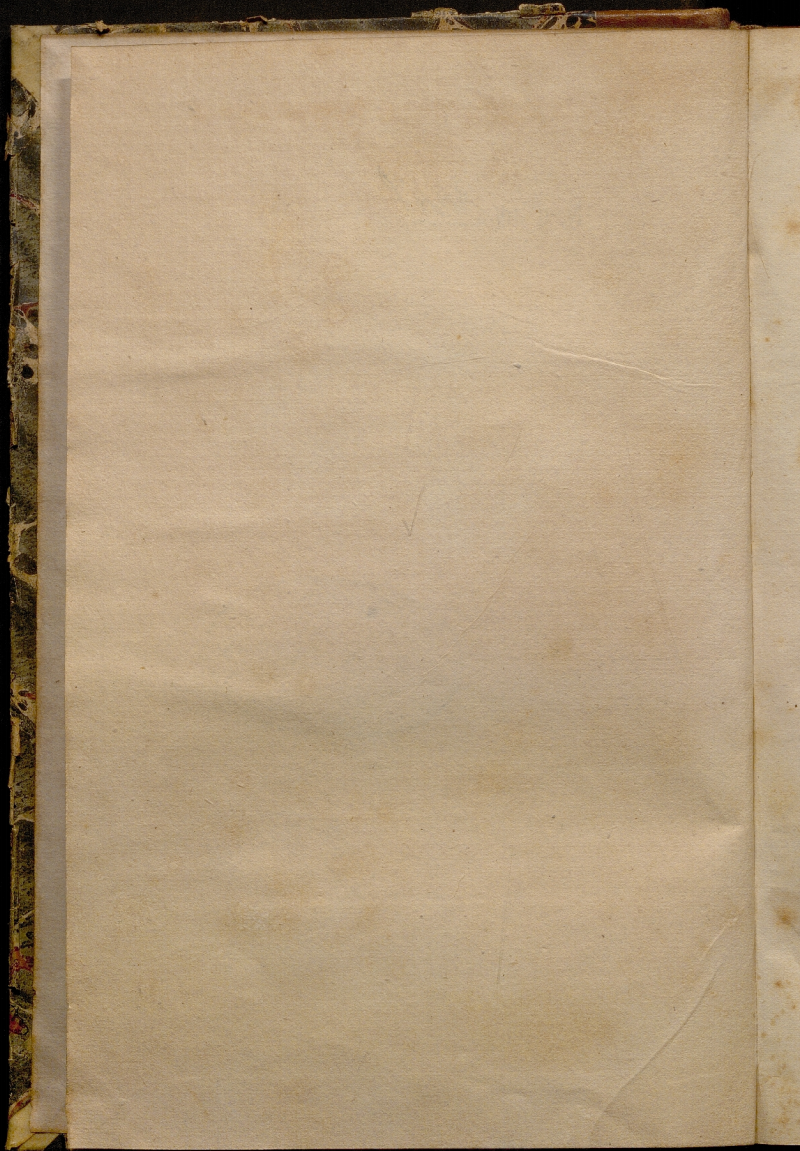
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KEW
REPORTS

REPORT
ON
THE PROGRESS AND CONDITION
OF
THE ROYAL GARDENS AT KEW,

During the Year 1875.

Royal Gardens, Kew, January 1, 1876.

MY LORD,

THE number of visitors to the Royal Gardens exhibits a diminution compared with that of the two previous years. It will be seen, however, from the figures given in Appendix I. to this Report that while there has been an increase of 34,621 visitors on week days, there has been a falling off of 56,045 visitors on Sundays, producing a net diminution of 21,424. On the 2nd of August the Royal Gardens were visited by 61,133 persons, the largest number which has ever been recorded for any one day.

The revival of the office of Assistant Director (which was suppressed on my appointment as Director) has been rendered obligatory by the great increase in the collections of all kinds—whether living, dried, or economic—comprised in this establishment, by the expansion of the official correspondence, more especially with the Admiralty, Colonial and Indian Offices, and the local governments of our foreign

and colonial possessions and by the more numerous scientific persons, travellers, and others who visit the Royal Gardens for information. Parliament having sanctioned the re-establishment of this office it has been filled by the appointment of Mr. W. T. Thiselton Dyer, M.A., who, besides being qualified by a knowledge of botany, has acquired in his previous tenure of professorship in the Agricultural College at Cirencester, the Royal College of Science for Ireland, and the Royal Horticultural Society, experience of many of the practical details of the management of a large botanical establishment.

In my report for last year I stated that the desirability of providing more commodious and fire proof accommodation for the herbarium, library, MSS., and collections of drawings of plants, was under the consideration of the Government. A sum of money was included in the estimates for the purpose of erecting a new building. Up to the close of last year, however, the plans had

not been finally decided upon owing in great part to the difficulty of determining to what extent the existing building could be rendered available. I should view with satisfaction the incorporation of at any rate the front portion of this in the new design. When first purchased by George III. it was determined at the instance of Sir Joseph Banks to devote it to the accommodation of a botanical library and herbarium for which the garden collections would have afforded a foundation. One of the rooms was at the time fitted up with bookshelves as a commencement towards carrying out this project, and these are still in use. At Sir J. Banks's death the plan was abandoned and the house was eventually occupied by the late King of Hanover, after whose death it was again devoted to the purpose for which it was originally destined.

The Herbarium has now been housed in it for nearly a quarter of a century and has at last completely outgrown its space. In this house the various important botanical works which have proceeded from Kew and which will always be identified with the Herbarium have been prepared. I am not without hopes that in my next Report I may be able to record if not the completion, at any rate the considerable progress of the new edifice.

In the Fourth Report of the Commission on Scientific Instruction and the Advancement of Science, it is recommended (paragraphs 57 and 154), "That opportunities for the pursuit of investigations in Physiological Botany should be afforded in the Royal Gardens at Kew." To this recommendation effect will be given by the erection of a laboratory, through the liberality (as I announced in my last Report) of T. J. Phillips Jodrell, Esq., M.A. It was originally intended that this laboratory should form part of the

group of buildings containing the Herbarium. But in consideration of the necessity of using gas in it and the consequent risk of fire, it has been determined to place it in a reserved portion of the garden not far from No. 2 Museum and near the Herbaceous collection and the propagating houses.

The sum placed by Mr. Jodrell at our disposal amounts to 1,500*l*. Of this it has not been considered expedient to expend more than half on the actual building, leaving the remainder to meet the cost of fittings and apparatus. The design was very carefully considered, and as finally approved by your Lordship, provides for a building of one story in height, with rooms of moderate but commodious size for chemical, physiological, and microscopic work. The construction has been commenced, and will I hope be concluded during the present year.

BOTANIC GARDENS.

The whole of the collections of plants in tubs and pots in the centre and wings of the Palm House have been rearranged with the view of removing duplicates and overgrown plants, so as to give more space and light to other plants better worth cultivating. By this means the magnificent specimens of Cycads and Screw Pines, which were more or less concealed by less interesting plants in front of them, have been brought into greater prominence. The Palms in the four side compartments of the centre of the building are now arranged as far as possible geographically.

During the ensuing spring further great changes will be necessitated in consequence of many of the Palms which have been planted out in the beds having reached the full height which they can attain in their present position. These will have to

be cut down and others transplanted or removed from tubs to take their place.

It is very much to be desired that both the staircases leading to the gallery should be removed and replaced by a single one opening under the floor. This re-arrangement would give considerably greater accommodation for tall Palms.

In my Report for 1871 I stated that the boilers of the Palm House would not last much longer, and that when they did "give way it" would be advisable that a more "economical apparatus should be" introduced into that building.* For this the time has now arrived; five of the existing boilers are from 16 to 17 years old, and are box-boilers of a very old-fashioned construction.* The remaining six are "improved saddles," and have been put in during the last three years. Instead of replacing any more boilers as they give way, it appears to me that the whole heating arrangements should be put upon a different plan. In place of 11 boilers warming different sections of the house, I believe that four large saddle-boilers of the type now in use in large horticultural establishments would give a more satisfactory result. The separate systems of pipes would in this case need to be combined on the "universal flow and return" principle, an arrangement which would secure a much more uniform distribution of heat.

It would also, I think, be desirable to carry a hot water pipe round the gallery. The rapid reduction of temperature which the heated air suffers in the upper part

of the dome produces great condensation of moisture, which is not merely injurious to the plants by continually dripping upon them, but also accumulates in puddles upon the gallery floors, where it is very inconvenient to visitors. An additional evil arising from the same cause is the draught of air from the wings towards the dome. Both these defects might be considerably mitigated by partially warming the air of the dome itself, instead of wholly depending upon upward currents from below.

The necessity for the frequent external, and also, unfortunately, internal painting of the houses is a matter to which I shall probably have to advert in future reports. During the past year portions of the exteriors of the Palm House and Temperate House were painted, as were also (both within and without) the Stove and the Water-Lily, Begonia, and Heath Houses. Besides the inconvenience of emptying the houses at the most frequented season of the year, well-established climbing plants and creepers have to be taken down, while the other contents of the houses are deteriorated by being crowded into places for their temporary accommodation.

I have caused an enumeration to be made of all the plants cultivated in pots, tubs, &c. in the Royal Gardens (exclusive of those required for external decoration). In Appendix II., I have given the detailed figures, as well as those of a similar enumeration made in 1871, five years before.

The following are the totals:—

	1871.	1876.
Permanent collections -	19,416	20,579
Propagating departments -	23,127	26,953

* The boilers first used in the Palm house were Sylvester's "fluted conical."

It is of course obvious that with the same amount of space the number of pot plants must be within moderate limits from year to year the same. The collections can therefore be only improved from a scientific point of view by diminishing the number of duplicates, or by cultivating more interesting plants in the place of others less so. Taking 20,000 specimens as likely to be the number which will not be exceeded for some time to come, and allowing two specimens to each species 10,000 species may be taken as the number which with our present accommodation can be cultivated under glass in pots, &c. in the Royal Gardens, and this is probably about the point which we have already reached. I ought to add that this estimate does not include the species planted out in the Temperate House and Palm House.

The ornamental conservatory (No. 4), is also not taken into account here, as the contents are arranged from a purely decorative rather than scientific point of view. As the plants which fill it go out of flower, others are substituted in their place. The expense and labour necessary to keep up a satisfactory show is far more than would be supposed by any person not conversant with garden affairs, or who has not visited the house repeatedly throughout the year. It has been my aim to obtain a proper supply of decorative plants with a due regard to economy. While the general appearance of the house exhibits no falling off, there has been a considerable reduction in the number of pot-plants cultivated for it, as will be seen from the following figures:—

	1871.	1876.
Average number in house	1,808	1,340
Total number cultivated for annual supply	14,683	10,859

The Aroid House (No. 1) has been re-arranged and numerous duplicates sent to correspondents, especially the Calcutta and Capetown Botanic Gardens.

The lessons given to the young gardeners in the evening, in chemistry, meteorology, structural and economic botany, and upon which the attendance is voluntary, continue to give satisfactory results.

The following plants of especial botanical interest, amongst others of less importance, have flowered during the past year in the Royal Gardens for the first time in this country.

Albica glandulosa, Bak.
Androsace sarmentosa, Wall;
 Bot. Mag. 6210.
Anthurium Saundersi, Hk.f.;
 Bot. Mag. 6218.

Carica candamarcensis, Hk.f.;
 Bot. Mag. 6198 (flowered, 1874,
 fruit ripened, 1875).
Colchicum luteum, Bak.; Bot.
 Mag. 6153.
Columelia oblonga, R. & P.; Bot.
 Mag. 6183.
Crassula Bolusii, Hk.f.; Bot.
 Mag. 6194.
Cucumis sativus var. *sikkimensis*,
 Hk.f.; Bot. Mag. 6206.
Decabelone Barklyi, Dyer; Bot.
 Mag. 6203.
Dictes Huttoni, Hk.f.; Bot.
 Mag. 6174.
Dipcadi hydysuricum, Bak.
Diuris alba, Br.; Bot. Mag.
 6201.
Draba hederifolia, Coss.
Eranthemum hypocrateriforme,
 Br.

Ferula (*Euryangium*) *Sumbul*,
Hk.f.; Bot. Mag. 6196.

Heteranthera limosa, Vahl; Bot.
Mag. 6192.

Hoodia Gordonii, Sweet.

Hypoxis pannosa, Bak.

Lewisia brachycalyx, Eng.

Milla Leichtlini, Bak.

Michelia lanuginosa, Wall; Bot.
Mag. 6179.

Nicotiana tabacum var. *fruticosa*,
Linn; Bot. Mag. 6207.

Ornithogalum sororium, Schott.

Piранthus flavidus, N. Brown.

Romanzoffia unalaschensis,
Chmss.

Senecio chordifolia, Hk.f.; Bot.
Mag. 6216.

Theropogon pallidus, Maxim.;
Bot. Mag. 6154.

ARBORETUM (IN THE PLEASURE GROUNDS).

The process of replanting and the attendant labour of clearing the young plantations, &c. over this large area, continue to absorb a great deal of labour. The more these grounds become transformed from their original forest features to those of lawn and park, the more attention do both old and young trees require. The crowds of visitors are now so great that it is no longer possible to leave the grass unmown and allow the leaves to lie in autumn; the consequence is that the lawn grass, overlying as it does a sterile soil, prevents the rain from penetrating further than its own roots, absorbs and exhales it in the heat of the day, depriving the subjacent root feeders of the trees, whether young or old, of moisture. It has hence become necessary to keep the ground of plantations open and clear of weeds till the trees are fully established, and to remove the turf over the roots of trees that are planted singly. Meanwhile, many old trees die, and the proportion of

these to those remaining of the original plantation increases annually.

It has been found necessary to remove the noble row of old elms that stood by the river side at the back of the old Palace wall. One of these having been blown down during the winter it was found that it had no adequate roots, and was mainly supported in its erect position by about 5 feet of ballast that had been used to raise the level of the road; an examination of the others showed that a very heavy gale might prostrate the whole and cause immense damage. It was therefore decided to remove them at once and replace them by younger trees. This has been done, and in addition a row parallel to them has been planted on the opposite side of the path.

These trees served in great measure to mask the gas works and other unsightly buildings belonging to the town of Brentford. Their removal has brought into greater prominence the rapid progress to ruin of the trees and plantations upon the eyots in the river, and upon which the great beauty of the reach immediately above Kew Bridge and bounding the northern side of the Royal Gardens entirely depends. The eyots are two in number, with an aggregate acreage of 4a. 2r. 24p. Part of the most easterly of them (1a. 3r. 35p.) was in 1626 conveyed to trustees for certain charitable purposes in the parish of Fulham. In 1811 it was leased to Robert Hunter, Esq., on behalf of His Majesty George III., for twenty-one years at an annual rent of 20l. From the expiration of this lease in 1832 up to 1873 the same amount of annual rent appears to have been paid by Her Majesty's Commissioners of Woods and Forests. Under the direction of the Charity Commission it was sold to the Office of Woods and Forests, the Office of Works undertaking to pay to them the same

amount of rent. I am not, however, aware that any steps have been taken to ensure an effective supervision of the eyot, or that part of it which has now become national property, and I take this opportunity of drawing your Lordship's attention to the subject as one not merely of importance to the Royal Gardens, but also of great interest to the public generally. At high tides the surface of the eyot is frequently covered with water, and from the consequent yielding condition of the soil every winter sees some of the trees uprooted.

Old Gravel Pit.—As stated in my previous Report the rough ground between the Deodar Avenue and the Richmond Road in which was the old gravel pit was devoted to the collection of shrubby *Poly-petalæ* (*Thalamifloræ*). Prior to its rearrangement and extension this portion of the Pleasure Grounds has been converted into an undulating depression, which with its bounding and included eminences occupies an area of about three acres. 500 yards of beds 6 feet wide have been made in it and filled with good soil for the collection of *Clematis*, *Magnolia*, *Berberis*, *Cistus*, *Helianthemum*, *Hypericum*, *Hibiscus*, and allied

plants. The ground behind the beds has been trenched and dressed with rotten leaves for the reception of plantations of shrubs and trees. It is further intended to plant Evergreen Oaks, Cedars, and other ornamental trees in suitable positions on the undulations that skirt the area.

The dead and dying trees have been removed from an area 100 yards in length skirting the boundary wall of the Richmond Road, and the ground levelled and trenched for replanting. This has been a most laborious operation, the roots of the Limes, Beeches, and Elms forming in the sandy soil far below the surface dense interlacements which required to be cut through in every direction before they could be removed. On the opposite side of the path between the Douglas Spar mound and Ruined Arch beds have been made for the reception of the collection of *Vitis*, *Rhamnus*, *Euonymus*, *Celastrus*, and allied genera.

INTERCHANGE OF PLANTS AND SEEDS.

The receipts during the past year have been 7,326 plants of all kinds and 2,811 packets of seeds from 233 contributors. They were distributed as follows:—

—	Ward's Cases.	Packets of Seeds and Fern Spores.	Stove and Greenhouse Plants.	Herbaceous Plants.	Hardy Trees and Shrubs.	Number of Contributors.
British Isles	—	1,107	948	4,662	212	133
Continent	—	24	203	43	32	13
Asia	9	530	216	—	—	24
Africa	2	284	160	—	—	19
America	13	392	240	253	260	27
Australia and New Zealand	10	474	97	—	—	17
	34	2,811	1,864	4,958	504	233

The Liberian Coffee to which I referred in my last year's Report has been largely distributed and has now been sent with uniform success (except in the case of Queensland and Grenada) to all the coffee-growing countries, colonial or foreign, with which Kew is in correspondence. I may enumerate as the most important recipients:—Bahamas, Bangalore, Barbadoes, Bermuda, Calcutta, Ceylon, Dominica, Jamaica, Java, Madras, Mauritius, Montserrat, Natal, New Granada, Rio de Janeiro.

In my last Report I stated that an extensive correspondence had been carried on between this establishment and various coffee-growing countries with respect to the diseases and insect ravages to which the Coffee is subject. At my request Dr. Thwaites, the Director of the Botanic Gardens, Peradeniya, Ceylon, drew up a series of questions which have been addressed to the various coffee-growing colonies. A large body of replies have been received, and the information contained in them is now in course of examination and will be reported upon to the Colonial Office.

The *Eucalyptus Globulus* which has been so largely distributed on account of its supposed prophylactic virtues will probably turn out to be extremely useful for its timber in countries not too hot for its growth. On the Neilgherries where Australian trees have been largely introduced; one of the most valuable, the *Acacia Melanoxylon*, proves to be all but valueless owing to the ravages of various Lorantheous parasites. The *Eucalyptus Globulus* is, however, reported by Dr. Bidie to entirely escape their attacks. He attributes this immunity to the "deciduous bark, the seeds" (of the parasite) "thereby being dislodged

"before they can germinate and "gain a hold."

A supply of seeds of the best kinds of American, West Indian, and Turkish Tobaccos have been obtained and sent to the Straits Settlements, the Governor of which, Sir W. Drummond Jervois, is anxious to introduce their cultivation.

The botanical identity of some kinds of Tobacco plant appears not to be perfectly ascertained. During the present year a careful trial will be made of seeds from different sources.

The production of different kinds of Caoutchouc in India continues to engage the attention of the India Office and of this establishment. One fact in connexion with it which seems to require very careful consideration has been pointed out by Mr. Mann in his Report on the Caoutchouc plantations in Assam. It is found that although the *Ficus elastica* will grow with undiminished rapidity and luxuriance in situations remote from the hills, it fails to yield Caoutchouc. Mr. Mann concludes that no greater mistake could be made than to start plantations of *Ficus elastica* in any part of Bengal. It appears therefore judging from this case that conditions which may ensure the successful growth of caoutchouc-yielding trees may not be sufficient to determine their producing caoutchouc.

The India-rubber of Para (*Hevea brasiliensis*) has already been introduced into India. It proves to be capable of easy propagation at Kew by cuttings. I am endeavouring to obtain additional supplies of the seeds, but these rapidly lose their germinating power. Hardly one per cent. of the seeds have hitherto reached us alive.

Mr. Robert Cross was despatched by the India Office to Central America to obtain seeds and plants

of the *Castillon elastica*. Of a very large quantity of seeds, upwards of 7,000, transmitted from him to Kew all have failed to germinate, as they are (like the *Hevea*) of a kind which very speedily lose their vitality. Mr. Cross, however, with considerable difficulty, and after undergoing shipwreck, succeeded in bringing safely to Kew a considerable collection of cuttings, and from these a supply of plants will be raised which will be probably sufficiently matured to forward, at any rate in part, to India during the ensuing summer. One healthy plant, which was obtained by the Royal Gardens from another source, has already arrived at Calcutta.

A large collection of forest trees, and shrubs, and miscellaneous decorative plants, filling 12 Wardian cases and six casks, and comprising upwards of 6,000 plants, have been despatched to the New Zealand Government.

A large consignment of young plants of the Cork oak has been despatched to India for the Punjab.

My attention has been drawn to the great value of the Mesquit or Screw bean of Arizona (*Prosopis pubescens*), for the purpose of cattle-feeding in hot dry countries. It would be, probably, extremely valuable in South Africa and Australia. I have taken steps to procure

a supply of the seeds, but nearly all those at present received have been killed by the attacks of a small boring beetle.

I have received both from the "Challenger" and "Transit" expeditions seeds of the *Pringlea*, or Kerguelen's land cabbage. Although a large number of fine young plants were raised, they have nearly all perished during last summer. As a similar ill fate has befallen this interesting plant at the Botanic Gardens of Paris, Cape-town, and Edinburgh, I can only conclude that it is very intolerant of warmth. Its destruction has also been hastened by the attacks of the white cabbage rust (*Cystopus*).

A Superintendent (Mr. H. J. Murton) has been supplied from Kew for the Government Gardens at Singapore, and six young gardeners have been sent from Kew to tea plantations in Sikkim, Darjeeling, and Cachar; another is accompanying Mr. L. A. Lucas in an expedition to Central Africa.

Mr. Christopher Mudd was appointed to accompany H.R.H. the Prince of Wales as plant collector during his Indian tour.

The following is a statement of the packets of seeds and plants sent out during the past year, and included in 300 consignments:—

—	Ward's Cases.	Packets of Seeds.	Stove and Greenhouse Plants.	Herbaceous Plants.	Trees and Shrubs.	Number of Recipients.
British Isles -	—	1,197	3,802	2,166	48	100
Continent -	—	27	427	14	—	18
Asia -	17	584	1,048	51	45	20
Africa -	5	970	543	—	—	10
America -	13	387	615	55	—	10
Australia and New Zealand.	31	1,271	583	23	1,838	9
	66	4,436	7,018	2,309	1,931	167

The principal contributors of seeds and plants are enumerated below :—

I. BRITAIN.

The usual exchanges have been made with the Botanic Gardens of Belfast, Chelsea, Edinburgh, Hull, Glasnevin, Oxford, and Sheffield; with the Royal Horticultural Society, Chiswick; also with the principal nurserymen, especially with Messrs. Backhouse and Son of York, Barr and Sugden, Bull of Chelsea, Dickson and Turnbull of Perth, Green of Reigate, Henderson of St. John's Wood, Herbst of Richmond, Jackson and Sons of Kingston, Kinghorn of East Sheen, J. and C. Lee of Hammersmith, Maule and Sons of Bristol, New Plant and Bulb Co. of Colchester, Parker of Tooting, Pearson of Chilwell, Pfersdorff, Rollison and Sons of Tooting, Sanders and Co. of St. Albans, Smith of Worcester, Thompson of Ipswich, Veitch and Sons of Chelsea, Ware of Tottenham, Wheeler of Warminster, Williams of Holloway.

Contributions have been received from upwards of 200 additional sources; of these the principal have been :—

Anderson-Henry, I.; *Androsace sarmentosa* (Bot. Mag. 6,210,) and plants from Andes.

Ashton, Lieut.-Col.; seeds *Anchusa capensis*.

Atkins, J.; choice herbaceous plants.

Bell, J.; seeds from China.

Bell, Mrs.; box of orchids, and Ward's case of ferns from Ceylon.

Bunbury, Sir C.; Croci.

Cheales, Rev. H.; Malayan seeds.

Church, Prof.; *Hierochloe bo-realis*.

Clarke, Col. T.; *Agave Ellemet-tiana*, *Freesa Leichtlini*, Cotton plants and seeds.

Constable, Rev. J., (Agric. Coll., Cirencester); seeds of *Abies Doug-lasii* and *A. Williamsoni*.

Crewe, Rev. H.; herbaceous plants, Croci, &c.

Cross, R.; palm seeds from Central America.

Danford, A. E.; *Asplenium Bourgaei*.

Darwin, W. E.; *Spartina al-terniflora*.

Davis, Dr.; *Amaryllis py-rochroa*.

Eaton, Rev. A. E.; seeds of *Pringlea*.

Eaton, R. J.; Indian seeds.

Ellacombe, Rev. H.; herbaceous plants, *Gymnogramma triangularis*.

Elwes, H. J.; new and rare bulbous plants.

Ewing, J.; *Ouvirandra*, Sar-racénias.

Feilding, Col. the Hon. W.; Am-herstias and seeds.

Fraser, P. N.; new and rare ferns.

Fraser, J.; *Luculia Pinccana*.

Frere, Sir Bartle; Zanzibar seeds.

Frere, Lady; seeds *Hibiscus Rosa-sinensis*.

Green, W. K., H.M.'s Vice-Consul, Damascus; seeds of Le-banon and Lattakia tobacco.

Hanbury, the late D.; seeds of the Asafetida plant of Persia, *Ferula alliacea*.

Hanbury, T.; seeds of *Pyrus domestica* from Mentone (from which seedlings have been raised)

Holland, W. J.; *Euphorbia bu-pleurifolia*, *E. meloformis* and other plants.

Holmes, E. M.; root of African Ammoniacum and seeds.

Homan, Dr.; *Tillandsia* sp. and *Bryophyllum*.

Howard, J. E.; Cinchonas, *How-ardia caracacensis*.

Kellock, Dr.; Agaves, *Dick-sonia squarrosa*, *Yucca aloifolia*, var.

Leighton, Rev. W. A.; herbaceous plants, *Tuxus Dovastonii* from the original tree.

Macleay, Sir. G.; *Calorophus elongatus* and bulbs.

Mair, Mrs.; seeds of *Phrynium brachystachyum*.

Martin, R.; *Tillandsia* sp. from Paraguay.

Martindale, W.; seeds of *Jaborandi* (*Pilocarpus* sp.)

Maw, G.; alpine plants, *Primula daonenensis*, Lilies, Croci, *Notholana*.

Munby, G.; species of *Crocus*, *Ornithogalum*, and *Oxalis*.

Nevill, Lady D.; Darlingtonias, Primulas, *Anacetocheilus*, *Odontoglossum*.

Oakes, W.; bulbs of *Crinum*.

O'Halloran, Mrs.; collection of Australian seeds.

Ormerod, Miss; Guiana seeds.

Ossington, Lady; bulb of *Chlorogalum pomeridianum*.

Paterson, H.S.; *Pyrethrum uliginosum*.

Peach, J. S.; Bolivian seeds.

Phillips, W. H.; seeds of *Nelumbium Leichardti*.

Reeves, W. W.; *Carex depauperata*.

Saunders, W. Wilson; herbaceous plants.

Sclater, P. L.; seeds of *Acacia Farnesiana*, &c.

Semper, Mrs.; seeds of *Adansonia digitata*.

Smythe, Col.; *Polygonum amplexicaule*.

Strachey, Lt. Genl.; seeds of *Coniferae*.

Stone, Mrs.; *Stapelia* sp.

Thomas, J.; *Dendrobium densiflorum*.

Traill, J. W. H.; *Hevea* seeds, palm seeds.

Tyerman, J. S.; herbaceous plants, bulbs.

Wilson, G.; collection of lilies.

Young, Liston; collection of Cape bulbs, Ward's case of ferns.

Young, G. W.; *Lisianthus Russellianus*.

II. CONTINENT.

Baillon, Prof., Paris; seeds of *Cardiopteris lobata*.

Décaisne, Prof., Paris; collections of *Pyrus* and other shrubs, *Rheum Ribes* and other herbaceous plants.

Goeze, Dr., Lisbon; herbaceous bulbs and seeds of *Abies Pinsapo*.

Joret, H.; varieties of *Phyllocactus* and other Cacti.

Kreuter, J., Vienna; Japan seeds.

Linden, J., Brussels; new and choice stove plants.

Loury, C.; hardy *Anthurium* sp., *Xanthoceras sorbifolia*, *Hierochloa borealis*, &c.

Pancic, Dr. Belgrade; seeds of *Pancicia serbica* and *Acer Helldreichii*.

Regel, Dr., St. Petersburg; *Tulipa Greigii*, bulbs and seed.

Sisley, J., Lyons; pelargonium seeds, &c.

Van Houtte, L., Ghent; new Bertolonias and tuberous Begonias.

III. ASIA.

Botanic Gardens of Calcutta, Saharunpore, Ceylon, and Buitenzorg; Government Garden of Hong Kong.

Aitchison, Dr.; seeds of *Pinus Gerardiana*, *Butea*, *Moringa* and others.

Benson, Colonel; ward's case of plants, boxes of orchids, and seeds.

Berkeley, Major; *Microstylis discolor*.

Blackader, Dr.; *Thecostele alata*.

Brandis, Dr.; seeds.

Bridgford, Capt.; *Lilium*-bulbs.

"Challenger," expedition of H.M.S.; box of orchids, *Hydnophytum*, *Myrmecodia*, &c.

Gammie, J.; seeds of *Décasneia*, *Bucklandia*, and others.

Hobson, Lieut.-Col.; *Drynaria quercifolia*, *Lastrea eriocarpa*, and seeds.

Man, Colonel, Nicobar Islands; seeds.

Medhurst, W. H.; *Ecceoclades falcata*.

Parish, Rev. C.; *Phymatodes sinuosum*, *Vanda Parishii*.

Playfair, G. M. H.; seeds of *Orychophragmus sonchifolia* and others.

Puckle, Colonel; collection of seeds.

Richards, Westwood T.; box of Liliiums.

Skene, J. H., H.M. Consul, Aleppo, seeds of Lattakia tobacco.

Travancore, H. H., Rajah of; seeds of *Musa*, *Areniga*, and other palms.

Treutler, Dr.; collection of seeds of *Smitacina*, &c.

Woodrow, G. M.; *Actinopteris radiata*.

IV. AFRICA.

Botanic Gardens of Cape Town, Natal, Mauritius.

Arnot, the Hon. D.; bulbs and seeds.

Atherstone, Dr.; large collection of South African succulents.

Balfour, Dr. I. B.; seeds of Pandani, palms, &c., from Rodrigues.

Barkly, H. E. Sir H.; seeds and plants of *Aloe dichotoma*, seeds of *Decabelone elegans* and *Stangeria*, plants of *Crassula columnaris* and many *Stapelias*, including *S. cactiformis*, and new species.

Bennett, G. B.; seeds of *Cucurbitaceae* bulbs.

Birmingham, Rev. G.N., Madeira; *Aspidium aculeatum* var *falcinelliforme*.

Bolus, H.; collections of Cape bulbs and seeds.

Cordukes, S.; collection of seeds.

Dunn, E. J.; seed of "Apies Doom."

Grabham, Dr., Madeira; box of sweet potatoes.

Hutton, H.; collection of seeds.

Kirk, Dr.; seeds of *Hibiscus Rosasinensis* and box of plants.

Lanyon, Major, W. Owen; W. African bulbs and seeds.

Macowan, Principal; seeds of bulbs and other plants, *Eriosperrum* sp., *Lachenalia campanulata* and others.

Sanderson, J.; Natal seeds.

Schönfield, C.; *Encephalartos* sp., seeds of butter nuts.

V. NEW WORLD.

Botanic Gardens of Jamaica, Trinidad, Cambridge, Washington, and Potomac.

Bebb, M. S. V., Illinois; seeds of *Desmodium illinoiense*, &c.

Briggs, Sir T. G., Barbadoes; large and small plants of *Melocactus communis*, &c.

Capanema, Dr., Rio de Janeiro; box of *Cyperus pseudo-giganteus*, large plant of *Gynnerium saccharoidum*, yellow-berried coffee, box of orchids, and Wardian case of plants.

Dawson, G. M., Montreal; seeds from the Rocky Mountains.

Department of Agriculture, Washington; box of herbaceous plants, shrubs, and acorns; collection of native tree seeds.

Donohoe, Denis, H.M.'s Consul, Baltimore; seeds of Maryland, Virginia, and Yellow Oronoko tobacco.

Endres, M., Costa Rica; seeds of *Heteranthera limosa*, and other plants.

Engelmann, Dr., St. Louis; seeds of *Abies concolor*.

Ernst, Dr.; Caracas seeds.

Glaziov, A., Brazil; seeds of *Copernicia cerifera*.

Goldsmith, J. T., Ontario; plants of *Cypripedium spectabile*, *Sarracenia purpurea*, &c.

Gray, Prof. A., Cambridge, Mass.; seeds of new hardy plants, Darlingtonias, &c.

Hollings, J. S., Montserrat; large and small plants of *Melocactus communis*.

Imray, Dr., Dominica; Ward's case of ferns and other plants.

Leybold, Dr. F., Santiago; seeds of *Opuntia* and *Cordia decandra*.

MacPherson, J., North Carolina; seeds of *Dionaea*, *Cornus florida*, and *Magnolia macrophylla*.

Munro, H. E., Maj.-Genl., Barbadoes; mahogany seeds.

Pringle, C. G.; new and rare ferns *Cypripediums*, *Darlingtonias*, *Sarcacenias*, *Agave virginica*.

Roezl, —; collection of orchids.

VI. AUSTRALIA AND PACIFIC ISLANDS.

Botanic Gardens of Adelaide, Brisbane, and Sydney.

Abbott, F., Tasmania; sods of *Abrotanella Forsteri*, seeds of species of *Eucalyptus*, *Telopea*, &c.

Bernays, L. A.; seeds of *Macadamia ternifolia*, &c.

Curdie, D.; *Gymnoschoenus aduatus* and *Cyperus* sp.

Dickson, E. B.; seeds of *Myosotidium nobile*, &c.

Hartmann, C. H.; collection of orchids *Doryanthes* sp., *Dictyopteris attenuata*, &c.

Hector, Dr.; six Ward's cases of plants, boxes of palm seeds, seeds of *Notospartium Carmichaelia*, &c.

Kilgour, W. T.; New Zealand seeds.

Kirk, T.; box of *Cyathea Cunninghamii*.

MacArthur, Sir W.; *Iris Robinsoni* orchids, *Gleichenias*, and other plants in Ward's case.

Mueller, Baron von.; seeds of *Kingia australis*, *Musa Hilli*, sp. of *Eucalyptus*, &c.

Powell, Rev. T.; seeds of Palms, &c.

Weld, H. E. Gov.; seeds of *Hakea*, &c.

Whitnee, Rev. S. J., Samoa;

seeds of *Flagellaria elegans* and Palms.

MUSEUMS.

A new edition (the sixth) of the Museum Guide has been published during the past year.

Advantage has been taken of this to effect an entire re-arrangement of the products and specimens illustrating the *Palmaceae* in Museum No. 2. These had become much crowded together by the continuous acquisition of new objects. The more interesting things have now been brought into greater prominence, which can, of course, only be done when the Guide is under revision, as otherwise the descriptions of the cases would not correspond with their contents. Similar improvements have also been effected in Museum No. 1., where, however, much still remains to be done.

The separate collection of specimens illustrating vegetable teratology and pathology commenced in 1874, and the foundation of which was largely formed of specimens received from the Scientific Committee of the Royal Horticultural Society, has been considerably augmented and revised. It comprises at present nearly 300 specimens, and promises to be one of the most interesting features of the museums, no public collection having hitherto been formed to illustrate the diseases and the transformations of the organs of plants.

The further development of this and of the exhibited collection of Cryptogamic plants must at no very distant date necessitate the provision of some increased accommodation in Museum No. 2, and this will probably be most advantageously supplied by the erection of a new room as an extension to the west of the present building.

By the appointment of an extra attendant for six months of the year,

the work of preparing and mounting fresh contributions and remounting old specimens, together with the substitution of printed labels for those written by hand, has been pushed forward. The attendants perform this work when not required for duty during public hours.

The principal objects deposited during the year have been:—

Aitchison, Dr.; stems of *Ephedra* and *Crotalaria* used as ropes in Tibet; specimens of *Geaster hygrometricus*.

Allan, J.; fine plank of Swamp Cypress (*Taxodium distichum*).

Antoine, F.; 19 photographs taken in the Imperial Winter Garden, Vienna.

Bernays, L.; cones of *Macrozamia Miquelii*; sticks of *Acacia glaucescens*, *Calamus australis*, &c.

Bull, W.; fruits of *Lecythis*, *Bignoniaceae*, cones of *Macrozamia plumosa*, &c.

Calvert, H. H.; germinating seeds of *Trigonella Foenum-græcum*; cake of crushed Doum-palm fruits and other vegetable products of Alexandria.

"Challenger," expedition of H.M.S.; caterpillars with attached fungus (*Cordiceps sinensis*), used as a condiment in China; various specimens of fruits, seeds, &c.

Cyriax and Farries, Messrs.; leaves of Jaborandi (*Pilocarpus pinnatifolius*) and of Boldo (*Boldoa fragrans*).

Fletcher, T. H.; specimens of Myall wood (*Acacia* sp.)

Ford, C., Hong Kong; fruits of *Melodinus suaveolens*, cones of *Pinus sinensis* and pods of *Gleditschia sinensis*.

Foreign Office; specimens of *Broussonetia* and *Edgeworthia*, yielding paper materials.

Hanbury, T.; umbel of *Ferula alliacea* and fruits of *Pyrus domestica* from Mentone.

Horne, J., Mauritius; large collection of fruitheads of Pandani from

Mauritius and Rodrigues; spadices of palms, &c.

Horticultural Society, Royal; mounted series of seeds of 204 varieties of French and Kidney beans; medals (in fusible metal) of Thos. Andrew Knight and Dr. John Lindley.

Horticultural Society, Scientific Committee of the Royal; specimens illustrating vegetable morphology and pathology.

Imray, Dr., Dominica; coffee leaves affected by so-called blight; mounted specimens of minute moth which produces the injury.

India Museum; liquid kino from *Pterocarpus indicus*.

Jamie, R., Singapore; fine plant of *Hydnophytum formicaria*, and specimens of the ants (*Camponotus irritans*) which makes its galleries in the plants, also leaves, flowers, fruits, and stems of the Siam Gamboge plant (*Garcinia Hanburyi* Hk. f.)

King, Dr., Calcutta; stem of *Wallichia disticha* and woods of *Dalbergia latifolia* and *Chloroxylon Swietenia*.

Lee, C.; fruits of the Sand pear, *Pyrus sinensis*.

Masters, Dr. M. T.; specimens illustrating vegetable teratology, including many referred to in his work on this subject.

Murray A.; specimens of diseased larch roots and other vegetable diseases.

Ormerod, Miss E.; numerous specimens of galls and other specimens illustrating the diseases of plants.

Routledge, T.; specimens of alfa, esparto, and various vegetable substances used in the manufacture of paper with specimens of paper-pulp and finished paper manufactured from them.

Saunders, W. Wilson; specimens and drawings illustrating disease in poplars.

Smith, J. A. Dorrien; photographic

views in the gardens of Tresco Abbey, Isles of Scilly.

Smith, W. G. ; drawings illustrating the potato disease and peach blister (*Ascomyces deformans*).

Thomson, D., Drumlanrig; pitchers of various species of *Nepenthes*.

Thwaites, Dr. ; photographic views in the Royal Botanic Gardens Peradeniya, also fruits of Mangosteen, (*Garcinia Mangostana*).

Trail, J. W. H. ; large collection of fruits, palm spadices, &c. from the Amazons.

Transit of Venus expedition to Rodrigues (Dr. I. B. Balfour) ; large collection of *Pandanus*, and other fruits, woods, &c. from Rodrigues and Mauritius.

Treutler, Dr. ; tinder prepared in India from stems of fresh bamboo also from the epidermis of species of *Plectocomia* and from leaves of *Saussurea*.

Trevelyan, Sir, W. C. ; section of branch of spruce fir showing eccentricity of growth.

Warrington, R. ; samples of " yeso " (plaster) and " Spanish earth " used in Spain in the manufacture and refining of wine.

Weld, H. E. Gov., W. Australia ; proteaceous fruits and seeds.

Yokoyama, Mr. (per Capt. Fleetwood Richards) ; specimens of Japanese paper manufactured from barks of species of *Broussonetia*.

HERBARIUM.

Very extensive collections and contributions have been received at the Herbarium (chiefly by gift) during the past year.

The complete herbarium of the late J. Stuart Mill was presented after his death by Miss Helen Taylor. Although better known for his philosophical and other writings Mr. Mill was throughout his life an eager botanist. Mr. Mill collected diligently in his early life in the neighbourhood of London and in his later

years travelled extensively in south Europe. The range of his specimens extends from the Pyrenees to the Bithynian Olympus, and Greece is particularly well represented partly by plants gathered by his own hands and partly by a collection procured from Professor Van Heldreich of Athens. Amongst plants from Asia Minor is a new and very distinct species of flat-leaved *Sedum* which has been described by Mr. Baker in the Journal of Botany under the name of *Sedum Millii*. A selection of about 2,530 species has been made from the collection for the Kew Herbarium, and it is Miss Taylor's wish that the remainder be presented to Harvard University, U.S.A. and to the Botanical Museum of the Melbourne Gardens.

The Herbarium of the Rev. R. T. Lowe (containing 1,653 species) in accordance with his will has been divided between the Herbaria of the Royal Gardens and that of the British Museum, the few unique specimens under instructions from the executor being retained at Kew. It consists almost exclusively of plants of the Atlantic Islands and is especially valuable as including the carefully determined types of the unhappily unfinished "Flora of "Madeira and adjacent Islands," and of other publications.

The Herbarium of the late J. T. Moggridge (author of the Flora of Mentone) has been presented by his father, Mr. M. Moggridge.

Further collections have been received from the expedition of H.M.S. "Challenger" comprising those from the islands of the Eastern Archipelago, Philippines, &c. The new Ferns, about 12 in number, have been described by Mr. Baker for the Journal of the Linnean Society.

The collections formed during the Transit of Venus Expeditions in Kerguelen's Land by the Rev. A. E.

Eaton and in Rodrigues by Dr. I. B. Balfour have been presented by the Royal Society, and are in course of arrangement.

The most important remaining contributions are especially noticed below under the different geographical headings. The figures in brackets denote the number of species received from each contributor.

EUROPE.

Cooke, M. C.; European and American Fungi, (39); "Fungi Britannici" (purchased, 300).

Geheeb, A.; Mosses (103).

Goeze, Dr.; Portuguese plants, (36).

Lindberg, Dr.; Irish Hepaticæ (34).

Lojka, H.; European Lichens (purchased, 65).

Maw, G.; plants from Spain and Portugal (29).

Pancic, Dr.; Belgrade (58).

Plowright, C. B.; *Sphaeriaceæ* (purchased, 100).

Rabenhorst, Dr.; European *Hepaticæ* and *Algæ* (purchased, 60).

Smith, W. G.; drawings.

Stewart, S. A.; Ireland (10).

Thuemen, Baron; *Mycotheca universalis* (purchased, 300).

Other contributions were received from Briggs, T. G.; Edgeworth, M. P.; Fraser, Dr.; Gomes, Dr.; Guise, Sir. W. V.; Hanbury, the late D.; Howard, E.; Mansel-Pleydell, J. C.; Masters, Dr.; Max Leichtlin; Oakeshott, Mrs.; Parlatore, Prof.; Reichenbach, Prof.; Whitehead, J.; Sadler, J.

ASIA.

India and Indian Archipelago.—Aitchison, Dr.; N.W. India (37).

Bellew, H. W.; Kashmir and Kashmir (208).

Henderson, Capt.; Indian Ferns (21).

Riedel, M. (per Dr. A. B. Meyer of Dresden); Gorontalo, Celebes;

collection of Celebes plants. Two new species have been described for the journal of the Linnean Society (341).

Scheffer, Dr.; Botanic Gardens, Buitenzorg; plants from Java, Borneo, &c. including numerous *Dipterocarpeæ* (426).

Trentler, Dr.; an excellent collection from neighbourhood of Darjiling with specimens for distribution (1276).

Wall, G.; Ceylon Ferns (20).

Other contributions have been received from Beddome, Col.; Cattell, Dr.; Hobson, Lt.-Col.; King, Dr.

China and Japan.—Shearer, Dr. (per J. Harbord Lewis); Kewkiang, China; collection including one new genus and a considerable number of Chinese specimens which Kew did not possess. The principal novelties have been described by Mr. S. Le M. Moore in the Journal of Botany for August. Among other interesting species there is a Tulip tree (*Liriodendron*), which if it proves indigenous as Dr. Shearer believes it to be in Kew kiang, is new to the flora and the old world (602).

Other contributions have been received from Ford, C.; Foreign Office; Maximowicz, Dr.; Quekett, J. F.

AFRICA.

North and Tropical.—Afrikanische Gesellschaft, Berlin Soyaux's Loango plants (purchased, 165).

Bulger, Lt.; Koomassie (3).

Cameron, Lt.; neighbourhood of Lake Tanganyika. The majority of the plants unfortunately are in very bad condition; the novelties have been described for publication in the Journal of the Linnean Society (100).

Cosson, E.; Morocco (341).

Hildebrandt, Somali and Zanzibar (purchased, 440).

Mair, Mrs.; Sierra Leone; chiefly Ferns (22).

Monteiro, J.; Angola (1).

Mueller, Dr. K.; Mosses of Schweinfurth's African Expedition (33).

Oakeshott, Mrs.; plants collected by Rev. C. New about Kilima-njaro (8).
Thomson, G.; Mosses from Camaroons (30).

South.—Atherstone, Dr.; Diamond Fields, &c. (208, containing many new species).

Barber, Mrs.; Kimberley Gold Fields (31).

Barkly, H. E., Sir H.; drawings of Stapelias.

Buchanan, Rev. J.; Natal monocotyledons (264).

Eaton, Rev. A. E.; Cape of Good Hope lichens.

Sanderson, J.; Natal (9).

Shaw, Dr. J.; Cape (8).

Mascarene Islands and Seychelles.
—Balfour, Dr. I. B.; Bourbon plants.

De Cordemoy, Dr. J.; Bourbon (65).

Horne, J.; Mauritius and Seychelles (340).

AMERICA.

North.—Dawson, G. M.; plants collected on N. American Boundary expedition (110).

De Candolle, Prof.; calques des dessins de la Flore de Mexique, de Moçino et Sessé (purchased).

Endres M. (presented by Messrs. Veitch); Costa Rica (218).

Gray, Prof. A.; very valuable collections, including types of many new species from the Western States (316).

Horner, A. C. (Voyage of Pandora); Greenland plants (95).

Mitchell, Mrs.; Honduras Ferns (3).

Munroe, H. F.; Illinois (388).

Watt, D. A.; Ravenel's Carolina Fungi (500).

Wilson, the late W.; annotated copy of Drummond's N. American Mosses (purchased).

Other contributions have been received from Cross, R.; Engelmann, Dr.; Murray, A.; Pringle, C. G.

West Indies.—Lefroy, H. E., Genl.; Bermuda (13).

Jenman, G. S.; Jamaica ferns (45).

S. America.—Gibert, E.; Montevideo, &c. (389).

Glaziou, A.; further Brazilian collections which are of especial value as the numbers are cited in Flora of Brazil (507).

Hiern, W. P.; selected desiderata from Warming's Brazilian Monopetalæ (24).

Traill, J. W. H.; further collections from the Amazons. These are especially rich in Palms (of which a fine set has been selected for the Kew Herbarium to be mounted upon paper of large size) and in insect-tenanted plants. The Dicotyledons are in course of arrangement.

Other contributions have been received from Bureau, Prof.; Bull, W.; Grisebach, Prof.; Holmes, E. M.; Leybold, Dr. F.; Veitch, Messrs.; Winter, A.

AUSTRALASIA AND POLYNESIA.

Bernays, L. A., Queensland Acclimatisation Society (4).

Cheeseman, T. F.; New Zealand (2).

Hector, Dr.; New Zealand (90).

Kirk, T.; New Zealand (12).

Mueller, Baron von; Australian plants; plants of Lord Howe's Island; Educational Collection, Part II. (86).

Powell, Rev. T.; Samoan plants (253).

Schomburgk, Dr. R.; plants from vicinity of Lake Eyre (271).

Whitmee, Rev. S. J.; Samoan

plants. The Ferns have been described by Mr. Baker in the Journal of Botany (178).

BOTANICAL PUBLICATIONS prepared in connexion with the work of the Herbarium.

"Flora of British India," by the Director, assisted by other botanists. Part III., completing Vol. I., has appeared during the past year, and Part IV. is passing through the Press.

The second part of the second volume of the "Genera Plantarum," by G. Bentham and the Director, has nearly passed through the Press, and will be published shortly.

The Flora of Mauritius and the Seychelles has been nearly completed by Mr. Baker, First Assistant in the Herbarium, and will shortly be in the hands of the printers.

A revision of the suborder *Mimoseæ* has been published by Mr. Bentham in the Transactions of the Linnean Society.

A revision of the genera and species of *Asparagaceæ*, by Mr. Baker, has appeared in the Journal of the Linnean Society.

The third and concluding part of the Botany of the Speke and Grant Expedition has been published, under the superintendence of Prof. Oliver, by Col. Grant in the Linnean Transactions.

An illustrated account of the genus *Narcissus* has been published by F. W. Burbridge and J. G. Baker.

An account of the Island of St. Helena, by J. C. Melliss, F.L.S., contains coloured figures of nearly all the endemic plants.

An English translation of Sachs's "Lehrbuch der Botanik" has been executed by A. W. Bennett, F.L.S., assisted by W. F. Thiselton Dyer, F.L.S. (now Assistant Director).

The 101st volume of the "Botanical Magazine" by the Director has been published. A large proportion of the new and rare plants figured have flowered in the Royal Gardens.

I have, &c.

(Signed) JOS. D. HOOKER, *Director.*

To the Right Honourable

The First Commissioner of Her Majesty's Works and Buildings.

APPENDIX I.

Number of Visitors in the year 1875, as compared with 1874.

	1874.	1875.
Total number on Sundays - - - -	359,237	303,192
Total number on weekdays - - - -	340,189	374,810
	<u>699,426</u>	<u>678,002</u>
Greatest monthly attendance (May) - - - -	-	171,963
Smallest monthly attendance (December) - - - -	-	5,578
Greatest weekday attendance (August 2nd) - - - -	-	61,133
Smallest weekday attendance (December 4th) - - - -	-	11
Greatest Sunday attendance (June 6th) - - - -	-	21,721
Smallest Sunday attendance (January 17th) - - - -	-	102

Number of Visitors in each month.

	1874.	1875.
January - - - -	6,507	7,344
February - - - -	9,413	5,645
March - - - -	26,048	52,238
April - - - -	83,310	33,049
May - - - -	148,803	171,963
June - - - -	86,781	80,416
July - - - -	104,527	67,895
August - - - -	155,728	166,778
September - - - -	50,092	64,669
October - - - -	17,121	16,156
November - - - -	7,667	6,271
December - - - -	3,424	5,578

APPENDIX II.

Number of plants cultivated in pots in the Royal Gardens exclusive of those required for external decoration.

					1871.	1876.
Permanent Collections.	{	No 1.	-	-	657	678
		No. 2	-	-	1,924	1,762
		No. 3	-	-	829	702
		No. 5	-	-	2,629	2,417
		New Range.	Heath House	-	-	578
	Begonia „		-	-	511	507
	Stove		-	-	586	538
	Victoria House		-	-	340	334
	Economic „		-	-	480	643
	{	Orchid „	-	-	1,687	2,300
		Palm House	-	-	4,208	4,319
		Water-lily House	-	-	625	600
		Temperate „	-	-	3,050	3,258
Bulb Pit		-	-	1,312	1,986	
					19,416	20,579
Propagating Department.	{	Herbaceous frames	-	-	6,600	4,670
		Fern pit	-	-	2,241	2,030
		Orchid pits	-	-	937	1,289
		Propagating pits	-	-	8,475	11,097
		Nursery pit	-	-	4,874	7,867
					23,127	26,953
Ornamental Conservatory No. 4.	{	Average number of plants in house		- 1,808	1,340	
		Total number cultivated for annual supply.		14,863	10,859	

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