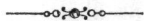


Kew

INTRODUCTION.



Kew is popularly known as a great botanical institution possessed of a garden wherein is grown the most comprehensive collection of plants ever brought together in any country. Her influence in science and commerce has long been acknowledged as pre-eminent among botanical establishments. Kew is also a great training school for horticulturists, but the important part she plays in horticulture has not hitherto been generally recognized. The Kew Guild will, we think, go a long way towards showing how much Kew has done, and continues to do, in the development of scientific horticulture, not only in the British Empire, but in all the civilized countries in the world. Our Journal will reveal the whereabouts and positions of all living Kewites, as far as they can be ascertained. Kew "graduates" are everywhere: as directors, curators, superintendents, head gardeners; as botanists, professors, Fellows of the Royal Society, the Linnean and other great scientific societies; wherever botany or scientific horticulture is encouraged, there Kewites are sure to be found. Looking at the facts this is scarcely to be wondered at. Kew has employed a large staff of gardeners for at least one hundred years. These have been selected young men whose previous training and progress gave promise of their developing into first-class gardeners. Their term at Kew has been limited to about two years, for reasons which will be obvious. A well stocked library of books on botany, horticulture, and kindred sciences; courses of lectures upon subjects useful to horticulturists; daily employment in the care and cultivation of the collections of plants in the gardens,—these advantages could not fail to have a powerful influence in the training of the young men who enjoyed them.

Kew as a garden of any pretensions was founded in 1759 by Augusta, Dowager Princess of Wales, the mother of George III. Its area then was nine acres and it was superintended by William Aiton, a young Scotchman, who had been trained by Philip Miller in the Apothecaries' garden at Chelsea, the Kew of that period. Under Aiton's management and with the aid of Sir Joseph Banks, the Garden increased in size and interest, until by the end of the century it was "famed throughout Europe for the great collection of plants it contained." We may therefore reckon that Kew has been a great training school for gardeners for about one hundred years.

In 1840 there was a strongly expressed desire throughout the country that the Garden, which at that time belonged to the Royal Family, and

was to all intents and purposes private, should be placed on a different footing and rendered available, "as a great instructive and scientific establishment, for the advantage of the public." Dr. Lindley, a great horticultural teacher as well as botanist, recommended that Kew should be made a National Botanical Garden and maintained by the Government.

Kew is now all that Dr. Lindley recommended that it should be, and a great deal more. Its present area is 250 acres, the greater part of which is now systematically planted with all kinds of trees, shrubs, and herbaceous plants. There are 35 houses, including a gigantic Palm-house and an equally large Winter Garden, with numerous pits and frames. There are three large Museums of Economic products and objects derived from the vegetable kingdom, the North Gallery of paintings of plants in their native countries, and the finest Herbarium in the world. The present staff numbers 171, of which 55 are gardeners.

Such, in brief, is the character of the "school" in which all Kewites have passed, or are passing, through a course of training. We have made a rough calculation of the number of men now alive who have been employed as gardeners at Kew, and find there are probably about five hundred. They were all young men when they entered Kew, and it is only natural that whilst here they formed friendships and acquired an interest in and affection for their "high school" which did not die with their departure to other places. The desire to know of the whereabouts and career of their fellow-workers whilst at Kew, and to learn something of the way things are done in the Garden now is very general among Old Kewites, and sometimes finds expression in letters of enquiry to present members of the staff, but this is necessarily an unsatisfactory method. Our Guild and Journal will remove all difficulties of this kind. We shall now be able to shake hands with each other no matter by what distance of time or space we are separated. We shall also be able to compare Kew as she is now with the Kew of past times, and the interest of all Kewites in each other and Kew will, by these means, be encouraged and satisfied.

The Kew Guild is the offspring of the Kew Mutual Improvement Society which has been in existence some twenty years, and which is devoted to essays and discussions on professional subjects. This Society is now most popular with the Garden staff, and is looked upon as being one of the most valuable means of professional improvement. It is at the same time, to all intents and purposes, the "Club" of Kew men. Old Kewites retain an affectionate feeling for "the Mutual," as is abundantly shown in their correspondence; enquiries as to the proceedings and prosperity of the Society being frequent. This desire to keep in touch with each other found expression last year in a resolution to take steps to unite by some means all Kew men, and it was finally decided to form a Guild and publish a Journal annually. To set the scheme in motion it was necessary that men on the spot

should be selected; at the same time it was felt that a Union of all Kewites was only possible by obtaining the sympathy and assistance of those who were elsewhere than at Kew. We hope in time to be in a position to hold an annual meeting, a general muster, a Club day at Kew or somewhere near. An annual dinner might be arranged at which all the members possible might be present. We who are at Kew have no wish to run this affair as a purely "domestic" concern. Any suggestions as to the best means of making our Guild a genuine union of hearts, and as far as possible of hands also, will be most welcome.

To keep ourselves strictly "in order" we first obtained the consent of the Director, Mr. Thiselton-Dyer, for the formation of our Guild. This he readily gave, as will be seen from the following correspondence:—

Kew, December 1893.

SIR,—The Gardeners of Kew, past and present, desire to form themselves into a Guild, to be known as the Kew Guild, and to publish annually a Journal containing the names and addresses of all members, with interesting notes of the Gardens, etc. We shall be glad if this scheme meets with your approval.

I am, Sir,

Yours faithfully,

W. WATSON.

W. T. Thiselton-Dyer, Esq., C.M.G., &c., Director.

Royal Gardens, Kew.

DEAR MR. WATSON,—I think the idea of the proposed Kew Guild is a very excellent one. Such an organization cannot but have the effect of consolidating the *esprit de corps* which already exists amongst our young men, and its doing so will, I do not doubt, be of great benefit to the establishment.

It has often struck me that the young men—of whom there is now a not inconsiderable body employed—who come to Kew for a period of advanced training and instruction, enjoy in no small degree much the same advantages as in other classes of the community are afforded by University life. It is generally considered that the most important of these are the formation of character and the reception of those impressions which determine an intelligent interest in, as opposed to a merely mechanical pursuit of, the occupations of life. The age at which young men come to us is about the same as that at which others go to the Universities. It is the age when the responsibilities of life begin to emerge above its horizon, and it is the age when, for better or worse, the future career, as far as it depends upon the influences under which a young man is thrown, pretty distinctly shapes itself.

I have always felt that a great responsibility falls upon the Staff in doing what can be done to maintain a healthy and somewhat stimulating tone throughout the establishment. As you know we do not "coddle."

We treat our young men as "men," and expect them to work out their own salvation. We wish them to be manly, self-respecting, and strenuous. We put, with the aid of the Government, what help we can in their way, and leave them to make an intelligent use of it.

Just as at the Universities, one of the great advantages of Kew, as it seems to me, is the association within it of a large body of young men of the same age and with the same pursuits. Such an association is itself an education and a preparation for the bigger world of life. Rubbing together in the work of the day, in the lecture-room, the reading-room, the Mutual Improvement Society, and the cricket-field, they learn to appreciate and understand those good personal qualities which enable capable men to advance themselves with modesty, and everyone to get through the business of life without undue self-assertion or individual friction. This is the great merit of University training, and something of it I am sure is attained at Kew.

Out of this grows one of the greatest charms of life, the formation of permanent and valuable friendships. But stay at Kew is short, and I have always felt that some organization such as you propose would serve the double purpose of keeping Kew in touch with the men who have passed through it, and of enabling the men themselves to keep in touch with one another. Sometimes in turning up old files of correspondence I have come across letters from distant parts of the world from men who were once with us. And nothing has encouraged me more as Director than to see the spirit of loyalty, not to say affection, which always animates Kew men towards their *Alma Mater*.

Men go from us to all parts of the Empire, some in official, some in private employ. The maintenance of correspondence with every individual would be impossible. Still, to have a record of their whereabouts, to rescue their names and work from the oblivion which sooner or later falls on everything human, will be of interest to everyone concerned.

After all, it is *interest* which makes work enduring, and anything which stimulates it in the long run well repays the trouble.

Kew has now completed the first half-century of its existence as a national and public institution. It has accomplished work already of which any institution might be proud. It carries its influence through its men to every part of the world. That it is so strong arises in great measure from the fact that the uniform tradition which has animated every member of the Staff from top to bottom is to work self-sacrificingly for Kew rather than for himself. Officials and employées arrive and pass away: the institution remains, and grows in usefulness, in strength, and in beauty. All who have had a hand in the work are content that that should be their "record."

Believe me, dear Mr. Watson,

Yours sincerely,

W. T. THISELTON-DYER,
Director.

The following prospectus was then prepared and forwarded to the leading horticultural papers, both English and Foreign, for publication. They all kindly gave it a prominent place in their columns and in some instances also expressed cordial sympathy with the movement.

“GUILD OF KEW GARDENERS.

“The gardeners of Kew, past and present, are desirous of forming themselves into a Guild, and propose to publish annually a Journal in which will be recorded—(1) the present Kew Staff from the Director to the gardeners; (2) a list of all Old Kewites, with the date of their leaving Kew and their present positions and addresses; (3) brief notices of distinguished Past Kewites; (4) Kew Notes; (5) interesting correspondence from Old Kewites; (6) the Proceedings of the Mutual Improvement Society and the prize essays of the year; (7) the Proceedings of the Kew British Botany Club; (8) the Report of the Cricket Club; Frontispiece, portrait of a distinguished Kewite.

“The Journal will consist of about 50 pages, royal 8vo, to cover the cost of which, with postage, an annual subscription of one shilling will be necessary; it will be published on May 1st. Will all Old Kewites, *i. e.* men who have at any time worked as gardeners at Kew, kindly send their names, date of leaving Kew, with present position and address, to the Secretary for publication in the Journal? It is anticipated that every Kewite will gladly become a subscribing member of the Guild, and also communicate any interesting professional information for publication in the Journal.

“It will be seen that the aim and object of the Guild is the very laudable one of uniting all Kew men in a bond of fellowship by means of a Journal which will convey to them news of interest and enable them to communicate with each other. There are probably 500 Kewites distributed all over the world, but of the whereabouts of all except a small proportion there is at present no record.

“The Committee to carry out this scheme is composed of Messrs. W. Watson, W. J. Bean, G. H. Krumbiegel, J. Browne, H. Pettigrew and J. Aikman. All communications should be addressed to the Secretary, J. Aikman, Whitestile Road, Brentford. It would save correspondence if members would enclose their subscriptions when they write to the Secretary.”

Our anticipations of general support from past Kewites were at once abundantly realized, letters expressing hearty sympathy with and readiness to join the Guild pouring in from all quarters. Space will not permit us to quote more than a few of these letters, but the following extracts will probably serve to show that the Kew Guild is a going concern:—

Mr. F. W. Burbidge, Trinity College Gardens, Dublin, writes:—
“I am glad you have started a ‘Kew Guild,’ and hasten to subscribe

myself a member, a privilege which I trust all past Kew men will claim for themselves."

Mr. Thomas Meehan, Botanist to the Board of Agriculture, Germantown, Pa.:—"As a graduate of Kew Gardens in 1848, I shall be pleased to have my name added to the list of members of the Guild. Please send me a copy of the Journal which you propose to issue."

Mr. R. Irwin Lynch, Curator, Botanic Gardens, Cambridge:—"I enclose my subscription to the Guild. I am glad to learn of the *esprit de corps* that has grown up at Kew: it implies credit to the management. It should now extend to all Kewites, for the expression denotes a common spirit pervading all—feelings of reciprocity, sympathy, devotion, and jealous regard for the honour of the whole body. I join you with enthusiasm, if by combining there is any hope of our raising the standard of our profession and obtaining for it just recognition. . . ."

Mr. W. Denning, Heathfield Nursery, Middlesex:—"I think your idea a good one, and I hope all Kew men will respond. I left Kew in 1856."

Mr. J. M. Gleeson, Superintendent, Agri. Hort. Gardens, Madras:—"I read in the 'Gardeners' Chronicle' for Dec. 17th of the formation of an association of all Kewites. This is, I trust, the fulfilment of a long-felt want. I left Kew in 1870 for India."

Mr. J. Dalgarno, Nurseryman, Aberdeen:—"I was very pleased to see a notice announcing the formation of a Kew Guild. I am sure such an object will be very favourably received, more especially by the past section. I wish the movement every success. It is now 22 years since I left Kew."

Mr. George Stanton, The Gardens, Park Place, Henley-on-Thames:—"I am delighted with the idea of a Guild to be formed of the Gardeners of Kew, past and present. It will be most interesting to all who have worked or work still in our grand national garden to learn something more of the gardens and of each other than is possible at present. With very few exceptions I have lost sight of all my Kew contemporaries, and it will give me pleasure to learn through the Journal what they are doing now. I have had some success in the years since I left Kew, but no happier nor more profitable years than the two I spent whilst there."

Mr. W. Harris, Superintendent, Hill Garden and Government Cinchona Plantations, Jamaica:—"I am pleased to see by the 'Gardeners' Chronicle' that you are about to form a Guild and publish a Journal which will be the means of affording Old Kewites some knowledge of the present whereabouts of the many with whom they associated whilst employed at Kew. Those who are now far away in the Colonies or India will, I am sure, welcome any medium whereby they will be placed in communication with old friends and learn of each other's welfare. I left Kew in 1881."

Mr. T. Turton, The Gardens, Maiden Erlegh, Reading:—"I am much pleased with the proposal to form a Guild of Kew Gardeners, past

and present. It is twenty years since I left Kew, after spending there the happiest and most profitable thirteen months of my gardening career. I hope to learn through the Journal the whereabouts of some old Kew friends whom I have lost sight of for some years."

Mr. John A. Hall, The Gardens, Shiplake Court, Henley-on-Thames:—"As an old Kew man I welcome the formation of a Guild of Kew Gardeners, past and present. I hope all Old Kewites will help to make it a success."

Mr. Walter Hill, late Curator of the Botanical Gardens, Brisbane:—"As an Old Kewite I wish the proposed Guild every success. I entered Kew in March 1843 and left for Australia in 1851, where I still am."

Mr. John Weathers, Assistant Secretary, Royal Horticultural Society:—"I can only say Bravo! Bravo! to the idea of forming a Kew Guild. I think every Old Kewite will be certain to welcome it, and especially the Journal, with the information you propose to publish in it."

A few words now with regard to our plans for the future. The Journal will be sent as soon as printed to all Kewites whose addresses we possess. The names of all as far as we can obtain them are printed, and where the address is wanting we trust that this, if known to anyone, will be supplied for future insertion.

A full report and balance-sheet will be published in all succeeding numbers of the Journal. To cover the cost of printing we have secured a few advertisements. For the use of the portrait of the Director we are indebted to Mr. Gordon and the proprietors of the 'Gardener's Magazine.' In conclusion, we again ask that all who feel disposed will send to the Secretary any suggestions for the furtherance of the aims of the Guild or the improvement of the Journal.

April, 1893.

Our Motto:
FLOREAT KEW!

RECENT APPOINTMENTS AND RETIREMENTS.

AMONG the appointments recently obtained by Kewites the following call for special mention:—

MR. DANIEL DEWAR to the Curatorship of the Botanic Gardens, Glasgow, made vacant by the death of Mr. R. Bullen, an Old Kewite. Mr. Dewar, who left Kew on February 25, 1893, entered as a young gardener on April 19, 1880. From November of that year he superintended the Herbaceous department, which has since greatly increased both in size and importance, the Rockery and the Wild Garden (surrounding the Temple of Æolus) having been formed; these are now

and present. It is twenty years since I left Kew, after spending there the happiest and most profitable thirteen months of my gardening career. I hope to learn through the Journal the whereabouts of some old Kew friends whom I have lost sight of for some years."

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amongst the most beautiful and popular features of Kew. Latterly, too, what used to be the Rockery (near the end of the Economic houses) has been turned into a hardy Fernery.

MR. JOHN AIKMAN to the post of Assistant to the Director. Mr. Aikman entered as a gardener in December 1888. In 1890 he was made label-writer, and in 1891 he was appointed to his present position, after the usual Civil Service competitive examination.

MR. WILLIAM N. WINN to the post of Assistant to the Curator. He entered as a gardener in March 1890, was made label-writer in July 1891, and won his present appointment in the same way as Mr. Aikman.

MR. WILLIAM TRUELOVE, who for twenty-six years was foreman in the Arboretum at Kew, having reached the age of seventy years, retired from the service in April 1892. Mr. Truelove was employed in his younger days in the famous arboretum at Bickton and in Mr. Barron's nursery at Borrowash. He is now residing at Brixton.

MR. WILLIAM J. BEAN is now foreman in the Arboretum. He entered Kew as a gardener in April 1883 from the gardens of Belvoir Castle. He was appointed foreman of the Temperate house in 1888 on the retirement of Mr. W. Binder.

MR. THOMAS JONES fills the post of foreman of the Temperate house vacated by Mr. Bean. Mr. Jones entered as a gardener in January 1888 from the nurseries of Messrs. J. Dickson and Sons, of Chester.

MR. WALTER IRVING succeeds Mr. Dewar as foreman of the Herbaceous department. He entered as a gardener in October 1890 from the gardens of Belvoir Castle.

MR. THOMAS HUMPHREYS, who since 1887 had been propagator in the Arboretum, was in December last appointed Assistant Superintendent of the Royal Horticultural Society's Gardens at Chiswick. Mr. Humphreys received his early training in Messrs. Dickson's nursery at Chester.

MR. CHARLES H. CURTIS, who held the above post at Chiswick previous to Mr. Humphreys, and was formerly subforeman of the Orchids at Kew, is now on the editorial staff of the 'Gardener's Magazine.'

MR. G. H. KRUMBIEGEL, for the last two years subforeman in the Propagating department, and writer of one of the prize essays which appear in these pages, has been appointed Superintendent of the State Gardens at Baroda in India. These gardens have been in course of reconstruction and extension during the past four years under the superintendence and in accordance with the designs of Mr. W. Goldring, an Old Kewite, who was foreman of the Herbaceous department some fifteen years ago, and afterwards joined the editorial staff of the 'Garden.' He has now for some years devoted himself entirely to landscape work, and has been occupied in India for six months during each of the last four years.

MR. FREDERICK W. SMITH, subforeman of the Greenhouse department, left Kew in February last to take charge of the Villa Valetta garden at Cannes. This garden is one of the most famous of all those

on the French Riviera, being stocked with a large collection of rare plants.

MR. ROBERT HARROW entered as a gardener in November 1891 from the Botanic Garden, Cambridge, and has lately been appointed foreman of the Indoor department in the Edinburgh Botanic Garden.

MR. FREDERICK J. INGLEBY entered as a gardener in January 1890, and was appointed Superintendent of the State Gardens at Travancore in January 1891.

MR. JOSEPH JONES entered as a gardener in September 1889, and was appointed Curator of the Botanical Station at Dominica in February 1892.

MR. A. B. WESTLAND, who was appointed Assistant Superintendent of the Botanic Gardens, Hong Kong, from Kew in 1883, was, on the recommendation of Kew, transferred in August 1891 to the post of Superintendent of the Taj Garden at Agra.

MR. WILLIAM J. TUTCHER, who entered as a gardener in December 1888 and was subforeman in the Orchid houses for nearly two years, was appointed in September 1891 to the post vacated by Mr. Westland in Hong Kong.

MR. CHARLES S. MARKHAM entered as a gardener in July 1890 and was engaged by Mr. Burbidge as Foreman of the Trinity College Gardens in March 1891.

MR. F. E. WILLEY, who entered in May 1892, has accepted the post of *locum tenens* for a year in the Botanical Station at Aburi, Gold Coast, during the absence of the Curator, Mr. W. Crowther, who is coming to England on leave and is to proceed afterwards on a professional tour through the principal Botanical Gardens in the West Indies.

MR. GRANGER.—For very many years there has been no face better known at Kew than that of Mr. William Granger. Owing to the regulations as to age which now affect Government employes, Mr. Granger retired from the service on April 30th. He entered the Royal Gardens on June 20th, 1850, and has, therefore, a record of nearly forty-three years' service at Kew. After filling various posts in the Garden during the earlier part of his career—amongst others those of office-keeper and Curator's clerk—he was, in 1866, appointed Keeper of the Stores, a position he filled until his retirement. Previous to his coming to Kew Mr. Granger served for eight years in the Royal Navy. It is difficult to adequately express the feeling with which he has always been regarded by Kew men; that feeling, however, is one of deep respect and esteem, it would scarcely be too much to say of affection. Only those who have lived and worked at Kew can appreciate the peculiar position he has occupied in the establishment, and the great moral influence he exerted over the men, many a new-comer having had reason to be thankful for his advice and encouragement. It is gratifying to know that his services have been rewarded by a pension as high as the Superannuation Acts allow of. Mr. Granger has, we are sure, the hearty wishes of all Kewites for health and happiness in his retirement.

GARDEN NOTES.

A NEW entrance to the Herbaceous Ground was made at the beginning of 1892 within a few yards of the Cumberland Gate. An opening has also been made in the long brick wall which skirts the western side of the Herbaceous Ground, through which a path now leads directly down into the Rockery.

The large Rhododendron beds on each side of the broad walk leading from the Main Entrance to the Pond, which were originally filled with *R. ponticum*, are being gradually furnished with good varieties.

A new garden was made in the early part of 1892 in the wood near the Rhododendron Dell, and now accommodates an extensive collection of Bamboos. The place was in past times a gravel pit, and by the removal of many hundreds of loads of sand and gravel it has been considerably enlarged and is now a pretty, sheltered hollow. It is intended eventually to concentrate here all the larger-growing hardy Monocotyledonous plants.

Owing to the luxuriant growth of the willows, poplars, etc., on the islands and banks of the lake in the Arboretum, the area of water visible has during the last year or two been much reduced. By the removal last autumn of large quantities of the superabundant vegetation, not only has the lake been made to appear larger, but several charming and entirely new vistas have been opened. The accumulation of Thames mud on the bottom, varying in different places from one foot to three feet in depth, has during the past two winters been to a great extent wheeled out and used as manure for the Conifers and other large trees near the lake.

The ARBORETUM continues to grow in extent and interest, and attracts considerable attention from horticulturists. In spite of the evil effects of London fog, the collection of Coniferæ is now a very fine one and comprises many handsome specimens. Deciduous trees and shrubs are also becoming more and more interesting, and as the fogs and smoke of winter do not appreciably damage them, they are likely to become much more extensively used for gardens in the neighbourhood of large towns than they are now. The Curator, Mr. Nicholson, is preparing a catalogue of all the hardy ligneous plants cultivated at Kew, which will no doubt be published in some form so that all who are interested in trees and shrubs will be able to obtain it. This catalogue will reveal a wealth of material available for out-door gardening of which few people have any idea. Anyone who has made a study of the collections grown outside at Kew will agree that in English gardening generally there is a want of variety among the trees and shrubs used which under the circumstances is deplorable.

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The **T**-Range, the Conservatory (No. 4), and the Tropical Fernery have all been partly re-roofed and reglazed in closer accordance with modern ideas on the subject of plant-houses. Ordinary clear glass is now being substituted for the green-tinted kind which has had so long a reign at Kew.

The staff of skilled young gardeners at Kew is now much larger than it was five or six years ago. This is owing to the Temperate house being worked by gardeners instead of labourers, several also being employed outside in the Botanic Garden and Arboretum to do the more responsible work. This arrangement adds a good deal to the value of Kew as a horticultural training-school, particularly as the importance of out-door work is apt in these days to be overlooked by young men in course of training.

ARAUCARIA IMBRICATA.—Every Old Kewite will remember the large Chilean Pine which until last autumn stood on the lawn near the Conservatory. For several years it had been rapidly deteriorating, every winter rendering it more gaunt and unsightly. Latterly it became too dilapidated to be even picturesque, and so far as the beauty of that part of the garden is concerned nothing was lost when, last autumn, its death necessitated its removal. One cannot help regretting it, however, as a tree of great interest; it was, in fact, an old Kewite with a romantic history. The story of its introduction to Kew is an "oft told tale," which has, moreover, lately gone the round of the daily press, so that the following few particulars of its origin will suffice. In 1792 Archibald Menzies, a navy surgeon and botanist, was dining with the Viceroy of Chili, when at dessert some nuts were brought to table which were quite unknown to him. Of these he kept a few, which he afterwards sowed in a box of soil; they germinated on board ship, and he finally succeeded in bringing five plants home to Kew, which were the first ever seen in this country. Of these, the specimen under notice was one, so that when it died it was exactly 100 years old. It seems to have been much damaged by being used at a fête at Carlton House during the Regency of George IV., hanging-lamps having been attached to its branches!

SABAL BLACKBURNIANA is another plant which in all probability this year completes its century, and is now a splendid specimen in the Palm-house, well known to visitors by the immense bunches of grape-like fruits it always carries. Mr. J. Smith, the first Curator, states that it was probably brought from the West Indies in 1793 by Admiral Bligh.

Last summer the Cool Fernery known as No. 3 was demolished, and a new house erected on nearly the same site. According to the "Historical Account of Kew," published in the 'Kew Bulletin' for 1891, this house was constructed out of two others—one a dry stove, used fifty years ago for succulent plants, the other a greenhouse filled with Cape

and New Holland plants, and which was built in 1803. For such light-loving plants as these one could scarcely imagine a structure more ill-suited than the one which has just been removed. Even "cool" Ferns, for the cultivation of which it was latterly used, would not thrive beneath the enormous beams and narrow panes of green glass. The house which has replaced it is a light structure of iron and wood, and is glazed with broad sheets of clear glass. The filmy Ferns are now accommodated in a separate and specially built house against the north side of the Tropical Fernery, No. 2.

Old Kew men who, like some of our Indian and Colonial members, have not seen the place for six or eight years will find it a good deal changed. This will be evident to them not only in regard to alterations in buildings, walks, etc., and here and there in broad landscape effects, but more especially in the greater prominence that is now given to the purely horticultural part of Kew's work. As an instance, we may mention the delightful display which has this spring been made by hardy bulbs, such as scillas, snowdrops, daffodils, hyacinths, and tulips. The Wild Garden has been a continuous sheet of blossom from the middle of February, and many of the mounds in the Botanic Garden have been thickly covered with white, yellow, and purple crocuses. These masses of bright colour resting on the grass have a singularly charming effect.

In the Houses, also, the old botanic garden system of growing as many species as possible without regard to their interest or value has, to a certain extent, become obsolete. A plant now to obtain a place in the collections must have either economic or horticultural value, or be of special scientific interest. Owing to the enormous increase in the number of known plants which the last decade has witnessed, this discrimination has become a matter of necessity. It would be impossible even under the immense area of glass at Kew to maintain anything like complete collections in satisfactory health.

SELECT NEW AND INTERESTING PLANTS FLOWERED AT KEW IN 1892.

- | | |
|---|------------------------------------|
| <i>Acidanthera bicolor.</i> | <i>Brunsvigia gigantea.</i> |
| <i>Aganisia inoptera.</i> | <i>Bulbophyllum barbigerum.</i> |
| <i>Allium kansuense.</i> | — <i>comosum.</i> |
| <i>Amherstia nobilis.</i> | — <i>Sanderianum.</i> |
| <i>Arachnanthe Clarkei.</i> | <i>Calochortus Kennedyi.</i> |
| <i>Aristolochia gigas</i> , var. <i>Sturtevantii.</i> | <i>Calpurnia lasiogynne.</i> |
| — <i>Goldieana.</i> | <i>Caralluma campanulata.</i> |
| <i>Barbacenia squamata.</i> | <i>Casuarina stricta.</i> |
| <i>Bauhinia densiflora.</i> | <i>Cattleya Alexandræ.</i> |
| <i>Beaumontia grandiflora.</i> | <i>Cirrhopetalum Collettianum.</i> |
| <i>Bromelia fastuosa.</i> | — <i>Gamblei.</i> |

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- Cirrhopetalum Medusæ.*
 — *pulchellum.*
Crinum purpurascens.
Crotalaria longirostrata.
Cyrtopodium cardiochilum.
Daphne Genkwa.
Dendrobium Phalænopsis.
Dianthus callizonus.
 — *Freynei.*
Dioon pectinatus.
Disa Cooperi.
 — *Draconis.*
 — *incarnata.*
 — *lacera, var. multifida.*
 — *racemosa.*
Dischidia Rafflesiana.
Faradaya splendida.
Ferula Linkii.
Gentiana origana.
Gladiolus oppositiflorus.
Greyia Sutherlandii.
Hydnophytum Forbesii.
Kniphofia Northiæ.
 — *pauciflora.*
Lissochilus cristatus.
Lonchocarpus Barteri.
Mangifera indica.
- Marica occidentalis.*
Megaclinium falcatum.
 — *minutum.*
 — *purpuratum.*
Monodora grandiflora.
Musa Basjoo.
Odontospermum imbricatum.
Pachira macrocarpa.
Pleurothallis insignis.
Primula imperialis.
 — *Poissonii.*
Protea nana.
Ranunculus Lyalli.
Restrepia Shuttleworthii.
Rhododendron Collettianum.
 — *racemosum.*
 — *scabrifolium.*
Senecio Galpini.
Stapelia gigantea.
Stevensonia grandifolia.
Streptocarpus Galpini.
Susum anthelminticum.
Synandropadia vermitoxicus.
Thalictrum rhynchocarpum.
Thunbergia grandiflora alba.
Utricularia Humboldtii.
Vernonia podocoma.

THE LECTURES.

FOUR courses of lectures are given every year, three in the "Iron house," which has recently been fitted up with desks, etc., and is used now only as a lecture-room for the Staff.

Mr. J. G. Baker, F.R.S., Keeper of the Herbarium, gives a course of 25 lectures on two evenings in every week from May to the end of July on Organography and Systematic Botany. Mr. Baker as a lecturer is as popular as ever, his lectures being followed with great interest by all.

Mr. J. R. Jackson, A.L.S., Curator of the Museums at Kew, gives a course of 34 lectures on Economic Botany in the Museums, on two mornings after breakfast in each week during the early part of the summer. A knowledge of the most important Medicinal and other Economic products of the vegetable kingdom is of considerable advantage to men in Colonial or Indian service. A study of the contents of the Kew Museums, aided by Mr. Jackson's lectures, is therefore most essential.

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Mr. N. E. Brown, A.L.S., Assistant in the Herbarium, gives in March a course of 10 lectures on Geographical Botany.

Dr. J. F. Harris gives, during the winter months, a course of 35 lectures on Elementary Physics and Chemistry. These lectures also are popular, the lucid style of the lecturer and the excellent illustrations and experiments made by him being much appreciated by those who attend.

It will interest Kewites to read the following copy of the first notice issued by Professor D. Oliver, F.R.S., for the commencement of Lectures to Kew men. The worthy Professor still resides at Kew, and, although no longer officially connected with the place, may generally be seen busily engaged in the Herbarium.

“ROYAL GARDENS, KEW.

1860.

“The Summer Course of LECTURES ON BOTANY to the Foremen and Gardeners engaged in the Royal Gardens will commence on Tuesday the 22nd May, and will be continued on two evenings weekly (at Seven o'clock, on Tuesdays and Fridays), until Friday, the 20th July.

“Examinations on the subjects lectured upon will be held from time to time; and at the close of the Course—on Monday and Tuesday, the 23rd and 24th July. The Prizes will be awarded on Wednesday, the 25th July.

“The first ten or twelve Lectures will be devoted chiefly to the Structure of Plants and Botanical Demonstrations. The latter portion of the Course to the principles of Classification, the Characteristic Marks of the leading Natural Orders, and their general History.

“The Lectures are abundantly illustrated by fresh specimens, etc., from the Gardens, Museums, and Herbarium; by numerous Diagrams, Drawings, etc.

“The Course is open to all employed in the Royal Gardens.

“DANIEL OLIVER, JUN.,

“1st May, 1860.

“*Librarian to the Royal Gardens, Kew.*”

We hope soon to learn that arrangements have been made for a course of lectures to be given on the Physiology and Life-History of Plants. The lecture by Professor F. W. Oliver, which formed one of the items in the Syllabus of the Mut. Imp. Soc. last session, was most keenly appreciated by the whole Garden staff, and the hope was afterwards expressed that a course of such lectures would soon form part of the Kew curriculum.

The two lectures on Tropical Vegetation, with lime-light illustrations, given by Mr. Morris, the Assistant Director, were also much enjoyed and appreciated. The screen illustrations were a large series of the most beautiful pictures of tropical scenery which had been prepared from photographs.

THE MUTUAL IMPROVEMENT SOCIETY.

THIS Society is composed exclusively of gardeners employed in the Royal Gardens, Kew, and limits its proceedings entirely to essays and discussions on professional subjects. It has been in existence now about twenty years. The Meetings are held in the Library on Thursday evenings during the six winter months, each Meeting lasting from two to three hours.

There are about forty Members, and the attendance last Session averaged 29.5.

Recently two prizes have been given for the best essays and one for the best contributions to the discussions. The prizes this year have been won by Mr. G. H. Krumbiegel and W. Dallimore for essays, Mr. J. Browne being successful as the best "talker."

List of Papers read at the Meetings held in 1892-3.

Oct. 20.	Tropical Vegetation, I. . . .	Mr. D. Morris, Assist. Director.
27.	Hardy Trees and Shrubs ..	Mr. G. Nicholson, Curator.
Nov. 3.	Rhododendrons	Mr. W. Watson, Assist. Curator.
10.	The Education of Gardeners	Mr. C. Curtis.
17.	Greenhouse Leguminosæ ..	Mr. C. Wakely.
24.	Tropical Ferns	Mr. E. Crowder.
Dec. 1.	Decorative Uses of Flowers and Foliage	Mr. J. W. Miles.
8.	Leaves and their Work	Mr. W. Lunt.
15.	Roots and their Work	Mr. C. W. Zimmer.
22.	Fruits	Mr. R. L. Harrow.
Jan. 5.	Landscape Gardening	Mr. J. C. Newsham.
12.	Tropical Vegetation, II.	Mr. D. Morris.
19.	Herbaceous Plants	Mr. A. Tucker.
26.	Palms	Mr. H. French.
Feb. 2.	Pruning of Hardy Trees and Shrubs	Mr. W. Dallimore.
9.	Cool Orchids	Mr. H. J. Davies.
16.	A Chat on Propagation	Mr. G. H. Krumbiegel.
23.	The Apple and its Cul- tivation	Mr. H. A. Pettigrew.
Mar. 2.	Crinum	Mr. F. Willey.
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16.	Carnations	Mr. A. Galt.
23.	Fog: its Effect on Plants ..	Prof. F. W. Oliver, B.A., D.Sc., F.L.S.
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Prize Essay.

THE PRUNING OF HARDY TREES AND SHRUBS.

By Mr. W. DALLIMORE.

THE question "Ought trees to be pruned, and if so what is the right method and the right time to do it?" has lately received considerable attention in the horticultural press from writers specially interested in hardy trees and shrubs as objects for the garden and park.

Although tree-pruning has been practised for a considerable number of years, it is still far from being thoroughly understood by the generality of gardeners and foresters in this country. This state of affairs will we hope soon be remedied, as during the last few years many eminent horticulturists have given much attention to this particular question. With scarcely an exception all agree that judicious pruning is more or less essential to the well-being of trees, and although the methods they recommend are somewhat varied, still they all pertain to one end, viz., the suppression of certain parts of the tree to promote the building-up of others which the cultivator thinks desirable for the healthy development of the tree in the form that he prefers.

Some authorities recommend hard pruning, others comparatively light. What can be more harassing to the amateur than these conflicting opinions? He tries one way and finds it does not give satisfaction, then he tries the other, with perhaps worse results; for all this, neither of the former persons has been absolutely wrong. They have recommended the system from which they have obtained the results they required; but the harm is often done by advertising their system as the true one for cultivators at large to follow. A large amount of useful information as to the principles of pruning may be derived from books; but to have a thorough knowledge of the subject one must have practical experience, and that he must obtain in many different parts of the country. For instance, if a tree requires a certain amount of pruning in Surrey, it does not warrant the same amount being done to a corresponding tree growing in a northern county. There are differences of aspect, soil, position, locality, and stock (if the tree has been worked) to be taken into consideration. Often two trees of one variety growing in the same garden, but in different positions, require much different treatment.

These are obstacles in the way of one common rule being adopted. Many failures are often due to insufficient attention being paid to the climate and general surroundings of the trees. It will therefore, I think, be readily understood why gardeners and foresters are now urged to study the subject from every point in all its aspects before they can hope to arrive at anything like a thorough knowledge of it.

It is my intention to give a brief outline of the pruning of hardy trees and shrubs as practised by me and others in the various places I have worked in and visited, and which has been attended with very satisfactory results.

I shall first give a few general directions which will apply to all trees

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alike, after which I shall treat separately on Fruit-trees, on Forest-trees, and on Shrubs.

The truth of our old copy-book proverb, "Prevention is better than cure," is well exemplified in this matter of pruning. It is much better to commence pruning whilst the trees are in a young state, looking over them annually, and checking unnecessary growth for a few years, so as to get a good foundation, and then let them grow naturally, than it is to let them grow as they please for a considerable number of years, until they are far advanced towards maturity, and then begin pruning. For instance, if a branch half an inch in diameter is cut off a young tree, the wound very readily heals over, whilst if that same bough had been left for ten or twenty years, and then had to be cut off, besides leaving a wound perhaps nine inches in diameter to be healed over, it would also be so much wasted energy, which might have gone towards the development of the permanent parts of the tree.

Trees which have attained large dimensions before being taken in hand have naturally to be severely dealt with. This often gives them a somewhat bare appearance and causes loss of fruit for a time, but after a few seasons' growth have been completed and the trees have again assumed their natural habit, we shall be amply recompensed by their improved appearance, healthy growth, and fine fruit.

This leads to the subject of the best way to prune an old tree. Before removing any part of it, the operator should examine his tree and make up his mind what he is going to do, the way in which it is to be done, and what the tree is to look like when finished. This is the only way in which the work can be done satisfactorily.

The proper place to commence to prune is at the top and work downwards; by this means it is much easier to get a tree into shape than if the work is done from the bottom upwards. When possible it is better to cut branches clean out than to shorten them. If, however, they cannot be taken out altogether, they should be shortened to a fork, by which means the tree is prevented from showing too many stumps. In shortening branches it is advisable to make oblique cuts in preference to straight ones, as they heal quicker and give the tree a much more presentable appearance. When cutting off, or shortening a bough, a cut should first be made underneath the branch so that when cut from above the weight of the bough will not tear the bark off the trunk or portion left. Cuts should always be made clean and well into the wood, snagged branches being one of the worst evils attending bad pruning. The snags die and decay, thus forming a channel for the conveyance of disease into the heart of the tree. As soon as a tree has been pruned, all wounds should be dressed with coal-tar, which forms a sure protection against the inclemencies of the weather and the entrance of fungoid diseases, until the wounds are healed over.

A great point is to have good tools and keep them clean and sharp. The requisite tools are: saws of various sizes, standard pruners, choppers, axe, knife, light steps, ladders, etc.

FRUIT-TREES.—By pruning fruit-trees we check too luxuriant growth, keep the trees open, and throw the strength into parts which are likely to produce fruit-buds. The methods adopted are extremely varied: the most approved are those which encourage a free habit of growth consistent with the fruitfulness of the tree.

The most popular shapes for fruit-trees are standards, dwarf-pyramids, and bushes for the open; cordons, horizontal and fan-trained, for espaliers and walls.

To obtain good trees it is advisable to plant one-year old maidens and develop and train the growth one's self. The maidens should be planted in autumn, and in spring cut back to within 6 inches of the stock when intended for standards. One shoot alone should be encouraged to grow, and that perfectly upright. Any lateral growths which may be produced should be pinched off to within an inch of the stem, during summer, thus concentrating the whole of the strength in one good growth. The following spring the top of the shoot should be cut off about five feet from the ground, and all remaining portions of lateral branches cut clean away. Three or four shoots should be allowed to grow at equal distances apart near the top of the stem; lateral growths should be checked as in the preceding year. In spring, these branches will require shortening to half their length, each will again produce two or three shoots, which must be encouraged to grow in an outward direction at equal distances apart; these growths will be found sufficient to form the foundation of a well-balanced tree. Shortening will again be found necessary to check too luxuriant growth. The following autumn fruit-spurs will have begun to form, after which time the chief thing will be to keep the trees thinned by cutting out all branches which cross others, and checking growths which are becoming too strong.

When the trees are to be grown as pyramids or bushes, the maidens should be cut down to within 15 inches of the ground, as advised for standards, but for pyramids a leader will be essential until the desired height is attained. It is often necessary to stop the upper branches of pyramids during summer, or they overbalance the lower branches.

Trees which have been neglected for a number of years and have become a thicket of unfruitful growth will require more severe treatment. All inside branches should be taken out, together with branches which cross others; the outside branches will require shortening to bring the trees into shape and promote young healthy fruitful wood. Where possible a small growth should be left at the end of each branch; this draws the sap up and often prevents the branch from dying back. In this manner old unfruitful trees may often be renewed and made productive. After severe pruning a lot of young wood is often made, this should be thinned down to the number of shoots required for the foundation of a well-shaped head. Apples and pears give but little trouble after severe pruning; plums and cherries, on the contrary, do. The effect of bad pruning on these trees is gumming, followed by decay and even the death of a portion, if not the whole tree.

TRAINED TREES.—We train trees against walls or espaliers to give them more protection than is convenient in the open orchard. By this means crops of fruit can be obtained from trees which, if treated in the ordinary way, would be a failure.

Apples and pears are sometimes trained horizontally or grown as cordons. The cordon is the most easily managed of any trained tree. It consists usually of one or two branches only, and is used to cover low walls or trellises where trees trained on any other system would be useless. Maidens should be planted and kept growing on until they have attained the required height. The pruning consists of checking all lateral growths during summer to within an inch of the stem; these laterals will form fruit-bearing spurs.

For horizontals grown on walls, maiden-trees should be planted in autumn and cut back in spring to within 12 inches of the ground. Three growths should be encouraged at the top of the stem, the centre one to form the leader; the other two, one on each side of the stem, to form the two bottom branches. All should be allowed to grow upright until autumn, when the two bottom branches must be fastened into position, opposite each other, about one foot from the ground. In spring the leader must be shortened to within 10 inches of the branches, and three more shoots encouraged to grow, treating them as in the preceding year. The same thing must be repeated each year until the desired height is attained; a space of 9 inches must be left between each pair of branches. The pruning will consist of pinching back all breast-wood during summer to within six buds of the base, reducing it still further to two buds in the winter. It is by checking these lateral growths that fruit-spurs are obtained. The ends of the main branches must not be checked, save when some are getting ahead of others, until the trees have filled their allotted space. Trees grown on espaliers may be pruned in the same way, but spurs must be left on both sides of the branches.

Plums, cherries, apricots, and peaches are usually fan-trained. The peach and morello cherry produce their fruit on the preceding year's growths only; whilst plums, apricots, and other varieties of cherries bear theirs on spurs of the old wood in addition to that of the previous year, consequently a slight difference of pruning is necessary.

The branches should be trained in the shape of a fan, leaving plenty of room between the main ones for the laying-in of young wood. The peach and morello cherry should have as much young wood as possible laid in, taking care not to overcrowd. All breast-wood and any not required for laying-in must be cut clean out. The unripened tips of peach-trees should be shortened in spring, taking care to shorten to a wood-bud, not a flower-bud.

In plums, apricots, and other varieties of cherries, the breast-wood not required for laying-in may be shortened during summer to four buds, and in winter to two; these shoots will form fruit-spurs. Strong shoots developed from the main stem should be cut clean out, if

there is not an opportunity of nailing them in among the other branches.

Root-pruning is usually practised on fruit-trees which make strong growth but are very shy at fruiting. It consists of opening out a trench at a sufficient distance from the tree to escape cutting off fibrous roots, and tracing the main roots to within from $2\frac{1}{2}$ to $3\frac{1}{2}$ feet from the stem, and there cutting them clean off. After this has been done the ground underneath should be made firm and the fibrous roots brought near the surface of the ground. The operation is best performed in late summer or early autumn, as then the roots have a chance to recover before winter sets in. When large trees are taken in hand it is best to do one side one year, and, if required, the other side the year but one following. Often the pruning of one side only is found sufficient to check the growth and induce fruitful wood, and as this is all that is required it is useless to waste time and the strength of the tree in pruning all round.

Shy flowering shrubs may often be got to bloom quite freely by a judicious pruning of the roots.

FOREST-TREES.—Although trees belonging to this division play such an important part in the general health, prosperity, and beauty of the country, they are as a rule sadly neglected; because they are hardy and grow about the fields and roadsides, it is generally considered that no attention need be paid them. On careful examination, however, it will be found that the pruning of forest-trees is quite as important as the pruning of fruit-trees. In woods and forests where trees are planted thickly, a kind of natural pruning takes place, each tree tries to get the most light, and in the struggle is forced rapidly upwards, the bottom branches not having room to develop. Mr. Morris, in his lecture on Tropical Vegetation, gave a good illustration of this. In this country it is not possible, save in a few places, to cover large tracts of land with forest-trees, consequently something must be done to make up for this natural pruning.

Passing through a wooded district where trees are left to themselves, one cannot fail to be struck with the gnarled and stunted appearance of many of them. Some, perhaps the majority, are in good health, and their shape leaves little to be desired; others, however, present a miserable appearance, and are hardly worth the name of trees, their trunks covered with wounds, dead branches, and protuberances of various kinds; others again with a weak trunk and large mop head of branches, reminding one more of an orchard apple-tree than a forest-tree. These are evidences of deplorable neglect, as a little timely attention from a pruner would have helped them to outgrow such deformities.

I have heard that timber-merchants have raised objections to timber from pruned trees on account of its not being sound; this unsoundness, however, has been invariably traced to bad pruning. It is a fact that good pruning improves wood. Pruned trees grow quicker than unpruned, and it is generally acknowledged that the quicker trees are grown the sounder and more durable is their timber.

In pruning Forest and Ornamental trees it is at least as necessary as for fruit-trees that all cuts should be made clean and even with the bark, so that the wounds will heal over in the least possible time.

In sawing a large branch off, some foresters recommend leaving a foot or more of wood next the trunk, to be removed the following year; this plan is good in its way, but the drawbacks are much greater than the advantages gained by the practice. If the stumps are not removed, the following year they often die, decay sets in, often penetrating the trunk and even destroying the tree.

When no pruning is done the results are often quite as bad as when the operation is badly performed. Branches often get damaged by bad weather; these, if not seen to, are productive of the same fatal results as those which follow snagging.

After deciding what is to be done to a tree, the first thing to do will be to select a leader. If the tree has been kept growing freely this will be comparatively easy, but where several leads have been developed it is often difficult to decide which will be the best to leave. The one nearest the centre of the tree will be the best one to leave if it is healthy and fairly straight; the others should either be cut clean out or shortened. If the leader is not straight it should be drawn into position and secured to a good stout stake tied to the stem below the bend. If the strain is too great for one of these guides, the leader is held in position by a wire fastened to a stake driven into the ground a little distance from the tree, or to a good stout bough. In any case care must be taken that the wire does not cut or injure the bark, and an examination of all wires should be made annually in case any become too tight.

Trees which have lost their leads may often be renovated by tying a branch near the top of the stem into an upright position, which in the course of a year or two will develop into a lead. Leaders which have become so bent that it is an impossibility to straighten them, should be cut off below the bend to induce the development of a new growth which will form a new leader. Araucarias, Sequoias, and numerous other trees are often rectified in this manner.

A good specimen forest-tree should consist of a single erect trunk, destitute of branches for at least one third of its height, with an open well-balanced head on a framework of good strong boughs clothed with healthy foliage. Pruning to one common standard will be productive of a somewhat formal appearance, especially whilst the trees are young; this formality, however, will be outgrown when the trees have attained that size at which pruning can be dispensed with.

After keeping the upper branches open and shapely, it is most important to keep the bottom branches from outgrowing other parts of the tree.

The following passage, quoted from Lindley's 'Theory of Horticulture,' bears upon this point. He says:—"The only rule to attend to is to keep the top taper, preserving the leading shoot clear and free from clefts and the bole from all the longest branches, leaving only those of the smaller

kind that are requisite for the health and support of the tree, and clearing the tree from the bottom of all its branches as it advances in age. But the bole should be cleared slowly at first when the trees are young, only keep the branches that are left thereon small by often pruning, so as not to injure the tree when it becomes timber."

When pruning large trees, the best plan, after finding the leader, is to remove all unnecessary branches, together with dead wood and inside growths. After this probably some of the branches that remain will require shortening. They should be shortened at the place where they begin to assume a vertical position, but always, if possible, at a fork, so as to leave a branchlet, for reasons already mentioned.

Trees which are showing signs of decay may often be rejuvenated by judicious pruning. All dead and dying parts should be cut away and the wounds dressed with coal-tar. In this manner the life of old trees may often be prolonged for a considerable number of years.

Old trees which have had their leads broken by wind or snow should be cut clean off below the damaged place; by this means new leads are often formed. An excellent illustration of this may be seen in two elms on the Thames bank between Kew and Richmond.

Bark which has been damaged in any way should be cut away to where it is sound, for if left it will only die and form a harbour for insects, an inlet for disease, and will prevent new bark from being formed.

In cutting off a large branch it should first be lightened, that is, cut off about three feet from the trunk, and then again close to the trunk; this prevents accidents, either by the branch falling against the ladder on which the pruner stands or by tearing the bark off the trunk.

Conifers require little pruning beyond what is necessary to keep the lead clear, the removal of dead wood, and the shortening of any branches which are outgrowing others. When branches are bare the greater part of their length they may often be re clothed by stopping them, and so throwing the strength into the lateral branchlets.

SHRUBS.—Time will not allow me to do more than briefly touch upon this branch of the subject. It must not be considered, however, that the pruning of shrubs requires less attention than that of trees, quite as much care being necessary for them if healthy well-formed bushes, capable of producing plenty of flowers or leaves, are desired. One of the most particular items is thinning, for in my opinion all shrubs require this to a greater or less extent. If thinning is not attended to the centres of the plants become a mass of weak wood, to which it is impossible for sufficient sunlight and air to find access, the consequence being unripened wood and little or no flowers.

By the proper formation of a shrubbery much may be done to lessen the amount of pruning. For instance, if each species or variety is represented by a group with sufficient space between each group to allow of ordinary development, much less pruning will be found necessary than if the shrubs had been planted in a haphazard manner; in the latter manner strong-growing plants encroach on the space allotted to

their weaker neighbours, thus making it necessary to cut hard back plants which, under ordinary circumstances, would require far less pruning.

Some shrubs, such as Staphyleas, Hydrangeas, and Wistarias, flower all the better if pruned fairly hard; whilst others, such as Lilacs, Mock Oranges, and Witch Hazels, require little beyond thinning and keeping in shape.

Even Rhododendrons should be overhauled after flowering and all old flower-heads taken off, and where the growths are too thick the weaker superfluous ones removed.

Laurels often become bare at the base; when this occurs and is objectionable, hard pruning in spring causes them to produce plenty of new growths from all parts of the stems.

If we consider that most trees in the hands of a careful cultivator may be made to assume almost any shape in reason if taken in hand in time, and that neither in the garden nor the park should a place be found for a misshapen or sickly tree, the necessity for pruning will be obvious. There is nothing in nature more beautiful than a large healthy well-balanced tree; it should be the aim of all who have to do with the management of trees to adopt those means which are known to be productive of fine specimens, and these means are selection, careful cultivation, and the judicious application of the pruning-knife whilst the tree is forming. This applies not only to hardy trees and shrubs, but to all kinds of plants. In conclusion I would say, don't prune unless the plant requires it, and if it does, then prune with judgment. Like all other important operations in horticulture, pruning may do good or the reverse, according as the operator understands it or doesn't.

Prize Essay.

A CHAT ON PROPAGATION.

By Mr. G. H. KRUMBIEGEL.

I HAVE purposely called my paper a "chat," so as to allow us to deal in a conversational way with any interesting point connected with this important branch of our profession.

There is, of course, a marked difference between propagating large quantities of a few kinds of plants, such as, for instance, bedding stuff in London parks or market stuff in nurseries, and propagating only to keep up the supply of out- and indoor plants in a good gentleman's garden, or a botanical collection. The former is merely mechanical work; the latter brings one in contact with all the fine and striking rarities of flowering and ornamental-leaved plants. In a botanical garden such as Kew we have almost endless variety; for in addition to the ordinary garden-plants you get what are known as botanical plants, some of which are anything but beautiful. Still they are botanically interesting, and it is through being engaged in their propagation that we here

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get to know a great deal about them. Here one sees many very beautiful and rare Palms, flowering and foliage-plants, such as nursery-men are always on the look-out after, and which, when they get possession of them, are turned to valuable account only by successful and rapid propagation. In a nursery like Mr. Veitch's you may see such plants propagated to the utmost advantage.

Coming now to the subject of the paper, let us begin with propagation by seeds, which is, as you all know, the most natural means of reproduction. Simple as it may look, seed-raising requires a lot of forethought and practical experience.

The best time to sow seeds is, of course, immediately after they are ripe; but in many cases circumstances prevent this. Tropical seeds should be sown as early in spring as possible, excepting perhaps those which germinate very quickly, such as Cucurbits. February is not at all too early; the seedlings will then have a chance to grow into good-size plants before winter, for we must consider that these plants are the produce of seeds ripened in a more favourable climate than ours. I should not advise the sowing of anything after autumn unless for seeds whose germinating power is doubtful; and even then I would sow only a few and keep the rest till spring. For the safe preservation of seeds much depends upon the room and the bags in which they are kept; a seed loses its germinating power quicker the more oil it contains, and keeps or retains it longer the more carbon there is present in its composition: thus some must be sown while quite fresh, such as *Lapageria* etc., and others will keep for years, viz. Melon etc.

In the tree-nursery, where many things are propagated by seed, there are different times for sowing. In autumn we sow those which take a long time to germinate, such as *Cornus*, *Staphylea*, *Rosa*, *Crataegus*, etc.; and for all those the seedlings of which are not so sensitive to frost, autumn is by far the best time. In Germany, where severe winters are experienced, we cannot sow just when we like. Nuts, acorns, etc., which, if sown in autumn, would fall a prey to mice during the winter, must for that reason be kept till spring. Seeds that germinate very quickly and would suffer from late frosts are sown late in spring, such being *Ceanothus*, *Colutea*, *Cytisus*, *Weigela*, etc. Most of the berry-bearing ornamental shrubs are sown in summer as soon as the seeds are ripe.

For seeds of Alpines and herbaceous plants late autumn or early spring is best. Most Alpines are sown in pans and put into cool frames, the lights of which are frequently removed during snowfall; the soil used for them is chiefly peat and leaf-mould, varied with loam, sand, granite, or, for bog plants, chopped sphagnum.

Seeds in general, whether tropical or otherwise, do not, as in case of plants, require soils of particular kinds: the chief thing is to get a light porous soil which will keep the seed surrounded with moisture and at the same time admit sufficient air, which is most essential.

In addition to moisture and air darkness is also desirable, and I know

of nothing better for this purpose than the canvas shading employed at Kew. It gives sufficient shade to keep the pots free from green moss, and it also prevents evaporation. For seed-beds out-of-doors, shading may be effected by covering them with short dung. Seeds should not be dry one moment and wet the next, delicate seeds being almost certain to be killed by an irregular water-supply. Very little watering is needed for seeds when shaded as I have recommended.

Nymphaeas and other aquatics are sown in the usual way and the pots submerged in water. *Nelumbium*-seed has to be filed to germinate within two or three weeks, otherwise it will take as many months or will not grow at all. Seeds of *Victoria regia* require a temperature of 90 degrees to germinate within a reasonable time; we have sown them in a pan of water which was placed on the hot-water pipes, and the seedlings, as soon as they appeared, were potted and put in the tank.

Such seeds as *Tillandsia*, *Nepenthes*, *Sarracenia*, etc., are best sown in chopped moss, with a little peat and sand. Bromeliads are also sown on living bark. The raising of Orchids from seeds is very interesting, but a slow process. I think Mr. Veitch states that the shortest time it took to flower a *Cattleya* was 8 or 9 years, and the longest took 19 years from seed. I don't know whether it is really necessary to sow the seeds on other Orchid pots; in the case of our *Disa* crosses it was certainly not; they were sown in ordinary pans in a mixture of peat, sphagnum, crocks and sand, and they germinated freely. Some parasites, such as *Loranthus*, *Cistanche*, *Orobanche*, etc., are difficult to raise; one must have their respective host-plants to sow them on.

There are many other things to be said about seeds:—the boiling of hard-shelled seeds, sowing of fern-spores, care in sowing fine seeds to spread them equally over the pot and not get the seeds all on one side and the dust all on the other; then the pricking off of the seedlings, which should not be neglected, the removal of the seedlings when strong enough into proper temperatures, and keeping them close to the glass; removing the old seed-shells from the cotyledons, which often rot and thus cause the death of valuable seedlings, and so forth. One cannot bestow too much care on seedlings; they are like little children, always in want, only they cannot cry when they need attention, and a blessing it is for some gardeners that they can't!

There are other points of interest connected with the germination of seeds; for instance, there are dicotyledonous plants with only one cotyledon, i. e. *Cyclamen*, *Pinguicula*, *Trapa natans*, etc., or with more than two cotyledons, as in Conifers. Again, there is the interesting development of a cotyledon into such an enormous leaf as in *Streptocarpus Dunnii*. There are also phanerogamous plants without any cotyledons, viz. Orchids, *Cuscuta*, etc.

PROPAGATION BY CUTTINGS.—This method is most advantageously adapted for plants whose characters are not reproduced by their seed, or which only bear seeds at very long intervals, or the seeds of which are difficult to germinate.

From the cutting of a succulent plant to that of a thin-leaved stove-plant we have a range of great variety ; the one we root by drying it in the sun, while the other we have to shade and keep constantly in a moist close atmosphere.

For most tropical plants it is necessary to start soon ; there is no time like the days of early spring ; the cuttings strike easily, and have then the whole summer to grow in. Cuttings of ornamental fruit and berry-bearing plants, such as *Rivina*, *Psychotria*, *Callicarpa*, *Solanum*, and *Capsicum*, should be put in as early as possible, as it is important that they should be in flower early in summer in order to set and ripen plenty of fruits.

Some cuttings try one's patience to the utmost. Economics as a class are about the worst in this respect. Other things will rot off or go black almost as quick as you put them in ; I don't know how many batches of cuttings of *Camoensia* I have put in and failed with. Still I persevered and put more in, and finally was rewarded with a whole batch, not one of which failed.

If, therefore, any one tells you that such and such a plant cannot be raised from cuttings, I would advise you to try for yourself. In making cuttings, it is important to have a good knife and cut clean. Cuttings of tropical, and indeed of most plants, I prefer to put singly in small pots, as it saves a shift and prevents damage to the roots. For hard-wooded plants of course you use larger pots, or even pans or boxes ; the drainage must be perfect, the cutting properly ripe but not hard, thin and weaker shoots to be preferred ; the lower leaves must be carefully removed. For planting the cuttings use a dibber with a proper point according to the thickness of the cutting, it being important that the base of the cutting should rest on the bottom of the hole, and not have a hollow space beneath. If the cuttings are covered with a bell-glass let it be large enough, and be careful to keep it clean. Cuttings under bell-glasses want very careful watching as to watering, cleaning, airing, etc.

In the nursery it is chiefly ornamental shrubs and Conifers that are propagated from cuttings. The former may be taken as young soft-wooded shoots and put under hand-lights or in frames, treatment which answers for *Ribes*, *Deutzia*, *Philadelphus*, *Spiræa*, etc. ; or large shoots two or three years old may be used if they are put in beds outside. Cuttings of Conifers must not be too sappy nor too woody.

Cuttings of young shoots do not make much callus, while woody cuttings do. Should the callus get hard outside it will prevent roots from breaking through ; such cuttings should be picked out when the others are potted up, the callus cut, and then placed in a little extra heat.

Roses are propagated from cuttings put in frames in July and August. They must be kept close, exposed to sun and frequently syringed, potted off when rooted and wintered in a cold frame.

Cuttings of many Cacti root easily and will not only produce bulbils from the spine-cushions, but also on the axis. The stems of Cycads

may be cut through and the tops used as cuttings, and even the scales of *Cycas* will form new plants.

The scales of bulbs will produce a number of young bulbils if the base of the bulb is cut crosswise or sliced off altogether. I may here say that young bulbils, whether from seeds or scales, do nowhere better than when planted out in frames, and that young seedlings of bulbous plants do not go to rest, as a rule, until they are two or three years old.

LEAF-CUTTINGS.—There are a great number of plants which may be propagated from their leaves. *Begonia Rex* is a well-known example; but whenever you have a plant of special value and wish to propagate it rapidly it is well to try leaf-cuttings. Beside Begonias such things as Peperomias, almost all Gesneriads, including *Ramondia pyrenaica*, *Pelargonium*, *Cyperus* (leaf-whorls), *Phyllogathis*, Bertolonias, Echeverias, and other succulents will easily strike. For some plants leaf-cuttings are by far the best way.

ROOT-CUTTINGS.—Cuttings formed of roots are sometimes taken advantage of where a large quantity of plants from small stock is desired. This method is, however, slow, and the plants thus obtained are not as strong as from ordinary cuttings. Root-cuttings must not be put in much bottom-heat, or they will only form shoots which soon turn black and perish. In the nursery such plants as *Rhus*, *Calycanthus*, *Paulownia*, and *Sophora* are propagated from roots of the thickness of a pencil to that of a thumb; they are cut into six-inch lengths and put in pots, cutting-fashion, and placed under glass in slight bottom-heat.

Layering is a convenient way of propagating in the nursery, as it may be done at any time after the wood is ripe. It is commonly employed for Carnations and Lapagerias, and may also be applied to *Asparagus plumosus* when all the foliage has been cut off.

It must not be forgotten that in many cases you cannot get cuttings early enough unless stock plants are prepared expressly for that purpose.

PROPAGATION BY GRAFTING is one of the most important methods of artificial propagation. The subject in itself is so wide that I cannot hope to be able to do it justice.

The objects of grafting are :—

1. To save time: where you would otherwise have to wait ten years before getting fruit, through grafting you may get the result in two or three years.
2. To keep sorts true.
3. To alter the habit of a plant, *i. e.* dwarfing.
4. To propagate plants which are difficult to strike and do not seed.
5. To improve the flavour and colour of fruits.
6. To enable us to grow plants on soils and in climates which, under ordinary circumstances, would be unsuitable for them.
7. To grow several kinds on one plant.
8. To renew the fertility of old trees.
9. To repair imperfect wall-trees.

There are four kinds of grafting, namely :—

1. *Inarching* : where the scion is a rooted plant.
2. Where the scion is a cutting, as in splice, saddle and cleft grafting.
3. Grafting on roots.
4. Budding.

Both stock and scion should be in perfect health, and the latter properly ripened. Season and weather must be carefully studied, and also the relationship of stock and scion.

Stocks in pots, such as *Rhododendron* and *Camellia*, must be thoroughly soaked before being worked. The grafts must be well attended as to airing, shading, and moisture.

GRAFTING ROSES in winter.—The stocks, which, by the way, should be seedlings, must be potted previously, and placed in a temperature of about 60°–70°, to induce quick root-action and soften the stem.

FLOWER-FERTILIZATION and SEED-GROWING are operations which the propagator has very often to perform. Very often one plant out of a large batch will show a character distinctly different and superior to the rest, or it may have proved successful as stock for a certain valuable fruit, or even be a common weed which through some abnormal development may be turned to useful account as a vegetable. In all these cases it should be the aim to fix these peculiar characters and propagate the plants for general use. We owe most of our vegetables to selection of this kind.

If a plant which is planted out be required to bear seed, it should be lifted and potted. The soil for such plants should not be too rich, or they would grow too vigorously, flower late, and have very little chance of ripening their seed. On the other hand, if the soil is too poor, the seeds are produced before sufficient foliage is developed for the supply of nourishment to the seed.

Some plants, owing to the peculiar structure of their flowers, are not self-fertilizing. These must be artificially fertilized, using, if possible, pollen from another plant.

CROSSING and HYBRIDIZING is usually the work of the propagator, and is most pleasant and interesting work. Only good healthy plants should be used as seed-bearers ; be careful in the selection of male and female parents as to colour and shape of flowers, habit, etc. In double flowers, such as *Roses*, you can often strengthen the pistil by removing some of the inner petals before the flower expands. To cross double flowers, select pollen from semi-double blooms the anthers of which have become more or less petaloid.

Flowers which are self-fertilized, if wanted for crossing, must have the anthers removed before the flower expands—an operation requiring some care. In some plants the pollen is ripe before the flowers open, and in others not until the petals have faded. Some pollen can be preserved for a considerable time. The stigma also matures variously ; it is therefore best to make sure and pollinize it several times.

Propagation may be called by far the most important and responsible

of the gardener's duties; men engaged in this work should have a genuine love of it, be reliable, patient, and methodical. Careful observation of the smallest details, and thoughtful execution of even the simplest operation, are most essential to success. Everything should be clean and sweet—pots, crocks, stages, and glass—inside as well as outside. Cleanliness is half the success in plant-growing. The plunging material in the propagating cases—fibre, or whatever is used—should also be kept as sweet as possible. Decaying wood often breeds fungus; and once you get fungus into the cases, it is difficult to get rid of it. The water-tanks also should be cleaned out now and then. I should like here to recommend to you a hot-water tank such as we have in the pits at Kew. This tank is in itself a most pleasant and exceedingly interesting study to me. If you have any cuttings which refuse to strike, try them in warm water. *Bambusa striata*, with which I had failed so often, was at last struck in the tank. Many young Palms we have saved by placing them on warm water; also bulbs, ferns, and many other plants we have tried with success. Nothing, as far as I can remember, has yet failed. We hope to succeed in this way in growing that rare Aroid, *Montrichardia arborescens*, which Mr. Morris found doing so well near water in the West Indies.

I must not omit to recommend the use of water of the proper temperature and perfectly clean, especially for syringing. I do not think bottom-heat is so necessary for propagating as some gardeners seem to make out.

Be careful not to overshadow the propagating houses or frames. Proper ventilation is likewise of the highest importance, especially in spring, when everything is waking up; and the plants should have every advantage of the sunny and warm days of early spring.

KEW BRITISH BOTANY CLUB.

WITH a view of inducing the gardeners employed at Kew to pay some attention to drying plants for herbaria, and also to acquire a knowledge of British plants, the Assistant-Director, Mr. Morris, offered two prizes for the two best dried and correctly named collections of British plants, to be collected between the middle of April and the end of September in 1892.

This led to the formation of our B. B. C. We arranged to have an excursion every Monday evening to places in the immediate neighbourhood of Kew. In addition to this the Director permitted us to arrange for four afternoon excursions to well-known botanizing fields some distance away from Kew.

The various members of the Garden and Herbarium Staff kindly accompanied the parties as conductors, both at the half-day and the evening excursions.

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The half-day excursions were as follows :—

May 28th, to Guildford, with Dr. Stapf and Mr. Massee.

June 16th, to Chislehurst, with Mr. Rolfe.

July 6th, to Wimbledon Common, with Mr. Baker.

July 21st, to Reigate hills, with Mr. Brown.

At this last excursion we were accompanied by Dr. Bossey, a Reigate botanist, who afterwards invited the party to a most substantial tea.

The average attendance at each excursion was 23.

The Prizes were awarded as follows :—

1st Prize: Bentham and Hooker's 'Illustrated Flora of the British Islands.' Mr. H. J. DAVIES.

For the second Prize two members gained an equal number of marks, and were therefore treated alike :

2nd Prize: Hooker's 'Student's Flora.' Mr. ZIMMER.

Ditto: " " " " Mr. NEWSHAM.

A 3rd Prize: 'Our Country's Flowers,' by W. J. Gordon, was awarded to Mr. SMITH, whose collection, though a small one, showed much skill in mounting.

THE CRICKET CLUB.

THE Kew Gardeners' Cricket Club probably does more to keep the gardeners in health than the official medical officer. A game on the green in the evening, after ten hours' hard work in a tropical house, does good in several ways. The present *régime* recognizes this, and the Club is now allowed to arrange two half-day matches every season with the Village Club. These are played on Saturday afternoons, and are now classed among the local events of the summer. The usual evening-matches, such as North *v.* South, Public Departments *v.* Private Departments, Smokers *v.* Non-Smokers, are played. On the whole the Club is in a most flourishing condition, and some of the members play good cricket. Last year we succeeded in beating the Village Club in both matches, the scores being :—

Kew Gardeners	161		Kew Village	74
" "	93		" "	49

OFFICERS, 1892.

Captain Mr. W. N. WINN.
Secretary Mr. C. H. CURTIS.
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EARLY REMINISCENCES OF KEW.

By Mr. W. BOTTING HEMSLEY, F.R.S., etc.

WITH the exception of Mr. J. R. Jackson, the Curator of the Museums of Economic Botany, two of the Museum porters—J. Haynes and G. Hillary, and one fireman, J. Horwill, there is not another person now on the Garden books who was on them when I entered Kew, which happened during the administration of the first Director and the first Curator after the Gardens had been made public; yet the establishment has only quite lately lost the faithful services of the universally esteemed W. Granger, who antedated me by ten years. But I entered as a “young gardener,” and I believe there is no other “young gardener” of that date now left at Kew. Perhaps, therefore, my early reminiscences of the place may not only interest the present successors of those who filled the various posts in those days, but may also awaken pleasant memories in the minds of some of the, alas! too few, survivors of that period under whose eyes the following lines may chance to appear.

It was on a beautiful, bright sunny morning in the early days of September 1860 that I first beheld Kew—the paradise, as I had pictured to myself, of the botanist, and the home of vegetable forms from all parts of the world. The season had been wet and cold during the whole of the spring and summer; from May to the end of August the mean temperature had been about $5^{\circ}\cdot5$ below the average, with something considerably above the average rainfall; but this had not injuriously affected the arboreous vegetation, and I was much struck with the pretty appearance of Kew Green. Kew was still a village, and there were large elms and horse-chestnuts from the pond on the eastern side to the Garden entrance—in fact, nearly all round the Green; but the limes on either side of the central road were then quite small. Of course the Green was at its greenest; for in those days there were no great bank-holiday crowds to trample it bare. Looking into Kew from the crown of the bridge, and up and down the river, I was delighted with the views around me; but naturally I did not tarry long in admiration of them, because there was a great goal before me. I had been instructed to present myself at the Office of the Curator, and thither I hastened, though not without some trepidation; for I was barely seventeen years of age, and overestimated the qualifications necessary to obtain employment in the Gardens. Suffice it to say that, after some interchange of letters, Sir William Hooker had agreed to take me, on the recommendation of Mrs. Eardley Hall, daughter of Mr. W. Borrer, a well-known British botanist, although I was under age.

I found Mr. Smith, or “Old Jock,” as he was generally called, seated in a small dark room, with a shade over his eyes; for already the premonitory symptoms were upon him of the perpetual darkness which soon followed. He questioned me as to what I could do in short jerky

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sentences, and with an accent quite new to me; and he was evidently amused at my botanical aspirations. Nevertheless, he was exceedingly kind, though rather abrupt in his manner. He arranged for a porter to fetch my luggage from the railway-station and accompany me in quest of lodgings, to see that I was placed with respectable people. But this very important step had to be deferred until the afternoon, as I had to pay my respects to Sir William Hooker and deliver to him a letter from my patroness.

Sir William received me with such a pleasantness of manner, and with so much consideration for my evident nervousness, that I soon forgot it and opened my heart to him quite freely. Sir William personally conducted me through a portion of the botanic garden, pointing out various objects of interest; and when he dismissed me it was mid-day.

Soon after this I was startled by a voice calling to me through a shrubbery. It proved to be the genial and amiable C. W. Crocker, concerning whom I shall have more to say anon. He had heard of me, guessed who I was, and invited me into his cottage to join him and his wife at dinner. I knew nothing of his position; but he was so sympathetic and kind that I gladly accepted, at the same time begging to be excused in time to keep an appointment with Mr. Smith at one o'clock. Crocker was one of the foremen; furthermore he was a Sussex man, and I felt sure that he would help me if I showed myself worthy of his help.

The meal over, I hastened to meet Mr. Smith. I was quite punctual, and he was still in his office. He made some curt inquiries as to how I had spent my time; and, on learning that I had dined with Crocker, he as curtly told me that he had intended that I should dine with him, and dismissed me with the injunction that I should report myself at the office the following morning.

The next business was to find a lodging—not so difficult a task then as now, when everybody makes tea and much more profit thereby than he could out of poor lodgers. We went from house to house, and at length I succeeded in finding a room within my means; and, as I learnt that two gardeners occupied another room in the same house, I thought I should be able to make myself happy, and I was able, thanks to the kindness of my fellow-lodgers, J. Morrison and W. Coomber, who often invited me to share their fire with them. Neither of these men have I seen since they left Kew; but the latter I have been informed, since writing the foregoing lines, has long been Curator of the Botanic Gardens, Regent's Park.

The next morning I made the acquaintance of Mr. McLeod, the Assistant Curator, a man of firm and somewhat stern character, though of a kind and discerning nature. He introduced me to Eastwood, the foreman of the Herbaceous department, a hard, unsympathetic Yorkshireman, who, so far as I was concerned at least, made his subordinates

feel that there was a wide gulf between him and them. Still, I was not unhappy, for something new was constantly coming under my observation. At this season the principal work was cleaning seeds, and afterwards making them up into packets for distribution. "Old Grey," the seed-collector, presided over the former operation, and enlivened the proceedings by his almost ceaseless talk. He knew the history of the past and present gardeners better than anyone else, and was unequalled for his skill in extracting particulars from fresh comers. Earlier in life he had been to Australia, where he was unsuccessful in business. Returning to this country, he was given the post of seed-collector, which he retained until a few years ago, when he was pensioned, a condition he did not long survive.

I will now relate my first impressions of Kew, for they are as vivid as ever. Having been accustomed to business habits, I was much struck by the leisurely, I might almost say dignified, movements of the workmen, many of whom were old men, some very old men. Nobody was in a hurry, and this seemed to be in keeping with the traditions of the place. The gardens themselves offered me such a wealth of variety, that I was overwhelmed, and began to wonder whether I had not mistaken my calling. I remember particularly well how puzzled I was with Roetz's Mexican pines. There were dozens of them in pots, and nearly all bore different names. In like manner the asters and golden-rods in the herbaceous grounds filled me with bewilderment, for the names were different, though, to my unpractised eye, many of the plants seemed to be the same. I was in despair, for I thought I should never be able to master such subtle distinctions. But my mind was in due time set at rest on this point, and in a manner quite unexpected by me, because I had not supposed it possible that a plant at Kew could bear a wrong or fictitious name! The solution was this: Roetz had given a different name to the seeds of each tree, or thereabouts, from which he had collected; and the strong-growing asters and golden-rods had driven out and usurped the places of the weaker ones, and were there under false names.

I have already alluded to the atrocious weather that prevailed all through the spring and summer of 1860. Its effects at Kew, though not so bad as on stiff heavy soils, were sufficiently apparent, and there was little to attract my attention in the flower-garden. Commencing at the Grand Entrance, the "Old Arboretum" was still full of fine trees, but the Cedar of Lebanon, Turkey Oak, and False Acacia, which still overshadow the Temple of the Sun, were even then the noblest of the noble. It would occupy too much space to recount how one fine tree after another was prostrated by storm or broken down by snow, and how rapid the destruction was after it had once commenced.

Proceeding towards the "Orangery," now the Museum of Timbers, I was much interested in the fine specimens of Coniferæ and other sub-tropical plants from Australia, New Zealand, South America, and various

other regions. They were in huge tubs, dotted about on the lawns, but already the operation of removing them to their winter quarters in the Orangery had commenced. This toilsome process had not again to be repeated to so great an extent, as the octagons of the new Temperate house, then in course of construction, were completed and filled with plants the following autumn. Now for my impressions of the collections under glass, though I will not attempt to pass the whole in review. It is with some diffidence that I venture, even at this remote period, to set down my opinions on the cultivation of the plants, because my judgment must have been greatly biassed by my previous training. In my experience an unhealthy deformed plant was not allowed to encumber a house. At Kew, especially among the hard-wooded plants, in some of the houses I saw scarcely a marketable plant—I do not know how otherwise to put it. The collection of heaths, too, which had been enriched some years previously, I believe, by a munificent gift from the Duke of Bedford, was slowly but surely going. Among the larger Australian and South-African Proteaceæ etc. there were still some fine specimens in no. 1, which was then a “conservatory”; but few of these survived their later removal to the new Temperate house. In the “New Zealand and Coniferous House,” as it is styled in the Guide of that date, there were a few really good plants amid a crowd of disreputable representatives of their species: they were waiting for expansion in the new Temperate house. As the “New Zealand House” in question has long disappeared, a few words concerning its history may be given. It was situated to the west of the block of houses of which the recently rebuilt temperate fern-house forms one, and the eastern end, on the north side of which there were gardeners’ rooms, was covered by the *Wistaria* now trained on a circular trellis. Built by Sir W. Chambers in 1760, it had been the show-house of the Gardens, and, for its date, was a house of stately dimensions, being 114 feet in length and 20 feet high at the back, for, like most or all of the older houses, it was a lean-to. It was in three divisions, the central being the largest, and it was heated by flues. When the Temperate house was completed, this venerable structure was pulled down, and the only relic of it now is the *Wistaria*. The present “greenhouse,” the no. 4 of to-day, was the “Australian House” then, and then, as now, was one of the most attractive of the cool houses in spring.

Another failure of that year was the Victoria, if my memory serve me faithfully, and the Lace-leaf (*Owirantra*) put forth leaves only a few inches long. But there were many things that excited my admiration and even wonder. The Palms, the Ferns, and the Succulent Plants were to a great extent a revelation to me. Then there were the large lean-to stoves on the eastern side of the garden filled with interesting subjects. No. 15, at the back of the old Museum, contained a mixed collection; and to the east of that, abutting on the old seed-room and potting-sheds, and running out to the wall skirting the road, was an orchid-house. To the northward, and partly within the present enclosure, stood no. 19, in

which was a good collection of aroids, etc., and behind it a temperate fern-house. A rich collection of species of *Begonia* I had almost forgotten to mention. They were in the no. 5 of that day, a small span-roofed house situated near the west end of the top of the present T-range.

I have already mentioned the names of Crocker and Eastwood as foremen. In those days there were more permanent foremen than now. James Walker was foreman of the Palm-house; W. H. Gower of the Orchid-houses etc.; Craig of the Flower Garden; and James Aldridge of the Greenhouses.

The Pleasure Grounds, I should add, were under a separate Curator, and John Smith accompanied the Director and the Assistant Director, Dr. J. D. Hooker, in their daily rounds only as far as the wire fence; then faced about and limped back. It was rumoured that he was very careful not to pass this line. Mr. Williamson had charge of the Pleasure Grounds, but I never knew much of him.

Taking the young gardeners of that date as a whole, they were, perhaps, equal to any other year's men up to the present date. Their subsequent records will prove this assertion, I believe. Names that occur to me are: George Stanton, Henry Prestoe, Richard Oldham, James Gammie, George Batcock, Abraham Hubbard, William Ferguson, William Foden, and William Coomber; all men who have made a mark. I have not purposely omitted any name, and I daresay there were others who were equally as meritorious as those mentioned, and who may have been equally as successful in after-life. There were also several good Germans at that period, notably H. Walter, a clever draughtsman, now, I believe, head-gardener to the Empress Frederick; George Egertorff, who gained the first prize for botany at Kew in 1861; and finally E. Goeze, with whom I later on shared apartments, and to whom I am greatly indebted for what knowledge I possess of modern languages. He had enjoyed a college education, and we studied systematically together for two or three years to my very great advantage. But previous to his coming to Kew I studied more especially with Oldham, Stanton, and Prestoe.

The facilities for study and the means of instruction for gardeners were not quite equal to what they are at the present day; yet those in earnest had no cause for complaint in the matter. Provided the foreman of a department was agreeable, and your own foreman considered that you were deserving of the privilege, the Curator would issue you a ticket, available for a fortnight, entitling you to spend half-an-hour each morning in any department you might select for purposes of observation and note-taking. There were lectures on botany and a variety of other subjects, delivered without fee or recompense by Prof. D. Oliver, who had about that time succeeded Dr. Lindley at University College, and who also held the appointment of Librarian at the Herbarium at a mere nominal salary. These lectures were given in a large room in the Herbarium buildings, now a part of my official residence. There was

also a reading-room, open every evening, containing a very small though very useful selection of books. This was a great boon, beyond the opportunities it afforded the young men for improvement, as it was a warm and comfortable resort for those who could not afford a fire at their lodgings; and that meant nearly all of them, for the wages then were only twelve shillings a week! The reading-room of that day is now the Assistant-Director's Office; and the small room between that and the Director's Office served to accommodate any overflow that might and did occasionally occur.

During the winter of 1860-61 Professor Oliver lectured to us on chemistry, electricity, thermometers, and barometers, etc., illustrated by experiments; but not less interesting were the letters he read to us from Gustav Mann, Dr. Welwitsch, Spruce, Dr. Seemann, and other botanical travellers. One of the great excitements of the day at Kew was Baikie's Niger Expedition and the death of Charles Barter, a Kew gardener, whom Gustav Mann had succeeded as botanist to the expedition. Mann was more fortunate than his otherwise equally successful predecessor, but even he suffered from many bad attacks of fever. Now he was retired, after serving nearly thirty years in the forestry department of India. Returning to Welwitsch, I think it was not till the autumn of 1861 that we received his description of the singular Gnetaeous genus, which Dr. Hooker named after him and very elaborately described and illustrated in the 'Transactions' of the Linnean Society and in the 'Botanical Magazine.' Early in 1861 Dr. Hooker* delivered three lectures before the foremen and gardeners on a tour in Syria he had made the previous year, accompanied by the incomparable Daniel Hanbury, of ever-lamented memory. They visited the Cedar groves of the Lebanon, and Dr. Hooker gave very full statistics of the numbers and sizes of the trees. I still have a tolerably full and accurate report of those lectures, jointly drawn up by Richard Oldham and myself, though it owes much more to him than it does to me, for he was already a facile and practised writer.

I may here add that the weather continued cold and wet to the end of 1860; and the cold culminated in sharper frosts than have since been experienced here. Twice, as I learnt at the time, the mercury fell below Fahrenheit's zero, and on reference I find that it is so recorded for Chiswick. There have been several hard frosts of much longer duration since, but none so intense. Great damage to vegetation followed throughout the country; but Kew, probably on account of the gravelly subsoil, did not suffer so much as might have been expected. Nevertheless, there was a big death-roll. All the fine specimens of *Pinus insignis* and *Cupressus macrocarpa* succumbed, and numerous small plants were killed.

After serving a few months under Eastwood I was transferred to Crocker's department; and I was successively under George Batcock, in the propagating pits, and Abraham Hubbard, in no. 15; and then I went

* Now Sir Joseph Hooker.

to assist Richard Oldham. This was a happy and profitable time; and I do not think I ever felt discontented, though, like my fellow lodgers, I had nothing but bread and butter for dinner four or five days a week! In February, I believe, in 1861, Mr. Smith gravely informed me, with many warnings and admonitions as to the evil effects it might have on my career, that there was certain work to be done at the Herbarium which Sir William Hooker thought I might be capable of performing. Was I willing to try? Wasn't I! But my eagerness to escape from the garden seemed to vex the old gentleman, and he repeated his arguments against my botanical aspirations; told me it was only a temporary arrangement; that it was folly on my part to be devoting so much time to a subject that would never yield me bread and cheese, and, finally, why was I not content to be a "gairdner"? However, I went to the Herbarium, and there, under the kind, clever, conscientious Allan A. Black, who, I believe, began active life in the gardens at Dunkeld, I made satisfactory progress.

Meanwhile important events had occurred in the Gardens, some of which deserve recording here. The raising of the magnificent spar of the Douglas Fir, *Pseudotsuga Douglasii*, in the Pleasure Grounds caused no little excitement. This year, too, the present reading-room was built with rooms underneath for two of the foremen, displaced, I believe, by the demolishing of the centenarian "New-Zealand" house and the rooms at the back. Indeed, building operations at Kew were numerous in 1861. The Curator's office was enlarged, and an annexe was built on to the Fern-house to accommodate tree-ferns. One important event I had almost forgotten, namely, the raising and propagation of various kinds of Cinchona for India from seeds and plants collected in the forests of the Andes by Markham, Spruce, and Cross, a former Kewite. A small house had been built for the purpose. Crocker had charge of this important work, and I well remember the anxiety it caused him.

Everything went well at the Herbarium until the autumn of 1862, when I was most unexpectedly told that I should have to return to the garden. Up to that time I had been paid as a young gardener, and Mr. Smith insisted upon having garden work out of me. I was placed in charge of no. 15 stove, recently vacated by a German, whose name I in charity withhold, for he had sadly neglected the plants, which were teeming with mealy-bug and scale. I made a list of the plants in this house, and this list I still possess; it contains 352 species belonging to 215 genera. Soon after this I returned to the Herbarium, though I did not receive a definite Civil Service appointment until June 1865. During these five years many changes had taken place, for, in addition to the normal movements, infirmity, disease, and death had removed a large number of the permanent staff. The Director, Curator, Assistant Curator, two, at least, of the foremen, and the Curator of the Herbarium had been replaced. Richard Oldham, who was sent out to Japan as botanical collector, died from dysentery at Amoy, in China. When A. A. Black resigned on account of hopelessly bad health, Prof. D. Oliver was

appointed Keeper of the Herbarium and Library; my position was improved, and Alexander Smith, son of the ex-Curator, and the first Curator of the Museums, was made clerk. He had been an invalid really for years, but he was supposed to be a little better, and he was anxious to be doing something, and the authorities were desirous of reinstating him to some extent. Poor fellow, he survived the appointment only a few months. I was indeed sorry to lose him, as I had been Black, who went to Southern India, to the garden at Bangalore, as a last resource. His health not improving, he went to Malacca to visit a brother, and dying at sea was buried in one of the Cocos Islands, in the Bay of Bengal. In 1867 my own health broke down completely, and to my great grief I was obliged to leave Kew. After nearly seven years' absence I returned, and that is now nearly twenty years ago!

FROST IN HONG KONG.

By Mr. W. J. TUTCHER.

As we have just experienced a regular English winter in Hong Kong, perhaps a few notes upon it may interest you. It is doubtful whether such low temperatures as were registered on January 15th and the three following days were ever known in this island before. The oldest residents in the Colony, some of whom have been here upwards of thirty years, do not remember anything like it. On the 15th of January, with rain falling, the thermometer dropped to 35° F., at sea-level. This was exceptionally low for Hong Kong, but worse was to follow. On the 16th, with rain falling occasionally during the day, the thermometer at sea-level touched its lowest point, which was 32° F. At about 10 A.M. on this date, one of the most brilliant spectacles ever seen in this, or any other part of the world, presented itself to view. From Victoria Peak, 1800 ft. above sea-level, where the temperature must have been at least 28° F., down to about 400 ft. above sea-level, the leaves of the thousands of pine-trees which clothe the hill-sides were encased in beautiful, transparent ice. At 4 P.M. there was ice at the Peak an inch thick, which, combined with the rugged scenery, reminded one very forcibly of Scotland. Telegraph-wires were broken in several places with the weight of the ice upon them, and in some instances the cast-iron poles also.

Considerable damage has been done in the Botanic Garden, the highest altitude of which is about 400 ft. above sea-level. Orchids have suffered severely, in fact the orchid-house is a picture of desolation. Ferns have come off better than most things, very few having been killed. Amongst those that have suffered are several indigenous species. I enclose a list of plants, indigenous and exotic, that have been either killed or injured in the Gardens. Small plants generally suffered worse than large ones. For instance, plants of *Malpighia coccifera* in 6-in. pots were killed, whilst large specimens planted out were uninjured. Again, small plants of *Faradaya splendida* lost all their leaves, whilst a

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large plant was not affected in the least. There are only two small glass-houses in the Gardens, so that it was impossible to get any great number of plants inside. We had to carry the majority of them to sheltered positions, and cover them with straw and rush mats. The temperature in the houses was kept up to about 40° F., by burning kerosene lamps inside and by covering the roofs with straw outside. In spite of this, many Anthuriums, amongst other things, were killed. *Anthurium Veitchi* and *A. Scherzerianum* proved the two hardiest, as they are apparently unhurt. *Aristolochia gigas*, var. *Sturtevantii*, received from Kew last year, and planted out against a wall facing north, is unhurt, although its only protection was a mat. *Aristolochia elegans*, quite unprotected, has stood all right. Several Begonias suffered, but the Rex section is none the worse.

The most noteworthy of the Palms which did not suffer are *Washingtonia filifera*, *Archontophoenix Alexandrae*, *Oreodoxa regia*, *Martinezia caryotefolia*, *Licuala horrida*, *Caryota Rumphiana*, and *Howea Belmoreana*. Among Cycads, *Cycas siamensis* and *Bowenia spectabilis*, wholly unprotected, showed no signs of suffering. Indigenous Orchids under cultivation in the Gardens are unhurt, but at 1330 ft. up *Pholidota chinensis* was killed, whilst *Ceologyne fimbriata*, growing by the side of it, is as healthy as ever. Many plants which under ordinary conditions are evergreen are at present leafless, but the majority of them will no doubt be all right again when the warm weather comes.

THE HAKGALA GARDEN.

By Mr. W. Nock.

THE Hakgala Garden is the mountain branch of the Botanic Gardens of Peradeniya, Ceylon, and is situated at an elevation of 5581 feet above the level of the sea.

As the highest mountain in Ceylon, Pidurutalagala, is 8296 feet high, the climate varies very much both as regards temperature and moisture. Anyone who can afford it has here a chance of living in a climate of anything they like between 90° Fahr. in the shade in the low country, and 25° Fahr. on the grass in the highest locality, with an annual rainfall varying from 250 inches at Padupolla, in the Western Province, to 30 inches at Hambantota, in the Southern Province.

The average mean temperature of Hakgala is 62° Fahr.; the maximum being 78° Fahr., and the minimum 35° Fahr. I have, however, registered as high as 150° Fahr. in the sun, and as low as 25° Fahr. on the grass. This latter reading has only occurred once in my experience of eleven years, viz., on February 12th this year, lasting only a few hours. Very little damage was done by it. The average rainfall here is 90.00 inches, but the average number of rainy days is as high as 204. Occasionally we get droughts of from three to four weeks' duration.

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These generally occur at the beginning of the year. Heavy rains fall, usually, during the last three months of the year. I have registered as much as 33·77 inches in one month, December 1877. We have our share of wind too, June and July being the windiest months. The calmest months are December, January, and February, but we never get much wind until the burst of the monsoon in May, it then continues more or less until October. Notwithstanding heavy rains and strong winds, this is, without doubt, one of the healthiest climates to be found in this or any other country. The surroundings, too, are perfectly lovely. At our back—the south-west—stands the grand twin mountain of Hakgala, with its almost perpendicular face, covered for the most part with forest-trees and scrub; but in places quite bare and overhanging. The top of this mountain reaches to a height of 6981 feet, or exactly 1400 feet above the Garden; and as the intervening space is covered with thick forest, it forms a splendid background. To the left, or north-west, is a mountain nearly as high as Hakgala, with a deep gorge between, the whole being covered with beautiful forest, thousands of acres in extent. The rich deep claret colour of the young foliage of the *Eugenias*, which occur plentifully in this forest, often dotted with masses of the white flowers of *Catophyllum Walkeri* and other trees, and the numerous and ever-varying shades of green, are special features in the scenery.

Looking over the Garden, in front, from the north right round to the west, the eye rests on a series of mountains: those in the foreground steep and undulating, covered with patana, or grass-land, with patches of forest here and there, the hills rolling down to 3000 feet, where the paddy-fields are visible, five or six miles away, their sites being marked by silvery streaks, caused by the sun shining direct on the water which irrigates the paddy-fields after sowing, or, later on, by the rich golden hue of the ripening corn.

Monkeys, leopards, elephants, and plenty of Sambur deer and other smaller game inhabit the forests round about. The leopards occasionally take a calf or stray goat or dog that comes in their way. The Sambur deer give trouble by eating off the tops of Fuchsias, *Habrothamnus*, and other shrubs. The other animals named rarely do the Garden any damage, but hares and porcupines do. Hares go in for almost everything we grow: Carnations, Iresines, and Verbenas they are particularly fond of, and this year they have taken a liking to *Alternantheras*! Porcupines pay special attention to all bulbous plants, apparently preferring *Liliums*.

The Garden contains over 3000 species and varieties of plants, having representatives from many parts of the globe. Growing side by side, or within a few yards of one another, are such things as *Cinchona* and *Heliotropium* from Peru; *Cryptomeria* from Japan; *Musa Ensete* from Abyssinia; *Musa* and *Stillingia* from China; *Morœa Robinsoniana* from Lord Howe's Island; *Gentian*, *Daisy*, *Violet*, *Myosotis*, and *Primrose* from Europe; *Cobœa* and *Opuntia* from Mexico; *Acalypha* from Fiji;

Fuchsias from Chili; Tacsonias and Passifloras from Brazil and North Grenada; Carica from Colombia; Franciscea, Yucca, and Bocconia from the West Indies; Ceroxylon from South America; Phœnix from Arabia; Calla and Mesembryanthemum from the Cape; Salix from the Caucasus; Cupressus from California and Himalaya; Dammara from Queensland; Sterculia from New South Wales; Phormium from New Zealand; Olearia from Tasmania; Myrtus from the Mediterranean; Aberia from Africa; Amygdalus and Punica from Persia; Neillia from North America; Callistemon and Eucalyptus from Australia; Pimenta from Central America; Eugenia from Malaya, etc.

The fernery, which is partly natural, contains about 30,000 plants of ferns, Begonias, etc. Some of the tree-ferns have stems eighteen to twenty feet high with a spread of fronds of from twelve to eighteen feet.

There are two pieces of ornamental water, three summer arbors, herbaceous and rose gardens, nurseries, and over two miles of paths and drives. The borders and shrubberies contain many very interesting trees and plants.

We have also a glass propagating-house and two propagating-pits, and the staff consists of a Singalese foreman, two educated Singalese young men as students, who are being taught general horticultural work, and about twenty-six Tamil and Singalese labourers.

The extent of the enclosure in which the Garden is located is 550 acres. It is six miles from Nuwara Eliya, the sanitarium of the island, and is visited by persons from all parts of the world.

NOTES FROM ST. VINCENT.

By Mr. H. POWELL, Curator of the Botanical Station.

I LEFT Kew in April 1890, and sailed from Southampton in the good ship 'DON' on May 1st, my destination being this island, to take charge of the botanical station here.

The passage was uneventful until Barbados was sighted on the morning of the 12th. At first sight Barbados appeared to be a low swampy place; but on nearer approach it was at once seen that the island was in a thorough state of cultivation, and dotted over with cane-mills. The Harbour or Roadside teemed with steamers and numerous other shipping. On landing one appeared to be in dreamland, so novel were the sights that met the eye almost at every turn. Many of the plants which are watched over and attended to so assiduously in the hottest houses at Kew were here growing in the open air in rank luxuriance and flowering profusely.

The run to St. Vincent, a distance of 95 miles westward, was accomplished in about nine hours. This island presents a totally different appearance from Barbados. The harbour is good, but has little shipping beyond the local schooners and sloops.

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Kingstown, the capital, with its long line of red-roofed houses stretched along the beach, looks very pretty viewed from the sea, and the scenery, which is said to somewhat resemble that of Dominica, is simply enchanting. In the centre, but standing some 3 or 4 miles back, is Mount St. Andrews, 3400 feet high and clothed with vegetation. This and several other high mountains form a truly majestic background to the town.

The Botanic Garden lies in a hollow a few hundred yards from the lower end of the town, and is approached by a good road. An interesting notice of the Old Botanic Garden by Mr. D. Morris, the Assistant Director at Kew, was published in the 'Kew Bulletin' for April 1892. Government House is situated at the base of the Old, and about 100 yards to the north of the New Botanic Garden, where at the present time there is a good collection of plants. Government House commands a fine view of the harbour and a number of the small islands forming part of the chain known as the Grenadines.

The land and garden immediately surrounding Government House has recently been transformed from a waste into a veritable "Garden of Eden." Such old favourites as *Gardenia*, *Stephanotis*, *Iwora*, *Rondeletia*, *Croton*, *Bougainvillea*, and many others grow here amazingly in the open air, not the small plants one is accustomed to see at home, but large shrubs or trees covered with healthy highly-coloured foliage or with plenty of blossoms during the greater part of the year.

The Curator's Lodge resembles a Swiss chalet, and adds considerably to the appearance of the garden. Immediately behind this lodge is a clump of very fine Mahogany trees, interspersed with a few Teak trees of considerable size, but which do not appear to be so much at home as the mahogany. In front is a Nutmeg, and farther down a clump of the Royal Palm and a few specimens of *Attalea Cohune*; on the right are Cinnamon trees, and to the left Clove, Mango, and Cashew trees. The magnificent Cannonball trees growing by the side of a tiny rivulet produce annually in April their peculiarly formed and gorgeously-tinted flowers, followed by fruits which greatly resemble cannon-balls and are objects of great interest to visitors. The celebrated Mangosteen of the East Indies, said to be the most luscious of all tropical fruits, grows luxuriantly here.

The garden is specially indebted to Kew for many plants, seeds, and cuttings. Amongst them I might specially mention the many varieties of *Vitis vinifera*, cuttings of which, through careful packing, arrived in splendid condition, and, with few exceptions, soon rooted freely. Numbers of these vines have since been distributed at a small charge throughout the island, and have produced fruit in from a year to a year and a half after planting. A number of the Eucalyptus trees, raised from seed received from Kew, are now upwards of 50 feet in height, and appear to be doing well. The Charlotte Rothschild Pineapples received from Kew are also doing well, and will prove a valuable addition to the Pines cultivated here.

Fifty selected kinds of Rose have lately been imported and are now making good progress. Roses are in great demand here, such kinds as Niphetos, The Bride, Marie Van Houtte, La France, W. F. Bennet, Paul Neron, Maréchal Niel, and Duke of Edinburgh flourishing well, being rarely without flowers.

The Lion of St. Vincent is the volcano where an eruption took place so late as 1812, causing the destruction of several estates. The Rev. L. Guilding, in his book on the Old Botanic Garden, published in 1825, in speaking of Dr. Anderson, a former curator, says:—"In his travels over our mountains in 1784 he discovered the crater of Morne Soufrière, which probably exceeds in magnitude any other volcano in the world. An account of this volcano, which seems to lead into the lower world, was published by the Royal Society in their 'Transactions' for the year 1785."

One bright moonlight night in November 1891 I went with a party of excursionists to view this volcano. Our mode of travelling was partly by boat. Early the next morning we began the ascent of the mountain, a height of 4048 feet. The way at first was fairly easy. It was interesting to notice how the vegetation decreased as we ascended, till gradually we left the tall trees behind and came through groves of Tree-fern (*Hemitelia*) and *Oreodoxa oleracea*. The vegetation at the summit consisted principally of Soufrière berry (*Weinmannia pinnata*), Blechnums, *Charianthus coccineus*, *Lisianthus frigidus*, and a Selaginella. The crater is nearly circular and is upwards of a mile in diameter. Deep down, 1200 feet below the summit, is a lake, the waters of which are of a peculiar creamy greenish hue, which colour when the mists float over its surface is constantly changing, but is never ruffled by the wind. The sides are very steep, and in places are covered with brushwood. The crater I have but faintly described is known as the "old crater." The new one, blown out in 1812, is two miles farther on. The two craters are separated by an exceedingly narrow strip. The top of the mountain is at times enshrouded in mist, and on this occasion rain came down and drenched us to the skin. Our discomfort was further increased by the wiry "Black Snake" of St. Vincent showing itself at unexpected moments in the fern beneath our feet. When the mists lift a grand view is obtained. There are several dry rivers down which the molten lava flowed to the sea. The mouth of one on the windward side is fully 200 yards in width. During the rainy season the water rushes down these rivers with great force.

On the whole there is plenty to interest one in the West Indies. The Fleet stationed in this part of the world paid us a visit on the 23rd January last, and H.M.S. 'Blake' was greatly admired. Cricket is played here all the year round, and some of the natives excel in the English national game.

HORTICULTURE IN TRINIDAD.

By Mr. W. E. BROADWAY.

TRINIDAD people are ardent and enthusiastic horticulturists, and thousands of decorative plants are purchased annually by residents of the Colony, chiefly from the Botanic Gardens. Many plants and seeds are imported direct from nurserymen in New York and elsewhere in America, as well as from Europe.

Roses, Palms, Orchids, and Crotons appear to claim the greatest share of appreciation. The common white pink of English gardens, locally known as "œuillet," is in great demand for weddings. It is difficult to grow here, and consequently is uncommon; its flowers readily sell at 6*d.* and 1*s.* each. Chrysanthemums are grown, and are occasionally a partial success. Dracænas are used chiefly for defining the boundaries of estates. *Ipomœa Horsfalliæ* may be seen growing to perfection in villa gardens. The Bougainvilleas are grand. At the Botanic Gardens we have the salmon-coloured variety of *B. spectabilis* growing upon a large tree to a height of some 60 feet. It is a striking and remarkable object when in flower, as it is at the present time—March 1893. Both *B. spectabilis* and *B. glabra* are common garden-plants here. The Bread-fruit (*Artocarpus incisa*), which fails to grow from cuttings, will, if the roots are severed by a spade, throw up quantities of suckers.

Conspicuous amongst other flowering-trees are *Cassia moschata*, *Peltophorum ferrugineum*, *Cassia Fistula*, *Tecoma serrulata*, *Lagerströmia Regiæ*, and *Amherstia nobilis*. Generally, Palms are a decided success; Livistona, Areca, Pritchardia, Thrinax, Martinezia, and Cocos being worthy of note. The seeds of palms are sown in boxes, and when the young plants are about 6 inches in height they are transferred singly into pots made from the joints of *Bambusa vulgaris*. For large specimens, half barrels prepared by the cooper, oil tins, or the ordinary clay pot are used. Small palms in bamboo pots are sold at the Botanic Gardens at 6*d.* each. Ixoras are too common to be much valued. The numerous hybrids and varieties of Hibiscus, Crotons, and the delicious Governor-plum (*Flacourtia Ramontchi*) are frequently used as hedges. Maréchal Niel is the best, undoubtedly, of all the roses we have. During April and May many dozen baskets of flowers are cut from two or three plants. *Eucharis grandiflora* and the Tuberose grow easily and are popular.

Numerous kinds of Ferns are extensively grown, especially *Adiantum tenerum* and its variety *Farleyense*. *Asparagus plumosus*, *Caladium Humboldtii* (*C. argyrites*), and *Maranta zebрина* thrive well and sell readily. *Impatiens Sultani* flowers freely, especially during the dry season, and so too does *Aphelandra aurantiaca*. Fine creeping plants are *Porana paniculata*, *Antigonon leptopus*, and *Thunbergia laurifolia*. One of the honeysuckles (*Lonicera japonica*) does fairly well. *Clavija ornata*, whether grown for the sake of its bold, large, green leaves, or its clusters of pretty fruits, deserves general cultivation as a decorative

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By Mr. W. E. BROADWAY.

TRINIDAD people are ardent and enthusiastic horticulturists, and thousands of decorative plants are purchased annually by residents of the Colony, chiefly from the Botanic Gardens. Many plants and seeds are imported direct from nurserymen in New York and elsewhere in America, as well as from Europe.

Roses, Palms, Orchids, and Crotons appear to claim the greatest share of appreciation. The common white pink of English gardens, locally known as "œuillet," is in great demand for weddings. It is difficult to grow here, and consequently is uncommon; its flowers readily sell at 6*d.* and 1*s.* each. Chrysanthemums are grown, and are occasionally a partial success. Dracænas are used chiefly for defining the boundaries of estates. *Ipomœa Horsfalliæ* may be seen growing to perfection in villa gardens. The Bougainvilleas are grand. At the Botanic Gardens we have the salmon-coloured variety of *B. spectabilis* growing upon a large tree to a height of some 60 feet. It is a striking and remarkable object when in flower, as it is at the present time—March 1893. Both *B. spectabilis* and *B. glabra* are common garden-plants here. The Bread-fruit (*Artocarpus incisa*), which fails to grow from cuttings, will, if the roots are severed by a spade, throw up quantities of suckers.

Conspicuous amongst other flowering-trees are *Cassia moschata*, *Peltophorum ferrugineum*, *Cassia Fistula*, *Tecoma serrulata*, *Lagerströmia Regiæ*, and *Amherstia nobilis*. Generally, Palms are a decided success; Livistona, Areca, Pritchardia, Thrinax, Martinezia, and Cocos being worthy of note. The seeds of palms are sown in boxes, and when the young plants are about 6 inches in height they are transferred singly into pots made from the joints of *Bambusa vulgaris*. For large specimens, half barrels prepared by the cooper, oil tins, or the ordinary clay pot are used. Small palms in bamboo pots are sold at the Botanic Gardens at 6*d.* each. Ixoras are too common to be much valued. The numerous hybrids and varieties of Hibiscus, Crotons, and the delicious Governor-plum (*Flacourtia Ramontchi*) are frequently used as hedges. Maréchal Niel is the best, undoubtedly, of all the roses we have. During April and May many dozen baskets of flowers are cut from two or three plants. *Eucharis grandiflora* and the Tuberose grow easily and are popular.

Numerous kinds of Ferns are extensively grown, especially *Adiantum tenerum* and its variety *Farleyense*. *Asparagus plumosus*, *Caladium Humboldtii* (*C. argyrites*), and *Maranta zebra* thrive well and sell readily. *Impatiens Sultani* flowers freely, especially during the dry season, and so too does *Aphelandra aurantiaca*. Fine creeping plants are *Porana paniculata*, *Antigonon leptopus*, and *Thunbergia laurifolia*. One of the honeysuckles (*Lonicera japonica*) does fairly well. *Clavija ornata*, whether grown for the sake of its bold, large, green leaves, or its clusters of pretty fruits, deserves general cultivation as a decorative

plant. It is a native of the South-American continent, and probably Trinidad as well.

For flower-gardening, *Phlox Drummondii*, Verbenas, Dahlias, Asters, Sunflowers, Heliotrope, Balsams, *Dianthus Heddewigii*, Begonias (not tuberous-rooted), Zinnias, *Gomphrena globosa*, and Celosias are grown with success. Few indeed of our native plants find a place here, except *Angelonia salicariæfolia*, a most useful perennial plant. Gardenias, Tabernæmontanas, *Hypericum japonicum*, "Tree Mignonette" (*Lawsonia alba*), *Pentas carnea*, *Rondeletia speciosa*, *Plumbago capensis*, and *Petræa volubilis* are useful flowering-shrubs. *Tabernæmontana capensis* is one of the most useful plants for supplying white cut flowers, as it blossoms profusely from January to December. *Panax Victorie* is deservedly highly esteemed. Amongst Conifers, *Araucaria excelsa*, *Biota orientalis*, and *Retinospora squarrosa* when young are largely used as ornamental pot-plants.

The native Orchids of Trinidad are not so grand as the Cattleyas of Venezuela, or the equally beautiful Dendrobiums of the East. Our best are: *Oncidium Papilio*, *O. Lanceanum*, *O. luridum*, *O. ampliatum*, *Diacrium (Epidendrum) bicornutum* ("Virgin Mary," locally), *Gongora maculata*, *G. atropurpurea*, *Brassia caudata*, and *Epidendrum atropurpureum*.

Kitchen Garden.—The dry season is essentially the best part of year to grow vegetables and salads, and the same remark applies to flower-gardening. Lettuces, Cabbages, Kohl-rabi, Carrots, Turnips, French Beans, Bonavist, Black-eye and Lima Beans, Christophine or Cho Cho (*Sechium edule*), Pigeon Peas (*Cajanus indicus*), Egg Plant, Ridge Cucumbers, Parsley, Chives, Shallots, Leeks, Jerusalem Artichokes, Beetroot, Thyme, Celery (grown only for flavouring soups like Parsley), Yams, Cassava, Tania (*Calocasia esculenta*), and Radishes are the principal kitchen-garden subjects. Watercress must not be forgotten. Success is difficult to attain during the wet season, as but few salads or vegetables thrive at this time. It is often advisable to raise some kinds of vegetables and salads in boxes under the shelter of glass sashes, transplanting them into beds when strong enough.

Crickets and Parasol Ants are the worst enemies to kitchen-garden plants. Bats will sometimes attack and destroy quantities of beans in the pod. Caterpillars and other vegetable-feeders are abundant; they are, however, kept in check by two characteristic birds of the Colony: "Qu'est-ce-qui-dit" (*Lanius Pitanga*), a pretty yellow and brown bird of the flycatcher section, and about the size of a song-thrush, and the "Tick Bird" (*Crotophaga Ani*), similar also in size to the thrush, but differing widely in its parrot-like beak, black plumage, and long tail.

Artificial watering entails a vast amount of daily labour throughout the dry season in all divisions of the garden.

Closely mown and well-kept lawns, rivalling those in England, are to be found at the Botanic Garden. Many residents also pride themselves on their neatly kept lawns.

Crickets are a veritable pest, by causing bare and unsightly patches. To people coming from temperate countries the closely set, broad blades of *Paspalum compressum*, the basis of our lawn grasses, are very noticeable. The hard, wiry stems and leaves of the Bahama, or Devil grass (*Cynodon Dactylon*), also form a pretty lawn, the blades being quite fine and of a peculiar green colour. The worst of all our weeds is *Cyperus rotundus*.

The principal fruits grown here are Mangoes, Oranges, Shaddocks, Sapodillas (or Naseberry), Governor Plum, Malay Apple, Star Apple, Pineapple, and Banana, also the Sour-sop and Sugar Apple. Our fruit-trees are rarely pruned. There is an immense amount of work for the scientific fruit-grower in Trinidad. This branch of horticulture receives little attention here.

PRESENT KEW STAFF.

	<i>Entered Kew Service.</i>
Director	W. T. Thiselton-Dyer, C.M.G., C.I.E., F.R.S., Ph.D., F.L.S. .. 1875
Assistant-Director	Daniel Morris, M.A., F.L.S. 1886
Assistant (Office)	John Aikman
" "	William Nicholls Winn
Keeper of Herbarium and Library..	John Gilbert Baker, F.R.S., F.L.S. 1866
Principal Assistant	William Botting Hemsley, F.R.S., A.L.S. 1860*
Assistant (Herbarium)	Nicholas Edward Brown, A.L.S. ... 1873
" "	Robert Allen Rolfe, A.L.S. 1879*
" "	Charles Henry Wright
" for India	Otto Stapf, Ph.D. 1891
Botanical Artist	Miss Mary Smith
Attendant	John Frederick Jeffrey
Doorkeeper	Samuel Marshall
Honorary Keeper, Jodrell Labora- tory	Dukinfield Henry Scott, M.A., Ph.D., F.L.S. 1892
Curator of Museums	John Reader Jackson, A.L.S. 1858
Assistant (Museum)	John Masters Hillier
Preparer	George Badderley
Curator of the Gardens	George Nicholson, A.L.S. 1873
Assistant-Curator	William Watson
Foremen:—	
Arboretum	William J. Bean
Greenhouse and Ornamental Department	Frank Garrett
Temperate House (Sub-tropical Department)	Thomas Jones
Herbaceous Department	Walter Irving
Storekeeper	George Dear
Packer	William Crisp
Clerk of the Works	E. Chart.
Assistant ditto	J. Allen

* Entered as a young gardener.

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" "	Charles Henry Wright 1884
" for India	Otto Stapf, Ph.D. 1891
Botanical Artist	Miss Mary Smith 1880
Attendant	John Frederick Jeffrey 1882
Doorkeeper	Samuel Marshall 1876
Honorary Keeper, Jodrell Labora- tory	Dukinfield Henry Scott, M.A., Ph.D., F.L.S. 1892
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Assistant-Curator	William Watson 1879
Foremen:—	
Arboretum	William J. Bean 1883*
Greenhouse and Ornamental Department	Frank Garrett 1836
Temperate House (Sub-tropical Department)	Thomas Jones 1888*
Herbaceous Department	Walter Irving 1890*
Storekeeper	George Dear 1884
Packer	William Crisp 1875
<hr style="width: 20%; margin: 10px auto;"/>	
Clerk of the Works	E. Chart.
Assistant ditto	J. Allen 1879

* Entered as a young gardener.

SUB-FOREMEN.

<i>Name.</i>	<i>Department.</i>	<i>Entered Kew Service.</i>	<i>Previous Situation.</i>
Browne, John M. . .	Label Writer . .	Oct. 1892. .	Clonard, Dundrum, Dublin, S.
Dallimore, William	Arboretum	Feb. 1891. .	Calveley Hall, Tarporley.
Davies, Henry J. . .	Orchids	Dec. 1889. .	Langford Park, Maldon, Essex.
French, Henry	Palm House	Apr. 1891. .	Danesfield, Marlow, Bucks.
French, William B.	Ferrieres	Sept. 1891. .	Pendell Court.
Milne, David	Decorative Dept.	May 1892. .	Howden & Co., Inverness.
Wakely, Charles . .	Propagating Pits.	Sept. 1890. .	The Ferns, Weybridge.

GARDENERS.

<i>Name.</i>	<i>Entered Kew Service.</i>	<i>Previous Situation.</i>
Archer, Sidney	Apr. 1893. .	Shipleigh Hall, Derby.
Arnold, George	Oct. 1892. .	Cranbourne Court, Windsor Forest.
Bass, Edward	Nov. 1888.	
Bliss, Daniel	Sept. 1892. .	Dalkeith Palace.
Cambridge, Robert . .	Nov. 1892. .	Weston Birt, Tetbury.
Chaplow, Albert W. . .	Apr. 1893. .	May's Nursery, Edmonton.
Cooper, Edward	Jan. 1893. .	Pierrepoint, Farnham.
Dawodu, Thomas	Apr. 1893. .	Jamaica Bot. Gard.
Frank, Henri	Sept. 1892. .	Sander & Co.
Galt, Alexander	Jan. 1893. .	Stanwick Park, Darlington.
Green, James	Mar. 1893. .	Trelissick, Truro.
Hardy, William	July 1892. .	Maindiff Court, Abergavenny.
Haydon, Walter	Apr. 1892. .	Cardiff Castle.
Hosking, Albert	Apr. 1893. .	Pinalvern, Penzance.
Howlett, Charles	Dec. 1892. .	Wood Lane Nursery, Isleworth.
Humphries, Charles . .	July 1892. .	Cannell & Sons, Swanley.
Hutchins, Edward	Apr. 1890.	
Jackson, Robert	Feb. 1893. .	Shugborough, Stafford.
Jones, Charles	Aug. 1892. .	Lyons, Co. Kildare.
Leigh, Ferdinand	Apr. 1893. .	Jamaica Bot. Gard.
Lunt, William	May 1892. .	Welbeck Abbey.
Mathews, Joseph W. . .	Apr. 1893. .	Botanic Garden, Manchester.
Meldrum, William	Oct. 1892. .	Daylesford, Chipping Norton, Oxon.
Miles, John W.	July 1891. .	Sussex Horticultural Co.
Negus, Edward	Feb. 1893. .	Pennell & Sons, Lincoln.
Newsham, John C. . . .	Feb. 1892. .	Reid & Bornemann, Sydenham.
Parker, John	June 1892. .	Lynhales, Kington, Herts.
Pettigrew, Hugh A. . . .	Feb. 1892. .	Cardiff Castle.
Piret, Leandre J.	Mar. 1893. .	Low & Co., Clapton.
Plummer, Herbert	Feb. 1893. .	Clovelly, Winchester.
Skam, Sydney A.	Sept. 1892. .	Birmingham Botanic Garden.
Thomson, Walter	Mar. 1892. .	Coombe Ridge, Kingston-on-Thames.
Thurley, Frederick	July 1891. .	Theobalds Park, Waltham Cross.
Tucker, Alfred	Mar. 1892. .	Veitch & Sons, Exeter.
Ward, John R.	May 1892. .	Willesley Hall, Ashby-de-la-Zouch.
Waugh, James	May 1893. .	Dicksons' Nursery, Chester.
Wendt, Hermann	Feb. 1893. .	Van Houtte, Ghent.
Zimmer, Carl W.	Mar. 1892. .	Jardin des Plantes, Paris.

PAST KEWITES.

<i>Name.</i>	<i>Left Kew.</i>	<i>Present Position and Address*.</i>
Aggett, William	June 1888	.. Walpole Road, Teddington.
Aherne, Michael	Aug. 1866.	
Aldridge, A.	About 1850..	N., Petersham, Surrey.
Allan, William	Aug. 1851	.. H. G., Brownlow House, Lurgan.
Allen, Robert	Oct. 1878.	
Appleby, George	April 1866.	
Arksey, Thomas	Dec. 1870.	
Armstrong, James	Mar. 1893	.. F., Canford Manor, Wimborne.
Armstrong, Thomas	Aug. 1850	.. N., Moorville, Carlisle.
Ashton, Frank	May 1885	.. Lewis & Co., Southgate.
Bahr, Halfdan	Oct. 1883	.. Went to Darjeeling.
Bailey, Thomas	Sept. 1892	.. Chiltley, Liphook, Hants.
Baker, William	Dec. 1887	.. Curator, Bot. Gard., Oxford.
Barfoot, John	May 1860	.. H. G., Sherbrook, Caterham.
Barham, William	Sept. 1856.	
Barker, Michael	Mar. 1884	.. Assist. Curator, Bot. Gard., Harvard, Mass.
Barker, Robert	Mar. 1858.	
Barnes, Richard	Mar. 1871	.. Curator, Public Gardens, Saltburn-by-Sea.
Barrie, George	June 1878.	
Bartley, Henry	April 1871.	
Barton, Robert	June 1890.	
Batchelor, William	April 1859.	
Batcock, George	About 1862..	To Cinchona Plantations, Ootacamund.
Bates, Frederick	Oct. 1874	.. H. G., Calke Abbey, Derbyshire.
Batters, Frederick H.	Feb. 1891	.. F., Holker Hall, Lancashire.
Baxter, Robert S.	Mar. 1874	.. F., Bot. Gard., Oxford.
Beaucham, William	April 1870.	
Beck, Joseph	Oct. 1870	.. Supt., State Gardens, Morvi, India.
Bell, William	June 1873	.. H. G., Shrublands, Chelmsford.
Benbow, Joseph	Sept. 1884	.. H. G., Abbotsbury Castle, Dorset.
Bennett, William H.	May 1880	.. H. G., Menabilly, Par, Cornwall.
Benzon, Josef von	June 1885	.. Germany.
Berman, Adolf	Oct. 1863.	
Bevan, Henry	April 1888	.. Went to Paris.
Binder, William	Dec. 1887.	
Birschell, John W.	Dec. 1855	.. Collector in Venezuela.
Bischoff, William	July 1850	.. Germany.
Blackman, Walter	April 1874.	
Bleil, Frederick	May 1885	.. Germany.
Bolt, Phillip	Oct. 1874	.. H. G., Overhall, Winsford.
Bond, William	June 1876	.. H. G., The Cottage, Abbey Wood, Kent.
Boorman, John	Aug. 1885	.. Botanic Garden, Sydney, N.S.W.
Bouckenooghe, Val.	Sept. 1892	.. Etat Indépendant du Congo.
Bradbury, James	July 1880.	
Brenchley, J. A.	Nov. 1882	.. Sec., North Hants Conservative Assoc.
Brewer, Giles	Mar. 1881	.. Cannes.
Brien, Samuel	Feb. 1878	.. H. G., Gilttown, Newbridge, Co. Kildare.
Broadway, Walter E.	June 1888	.. Assist. Supt., Bot. Gard., Trinidad.
Brooks, Thomas	May 1861	
Broomer, Frederick	April 1881	.. Florist, The Weirs, Winchester.
Brown, Thomas	Nov. 1884	.. N., Meadowbank, Uddingston, N.B.
Brown, William McL.	May 1878.	
Browne, William		Supt., Hyde Park, W.
Bryan, William	Aug. 1881.	
Budd, George	Mar. 1855.	
Bulten, Arthur	June 1876.	
Burbidge, F. W., M.A.	Mar. 1870	.. Curator, Trin. Coll. Bot. Gard., Dublin.
Burgess, William	Jan. 1877.	

* Abbreviations : H. G.=Head Gardener ; F.=Foreman ; N.=Nurseryman ; M. G.=Market Gardener.

FORM OF APPLICATION FOR EMPLOYMENT AS
GARDENERS.

It may interest Old Kewites to see what are the qualifications now insisted on in Candidates for employment in the Royal Gardens. The following is a copy of the form :—

APPLICANTS for admission as Gardeners into the Royal Gardens are furnished with a copy of this paper, which, when filled in, must be signed by their present or last employer, and returned to the Curator, accompanied by a letter in applicant's own handwriting.

The wages are eighteen shillings per week, with extra pay for Sunday duty.

Applicants must be at least 20, and not more than 25 years of age, and have been employed not less than 5 years in good private gardens or nurseries. They must be healthy, free from physical defect, and not below average height.

Preference will be given to men who have had most experience in the cultivation of plants under glass, and no application will be entertained from men who have not had some such experience.

Where obtainable, testimonials from known practical gardeners should accompany the application.

The applicant will be informed if his name has been entered for admission, and, on a vacancy occurring, he will receive notice to that effect. Should there be no vacancy within 3 months from the date of application, it must be renewed if employment at Kew is still desired. If not renewed, the applicant's name will be removed from the book.

Gardeners who remain at Kew a year, and whose conduct is satisfactory, will be eligible, as vacancies arise, for the positions of Sub-foremen, and will be recommended, according to the capacity they display, for employment in other first-class gardens either at home, in India, or in the Colonies.

W. T. THISELTON-DYER,

Director.

GEO. NICHOLSON,

Curator.

Name _____

Age _____

Names of employers in whose gardens applicant has worked, and length of time in each :—

Science and Art Classes (if any) attended by applicant, stating subjects studied and certificates obtained by him :—

Employer's Signature _____

Place _____ Date _____