UNDER THE PATRONAGE OF

HER MAJESTY THE QUEEN,

AND

HIS ROYAL HIGHNESS THE PRINCE OF WALES.

THE

International Horticultural Exhibition,

AND

BOTANICAL CONGRESS, London, 1866.

HELD IN

LONDON,

FROM

MAY 22ND TO MAY 31ST,

1866.

REPORT OF PROCEEDINGS.

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TABLE OF CONTENTS.

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HER MAJESTY THE QUEEN.

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H.R.H. THE DUCHESS OF CAMBRIDGE.
H.R.H. THE DUKE OF CAMBRIDGE.
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The Earl of Dartmouth.
The Earl Cowper, K.G.
The Earl De La Warr.
The Earl of Craven.
The Earl Manvers.
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The Viscount Hill.
The Viscount Eversley.
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The Lord Bishop of Winchester.
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The Lord Clermont.
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The Lord Rayleigh.
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The Right Hon. the Lord Mayor of London.
The Right Hon. the Lord Mayor of York.
The Right Hon. the Lord Provost of Glasgow.
The Right Hon. R. C. Nisbet Hamilton.
The Right Hon. Sir W. Hutt, K.C.B. M.P.
Colonel the Right Hon. W. F. Tighe.
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Sir Walter C. James, Bart.
Sir W. J. Alexander, Bart.
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Deputy-Chairman.—*John J. Blandy, Esq., V.P.R.H.S., Highgrove, Reading.

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Mr. Thomas Moore, F.L.S. (Exhibition), Botanic Gardens, Chelsea, S.W.
Dr. M. T. Masters, F.L.S. (Congress), Spring Grove, Isleworth, W.
Dr. R. Hogg, F.L.S. (General Business), 99, St. George's Road, Pimlico, S.W.

Assistant Secretary.—Mr. Richard Dean.

* Since the close of the Exhibition, the Committee has had to lament the death of this gentleman.

SUMMARY

OF

GENERAL PROCEEDINGS.

The International Horticultural Exhibition and Botanical Congress of London, was originated amongst a few representatives of British Horticulture and Botany, who had accepted the invitation to attend the first of these International meetings, held in 1864, at Brussels, under the auspices of the Federation of the Horticultural Societies of Belgium, and under the immediate patronage of the Belgian Royal Family. The action then taken was followed up by those who attended the Exhibition and Congress at Amsterdam in 1865, when a pledge was given or implied that a similar meeting should, if possible, take place in London in 1866.

With the object of carrying out these views, a preliminary meeting was held in St. James's Hall on the 18th May, 1865. Present: J. J. Blandy, Esq., chairman; Messrs. J. Fraser, J. Gibson, Dr. R. Hogg, C. Lee, Dr. M. T. Masters, T. Moore, G. U. Skinner, J. Standish, C. Turner, and H. J. Veitch. At this meeting a Provisional Committee was formed (Mr. Thomas Moore acting as secretary) for the purpose of preparing a scheme for carrying out the proposed Exhibition and Congress. One of the first steps taken by the Provisional Committee was to confer with the Council of the Royal Horticultural Society, with the view to secure its co-operation in carrying out the scheme. Somewhat later the Linnean Society and the Society of Arts were invited to take part in the movement, and the Council of the latter body accepted the invitation, and set apart the sum of £50 to be offered as prizes for implements.

The general preliminaries having been arranged by the Provisional Committee, a meeting of supporters took place on the 1st July, 1865, when a Prize Schedule was agreed to, and it was announced that subscriptions in aid of the undertaking to the amount of £1,001 6*s*. had already been promised, while the further sum of £2,296 5*s*. had been guaranteed.

The following gentlemen were, at this meeting, delegated to act as an Executive Committee to carry out the Exhibition and Congress, namely:—

Chairman.
Sir C. WENTWORTH DILKE, Bart., M.P.

Deputy Chairman.
JOHN J. BLANDY, Esq., V.P.R.H.S.

Treasurer.
Sir DANIEL COOPER, Bart.

Committee.

Professor BENTLEY, F.L.S.
Mr. W. BULL, F.L.S.
Mr. E. EASTON.
Mr. C. EDMONDS.
Mr. JOHN FLEMING.
Mr. R. FORTUNE.
Mr. J. GIBSON.
Mr. J. LEE.
Dr. M. T. MASTERS, F.L.S.
Mr. T. OSBORN.
Mr. W. PAUL.
Mr. J. STANDISH.
Mr. C. TURNER.
Mr. J. VEITCH, F.L.S.
Mr. B. S. WILLIAMS.

Secretaries.
Mr. THOMAS MOORE, F.L.S. (Exhibition).
Dr. BERTHOLD SEEMANN,* F.L.S. (Congress).
Dr. R. HOGG, F.L.S. (General Business).

Messrs. COUTTS & Co., and Messrs. BARCLAY, BEVAN, & Co., were nominated Bankers to the undertaking; and Messrs. FLADGATE, CLARKE, & FINCH were named as Solicitors. At a later period Mr. RICHARD DEAN was appointed Assistant Secretary.

As it was early seen that the expenses would be very considerable, it was deemed advisable to invite subscriptions, in return for which certain privileges and tickets were assured, as explained in the Regulations as to admission, Nos. 37 to 39, page 259.

With reference to the Guarantee Fund a Sub-Committee was appointed to consult the solicitors, and several interviews with these gentlemen were held, in the course of which, so many difficulties in the way of framing a guarantee deed were pointed out, and it was found that the expenses connected therewith would be so heavy, and the delay occasioned so considerable, that the Executive Committee decided on dispensing with a guarantee deed, which was therefore never executed. Cards of admission, and other privileges, were nevertheless forwarded to all those who had expressed their willingness to join in the execution of such a deed. A list of guarantors is printed at page 402 *et seq.*

By the month of September the Executive Committee was enabled to decide finally as to its course of action. It had been felt from the first that the Exhibition should be held in connection with the garden of the Royal Horticultural Society; and upon negociation with the Council, it was agreed that a sum of £300 should be paid to the Society as a consideration for the use of its garden during the Exhibition week, the Committee providing the necessary music for the week (£194 16*s.* 8*d.*), and that the Fellows of the Society, the holders of their transferable tickets, and the Debenture holders should have

* Succeeded by Dr. Masters.

the privilege of free entry to the Exhibition on the day after the opening, the garden being open to them on every day. It was at first intended to have had the main portion of the Show in the western annexe of the Royal Horticultural Gardens; but at a later period, the permission of the Government, and of the first Commissioner of Her Majesty's Works, that it might be held on the adjoining and more convenient site of the Exhibition of 1862, was obtained. Subsequently, when it was found desirable to extend the period of the Show beyond the four days originally contemplated, a fresh arrangement was made with the Council of the Royal Horticultural Society, by which the Committee, on granting the Fellows another free day at the Show, and on providing music in the gardens of the Society for the five additional days (£100), was permitted to have the use of the garden up to the close of the Exhibition.

The Exhibition building, erected after plans recommended by the Building Committee (Messrs. C. Lee, J. Gibson, H. J. Veitch, and J. Standish), was contracted for by Mr. Unite, of Paddington, the amount of the contract being £2,000. To this sum, however, have to be added further charges on account of glass sashes* for lighting the orchid tent, and for iron gutters and other fittings; and these, with the necessary outlay for ground-work, raised the cost of the Exhibition tent and ground to £3,946. Since the close, the Committee has been called on to restore the ground to its original level, which will cost about £130. When it was proposed to prolong the Exhibition for five additional days, it was agreed that Mr. Unite should take 20 per cent. of the receipts, after payment of the expenses consequent upon the extension of the duration of the Show, and this percentage amounted to £700. The orchid tent was, with great liberality, heated by Mr. Ormson, of Chelsea, free of charge.

The plan for laying out the interior of the tent was designed by Mr. Gibson, and was carried out under his superintendence. The area covered with canvas was 3 acres, 2 roods and 38 poles. Of this space, 55,000 feet were allotted for plants, 50,000 feet for promenades, and 20,000 feet for single specimens and decoration, exclusive of the compartments devoted to Orchids, to Fruit, and to Vegetables. The pathways, including those of the Orchid tent, occupied 60,000 feet—sufficient to accommodate 15,000 persons within the tent, allowing 4 feet for each person. Several van loads of large plants, upwards of 100 in number, were kindly lent from the Royal Gardens at Kew for the purpose of being placed in certain prominent positions in the tent. Some Palms and other fine specimen plants were also lent by the Royal Horticultural Society.

As regards railway transit, all the principal companies (the Great Eastern only excepted) agreed to convey truck loads of plants to and from London at a single fare; but no reduction could be ob-

* These glass sashes, adopted as a precaution against injuring the plants, proved to be unnecessary. The tent without them was found to be light enough, and where the glass was used, it had to be painted over.

tained for smaller quantities, and the several companies declined to grant special concessions as to passengers, in consequence of the Show being held in the Whitsun week, during which unusual facilities for travelling, of which visitors to the Exhibition could avail themselves, were, it was pointed out, always granted to the public.

The disposition of the several subjects of exhibition throughout the tent was delegated to an Arrangement Committee, consisting of Messrs. Gibson, Eyles, and Moore, and Dr. Hogg.

It was at first proposed to open the Exhibition on the 22nd May, and to close it on the 25th of May, but the success of the Exhibition as a Show, and the uncertainty whether the extraordinary expenses, which it was necessary to incur, would be reimbursed in that period, determined the Executive Committee to keep it open until the 31st of May, the consent and active support of the principal exhibitors having been willingly granted.

The Schedule for the Exhibition embraced 238 Classes, distributed in 10 Sections. The aggregate number of entries in these classes on the morning of the 22d of May, after allowing for withdrawals, was 1,486, of which number, 329 were not sent in, owing to the unfavourable weather which preceded the Show, and to various accidental causes. The respective numbers in the various departments of the Show were as follows :—In the Plant Sections, 655 entries, of which 66 failed ; in the Fruit Section, 285 entries, of which 136 failed ; in the Vegetable Section, 302, of which 123 failed ; and in the Miscellaneous Sections, 244, of which 4 failed. These numbers do not include duplicate exhibitions by the same exhibitor in the classes for seedlings, implements, and miscellaneous objects. The aggregate number of Entries, including those withdrawn before the opening day, was 1751. The number of Exhibitors was 361. The amount of prize-money offered was £2,550, inclusive of the £50 offered for Implements by the Society of Arts. Of this sum, £2,007 9*s*. was actually awarded, and a further sum of £219 16*s*. was paid in liquidation of extra expenses incurred, in accordance with claims sent in, to those exhibitors who allowed their plants to remain during the additional days to which the Show was extended.

The amount of paid subscriptions (for which equivalent privileges were offered and given) was £5,604, and the sum guaranteed (for which stipulated privileges were also given) was £4,739 4*s*., although, as before stated, the guarantors were not asked to incur any liability. Further subscriptions to the amount of £161 14*s*. were promised, but not paid.

Considerable assistance was rendered to the Executive Committee by the various Local Committees established throughout the country. The amount of subscriptions thus obtained in the respective localities (amounting altogether to £859 13*s*. 6*d*., and included in the total before-mentioned) is, as nearly as can be ascertained, recorded in the following statement :—

	Hon. Local Secretary.	£	s.	d.
Ascot	Mr. John Standish	£17	17	0
Belfast	Mr. W. Hooker Ferguson	29	8	0
Bradford (Yorkshire)	Mr. William Dean	78	4	0
Bristol	Mr. J. R. Garaway	25	4	0
Chelmsford	Mr. Robert Warner	54	12	0
Chepstow	Mr. John Pillinger	8	8	0
Chester	Mr. Arthur Dickson	83	12	0
Coventry	Mr. William Miller	58	0	6
Derby	Mr. E. Cooling	81	10	0
Doncaster	Mr. James Tindall	58	10	6
Dublin	Dr. David Moore	12	0	0
Elgin & N. of Scotland	Mr. John Webster	82	11	0
Exeter	Mr. Robert T. Veitch	10	10	0
Glasgow & W. of Scotland	Mr. James Anderson	147	10	6
Hereford	Mr. N. Wynn	—		
Hertford	Mr. E. R. Francis	24	3	0
Huntingdon	Mr. John Ingram	1	1	0
Ipswich	Mr. Thomas Blair	1	1	0
Jersey	Mr. C. B. Saunders	1	1	0
Kelso & S. of Scotland	Mr. William Mein	16	16	0
Leamington	Mr. John H. Hawley	19	19	0
Leicester	Mr. William Penn Cox	6	6	0
Lincolnshire	Mr. D. Lumsden	89	18	0
Manchester	Mr. John Shaw	59	16	0
Newark	Mr. Thomas J. Caparn	2	2	0
Nottingham	Mr. E. J. Lowe	30	9	0
Oxfordshire	Mr. W. H. Baxter	15	15	0
Redditch	Mr. John Gould	1	1	0
Rugby	Mr. G. Batley	21	0	0
Shrewsbury	Mr. W. Pritchard	—		
Stamford	Mr. Thomas Laxton	2	2	0
Taunton	Mr. R. H. Poynter	1	1	0
Warrington	Mr. William Bishop	33	10	0

The amount of the receipts from subscriptions, sale of tickets, and other sources was £16,018 4*s*. 7*d*., distributed as follows:—

	£	s.	d.	£	s.	d.	£	s.	d.
Subscriptions paid							5,604	0	0
Cash taken at the doors—									
Tuesday, May 22nd (21*s*.)	£292	6	0						
Wednesday, May 23rd (10*s*. 6*d*.)	945	10	0						
Thursday, May 24th (2*s*. 6*d*.)	1,698	8	0						
Friday, May 25th (1*s*.)	1,043	0	0	3,974	4	0			
Saturday, May 26th (2*s*. 6*d*.)	932	10	0						
Monday, May 28th (1*s*.)	754	17	6						
Tuesday, May 29th (1*s*.)	1,103	7	6						
Wednesday, May 30th (1*s*.)	1,018	0	0						
Thursday, May 31st (1*s*.)	566	11	0	4,375	6	0			
Sale of admission tickets, less commission*—							8,349	10	0
553 guinea tickets	529	5	6						
1,062 ten-shilling tickets	478	9	7						
3,223 half-crown tickets	309	16	8						
2,061 shilling tickets	102	6	6	1,419	18	3			
Sale of gardeners' tickets—									
1,120 half-crown tickets	140	0	0						
1,029 shilling tickets	51	9	0	191	9	0			
							1,611	7	3
Percentages on refreshment receipts (five last days) and sundry small items				151	9	10			
Sale of Catalogues				225	6	6			
Advertisements in Catalogue				76	11	0			
							453	7	4

* Which, however, the nursery trade, most liberally, did not charge.

To the numbers admitted by money payments at the doors must be added those to whom admission was granted in virtue of some of the following considerations:—The tickets issued to Subscribers; the tickets presented to guarantors; the free admissions accorded to the Fellows and Debenture holders, as well as to the holders of the transferable tickets of the Royal Horticultural Society; the passes given to jurors, and to exhibitors and their assistants; and the invitations sent to foreign guests, to members of the Press, &c.

The principal items of expenditure, including the levelling and re-adjustment of the Exhibition Ground, were the following:—

Tent, including Fittings	£2,956	3	0
Groundwork, Materials, &c.	989	17	4
Band Stand	10	16	0
Percentage to Mr. Unite for continuance	700	0	0
Prizes awarded	2,007	9	0
Expenses allowed to certain Exhibitors for renewal and continuance	219	16	0
Advertising	998	0	0
Rent of Offices	58	15	0
Stationery, Postage, &c.	230	0	0
Working Expenses, Salaries, Gratuities, &c.	1,641	14	9
Police	74	13	0
Printing Circulars, Schedules, Cards, Catalogue, &c.	983	9	6
Printing Report of Proceedings	637	10	0
Law Expenses	39	19	2
Banquet Expenses (including Music)	970	12	6
Congress and Conversazione Expenses (including Music)	64	19	0
Music in the Gardens	294	16	8
Local Committee Expenses	38	9	8
Judges' Luncheon, Exhibitors' Breakfasts, &c.	212	19	0
Royal Horticultural Society	300	0	0
Readjustment and levelling of Exhibition Ground (about)	130	0	0

The printing of the Catalogue of the Exhibition, of the Report of the Proceedings, of the Admission Tickets, and of the Cards used for marking the various objects of exhibition, was executed by Messrs. Truscott, Son, & Simmons, of Suffolk Lane, Cannon Street, to the entire satisfaction of the Committee.

The Executive Committee has to thank Sir Richard Mayne, K.C.B., for the satisfactory dispositions made by him as Chief Commissioner of Police, and for the liberality shown in the arrangements for the payment of the police by the Committee. The Committee has also to tender its thanks to Mr. Superintendent Gibbs, Mr. Superintendent Gernon, Mr. Inspector Butler, Mr. Inspector Tanner, and to the other officers specially charged with the direction and carrying out of the necessary arrangements. A small gratuity was, with the consent of the Commissioner, presented to some of the officers and constables who were on duty throughout the duration of the Exhibition.

At the close of the Exhibition an auction sale of such plants as the exhibitors did not wish to remove took place, and in many instances good prices were realised by the vendors, while the purchasers were gratified by thus being able to secure some tangible memento of the Exhibition.

The Councils of the Royal Botanic Society and of the Zoological Society, as well as the Directors of the Crystal Palace, offered every facility to the foreign guests to visit their respective establishments. Dr. Hooker also, in his capacity of Director of the Royal Gardens at Kew, allowed special privileges to foreign visitors desirous of having access to the gardens and museums.

The Banquet, supplied by Messrs. Ring and Brymer, and at which about one hundred of the more eminent of the foreign visitors invited to take part in the Exhibition and Congress were entertained, according to the custom at the previous Continental Exhibitions, took place in the Guildhall of the City of London on the 22nd of May, the Lord Mayor, Aldermen, and Court of Common Council having liberally granted the use of the hall for this purpose. The Executive Committee has to express its thanks to Mr. Deputy Charles Reed, Mr. Deputy Obbard, J. E. Saunders, Esq., J. Kelday, Esq., F. W. Truscott, Esq., W. Lawley, Esq., and to other members of the Corporation, who were good enough to aid them most materially in the preparations for the Banquet.

The Lord Mayor was requested to preside, and after the customary loyal and patriotic toasts had been proposed and responded to,

Sir C. W. Dilke, Bart., the Chairman of the Executive Committee, proposed "The health of the Foreign Visitors and the President of the Botanical Congress." The Horticultural Exhibition was the most remarkable one that had ever been held, and he was happy to add that it had been most successful in the number of visitors it had attracted. As a whole, he might say, as he was not personally an exhibitor, that he thought it was an Exhibition that had never been equalled, and that it would not be easy to surpass it.

Professor De Candolle, in responding to the toast, said: "The fact that my name has been mentioned in so kind a manner, makes it incumbent on me to thank you in the name of the strangers present. You have done them great honour by inviting them to this banquet, and indeed since their arrival in this country they have received, in private as well as in public, a welcome of which they cannot but be proud, and which will leave many pleasant remembrances in their minds. This morning the Prince and Princess of Wales and the Princesses of the Royal Family condescended to express their regrets that they could not accept the splendid hospitality over which the chief of the illustrious city of London presides, to the hon. baronet who has directed all these preparations with a zeal which has been crowned with success, and who has been kind enough to propose the toast. The only persons who are to be pitied in all this are those botanists and horticulturists who desired to come to London, and who were prevented from doing so, either by their public duties, or by the unfortunate state of affairs now existing on the Continent. But let us put on one side these personal considerations, and let us rather congratulate ourselves on the prosperous state of Science and its applications, and particularly on the progress of Horticulture, of which this International gathering furnishes a proof. Our age is in this respect a great age. Horticulture has been pushed to an extraordinary degree of perfection, and Science has been greatly advanced. What Science wants, above all, is liberty—not only political liberty, which is to a certain extent very necessary, but, above all, that liberty which is accorded to each individual by public opinion. We have seen nations and ages where, under an absolute monarchy, there has been a great deal of liberty of thought, and, *vice versâ*, free countries in which public opinion has exercised an actual pressure on individuals. Those who seek for scientific truth require to be protected by the public, even more than by a free political system. All the world ought to know the advantages of toleration of opinion, and public reprehension should only fall on bad faith. Science prospers when national institutions and public opinion allow it freedom. At the present time Horticulture flourishes more particularly in the West of Europe, in England, Belgium, and Holland; and in certain cities, such as Paris, Berlin, and Hamburgh. Evidently a climate without extremes of cold, heat, or dryness, is favourable to its development. Evidently, also, the intelligent and painstaking inhabitants of these western lands pay great attention to the details of cultivation; but there is still one condition which overrules all. Horticulture, carried to a certain extent, is a luxury. It implies wealth, and there is no extent or breadth of country more generally rich than Western Europe. Will other International Horticultural Exhibitions spring up in the future in these regions? We must desire for the attainment of that purpose, as well as for others even more important—peace, for war devours men as well as capital. Imagine to yourself (said M. De Candolle) what is the cost of the millions of soldiers at the present day massed together on Continental Europe. You will find, that with their pay for a single day, or at least for a single week, we could construct a conservatory reaching from Paris to Berlin. And here is a piece of advice which may be given to the horticulturists of the East and South of the Continent—not to imitate too closely English, Belgian, or Dutch culture, but rather to create a new system of Horticulture suitable to their particular climates. In making efforts in this direction they will be doing something new and remarkable, and the horticulturists of the West will go to see the exhibitions of Eastern and Middle Europe with the same pleasure that they visit in the present day their own exhibitions." M. De Candolle concluded by again thanking the assembly for the kindness which had been shown to the foreign visitors.

The Right Hon. R. C. Nisbet Hamilton proposed "Success to the International Horticultural Exhibition and Botanical Congress."

Dr. Hogg responded.

Sir C. W. Dilke then gave "The health of the Lord Mayor and the Corporation of the City of London."

The Lord Mayor replied as follows:—"A gallant bard grieved that 'fair woman-kind could not reserve their smiles for him alone,' and I, by an inverse process of reasoning, would give my place to-night could I be blessed with a thousand warm and varied tongues wherewith to bid you, from 'heart to very heart,' one and all a sincere and earnest welcome. The gentlemen who honour us with their presence to-night have invited us to view one of the most interesting and marvellous Exhibitions the world has ever seen. I think I may call it the queen of exhibitions. A garden has close relations with religion—with poetry—with all that is brightest and holiest amongst men. What is there on earth that so much contributes to our delight, to our enjoyment, as a garden? A garden is health—a garden is wealth—a garden is happiness. What is more refreshing, more delightful than the sweet fruits of earth? What is more fragrant than the breath of flowers? It has been said that Nature, so fair and bounteous in herself, needs not the hand of man to train and cultivate her; but Nature in every shape requires cultivation.

"The luscious Peach, the clustering Vine,
The fragrant Myrrh, the Rose divine,"

abundantly illustrate the truth of this. In this age of great competitive industry our neighbours are doing with their flowers what we do with our sons—urging them to take honours at home, and sending them to gain laurels abroad. On the part of this municipality, I beg to assure you that we hold out to you, one and all, the right hand of fellowship—that we recognise the great claims of art, of science, and of literature, and that we look upon this Exhibition as one of the happy and peaceful triumphs of our time. May it flourish, not only for the present, but may it exercise a beneficial influence on the future."

Professor Koch proposed, in German, "The Executive Committee," to which toast Sir Daniel Cooper, Bart., responded.

A Conversazione, which was very numerously attended, was held by permission of the Lords of the Committee of Council on Education, at the South Kensington Museum, on the evening of the 23rd of May; and the Executive Committee has to record its thanks to the officers of that institution for the valuable services rendered by them on that occasion.

The Botanical Congress held its meetings, also by permission of the Lords of the Privy Council, in the South Kensington Museum. These meetings were open free, and a very large number of ladies and gentlemen took part in them.

The arrangements for the Congress were but slightly advanced when Dr. Seemann—who had, in the first instance, been appointed to act as Secretary to the Congress—was obliged to proceed to Central America on important business, and was compelled to resign his office, which was thenceforward filled (from the beginning of March) by Dr. Masters. Professor Alphonse De Candolle had, in the mean time, been invited to act as President of the Congress, and had accepted the invitation; and a Congress Committee, which, with subsequent additions, consisted of the following gentlemen, was appointed:—

President—PROFESSOR ALPH. DE CANDOLLE, Geneva; Foreign Member of the Institute of France, &c., &c.

Committee.

PROFESSOR C. C. BABINGTON, F.R.S., Professor of Botany in the University of Cambridge, *Vice-President.*

JAMES BATEMAN, F.R.S., Biddulph Grange, Congleton, *Vice-President.*

WILLIAM H. BAXTER, F.R.H.S., Curator of the Botanic Garden, Oxford.

JOHN J. BENNETT, F.R.S., Keeper of the Botanical Department, British Museum, *Vice-President.*

PROFESSOR BENTLEY, F.L.S., Professor of Botany in King's College, London, *Vice-President.*

REV. M. J. BERKELEY, M.A., F.L.S., Examiner in Botany in the University of London, *Vice-President.*

W. CARRUTHERS, F.L.S., British Museum.

PROFESSOR CASPARY, Kœnigsberg, *Vice-President.*

BENJAMIN CLARKE, F.L.S., Mount Vernon, Hampstead, N.W.

DR. ALEXANDER DICKSON, Edinburgh.

CHARLES DARWIN, F.R.S., Down, Bromley, S.E., *Vice-President.*

PROFESSOR DAUBENY, M.D., F.R.S., Professor of Botany in the University of Oxford, *Vice-President.*

DR. J. E. GRAY, F.R.S., British Museum, *Vice-President.*

DR. ROBERT HOGG, F.L.S., 99, St. George's Road, Pimlico, S.W.

PROFESSOR KARL KOCH, Berlin, *Vice-President.*

PROFESSOR KICKX, Ghent, *Vice-President.*

PROFESSOR LECOQ, Clermont Ferrand, *Vice-President.*

MR. ALDERMAN MASTERS, F.R.H.S., Canterbury.

PROFESSOR MORREN, Liège, *Vice-President.*

GILES MUNBY, Lawn Villas, Wood Green, N.

JAMES McNAB, Curator of the Royal Botanic Garden, Edinburgh.

JOHN MIERS, F.R.S., 84, Addison Road, Kensington, W., *Vice-President.*

ALEXANDER GOODMAN MORE, F.L.S., Glasnevin, Dublin.

DR. D. MOORE, F.L.S., Director of the Royal Dublin Society's Botanic Garden, Glasnevin, *Vice-President.*

THOMAS MOORE, F.L.S., Curator of the Botanic Garden, Chelsea, S.W.

WILLIAM MUDD, F.L.S., Curator of the Botanic Garden, Cambridge.

COLONEL MUNRO, C.B., F.L.S., Farnboro' Road, Hants, *Vice-President.*

ANDREW MURRAY, F.L.S., Bedford Gardens, Kensington, W.

WILLIAM PAUL, F.R.H.S., Waltham Cross, N.

DR. R. C. A. PRIOR, F.L.S., Halse House, Taunton, *Vice-President.*

PROFESSOR REICHENBACH, Hamburg, *Vice-President.*

THOMAS RIVERS, F.R.H.S., Sawbridgeworth.

DR. SCHULZ BIPONTINUS, Deidesheim, *Vice-President.*

SIGNOR TRIANA, Kew, *Vice-President.*

JOHN GOULD VEITCH, Chelsea, S.W.

M. WEDDELL, Poitiers, *Vice-President.*

DR. WELWITSCH, F.L.S., 17, Russell Place, Fitzroy Square, W.C., *Vice-President*

M. WENDLAND, Herrenhausen, Hanover, *Vice-President.*

DR. WIGHT, F.R.S., Grazely Lodge, Reading, *Vice-President.*

JAMES YATES, M.A., F.R.S., Lauderdale House, Highgate, N.

Secretary—DR. MAXWELL T. MASTERS, F.L.S., Spring Grove, Isleworth, W.

PROCEEDINGS

OF THE

HORTICULTURAL & BOTANICAL CONGRESS.

THE first meeting of the CONGRESS was held on Wednesday, May 23rd, at 11 A.M., in the Raphael Cartoon Room, South Kensington Museum.

PROFESSOR ALPHONSE DE CANDOLLE, President of the Congress, in opening the proceedings, made a few observations in English as to the way in which the business of the Congress was to be conducted, and stated his intention of reading his inaugural address in his native language (French), thereby asserting the right of others, at this and any subsequent meetings of the same kind, to employ the language most convenient to them.

M. DE CANDOLLE then read the address (see p. 29), at the conclusion of which SIR C. WENTWORTH DILKE, Bart., M.P., the Chairman of the Executive Committee, proposed a vote of thanks to the President for his able address: a proposition which was seconded by SIR RODERICK I. MURCHISON, Bart., supported on behalf of the Botanists of Great Britain by Mr. J. J. BENNETT, keeper of the Botanical Department of the British Museum, and carried by acclamation. Copies of this address in the French, German, and English languages were circulated at the meeting, as were also condensed abstracts of the principal papers presented to the Congress.

DR. SCHULZ BIPONTINUS, Vice-President of the Imperial Leopoldine-Caroline Academy of German Naturalists, in the name and on behalf of the President and members of that ancient and learned body (the oldest scientific Society north of the Alps), offered his congratulations to the President, and expressed his sympathy with the objects of the Congress. A letter conveying similar sentiments was read from DR. VON MARTIUS, the President of the Bavarian Horticultural Society.

The following books and other objects were laid on the table for exhibition at the request of their several proprietors:—Water-colour Drawings of Plants, from M. JULIUS PLATZMANN, Leipsig. Similar Drawings, from Mr. W. G. SMITH, Mildmay Park, London. Photographic Portrait of George Forster the Younger, exhibited by Dr. SCHULZ BIPONTINUS on behalf of M. Herder, of St. Petersburgh. A Manuscript "Clavis to the Hortus Malabaricus of Rheede," by Dr. HASSKARLL, of Cleves. Illustrations of Cinchona Plants and their products, &c., by J. E. HOWARD, Esq. Specimens of Cinchonas grown in India, exhibited by CLEMENTS MARKHAM, Esq. Photographs of the Breslau Botanic Garden, from Professor GOEPPERT. A Century of rare Belgian Plants, by M. THIELENS. An illustrated work, "Le Specie di Cotone," from Professor PARLATORE, Florence.

Several Memoirs, from Professor GASPARINI, of Naples. Illustrations of Sports in *Pelargonium*, by Mr. WILLS. Fasciated Stems of Cowslip, by Mr. W. THOMSON. Case of seeds of Peas, illustrating the effect of Hybridization, by Mr. LAXTON. Model of an apparatus for the Shading and Night-covering of Plant-houses, by Mr. HOWLETT. Flowers of *Megacarpæa polyandra*, by Dr. MOORE, Glasnevin. Cones of *Araucaria Cunninghami glauca*, by Sig. MAX NISSON, Naples, &c., &c.

The following papers were read :—

On Seedling Peaches and Nectarines, by Mr. T. RIVERS (see p. 148).

Über die Veraenderungen der Richtung der Aeste holziger Gewächse, bewirkt durch niedrige Wærmegrade. By PROFESSOR CASPARY. (On the change in the direction of the Branches of Woody Plants caused by low degrees of temperature.) (See pp. 20 and 98.)

Observations on the present state of our knowledge of the Species of *Cinchona*. By MR. J. E. HOWARD. (See p. 195.) In the discussion that ensued, MR. MIERS, M. WEDDELL, and others took part (see p. 221).

Einige die Systematik betreffende Vorschlage. By PROFESSOR KARL KOCH. (Some propositions with reference to Systematic Botany.) (See pp. 21 and 188.)

The Meeting then adjourned.

The SECOND MEETING of the Congress was held on Thursday, May 24th, at 11 A.M., in the Sheepshanks Gallery, PROFESSOR DE CANDOLLE presiding.

The following papers were read :—

On the Climate, Flora, and Crops of Ireland. By DR. MOORE, Glasnevin, and A. G. MORE, Esq. (See p. 165.) In the discussion, the President, PROFESSOR REICHENBACH and others took part. (See p. 176.)

De la Migration des Plantes des Montagnes. By PROFESSOR LECOQ, Clermont Ferrand. (See pp. 22 and 158.)

On Night-covering and Shading of Plant and Forcing-houses. By MR. H. HOWLETT. (See p. 76.)

Observations on the Temperature of Water, and its effects on Plant Cultivation. By MR. JAMES ANDERSON. (See p. 42.) In the discussion on this paper, PROFESSOR DAUBENY, PROFESSOR REICHENBACH, MR. BATEMAN, MR. A. DE MORNAY, MR. HOWLETT, and others took part (see p. 45.)

On the Leaves and Shoots of *Sciadopitys* and *Phyllocladus*. By DR. A. DICKSON, Edinburgh. (See p. 124.)

On the Names bestowed on Garden Varieties, and the confusion in their Synonymy, with special reference to Bulbous and Tuberous-rooted Plants. By M. J. H. KRELAGE, Haarlem.

MR. BENNETT having taken the chair, PROFESSOR DE CANDOLLE read a paper from M. EDGAR DE LA RUE entitled—Communication d'une mesure récente et très exacte du diamètre de l'un des grands *Sequoia* de Californie. This was illustrated by a slip of paper, which indicated that the tree (Wellingtonia), at six feet above the ground, was twenty-six feet five inches in diameter, and had about 1,234 annual rings, the position of which was marked on the paper. (See p. 96.)

On M. De Candolle's resuming the chair, Professor Reichenbach made some observations on Orchidaceous Plants (see p. 119): in the discussion on which, Mr. Bateman, Dr. Masters, Mr. Anderson, and others took part. (See p. 123.)

Professor Edward Morren then detailed the results of his "Recherches expérimentales pour déterminer l'influence de certains gaz industriels, spécialement du gaz acide sulfureux, sur la végétation." (See p. 223.)

The next paper read was—On the Corona of *Narcissus*. By Mr. W. G. Smith. (See p. 125.)

The time at the disposal of the Meeting having expired, it was decided *nem. con.* that the remaining papers on the list should be taken as read; and that a Committee of Reference, consisting of the President of the Congress, the Chairman of the Executive Committee, Messrs. J. J. Bennett, J. Miers, T. Rivers, W. Paul, and the three Secretaries, should be appointed to consider which of the communications should be published in the Report of the Congress; and it was arranged that the Congress Secretary should superintend the publication of the same, with the co-operation of the Committee of Reference.

A vote of thanks to the Chairman was then proposed by Mr. Bennett, seconded by Professor Daubeny, supported by Dr. Schulz Bipontinus, and carried by acclamation.

The Congress was then declared terminated.

The following is a complete list of the subjects that were proposed for discussion, and of the papers presented to the Congress. Abstracts of some of the German and French papers are also here given, together with a few short communications that were addressed to the Secretary.

Mr. James Anderson, *Meadow Bank, Uddingstone, Glasgow.*

Observations on the Temperature of Water, and its effects upon plant cultivation.—(See p. 42.)

M. Ed. André, *Paris.*

Histoire et developpement de l'art des jardins en France.

An historical sketch of the art of landscape gardening in France, from the earliest times to the present day.—(See also p. 78.)

M. Baumann, *Ghent.*

1.—Eloge des expositions en Angleterre.

2.—Observations critiques sur celles de la Belgique.

3.—Réponse aux enthousiastes de l'arboriculture Belge.

M. Axel Blytt, *Christiania.*

On the vegetation of the *Sogne Fjord.*—(See p. 177.)

M. Bommer, *Ghent.*

"J'ai l'intention de traiter de la panachure (variegatio) et peut être de la coloration des feuilles."

M. Bossin, *Paris.*

1.—Existe-t-il un signe constant et un caractère botanique extérieur qui permettent de reconnaître a première vue les semences qui doivent donner des fleurs doubles, parmi celles qui ne produisent que des individus à fleurs simples comme le *Cheiranthus?* Quel est ce signe ou ce caractère?

2.—Pour faciliter les relations entre les peuples de tous les pays doit on employer les adjectifs latins pour désigner les variétés fixes de plantes potagères? En adaptant ces adjectifs aux noms génériques, quelle en sera la forme, une fois le principe adopté?—(See *Bulletin du Congrès International d'Horticulture*, Brussels, 1864, p. 173; and *Bulletin du Congrès International de Botanique et d'Horticulture*, Amsterdam, 1865, p. 350.)

3.—La Poire phénomenale designée sous le nom de belle Angevine, de belle de Bruxelles, de Royale d'Angleterre, Bolivar, etc. est-elle Française, Belge, ou Anglaise? Counait on le lieu et le date de son origine ainsi que le nom de son heureux obtenteur?

MR. W. BULL, *Chelsea*.

On the relation of horticulture and botany to mankind in general.

MR. E. CARROLL, *Glasnevin*.

On garden drainage.—(See p. 74.)

PROFESSOR CASPARY, *Kœnigsberg*.

Über die Verænderungen der Richtung der Aeste holziger Gewachse, bewirkt durch niedrige Wærmegrade.

On the change in the direction of the branches of woody plants caused by low degrees of temperature.

The author, in this paper, gives with much elaboration the result of his observations on the motion observed in the branches of trees in frosty weather. He shows that there is in winter a movement of the branches to the left-hand side, the amount of which is in direct proportion to the intensity of the frost. 2ndly. There is in many cases, in addition to the lateral motion, a vertical one from above downwards, also in proportion to the intensity of the frost. 3rdly. In other cases the vertical motion takes place in the opposite direction—that is, the branches move upwards as soon as frost sets in, and rise proportionately to the severity of the cold: *e. g.*, *Acer Negundo*, &c. 4thly. In other woody plants the branches are observed to rise in mild weather, and to droop during severe frost: *e. g.*, *Æsculus Hippocastanum*, &c. —(See also p. 98.)

MAJOR TREVOR CLARKE, *Daventry*.

On a certain phenomenon of Hybridism in the genus *Matthiola*.—(See p. 142.)

MR. B. CLARKE, *London*.

On the floral envelopes of *Lauraceæ*.—(See p. 118.)

DR. ALEXANDER DICKSON, *Edinburgh*.

On the leaves of *Sciadopitys* and *Phyllocladus*.—(See p. 124.)

MR. W. EARLEY, *Digswell, Welwyn, Herts*.

On the preparatory formation of trained wall-fruit trees.—(See p. 59.)

PROFESSOR GOEPPERT, *Breslau*.

1.—Ueber die Anordnung der Alpen-Pflanzen in unsern gärten.

On the arrangement of Alpine Plants in our gardens.

The author condemns the indiscriminate planting, and comments on the want of order or arrangement of the alpine and arctic plants grown in our gardens; he considers, moreover, that one object in our botanic gardens should be the illustration of botanical geography. About 450 of the flowering plants of Germany and Switzerland may be looked on as truly alpine, and of these about two-thirds are grown in the Breslau Botanic Garden; some in pots, others occupying a space of about a Prussian acre in extent, planted out amongst various kinds of stone and rock in eight groups. The red snow, *Protococcus nivalis*, grows here in a hollow slab of granite. The plants are arranged in groups according to the levels at which they grow in their native habitats. In this way the relation of vegetation to altitude may be seen at a glance.—(See also p. 67.)

2.—Die Palæontologie und unsere botanischen Gärten.

Palæontology and our botanic gardens.

The author draws attention to the intimate connexion between recent and fossil botany, and gives an account of the steps he has taken in the Breslau Botanic Garden to illustrate the latter, by forming a model section of the coal formation, with its characteristic plants. In a similar way the enormous trunk of the *Pinites Protolarix*, discovered and described by the author, serves as a representative of the tertiary formation. The paper was accompanied with photographs, now deposited in the Library of the Royal Gardens, Kew, by request of the author.

MR. S. HIBBERD, *Stoke Newington, London.*

On the naming of Plants.

"The importance of botanical nomenclature to science, art, and literature.—Classical origin of many of the names of plants.—Names of plants divided into two classes, natural and artificial.—Prevalence of artificial names at the present time; objections to them.—Proposed revision of botanical lists.—Proposed establishment of a board of botanical nomenclature."

DR. HILDEBRAND, *Bonn.*

On the necessity for insect agency in the fertilisation of *Corydalis cava*. Communicated by Charles Darwin, V.P. (See p. 157.)

MR. J. E. HOWARD, *London.*

Observations on the present state of our knowledge of the species of *Cinchona*.—(See p. 195.)

MR. H. HOWLETT, *Chelsea.*

On night-covering and shading of plant and forcing houses.—(See p. 76)

M. VAN HULLE, *Ghent.*

La taille raisonnée.—(See *Bulletin du Congrès International de Botanique et d'Horticulture,* Amsterdam, 1865, p. 219.)

PROFESSOR KICKX, *Ghent.*

"Je serai heureux surtout d'y voir traiter les questions de physiologie spécialement appliquées à la cryptogamie."

PROFESSOR KARL KOCH, *Berlin.*

Einige die Systematik betreffende Vorschläge.

Some propositions with respect to Systematic Botany.

Three especial sources of difficulty beset the systematic botanist of our day. 1st.—The confused nomenclature. 2nd.—The scattered literature. 3rd.—The distribution of great numbers of plants by nurserymen under fanciful names. One man can do but very little to remove these obstacles, but a Congress of botanists and horticulturists is better able to effect the necessary changes and improvements.

Professor Koch proposes to obviate the confused synonymy by retaining the specific name first given; but as regards the generic name, to place that which recent investigation has adopted, first, and the one by which it was first described afterwards, in a parenthesis. If an author's name be given, it should be that of him who first described the plant. Our nomenclature begins with Linnæus, and hence all botanists prior to him should be disregarded. Linnæus, for instance, describes *Ornithogalum luteum*, but Salisbury discovered characters of sufficient importance in this plant to justify him in making a new genus, *Gagea*. The plant should therefore be called *Gagea lutea* (*Ornithogalum*.) Linn.

Secondly, the scattered literature. Botanists now-a-days write in German, French, English, Italian, &c., and in a large number of different periodicals, so that it becomes very difficult, or next to impossible, for a man to make himself thoroughly acquainted with the literature of the subject. Professor Koch proposes, therefore, to select a number of botanists from various countries to examine and collate the separate publications of their several countries. A general editor should be appointed in a European town where there is a good library, and all extracts should be sent to him at that place. The general editor should arrange these extracts scientifically, and publish them in the Latin language.

Thirdly, as to the importation of plants by nurserymen. No disadvantage would ensue if the horticulturist were to adopt a provisional name in the first instance, and then apply to a botanist for the correct name, which could then be published; but in adopting this plan, there are two difficulties to be encountered. Gardeners would seldom take the trouble to change the provisional for the scientific name; and they would not always know which botanists studied particular families, or would not venture to trouble them. This ought, therefore, to be the task of a Botanico-Horticultural Congress.

Fourthly, many botanists have already devoted themselves to particular families, and it is to be desired that others should do the same. Horticulturists might then apply to those botanists for information, &c. Professor Koch then points out several instances where he has succeeded in carrying out the proposed reforms.—(See also p. 188.)

M. Krelage, *Haarlem.*

On the names of garden varieties and their confused synonymy, with special reference to bulbous and tuberous rooted plants.

M. Lahaye, *Paris.*

Sur la conservation des fruits.

The author says it is impossible to preserve fruits out of their season if the trees which produce them are in bad health or condition.

Mr. E. Laxton, *Stamford.*

On the variations effected, by crossing, on the colour and character of the seed of Peas.—(See p. 156.)

Professor Lecoq, *Clermont Ferrand, Auvergne.*

1.—Sur la culture et le mode d'emploi du Colchique Byzantin.

A description of the plant, and of the method of cultivating it, is here given. The author recommends it for use in greenhouses and living rooms, its corms being concealed by *Selaginella denticulata*, &c. (See also p. 72.)

2.—De la migration des plantes des montagnes.

The object of the author is to show that the mountains of Auvergne have received their Alpine plants by the agency of birds and of the winds, and not by a gradual migration during the glacial period, when it is assumed that a lower temperature prevailed, but the correctness of which assumption he denies, the former extension of glaciers being attributed by him not so much to a lower as to a higher temperature than now exists.

This district, he says, was, at the tertiary period, a vast plateau, with a mean altitude of 8-900 feet. Volcanic eruptions then inundated it, altered its soil and climate, and raised it in some places 1,000 metres. "Then," says he, "clouds began to settle on the heights and snow to accumulate, and innumerable streams flowed from its icy summits, and by their murmurs seemed to call to a foreign vegetation to come to enjoy these happy conditions."

The boreal species, with which alone we are concerned, and a list of which, about 104 in number, he gives us, could not, he says, have arrived till after the volcanic elevation of the district, and they could only have come from the Alps, the Pyrenees, Lapland, or the mountains of Grenada. But as all these species are either Alpine or Pyrenean, with the one solitary exception of the *Arabis Cebennensis*, we may assume that these two great chains were the home from which they came as colonists to France.

The intermediate country is low and flat, and afforded them no resting place; Darwin's theory of their progress by means of a glacial period he rejects; and concludes that they must therefore have been transported thither through the air, and mainly by birds of passage and violent storms of wind.—(See also p. 158.)

M. Mas, *Bourg.*

De la direction à donner à la recherche des nouvelles variétés d'arbres à fruit.

Dr. Masters, *Spring Grove, Isleworth, W.*

Notes on Double Flowers, &c.—(See p. 127.)

Dr. David Moore and Mr. A. G. More, *Glasnevin.*

On the Climate, Flora, and Crops of Ireland.—(See p. 165.)

PROFESSOR EDWARD MORREN, *Liège.*

Recherches expérimentales pour déterminer l'influence de certains gaz industriels, spécialement du gaz acide sulfureux, sur la végétation.

The results of these experiments tend, *inter alia*, to show that pure coal gas has not necessarily any ill effect on plants, but in proportion as it is mixed with sulphurous acid gas it becomes detrimental to vegetation.—(See also p. 223.)

DR. FERD. MUELLER, *Melbourne.*

On the cultivation of the Cinchona in the South of Europe.

The culture of the Cinchonas in the Madras Presidency, according to authentic calculations, holds out most startling prospects of remunerative yield; and there can be no doubt that Peruvian-Bark-tree plantations will be among the most lucrative in any locality where these plants will prosper. The facts thus, beyond dispute, ascertained in India lead to the reflection as to how far Cinchona culture can be extended over the globe. From trials instituted in the Botanic Garden of Melbourne it is apparent that, for the cultivation of Cinchonas, no absolute necessity exists for the rarity of air of those mountain regions of the Andes, which are the proper home of these trees. On the contrary, it would seem that merely a warm temperate atmosphere, combined with humidity and shelter, is required for Peruvian Bark plants; and as in the Cinchona plantations of India extra-tropical Australian and Mediterranean plants do prosper, the question arises whether their cultivation could not be pursued to advantage in moist valleys on the Mediterranean shores, and in any other isothermal zone. In Victoria arrangements are made to try the growth of these plants in the extensive Fern-tree gullies which abound. For these experiments more extended facilities now exist since Cinchonas have commenced to ripen their seeds in India.

Under any circumstances it appears desirable that in South Europe and elsewhere experiments should be made to teach us how far these plants can adapt themselves to the somewhat altered influences which they will experience.

PROFESSOR PYNAERT, *Ghent.*

Moyens d'améliorer les races fruitières par la voie du semis.

"The method of obtaining new varieties of fruit trees, from seed, by selection, hybridization, choice of seeds; influence of the method of culture of seedlings on the constitution of varieties," etc.—(See also p. 61.)

PROFESSOR REICHENBACH, *Hamburgh.*

On some points connected with the *Orchidaceæ.*—(See p. 119.)

MR. T. RIVERS, *Sawbridgeworth.*

1.—On the culture of Fruit in unheated glass structures.—(See p. 47.)

2.—On Dessert Orange culture in England.—(See p. 55.)

3.—On raising Peaches and Nectarines from seed.—(See p. 148.)

M. EDGAR DE LA RUE, *Geneva.*

Communication d'une mesure recente et très exacte du diamètre de l'un des grands *Sequoia* de Californie. Communicated by Prof. ALPH. DE CANDOLLE.

Records the details of the measurement of one of the famous Wellingtonias. —(See also pp. 18 and 96.)

PROFESSOR SCHULTZ SCHULTZENSTEIN, *Berlin.*

Ueber den Stickstoffgehalt und den Ursprung des Stickstoffs im Torf mit Beziehung auf die Benutzung des Torfs als dunger bei der Pflanzen cultur.

On the presence and source of nitrogen in turf or peat, with reference to its use as a manure for plants.

The author in this paper controverts the opinion of most chemists—that plants derive the carbon and nitrogen which they contain from the air and not from the soil. "Practical experience contradicts this theory." The author proposes to use turf as a manure, from the quantity of nitrogen that it contains, and which obviates the necessity of using animal manure. The nitrogen of the turf is derived from the remains of animal life in it, such as infusoria, worms, mollusca, &c. Turf does not decompose so quickly as animal manure, but it is on that account the more efficacious. The author has not found any advantage in adding bone dust (phosphate of lime) to the turf, which, indeed, contains a sufficient quantity of that substance.—(See also p. 248.)

MR. W. G. SMITH, *London.*

The Corona of Narcissus.—(See p. 125.)

SIGNOR TRIANA, *Kew.*

Sur les manuscrits et magnifiques dessins de l'expédition botanique du nouveau royaume de Grenade, dirigée par Mutis et qui sont conservés à Madrid.

The attention of Botanists is drawn to a valuable series of manuscripts and drawings of the plants of New Granada, collected by Mutis, long overlooked, but still in existence at Madrid. It is hoped that the Spanish authorities will see fit to preserve these valuable drawings, &c., in a more satisfactory manner than is the case at present, and to render them readily accessible to Botanists.

MR. ROBERT WARNER, *Broomfield, Chelmsford.*

On Cool Vinery Orchids.—(See p. 46.)

M. HERMANN WENDLAND, *Herrenhausen, Hanover.*

Beiträge zur Palmenkultur.

Note on the culture of Palms.

The author, in this paper, insists upon the paramount necessity of supplying Palms with an abundant supply of water.—(See also p. 65.)

MR. TUFFEN WEST, *Frensham, Farnham.*

On the structure of the testa of the seed of *Solanaceæ*, and some allied orders.—(See p. 182.)

DR. WIGHT, *Grazely, near Reading.*

On the phenomena of Vegetation in the Indian spring.

Dr. Wight, referring to some correspondence in the *Gardeners' Chronicle*, 1865, pp. 1059, 1203, offered a suggestion towards explaining the difficulty in accounting for the sprouting of trees during the hottest and driest months of the year, at a time when the heat and drought would seem enough to wither up all vegetation. It is a phenomenon often observed, and always with wonder, but one which may, he thinks, be accounted for on the same principles as the swelling of the buds and renewal of vegetation in higher latitudes, namely, by change of temperature stimulating the flow of sap that has been rendered sluggish by previous cold. In high latitudes, where the cold is often intense, the susceptibility of plants to heat becomes so acute, that the rise of only a few degrees of temperature above the freezing point sets the circulation in motion, especially when the soil in which the roots are distributed is still unfrozen, and permits absorption by the rootlets. Here the action in the roots and stem is simultaneous through the rise of temperature of the air equalising that of the soil in which the roots are distributed, permitting freer circulation to take place, and with it a renewal of the operations of vitality and growth.

Applying this principle to tropical vegetation, we must bear in mind that, owing to the high range of temperature in which the plants habitually grow, their susceptibility to variations of temperature is at the minimum, so that it is not until a considerable rise has taken place that the effect becomes obvious. Again, as in the other case, synchronous action between the stem and roots is necessary. "The hottest and driest month of the year" is preceded by the wettest and coldest, during which the soil is first saturated with moisture and then cooled by subsequent evaporation to a temperature considerably below that of the air. Then it is that vegetation in arboreous deep-rooting trees flags until renewed by the heat of the advancing season which restores the equilibrium between the roots and branches. Then, indeed, tropical vegetation in all its glorious perfection is seen. These are the circumstances in which a Bamboo shoot can almost be seen to grow, and its progress marked from hour to hour at the rate of nearly a foot a day, or even more than that.

This principle of synchronism between the above and below-ground portions of arborescent plants, carefully applied, will, Dr. Wright apprehends, be found applicable to the explanation of several apparent anomalies presented by the renewal of vegetation after the annual rest, and in the hands of ingenious horticulturists may be turned to good practical account.

MR. J. WILLS, *Huntroyde Park, Burnley, Lancashire.*

On the sporting of Pelargoniums and other plants.—(See p. 144.)

LIST OF THE FOREIGN VISITORS

PRESENT AT THE

HORTICULTURAL & BOTANICAL CONGRESS.

FRANCE.

MM. André, Paris.
Armand Béhic, Paris.
Barillet, Paris.
Baltet, Troyes.
Bertin, Versailles.
Bleu, Paris.
Bossin, Paris.
Camille Bernardin, Brie Comte Robert.
Bergmann, Ferrière en Brie.
Charpentier, Paris.
A. Cachet, Angers.
Cochet, Melun.
Durand, Bourg la Reine.
Delaire, Orléans.
A. Duguet, Lieusaint.
Dupré, Paris.
Duflot, Paris.
Fontaine, Paris.
F. Gloëde, Fontainebleau.
Courtois Gérard, Paris, Delegate from the French Government.
Henniquin, Angers.
Audusson-Hiron, Angers.
Jamin, Bourg la Reine.
Le Comte L. de Lambertye, Chaltrait.
Lefort, Paris.
V. Lemoine, Nancy.
Leroy, Angers.
Lüddemann, Paris.
Le Prof. Lecoq, Clermont Ferrand, corresponding Member of the "Institut"— *Vice-President.*
Abel Leblanc, Fils, Coulommiers.
Loise, Paris.

MM. MARÈS, Montpellier, corresponding Member of the "Institut."
MAS, Bourg.
MAZEL, Marseilles.
MORLET, Fontainebleau.
MINGAUD (Du Gard).
PAJARD, Versailles.
A. PAVARD, Trianon.
P. PAVARD, Trianon.
PEPIN, Paris, Delegate from the French Government.
PINEL, Rouen.
PFERSDORFF, Paris.
REMI-RABOUIN, Laval.
PESTY-REMONT, Versailles.
RIVIÈRE, Paris.
ROUGIER CHAUVIÈRE, Paris.
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LE SUEUR, Boulogne (Seine).
SCHLUMBERGER, Guèbville.
THIBAUT, Paris.
THOUVENEL, Orlèans.
H. VILMORIN, Paris.
CH. VERDIER, Paris.
E. VERDIER, Paris.
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DAYENEUX, Liège.
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DELARGE, Ghent.
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MM. Van Heurck, Antwerp, Delegate from the Belgian Government.

Van Houtte, Ghent.

Van Hulle, Ghent.

Cannart d'Hamale, Brussels, Sénateur, President of the Federation of the Horticultural Societies of Belgium, Delegate from the Belgian Government.

Van den Hecke de Lembeke, Ghent.

Professor Kickx, Ghent, *Vice-President.*

Kegeljan, Namur.

Kinard, Antwerp.

Linden, Brussels, Delegate from the Belgian Government.

Dr. Lodewyckx, Ghent.

Ath. de Meester, Antwerp.

Professor Morren, Liège, *Vice-President*, Secretary to the Federation of the Horticultural Societies of Belgium, Delegate from the Belgian Government.

Morren, Brussels.

Jacob Makoy, Liège.

Nuytens, Ghent.

Olivier, Brussels.

M. le Baron Osy, Antwerp.

Pynaert, Ghent.

Stelzner, Ghent.

Thielens, Tirlemont, Delegate from the Belgian Government.

Alfred van Volxem, Brussels.

J. van Volxem, Vilvorde.

J. Verschaffelt, Ghent,

Ambr. Verschaffelt, Ghent.

Vermeulen, Malines.

Léon Warocqué, Brussels.

Arthur Warocqué, Brussels.

HOLLAND.

Jhr. M. W. M. de Brauw, The Hague.

MM. Van der Brink, Utrecht.

Boer, Boskoop.

Th. van der Bom, Oudenbosch.

Cankrien, Rotterdam.

Groenevegen, Amsterdam.

Glym, Utrecht.

Jhr. Hoeufft van Velsen, Amsterdam—Vice-President of the Amsterdam Exhibition, 1865.

MM. S. Knuttel, Amsterdam.

D. Knuttel, Amsterdam.

Arie Koster, Boskoop.

Krelage, Haarlem.

Dr. Rauwenhoff, Rotterdam, Delegate from the Government of the Netherlands.*

* This gentleman was unfortunately prevented from attending.

MM. WILLINK, Jun., Amsterdam.
LE CHEVALIER OSCAR DE WARYNUFF, Boort, Meerbeuck.

GERMANY.

MM. BOETTNER, Greussen.
E. BENARY, Erfurt.
L. BOOTH, Hamburgh.

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PROFESSOR DR. CASPARY, Königsberg, Delegate from the Government of Prussia, *Vice-President.*

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M. LUCAS, fils, Reutlingen, Wurtemburg.

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E. SELLO, Potsdam, Delegate from the Government of Prussia.
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DISCOURS DU PRÉSIDENT
DU CONGRÈS.

MESSIEURS,

UNE réunion aussi nombreuse d'amis des sciences, d'horticulteurs et de botanistes accourus de toutes les parties de l'Europe, a besoin pour se constituer utilement de comprendre en vertu de quelle idée commune tant de personnes différentes se sont tout à coup rapprochées. C'est à celui qu'on a appelé à l'honneur de vous présider, et qui s'en trouve si peu digne, de faire ressortir le lien qui vous unit, ce lien dont vous n'avez peut-être encore qu'une notion trop vague et pour ainsi dire instinctive.

À mon avis nous ne sommes pas venus à Londres dans le but de satisfaire une pure curiosité d'amateurs.

La preuve en est que nous écoutons ici des discours, au lieu d'errer dans le jardin féerique de l'exposition. Evidemment nous cherchons autre chose qu'un spectacle, et cette autre chose est, si je ne me trompe, de l'instruction. Il ne suffit pas aux horticulteurs de voir, il leur faut aussi étudier et réfléchir. Il ne suffit pas aux botanistes d'observer minutieusement des détails, il leur faut aussi voir des plantes en grand et par masses. Les rapports de la pratique avec la théorie, de l'art avec la science, sont reconnus indispensables, et conformément à cette idée qui triomphe à notre époque, nous affirmons par notre présence dans cette salle, l'union nécessaire de la botanique et de l'horticulture. Rappeler comment elles s'aident l'une l'autre, indiquer comment elles pourraient s'aider davantage, tel sera l'objet de mes courtes reflexions. Si je ne m'abuse, il résultera des faits auxquels j'aurai à faire allusion, le sentiment que nos efforts communs scientifiques ou pratiques, malgré leur apparence très modeste, contribuent à augmenter le bien-être des hommes dans toutes les conditions et dans tous les pays.

I. *Utilité de l'Horticulture pour la Botanique.*

Parlons d'abord des services que l'horticulture rend ou peut rendre à la botanique. Sans être horticulteur moi-même, je les constate ou les prévois volontiers, la marche de la science rendant nécessaire de recourir à toutes les branches collatérales.

Nous ne sommes plus dans ces temps d'illusions où les botanistes ne s'occupaient guère que des plantes d'Europe, un peu de celles d'Orient, et où par timidité d'esprit, plutôt que par ignorance, ils se figuraient les pays lointains comme ayant tous à peu près le même fond de végétaux, avec un petit nombre d'espèces extraordinaires et exceptionnelles. Un siècle de découvertes a montré l'extrême diversité des flores, la grande localisation de beaucoup d'espèces et l'enchevêtrement compliqué de leurs limites géographiques. Pour voir soi-même toutes les végétations du globe il faudrait réaliser en quelque sorte, la légende du Juif Errant ; et d'ailleurs, dans des voyages continuels, où seraient les moments de réflexion et d'études qui créent la science proprement dite? Le voyageur est trop fatigué dans les pays chauds, trop agité dans les régions tempérées favorables à la vie active, trop enveloppé ou engourdi dans les régions froides pour pouvoir se livrer à des recherches attentives sous la loupe et le microscope, et même pour dessiner ou décrire convenablement ce qu'il récolte. Il voit en passant une foule de choses et ne peut presque jamais s'arrêter aux détails, surtout à ceux qui se succèdent. Rarement il peut voir le fruit en même temps que la fleur d'une espèce, et il lui est bien impossible d'étudier le développement complet dans toute l'année. Les notes recueillies par les plus intelligents d'entre eux se ressentent tellement de ces fatales nécessités, que le plus souvent elles n'ajoutent rien à ce qu'un échantillon d'herbier peut apprendre au botaniste sédentaire.

C'est donc l'horticulture qui met à notre portée une foule de plantes exotiques, dans les conditions qui permettent le mieux de les étudier. Grâce aux espèces variées qu'elle sait réunir et faire prospérer, le botaniste peut scruter les questions les plus difficiles, et cela dans des familles ou des genres de plantes qui n'existent point en Europe. Les herbiers permettent des travaux d'analyse plus délicats qu'on ne le pense dans le public, cependant il faut absolument la plante vivante pour certaines recherches, en particulier sur la disposition relative des organes, sur leur origine et leur développement. De même pour l'étude des phénomènes si curieux de la fécondation, ainsi que des mouvements et des directions de la tige, des feuilles et des parties de la fleur.

L'horticulture a beaucoup fait pour le progrès de la physiologie botanique, mais elle a encore une grande carrière à parcourir dans ce sens. Les plus remarquables expériences des physiologistes, celles par exemple de Hales, de Duhamel, de Knight, ont été faites dans les jardins. Il en est de même des longues séries d'expériences de Gaertner fils, et plus récemment de M. Naudin, sur l'hybridation, expériences qui ont trait à la question toujours capitale de l'espèce. On peut en dire autant de la multitude des essais qui se font dans les établissements horticoles pour obtenir de nouvelles races ou variétés. Elles ont une grande portée scientifique, et ce sont assurément les horticulteurs qui en apprennent à cet égard aux botanistes.

On pourrait cependant, ce me semble, augmenter l'utilité des jardins sous le point de vue des expériences de physiologie. Par exemple il y a encore de grandes lacunes à combler au sujet du mode d'action de la chaleur, de la lumière et de l'électricité sur les végétaux. J'ai signalé plusieurs de ces lacunes, en 1855, dans ma *Géographie botanique raisonnée.** Dix ans plus tard, M. Julius Sachs, dans le volume important qu'il vient de publier sur la physiologie botanique,† remarque à peu près les mêmes déficits, malgré certains progrès incontestables des connaissances. Le mal est toujours celui-ci : quand on veut étudier l'action d'une température soit constante, soit variable, soit moyenne, soit extrême, ou l'effet de la lumière, il est très difficile et quelquefois impossible, si l'on observe dans le cours ordinaire des choses, de se dégager des variations incessantes de la chaleur et de la lumière. Dans les laboratoires on peut opérer sous des influences nettement déterminées, mais il est rare qu'elles soient assez durables, et l'on tombe aussi dans l'inconvénient de mettre les plantes trop à l'étroit dans des tubes ou sous des cloches. Cette dernière objection est évidente lorsqu'il s'agit de constater l'influence des gaz répandus dans l'air autour des végétaux ou celle des végétaux eux-mêmes sur l'atmosphère. Mettez les plantes sous un récipient, elles ne sont plus dans une condition naturelle ; laissez-les à l'air libre, les vents et les courants déterminés à chaque instant de la journée par la température, dispersent les corps gazeux dans l'atmosphère. Personne n'ignore combien de débats se sont élevés sur l'influence plus ou moins nuisible des vapeurs que les fabriques répandent autour d'elles. La ruine tantôt d'un fabricant, tantôt d'un horticulteur peut venir de la déclaration d'un expert sur ces sortes d'influences, d'où il résulte pour les savants une impérieuse nécessité de ne rien avancer sur ces questions délicates, à moins d'expériences véritablement probantes.

C'est en vue de ces recherches, dont j'indique seulement la nature, mais qui sont immensément variées quant aux détails, que j'avais posé naguère‡ la question : "Ne pourrait-on pas construire des serres expérimentales, dans lesquelles on serait maître d'obtenir, pour un temps prolongé, des températures déterminées, ou constantes, ou variables, et variables à volonté ?" Ma question a passé comme inaperçue dans un ouvrage volumineux, où elle n'était à vrai dire qu'un accessoire. Je la renouvelle aujourd'hui, en présence d'un public admirablement qualifié pour la résoudre. J'aimerais que dans un grand établissement d'horticulture ou dans un jardin botanique, on put mettre à la disposition de quelque physiologiste ingénieux et exact, une serre appropriée aux expériences de physiologie végétale, et voici à peu près comment je concevrais ce genre de construction.

* Pages 46, 49, 57, 1346.

† Handbuch der experimental-physiologie der Pflanzen ; un vol. in 8o. Leipsig, 1865.

‡ Géographie botanique (1855), p. 49 et 1346.

Le bâtiment devrait être à l'abri des variations extérieures de température. Pour cela j'imagine qu'il serait en grande partie au-dessous du niveau du terrain. Je voudrais une construction en maçonnerie épaisse et en forme de voûte. La convexité supérieure qui s'élèverait au-dessus du sol, aurait deux ouvertures, l'une au midi, l'autre au nord, afin de recevoir ou la lumière directe du soleil ou la lumière diffuse. Ces ouvertures seraient fermées chacune par deux glaces bien transparentes, fixées hermétiquement. Il y aurait en outre des moyens extérieurs de clôture pour pouvoir obtenir une obscurité complète, et pour diminuer l'influence des variations de température, quand on n'aurait pas besoin de lumière. Par l'immersion dans le sol, par l'épaisseur des murs et en recouvrant les surfaces extérieures avec de la paille, des nattes, etc., on obtiendrait la même fixité de température que dans une cave. La construction voûtée aurait une communication souterraine avec une chambre, dans laquelle se trouveraient la source de chaleur et des appareils d'électricité. On arriverait dans la serre expérimentale par un couloir fermé de portes successives. La température serait donnée par des conducteurs métalliques échauffés ou refroidis à distance. Les mécaniciens ont déjà inventé des procédés pour que la température d'une salle, agissant sur une soupape, détermine la sortie ou la rentrée d'une certaine quantité d'air, de façon que la chaleur soit réglée par elle-même.* On pourrait s'en servir lorsque cette complication serait nécessaire.

Evidemment au moyen d'une serre ainsi construite on suivrait des plantes depuis leur germination jusqu'à la maturité de leurs graines, sous des degrés de température et des quantités de lumière parfaitement déterminés. On pourrait alors préciser comment la chaleur agit dans les phases successives, du semis à la germination, de la germination à la floraison, de celle-ci à la maturité des graines. On construirait pour diverses espèces des courbes qui exprimeraient l'influence de la chaleur sur chaque fonction, courbes dont on possède déjà quelques exemples pour les phénomènes les plus simples, comme la germination,† l'alongement des tiges et le mouvement des sucs dans l'intérieur de certaines cellules.‡ On constaterait un grand nombre des minima et maxima de température qui existent partout en physiologie, comme limite des phénomènes. On scruterait enfin une question plus compliquée, où la science a déjà fait des progrès, celle de l'action des températures variables, et l'on verrait si, comme cela

* Voir le système électrique de M. Carbonnier, exposé à Chiswick, en 1857, figuré dans la *Flore des Serres et Jardins*, vol. xii, miscell., p. 184.

† De la germination sous des degrés divers de température constante, par Alph. de Candolle, dans la *Bibliothèque Universelle de Genève* (*Archives des Sciences*), Novembre, 1865.

‡ Si les courbes n'ont pas été construites, les données numériques pour les construire existent au moins, dispersées dans les ouvrages. Je citerai, par exemple, la croissance d'un scape de *Dasylirion*, d'après M. Ed. Morren (*Belgique hortic.*, 1865, p. 322). Les chiffres, par parenthèse, n'y sont pas favorables à l'idée admise que la croissance des tissus est plus active la nuit que le jour.

parait démontré, ces températures sont tantôt avantageuses et tantôt nuisibles, suivant l'espèce, la fonction envisagée et la partie de l'échelle thermométrique parcourue.

L'action de la lumière sur les végétaux a donné lieu aux expériences les plus ingénieuses. Quelquefois malheureusement ces expériences n'ont abouti qu'à des résultats opposés ou incertains. Les faits le mieux constatés sont l'importance de la lumière du soleil pour la coloration en vert, la décomposition du gaz acide carbonique par les organes foliacés, et certains phénomènes de direction ou de position des tiges et des feuilles. Il reste encore beaucoup à apprendre sur les effets de la lumière diffuse, sur la combinaison du temps et de la lumière, et sur l'importance relative de la lumière et de la chaleur. Une lumière prolongée pendant plusieurs jours ou plusieurs semaines, comme dans les régions polaires, produit-elle, en dégagement d'oxygène et fixation de matière verte, autant d'effet que la lumière distribuée de 12 en 12 heures comme sous l'équateur? C'est ce qu'on ignore. Il y aurait là, comme pour la température, des courbes à construire, exprimant l'action croissante ou décroissante de la lumière dans chaque fonction, et puisque la lumière électrique est semblable à celle du soleil, on pourrait dans notre serre expérimentale soumettre des végétaux à une lumière continue.*

La construction supposée permettrait de faire passer la lumière par des verres colorés ou au travers de solutions colorées, pour vérifier l'effet des divers rayons visibles ou invisibles qui entrent dans la composition de la lumière du soleil. Au point de vue de l'exactitude rien ne remplace la décomposition du faisceau lumineux par un prisme, avec fixation des rayons au moyen de l'héliostat. Cependant un bon choix de matières colorantes et une marche logique dans le mode d'expérimentation conduisent aussi à de bons résultats. J'en donnerai pour preuve que les expériences récentes les plus rigoureuses, en ce qui concerne l'action des divers rayons sur la production d'oxygène par les feuilles et sur la coloration en vert, n'ont fait que confirmer les découvertes faites en 1836, sans prisme ni héliostat, par M. le professeur Daubeny†, expériences d'après lesquelles ce sont les rayons les plus clairs qui agissent le plus, après eux les plus calorifiques, et enfin les rayons dits chimiques. Le Dr. Gardner en 1843, M. Draper immédiatement après, et le Dr. C. M. Guillemin en 1857,‡ avaient déjà vérifié au moyen du prisme et de

* L'appareil qui produit le plus de fixité et d'éclat, en fait de lumière électrique, est la machine magnéto-électrique, fondée sur le développement de l'induction par le magnétisme découvert par l'illustre Faraday. La pile y est remplacée par une machine à vapeur de faible puissance, qui met en mouvement une roue garnie de forts aimants. (Voyez *Biblioth. Univ. de Genève*, *Archives Scientifiques*, 1861, v. 10, p. 160.) L'entretien en est peu coûteux, mais malheureusement l'achat des aimants est une forte dépense. On a appliqué déjà ce système à deux phares, celui du South Foreland, (Voy. *Phil. Mag.*, *April*, 1860; *Biblioth. Univ. de Genève*, v. 8, 1860), et celui de la Société l'Alliance, au Havre, à la suite d'expériences de MM. E. Becquerel et Tresca.

† Daubeny, *Philos. Trans.*, 1836, part 1.

‡ Dr. Gardner, *Edinb. Phil. Mag.*, 1844, extrait en français dans la *Bibl. Univ. de Genève*, Février, 1844; Draper, *Edinb. Phil. Mag.*, Septembre, 1844, extrait *ib.*, 1844, vol. 54; Guillemin (C. M.), *Ann. Sc. Nat.*, 1857, ser. 4, vol. 7, p. 154.

l'héliostat la découverte de M. Daubeny, qui renversait les idées répandues depuis Senebier et Tessier, à la suite d'expériences fautives.* On avait cependant de la peine à croire que les rayons les plus réfrangibles, le violet par exemple, qui agissent le plus sur les matières métalliques dans les opérations de la photométrie, soient précisement ceux qui décomposent le moins le gaz acide carbonique dans les plantes et qui influent le moins sur la matière verte des feuilles. Malgré la concordance des résultats obtenus, à la suite de M. Daubeny, par des procédés plus rigoureux et par plusieurs expérimentateurs, les anciennes opinions, plus vraisemblables en elles-mêmes, influaient encore sur les esprits,† lorsque M. Julius Sachs dans une série importante d'expériences a constaté une fois de plus la vérité.‡ Ce sont bien les rayons jaunes et oranges qui influent le plus, et les rayons bleus et violets qui influent le moins dans les phénomènes de la chimie végétale, contrairement à ce qui se passe dans la chimie minérale, de moins pour le chlorure d'argent. Les rayons peu réfrangibles, comme l'orange et le jaune, ont aussi la double et contraire propriété qui s'observe pour la lumière blanche, de colorer la matière verte des feuilles et de la décolorer, sous un degré supérieur d'intensité. Ce sont eux aussi qui altérent la matière colorante des fleurs, lorsqu'elle a été dissoute dans de l'eau ou de l'alcool.§ Les rayons dits chimiques, tels que le violet et les rayons invisibles au-de là du violet, d'après les expériences récentes, confirmatives de celles des anciens auteurs, puis de Sebastien Poggioli en 1817.‖ et de C. M. Guillemin, n'ont qu'une seule propriété bien constatée, celle de favoriser la flexion des tiges de leur côté avec plus d'intensité que d'autres rayons, et cela même serait un effet peut-être plus négatif que positif, si la flexion provient, comme beaucoup le croient encore, de ce qui se passe dans le côté le plus mal éclairé.¶ L'extrême opposé du prisme, celui des rayons calorifiques non visibles à l'œil, a été peu étudié dans ses effets sur les végétaux. D'après les

* Senebier, *Mém. Phys. et Chim.* 2, p. 69; Tessier, *Mém. Acad. Sc.*, 1783; Gilby, *Ann. de Chimie*, 1821, v. 17; Succow, *Commentatio de lucis effectibus chemicis*, in 4to., Jena, 1828, p. 61; Zantedeschi, d'après Dutrochet, *Compt. Rend. Acad. Sc.*, 1844, sem. 1, p. 853.

† Comme preuve de cette persistance de l'ancienne opinion je citerai une phrase du Professeur Tyndall, dans son opuscule très clair et très intéressant *On Radiation*, (London, 1865), p. 6: "In consequence of their chemical energy these ultra violet rays are of the utmost importance to the organic world." J'ignore si l'auteur avait en vue quelque propriété des rayons chimiques sur le règne animal, mais d'après certain passages de M. Sachs, je doute qu'ils aient plus d'importance dans ce règne que sur le règne végétal. Du reste, M. Tyndall n'avait pas à s'occuper de ces questions, il s'est contenté d'élucider admirablement la nature physique des divers rayons.

‡ Les travaux de M. Sachs ont paru d'abord dans la *Botanische Zeitung*; ils sont réunis et condensés dans le remarquable volume intitulé *Handbuch der Physiologischen Botanik*, vol. 4, Leipsig, 1865, p. 1 à 46.

§ Sir John Herschell, *Edinb. Philos. Journ.*, January, 1843.

‖ S. Poggioli, *Opuscoli Scientifici*, cité par Dutrochet, *Compt. Rend. Acad. Sc.*, 1844, sem. 1, p. 850.

¶ Les explications, assez confuses et contestables, fondées sur les idées de Dutrochet, d'une influence désoxydante du côté le plus éclairé, viennent se heurter contre le fait que les rayons bleus, indigos, et violets, les moins actifs pour désoxyder les tissus, sont les plus énergiques pour les courber.

expériences connues il aurait une action assez faible sur toutes les fonctions, mais il vaudrait la peine d'explorer mieux cette région calorifique du prisme, en employant le procédé de M. Tyndall, c'est-à-dire au moyen de l'iode dissous dans du bisulfure de carbone, qui ne laisse passer aucune trace de lumière visible.

Combien toutes ces expériences de laboratoire seraient curieuses à faire en grand! Au lieu de regarder dans de petites cases, ou de petits appareils qu'on tient à la main et où les plantes se voient mal de dehors, on serait soi-même dans l'appareil. On disposerait les plantes à volonté. On observerait plusieurs espèces à la fois et des plantes de toute nature, grimpantes, mobiles, à feuillage coloré, etc, comme des plantes ordinaires. On prolongerait l'expérience aussi longtemps qu'on le voudrait, et on aurait probablement des effets inattendus sur la forme ou la coloration des organes, particulièrement des feuilles.

Sur ce point qu'il me soit permis de rappeler une expérience faite en 1853 par M. de Martius.* Elle intéressera les horticulteurs aujourd'hui que les plantes à feuillage coloré sont de plus en plus à la mode. M. de Martius avait placé des *Amarantus tricolor*, pendant deux mois, sous des vitraux de diverses couleurs. Avec du verre jaune la coloration multiple s'était conservée. Les verres rouges avaient gêné un peu le développement des feuilles, et produit à la base du limbe du jaune au lieu de vert, au milieu de la surface supérieure du jaune au lieu de brun rouge, au dessous une tache rose au lieu de rouge pourpre. Avec des verres bleus, qui laissaient passer un peu de vert et de jaune, ce qui était rouge ou jaune dans la feuille s'était étendu et il n'était resté qu'un bord vert. Sous des vitraux violets, presque purs, la feuille était devenue à peu près uniformément verte. Ainsi au moyen de verres colorés, pourvu qu'ils ne soient pas jaunes, les horticulteurs peuvent se flatter d'obtenir des effets, au moins temporaires, sur la coloration des feuilles multicolores.

L'action de l'électricité sur les végétaux est si douteuse, si difficile à expérimenter que j'ose à peine la mentionner, mais on comprend à quel point les expériences seraient facilitées par la construction supposée. Quant à l'effet des plantes sur l'air qui les environne et à l'influence d'une certaine composition de l'atmosphère sur les végétaux, on aurait de grandes ressources d'expérimentation par le moyen indiqué. Rien ne serait plus facile que de créer dans la serre expérimentale une atmosphère chargée d'un gaz nuisible, pour savoir comment il agit, dans chaque proportion, de jour et de nuit. On pourrait aussi créer des atmosphères chargées de gaz acide carbonique, telles qu'on suppose en avoir existé à l'époque de la houille. On verrait jusqu'à quel point nos végétaux actuels prendraient plus de carbone à l'air et si leur vie générale s'en accommoderait. On saurait quelles familles de plantes peuvent supporter cette condition, et quelles autres familles n'ont pas pu exister en supposant que l'air aurait eu jadis une très forte proportion de gaz acide carbonique.

* *Gelehrte Anzeige*, München, 2 Dec. 1853.

En attendant que l'horticulture fournisse à la physiologie des moyens d'expérimentation aussi commodes, elle avance la botanique descriptive par les grandes publications qu'elle favorise. La plupart des anciens ouvrages à planches, tels que *Hortus Eystettensis*, *Hortus Elthamensis*, etc., ensuite ceux de Ventenat, Cels, Redouté etc., puis les *Salictum*, *Pinetum*, du duc de Bedford, et plus récemment les *Rhododendron* de l'Himalaya par Hooker fils, les ouvrages de Bateman, Pescatore, Reichenbach fils sur les orchidées, et bien d'autres que je pourrais citer, n'auraient pas vu le jour s'il n'y avait eu de riches amateurs de jardins pour les éditer ou les acheter C'est l'horticulture qui nous a donné les plus longues séries de journaux à planches qui aient été publiées, et ici je dois rendre hommage d'une manière toute spéciale aux horticulteurs anglais. Sans doute les figures des *Botanical Magazine*, *Botanical Register*, *Andrews' Repository*, *Loddiges' Botanical Cabinet*, *Sweet's British Flower Garden*, *Paxton's Magazine* et *Flower Garden*, et autres journaux anglais, ne contiennent pas un assez grand nombre des détails d'analyse demandés par la science de notre époque, mais quelle abondance de formes fixées ainsi par la gravure dans les livres, et quelles sources précieuses de documents à consulter ! Il faut admirer ce *Botanical Magazine*, commencé en 1793, continué de mois en mois avec une ponctualité exemplaire, et qui en est aujourd'hui à la planche 5580. Non seulement il a toujours donné des espèces rares ou nouvelles, mais encore il a été maintenu sur un plan simple et uniforme, qui le rend commode à consulter. La série des planches est unique depuis l'origine, chaque planche porte son numéro, chaque article du texte se rapporte seulement à une planche, de manière que les citations de l'ouvrage peuvent être brèves et claires. Beaucoup d'éditeurs n'ont pas compris les avantages de cette grande simplicité. Ils ont varié les titres, les séries, les paginations ; ils ont fait mettre sur les planches des numéros, puis des lettres, ou rien du tout, mais en définitive, et ceci devrait leur servir de leçon pour l'avenir, plus ils ont varié et compliqué, moins leurs journaux ont duré.

Pourquoi faut-il que ces détails purement bibliographiques évoquent en nous des souvenirs douloureux ? De ces quelques hommes dont je viens de parler, qui ont rendu de si éminents services à l'horticulture botanique, l'Angleterre en a perdu trois dans l'année 1865 : Sir Joseph Paxton, le Dr. Lindley, et Sir William Jackson Hooker.* Assurément je manquerais à ce que vous attendez de moi, si je n'exprimais au nom des étrangers qui assistent à cette séance notre vif regret de pertes aussi sérieuses. Nous connaissons tous par leurs écrits, et plusieurs d'entre nous avaient connu personnellement, les trois hommes d'élite dont je viens de parler. Leurs

* Nous apprenons à l'instant la mort d'un botaniste Irlandais bien distingué, M. le Dr. W. H. Harvey, si connu par ses ouvrages sur les algues et sur les plantes du Cap de Bonne Espérance. Il est impossible de ne pas constater ici, ne fut-ce que par ces quelques lignes, le regret que nous éprouvons d'une perte aussi sensible.

noms nous poursuivent à chaque pas sur ce théâtre de leurs travaux. Si nous admirons la hardiesse des coupoles en fer qui caracterisent les constructions modernes, nous pensons au Crystal Palace, à Chatsworth, et à l'humble jardinier qui était devenu un grand architecte. Si nous visitons le bel établissement de Kew, nous y voyons partout la preuve de l'activité infatigable de Sir William Hooker. Enfin si nous demandons l'origine du jardin de la Société Royale d'Horticulture à Kensington, on nous dit qu'il a été un développement de celui de Chiswick, où Lindley, naguère, brillait par la science et par l'esprit, et où les botanistes de mon âge ont trouvé dans leur jeunesse des encouragements si précieux pour leurs études.

Les noms de Sir William Hooker et du Dr. Lindley resteront dans la science, grâce a des ouvrages tout à fait spéciaux. Ces deux botanistes ont été cependant les directeurs de journaux horticoles et de grands établissements d'horticulture, et puisque leur influence avait été si bien acceptée par les hommes pratiques, j'aurai peu de peine à démontrer, ce qui est l'objet de la seconde partie de mon discours, que la science est utile aux horticulteurs, comme l'horticulture aux botanistes.

II. *Utilité de la botanique pour l'horticulture.*

Les principes de la physiologie végétale sont ce que les horticulteurs et agriculteurs recherchent ordinairement le plus dans les ouvrages de botanique. Ils n'y trouvent pas toujours des réponses directes à leurs questions, mais ils peuvent y puiser certaines règles, certaines manières d'expérimenter et de raisonner, qui leur évitent bien des erreurs. Qu'une idée bizarre soit lancée dans le public par un ignorant ou un charlatan, c'est par des notions générales de physiologie que l'homme pratique peut les rejeter d'emblée, ou au moins s'en défier. Inversement, les nouveautés conformes aux principes peuvent être, je dirai même doivent être accueillies facilement. Ne croyons pas trop aux bons résultats d'essais faits absolument au hasard. Il en est de ces essais comme des rêves et des pressentiments: s'ils se vérifient une fois sur mille on en parle, sans cela on les cache et on les oublie. Au surplus, il faut le dire, les hommes se dirigent presque tous par des théories, seulement les théories des ignorants sont souvent sans base et absurdes, tandis que celles des hommes instruits reposent sur des indices ou sur un ensemble de faits.

A côté de la physiologie, la géographie botanique enseigne la distribution des végétaux sur le globe, leur lutte contre les éléments, leurs migrations, et elle soulève déja quelques lambeaux du voile qui recouvre la connaissance obscure de leurs origines. Tout cela doit présenter aux horticulteurs un véritable intérêt. Nous approchons de pouvoir constater par des chiffres l'influence de chaque climat sur les végétaux, par conséquent la possibilité pour une espèce de supporter les conditions moyennes et extrêmes de tel pays où l'on voudrait l'introduire. Déjà nous pouvons montrer de la manière la plus claire l'analogie de végétation et de climat de certaines régions éloignées les unes des autres, et indiquer dans quels cas on peut essayer ou l'on doit repousser des tentatives nouvelles de cultures. Un illustre géologue a pu dire d'avance: il y a de l'or dans telle partie de la Nouvelle Hollande, et l'or y a été trouvé. Nous pouvons dire aussi : l'olivier et le chêne-liège réussiront en Australie ; la région orientale et tempérée des Etats-Unis est favorable aux cultures de la Chine, en particulier à celle du thé, et la partie de l'Amérique comprise entre San Francisco et l'Orégon, donnera un jour des vins aussi variés et aussi distingués que ceux de notre Europe, entre le Portugal et le Rhin. Chose singulière ! les deux boissons principales de l'homme civilisé, qui produisent quelques effets semblables comme excitants, mais qui s'excluent aussi l'une l'autre, jusqu'à un certain point, dans les habitudes, le vin et le thé, présentent aussi dans la culture qui les produit des ressemblances et des dissemblances marquées. La vigne et le thé réussissent sur des coteaux pierreux, primitivement inutiles et dont ils centuplent quelquefois la valeur. Selon l'exposition, le sol, la culture et la manière de préparer les produits, on obtient çà et là des crus de vin ou des qualités de thé d'une supériorité incontestable, les récoltes voisines, à quelque pas de distance, étant plus ou moins ordinaires. Les deux arbustes demandent un climat tempéré, mais la vigne exige de la chaleur et pas de pluie en été, au contraire le thé demande peu de chaleur pendant l'été et de la pluie, d'où il résulte entre ces deux espèces une incompatibilité géographique presque complète. Les pays de vignobles ne seront point des pays produisant du thé, et *vice versâ*.

Mais, dira-t-on, ces exemples tirés de la grande culture, ne concernent ni la botanique ni les jardins. Je prétends le contraire. C'est, à notre époque du moins, la science qui indique les plantes à cultiver et les pays ou il faut les introduire. L'horticulture en fait l'essai avec une infinité de précautions, et lorsqu'elle a réussi, elle livre les jeunes plantes aux procédés nécessairement plus grossiers de l'agriculture. Avant l'introduction si heureuse des quinquinas dans les Indes Anglaises et Hollandaises, il a fallu des botanistes pour recueillir, distinguer et décrire soigneusement les diverses espèces de Cinchonas d'Amérique ; il a fallu ensuite des horticulteurs pour en faire des boutures, en recueillir les graines, élever les jeunes plantes, les transporter et les établir dans une autre partie du monde, et là, enfin, la grande culture s'en est emparée. Le caféier ne s'est pas répandu de proche en proche d'Arabie dans l'Inde et de l'Inde à Java. Ce ne sont pas les colons Américains qui l'ont fait venir du pays d'origine dans leurs *fazendas* ou *haciendas*. L'arbuste a été d'abord décrit par les botanistes ; ensuite les Hollandais l'ont introduit dans un jardin à Batavia, de là dans le jardin botanique d'Amsterdam, d'où un pied fut envoyé au roi de France, en 1714. L'officier de marine de Clieu transporta l'espèce du jardin de Paris dans les colonies françaises d'Amérique. Il serait facile de multiplier ces exemples. Aujourd'hui la science a fait des progrès, les hommes pratiques s'en servent, les gouvernements et les peuples ont abandonné ces stupides idées d'après lesquelles une culture avantageuse à un pays était supposée nuire aux autres. On peut donc espérer de voir, assez promptement, les espèces utiles implantées dans toutes les régions où elles peuvent prospérer, au grand avantage de l'humanité considérée dans son ensemble.

Parmi les effets de la science au milieu du public horticole un des plus évidents a été de susciter le goût de formes variées et peu connues. On vivait autrefois, dans les jardins, sur un certain fonds de plantes qui remontaient au temps des croisades, ou même des Romains. La découverte du nouveau monde n'avait pas produit un changement proportionné à son importance, peut-être parce que les horticulteurs ne voyageaient pas assez, ou ne s'adressaient pas aux pays dont les espèces pouvaient le mieux convenir à l'Europe. Les botanistes heureusement furent plus ambitieux. Leurs voyageurs au-delà des mers furent nombreux et intrépides. Ils enrichirent les herbiers d'une infinité de formes nouvelles, et l'on publia des ouvrages tels que ceux de Hernandez, Rumphius, Sloane, etc., sur les plantes exotiques. On comprit dès-lors l'immense diversité des végétaux, et en fait de goût, l'élégante simplicité des fleurs primitives put lutter contre l'excessive parure des fleurs doubles. Le règne de la tulipe et des pivoines cessa dans les parterres. La curiosité, ce principe moteur de toutes les sciences, ayant pénétré en horticulture, le changement des jardins fut rapide Au lieu de quelques centaines d'espèces qu'on cultivait au commencement du siècle dernier, ce sont 20 ou 30,000 qui figurent dans l'ensemble des catalogues actuels. La seule famille des Orchidées a probablement plus d'espèces différentes dans nos serres qu'il n'en existait de toutes les familles de plantes il y a cent ans. La mode, unie à la curiosité moderne des amateurs, fait abandonner de temps en temps les vieilles plantes pour de nouvelles, et ainsi le règne végétal tout entier finira par passer sous les regards de l'homme civilisé.

Comment les horticulteurs se reconnaitraient-ils au milieu de ces invasions d'espèces par milliers, si les botanistes n'avaient imaginé des procédés commodes de classification et de nomenclature? Les familles, genres et espèces ont été disposés dans les livres comme les quartiers, les rues, les numéros de maisons dans nos grandes capitales, avec cette supériorité de méthode que la forme des objets indique leur place, comme si en regardant une maison dans une ville on découvrait par cela même à quelle rue et à quel quartier elle appartient. L'usage de donner un seul nom à chaque espèce, outre son nom de genre, combiné avec l'interdiction de changer les noms sans de justes motifs et de donner le même nom à deux espèces ou à deux genres, dépasse de beaucoup en régularité nos procédés de désignation des individus. Quelle ne serait pas la simplification des relations entre les hommes et la facilité de les trouver un à un, si dans le monde entier, il ne pouvait y avoir qu'une seule famille s'appelant d'une certaine manière, et si chaque individu ne pouvait avoir qu'un seul nom de baptême, différent de ceux des autres personnes de sa famille ? Tel est pourtant l'admirable système de nomenclature que la science a mis à la disposition des horticulteurs et qu'ils ne sauraient trop apprécier et respecter.*

III. *Effets avantageux du rapprochement de la Botanique et de l'Horticulture.*

En horticulture on a besoin de livres et d'herbiers, comme dans la botanique scientifique on a besoin de plantes vivantes cultivées. De là cette nécessité de plus en plus reconnue que les matériaux à comparer soient rapprochés les uns des autres dans les mêmes villes, dans les mêmes établissements, et même sous une seule administration propre à en faciliter l'emploi. Combien d'institutions en Europe, soit particulières soit officielles, ont à gagner sous ce rapport ! Combien de villes et de pays sont restés en arrière, tantôt en fait de bibliothèques ou d'herbiers, tantôt en fait d'horticulture. Les hommes spéciaux réclament; espérons que l'opinion publique finira par les écouter.†

Le rapprochement des moyens matériels d'étude, ai-je dit, est désirable. Celui des idées et des tendances propres, soit aux botanistes, soit aux horticulteurs, ne l'est pas moins. Chacune de ces catégories de personnes doit avoir évidemment des traits distinctifs, mais l'influence de l'une doit se faire sentir sur l'autre. C'est le moyen par lequel certaines dispositions trop exclusives se trouvent combattues et certaines facultés latentes peuvent se développer. L'horticulture, par exemple, a un côté mercantile qui entraine quelquefois trop loin. Le charlatanisme peut se glisser parmi les fleurs. La botanique, au contraire, est une science ; par conséquent elle repose sur la recherche de la vérité pure et simple.

* J'ai addressé il y a deux ans à la Fédération des Sociétés d'Horticulture Belges, une demande, qui parait avoir été bien accueillie, et qu'il n'est peut-être pas inutile de reproduire ici. Elle consiste à prier les horticulteurs qui obtiennent de nouvelles variétés, de ne pas leur donner des noms de forme botanique, avec la désinence latine, mais plutôt des noms arbitraires, d'une forme toute différente, afin d'éviter des confusions et des recherches inutiles dans les livres. Par exemple, si l'on a appelé une Calceolaria *Sébastopol* ou *Triomphe de Gand*, tout le monde comprendra qu'il s'agit d'une variété de jardins, mais si on l'a nommée *Lindleyi* ou *mirabilis*, on pourra croire que c'est un espèce botanique. On ira alors la chercher dans les ouvrages scientifiques ou dans les flores du Chili, et les botanistes venant peut-être à s'y tromper, la mettront à la suite du genre dans leurs livres, comme une espèce mal connue. Plus les noms horticoles tranchent sur les noms latins, mieux cela vaut, à moins toutefois qu'on ne puisse les rattacher clairement à la nomenclature botanique, en indiquant l'espèce, comme lorsqu'on dit *Brassica campestris oleifera*, au lieu de dire brièvement *Colsa*.

† Le jardin botanique de Kew est un bel exemple de ce qui devrait être fait, soit en grand, soit sur une échelle modeste, dans plusieurs villes où les moyens d'étude sont encore incomplets ou incommodes.

En se pénétrant de l'esprit scientifique l'horticulteur s'éloigne nécessairement de tendances trop intéressées. De son côté, l'histoire naturelle, à cause de la perfection même de ses méthodes, de ses nomenclatures et de ses observations minutieuses, a quelque-chose de technique et d'aride qui contraste avec la grandeur de la nature et avec le sentiment de l'art. C'est à l'horticulture, en y comprenant le tracé et le décor des jardins, de développer le sens esthétique des savants, comme de tout le monde. Une belle fleur, de beaux arbres, une splendide exposition florale, font naître une sorte d'admiration et même d'enthousiasme, comparable aux effets de la musique ou de la peinture. On vante avec raison la puissance des compositeurs Allemands de l'époque moderne et celle des peintres Italiens du XVI^e^ siècle, ne peut-on pas dire aussi que les beaux parcs de la vieille Angleterre, sont dans leur genre à une hauteur égale, au point de vue de l'art? Le sentiment de l'harmonie dans les teintes et dans les formes n'y est-il pas étudié aussi ? L'effet des contrastes n'y est-il pas habilement calculé ? Le passage insensible de l'architecture aux beautés naturelles n'y est-il pas ménagé d'une manière admirable ? Oui, assurément, les jardiniers paysagistes Anglais ont été poëtes. Ils ont puisé du moins à la même source d'inspiration que les écrivains les plus nationaux de leur pays, et cette source est le sentiment, si général en Angleterre, du beau dans une nature élégante et attrayante quoique sérieuse.

Ainsi, Messieurs, pour le developpement de nos facultés, comme pour nos intérêts positifs, l'art et la science marchent bien ensemble. Félicitons-nous de leur union, rendue visible aujourd'hui par ce Congrès de botanistes annexé à une grande Exposition d'horticulture, et après ces réflexions générales, un peu trop prolongées peut-être, abordons les questions plus véritablement scientifiques aux quelles plusieurs d'entre vous se disposent sans doute à prendre part.

PAPERS

PRESENTED TO THE

HORTICULTURAL AND BOTANICAL CONGRESS.

OBSERVATIONS ON THE TEMPERATURE OF WATER, AND ITS EFFECTS UPON PLANT CULTIVATION.

By James Anderson, Gardener, Meadow Bank, Uddingstone, near Glasgow.

One of the most important elements engaging our every-day attention in an artificial climate, is moisture. Cultivators in general are not over zealous in taking cognisance of the relative temperature that exists between water and air in any given house, and yet upon such, in a great measure, depends the luxuriance of the plants. Many scarcely recognise the importance of making adequate provision for water heated, at least, to the same temperature as the atmosphere. It is not sufficient to have cisterns dug out under the ground floor (which is a common method), and made water-tight by the various methods in practice, to produce a temperature sufficiently high; in fact, under the most favourable circumstances, unless the hot-water pipes actually run through or under the cisterns, I have found by repeated experiments, especially in tropical houses, the temperature of the water ranging from 5° to 10° Fahrenheit, below that of the atmosphere. I can scarcely conceive anything more prejudicial in the whole routine of plant cultivation, and more likely to check and paralyse root action, than frequent waterings at such a dissimilar temperature. It is bad enough under any circumstances, but when we come to practise upon valuable tropical Orchids, the injury becomes, after a time, irreparable.

Curiously enough, it has long been a custom to furnish bottom heat for Pines, and even for Melons and Cucumbers, arranging the beds in such a way as to be from 5° to 10° higher than that of the surface, and good results have invariably followed. Tepid water has always been in request by our foremost pine-growers, and formed one of the recommendations in every calendar of operations. Indeed, were any one to question the merits of the system as a whole, a hundred voices, at least, would be lifted up against him. Innovations make slow progress; for it is only a modern practice that of looking to the geothermal state of vine borders, and furnishing, either by chambers or aerated passages, an auxiliary means of conserving and dispensing heat to the roots. No one, unless he be a bigot, will venture to challenge or gainsay the good to be derived by the adoption of such a system. Any little dispute that has arisen as to the efficacy of heated vine borders, is traceable to individuals resident in localities having subsoils, such as sand or chalk, which have greater power of retaining heat, and of parting with superfluous moisture, than other subsoils, and which, therefore, have less need of artificial appliances. And how, I would ask, is it that the practice is not universally carried out? If we have unmistakeable proofs of improved cultivation in every advance made in accordance with a given system, we may be certain that it is an innovation of the right stamp, and one worthy of imitation and adoption.

So far as the practical gardener is concerned, there is no family under cultivation that merits a more undivided attention—whether we look to its variety, the geographical range over which it extends, and, above and beyond all, its monetary value—than the *Orchidaceæ.* Every little scrap of information, from reliable sources, is gathered up and noted down with an avidity only known to orchidophilists and orchidculturists. The physiological structure of the plants is so peculiar, so different to that of every other form of vegetation, as to render them pointedly interesting to every naturalist. That they are capable of resisting far more fatigue than any other plants, is well known, and yet it requires the highest degree of cultural skill to maintain a collection in a generally healthy state. They are also liable to diseases quite foreign to other groups of plants, and in this respect, perhaps, approach a step closer to the animal kingdom.

In the course of experience and experiment over a large and varied collection, I have found tangible benefits to accrue from studying the thermal condition of the compost in which the plants grow. I may say that it is no haphazard conjecture that I am about to propound, but a simple statement of facts deduced from a ten years' practice upon a collection of Orchids. Formerly, although I managed to grow the temperate species quite satisfactorily enough, I could not manage the great subdivision of *Vandeæ* at all well. I found, especially in the case of *Saccolabium*, *Phalænopsis*, and some of the more tender *Aërides*, the most discomfiting opposition. The firm fleshy roots which had been emitted during the growing season, and which had been introduced into the pots, pans, or baskets, as the case might be, at the season of repotting, were, on the next examination, found to be a mass of rottenness—in many instances, very few of the roots under ground escaped unscathed. What was the consequence? The lower leaves became yellow, dropped off one by one, and left me and the plants, at the end of the season, in pretty much the same condition as at the beginning. This was very mortifying, especially as the compost was physically and chemically good enough, as I have ultimately proved. Wherein, then, lay the defect? It was in the watering the plants with water taken from an underground cistern, which, a series of thermometrical experiments shewed me, was lower in temperature, by from 7° to 10°, than was the atmosphere. "Necessity is the mother of invention;" and when I began to reflect upon the advantages of bottom heat to pines, vines, and even stove and fine-foliaged plants, I set about to effect a reformation. I shrugged my shoulders at the very idea of a tan or sand bed in an orchid-house, as being a resort for an army of cockroaches *(Blatta orientalis)* that could never be successfully overcome, and that would be a plague among the plants scarcely less devastating than the locusts of old. I ordered hot water to be drawn from the boilers, and to be mixed with the colder water drawn from the cistern, until it was never less than ten—it might be sometimes as high as twenty degrees—higher than the atmosphere of the house about to be watered. The effect, in a few months, quite exceeded my most sanguine anticipations. The vigour of the plants increased, the quality and quantity of the bloom were greatly superior, and when the season of repotting came round, the roots embedded in the compost, instead of being all but universally putrid, were generally healthy. I have now, for upwards of two years, carried out the above plan, not only in tropical but in "cool" orchid-houses, with marked success. The impregnation with iron of the water drawn from the boilers, instead of being attended with any depreciating influence, as some maintain, on the contrary, appears to be productive of good.

I have no wish to arrogate to myself any particular claim or merit for initiating and propounding this theory. Far from it. It has been more or less recognised and acted upon, although in most instances its value has been unheeded. My sole object, now, is to engage the attention of cultivators, and more particularly cultivators of orchids, so that they may act upon it systematically, and take cognisance of the results. With what nicety and discrimination do we all go into the various modes in practice of pots and potting, of houses and glazing, of out-door and in-door temperature—in fact, every gardener is a meteorologist almost by compulsion; and yet there are probably not half a dozen cultivators in England that ever took the trouble to gauge the temperature of the water about to be used, either out of the waterpot or the syringe. Men in charge, under the principal, although obedient, are not always reflective and painstaking, and, unless positive orders be given that water at such a temperature must be used, there will be a good deal of random practice.

In order, then, that there may be no misunderstanding or doubts as to the theory I wish to inculcate, I reiterate, that all pot plants, as a rule, ought to have water at the root at least five degrees higher in temperature than that of the atmosphere in which they live, and that tropical orchids will prosper all the better with a minimum variation of ten degrees—that is to say, if all other conditions of treatment are skilfully complied with. Much the best system I have seen in practice, recognising the value of bottom heat, without plunging material, is that applied in one of Mr. Day's tropical houses at Tottenham. Along the centre of the house, instead of so many tiers of four-inch piping, there is a trough-like cistern, narrow at bottom, and widening out towards the top, somewhat in the form of a feeding box for horses on a large scale. This is connected with the boiler by pipes in the usual way, and circulation is constantly taking place. The top is so arranged as to be open or shut at pleasure, and by this means an excellent steady heat, either moist or dry, is diffused over the roots of such plants as are immediately over its surface. I need scarcely say that Mr. Day's *Saccolabiums*, *Aërides*, and such like plants, in a medium of this kind, under Mr. Stone's cultural care, are indicative of high health and vigour. Mr. Williams, of Holloway, formerly with Mr. Warner at Hoddesden, to whom I was lately speaking as to my watering practice, appeared to be agreeably surprised, and intimated to me that he never grew orchids before or since equal to those under his charge at Hoddesden, where his water tanks were in connection with the hot water pipes. This surely goes a long way to prove the soundness of the theory.

Lastly, we all know and fear the ravages of spot; we look with the greatest concern upon the insidious way in which it works itself over a collection of *Orchideæ*, and oft times disfigures for life the appearance of many valuable plants. I unhesitatingly pronounce that there seems to be no absolute cure for some of the more aggravated forms of it; but, beyond question, skilful treatment will in a great measure prevent it. There are a variety of conditions that must be observed before any cultivator can command success; but I was never able to claim immunity from the inroads of spot in the same satisfactory manner as I do now, until I had reduced this watering theory to every-day practice.

THE views of Mr. Anderson were supported by the observations of MR. BATEMAN, PROFESSOR DAUBENY, and others. MR. A. DE MORNAY said, that in Brazil he had observed, on emerging from the forests, where the temperature was comparatively cool, that the rain drops felt warm.

PROFESSOR REICHENBACH remarked, that it would be very desirable to know all the circumstances that affect stove plants. He adduced two very striking cases of variation, one of which occurred in a small orchid-house in the Palace Garden at Dresden, and in which nearly all the flowers that were produced were monstrous. What can have been the cause? The second case may be observed in the Botanic Garden at Brussels, where there is a small lean-to orchid stove, the whole of the windows of which are painted with lines of dark green. All the orchids in this house are remarkably changed, some so much so that they can hardly be recognised. The internodes are lengthened, and plants with pseudo-bulbs become almost distichous. A plant of *Oncidium carthaginense* (or *O. luridum*) produced small narrow leaves, and small spikes of bloom, instead of the usual panicles. The plant was so altered, that it was difficult to recognise it. No doubt the deficiency of light was the inducing cause of these changes.

COOL VINERY ORCHIDS.

By Robert Warner, Broomfield, Chelmsford.

My excuse for offering this paper to the notice of the Congress must be, that I entertain the hope of benefiting others.

My experience in growing orchids under the shade of thinly-trained grape-vines, has been so satisfactory to myself, that I think a record of it may not be uninteresting. I do not wish it to be supposed that this plan is promulgated as being better than any other, but simply to show that many orchids may thus be grown well, and flowered in great perfection.

It is now about ten years since I bought several lots of imported *Lycaste Skinneri*. They were placed in a cucumber-house, that being the only hot-house I then had. They began to push out young shoots, but soon after this an old orchid-grower called, and when he had seen them, he remarked, "Ah! they look as though they meant growing well, but in three years not a bit will be left. No one can keep them long."

I immediately concluded, that if they did not live long in great heat, it could not be right to continue the old plan. They were removed into a vinery, where the vines were young and thin; considerable quantities of water were given frequently to their roots, and, to the surprise of all, they flourished remarkably well, and continued to increase and flower, until, about three years since, the late Dr. Lindley pronounced that in his opinion longer and broader leaves, and finer flowers, had never been seen in England before.

In an evil hour for them, they were divided; and not having so much attention as formerly, from my collection having become much more numerous and extensive, they felt the effect much, but are now recovering, and will soon be as strong as ever.

This was one of the first, if not the very first successful experiment in growing orchids of this species cooler than under the ordinary treatment. An extract from "The Gardeners' Chronicle," of June 11, 1864, will show the opinion of a competent judge who inspected them:—

"In one division were gathered what Mr. Warner more especially calls his 'cool vinery orchids.' This is a low span-roofed house, like the rest, covered with vines bearing a capital crop of grapes, and with the leaves so trained as just to screen the plants without the use of blinds. It has a fixed roof, with a few side ventilators, and the rule adopted, as we were told, is 40° [4·44° C.] minimum in winter, and in summer as much natural heat as the season affords, with ventilation. In this house *Lycaste Skinneri* was revelling, its leaves a yard long; Odontoglots had formed pseudobulbs half as large again as those of imported plants. Arpophyllums were in sturdy vigour; and Pleiones, which had been flowering some time since, now presented a perfect picture of healthy foliage."

After my first year's experience with *Lycaste Skinneri*, other Lycastes were tried and did equally well; also, *Odontoglossum grande*, *pulchellum*, &c.; next, Arpophyllums; and lastly, *Pleione lagenaria*, and various others, including Cattleyas.

All did well under the shade of the vines in summer, but I should not recommend Cattleyas to remain during winter at the same low temperature which is sufficient for Odontoglossums and Lycastes.

It is not, however, desirable at the present time to describe too minutely the treatment of what are now called cool orchids; suffice it to say, that in my opinion there are very few orchids but feel the beneficial effects of warm, fresh air, and of the sun's rays, especially if the latter are made to pass between grape-leaves. Temperature in winter, 45° to 50° Fahrenheit [7° to 10° C.]: sometimes lower, if frost is severe, but never below 40° [4·44° C.], even at night. Summer temperature varies according to the weather outside. Plenty of fresh air is admitted when the days are fine and warm, entering by front sashes through perforated zinc, and passing directly over the foliage of the orchids, so that the leaves may gently wave about.

As a rule, artificial heat is dispensed with in warm spring, summer, and autumn days; but at those seasons, if the weather is cloudy or cold, a little fire-heat is given, to dry up the moisture occasioned by watering the plants. The temperature of the water should be at least ten degrees higher than that of the atmosphere of the house.

The annual value of the grapes usually amounts to half the cost of erecting the house.

Thus many orchids may be grown well, and at little cost, for two different crops are produced out of one simple house. The first consisting of beautiful flowers, to please the eye in the winter and spring months; and the other, such fruit as no one would refuse to partake of in July and the early autumn.

THE CULTURE OF FRUIT IN UNHEATED GLASS STRUCTURES.

By Thomas Rivers, Sawbridgeworth.

It is now about sixteen years since a method of cultivating fruit trees in pots, in small roughly-built glass structures, was pointed out. As it seemed a novelty, it was, as a matter of course, received with much incredulity, and in some cases with ridicule. In spite of this, the system has progressed, and has now, with various improvements, suggested by experience, spread over the whole empire, partially on the Continent, and extensively in the United States of America. It seems, as now carried out, particularly well adapted to the North of Europe, and I have recently heard from a friend who has built some large Orchard-houses at Gothenburg, in Sweden, that nothing can be more promising or gratifying.

The kinds of fruit to which the system was at first applied in England, were those universal favourites, the Apricot, Peach, and Nectarine, which had hitherto been cultivated on trees trained to walls or on trellises in peach-houses with artificial heat. The very simple idea of their cultivation on trees allowed to take their natural form of growth in pots, or planted in the borders of unheated houses, was entirely overlooked, and thought by most gardeners to be impracticable.

It is now well ascertained that the climate given by a roof of glass approaches, or even surpasses, that of the most favoured districts of Europe, inasmuch as a warm and favourable ripening temperature is insured, and perfect immunity from the blighting effects of spring frosts, often so destructive to the blossoms of fruit trees, even in the most genial climates of Europe, as well as protection from storms of wind and rain, equally injurious to fruit when progressing towards ripeness.

As much experience has, within these few years, been acquired with respect to the most approved mode of erecting and planting Orchard-houses, I will endeavour, in as few words as possible, to convey the lesson that experience has taught.

With respect to the form of a glass structure to be called an Orchard-house—a term at first broached with diffidence, but now imbedded in our language—the span-roofed is most undoubtedly to be preferred; the width and height are of course a matter of taste, but the dimensions the most approved of are a width of 24 feet, height at sides 6 feet, height to apex of roof 15 feet; a house of this width is on the whole to be preferred to one of wider dimensions, only because it can be so thoroughly ventilated by side ventilators; still, a width of 30 feet is not objectionable.

Houses of the above size are adapted to large gardens, but smaller span-roofed houses are equally efficient, and capable of giving much pleasure and produce to the amateur cultivator of more limited means.

A house 14 feet wide, 5½ feet in height at the sides, and 12 feet to the apex of the roof, is less costly, and nearly as well adapted to the cultivation of fruit; I say nearly, only because such houses do not possess perfect immunity from the severe frosts which often occur in England in the month of April, when the trees are in bloom, and sometimes require a pan of ignited charcoal to enable them to resist frost, while large houses retain such a large body of heated air, that frost in spring, to any injurious extent, seldom or never enters.

The striking peculiarity of these Orchard-houses is their construction. The ancient and expensive form of building houses for the cultivation of fruit, viz., by sliding sashes and heavy rafters, is entirely departed from; they are built with fixed unbroken roofs; none of the useless and expensive methods of roof ventilation are resorted to; no pulling down of sashes "to give air" is necessary;

the most thorough ventilation is given by the admission of air at the sides at a low level.

In a large house, 24 to 30 feet wide, and 6 feet in height at the sides, there should be in the centre of each side a shutter, two feet deep, either glazed or of wood, two feet either of boards or brickwork below it, and two feet above it of glass. The two-feet openings on each side admit large volumes of cool air, which, when the sun shines, is rarified, and rapidly ascends to the roof, through the foliage of the trees, and makes its escape at a triangular aperture under the gable at each end; these apertures, in houses of the size above mentioned, should be fifteen inches in depth. After years of experience, this simple mode of ventilation is found to be perfectly efficient. For span-roofed houses, 14 feet wide and 5½ feet high at the sides, a ventilating space fourteen inches wide will be found amply sufficient, and a triangular aperture at each end, under the gable, one foot in depth, will give free egress to the heated air; these apertures are permanent, and left unglazed; in severe spring frosts, when the trees are in bloom, they should be closed with a temporary shutter; with the larger houses this is never required.

A very recent improvement in the building of Orchard-houses has originated here owing to a mistake. The builder had orders to place the rafters of a new house 400 feet long, at the usual distance (20 inches) apart; he placed them 24 inches apart, and as 21-oz. glass has been used, the effect is remarkably good, the admission of light being so abundant. The pieces of glass are 24 inches by 18 inches, placed crosswise; the rafters neatly chamfered, are 4½ inches by 1½.

I have been tempted to go into these details, trusting that to some persons they may be useful.

With regard to the planting and management of trees in such houses as I have attempted to describe, there are some few particulars, the gainings of experience, that are perhaps worthy of a few paragraphs.

The most interesting of all fruits to English people are Peaches and Nectarines, and to these I will first devote some attention.

There are two methods of cultivating these fruits in Orchard-houses, both equally favourable to their well-doing: one is to cultivate the trees in pots, the other to plant them in the borders of the houses. With the large houses the most eligible form of tree to plant in pots is the pyramidal; this most interesting form succeeds better in pots than when planted in the borders; the roots being confined, the shoots are not so gross as those on trees planted in the ground, the sap does not rush to the top so rapidly, leaving the lower branches in a weakly state; in fact, it seems more regularly distributed, so that for many years, a pyramidal Peach or Nectarine tree, in a pot from 15 to 18 inches in diameter, will gradually increase in beauty, and by the simple operation of pinching all the young shoots formed during the summer, to two, three, or four leaves, a fruitful and beautiful pyramid, ten feet or more in height, may be formed. Such trees, placed among others planted in the borders, are most ornamental, showing, as they will do if attended to, perfect cultivation. The health and fertility of such trees is kept up by giving them every season some fresh food in the shape of a rich compost formed of loam (if tenacious, all the better) and manure, thoroughly decomposed, in equal quantities. This operation should be performed about the last week in October, by removing the surface soil—generally a network of fibrous roots—to a depth of 5 inches, and replacing it with fresh compost of the description just given. The most important matter connected with the culture of trees in pots, is keeping their roots dry during the winter months, so that they are not too much excited—they are never at rest—the shoots then become dry and ripe, and in a fit state to put forth their blossoms in spring, which, owing to the trees not being subjected to the great atmospheric changes incident to the open air in an English winter, they do with great vigour. To make success doubly sure, this dryness of the soil in the pots must be strictly attended to. The trees should be well watered when top dressed, and again before the middle of November; they may then, if in the large pots I have mentioned, remain without water till early in March, when the blossom buds begin to swell. Many failures in the pot culture of fruit trees have occurred from the fears entertained by cultivators that trees must always have their roots in a soil saturated with moisture—the great evil of our English climate, for if the roots of our fruit trees in the open air could be kept from the heavy rains of our winter months, we should have much greater success in the culture of the more delicate kinds of fruits.

Before I leave the subject of pot culture I must mention the necessity of giving the trees extra food during the summer months. This is best done by placing on the surface of the mould in the pot a layer of some rich compost, about 3 inches in depth at the outside, and made concave round the stem of the tree, so as to retain water. This compost may consist of manure chopped into small pieces, and saturated with liquid manure; or horse droppings from the roads, and malt or kiln dust from a malt-house, equal quantities, also saturated with liquid manure; the latter compost is the most valuable surface-dressing ever invented, for not only do the roots of Peach trees come to the surface to feed upon it, but vines, if dressed with it, show extraordinary vigour; if a vine in a pot has a dressing of it from 6 to 8 inches deep (this must of course be supported by pieces of slate stuck inside the rim), the roots ascend rapidly, and seem to devour it with avidity, so that by the autumn a mass of this compost on the surface of the soil in the pot, in which a vine has been growing all the summer, will be found a complete mass of fibrous roots, hard and compact, the virtue of the compost being seemingly absorbed.

I have thus far endeavoured to give an outline of the pot culture of Peaches and Nectarines in unheated glass structures. The other method of cultivation by planting the trees in the borders, must next be considered; this is neither more nor less than planting a Peach garden, such as one would do in Italy or in some of the States of

North America. Still, as a glass structure is of more value than a piece of uncovered ground, care must be taken that it is made the best of. There is a peculiar feature in most stone fruits—their love of a firm soil. A light, porous soil is generally fatal to the health of a Peach tree, at least in the gardens of Europe; how the light soils of Buenos Ayres and other parts of South America act on the constitution of the Peach tree, I am not able to say; I only know from report that the trees make good firewood.

In Orchard-houses, I am now able to assert, with full confidence, that a firm border for Peach and Nectarine trees is a *sine quâ non;* there is no sound prospect of success without it; and I may add, that if such a border is calcareous, or can be made so by mixing one square yard of chalk to ten of the natural soil, so much the better for the fruit trees. In forming the borders, the soil should be refreshed with a slight dressing of manure, and then stirred to a depth of 20 inches—no other preparation is required. The trees should be planted in this rather shallow border, heavily watered, and suffered to remain for a week; at the end of that time, the entire border should be gone over with a rammer, and rammed firmly down; a wooden rammer, about one-third the weight of those used by the London paviors, will be found the best implement.

The border thus rammed and levelled, should remain solid, and never again be stirred, except to be slightly pricked with a fork in spring—early in March—to admit water to the surface roots of the trees. After being watered, a slight dressing of rotten manure, about 1 inch in depth, should be laid on the surface of the solid soil, and no other disturbance of it should take place. So obnoxious is the disturbance of the soil to the roots of Peach and Nectarine trees, that I have seen in an otherwise well-managed house fine and well-grown half-standard trees quite bare of fruit, owing to the borders having been carefully dug 6 inches in depth in spring, every blossom having consequently dropped, without setting its fruit.

I have thus far endeavoured to give the principal outlines of the successful culture of those favourite fruits, Peaches and Nectarines. All that I have said has been gained by observation and experience, and I see no reason why the principles here laid down should not be applicable to all soils and climates in which their cultivation requires the assistance of glass. I will even go further, and fearlessly assert, that their culture, when trained to walls, may be much benefited by solid undisturbed borders.

A few words as to the culture of Apricots in Orchard-houses will, I trust, not be out of place. As far as I have experienced, there are many professional and amateur gardeners, who, although having succeeded in the culture of Peaches and Nectarines under glass, have yet failed in producing crops of Apricots, much to their regret, for of all stone-fruits the Apricot, when thoroughly ripened in an orchard-house, and in that state when the skin commences to shrivel, is the finest; so full of delicately-perfumed saccharine juice, so nutritive, and so digestible is it, that no fruit I have ever eaten can compare with it.

How great is the contrast between such fruit and those generally taken from walls, but seldom fully ripe; from those offered for sale on the Continent, and from those imported thence; all hard, dry, and unwholesome.

The most curious fact relative to the culture of the Apricot in orchard-houses is a recent discovery that they require less care than any other kind of fruit; it is simply the "let alone" principle, and the avoidance of too much care. Their successful culture in pots, with this proviso, is soon told. Trees of three or four years' growth should be planted in pots 15 or 18 inches in diameter, in a compost of loam and manure; if the loam is not calcareous, the same proportion of chalk (one-tenth) as recommended for Peaches and Nectarines should be mixed with it. The compost should be rammed down firmly, but not too heavily—the blunt end of a stout stick will do very well. The trees should have no water after the middle of November till early in March, just as the blossom buds are swelling, and then must have it only in small quantities.

As soon as the fruit is set, and about the size of small horse-beans, some rich dressing should be placed on the surface of the soil in the pots, and water given liberally; this treatment is adapted for trees potted in autumn. For trees established in pots, the following simple treatment has been found here perfectly successful. About the first week in November they should have a liberal supply of water; this cannot be given at once, but should be supplied at intervals—say three times during one day; this is the last time of watering, and it should be done effectually. No top-dressing, as with Peaches and Nectarines, should take place, but the earth in the pots should be suffered to remain firm and undisturbed. About the first week in March, when the blossom buds begin to swell, the trees may have water, as directed for trees freshly potted; but now comes the peculiar treatment which has here been so successful: the surface of the soil must remain perfectly undisturbed until the fruit is fully set, and about the size of a small horse-bean; then, and not till then, should the tree have fresh food to nourish its crop of fruit—and this is done by carefully scraping off the surface soil to an inch in depth, so as not to injure the roots, and then placing on the surface a dressing of the rich compost named above; this should not be heaped up to the stem, but should be made concave, so as to retain water. The dressing should be 3 inches deep round the outside of the circle; if the weather be warm, the trees may have water daily, and the fruit will swell rapidly. I must add, that this surface-dressing given, say early in May, must be repeated in June, and again in July; for the roots seem, as it were, to feed upon it - at any rate, it disappears. If a tree should happen to have an extra full crop, it is a good practice to stick some pieces of slate inside the rim of the pot, so that more food, in the shape of an additional coat of compost, may be given; this is, however, not to be recommended—it is better to thin the fruit more severely, so as not to distress the tree.

The most preferable form of tree to plant in a large Orchard-house is the standard with a stem about five feet in height; these may be planted ten feet apart. For cultivation in pots in such houses, pyramids, in pots 15 to 18 inches in diameter, are to be preferred; they soon make noble trees, and should be placed among the standards, wherever an eligible space can be found. For smaller houses, half-standard trees, with stems about three feet in height, should be planted in the borders, and bushes—round-headed trees on stems one foot in height—cultivated in pots.

These descriptions of trees apply to Apricots, Peaches, and Nectarines.

With reference to the recommendation of a solid undisturbed soil being so favourable to the Apricot, I may mention that some standard trees, standing in one of my houses in a stiff calcareous clay—the soil as hard as a well-trodden path—bear so abundantly that unless the fruit were thinned severely, they would destroy themselves. There is nothing new in this liking of the Apricot tree for a solid unbroken soil, although it was discovered here by mere accident, viz., by some trees in pots being forgotten, and having no water or care till the fruit was set. It is, however, simply an old fact with a new face; for, since it has been practised here with trees under glass, I have recollected seeing in many of the cottage yards in Oxfordshire and elsewhere, Apricot trees, trained to the gable ends of cottages, flourishing and bearing most profusely, their roots being in some cases under a pavement, and in others under the common footpath used by the family. It should never be forgotten by the cultivator, that Apricot trees in Orchard-houses require abundance of air while in bloom, and that they will bear three or four degrees of frost with impunity, while one night of confined moist air will make their blossoms drop without setting the fruit.

I have thus far endeavoured to sketch the outlines of the cultivation of three kinds of fruits most in favour in temperate climates, but feel that I must not pass over my favourite, the Cherry. I sometimes think that I would give up eating Peaches and Nectarines rather than relinquish the great pleasure which my cherry-house annually gives me.

With respect to the construction of houses for the cultivation of Cherry trees, the small span-roofed house, 14 feet wide, will be found the most eligible, for one special reason—the cherry aphis can only be effectually kept under by tobacco smoke, and this can never be made sufficiently dense in large houses. The most eligible form of tree, either for planting in the borders or for pot culture, is the pyramidal. Some care is required in selecting the sorts, and the kind of stocks the trees are grafted on; the most compact-growing race, and the best adapted for the borders, is the May Duke. The following are select varieties of the May Duke class: Empress Eugénie, Nouvelle Royale, Archduke, and Duchesse de Palluau, all form beautiful and fertile pyramids, easily kept in order by constantly pinching in the young shoots to three leaves during the summer. These kinds of Cherries require to be grafted on the *Cerasus Mahaleb*, which induces a dwarf compact habit.

The finer kinds of Bigarreau Cherries, which, when grafted on the common Cherry (*Cerasus vulgaris*), become, in orchards, such large trees, should be cultivated in pots, from 15 to 18 inches in diameter; and if their young shoots are pinched in to three leaves during the summer, they form most beautiful pyramids. If trees of this race are planted in the borders, their tendency to luxuriant growth must be checked by double grafting; this is done by budding or grafting some kind of Duke or Morello Cherry on the Mahaleb Cherry, and then regrafting it with the kind of Bigarreau or Heart Cherry wished for; they soon form, when subjected to the summer pinching of their shoots as directed above, most fertile and beautiful trees; indeed, I know of no fruit trees more beautiful and desirable than pyramidal Cherries. When cultivated under glass, their fruit is brought to such perfection of ripeness as is seldom or never seen in the open air, at least, in England; besides this, its duration is so great, for the early kinds ripen the first week in June, and the late varieties continue in perfection till the end of August.

There are still a few kinds of fruit worthy of a passing notice, as being adapted to Orchard-house culture. Among these the finer kinds of dessert Plums deserve attention. It is well known how liable to injury the blossoms of the plum tree are from spring frosts, not only in England, but over a large portion of the continent. By cultivating the trees, either as pyramids or half-standards, in Orchard-houses, their blossoms set freely, and they bear abundantly. In the warmer parts of England, the trees should be removed to some warm sheltered place in the open air to ripen their fruit, the flavour of which is then more racy; but in cool moist climates they may remain under glass, if the house is allowed to have abundance of air night and day, till the fruit is ripe; the trees may then be placed out of doors till the commencement of November, and then be removed to the Orchard-house, or their roots become too much saturated with the heavy autumnal rains.

Pear trees, of which we so often lose the crop by frost destroying their blossoms, may be subjected to exactly the same treatment as Plums. Pear trees grafted on Quince stocks are to be preferred for this mode of cultivation—they are so enormously fertile. The pyramidal form is most to be recommended for Pear trees, and the pinching in of the young shoots in summer, as directed for Cherries, is quite indispensable.

Knowing, as we all do, the hardy nature of the Apple, it seems almost an extravagant idea to recommend it as a tree to be cultivated under glass. Unless I had had experience, I should participate in this opinion; but after seeing and tasting the magnificent Apples I have gathered from trees in my apple-tree house, I can safely say that the difference between a Golden Pippin of the old sort ripened on trees in the house, and those from trees in the open air, both in size, beauty, and flavour, can scarcely be realised; and the melting, juicy texture of some of the finer kinds of American Apples, such as the Melon Apple, the Northern Spy, the Primate, the Washington, and some others, is equally remarkable; the latter-named sort ripens in September, and when fully ripe its juice is nearly as abundant as that of the Peach, running down the knife when cut.

I have in this slight sketch endeavoured to give an idea of what may be done in fruit culture in temperate climates, such as Orchard-houses give; and although some sixteen years have passed since its advantages were shadowed forth, and although thousands of Orchard-houses have been built, I can, with the most perfect confidence, say, that it is still not only in its childhood, but in its infancy. I feel no hesitation in prophesying that, ere this century closes, Orchard-houses will be as familiar to the eyes of Englishmen as are green fields, and that they will spread over all the temperate regions of the United States of America, where they are already numerous. With regard to the continent of Europe, they will be adopted more slowly, but as wealth and intelligence increase, they will, to a surety, be things well-known and highly prized, more particularly in Sweden, Norway, and the north of Europe generally.

DESSERT ORANGE CULTURE.

By Thomas Rivers, Sawbridgeworth.

In the diary of that "fine old English gentleman," John Evelyn, may be found an intimation to the effect that he had eaten as good "China oranges" plucked from his own trees as he ever wished to eat. In those days dessert oranges were, it seems, called "China oranges." Although oranges were cultivated in France long before Evelyn's time, yet they were considered merely ornamental appendages to palaces and mansions: no thought seems to have been turned to them, so as to consider them fruit trees; and even Evelyn, with his remarkable horticultural sagacity, does not mention that he had ranked orange trees among fruit trees; for in his "Kalendarium Hortense," when he mentions for every month "fruits in prime and yet lasting," no mention is made of oranges; it would seem, therefore, that his gathering of oranges fit to eat was an accidental occurrence, and we are led to suppose from the silence of gardeners for nearly two hundred years as to their culture, that the orange-eating world has felt perfectly satisfied with imported oranges, brought quickly by fast-sailing vessels; still, the difference between oranges freshly gathered from the trees, and the very finest imported, is most remarkable; there is a crispness and fine aroma in oranges freshly gathered difficult to realise, unless they are promptly compared with imported fruit; they are indeed a luxury, and, as such, will be cultivated ere long in every good garden.

The houses best adapted for their cultivation are the large span-roofed, 24 feet wide, 6 feet high at each side, and 15 feet high in the centre. A house of this size will require eight four-inch hot water pipes, four on each side, as artificial heat is required all the year to ripen oranges in one season perfectly.

A smaller span-roofed house, 5½ feet high at each side, and 12 feet high in the centre, heated by four four-inch hot water pipes, two on each side, is almost as eligible for orange culture, as one even of the larger size. A house of these dimensions, with a central path, and a border on each side planted with orange trees, would form a pleasant and productive orange garden; but to form an orange grove, so as to have trees of fine growth, and to give abundant crops, the larger house must be resorted to.

From the experience I have gained, I firmly believe that no conservatory, no orchid-house, no greenhouse, is half so beautiful or interesting as an orange-house constructed on the principles I now advocate, and provided with fixed roofs, rafters 24 inches apart, glazed with large pieces of glass, and admitting abundance of light; so that in December, when the trees are covered with their golden fruit, and many of them showing their snowy-white, perfumed flowers, the scene is indeed enchanting, and is enhanced by the agreeable temperature, which need not be higher than from 50° to 60° (10° to 15° cent.) in cloudy weather. It is not fierce heat in winter that ripening oranges require, but an even agreeable temperature, such as is experienced in the Azores during that season of the year.

The houses above mentioned should have side ventilation, as in orchard-houses, viz., an opening in each side of the large house two feet wide, for the smaller houses one foot wide; these openings should be in the centre of each side, and shutters of wood or sashes employed to close them, the latter, of course, being the most agreeable.

In houses thus treated, orange trees may be cultivated in pots or tubs, or planted in the borders. There is no doubt that more rapid growth would take place if such borders were heated by having hot-water pipes placed two feet under the surface; but from recent experience I am inclined to think this is not absolutely necessary, for if the borders are raised eighteen inches above the surface, they would have sufficient heat from the atmosphere of the house, and their temperature would be quite equal to sustain the trees in health.

The cultivation of dessert orange trees in pots or tubs, is very simple; the compost they require consists of equal parts of peat, loam, and manure thoroughly decomposed; the two former should not be be sifted, but chopped up with the pieces of turf and roots, so as to form a rough compost. The trees will grow in this freely, and bear abundantly; but they should have gentle, constant, root heat; this is best given by enclosing hot-water pipes in a shallow chamber of bricks, and placing the pots on a flooring of slates or tiles forming the roof of the chamber.

The compost for the borders in which orange trees are to be planted, should consist of turfy loam two parts, and equal parts of thoroughly decomposed manure and leaf mould. After planting, the borders should be trodden down firmly, as orange trees seem to flourish best in firm loamy soils. In the orange gardens of Nervi, where orange trees are, or used to be, so largely grown for exportation, and imported by the London dealers in oil, &c., the soil is a tenacious yellow loam.

The best form of tree for an orange garden under glass, is the round-headed, a form which it seems to take naturally; for if it is endeavoured to be cultivated as a pyramid, which would seem desirable, its lower branches soon become weakly and unhealthy. If trees with stems two or three feet in height are planted, the lower branches may be gradually removed till a clear stem of five feet in height is formed, and this height will be found sufficient. They may be planted from five to six or seven feet apart, according to the size of the house, and the room which can be afforded for each tree. It must not be forgotten that in small houses the heads of the trees may be kept in a compact state by summer pinching, and in large houses be allowed a greater freedom of growth, so that the owner of an orange garden in England may sit under the shade of his orange trees.

There are but few kinds yet known of really fine dessert oranges; the amateur who wishes to plant an orange garden to supply his dessert, must not think of planting the numerous varieties of the genus *Citrus* grown by Italian and French cultivators; they are mostly what are called fancy sorts, and are more prized for their foliage and flowers than for their fruit.

One of the most charming and prolific of dessert oranges is the Tangierine: the tree has small leaves, and seldom attains a height of more than 7 ft., even in North Africa. Its most valuable quality is its early ripening, so that in October, just as the late peaches and other soft fruits are over, this luscious little fruit is ready for the dessert; and when freshly gathered no fruit can be more gratifying or delightful, as its aroma is so delicious, and its juice so abundant, in this respect, offering a pleasing contrast to those imported from Lisbon in November and December, the flesh of which is generally shrunk from the rind, instead of being ready to burst, as is the case with those plucked from the tree. They should, in common with all home-grown oranges, be placed on the table with some leaves adhering to their stalks, thus showing that they have not made a voyage.

Among full-sized oranges the Maltese Blood takes the first rank; when quite fresh from the tree it differs much from those imported, although the voyage as now made by steamers is of short duration. I was not so fully aware of this till early in January, 1866, when I was able to compare some fine imported fruit with some gathered from my trees. I found the former, although rich and juicy, yet flat in flavour compared with those freshly gathered; they lacked the crispness and aroma which were most agreeable in the latter. The great advantage in planting this sort is its tendency to bear fine fruit while the trees are young; they are indeed so prolific, that trees of only two feet in height have here borne nice crops of fruit.

Some varieties, quite equal to the foregoing in quality, but without the red flesh, so peculiar to these "blood oranges," have been imported from the Azores, the paradise of orange trees. One of the most desirable sorts is called simply the St. Michael's orange. This kind has a thin rind, is very juicy, and bears abundantly, even while the trees are young. In the orange-house, these will ripen towards the end of December, and throughout January and February, in common with the Maltese Blood oranges.

No one but an amateur of gardening can imagine the pure, quiet pleasure of taking a morning walk in the orange-house, during the above-mentioned dreary months, and plucking from the trees oranges fully ripe. I have had much experience in the culture, and I may add, in the eating of fruit; but I can say with a firm conviction that I have never enjoyed any kind of fruit so much, as I have oranges of my own plucking in winter.

In addition to the three leading varieties I have mentioned, there are several kinds which will, doubtless, prove interesting and valuable. It is not to be expected that so much variation in flavour, as in the pear, for instance, can be met with in oranges. I believe, however, that when our orange palates are educated we shall find many delicate distinctions in the flavour of oranges. As far as I have gone I have found the Mandarin orange larger and more flat in shape than the Tangierine, and not so good as that sort. The Embiguo, the Egg, the Silver orange, the Botelha, the White orange, and some others, all varieties from the Azores, are of various degrees of excellence, and are all worthy of a place in an English orange garden.

There are many various forms of the genus *Citrus*, which, in a large orange garden, may be cultivated, and prove of interest to the cultivator, but I have thought it proper to confine myself, in conformity with the heading of this paper, to the kinds of oranges proper for our desserts. It may, however, be not thought out of place, if I mention that the lemon, more particularly the Imperial lemon, is well worthy of a place in the orange garden, as is also the Small Lime, which is a concentration of acidity.

In these few remarks, I hope to be excused any lack of full and proper directions to carry out my conceptions. It is at all times difficult to tell people how to cultivate even a cabbage; for unless full directions are given as to which end should go into the ground, it is just possible that a tyro in gardening would plant it head downwards. So it is in the higher branches of horticulture: it is only an outline that can be given in print, the picture must be filled in by observation and study. Ten minutes showing will do more than ten hours reading; still, without the preparation of reading the mind will not take in what is shown.

ON THE PREPARATORY FORMATION OF TRAINED WALL FRUIT TREES.

By WILLIAM EARLEY, Gardener, Digswell, Welwyn.

I WISH to draw attention to the general mode of procedure as practised in the formation of young fruit trees—trained wall fruit trees especially; more with the desire of profiting by the experience of others, than with the wish of explaining my own views.

I believe that the way in which young trees of this description are prepared in infancy for the grower, is not only detrimental to longevity, but is opposed to a uniformly good, even-balanced growth; and that the system adopted causes waste of valuable room, besides being the opposite of that necessary for the production of fruitful wood. The main object of the vendor, it is needless to affirm, is the attainment of the most robust growth possible at every stage, more especially in the season preceding the date at which the trees are ready to be sent out. Thus, in robustness of growth and exterior good health, there may be little to find fault with. How do these qualities agree with the confined training and restraint to which the trees are destined to be submitted? Once in the hands of the grower, the first step taken, in view of assisting the more or less injured roots, and of bringing the plant into proper training, is to needlessly reduce the strong, sappy shoots, oftimes to something less than a third of the growth of the previous season. The knife must be again used to sever in twain the last season's growth, and this process has to be repeated the following winter; for whether, when they get into the fruiter's hands, the knife be used sparingly or decisively, the past practice will exhibit itself in the emission of a few strong shoots only, from the apex of each shoot cut in. And only a close, observant practitioner knows how these strong woody shoots will elongate, even with the most determined pinching back of the young shoots as they appear. The more obvious consequence of giving this gross young wood to a tree as its future basis, is seen in the circle of non-fruiting wood formed around and over the base of the worked part—"a waste of valuable room." Independently, however, of wasted space, the time expended in reducing these trees into fruiting form is, to a great extent, lost. The severing of these strong growths with the knife causes the heart to die back to a far greater extent than can be imagined by those who have not given their study to this subject. It begins some two or three inches below where the bud and stock form a junction, through what remains of the bud's first growth, and even onward through the separating point of the several shoots, as far as to where they were severed the second season. Take a transverse section of these parts, with the decayed lifeless medullary substance, and does it appear strange that large sections of our wall trees shrivel and die, the Apricot especially? And if we adduce that the Hemskirke variety does not die off so readily, we may infer, until other proof be forthcoming, that, through its early habit of growth, it is better able to heal over the grosser wounds made in its young wood, and can thus with greater impunity withstand this unnatural treatment, than do other of its allies.

A young tree, such as above described, however harshly operated upon, loses none of its growing capabilities for the time being. Indeed, Peach and Nectarine trees of this description, the decayed parts of which I have minutely chiselled and gouged away, have grown twice as much as more healthy and perfect ones in the same house with equal advantages have done. The wood they produced, however, was ill matured, devoid of flower buds, and worse than useless; as at any moment in the following season, one of the best placed portions might be seen to be hanging its leaves, the whole shoot drooping with a little sun, and dying away.

It is a well-known fact, that the most observant and best fruit growers of our time, either bud their own trees, or procure maidens, with the upper portions of which they form their tree. As I write, it gives me great pleasure to allude to the opinion of our veteran fruit grower, Mr. Rivers, of Sawbridgeworth.

"The knife-man," says he, "I trust, belongs to a past age. In former days, he was a man who employed a sharp knife and a blunt intellect." What better support need I than this testimony affords?

In lieu of the practice above described and its attendant consequences, my suggestion is that a system of summer pinching be adopted. Let the primary bud, as it shoots forth from the stock, be so pinched back as to secure three or more well-placed main shoots. If requisite, keep these stumpy and well-matured, as they advance in growth, by another pinching; still selecting the bud which breaks nearest the base of the plant, and that alone, upon each shoot so pinched, to furnish the autumn formed plant, of three or four small woody shoots.

The following spring, instead of starting again with a cut stump of a few inches elevated upon the stock, we are prepared to commence with the bud having three or more main shoots well matured. If necessary, the tips of these may be taken off without any great injury, and from their produce we choose five well-placed secondary shoots, which, by the aid of pinching, are kept well in hand during the summer; and thus, in the following autumn, we have a healthy and sound frame-work for a tree, in less time than is necessary with the present system—according to which there would be, at this stage, only three long shoots, requiring to be again cut close, for the purpose of multiplying their number and strength for the following season, and if the number is not secured a multiplication of the horrors recounted takes place, as the whole are generally again severed in twain close down to the base. These strong periodical shoots, no doubt, form at the base roots of relative strength for their support, as opposed to a bunch of more moderate growth.

MOYENS D'AMÉLIORER LES RACES FRUITIÈRES PAR LA VOIE DU SEMIS.

Par Ed. Pynaert, Professeur à l'Ecole d'Horticulture de l'Etat à Gand (Belgique).

Le travail que j'ai l'honneur de soumettre est la suite d'une étude que j'ai présentée l'an dernier au Congrès d'Horticulture et de Botanique d'Amsterdam.* Dans cette étude j'ai particulièrement insisté sur les diverses causes qui peuvent altérer la qualité des fruits d'une façon intime, de manière à atteindre la durée de l'existence des variétés, et en second lieu j'ai démontré la possibilité de créer chez toutes les essences fruitières (comme cela existe actuellement chez quelques unes d'entre elles), des races plus ou moins fixes, possédant la propriété de se reproduire par le semis avec plus ou moins d'identité.

Je me propose d'examiner maintenant les moyens pratiques d'améliorer par la même voie les variétés fruitières; c'est-à-dire, d'en diriger l'obtention, ou plutôt de discuter les procédés qui ont été mis en usage jusqu'à ce jour par les hommes qui se sont le plus illustré dans cette branche de l'horticulture.

Je vais commencer par l'examen du système de Van Mons. Van Mons doit être considéré comme le premier des pomiculteurs Belges. L'influence qu'il a exercée sur le progrès de l'arboriculture fruitière est immense. Il est regrettable que les écrivains Belges qui ont fait l'éloge biographique de Van Mons, aient cru devoir exalter outre mesure le caractère scientifique de la méthode qu'il a préconisée; ils ont ouvert par là la voie à des critiques qui ne sont pas entièrement dénuées de fondement. Ce qui est incontestable, quelque soit d'ailleurs au point de vue scientifique le mérite de cette méthode, c'est que le résultat obtenu,—et ce résultat est immense, car le nombre des variétés gagnées par Van Mons et appartenant à toutes les espèces de fruits dépasse les 600,—ne peut être aucunement attribué au hasard comme on le pourrait dire de beaucoup d'obtentions récentes.

Nous devons reconnaître cependant que l'exposé de ce procédé, tel que l'auteur lui-même l'a publié, d'une manière très confuse, il est vrai, est parfois en opposition avec les principes de la saine théorie.

Dans ce genre de culture le succès peut dépendre de circonstances très variées. Ainsi on peut dire qu'il doit être dû au moins partiellement à l'extension donnée aux semis. Toutes autres conditions égales il est évident que les chances doivent être proportionnées au nombre d'individus soumis aux expériences.

Il résulte aussi et principalement du choix des graines et des arbres-porte-graines. Je pense que dans ce choix réside la cause la

* De la nécessité de recourir à la reproduction par voie de semis pour créer des plantations rustiques (Bulletin du Congrès International de Botanique et d'Horticulture d'Amsterdam, page 249).

plus fréquente de l'insuccès de plusieurs semeurs. C'est ainsi qu'un savant auquel on doit le premier ouvrage pomologique publié en France, Duhamel n'a jamais pu obtenir rien de bon, quoiqu'il ait opéré, paraît-il, un très grand nombre de semis.

Une autre circonstance qui peut exercer une action sur le succès, consiste dans la période plus ou moins longue pendant laquelle les essais sont poursuivis. La persévérance est à double titre une qualité indispensable au semeur ; d'abord, parce que les résultats eux-mêmes se font attendre longuement ; en second lieu, parce que les chances s'accroissent progressivement en raison de la répétition des semis.

Enfin, le résultat obtenu peut être influencé par le mode de culture adopté pour les semis. C'est à divers points de vue que je me propose d'examiner la question.

Les semis de Van Mons furent opérés sur une échelle considérable ; à certains moments il avait jusqu'à plusieurs centaines de mille pieds de semis. Au point de vue scientifique cette étendue des pépinières de Van Mons avait un tort, car dans cet immense chaos les erreurs d'observation devaient être inévitables. Si au commencement de ses expériences Van Mons avait su qu'un demi-siècle avant lui, l'abbé Hardenpont avait obtenu de semis, dans un tout petit coin de jardin près de Mons, plusieurs variétés de poires dont il y en a quatre qu'un grand nombre d'amateurs dans notre pays considèrent encore aujourd'hui comme les meilleures entre les bonnes,—je veux parler du *Passe Colmar*, du *Beurré d'Hardenpont* ou *Glou Morçeau*, du *Beurré Rance* et des *Délices d'Hardenpont*,—je suis certain qu'il aurait restreint ses cultures. Ceux qui ont visité l'école de semis de M. X. Grégoire à Jodoigne, le zélé continuateur des travaux de Van Mons, et qui dans un jardin de quelques centaines de mètres d'étendue à peine, a déjà gagné au delà de 200 variétés de poires dignes de figurer dans les collections, diront avec moi qu'au point de vue scientifique comme au point de vue pratique, il est préférable de concentrer son intelligence et ses soins sur un petit nombre de plantes de semis. On concoit qu'alors le choix des graines offre une importance encore infiniment plus grande.

Le choix des graines comprend non-seulement aussi le choix des individus porte-graines, mais surtout celui de la variété à laquelle ils appartiennent. Il n'est pas plus indifférent de prendre la graine d'une variété quelconque, quelque bonne qu'elle puisse être, qu'il ne l'est de la prendre sur un individu élevé en haute tige ou en espalier, franc de pied ou bien greffé sur franc ou sur coignassier.

Les premiers semis de Van Mons ont eu lieu au moyen de pépins des meilleurs variétés anciennes, ce qu'il a toujours regretté dans la suite, et il a conclu de l'insuccès relatif qu'il a obtenu de ces premiers semis que la génération issue d'une variété soumise depuis de longues années à la culture est plus sujette à s'éloigner de la perfection et à se rapprocher de l'état sauvage que la génération issue d'un semis de graines d'une variété récente.

Cette conclusion est forcée et n'est vraie qu'en apparence. On peut citer de nombreux exemples de semis de variétés plus ou moins anciennes qui ont donné naissance à des variétés nouvelles d'un certain mérite. Mais s'il est vrai, comme j'ai essayé de le constater* que la nature du sujet sur lequel une variété est greffée peut influencer la génération qui doit sortir du semis de ses graines et cela d'autant plus que la dissemblance est plus grande entre la greffe et le sujet, on comprendra qu'il y aura toujours avantage à choisir comme porte-graines des arbres-mères mêmes, c'est-à-dire francs de pied ou à défaut de ceux-ci des arbres greffés sur franc. Car lorsque les porte-graines sont greffés sur un sujet de nature différente, ainsi poirier sur coignassier, abricotier et pêcher sur prunier, la variation chez les semis offre toujours plus de tendance à se rapprocher de l'état primitif ou sauvage.

Dans la suite de ses expériences, Van Mons s'est attaché exclusivement à ne semer que les graines de ses semis précédents au fur et à mesure qu'ils arrivaient à fructification et il dit avoir constaté une amélioration progressive dans les produits. On ne peut nier celle-ci, c'est-à-dire, le résultat obtenu, mais on peut douter de la manière dont il l'a été. Sous ce rapport, je pense que Van Mons se sera trompé involontairement, en se laissant entraîner par une conviction préconçue. Il est impossible d'admettre l'amélioration successive dans les produits sans le secours de la sélection ou du croisement soit par le vent, soit par les insectes. Van Mons n'aura pas semé les pépins de tous les fruits indistinctement. Il semble tout naturel, surtout lorsqu'on a un grand nombre de fruits disponibles, de ne semer que les pépins des moins mauvais, et voilà comment on arrive à faire de la sélection sans y prendre garde. Au reste, n'en fait-on pas lorsqu'on recherche dans les plants de semis ceux dont les caractères ne promettent rien de bon, pour les en éliminer et ne conserver que ceux dont le *facies* inspire quelque confiance? Quant au croisement, il faudrait isoler les arbres pour les y soustraire entièrement. Son influence possible ne peut donc être mise en doute.

Par le semis immédiat des graines d'une variété nouvellement obtenue, Van Mons évitait l'influence défavorable du greffage sur la génération issue du semis et la maintenait ainsi avec plus de certitude dans la voie du perfectionnement. Sous ce rapport, il a été imité par tous les semeurs Belges qui ont continué ces travaux. Cependant il serait préférable que les arbres-mères ne fussent pas trop jeunes; ceuxci devraient toujours avoir atteint l'âge adulte et un développement normal. On peut conclure d'une observation analogue qui a été faite dans le règne animal, qu'en prenant exclusivement la graine d'arbres jeunes, affaiblis dans le but d'en obtenir une fructification précoce, on finirait par ne produire que des variétés naines.

Van Mons a conseillé encore de ne choisir comme porte-graines que des variétés tardives, afin, dit-il, que les graines ne soient pas complétement mûres. Il est d'avis que les plants de semis de ces dernières seront plus disposés à varier dans le sens de la perfection

* Bulletin du Congrès International de Botaniqué et d'Horticulture d'Amsterdam, page 276.

que ceux issus de graines ayant mûri complétement. Je partage son opinion et je la base sur cet autre fait très-remarquable, à savoir que les porte-graines de plantes-racines bisannuelles exigent d'être déplantées pour se maintenir et ne pas reculer vers l'état primitif. Comme je l'ai dit dans mon MANUEL DE L'AMATEUR DE FRUITS, page 212, le semis de graine parfaitement mûre rappellerait trop le faire de la nature. Il est évident qu'il ne faut pas pour ce motif exclure systématiquement des essais les graines de variétés hâtives : il y a encore dans cette catégorie, surtout dans le fruit de toute première saison de grandes lacunes ; il suffira de faire la cueillette quelques jours avant la maturation, comme le font d'ailleurs les bons praticiens pour tout le fruit d'été destiné à la table.

J'examinerai tout à l'heure l'action du mode d'éducation des plants de semis sur la constitution des individus, spécialement lorsque cette action se poursuit sur plusieurs générations consécutives. Je dirai seulement ici qu'il faut attribuer à un traitement défectueux et affaiblissant l'état débile, la constitution peu vigoureuse de certaines variétés gagnées par Van Mons et qui, quoique relativement récentes, offrent déjà tous les caractères d'affaiblissement sénil que l'on constate chez des variétés cultivées de longue date.

Le procédé suivi par les pomologues Belges, Bouvier, Bivort, Grégoire et quelques autres s'éloigne fort peu de celui de Van Mons, du moins en ce qui concerne le choix de la graine sur des variétés ou sur des individus d'origine récente. Il est à peine besoin de dire que ces expérimentateurs choisissent les fruits les plus beaux, les meilleurs et les plus sains : parmi les pépins mêmes on rebute ceux qui sont mal nourris, mal constitués. L'expérience a prouvé qu'ils donnent presque toujours naissance à des arbres rachitiques et d'un mauvais port.

Le semis se fait au printemps en Février ou Mars. Les graines de variétés hâtives ou d'arrière-saison auront dû être mises stratifiées dans du sable frais. Le semis se fait soit directement en pleine terre, soit en caisses, que l'on place dans un endroit abrité ou chaud, afin de favoriser la germination. Dans ce dernier cas déjà les plants peuvent être repiqués dans le mois de Mai. On conseille fortement de raccourcir dès lors le pivot, dans le but de faire ramifier les racines, ce qui est indispensable si l'on veut soumettre dans la suite les arbres aux transplantations périodiques considérées comme favorables pour amener de bonne heure la mise à fruit. Ces procédés de mutilation sont déplorables dans le cas où les expériences sont poursuivies durant plusieurs générations et où les arbres-mères doivent servir de porte-graines. Il est évident qu'ils doivent avoir pour conséquence non pas d'altérer la qualité du fruit des derniers semis, mais la vigueur des arbres et aujourd'hui plus que jamais on devrait s'attacher surtout à ne créer que des arbres forts et rustiques.

On comprendra aisément que le mode d'éducation préconisé par le célèbre pépiniériste Rivers, de Sawbridgeworth, et qui applique à ses plants de semis la culture en pots dans laquelle il obtient de si beaux succès, doit avoir également une influence désastreuse sur la vigueur des générations futures, lorsque les sujets soumis à ce mode de culture servent également d'arbres porte-graines. L'affaiblissement inévitable dans la constitution des variétés nouvelles sera de même ici la suite de la fructification précoce, forcée obtenue artificiellement sur les pieds mères.

Il ne faut donc ni transplanter ni mutiler d'un façon quelconque les arbres de semis. Si on veut les juger rapidement, il faut en greffer des scions soit sur des arbres déjà établis, soit sur des sujets de force ordinaire, que l'on transplante dans la suite ou dont on taille les racines pour avancer la mise à fruits. Comme il peut arriver que la greffe ne produise pas de fruits aussi bons, aussi beaux que le semis lui-même arrivé à l'âge de la fructification, on ne doit jamais précipiter le jugement dans le cas où un jeune sujet greffé a donné un premier produit simplement satisfaisant.

BEITRÄGE ZUR PALMENKULTUR.

Von Hrm. Wendland, Herrenhaussen, Hanover.

Bei dem gesteigerten Interesse, welches man für die noble Familie der Palmen, wie es wenigstens den Anschein hat, in England zu nehmen beginnt, halte ich es an der Zeit einige Beobachtungen hinsichtlich deren Kultur mitzutheilen, zumal ich annehmen darf, dass die Liebhaberei für diese elegante Familie einen ähnlichen Verlauf, wie sie ihn auf den Continent bereits genommen hat, hier in England nehmen wird, so dass man sich der Palmen nicht allein für die Auschmückung der Gewächshäuser, sondern auch für die der Salons bedienen wird. Dass das Interesse für die Fürsten der Pflanzenwelt im allgemeinen hier erst im Entstehen ist, glaube ich behaupten zu können, wenngleich sie schon lange ein gastliches Dach in botanischen und einzelnen grösseren Privatgärten dieses Landes gefunden haben.

Da die Kultur der Palmen im allgemeinen eine sehr einfache ist und sich von der anderer tropischen Pflanzen nicht unterscheidet, so enthalte ich mich darüber jeder Mittheilung, mache vielmehr nur darauf aufmerksam, dass es eine Menge Arten giebt, die nicht so leicht wachsen, wie vielen der Anwesenden sicher aus Erfahrung bekannt sein wird. Weshalb wachsen nun viele Arten bei der gewöhnlichen Kulturmethode nicht? Weshalb sieht man in den Gärten nie oder doch nur höchst selten grosse Exemplare von *Areca*, *Attalea*, *Borassus*, *Corypha*, *Cocos nucifera*, *Copernicia*, *Desmoncus*, *Guilielma*, *Hyphœna*, *Latania*, *Licuala*, *Manicaria*, *Mauritia*, *Nipa*, *Œnocarpus*, *Oncosperma*, *Oreodoxa*, *Phytelephas*, *Raphia*, von denen doch Samen schon zu Anfang dieses Jahrhunderts, wenn nicht noch früher, nach Europa gekommen sind und aus denen doch genügend junge Pflanzen erzogen wurden?

Dass etwas falsch in ihrer Kultur sein muss, ist natürlich. Worin besteht nun das Falsche ihrer Behandlungsweise? Diese Frage in etwas zu beantworten, ist hier meine Aufgabe. Um eine Pflanze zu kultiviren, müssen wir die Verhältnisse unter denen sie in ihrem Vaterlande wächst, zunächst berücksichtigen. Alle die oben genannten Gattungen mit ihren Arten sind die am meisten wasserliebenden Palmen, weshalb ihr natürlicher Verbreitungsbezirk auf die Küsten, Flussufer und sumpfigen Niederungen ausgedehnt ist. Ja, selbst wo in den Wüsten Palmen wachsen, da ist stets feuchter Untergrund vorhanden, wie wir aus Reisebeschreibungen und Bildern in Reisewerken zur Genüge ersehen können. Da ich in früheren Jahren viele Palmenarten, namentlich kränkelnde, durch Enthalten des Wassers verloren habe, so habe ich, nachdem ich erkannt in welch hohem Grade die Palmen ans Wasser gebunden sind, ihnen sehr viel Wasser gegeben; habe aber dennoch trotz allen Begiessens mit vielen derselben nur herzlich schlechten Erfolg gehabt, d. h. so lange, bis ich die Arten, die gar nicht wachsen wollten, in Untersätze mit Wasser gestellt habe. Diese Versuche sind derart glücklich ausgefallen, dass ich glaube behaupten zu können, dass diese Arten der Palmen durch zuviel Wasser kaum getödtet werden können, dass sie aber leicht verloren gehen, wenn man ihnen Wasser nicht in grossen Mengen giebt. Jeder Kultivateur der Palmen wird die Erfahrung gemacht haben, dass einige Palmen, namentlich die Cocos und Bactrisartigen, nur im untersten Theil ihres Topfes viele, im oberen Theil desselben aber wenig oder fast gar keine Wurzeln haben. Diese Arten stelle man zunächst in Untersätze mit Wasser und es wird nicht lange währen, dass der ganze Ballen voll kleiner Wurzeln ist. Die Bemerkung muss ich noch hinzufügen, dass solche in Untersätze gestellte Palmen eine mehr oder weniger lange Zeit gebrauchen, um sich an ihre neue Stellung zu gewöhnen, oft sogar noch etwas kränker werden, als sie vielleicht schon vorher sind; hierdurch lasse man sich aber nicht beirren, sie werden später sicher zu treiben beginnen. Als Regel möchte ich angeben, dass je stachlicher eine Palme ist, desto feuchter will sie stehen.

Derjenige Kultivateur, der sich diese Notizen zu Nutze macht, wird viele Freude an der Kultur der Palmen und weniger Verluste zu beklagen haben. Hat sich die Liebhaberei für die Palmen erst Bahn gebrochen, so wird es nicht lange dauern, dass dieser Artikel aufhören wird "good for Hanover" zu sein, zumal bei der hier zu Lande herrschenden Vorliebe für Pflanzen im allgemeinen, und so wird die Zeit nicht mehr ferne sein, dass die Palmen bis in die Wohnungen der Arbeiter eindringen und jedes aus den Tropen heimkehrende Schiff neue Samen mitbringen wird.

ÜBER DIE ANORDNUNG DER ALPENPFLANZEN IN UNSERN GÄRTEN.

Von H. R. Göppert, Director des Botanischen Gartens in Breslau.

In unsern Tagen, wo man keine Gefahren scheut um die früher im Ganzen wenig berücksichtigten höchsten Gipfel und Kämme unserer Alpen zu erklimmen, hat man auch den sie zierenden Pflanzen vermehrte Aufmerksamkeit gewidmet und sie in unsern Gärten einzuführen versucht, was auch mit den meisten unter genauer Berücksichtigung der Bodenbeschaffenheit und des natürlichen Vorkommens gelungen ist. Gewöhnlich stellt man sie nun in Gärten ohne alle wissenschaftlichen Principien nur nach Kultur oder Grössenverhältnissen bunt durcheinander, wobei man wohl allenfalls Kenntniss der Art, aber nicht Kenntniss ihrer Beziehungen zu den Verhältnissen ihres Standortes, zum Klima und geschweige ihrer Verwandschaft zu den arktischen Gewächsen erlangt, denen sie doch durch ihre Form wie namentlich auch durch ihre durch klimatischen Einwirkungen verursachte Vegetationszeit so nahe stehen. Allen diesen Anforderungen, welche die Pflanzengeographie stellt, sollte man in botanischen Gärten mehr Rechnung tragen, was ich schon seit Jahren zu thun versucht habe, indem ich meine, dass die botanischen Gärten auch die Aufgabe haben *pflanzen-geographische Studien nach den verscheidensten Richtungen hin zu fördern.* Hinsichtlich der Anordnung der Alpenpflanzen gehe ich von folgenden Grundlinien aus, die ich mir erlaube hier kürzlichst mitzutheilen: —

Allgemeine Grundlinien.

Zwischen der arktischen Flora und der Alpinen oder der Flora zwischen der Baum und Schneegränze findet eine innige Verwandschaft statt. So in Europa zwischen der Flora Lapplands und der Flora der Centralalpenkette, namentlich der Schweiz und Deutschlands (von den 360 Alpenpflanzen der Schweiz finden sich 150 im Norden Europa's), ferner in Sibirien zwischen der Flora der Nordküste und der des Altai. Die äusserste Grenze der Vegetation gegen den Nordpol ist noch nicht erreicht. Spitzbergen besitzt unter dem 78° selbst in 1,000 bis 3,000 F. Höhe nach Malgren noch kräftigen Pflanzenwuchs, überhaupt noch 93 Phanerogamen und an 280 Cryptogamen.

Dr. Robert Kane sah am offenen Polarmeere über dem Polarkreis in 82¾° noch blühend: *Papaver nudicaule, Saxifraga oppositifolia* und *Ranunculus nivalis*, und Dr. Hayes sammelte in Grinnel-Lande zwischen 78 bis 828 n. Br. vom Juli bis September 1861 noch 52 Phanerogame und 68 Cryptogamen. Die Floren aller dieser den Pol umgebenden Ländern zeigen die grösste Verwandschaft unter einander. Von jenen 93 Pflanzen Spitzbergens kommen nicht weniger als 81 auch in Grönland vor, 53 im Taymurlande Sibiriens unter

75°, 69 in Skandinavien. 24 Species sind, da sie sich auch in den andern arktischen Ländern finden, als die wesentlichen Pflanzen der arktischen Flora anzusehen, nämlich: ***Ranunculus arcticus*** Richards., ***Parrya arctica*** R. Br., ***Eutrema Edwardsii*** R. Br., ***Braya purpurascens***, ***Draba glacialis*** Adams., ***D. pauciflora*** R. Br., ***D. micropetala*** Hook., ***D. arctica*** Fl. Dan., ***D. corymbosa*** R. Br., ***Cochlearia fenestrata*** R. Br., ***Stellaria Edwardsii*** R. Br., ***St. humifusa*** Rottb., ***Arenaria Rossii*** R. Br., ***Potentilla pulchella*** R. Br., ***P. emarginata*** Pursh, ***Saxifraga flagellaris*** Sternb., ***Taraxacum phymatocarpum*** Vahl., ***Polemonium pulchellum*** Ledeb., ***Hierochloa pauciflora*** R. Br., ***Dupontia psilorantha*** Rupr., ***D. Fischeri*** R. Br., ***Glyceria angustata*** Mühlenb., ***Catabrosa vilfoidea*** Anderss., ***Festuca brevifolia*** R. Br.

Das Ende der Baumvegetation um den ganzen Nordpol bilden fast überall *Nadelhölzer:* in Nordamerika ***Abies alba, A. nigra H. Kew.***, ***Pinus Banksiana*** Lamb., und gruppenweise ***Larix americana*** Lamb , und ***Abies canadensis*** Poir., mit ***Juniperus virginiana;*** im arktischen Europa ***Pinus Abies*** L., und zuletzt ***Pinus sylvestris;*** im arktischen Asien (Sibirien) ***Pinus sylvestris*** nur bis zum 60°, höher hinauf ***Picea sibirica*** (***Pinus Pichta*** Fisch.) ***Picea obovata*** Ledeb., und ***Pinus Cembra***. Die baumleere Region beginnt in America, und zwar im Labrador schon unter dem 57°, erhebt sich jedoch bis zum Mackenziefluss bis zum 65° und diesseits der Behringsstrasse bis zum 66°; jenseits dieser Strasse in Nordasien schwankt sie zwischen dem 63 bis 71° und endiget in Europa in Norwegen und Lappland mit dem 70°. In Strauchform wachsen unter den Grenzen der Baumvegetation ja hie und da wohl noch, etwas darüber hinaus um den ganzen Pol die nordische Birke ***Betula alpestris***, Fr. (***B. pubescens*** var.), ***Alnus incana***, ***Populus tremula***, ***Sorbus Aucuparia***, ***Prunus Padus***, ***Rubus Idæus***, ***Ribes rubrum***, ***Ribes nigrum***, und noch darüber hinaus als letzte Holzgewächse niedrige kriechende Straücher aus ***Juniperus nana***, ***Betula nana***, ***Rhododendrum lapponicum***, ***Menziesia cœrulea***, ***Ledum palustre***, ***Vaccinium uliginosum***, ***Andromeda hypnoides***, ***A. tetragona*** L., ***Rubus Chamæmorus***, ***Empetrum nigrum***, und kriechende Weiden wie ***Salix arctica*** Pall., ***reticulata*** L , ***polaris*** Wahlb., ***arbuscula*** Wahlb., ***depressa*** L., ***ovata*** Seringe, ***Myrsinites*** L. Zuletzt bleiben fast überall nur als Holzpflanzen ***Andromeda tetragona***, ***Empetrum nigrum***, ***Salix reticulata*** und ***polaris***, Flechten und Moose (die sogenannten Tundren) machen den Beschluss des gesammten vegetabilischen Lebens. Auf dem ewigen Schnee verirrt sich nur eine Alge, die Bewohnerin des ewigen Schnees, der ***Protococcus nivalis***, die interessante Entdeckung von Scoresby und Shuttleworth, die allen Temperaturverhältnissen spottet. Auf der Centralalpenkette besteht zwar die letzte Baumvegetation auch aus Coniferen, aber niemals aus ***Pinus sylvestris***, sondern aus ***Pinus Abies*** L., und noch höher hinauf ***Larix europæa*** und ***Pinus Cembra***, wie in Strauchform die in der arktischen Region fehlende ***Pinus montana*** Mill. (***Pumilio*** Hænke), ***Sorbus Aucuparia*** var ***alpestris*** ist dagegen ebenfalls vorhanden, desgleichen *Populus tremula*, *Betula alpestris*, dann *Alnus incana*, höher hinauf *Alnus viridis*, dann *Rhododendron hirsutum* und *ferrugineum*, *Empetrum*, die Vaccinien, *Azalea*, *Juniperus nana*, und zuletzt ebenfalls die kriechenden Weiden, *Salix herbacea*, *reticulata*, *retusa* W., *Myrsinites* L., und *arbuscula* Wahlenb. als letzte Holzgewächse, Moose und Flechten machen auch hier den Beschluss.

Von den circa 3,500 Phanerogamen Deutschlands und der Schweiz gehören ungefähr ein Drittheil zu den Berg und Alpenpflanzen. Als wahre Alpenpflanzen sind jedoch nur etwa 450 anzusehen, zwei Drittheile davon werden in unserm Garten kultivirt. Sie befinden sich theils in etwa 2,000 Töpfen, theils im freien Lande auf einem Preuss. Morgen grossen an einem Wassergraben gelegenen Raume, zwischen Gesteinen verschiedener Art, in acht folgenden durch Tafeln bezeichneten Gruppen aufgestellt; unter ihnen eine ausgehöhlte Granitplatte erfüllt mit *Protococcus nivalis*, den Pflanzen des ewigen Schnees.

I. Pflanzen des höchsten Nordens über dem 80° *oder der Polarzone, und Pflanzen de Centralalpen auf Firn oder Gletscherinseln über der Schneelinie zwischen* 10,000 *bis* 10,700 *Fuss.*

a. Pflanzen des höchsten Nordens zwischen 78 bis 82° im Grinnell-Land (Smith Sound und Kennedy Canal).

Ranunculus nivalis, glacialis.
Draba alpina *D.C.*, corymbosa *R. Br.*, *und* rupestris *R. Br.*, Cochlearia officinalis.
Stellaria stricta *Richards.*
Cerastium alpinum, Silene acaulis, Lychnis apetala.
Dryas octopetala, Potentilla nivea, Alchemilla vulgaris.
Saxifraga oppositifolia, rivularis *L.*, tricuspidata *R.*, cernua *L.*, nivalis *L.*
Taraxacum palustre *D.C.*
Campanula rotundifolia *var.* linifolia.
Vaccinium uliginosum *L.*
Andromeda tetragona *L.*
Bartsia alpina *L.*
Armeria vulgaris *W.*
Polygonum viviparum *L.*, Oxyria digyna *Campder.*
Empetrum rubrum *L.*
Betula nana *L.*
Salix herbacea.
Tofieldia palustris *var.* borealis.
Luzula campestris *var.* congesta.
Carex rigida *Gaud.*
Eriophorum vaginatum.
Glyceria arctica *Hook.*
Festuca ovina *L.*
im ganzen 39, die übrigen 13 fehlen.

b. Pflanzen, welche auch auf unsern Alpen den höchsten Standpunkt einnehmen und in der Region des ewigen Schnees auf Firn oder Gletscherinseln, wie Z. B. im sogenannten jardin oder bei den Grand Mulet am Montblanc in 10,000 bis 10,700 Fuss vorkommen, etwa 40 bis 50 Phanerogamen, welche mit den vorigen grosse Übereinstimmung zeigen, unter ihnen *Cherleria sedoides* von höchstem Vorkommen in 11,700 F. Höhe am Monte Rosa (Schlagintweit).

Draba frigida *Sauter*, fladnicensis *Wulf*, tomentosa; Cardamine bellidifolia.
Silene acaulis *L.*
Potentilla frigida *Vill.*
Saxifraga groenlandica *L.*, exarata *Vill.*, muscoides *Wulf*, oppositifolia *L.*, bryoides *L.*
Erigeron uniflorum, Pyrethrum alpinum.
Phyteuma hemisphæricum *L.*
Androsace helvetica *Gaud*, pubescens.
Gentiana verna.
Luzula spicata *D.C.*
Agrostis rupestris *All.*
Trisetum subspicatum *P. Beauv.*
Poa laxa *Hænke*, cæsia *Sm.* alpina *L.*, vivipara.
Festuca Halleri.
Carex nigra.

II. Pflanzen der Schneelinie der Alpen von 8,500 *bis* 40,000 *F. Höhe.*

(Die in der arktischen Zone ebenfalls vorkommenden Arten sind in unsern Gärten mit einem Kreuz auf der Etiquette bezeichnet).

Von Monocotyledonen:

Sesleria microcephala *D.C.*, S. sphæracephala *Ait.*, Trisetum subspicatum, †Poa alpina, †Poa laxa *Hænke*, †Carex firma *L.*

Von Dicotyledonen:

†Salix herbacea, †S. retusa, Primula minima *L.*, Androsace glacialis *App.*, Pedicularis rostrata, Gentiana bavarica, †Azalea procumbens, Phyteuma pauciflorum *L.*, Pyrethrum alpinum *W.*, Artemisia Mutellina *Wulf*, spicata *Vill.*, Gaya simplex, Saxifraga androsacea, biflora *All.*, †bryoides, cæsia *B.*, muscoides *Wulf*, †oppositifolia *L.*, Sempervivum arachnoideum, Sedum atratum *L.*, †Cerastium latifolium, †alpinum, Arenaria ciliata, Cherleria sedoides, Alsine verna *Bartl.*, †Silene acaulis, Braya alpina, †Ranunculus glacialis *L.*

III. Pflanzen der subnivalen Region von 6,000 *bis* 8,000 *F. der Alpen, oder die eigentliche Alpenflora, welche im Allgemeinen der Flora der baumleeren Region der arktischen Zone entspricht.*

Auf unserm viel nördlicher gelegenen Riesengebirge beginnt die Region der Alpenpflanzen und mit ihr das Verschwinden der Bäume in 3,500 bis 4,000 F. Seehöhe.

Im Allgemeinen aus folgenden in unsern Garten mehr oder weniger stark vertretenen Familien (über 200 Arten): Filices, Lycopodiaceen, Juncineen Liliaceen, Orchideen (unter ihnen das sibirische *Cypripedium macranthum*), Salicineen, Thymeleen, Polygoneen, Plantagineen, Primulaceen, Rhinantheen, Antirrhineen, Borragineen, Gentianeen, Ericineen, Vaccinien, Campanuleen, Compositen, Stellaten, Saxifrageen, Crassulaceen, Onagrarien, Sanguisorbeen, Rosaceen, Papilionaceen, Alsineen, Sileneen, Violarien, Cistineen, Cruciferen und Ranunculaceen.

Alle sind Familienweise zusammengruppirt, wobei wir auch bemüht waren, Übelstände, welche durch Grössenverhältnisse der einen oder der andern Art herbeigeführt werden können, möglichst zu vermeiden.

IV. Pflanzen des höchsten Nordens, die in der baumleeren Region um den ganzen Pol verbreitet und auch in Deutschland einheimisch sind.

Unter dieser Rubrik haben wir etwa 90 Arten zusammengestellt welche mit wenigen Ausnahmen auch in Deutschland und Mitteleuropa überhaupt vorkommen.

V. Eine Anpflanzung von Laubhölzern, Sträucher und Bäume enthält, welche mit den vorigen unter Abtheilung IV. genannten Pflanzen um den ganzen Pol wachsen, wie Rubus Idæus, Sorbus Aucuparia, Alnus incana, Betula alpestris, Prunus Padus, Populus tremula.

VI. Diejenigen oben erwähnten Nadelhölzer, welche um den Pol herum wachsen.

VII. Sträucher der Centralalpen, welche nach dem Aufhören der Baumvegetation vorkommen.

VIII. Die Pflanzen der Bergregion Mitteleuropas, welche innerhalb des Baumwuchses, Z. B. in verschiedenen Gegenden Deutschlands zwischen 2,000 bis 6,000 F. Höhe vorkommen.

Endlich sind zum Vergleiche Repräsentanten der Alpenflora des Himalaya (Rhododendra, Polygoneen, Pomaceen, Saxifragen, Berberideen, Compositen) in der Nähe in einer Gruppe vereiniget, welche jedoch zu wenig Arten enthält um mit allen den geschilderten Verhältnissen in nähere Beziehung gebracht werden zu können.

Wir glauben dass Gruppirungen dieser Art uns wohl in Stand setzen, mit einem Blicke die Beschaffenheit der Vegetation nach den Höhenverhältnissen ihres Vorkommens von der Ebene bis zur äussersten Gränze organischen Lebens und wieder ihr Verwandschaft mit den Floren der immer noch so viele Räthsel bergenden arktischen Zone klar und übersichtlich zu übersehen und wünschen dass der hochgeehrte botanische internationale Congress unsere Mittheilungen gütig aufnehmen möge, welche eigentlich nur als praktische Ausführung der die Wissenschaft zierenden Lehren eines A. Humboldt, Schouw, Watson, A. de Candolle anzusehen sind.

Englands Forscher haben bis jetzt mit den grössten Opfern das Studium der Alpen verfolgt, vielleicht sieht man sich veranlasst auch meine Bestrebungen als einen wenn auch nur sehr unbedeutenden Beitrag zu denselben anzusehen.

SUR LA CULTURE ET LE MODE D'EMPLOI DU COLCHIQUE BYZANTIN.

Par Henri Lecoq, Professeur à la faculté des sciences de Clermont, Directeur du jardin de botanique, Correspondant de l'institut de France.

On cultive peu les Colchiques dans les jardins, et à tort peutêtre, car quelques-uns d'entre eux peuvent y tenir un rang très honorable. Toutefois nous ne pouvons guères en citer que deux espèces véritablement recommandables, le *Colchicum variegatum* Linné et le *Colchicum Byzantinum* Gawler.

Le premier peut se planter en larges bordures, dont les feuilles se développent dès le mois de Février et persistent jusqu'en Mai. Ses fleurs, d'une nuance très tendre, couvertes d'un léger réseau purpurin, paraissent en Août et en Septembre et ne conservent que très peu de temps leur fraîcheur et leur éclat ; mais comme cette plante est très rustique on peut toujours lui donner une place dans son jardin.

Le second, *Colchicum Byzantinum* Gawler, est une plante très remarquable dont nous allons essayer de faire ressortir tout le mérite. Nous dirons quelques mots de sa culture, nous parlerons ensuite de l'emploi que l'on peut en faire dans l'ornementation des serres et des appartements.

Ce Colchique croît naturellement en Grèce, en Turquie, dans l'Asie mineure, et probablement en Perse. Il paraît assez répandu dans tout l'Orient. Le nom de *byzantinum*, donné par Gawler, n'est pas le seul qu'il ait reçu ; Salisbury l'a cité sous l'épithète de *floribundum* qui lui convient parfaitement, et Frivaldszki l'a décrit sous le nom de *Colchique orientale.*

C'est une plante très vigoureuse à bulbes volumineux, enveloppés de plusieurs tuniques brunes dont il ne faut pas débarrasser l'oignon, à l'exception de la plus extérieure qui tombe en lambeaux.

Tous les terrains lui conviennent, mais il préfère les terres légères et amendées un ou deux ans, au moins, avant sa plantation ; le fumier frais lui est contraire.

On la plante en bordures, en lignes, ou en quinconce à un décimètre au moins de profondeur et, dans nos climats, immédiatement après la floraison, c'est-à-dire en Septembre ou en Octobre, sa plantation et sa culture sont les mêmes que celles des Tulipes, mais la Colchique est beaucoup plus rustique. Nous la cultivons en planches de 1m. 5c. de largeur ; il ne craint pas les gelées.

Dès le mois de Février on voit sortir les feuilles ; elles forment un bouquet de verdure magnifique, elles sont larges, lisses et luisantes, rappelant, sauf les gaufrures et les plis, celles des *Veratrum*.

Les feuilles se flétrissent, selon la température et la sécheresse de l'année, à la fin de Mai ou dans le courant de Juin. Comme elles ne se détachent pas d'elles-mêmes, il est bon de les couper, soit avec des ciseaux, soit avec une serpette ; on ne doit pas les arracher à la main dans la crainte d'endommager le tube par lequel les fleurs doivent sortir.

La plante reste alors dans un repos complet jusqu'à la fin d'Août et parfois jusque dans le courant de Septembre ; alors elle fleurit.

Ses fleurs sont nombreuses, quelquefois 15 à 20 pour chaque bulbe, d'un rose lilas très tendre et d'autant plus vîvement colorées qu'elles sont plus éclairées, car les boutons, qui sortent entièrement nus, sont blancs. Il y a toujours plusieurs fleurs épanouies en même temps ; néanmoins leur succession est telle que l'ensemble de la floraison se prolonge, au moins pendant trois semaines, quelquefois pendant un mois, quand elles sont abritées.

Ces fleurs ressemblent tout-à-fait, mais en grand, à celles du Colchique d'automne, dernière parure de nos prairies. Comme elles, leur délicatesse est extrême, et si l'on devait se contenter de les voir fleurir en plein air, nous n'en conseillerions pas la culture.

C'est pour les serres et les appartements que cette plante devient des plus intéressantes. Son large feuillage qui lui donne tant de vigueur, accumule dans le bulbe un véritable magasin ou dépôt de nourriture, de sorte que la plante, une fois la feuillage flétrie, n'a plus besoin d'aucun soin. Elle est à même de pourvoir seule au développement de ses organes floraux, sans terre, sans eau, sans que l'on s'en inquiète le moins du monde.

On arrache les oignons en Juillet, ou, au moins, avant leur floraison, on les nettoye et on les conserve.

Posés par leur base sur une tablette, sur une cheminée, sur un bureau, à l'air libre ou enfermés sous un globe de verre, ils fleurissent à leur époque sans que l'on puisse retarder ou accélérer leur épanouissement, plus ils reçoivent de lumière, plus ils sont colorés et moins leur tube s'allonge. Le tube de la corolle a toujours de la tendance à s'accroître, parce que, dans la nature, la plante étant quelquefois située profondément dans la sol, le tube a beaucoup de chemin souterrain à faire pour arriver au jour ; de là cette tendance à monter, rien de plus facile du reste, que de remédier à ce petit inconvénient ; il suffit de placer les oignons dans de la mousse sêche, car l'arrosement est inutile, et d'en faire ainsi de charmantes corbeilles qui n'exigent aucun soin.

On est toujours surpris de voir ce Colchique fleurir à nu, partout où on le pose et nous avons profité de cette singulière propriété pour orner les serres à une époque de l'année où elles présentent peu d'attraits.

C'est précisément lors de la floraison des Colchiques, que les Lycopodes qui forment les gazons dans les jardins d'hiver acquièrent leur plus grand développement. Nous plaçons alors dans ces gazons plusieurs centaines de bulbes de Colchique, les uns disséminés, les autres groupés, mais tous cachés entièrement sous la végétation active des Lycopodes.

Rien de plus curieux que de suivre tous les jours les progrès de ce parterre improvisé ; on ne se doute de rien, et bientôt l'on voit poindre quelques boutons blancs, allongés, qui s'élèvent timidement au-dessus du gazon. Leur pointe se colore et ils s'épanouissent; on voit çà et là quelques fleurs; le lendemain, il y en a davantage; tours les jours elles se multiplient, et l'on finit par jouir d'une prairie du plus beau vert admirablement émaillée de ces fleurs délicates qui payent en durée et en fraîcheur l'abri transparent dont on leur fait les honneurs. Tous les ans nous distribuons ainsi nos Colchiques dans la petite prairie de notre jardin d'hiver, et nous doutons qu'un plus joli spectacle puisse être offert à ceux qui comprennent les scènes riantes de la nature et l'harmonie des jardins.

Quand les fleurs flétries s'inclinent, on enlève les oignons; on prépare une large planche dans le jardin, et on les met en terre dès que la floraison est terminée.

L'oignon de Colchique byzantin n'est pas très cher dans les catalogues, mais il le deviendrait si l'on connaissait l'emploi si ornemental que l'on peut en faire.

Quoique nous le cultivions en nombre depuis longues années, nous n'avons jamais obtenu de graines et l'oignon donne peu de cayeux, en général, chaque bulbe en produit deux, comme le Glayeul, rarement trois, de sorte que cette plante se multiplie en progression géométrique, doublant chaque année, 2, 4, 8, 16, 32, 128, 256, etc., et telle personne qui poursuivrait pendant 20 ans cette culture, arriverait à envahir plusieurs hectares de terrain.

Nous laissons aux amateurs de fleurs le soin de vérifier nos assertions et la jouissance des gazons fleuris de leurs jardins d'hiver.

GARDEN DRAINAGE.

By EDWARD CARROLL, Albert Training Institution, Glasnevin, Dublin.

[Plate I.]

IT is a well-ascertained fact that the roots of not only perennial plants, whether delicate or robust in their growth, but of annuals, tender or robust, have all a tendency to descend to a great depth in search of moisture, when not attainable at a higher source. Of this —shall I call it law of nature?—I could quote innumerable examples that have come under my own notice, of trees growing on high rocks, or the tops of high walls, and various other crops growing, not alone on dry open but on stiff lands, when fissured, descending in dry weather in search of moisture. This every practical gardener who had ever "re-potted" a plant can well understand, from having found the roots of such plants descend below the pot-sherd draining materials at the bottom, entwining themselves in each other round the bottom angles of the pot, and in many cases descending still further, through the hole in the bottom, in search of moisture beneath it.

This fact alone should, in my opinion at least, be sufficient to enable any practical man to judge correctly of the theory on which was based the successful practices I have adopted, and now recommend to the impartial consideration and, if approved, adoption by others, in the drainage of gardens of all kinds, as well as of other lands in any degree similarly circumstanced, as to the causes which render ordinary drainage abortive.

Before I proceed to describe either the drainage materials I recommend or the mode of applying them, permit me to state the circumstances which led to my adopting such a simple system. In the year 1828 I had occasion to take up the pipes employed to convey water to a gentleman's residence, the pipes having been completely filled by the roots of trees growing in the vicinity of the water passage. This process had to be performed annually. In relaying the pipes, I found it necessary to vary the direction at one particular part of the line, and in doing so had to lay the pipes over the angle of old walls, on a dry built foundation. The year after, when taking up the pipes as usual, I found them all stopped as formerly, wherever laid on the more solid, impervious subsoil; whereas those placed over the porous old wall foundation were quite free from such obstruction, the roots in that particular part having descended into the open rubble stonework instead of forcing themselves, as they in all other parts did, in through the merest pores of the pipes, as well as through their cemented joinings.

Having left that locality soon after, I never thought more on the matter until land drainage by earthen pipes became pretty general in Ireland; and having, like many others, suffered much inconvenience by such stoppages, my early chance discovery flashed across my mind, and wherever I found I could conveniently do so, I had a porous material, composed either of broken stones, coarse gravel, or coarse peat-charcoal, placed under the ordinary drainage pipes, into which roots not only descended from the sides of the drain, but actually out of the pipes by their joinings, whenever such roots happened to enter the pipes themselves, which was seldom.

To facilitate such descent, or rather to prevent the possibility of their remaining any considerable time in the pipes, should they enter them by any chance, as well as to prevent the accumulation of any other matter obstructive of the water passage, I have designed the form of drainage pipe, a drawing of which is appended. (Plate I.)

I have calculated the probable weight of such pipes and their supporters when ready to be laid down in the drains, and believe that both combined will be found less than those of ordinary pipes and their collars of similar capacity. By adopting this form of pipe and supporter, no other material need be used as an auxiliary, were it not necessary to have a support under the pipes, between those supporters the ends rest upon, otherwise they would break down under the superincumbent weight, which in most cases would be considerable.

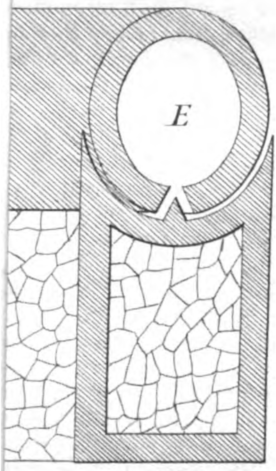
As it may not, in all cases, be convenient to have broken stones, coarse gravel, or other porous imperishable materials, to place under the pipes as a central support, I have designed additional side supporters, to sustain the pipes between the end supporters. In no case do I consider it necessary that what is called "the bore" of the pipe should be of large dimensions, as the object and office of such pipe, in this case, should be more for the conveyance of air than for the passage of water, whose passage should be through the end supporters and space under the pipes. Such pipes effect a double purpose, —that of a more perfect aëration and a thorough, safe drainage. The height of the supporters or the depth of drainage space must, of course, depend upon such a variety of circumstances, and be subject to so many conditions, to be known only to the scientific or practical operator in each respective case, that it would be little short of a waste of time, in the present instance, were I to seek to go more into detail. One thing I may observe, that whatever the depth of drain may be, its width at bottom should be reduced to the very narrowest space consistent with convenience, for it is a well-known fact that the narrower the space in which water has to flow, the more perfectly will it clear its passage; and I think it is equally well known to practical gardeners as to vegetable physiologists, that the roots of plants in the bottom of a narrow and rapidly flowing stream will have a less tendency to rise to the surface than they would were it wider and more sluggish. Further, I believe it is well known that when the water ceases to flow in drains, especially in dry weather, such roots descend still lower in search of that moisture denied them in the drain, then so fully dried up by the action of the air in the pipes, and from which the roots invariably seek, as it were, to escape.

ON THE NIGHT COVERING AND SHADING OF PLANT AND FORCING HOUSES.

By Henry Howlett, Mr. Ormson's Horticultural Works, Chelsea.

So much have gardeners been impressed with the necessity of using some kind of night covering, in order to arrest as much as possible the wasteful dissipation of heat by radiation, that in most gardens some kind of covering is used for pits, frames, and such low houses as may be conveniently reached; but for lofty or extensive roofs, I believe nothing thoroughly satisfactory has as yet been in general use: indeed, the late Dr. Lindley, in his *Theory of Horticulture*, ed. 2, page 209, seems to admit the fact, as he thus writes on the subject:—"The objections to external coverings are (1st) their expense and (2nd) the trouble attending them. If, however, the needless cost of fuel and the injury sustained by plants, be placed in one scale, and the expense of an external covering in the other, it would be found that the balance would turn in favour of the latter. The

Plate I.



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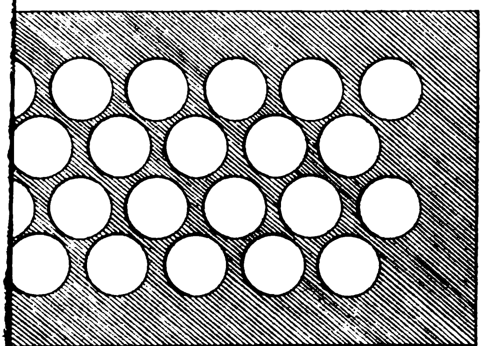


Prescott, Son & Simmons, lith. Suffolk Lane, E.C.

trouble of covering a house with mats every night is no doubt the main obstacle to their employment. Long ago Sir Joseph Paxton used moveable thatched roofs, running in a sort of groove or rail, capable of being pushed off again at one end every morning; and this device left nothing to be desired in principle, but it demanded space: for every fifty feet run of glass house, fifty more feet were required at the end of it to receive the moveable roof during the day, and it is only here and there that so much space can be afforded, nor is the plan applicable at all to houses of large dimensions. It, therefore, still remains for some ingenious person to show how glass houses may be covered every night cheaply and without trouble by a moveable roof."

Now, if there is no substance placed between the glass of a house and the ever-moving atmosphere, especially on clear frosty or windy nights, the great amount of heat and moisture consequently dissipated must be put down as a dead loss to the cultivator. In order to demonstrate this I prevailed upon two of my friends to make a few experiments, which consisted in placing two thermometers upon the roof of a forcing house, the one left exposed and the other covered by a common deal box. The result showed a saving of from seven to ten degrees, but as the area of glass covered was so small, we can hardly look upon the experiment as a fair test of the benefit that would accrue when a whole roof is covered.

EXPERIMENTS CONDUCTED BY MR. HOBDAY, GARDENER, AT HAVERLAND HALL.

Date.	Time of Observation.	Heat of House.	External Temperature.	Thermometer Laid on Roof Uncovered.	Thermometer Laid on Roof and Covered.
1865.		° F.	° F.	° F.	° F
Dec. 27	10 P.M.	70	34	50	57
28	8 A.M.	71	41	49	56
1866.					
Jan. 1	11 P.M.	69	33	45	55*
11	10 P.M.	66	30	42	53
	Average...	69	34·5	46·5	55·25

EXPERIMENTS CONDUCTED BY MR. SMYTHE, GARDENER, AT ELMHAM HALL.

Date.	Time of Observation.	Heat of House.	External Temperature.	Thermometer Laid on Roof Uncovered.	Thermometer Laid on Roof and Covered.
1865.		° F.	° F.	° F.	° F.
Dec. 27	10 P.M.	70	34	50	57
28	8 A.M.	70	41	49	56
	Average...	70	37·5	49·5	56·5

NOTE.—In each case a common deal packing-box only was laid over the thermometer, allowing a current of air to pass between it and the glass.

* Wind high.

Thus far I have only spoken of economising heat, but there is another element of great importance in plant houses, *i.e.*, moisture in the form of elastic vapour. The same great authority already quoted, says on this head, page 208-9 :—" It is well known that the effect of maintaining a very high temperature in hot houses at night during the winter is frequently to cause the leaves to wither and turn brown, as if scorched or burnt, and this is certainly owing to the dryness of the air. It is evident that the mode of preventing this drying of the air by the cold surface of a glass roof, will be either by raising the temperature of the glass, which can only be effected by drawing a covering of some kind over our houses at night, so as to intercept radiation, or by double glass sashes."

Now as the latter method has of late received considerable attention, it shows that gardeners are alive to their necessities, and bestirring themselves to meet their wants; and this circumstance emboldened me to bring forward a model, in which an attempt is made to combine a system of night covering with that of shading by day, by means of one and the same apparatus. But as the thing has never been practically tested, I simply exhibited it as a ground for discussion, or as likely to afford a hint to any one who may feel disposed to work it out to a practical and satisfactory solution.

It consists of a series of flaps, or louvres, worked by means of levers, so that a roof of any extent can be covered instantly; it can also, by a mere touch of the lever, be so far elevated as to admit the whole, or a part only, of the sun's rays, or by elevating it to the utmost extent a perfect shade is secured.

But I must recur again to the subject of atmospheric moisture, as it is not alone from the condensation of the moisture upon the cold roof that the air of houses becomes too dry to maintain a healthy vegetation in the plants, but also from the excessive evaporation that takes place in very bright weather. Hence the various methods of shading which gardeners adopt; for although shading may be applied to an extent that is hurtful, yet cultivators cannot do without it, and I believe when harm results from its use, it is for want of more perfect and readier means for its application and removal than have hitherto been in general use. This I seek to remedy by this system of louvre covering.

HISTOIRE ET DÉVELOPPEMENT DE L'ART DES JARDINS EN FRANCE.

Par Ed. André, Jardinier principal de la ville de Paris.

Comme toutes les choses venues de l'antiquité, l'art des jardins a subi les vicissitudes les plus diverses, des alternatives de lumière et d'obscurité, de barbarie et de progrès, suivant les siècles et les nations qu'il a traversé. Mais on remarque qu'il a toujours été en faveur aux époques de calme et de civilisation. Sa bonne ou sa mauvaise fortune ont suivi constamment l'état de la société ; à peine apprécié d'un petit nombre aux temps d'oppression et de misère, florissant au contraire sous l'émancipation intellectuelle, dans les temps de bien-être et de protection des beaux-arts.

Il peut donc être intéressant de rechercher les principaux traits historiques de cette charmante manifestation de l'esprit humain.

Le temps est propice, du reste, à cette étude. Jamais plus grande faveur n'accueillit les jardins. Ils sont devenus, grâce aux temps où nous vivons, non plus seulement l'apanage exclusif des grands et des heureux d'ici bas; ils se sont même adaptés aux plus humbles fortunes. Dans les plus belles époques de son histoire, nous voyons l'art des jardins sortir tout d'un jet, sous ses formes diverses, du cerveau des grands artistes qui l'ont créé, et forcément limité, malgré leur génie, aux matériaux restreints que leur fournissaient les découvertes de leur temps. Il n'en est plus de même aujourd'hui.

Les jardins ont pris un autre aspect depuis les nouvelles et innombrables conquêtes dues aux explorations de hardis voyageurs, depuis que l'ornementation végétale a changé ses principes, depuis que l'industrie et l'art lui apportent un concours si fécond, depuis qu'un entraînement universel porte tous les esprits vers ce délassement salutaire, depuis surtout que des hommes ardents et dévoués au progrès ont créé ces sociétés horticoles, ces échanges d'idées et imaginé ces réunions internationales où des savants spéciaux viennent disserter sur les différents points de l'art et de la science horticole.

Je me propose donc d'examiner succintement les développements et les modifications subies par l'art des jardins avant nous et de tracer les caractères saillants du style adopté de nos jours en France, par les principaux artistes qui se sont fait en ce genre une juste réputation.

Ce sera la première partie d'une étude qui aura pour complément l'examen des parcs et jardins Anglais, qui ont été autrefois pour nous d'incomparables modèles et qu'on invoque encore avec plaisir comme de magnifiques spécimens du genre naturel ou paysager.

Résumé historique des jardins dans l'antiquité.

L'histoire des jardins anciens est entourée d'obscurité. A peine les poètes nous ont-ils laissé quelques descriptions où le réel le cède toujours au fantastique et ne nous donne qu'une faible idée du jardinage dans les premiers âges.

Ce qui paraît certain, c'est que les premiers hommes songèrent plus au solide qu'a l'agréable et que leur première idée fût de cultiver, auprès de leurs demeures, les végétaux utiles. Plus tard, ayant pourvu aux principales nécessités de la vie, ils purent ajouter aux satisfactions matérielles quelques unes dès joies de l'esprit et quelques délassements à leurs durs travaux. De là naquirent les jardins d'ornement.

Mais quelles furent les premières formes en usage ? De quoi s'inspira-t-on dès l'abord ? Il est permis de croire, d'après les relations qui nous restent, que ce ne fût pas des beautés naturelles, et que la première idée de l'homme ne fût pas d'imiter la nature, mais de la dompter. L'art des jardins consista plutôt dans la difficulté vaincue et dans l'accumulation d'ornements artificiels que dans une concentration intelligente de beautés naturelles sur une surface modérée.

Ainsi, même dans les fictions des poëtes, il paraît évident que l'idéal des jardins était placé par eux dans les procédés humains, dans les tours de force des artistes, dans la nature asservie. Un beau site et les situations pittoresques ne furent jamais autre chose qu'un heureux cadre à leurs fantaisies.

Les traditions léguées par l'orient, et surtout par l'Égypte et la Grèce, puis par les Grecs à Rome, étaient empreintes de cet art de plier la nature et la végétation aux lignes architecturales. Il donna naissance au style qui prévalût à Rome, à ces jardins *construits* qui faisaient dire à Cicéron, *hortos edificavi pulcherrimos*, j'ai bâti des jardins charmants.

Soumis à ces lois conventionnelles, l'art des jardins se développa rapidement sous la république Romaine et surtout sous les Césars. Tout obéit alors à la ligne droite à la décoration sculpturale. L'Italie fut peuplée de terrasses, de colonnades, de portiques, de fontaines, de statues. Les arbres indigènes et très-peu d'exotiques, taillés, tourmentés, torturés sous le ciseau, firent tous les frais d'une décoration végétale qui ne fut plus qu'un accessoire ornemental. Et, il faut bien le dire, les restes de ces décorations qui nous sont parvenus des derniers siècles de l'Empire, prouvent une décadence artistique qui allait de pair avec la décadence des lettres. J'ai vu moi-même dans les campagnes Italiennes, des vestiges d'anciens jardins Romains d'aussi mauvais goût que nos pires productions modernes. Tout croulait à la fois dans Rome expirante : la force, la prépondérance, les mœurs, les arts, y compris même ces jardins où une aristocratie corrompue avait entassé à profusion des ornements sans grâce et sans raison.

L'Italie toute entière, devenue la banlieue de Rome, vît ses champs, ses collines, ses prairies, faire place aux avenues, aux colonnes, aux charmilles taillées des innombrables villas qui la parsemaient.

Bien plus, l'imitation sur une petite échelle dégénéra en un goût pitoyable, et ce qui avait encore sa raison d'être avec des proportions grandioses, devint ridicule sur de petits espaces.

Cette belle terre d'Italie, avec les horizons enchanteurs et son climat béni, donna donc naissance à une violation flagrante des lois de la nature, et ce qui nous reste des descriptions de Spartien, de Pline le naturaliste, de Sénèque, de Virgile, et de Catulle, ne contient pas une seule mention du côté pittoresque des sites et du charme des beautés naturelles.

L'invasion des barbares précipita tout cela dans la ruine. Sous le règne de l'épée et du désordre, pendant tous les temps sombres et terribles, où le christianisme jetait peu à peu les fondements de la société nouvelle dans un prodigieux et mystérieux enfantement, l'art des jardins, qui demande le calme et la sérénité, resta enfoui sous les cendres de la décadence. Il y resta de longs siècles. Mais ce fût pour en sortir avec une force nouvelle, qui cette fois, ne s'arrêta plus guère. Il devait donner l'exemple des transformations les plus complètes et des progrès les plus saisissants, se plier aux génies divers des nations qui l'adoptaient, et s'accroître de toutes les découvertes qui ont conduit le monde des ténèbres de la barbarie, aux vives clartés de nos sociétés modernes.

Naissance, développements, et transformations de l'art des jardins en France.

Les traditions des jardins antiques ne se perdirent jamais complètement, même aux temps les plus obscurs du moyen-âge. En Italie, en Espagne, et en France, elles furent toujours en honneur dans les nombreux couvents de Bénédictins qui les conservaient pieusement en les perfectionnant pour leurs besoins ou leurs agréments personnels. Ce n'est pas, du reste, la seule obligation qu'on ait à la patience, à l'esprit d'ordre et à l'amour de l'etude de ces pionniers infatigables. Que de resurrections inespérées de chefs d'œuvres antiques ne leur doit-on pas! Et que seraient aujourd'hui la plupart des découvertes qui font notre gloire, s'ils n'avaient travaillé pour nous pendant de longs siècles à la régénération d'un monde qui en recueille aujourd'hui les fruits, avec trop peu de gratitude. On trouve des traces fréquentes du rôle bienfaisant de ces amis du jardinage, dans les nombreux cartulaires du moyen-âge. Mais, il faut ajouter que c'est principalement au point de vue pratique et utile que sont écrites ces notes. Pour des hommes le plus souvent confinés dans d'étroits espaces entourés de murs, sans horizon, sans aucun agrément, on comprend que le dessin des jardins était du superflu. Le principal était pour eux le produit, les légumes et les arbres fruitiers. Aussi est-ce en France que parurent les premiers traités de culture des arbres fruitiers, et l'histoire de l'arboriculture fruitière rattache ses premiers pas à la célèbre pépinière que les Chartreux fondèrent au Luxembourg et qui florissait au 17$^{me.}$ siècle. C'est ainsi que les capitulaires de Charlemagne ne parlent que de ses plantations de vergers et de vignes, et des encouragements qu'il donna à la replantation des forêts. La maison de campagne qu'il avait sur le Rhin, à Ingelheim, ne paraît pas avoir eu des jardins de plaisance dignes de remarque.

A peine trouve-t-on à ces époques, dans le midi de la France, notamment dans le province de Narbonne et près de Nismes, quelques seigneurs conservant des villas Romaines avec les ornements contemporains de l'occupation des Gaules. Sous la féodalité, les mêmes obstacles s'opposaient au développement des jardins. Les seigneurs, renfermés dans des chateaux et des tours crénelées, occupés perpétuellement à attaquer leurs voisins ou à se défendre, quand encore ils ne couraient point les mers vers la terre sainte, ne songeaient guère aux embellissements de leurs propriétés. Quant au peuple, écrasé sous les impôts et le despotisme de ses maîtres, il n'avait guère de loisirs et restait dans les ténèbres de l'ignorance.

Jusqu'à l'avénement des Valois, ou à peu près, les choses restèrent ainsi. Les quelques grands jardins que les puissants du jour se donnaient étaient calqués sur ceux de l'Italie, où la Renaissance avait précédé la nôtre et qui ne présentaient eux-mêmes que des copies plus ou moins réussies des anciens jardins dont la pioche avait retrouvé la trace sous les décombres de la vieille Rome.

C'est à François I^er. seulement que commence la renaissance des jardins en France. Il s'était passé plus de 15 siècles sans qu'on en ouït parler.

Fontainebleau eût les prémices de ce renouveau. Le vieux château dont le roi chevalier avait entreprit la complète transformation, fut envahi par de nombreux artistes venus d'Italie, à leur tête deux peintres distingués, Rosso et le Primatice. La présence de ces deux grands artistes ne fût pas sans influence sur la disposition des jardins, qui reflétèrent du reste fidèlement le style néo-romain alors adopté et patronne en Italie par les Médicis, d'après les traditions antiques. St. Germain suivit Fontainebleau et reçut des améliorations conçues dans le même ordre d'idées, c'est à dire des terrasses, des colonnades, des statues, des portiques, etc.

Avec les batailles les historiens surgissent. Il en fût de même du jardinage et de son aimable science. Charles Estienne, en 1529, écrivit le *Proedium rusticum*, un livre à la louange de la vie champêtre; Champier parlait déjà des Champs Elysées à Paris, comme d'un lieu de délices; Liébaut publiait sa *Maison rustique*, que Markham appelait un livre "infiniment excellent," et qui contenait des tracés de jardins réguliers.

Sous l'influence de Henri IV. et du grand Sully, l'agriculture et l'horticulture sortaient enfin des ténèbres où elles avaient été si long temps plongées.

Claude Mollet, jardinier du roi, fit paraître en 1663 son *Théâtre des jardinages*, où les jardins d'agrément avaient leur part. Toutefois les berceaux, palissades, bosquets, et cabinets, dédales et labyrinthes constituaient encore tout l'art d'orner des jardins. "Le labourage et le paturage," ces deux mammelles de la France, comme disait le grand protecteur de l'agriculture, devaient passer avant tout et primer les arts d'agrement.

Cependant de bons livres surgissaient, traitant du jardinage : le *Jardin de Plaisance* d'André Mollet, le *Traité du jardinage* de Boyceau de la Baraudière, les petits livres de Morin, de Liger, et de plusieurs amateurs distingués.

Claude Mollet, aidé de Jean Robin, fut chargé de planter St. Germain. La plupart des avenues que nous voyons aujourd'hui datent de cette époque. Bientôt le roi Henri voulût augmenter le nombre de ses jardins. La Flèche, les Tuileries, Vendôme, s'ajoutèrent à cette liste qui s'accroissait d'une manière lente, mais sans interruption. Fontainebleau même, en 1607, avait reçu de nouveaux embellissements.

Le style français proprement dit n'était pas encore créé. Il allait se développer sous le règne de Louis XIV. et sous la main d'André Le Nôtre, que Loudon lui même appelle le plus grand jardinier qui ait jamais existé. Le Nôtre prit les jardins au point où les avaient laissé les imitateurs inhabiles des anciens. Il les transforma de toutes pièces, à ce point de créer tout un genre qui prit le nom de *style français* et qui fût imité par l'Europe entière.

Les caractères distinctifs des créations de Le Nôtre, bien qu'il les rapportât toutes à la ligne droite, aux dessins réguliers, à la symétrie, étaient la grandeur, la majesté. Il lui fallait de grands espaces où son talent pût respirer à l'aise et se développer en toute liberté. Sous son inspiration, les résidences royales furent encadrées par de somptueuses conceptions, de vastes terrasses comme à St. Germain, des escaliers monumentaux comme à Versailles, et une profusion de statues, de fontaines, de jeux d'eau, d'arcs de triomphe, de cascades, de charmilles, de vastes avenues en arcades, de parterres de broderie, dont les proportions grandioses semblaient reculer l'influence du grand roi jusqu'aux objets naturels qui l'entouraient.

De toutes les conceptions de Le Nôtre, Vaux le-Vicomte, Trianon, Meudon, St. Cloud, Sceaux, Chantilly, Versailles est un chef-d'œuvre, qui attire l'admiration même de ses détracteurs. On peut, en effet, ne pas en aimer le style, mais on ne peut refuser au parc de Versailles une grandeur de vues en rapport avec les lignes monumentales des bâtiments qu'il accompagne, avec le faste des costumes et l'élégance de la cour de Louis XIV. Le Nôtre vit adopter partout, de son vivant, le genre qu'il avait créé. L'Angleterre, la Suède, l'Allemagne, l'Espagne, voulûrent avoir des jardins sur ses dessins. Il fit même en 1678 un voyage en Italie, dont on lui avait parlé comme du berceau de l'art qu'il avait porté si haut. Il n'y trouva rien qui fut digne d'attention et revint, non seulement sans y avoir rien appris, mais encore après avoir tracé dans son propre style, les plans de deux belles résidences de ce temps-là, les villas Panfili et Ludovisi.

Il fit passer ce gôut dans l'esprit de ses contemporains et il releva le jardinage par le charme et la distinction de sa personne. Les grands seigneurs de son temps, dont il était devenu l'égal avant même que le roi l'eût anobli, avaient accueilli avec empressement ses nouvelles créations. Il leur avait inculqué son amour des jardins. Mdme. de Sévigné aimait à converser avec lui de Gourville et de Chaulnes, Boileau lui-demanda plus d'une fois des conseils pour son jardin d'Auteuil, Lamoignon l'emmenait à Baville; Bossuet lui-même causait avec lui volontiers et se mettait pour un moment à aimer les plantes. On peut s'en étonner, si l'on songe que le jardinier du grand êveque de Meaux lui disait un jour: "Si je plantais des St. Augustin et des St. Chrysostome, vous les viendriez voir, mais pour vos arbres, vous ne vous en souciez guère!"

Après la mort de Le Nôtre, qui arriva en 1700, les jardins français prirent une faveur incroyable. Les préceptes qui avaient présidé à ces grandioses créations et que le maître avait négligé d'écrire, furent publiés, exactement ou non, par de nombreux auteurs.

L'un d'eux entre autres, Dezallier d'Argenville, écrivit sous le voile de l'anonyme un livre ou étaient consignés très-en détail et aidés par de nombreux dessins, les principaux moyens d'exécution des jardins français.

Plusieurs éléves du grand jardinier cherchèrent à continuer ses traditions. L'architecte Druzé dessina Marly, Desgodetz planta Bagnolet ; les frères Mansart suivirent les plans et les préceptes de Le Nôtre dans plusieurs de leurs créations.

L'excès qui corrompt si vite les meilleures choses, ne se fit pas attendre. Comme autrefois à Rome, chacun voulut avoir sa terrasse et son jet d'eau, voire ses statues et ses charmilles, dans des jardins de petites surfaces. Ces parterres de broderie, où la pureté des lignes et la grâce des arabesques formaient de si charmants dessins sur les vastes terre-pleins de Versailles, se changèrent en ridicules enchevêtrements de fantaisie sans goût, sur des espaces microscopiques. Le désenchantement fût bientot aussi grand qu'avait été l'enthousiasme. A toute force on ne voulut plus entendre parler des jardins français.

Ce fut alors qu'une grande réaction se fût, qui devait être le point de départ des jardins *paysagers*, l'œuvre du 18e. et du 19e. siècle.

L'instigateur de cette révolution paisible, mais très-caractéristique, fût un homme de talent, tant comme poëte que comme amateur de jardins. Il se nommait Dufresny. Louis XIV l'avait pris en affection depuis la mort de Le Nôtre. Un peu sous la pression de l'opinion générale et beaucoup par l'ennui de voir toujours les mêmes choses, le roi lui-même avait fini par se fatiguer de ces grands lignes et de cette nature apprêtée. Il avait accueilli favorablement des projets de transformation en style paysager que Dufresny lui avait présentés pour Versailles, et les aurait sans doute fait appliquer s'il n'avait fallu reculer devant la dépense.

Toutefois Dufresny fut nommé contrôleur des jardins royaux et pût exécuter plusieurs de ses conceptions, dont les principales furent le jardin de l'abbé Pajot et deux autres dans le faubourg St. Antoine, à Paris.

Ici se place la question de savoir si Dufresny s'inspira des premiers travaux de Kent, dont il était contemporain, et qui passe pour avoir créé en Europe le style dit Anglais, où bien si Kent lui-même, qui était de 37 ans plus jeune que Dufresny, n'aurait pas developpé les idées du dessinateur français. On manque de preuves, et ni l'une ni l'autre de ces deux versions n'est acceptable à mon avis. Voici pourquoi. L'idée de passer tout d'une coup de la raideur du style français au pittoresque des jardins de la nature, c'est à dire d'un extrême à l'autre, ne sortit pas tout d'un coup du cerveau de Kent ou de Dufresny.

Or, on s'accorde à dire que les descriptions des jardins paysagers de la Chine d'après les missionnaires, frappèrent à ce moment tous les esprits. Qu'y a-t-il donc d'impossible à ce que les Jesuites de diverses nations qui à cette époque parcouraient le céleste empire, aient apporté dans leurs pays des versions analogues, et déterminé dans l'esprit de quelques hommes de mérite la réaction contre les jardins symétriques qui se fit jour simultanément sur plusieurs points de l'Europe ?

Les premières tentatives de jardins paysagers marchèrent d'abord de pair en France et en Angleterre. Une ardeur nouvelle, qui n'était plus contenue par les limites étroites d'une architecture de convention, s'empara d'un certain nombre de jeunes et vives intelligences. De cette époque date une série de magnifiques parcs anglais qui sont restés jusqu'ici nos modèles. La France marcha plus lentement vers le progrès. Les nombreux jardins faits et plantés sous le grand règne ne pouvaient se transformer du jour au lendemain. Il en coûtait beaucoup de détruire ces ornements végétaux que les temps avait formés à grand peine et qu'un coup de hache allait anèantir. Et puis, les hommes manquaient pour développer un art nouveau qui n'avait de limites que la fantaisie individuelle.

Les premiers écrits qui traitèrent du nouveau style, furent *l'essai sur l'agriculture*, de Laugier, en 1753, et l'ouvrage de Prévost, en 1770.

Vers le même temps, le marquis Louis René de Girardin, aidé de Morel et de Jean Jacques Rousseau, son hôte et son ami, se mit à embellir sa propriété d'Ermenonville. Il y consacra plusieurs années et réussit à en faire un spécimen de jardin paysager qui attira l'attention générale. La beauté naturelle du site aida fortement à la transformation rêvée. Le dessin nouveau présentait un composé d'allées droites, restes obligés de l'ancien style, et de chemins à courbes irrégulières, conçus plutôt pour l'utilité de la promenade que pour la grâce des tracés.

Girardin, pressé par ses amis d'écrire un traité des jardins, publia en 1777 la description du parc d'Ermenonville sous ce titre "*Composition des paysages.*" Le livre eût grand succès; il fut traduit en Anglais et acquit de nombreux adeptes au nouveau genre. Delille y prît les plus belles pages de son pöeme "Des jardins," et les auteurs anglais rendirent hommage à cette création conçue, dirent-ils "dans un style *chaste* et pittoresque."

Vers cette époque, un habile dessinateur écossais, M. Blaikie, vint s'établir en France, et profita de l'entraînement qui suivit l'exemple donné par M. de Girardin. Il dessina de nombreux et fort jolis parcs et ne contribua pas peu à répandre cet art, pendant plus de 20 ans de sa vie qu'il y consacra spécialement.

Le *Moulin joli*, créé par Watelet, suivit Ermenonville. Il reproduisait le style chinois, avec ses mille et un sentiers, l'exagération de ses ornements, temples, kiosques, pagodes, ponts, rochers, etc. On y voyait des autels "avec des troupe de pantomines qui portaient des offrandes et faisaient des sacrifices à l'antique."

Cette manie de décoration venait de constituer un nouveau travers. Tant il est vrai que le beau et le simple ne suffisent pas toujours à l'homme et que de tout temps le mieux à été l'ennemi du bien !

Le genre romantique fit irruption dans les jardins. Les ornements simples et agrestes, chaumières, bancs de bois, ponts rustiques, ne contentèrent plus le besoin de nouveauté qui s'empara des dessinateur. La couleur antique qui dominait dans la littérature du temps, et le ferment de républicanisme qui germait dans tous les esprits, eurent de l'influence même sur l'art des jardins.

Il n'y eût bientôt plus de coin de parc sans son temple de Diane, son île de Lesbos, sa grotte de Cacus. Des tombeaux, des urnes funéraires, des inscriptions à l'amour, à l'amitié, aux grands hommes et—jusqu'à quelque chien fidèle, fûrent les ornements obligés de tout paysage orné.

Cependant quelques parcs bien dessinés datent de cette époque. On compte, dans cet ordre de choses, Bagatelle, planté en 1779 par le Comte d'Artois ; Monceau (aujourd'hui le parc municipal de Monceaux) dessiné par Carmontelle ; le petit Trianon, si aimé de Marie Antoinette ; Méréville, en Beauce, où M. de Laborde dépensa, dit-on, 18 millions et détourna la rivière la Juine pour arroser ses jardins.

Tous ces parcs, tracés du reste avec goût et plantés de beaux arbres, présentent des exemples frappants de l'exagération dans les ornements accessoires, qui sont partout conçus dans un style lourd, sans grâce et sans à propos, dans des paysages choisis, où tout au contraire devrait garder le ton de la nature.

Les écrivains de ces époques donnèrent dans ce travers d'ornementation. Ils épousèrent chaleureusement l'allégorie du mode antique, et brochant sur le tout, enfouirent l'art des jardins dans des dissertations esthétiques auxquelles les premiers ils ne comprenaient rien.

C'est alors que furent imaginés le *style terrible* et le *style mélancolique*, les *dolmens druidiques* et les *ruines échevelées*, que devaient accompagner "*des arbres déracinés levant au ciel leurs racines éplorées comme des bras décharnés*," suivant l'expression d'un de ces visionnaires.

Par malheur tout cela fut pris au sérieux, sinon dans les jardins (qui malgré toutes ces aimables choses, ressemblèrent comme de coutume à des jardins, et non pas aux horreurs du Ténare et du Styx) au-moins dans les nombreux traités qui parurent en France avant la fin du siècle dernier.

La révolution éteignit tout cela dans la grande tourmente. Malheureusement, elle emporta aussi les bonnes choses, et si l'empératrice Joséphine, avec l'aide de Berthoud, n'eût embelli la Malmaison, on chercherait en vain les traces de quelques créations de beaux parcs sous la république et l'empire.

Jusqu'à la Restauration, nuit complète. On suivait de loin, par de pâles imitations, les exemples d'Ermenonville et de Trianon.

Il fallait le talent d'un nouvel arrivant pour renouveler le style paysager dégénéré. Après avoir dessiné un grand nombre de beaux parcs, conçus pour la première fois selon des régles pures, Gabriel Thouïn, c'est son nom, publia le résultat de ses travaux, en 1819, sous le titre de "*Plans raisonnés de jardins.*" Le livre avait été précédé, deux ans auparavant, par la "*Description des nouveaux jardins de France,* où M. de Laborde avait groupé les principaux parcs exécutés dans le genre de Méréville, à grand renfort de dépense, sinon de talent.

L'ouvrage de Thouïn eût un succès justement mérité. Il ramenait le tracé des jardins à des règles sages, les encadrant dans une allée de ceinture, coordonnant toutes les scènes comme dans les beaux parcs anglais, donnant pour la première fois une large part aux vues, et ajoutant à ses plans des dessins d'ornements rustiques appropriés avec goût aux sites qu'ils devaient accompagner.

On lui reproche pourtant et avec raison, l'abus des allées. St. Ouen, une de ses meilleures œuvres qu'habita Mad^me. de Cayla, présente ce grave défaut. Les chemins trop multipliés coupent le jardin en tous sens, diminuent les pelouses et les bosquets, ôtent l'ampleur à la conception. La promenade est embrouillée et pénible; les masses de bois, trop disséminées et trop faibles, se représentent à chaque instant, sans offrir de scènes tranchées, et ces contrastes qui sont la surprise et le charme des beaux sites.

A ce moment, le goût des jardins reprenait faveur. On avait déjà sous les yeux de nombreux modèles, le style français avait à peu près disparu de partout et l'on n'en connaissait plus guère que les grandes reliques conservées dans les résidences opulentes. Un coin de Versailles, qu'on nomme "le petit jardin du roi," fut arrangé à la nouvelle manière. La duchesse d'Angoulême embellit Villeneuve l'Etang. La paix était revenue; les propriétaires avaient de nouveau des loisirs dont leur jardins profitèrent.

MM. Doublat à Epinal, Ternaux à St. Ouen, l'Amiral Tchitchagoff à Sceaux, Berthoud à Chantilly, Soulange Bodin à Fromont, Boursault à Paris, suivirent le mouvement et créèrent des propriétés qui sont restées célèbres.

Le dessin de ces jardins n'accuse pas cependant une grande amélioration. Le choix des sites et la richesse de la décoration végétale ou artistique en font les principaux frais. C'est ainsi que le jardin de Fromont, planté de 1814 à 1830, avec un soin persévérant, réunissait le plus grand nombre des arbres exotiques apportés de l'Amérique du Nord par notre compatriote André Michaux. Celui de M. Boursault était plutôt un établissement d'horticulture monté avec luxe, qu'un assemblage de beautés uniquement artistiques ou naturelles.

Aucun nom de talent ne se présente à l'historien pendant cette periode de transition, si ce n'est Bellangé, qui planta avec beaucoup de goût le jardin de l'Elysée Bourbon à Paris en 1828. Le style adopté fut la plus libre fantaisie et le plus souvent le goût le plus contestable. Les petits jardins foisonnèrent dans les villes. Ils présentaient, sous le nom de *parterres*, un assemblage sans raison de plates-bandes rectilignes et de courbes sans grâce. Pendant que les Hollandais et les Anglais développaient avec goût, dans leurs petits jardins de ville, le parterre ancien perfectionné par Le Nôtre, la France n'eût pour tout partage qu'un genre bâtard, fait de pièces et de morceaux disparates.

Les jardins publics des grandes villes n'étaient ni mieux conçus, ni mieux ornés. Exceptés les Tuileries et le Luxembourg, à Paris, dessinés suivant le style français, la capitale de la France n'avait aucun jardin vraiment digne d'elle.

Les grandes villes de province n'étaient pas mieux partagées. Lyon, Rouen, Reims, Nîsmes, Montpellier, qui seules ou à peu près, possédaient le privilège de jardins et de promenades publiques, n'offraient guère autre chose que de grandes avenues et de maigres plates bandes entretenues sans art. Seuls les jardins botaniques présentaient quelque intérêt au point de vue pittoresque. Et encore prenaient-ils leur principal attrait dans les belles plantes exotiques dont ils étaient remplis.

C'est dans les créations particulières, de 1830 à 1850, qu'il faut chercher les traces d'une sorte de renaissance des jardins paysagers en France. Pendant cette période, si rien de saillant comme style ou comme proportions ne vint attirer l'attention publique, au moins trouve-t-on un certain nombre d'exemples de beaux parcs, dont les principaux sont dus à MM. Bühler, Joly, au Comte de Choulot, à Duclos, et à plusieurs hommes de talent.

MM. Bühler dépassèrent de beaucoup leurs contemporains. Ils raisonnèrent le tracé des allées dans les parcs et leur donnèrent des courbes harmonieuses se reliant les unes aux autres sans se heurter jamais. Jusque là ou peu s'en faut, on ne s'était guère préoccupé des allées que comme de chemins dont le tracé n'avait pour but que de conduire vers un but déterminé. Pour eux la forme de l'allée elle-même fut un ornement, une beauté. Plusieurs autre hommes de valeur suivaient ce mouvement et aggrandirent l'art de tracer les jardins.

Jusqu'à l'avénement de Napoléon III les choses restèrent ainsi dans un état de demi-renaissance qui n'attendait qu'un vive impulsion pour s'accentuer. L'examen de ces travaux récents formera la troisième et dernière période de cette étude.

Développements du style actuel des jardins en France.

Le genre qui tend actuellement à se substituer en France au style classique de Le Nôtre et au style romantique de M. de Laborde et consorts, n'appartient ni à l'une ni à l'autre de ces deux formes. Il offre une physionomie *sui generis* parfaitement tranchée et s'écarte des usages reçus jusqu'à ces dernières années. Il a pris naissance par un concours particulier de circonstances. A son avénement au trône, l'empereur Napoléon III fut frappé de la pénurie de jardins où étaient les grandes villes de France et surtout Paris.

La transformation du Bois de Boulogne fut arrêtée. Lui-même, il indiqua dans quel sens il concevait les travaux à exécuter. L'état, propriétaire du Bois de Boulogne, le céda à la ville sous la condition qu, elle y ferait des travaux d'embellissements jusqu'à concurrence de quatre millions.

La tâche était ardue. Il fallait s'attaquer à une des plus désagréables situations qu'on pût voir. Le sol du Bois de Boulogne, presque entièrement plat, ne prêtait guère au pittoresque. Les vues étaient masquées par des fourrés continus, maigres, monotones. Les beaux arbres étaient rares, les allées, droites, taillées, le sol détestable.

Le projet d'embellissement fut ainsi conçu. Choisir le point culminant du Bois; creuser au pied un lac et prendre les terres pour doubler la hauteur de l'éminence, superposer le premier lac à un second plus grand ouvert dans une large percée qui irait se perdre dans les profondeurs des taillis; du point culminant, faire diverger cinq vues grandioses, sur les environs les plus pittoresques: le Mont Valérien, Boulogne, St. Cloud, l'avenue des princes, Auteuil; de l'extrémité du lac faire sortir un ruisseau qui suivrait toutes les pentes intérieures pour s'épanouir en une grande cascade au dessus de la plaine de Longchamp, et de là se perdre dans la Seine; conserver quelques unes des plus belles avenues droites, obstruer les autres par des plantations, ouvrir enfin de vastes routes aux courbes élégantes qui embrasseraient la ceinture du bois et se relieraient à toutes les autres allées.

Telle fut la conception première dont l'exécution commença dès l'année 1855. En peu de temps les lacs furent creusés, le sol remué, les plantations commencées. L'œuvre s'acheva en moins de cinq années.

A cette transformation du Bois de Boulogne s'attachent les noms de M.M. Alphand, Darcel, Varé et Barillet, sous l'inspiration de M. Haussmann, préfet de la Seine. La faveur publique accueillit le nouveau bois avec un grand empressement. Toutes les élégances de la population parisienne se pressèrent dans ces allées spacieuses et sous ces beaux ombrages. Le Bois devint la promenade obligée de l'aristocratie et de la finance. Bientôt il ne suffit même plus à contenter le besoin de nouveauté, de distraction qu'il fit naître chez les promeneurs. Les deshérités de la fortune se prirent à regretter de ne pouvoir jouir à leur tour de semblables agréments.

C'est alors qu'on décida l'établissement de jardins à l'intérieur de Paris, lesquels à l'instar de ceux de Londres furent appelés *squares* par le public-parisien.

Successivement, chaque quartier de Paris, même les plus dépourvus d'air et d'espace, eût son jardin libre. Des gazons, des fleurs à profusion, des eaux, des ombrages, firent bientôt une douce habitude aux artisans, aux ouvriers, aux hommes de loisir, de la fréquentation innocente et agréable de ces retraites. La tour St. Jacques, le marché des Innocents, la place des Arts et Métiers, la place du Temple, Vintimille, Ste. Clotilde, furent successivement ornés de jardins.

Les Champs Elysées, composés d'avenues désertes et mal famées, se couvrirent de verdure et de fleurs. L'ancien parc de Monceaux, débarassé de ses broussailles antiques et d'une partie de ses ornements de mauvais goût, subit une rénovation complète et fort appréciée.

L'accueil fait du Bois de Boulogne par l'élégance parisienne porta l'attention de l'édilité vers d'autres points qui pouvaient comporter des travaux analogues.

A l'autre extrémité de Paris, à Vincennes, de vastes espaces boisés, appelaient aussi les transformateurs. La ville fut chargée de continuer là son œuvre, et le Bois de Vincennes devint l'égal du Bois du Boulogne, au moins par les travaux l'importants qu'on y exécuta.

Des lacs furent creusés, des plaines entières plantées, des eaux coururent et se précipitèrent à travers les bosquets et les sentiers, en cascades alimentées par de puissantes machines puisant l'eau dans la Marne, à 50 mètres au dessous; de larges avenues furent percées jusqu'au cœur de Paris pour donner au nouveau parc un accès digne de lui. On y ménagea un champ de courses qui fût bientôt célebre ; la ferme impériale donna au plateau de Gravelle une animation toute nouvelle, et la vaste plaine de Charenton, jusque là meublée uniquement de ronces et d'épines, devint en moins d'un an un parc complet, rempli d'eaux, d'allées ombreuses, de gazons et de fleurs.

Un autre point occupa bientôt la sollicitude de l'administration. Au nord-est de Paris, dans un quartier populeux, était un vaste espace inculte, occupé par des exploitations souterraines de carrières à plâtre, et présentant à la superficie une série de petites montagnes provenant ou de bouleversements naturels, physiques, ou d'effondrements de carrières. On nommait cet endroit les Buttes-Chaumont. De lugubres souvenirs s'y rapportaient. C'était là autrefois qu'étaient situées les fourches patibulaires ou gibets de Montfaucon.

Dernièrement encore c'était un lieu désert, inabordable à toute espèce d'industrie, impropre à la création d'un quartier et servant de receptacle à toute l'écume de la population parisienne.

La ville de Paris conçût bien vite le projet de changer cet état de choses en utilisant ces dépressions naturelles de terrain pour y établir le plus pittoresque de ses parcs, et appeler par ce changement inéspéré une population nouvelle et plus respectable.

Les travaux furent commencés en 1864, aussitôt après l'achèvement de ceux de Vincennes. Ils seront terminés à l'occasion de l'ouverture de l'exposition universelle de 1867. A l'heure qu'il est, le travail se poursuit sur une surface de 20 hectares, avec un matériel de 800 ouvriers, 100 chevaux, plusieurs machines à vapeur, des trains de wagons, etc. Le parc des Buttes-Chaumont sera un spécimen remarquable d'un jardin créé de toutes pièces, sur un terrain montagneux et absolument inculte. On y trouvera des grottes naturelles de soixante pieds de haut, tapissées de stalactites, et donnant passage à de hautes cascades qui se déverseront dans le lac. De gros blocs de rochers naturels émergeront comme une île gigantesque, découpée à pic et dépassant le niveau du lac de près de 150 pieds. C'est à ce point élevé que se dressera un monument reproduit avec soin du joli temple de la Sybille, que les touristes admirent à Tivoli, près de Rome.

D'autres projets sont encore à l'étude pour la rive gauche de Paris, qui attend à son tour un parc sur les terrains de Montsouris.

A l'instigation de la ville de Paris, les grandes villes de province voulurent aussi avoir leurs jardins publics et sortir de la routine où elles avaient dormi si long temps. Lyon eût à son tour son bois de Boulogne, dessiné par Mr. Bühler, près du fort de la Tête d'or, dans les terrains conquis sur le Rhône. Marseille créa autour du chateau Borely, près de cette admirable plage du Prado où se presse la société phocéenne dans les belles soirées, un parc étendu qui ne laisserait rien à désirer si le voisinage de la mer était moins nuisible à la végétation. Rouen, Montpellier, Avignon, Lille, Tours, Angers, Caen, Nantes, Troyes, Strasbourg, furent dotés de jardins pour lesquels les municipalités firent hardiment des sacrifices hautement récompensés par le bon accueil du public.

Le mode de création de tous ces parcs ou jardins découle de ce même principe dont je parlais tout à l'heure. Le mouvement général a suivi celui de Paris; les auteurs s'en sont inspirés, volontairement ou non, et partout l'on trouve des traces de l'art renouvelé dont je vais pour terminer examiner succintement les traits distinctifs.

Caractères distinctifs du style moderne.

Les caractères propres au style moderne, bien distincts de ceux des temps précédents, s'appliquent surtout aux détails suivants :

1°. les vues.
2°. le tracé.
3°. les vallonnements.
4°. la plantation de gros arbres.
5°. la composition des massifs.
6°. l'ornementation florale.

Vues.—Les vues étaient autrefois un accessoire des jardins; elles en sont aujourd'hui le principe. Dans les jardins bien conçus, on laissait jadis quelques espaces libres partant de l'habitation et découvrant des points saillants du paysage. Actuellement, tous les sujets qui servent à l'ornement d'un jardin doivent s'entre-regarder sans exception autre que quelques bancs sous bois, destinés au repos et à l'isolement, et les constructions disgracieuses qu'il importe de masquer. En un mot, il faut que de presque tous les points, on puisse avoir sous les yeux le plus grand nombre des aspects de l'ensemble.

Sur le plan, le tracé des vues doit primer tout autre combinaison; c'est par elles qu'il faut commencer, c'est à elles que tout doit obéir.

Quant à la forme et aux proportions des percées, on s'accordait jusqu'ici à les disposer en angle dont le sommet etait placé à l'œil de l'observateur, et qui allait s'élargissant suivant les dimensions de l'objet à contempler à son extrémité. L'expérience a démontré que ce procédé est vicieux. Ce serait fort bien s'il n'y avait pas réciprocité de vues. Mais si l'objet d'où part le regard est lui-même un point digne d'attention pris d'un autre point, il ne peut être resserré dans la pointe d'un angle.

Voici donc ce qu'on a imaginé : Si l'on a deux objets à vue réciproque, on dispose les plantations de manière à ce qu'elles présentent deux angles dont les deux sommets tronqués se touchent au milieu de la distance qui sépare ces deux objets. La partie la plus large de la vue part donc des objets eux-mêmes, et la plus étroite se trouve au milieu.

Or on a remarqué que-cette disposition, due à Mr. l'Ingénieur en chef Alphand, est excellente pour l'optique et que non seulement elle dégage entièrement les motifs de vue, mais encore qu'elle en recule fictivement la distance d'une manière notable.

Tracé.—Les progrès accomplis dans le tracé des allées sont remarquables. Au lieu de les faire serpenter sans raison, de les multiplier outre mesure, sans se préoccuper de la grâce de leurs courbes, comme on faisait il n'y a pas longtemps, on enveloppe d'abord la propriété dans une allée de ceinture unique, à la quelle viennent se raccorder les chemins accessoires. La préoccupation principale, dans le tracé des allées, doit être d'éviter les lignes qui serpentent, les contre courbes, les directions opposées, les coudes et les carrefours. Il faut qu'on soit sobre dans leur distribution, que toutes aient un but et conduisent à quelque chose de saillant. Elles ne doivent pas allonger le chemin outre mesure et donner la tentation de les quitter pour arriver plus vite. Toutes les voies principales doivent s'unir harmonieusement les unes aux autres et encadrer dans des lignes pures et dirigées vers le même but, les pelouses, les bois, les massifs, dont elles font valoir la grandeur et la richesse. Leur disposition doit être telle qu'elles ne laissent pas de doute dans l'esprit du voyageur sur le chemin à suivre pour arriver à un endroit déterminé par la direction initiale.

Il n'y a d'exception que pour les sentiers, qui peuvent serpenter à leur aise, pourvu toutefois que leurs courbes soient gracieuses, mais qui indiquent leur objet tout accessoire par de faibles dimensions. Leur caractère à eux, est de fournir une promenade continue, qui ne s'arrête en aucun cas, et ne force personne à revenir sur les pas.

Ces principes peuvent être invoqués aussi bien pour les parcs que pour les petits jardins. Une loi harmonique comme celle-ci peut se plier à toutes les combinaisons.

Le point est important, et j'y insiste parce qu'il est difficile de voir de bons tracés. Les exemples en sont rares surtout dans le nord de l'Europe, où presque tous les jardins sont pleins de courbes heurtées et sans liaison.

Vallonnements.—L'art des vallonnements est tout récent, au moins par son introduction dans les petits jardins de ville. Dans les grands jardins paysagers, il est vrai, où avait déjà tiré parti des mouvements naturels du terrain, en épurant leurs contours, en les harmonisant avec goût, mais on avait jusqu'ici apporté très-peu de perfectionnements au mode d'infléchir les pelouses. En France, ce goût à pris faveur depuis la création des jardins publics de Paris. Sans prétendre imiter les mouvements naturels des collines sur de petits espaces, et bien que ce genre n'ait pris son inspiration que dans une fantaisie réussie, on adopta les pelouses creusées, les massifs et les corbeilles exhaussés, les plis de terrain fondus avec harmonie dans un tout calculé à l'avance, d'après l'état du sol et le site environnant.

Ces dispositions se sont affirmées. Elles sont devenues un des points saillants du style actuel. Variés par tous les dessinateurs de jardins, avec plus ou moins de talent, les vallonnements ont pris les préceptes suivant pour base :

1°. Suivre d'abord les plis naturels du terrain.

2°. Creuser en cuvette le centre des pelouses, que ce centre soit occupé par des eaux, ou qu'il reste gazonné.

3°. Relever le niveau des massifs et des corbeilles, placés uniquement sur les bords des allées, et leur donner une saillie proportionelle à l'inclinaison des pentes centrales de la pelouse.

4°. Prolonger le vallon jusque sur le bord des allées, formant autant de gorges ou *coulées* qu'il y a d'intervalles entre les massifs et les corbeilles.

5°. Ne jamais planter, sous aucun prétexte, dans le milieu des vallonnements que le regard doit parcourir sans obstacle.

6°. Distribuer les groupes d'arbres ou les végétaux isolés seulement sur les contreforts ou pentes vives des massifs ou des corbeilles, qu'ils accompagnent et relèvent, en se dressant chacun sur des éminences légèrement saillantes au dessus du gazon.

7°. Faire suivre aux allées qui coupent les pelouses, l'inclinaison de ces pelouses, à leurs points d'intersection. Les allées doivent obéir au mouvement des pelouses et non pas les pelouses à celui des allées.

Il est d'autres acceptions et en grand nombre, où les vallonnements peuvent être employés, mais elles ne sont qu'accessoires et suivent les goûts individuels. Elles ne changent rien aux régles ci-dessus, généralement adoptées aujourd'hui.

Composition des massifs.—Il est plus difficile d'astreindre cette question à des règles certaines ou à des usages généraux. Les personnalités sont surtout absolues dans la plantation et le choix des végétaux appropriés aux jardins. Il n'y a pas de raison pour qu'un homme de goût n'ait pas sa manière de voir particulière. Les combinaisons de feuillages, les préférences des propriétaires, les questions de dépense, de terrains, etc., sont trop nombreuses et trop variées pour être traitées ici en quelques mots.

Je ne puis qu'indiquer les principaux modes adoptés pour les jardins publics de Paris.

Le centre des massifs est planté en grands arbres à belles fleurs, d'espèces très-variées, dirigés en forme pyramidale. Les essences sont étagées en amphithéatre suivant leur végétation prévue.

Le sous-bois est composé d'arbustes à feuilles persistantes, qui croissent mieux à l'ombre et qui sont une parure pour l'hiver. Dans les quartiers où les émanations délétères leur nuisent, on choisit parmi les arbustes à feuilles caduques, les plus jolis et les plus variés.

Autour de chaque massif dont les bords sont purement tracés, on ménage une bande de terre très-cultivée et fumée, dont la destination est de recevoir pendant la belle saison une bordure formant au massif une ceinture de fleurs. Ordinairement cette bordure est composée d'une seule espèce de plantes. L'effet général en est plus saisissant.

Les groupes ou les arbres isolés, sur les pelouses, sont choisis parmi les essences les plus rares ou les plus ornementales. Les groupes sont homogènes : ils se composent d'au moins trois arbres et vont jusqu'à un nombre indéterminé suivant l'espace. La plupart sont des Conifères de choix. Un point essentiel est de songer en les plantant à leur développement futur et de les placer assez loin des allées et des massifs pour que leurs branches n'envahissent pas sur le voisinage.

Transplantation des gros arbres.—La transplantation des arbres âgés, au moyen de machines, est une sorte de renaissance d'une coutume fort ancienne. Cette opération était pratiquée sous le règne du style symétrique. Il est probable même qu'elle était connue des anciens. Mais ce qui est certain, c'est qu'elle fût très perfectionnée au commencement de ce siècle en Angleterre. Sir Henry Stewart a raconté les résultats remarquables obtenus par la transplantation des gros arbres dans le parc d'Allanton-House, de 1816 à 1821.

On a employé plus récemment ce moyen, à l'occasion de l'établissement des jardins publics de Paris. Il s'agissait presque partout de créer des ombrages instantanés, sur des emplacements brulés et exposés à la poussière.

On planta des gros arbres, et à profusion, et des jardins vieillis se trouvèrent improvisés en un clin-d'œil.

L'opinion publique s'émût de ces sortes de tours de force où l'on semblait se jouer de la nature. Des esprits malveillants déclarèrent que les arbres ne reprendraient pas; d'autres ajoutèrent qu'ils mouraient déjà tous. La vérité est que, à part quelques rares exceptions, dans le cas seulement où des fuites de gaz avaient empoisonné le sol, aucun des gros arbres n'est mort depuis qu'on en transplante à Paris.

La ville de Paris possède actuellement 10 chariots à transplanter, dont certains peuvent embrasser des mottes de $2^{m.}$ 50 de diamètre et des arbres dont le tronc présente $2^{m.}$ de circonférence. Un service spécial est organisé à cet effet. Il occupe toute une escouade de *planteurs* qui en ce moment transportent de gros arbres au plus haut du parc des Buttes-Chaumont.

Ce procédé n'est guère applicable aux propriétés ordinaires ; il n'en faudrait pas faire une règle dans la création des grands jardins. On doit aussi savoir attendre. Mais il n'en est pas moins vrai que pour les compagnies, les riches municipalités et les grosses fortunes, c'est un excellent moyen de donner à une récente création l'aspect d'un jardin de 30 ans.

Ornementation florale.—Les découvertes récentes ont tellement multiplié le nombre des plantes d'ornement, que leur emploi dans la décoration estivale varie à l'infini.

On a totalement abandonné en France l'ancien parterre symétrique et ses complications bizarres. Je ne sais pourquoi quelques auteurs s'obstinent à donner des dessins de ce genre et des exemples qui n'existent que dans leur imagination. Dans quelques rares grands parcs et chateaux, dans les résidences impériales anciennes ou modernes, on voit encore des boulingrins, des plates bandes et des compartiments réguliers. Mais je ne connais pas en France un seul exemple du parterre proprement dit, soit comme nos pères le comprenaient, soit modifié suivant les manières en faveur aujourd'hui en Angleterre, en Allemagne et en Hollande. A peine même si aux jardins des Tuileries et du Luxembourg on a conservé l'antique usage, beaucoup plus loué que justifié, qui consiste à varier les couleurs alternativement suivant qu'elles sont complémentaires ou dissidentes, et d'après les règles de l'optique.

On s'en tient maintenant presque partout aux corbeilles et aux bordures des jardins paysagers grands et petits.

Géneralement la forme des corbeilles de fleurs est un ovale ou une ellipse plus ou moins allongée. Leur longueur est dans le sens de l'allée qui les borde. Rarement on leur donne une forme arrondie ou en cœur.

Leur composition varie à l'infini. Si on les garnit de plantes à fleurs, on choisit ordinairement des espèces à teintes éclatantes, et on en fait des corbeilles homogènes. L'effet en est bien plus complet, surtout dans les grands jardins.

Si au contraire on emploie des plantes à feuillage, on forme des contrastes. Par exemple on plante un centre de feuilles pourpres, comme des *Coleus Verschaffeltii* avec une bordure argentée comme la *Centaurea candidissima*.

Parfois encore, et cet usage se répand de plus en plus, on garde les fleurs pour border les massifs et on garnit les corbeilles de plantes à grand feuillage en tapissant le dessous avec des espèces basses ou rampantes.

Quant au groupement des couleurs, il a son importance, moins considérable pourtant qu'on l'a souvent fait croire. Il est évident qu'une corbeille bleue s'alliera mal avec une corbeille violette et qu'il faut autant que possible combiner les trois couleurs simples. Mais ce sont des détails que seul l'oeil exercé et réfléchi découvre, et qui n'empêchent point le plus grand nombre de jouir autant des disparates que des harmonies.

Les plantes isoleés, placées comme nous l'avons dit sur les rampes des masses plantées, se recrutent maintenant dans toute la série des végétaux à beau feuillage. Cette riche tribu s'augmente tous les jours d'un contingent nouveau venu de tous les points du globe, et prête à nos jardins un aspect tropical qui les a transformés d'une manière complète depuis quelques années. Cette mode ne sera point passagère ; elle repose sur autre chose que sur une fantaisie irréfléchie. Elle prend son origine dans l'amour et la connaisance du beau, qui se développe de plus en plus, à mesure que s'élève le niveau des intelligences dans toutes les classes de la société. Les beaux feuillages ont des charmes qui ne font point oublier les fleurs, sans doute, mais qui suffisent seuls à ceux qui savent chercher et trouver les différents aspects de la beauté, partout où elle est placée. A plusieurs titres elles se tiennent donc aux premiers rangs, et l'adoption universelle qui les entoure ne peut que grandir à mesure qu'elles seront plus connues et plus nombreuses.

Tels sont en résumé les traits saillants et constitutifs du genre nouveau qui fait actuellement un chemin rapide dans l'art des jardins. Je l'ai examiné et discuté sans passion, évitant même de porter des jugements qu'il ne m'appartient pas de formuler sur les hommes qui en sont les instigateurs et les appuis actuels. Ils ont posé, animés du désir de bien faire et sans parti pris de créer des théories nouvelles, les règles d'un style qui s'épure et s'affirme chaque jour et qui leur vaudra une place choisie dans l'histoire des jardins.

SUR UNE MESURE RÉCENTE ET EXACTE DU DIAMÈTRE DE L'UN DES GRANDS SEQUOIA DE CALIFORNIE,

Prise par M. Edgar de la Rue, et communiquée par M. Alph. de Candolle.

On connait généralement la taille élevée et la grosseur des fameux sequoias de Californie, mais il est plus difficile d'avoir des renseignements exacts sur le nombre et l'épaisseur de leurs couches annuelles, seul moyen cependant de pouvoir apprécier l'age de ces arbres.

Un de mes compatriotes, M. Edgar de la Rue, s'était donné la peine de compter le nombre des couches sur la section de l'arbre connu sous le nom de *Old Maid.* Il parait qu'un americain avait fait d'autres calculs, desquels on aurait pu inférer un âge beaucoup plus considérable et des erreurs dans la mensuration de M. de la Rue. Celui-ci s'est empressé, avec un zèle honorable, de vérifier de nouveau les faits. Comme nous le connaissons pour un homme très digne de foi, que d'ailleurs il nous a transmis, par le consul suisse, M. Hentsch, les renseignements les plus complets, nous croyons utile de donner ici un extrait de ses lettres datées de Eldorado, Calaveras County, 31 juillet et 18 sept. 1865.

. . . . " A la reception de votre lettre du 30 août j'ai bondi d'indignation et quoique parfaitement sur de ne pas m'être trompé, j'ai sellé un cheval et me suis précipité aux *big trees* en disant à mon charpentier-Mameluck* de me suivre, qu'il y allait de notre honneur, etc. Le brave homme en a eu pour deux jours et demi entre aller, revenir et le travail. Arrivé sur place je me suis informé des faits et gestes du Dr. X. et j'ai vérifié mes premiers calculs." (Suivent des détails sur le mode inexact de mensurations partielles du Dr. Américain.)

L'arbre dit *Old Maid* a été brisé par un orage, à la hauteur de 128 pieds. La base coupée horizontalement sert aujourd'hui de salle de danse. M. de la Rue a obtenu du propriétaire l'autorisation de faire raboter proprement une largeur d'un pied, dans la direction du centre à la circonference. Le vieux menuisier Francais ayant éxécuté ce travail en conscience, une bande de papier a été posée sur la partie nettoyée, et la rencontre des couches annuelles a été marquée par des raies sur le papier. C'est un procédé très simple et très commode, indiqué il y a longtemps par Augustin Pyramus de Candolle. Son avantage est de conserver une trace positive de la mensuration, de telle manière qu'on peut toujours compter à son aise les raies, et qu'on emporte avec soi des détails précis sur l'épaisseur des couches à toutes les époques.

M. Alph. de Candolle, montre la bande de papier transmise par M. de la Rue. Elle constate que le diamètre, à la hauteur de 6 pieds 1 pouce anglais au dessus du sol, est de 26 pieds 5 pouces anglais. L'élévation totale de l'arbre, avant qu'il fut brisé, devait être approximativement de 350 pieds. La rencontre des couches annuelles avec le papier a été marquée par M. de la Rue et son menuisier, l'un partant du centre, l'autre de la circonférence. Ils se sont ensuite remis à marquer en sens inverse, celui d'entre eux qui était parti d'abord du centre allant de la circonférence au centre et vice-versa. Les deux opérations se voient sur la bande de papier. Comme les couches sont quelquefois confuses ou obscures, il y a nécessairement un peu d'incertitude. L'une des notations a donné 1223 couches et l'autre 1245. On peut admettre, comme suffisamment exacte, la moyenne de 1234.

Cet age de 1234 ans n'est pas extraordinaire dans les arbres, en particulier pour des conifères. On sait qu'il existe dans la Grande-Bretagne des ifs (yew trees) qui remontent probablement au commencement de l'ère chrétienne. Les sequoias de Californie sont plus remarquables par l'élevation, le diamètre, et l'aspect que sous le rapport de l'ancienneté. Ils ont cru dans un sol très profond et très riche. Leur végétation parait avoir été uniformèment vigoureuse et l'on peut voir sur la bande de papier qu'à l'âge de 4 à 500 ans les couches annuelles étaient épaisses, tandis que d'ordinaire, dans les arbres, les couches deviennent minces à l'âge de 80, 100, ou 120 ans, selon les espèces et les localités. Sans doute il ne faudrait pas généraliser sur une mesure unique, et ce sont seulement

* Un ancien soldat Français que M. de la Rue avait employé précédemment.

des apercus assez probables que nous indiquons. Lorsqu'on possédera plusieurs mensurations aussi exactes de divers sequoias, il est clair qu'on pourra donner des moyennes de croissance, comme cela s'est fait pour nos espèces ligneuses ordinaires. En attendant il faut savoir gré à M. de la Rue de son travail et le conserver dans les ouvrages de botanique.

M. de Candolle termine en montrant deux fragments du bois, extraits, par M. de la Rue, de l'endroit où l'arbre s'était brisé, c'est-à-dire à 128 pieds de hauteur. L'un des fragments montre le bois près du centre, l'autre près de la circonférence. Les couches n'y presentent pas les mêmes épaisseurs que près du sol.

ÜBER DIE VERÄNDERUNGEN DER RICHTUNG DER ÄSTE HOLZIGER GEWÄCHSE BEWIRKT DURCH NIEDRIGE WÄRMEGRADE.

Von Professor Dr. ROBERT CASPARY, Königsberg.

[Plates II. III. IV.]

DIE einzige mir bekannte, auf diesen Gegenstand bezügliche Beobachtung, wurde von John Rogers Jun., Sevenoaks, Kent, an einer Linde gemacht und von Lindley (Trans. Hort. Soc. London, Ser. II., Vol. II., 1842, p. 230) mitgetheilt. Rogers nahm nämlich am 19. und 20. Januar, 1838, an welchen Tagen bezüglich die für England ausserordentlich seltene Kälte von—14·4° und—15·5° R. eintrat, wahr, dass die Zweige einer Linde seines Gartens so sehr sich senkten, dass die unteren völlig auf dem Boden lagen und die oberen, im Verhältniss dazu sich neigten, obgleich sie weder mit Eis noch Reif bedeckt waren, "so dass diese Erscheinung eine direkte Wirkung der Kälte gewesen sein muss." Die Zweige nahmen ihre frühere Richtung nach und nach wieder ein, als es im Laufe des Tages wieder wärmer wurde, und erlangten endlich ihre frühere Stellung völlig, so dass Rogers zuerst dachte, dass sein Gärtner die Zweige, welche hinabgesenkt waren und am Morgen zuvor den Weg versperrt hatten, abgeschnitten hätte.

Ganz dieselbe Beobachtung machte mein College, der Professor der Physiologie an der Universität zu Königsberg, von Wittich, an einem Lindenbaume in seinem Garten, welcher bei starkem Frost einen Ast, der über einen Weg sich hinstreckte, aber so hoch stand, dass man gut darunter weggehen konnte, so senkte, dass man nur gebückt unter ihm hinwegzukommen vermochte. Auf v. Wittich's Mittheilung und Aufforderung besichtigte ich den gesenkten Ast am Morgen des 4. Februar, 1865, bei einer Kälte von etwa —18·0° R. Einmal auf die Erscheinung aufmerksam gemacht, nahm ich eine starke Senkung der Äste an vielen Lindenbäumen in und bei Königsberg an demselben Tage noch wahr, besonders an einem im königlichen botanischen Garten, der einen Ast um mehr als 3′ gesenkt hatte, denn die zarten Zweige desselben berührten meinen Kopf, wenn ich darunter stand und erhoben sich später, als das Thermometer über den Gefrierpunkt stieg, so hoch, dass ich sie im Sprunge nicht mit der Hand erreichen konnte. Es war mir klar, dass hier eine Erscheinung vorlag, die bis dahin der Beachtung fast ganz entgangen war und ich nahm mir vor sie im Winter von 1865 bis 1866 genauer zu untersuchen.

Da sich erwarten liess, dass nicht bloss Linden, sondern auch andere Bäume eine Änderung der Richtung der Äste durch erniedrigte Wärme erleiden, unternahm ich im königlichen botanischen Garten die Untersuchung an 10 Baumarten: *Tilia parvifolia* Ehrh., *Æsculus Hippocastanum* L., *Carpinus Betulus* L., *Rhamnus catharticus* L., *Pterocarya caucasica* C. A. M., *Pavia rubra* Lam., *Pinus Laricio* Poir., *Pinus Larix* L., *Pinus Strobus* L., *Acer Negundo* L. Von allen beobachtete ich einen Ast, von *Tilia parvifolia* an zwei verschiedenen Baümen zwei; einer derselben war der oben erwähnte, welcher am 4. Februar, 1865, um mehr als 3′ gesenkt war. Ich suchte mir Äste aus, die in solcher Höhe vom Boden sich befanden, dass ich die Beobachtung stehend ohne zu grosse Unbequemlichkeit vornehmen konnte; nur unter zweien liess ich einen Tritt anbringen um hinanreichen zu können. Dicht neben jedem Ast liess ich einen senkrechten 3″ im Quadrat haltenden Pfahl errichten, der so tief in den Boden gesenkt wurde, zwischen 2′ und 3′, dass ich erwarten konnte, dass keine Hebung des Pfahls durch Frost eintreten würde, indem ich den Frost hier noch nicht über 1½′ in den Boden eindringen sah. Im Winter von 1865 bis 1866 ist der Boden nie auf 6″ Tiefe gefroren gewesen. Die Pfähle waren, wo es thunlich war, auf der Westseite des Astes angebracht, damit die herrschenden und stärksten Winde, Südwest und West, den Ast nicht an dem Pfahl reiben und beschädigen möchten. An der dem Ast zugekehrten Seite des Pfahls war in Fuss und Zoll ein Maasstab eingeschmitten, der etwas über die Höhe des Astes, wie er sie, ehe Frost eintrat, im Herbst hatte, hinausging und bei 2′ über dem Boden seinen Anfang nahm, da bis zu dieser Höhe hier wohl hin und wieder der Schnee liegt. Die Stelle des Astes, deren Höhe täglich gemessen werden sollte, bezeichnete ich durch eine kleine Kerbe in der Rinde. Um die Höhe des Astes zu ermitteln, wurde ein Winkelmaass mit einem Schenkel dicht an den glatt behobelten Pfahl gelegt und der andere Schenkel von unten her in die Höhe des Astes gerückt. Mit spitzigem, hartem Bleistift bezeichnete ich dann am Pfahl den Punkt, an welchem die Spitze des Winkelmaasses lag und bestimmte den Abstand dieses Punktes von der nächst darunter liegenden Zollkerbe in preussischen duodecimalen Linien. Nur bei dem erwähnten Ast der Linde, welcher am 4. Februar, 1865, um mehr als 3′ gesenkt war, bestimmte ich die Höhe anders. Mit starkem Eisendraht wurde an einer 17½′ über dem Boden befindlichen Stelle des Astes eine dünne viereckige senkrecht hinabhängende Holzstange angebracht, deren unterer Endpunkt etwa 4½ vom Boden sich befand, und in seiner Höhe an einem Pfahl, welcher in beschriebener Weise zugerichtet war, gemessen wurde.

Damit der Wind die Stange nicht zu sehr hin und her würfe, war sie mit dem unteren Ende durch eine weite, aber schmale Öse von starkem Eisendraht gezogen, der an dem Pfahl befestigt war und ihr hinreichenden Spielraum zum Auf-und Absteigen, aber nur beschränkten für eine seitliche Bewegung verstattete.

Die Messungen, welche diesen Mittheilungen zu Grunde liegen, vollzog ich täglich vom 29. November, 1865, bis 24. März, 1866, und werde sie fortsetzen. Ich stellte sie zwischen 7½ Uhr und 8 Uhr, auch wohl 8 Uhr 10 Minuten Morgens an, einer Zeit, die in Wintersmitte 2 bis 2½ Monate lang nicht weit von Sonnenaufgang ablag, um den das Minimum der Wärme einzutreten pflegt und auch den Vortheil bietet, dass zu ihr meist Windstille herrscht, oder der Wind doch durch seine Stärke die Messung nicht hindert, während es auf den Tag hin meist viel windiger wird. Nach beendigter Untersuchung gegen 8 Uhr Morgens wurde die Wärme und auch das Minimum der vergangenen Nacht von einem Weingeist führenden Oligistothermometer von J. G. Greiner d. I. in Berlin abgelesen. Die Stärke des Windes bestimmte ich in 5 Graden in der Weise, welche die Instruktion der preussischen meteorologischen Stationen angiebt (Dove, Bericht über die in den Jahren 1848 und 1849 auf den Stationen des meteorologischen Instituts im preussischen Staate angestellten Beobachtungen. Berlin, 1851, Beilage S. III.) 0 bezeichnet völlige Windstille, das eine Extrem, 4 Sturm, das andere, wobei ganze Bäume in steter Bewegung sind, zuweilen Zweige und Aste au belaubten Bäumen brechen oder auch ganze Bäume umgerissen werden. Ging die Stärke des Windes über 1 hinaus, d. h. setzte er die Baumzweige in solche Bewegung, dass sie gar nicht mehr zum Stillstand kamen, und ihr Höhe also nicht sicher beobachtet werden konnte, so wurde die Höhenmessung unterlassen.

Über die beobachteten Äste mache ich noch folgende nähern Angaben, indem ich sie mit derselben Zahl versehe, welche sie in den Beobachtungstafeln führen.

1. *Tilia parvifolia* Ehrh. Der Ast, dessen Richtung ich untersuchte, ist dritten Grades. Der ersten Grades entspringt am Fusse eines etwa 2′ dicken Baumes; 3″ über seinem Grunde trägt er einen Ast zweiten Grades, der 11″ über seinem Ursprunge den beobachteten hat und dicht über ihm abgeschnitten ist. Der secundäre Ast streckt sich nahezu in der Richtung des tertiären, welcher an ihm seitlich rechts entspringt; beide zusammen haben eine Länge von 8′2″, der tertiäre allein von 7′3″. Bis zum Punkte der Messung ist der tertiäre Ast allein 4′ lang, zusammen mit seinem Träger, dem secundären 4′11″; der Winkel unter dem er vom secundären abgeht, ist etwa 60°; am Grunde hat der Ast 13‴ Durchmesser, an der Messstelle 5¾‴; sein Grund ist 26″ über dem Boden, seine Messstelle 4′8″. Der secundäre und der tertiäre Ast stehen beide nach Süden und haben volle Sonne. Die Spitzen seiner Zweige sind in sanftem Bogen etwas abwärts gekehrt.

2. *Æsculus Hippocastanum* L. Ein secundärer Ast von 1′8″

Länge unter dem Ursprunge des beobachteten tertiären, kommt aus dem Grunde eines primären Astes dicht am Stamm. Der secundäre Ast ist etwas schief gerichtet, jedoch nicht fern von der Horizontalen. Der tertiäre Ast, welcher fast die Fortsetzung des secundären zu sein scheint, hat mit dem Stück desselben, das unter seinem Ursprunge liegt, zusammen 12′ 10″ Länge; der tertiäre Ast allein ist 11′ 2″, bis zur Messstelle 7′ 2″ lang; er entspringt seitlich, links vom secundären etwa unter 45°, unten steigt er schwach hinab, im obern Drittel schief an; am Ursprunge ist er 1″ 4‴ dick, an der Messstelle 8½‴; sein Grund ist 6′ 10″ über dem Boden erhaben, die Messstelle 5′ 3½″; er liegt nach Westen; im Sommer bekommt nur die Spitze die Nachmittagssonne.

3. *Carpinus Betulus* L. Der Hauptstamm fehlt; aus einem Stumpfen ½′ über dem Boden kommt ein fast senkrechter stammartiger Ast, der 39″ über dem Ursprunge fast unter einem rechten Winkel einen horizontalen, secundären Ast hat, der links 2′ 1½″ vom Ursprunge unter 45° einen tertiären, auch horizontalen Ast, den beobachteten, trägt. Der tertiäre Ast bildet somit fast die Fortsetzung des secundären. Beide zusammen sind 15′ 10″ lang, der tertiäre allein 13′ 8½″, seine Länge bis zur Messstelle 5′ 7¾″; am Grunde ist er 1½″ dick, an der Messstelle 11‴. Grund und Messstelle sind beide 45″ vom Boden entfernt; seine Richtung geht nach Westen; im Sommer ist er beschattet, bloss die Szitzen haben Sonne.

4. *Rhamnus catharticus* L.—Ein starker primärer Ast kommt aus einem unter der Erde halb verborgenem schiefem Stamm. Der secundäre entspringt dicht an der Erde und trägt 3′ 7″ über dem Ursprunge einen tertiären, den beobachteten, der jedoch so viele abgestorbene, in seiner Fortsetzung liegende Stummel abgefaulter Äste trägt, dass er wohl selbst ein Sympodium ist. Er ist 14′ 7″ im Ganzen, 9′ 6″ bis zur Messstelle lang, unten schief aufsteigend, dann in langem Bogen sich hinabkrümmend; Spitzen hängend. Er entspringt unter 65°, unten ist er 2″, an der Messstelle 11‴ dick; der Ursprung ist 45″, die Messstelle 46″ über dem Boden. Er hat die Richtung nach SO. und ist voller Sonne ausgesetzt.

5. *Pterocarya caucasica* C. A. M. — Viele schiefe, starke Stämme erheben sich strauchartig aus einem Punkte aus dem Boden. Einer dieser jedenfalls ursprünglich primäre Äste darstellenden Stämme treibt dicht über dem Boden einen stark geneigten secundären Ast, dessen Spitze fehlt und der mit dem untersuchten tertiären zusammen 15′ lang ist, 8¼′ bis zur Messstelle. Der tertiäre allein ist bis zur Messstelle nur 9″ lang. Der secundäre entspringt unter 45°, der tertiäre unter 35°. Der tertiäre ist unten 15‴, an der Messstelle 14‴, der secundäre unten 2½″ dick. Der secundäre, dessen unmittelbare Fortsetzung wegen fast gleicher Richtung der tertiäre zu sein scheint, ist am Grunde 31″ über dem Boden, der tertiäre an der Messstelle 4′ 2″. Beide liegen nach Westen, steigen in schwacher Neigung schief auf; die Spitzen erheben sich mit stärkerer Steigung.

Im Sommer bloss die Spitzen von der Sonne am letzten Theil des Vormittags und den ganzen Nachmittag beschienen.

6. *Tilia parvifolia* Ehrh.—Der beobachtete Ast ist ein primärer, der sich aus einem starken Baum 6′ über dem Boden, nach NO., anfangs schief ansteigend, erhebt, dann einen weiten Bogen bildet und mit den Zweigen endlich hinabhängt. Er entspringt unter 60°, ist 28′ lang, 18′ bis zur Messstelle, am Grunde ist er 15½″ von oben nach unten dick und 8½″ von rechts nach links. Die Messstelle ist 17½′ vom Boden; an ihr ist der Ast noch 3½″ dick. Im Sommer hat er die Morgensonne bis etwa 11 Uhr. Es ist der längste und dickste aller untersuchten Äste.

7. *Pavia rubra* Lam.—Ein primärer oben abgeschnittener und ein secundärer aus ihm hervorgehender Ast haben fast gleiche Richtung und stellen scheinbar einen Ast dar. Beide zusammen sind 7¾′ lang, der secundäre allein 5¾; bis zur Messstelle sind beide zusammen 41″, der secundäre allein 17″ lang. Der primäre entspringt unter 80°, der secundäre seitlich nach oben und rechts unter 40°; der primäre unten 1″ 7‴, der secundäre 10‴, an der Messstelle 9‴ dick. Grund des primären 45″, Grund des secundären 49″, Messstelle 49″ vom Bodem. Richtung nach Süden, fast horizontal, Spitzen hinabgesenkt, äusserste ansteigend. Hat im Sommer die Vormittagssonne bis etwa 11 Uhr.

8. *Pinus Laricio* Poir.—Primärer Ast mit wenigen, jedoch dicken Laubbüscheln; 6′ lang, 4′ 2″ bis zur Messstelle; entspringt unter einem Winkel von 110°, unten ist er 14‴, an der Messstelle 7‴ dick, unten 5′ 11″, an der Messstelle 4′ 8″ vom Boden. Er liegt nach N.W., steigt schräg hinab, wendet sich jedoch mit den beblätterten Spitzen dann wieder etwas aufwärts. Am späten Vormittag und am Nachmittag hat er die Sonne.

9. *Pinus Larix* L.—Der im Winter blattlose, primäre Ast ist 8′ 3″ lang, bis zur Messstelle 4′ 2″; unten ist er 14‴, an der Messstelle 7‴ dick; er entspringt unter einem Winkel von 110°, am Grunde ist er 7′ 6″, an der Messstelle 7′ 8″ von der durch den Grund des Baumes gelegten Horizontalen entfernt; anfangs wendet er sich abwärts, dann allmälig im Bogen aufwärts. Er liegt nach N.W.W. Im Sommer hat er die Sonne bloss am frühen Morgen und kurze Zeit am frühen Nachmittag.

10. *Pinus Strobus* L.—Dem primären, nach N. liegenden, jetzt nur 4′ 10″ langem Ast, hatte ich die beblätterte Spitze abgeschnitten, damit er nicht zu sehr von Regen und Schnee hinabgedrückt würde. Ich liess ihm bloss 5 beblätterte Äste. Die Messstelle ist 4′ 1″ vom Ursprunge; mit dem Stamm macht er einen Winkel von 100° und steigt schief ab. Unten ist er 1‴, an der Messstelle 7‴ dick, unten 8′ 1″, an der Messstelle 7′ 7″ von der durch den Grund des Stammes gelegten Horizontalen entfernt. Im Sommer hat er kaum zu irgend einer Zeit, wenn nicht am frühen Nachmittag Sonne.

11. *Acer Negundo* L.—Von schief aus dem Boden hervorge-

hendem dünnem Stamm, der wahrscheinlich ein primärer Zweig eines andern Stammes ist, erhebt sich schief ein secundärer oben gestutzter Zweig von 43″ Länge, der ein Knie hat, welches andeutet, dass sein oberer Theil ein tertiärer Ast ist. Aus diesem tertiären Ast entspringt der fast horizontale, beobachtete quaternäre Ast, der mit dem secundären und tertiären scheinbar einen bildet und mit beiden zusammen 14½′ lang ist; bis zur Messstelle sind alle drei 8′ 11″ lang. Die Äste entstehen auseinander unter etwa 45°. Der secundäre Ast ist unten 2″ 3‴, der quaternäre 1″ 6‴, an der Messstelle 9‴ dick. Der Grund des secundären ist 3′ 6″, der des quaternären 5′ 7″, die Messstelle des letzteren 4′ 9″ vom Boden entfernt. Der Ast geht nach SO. und hat im Sommer die Vormittagssonne.

Der ungewöhnliche milde Winter war den Beobachtungen sehr ungünstig. Das Minimum der Wärme am 21. Februar 1866, beträgt bloss—16° R. meist stand das Thermometer über O.

Nach Professor Luther's meteorologischen Beobachtungen, die er auf der Sternwarte macht, war der Winter von 1865 bis 1866 (December, Januar, Februar) der mildeste, welcher hier beobachtet ist; freilich fangen die Beobachtungen erst mit 1848 an. Nach Professor Luther's Mittheilung hat dieser Winter eine mittlere Wärme von + 0·32° R. Der nächst mildeste war der von 1851 bis 1852, welcher—0·02 R. hatte (Schrift. phys.-oekonom. Gesellschaft von Königsberg, 1864. V. Jahrg. 126).

Es mögen jetzt die Beobachtungen selbst folgen.

BEOBACHTUNGEN (OBSERVATIONS).

Zeit. (Time.)	1 Tilia parvifolia Ehr.	2 Æsculus Hippocastanum L.	3 Carpinus Betulus L.	4 Rhamnus catharticus L.	5 Pterocarya caucasica C. A. M.	6 Tilia parvifolia L.	7 Pavia rubra Lam.	8 Pinus Laricio Poir.	9 Pinus Larix L.	10 Pinus Strobus L.	11 Acer Negundo L.	Wärme Temperature. Min. voriger Nacht. (Min. of last night.)	Wärme Temperature. Gegen 8 Uhr. M. (At about 8h., a.m.)	Windesrichtung. (Direction of the wind.)	Windesstärke. (Force of the wind.)	
1865.	″ ‴	″ ‴	″ ‴	″ ‴	″ ‴	″ ‴	″ ‴	″ ‴	″ ‴	″ ‴	″ ‴	° R.	° R.			
29 November	18 3	21 4¾	15 10⅓	14 8	15 5	41 8	9 1½	16 8¾	14 11¾	19 7	17 9½	0·2	1·0	S·O. (S.E.)	1	Trockner Nebel (Dry fog.)
30 „	18 5¼	21 4½	15 10⅓	14 7	15 5	41 7½	9 1¾	16 8¾	14 11½	19 8	17 11	1·0	2·2	O. (E.)	0	Nebel und etwas Regen. (Mist and thin rain.)
1 December	18 5¾	21 5⅓	15 11¾	14 3¼	15 6½	41 9	9 1¾	16 10⅓	15 0	19 8½	18 2	0·1	1·0	O. (E.)	0	Trocken. (Dry.)
2 „	18 5¼	21 3¾	15 8¾	14 5	15 5½	41 7	9 0¾	16 7½	14 11⅓	19 8	17 11	0·3	2·6	W. (W.)	0	Nebel, früher Regen, Tropfen an den Ästen. (Fog after rain; rain-drops on the branches.)
3 „	18 6¾	21 6½	16 0	14 10¾	15 6¼	41 8¾	9 1	16 11½	15 0½	19 8¾	18 2¾	0·9	2·1	S.O. (S.E.)	0	Trocken. (Dry.)
4 „	18 4¾	21 7	16 1⅓	14 11½	15 4⅓	41 9	9 2	17 0¾	15 1	19 10	18 2¼	— 0·5	0·5	S.O. (S.E.)	0	„ „
5 „	17 9¾	21 9⅓	16 2⅓	15 0¾	15 4⅓	41 8½	9 2½	16 10	14 11	19 9½	18 4	— 1·9	— 1·0	O. (E.)	1	„ „
6 „	17 5⅓	21 11½	16 4	15 3	15 5¾	41 3	9 3	16 7½	14 9¼	19 8½	18 6¾	— 2·8	— 1·5	O. (E.)	1	„ „
7 „	16 7	22 9	16 7	15 7¾	16 6¼	39 0	9 2¼	15 11	14 1¼	19 3¼	19 4	— 9·6	— 8·6	O. (E.)	0—1	„ „
8 „	16 4	22 10½	16 5	15 7¾	17 3	36 0½	9 2¼	15 9¼	14 1	19 1¾	19 3	—10·0	— 8·5	S.O. (S.E.)	1	„ „
9 „	16 5	21 9⅓	15 9¾	15 1½	17 0¼	38 5	9 2¼	16 2½	14 6	19 5¾	18 10	— 6·0	— 3·3	S.S.W. (S.S.W.)	0—1	Etwas feuchter Nebel, durch den eine unmessbar dünne Kruste von Glatteis auf den Ästen erzeugt ist. (A somewhat moist fog, causing an immeasurably thin crust of sheet-ice on the branches.)
10 „	—	—	—	—	—	—	—	—	—	—	—	— 1·6	0·8	W. (W.)	3	Feiner Regen. (Thin rain.)
11 „	19 6	21 7⅓	16 0⅓	15 0¼	17 6	41 2	9 3	16 11⅓	15 0¼	20 0¼	18 1	2·1	3·5	W.N.N. (N.N.W.)	1	Etwas Regen. (Small rain.) Im Laufe des 11 Decbr. bei Tage W.N.N. 3 bis 4 an Stärke, wodurch die Äste so gewaltsam verbogen werden, dass noch am 18 Decbr. die Wirkung des Sturms sehr merklich in der der Wärme des 12 Decbr. nicht entsprechenden Stellung ist. In der Nacht vom 11/12 Decbr. wird es allmälig kälter; gegen 6 Uhr. Morgens ist—1°. (In the course of the 11th December, during the daytime, wind N.N.W.

12	”	19 6½	21 9¾	16 2½	16 7½	17 5½	41 6	9 8	17 0	15 2⅓	20 0½	18 1½	— 1·9	— 1·9	N. (N.)	0	with a force of 3—4, by which the branches are so violently deranged, that the effect of the storm is, on the 12th December, still very observable in their direction not corresponding to the temperature. During the night, between the 11th and 12th December, the air cools by degrees; towards 6h. a.m. only—1° R.)
13	”	19 8	21 11	16 8	16 7⅞	17 5⅓	41 5½	9 8½	17 2¼	15 1	19 11½	18 1⅛	— 8·5	0·4	S.W.W. (W.S.W.)	0—1	
14	”	—	—	—	—	—	—	—	—	—	—	—	— 0·8	1·4	S.W. (S.W.)	2—3	
15	”	—	—	—	—	—	—	—	—	—	—	—	1·0	1·4	N.W. (N.W.)	3—4	
16	”	—	—	—	—	—	—	—	—	—	—	—	— 1·2*	— 0·8	S.W. (S.W.)	2—3	
17	”	19 6½	21 7½	16 1¼	14 8	17 6¾	41 9	9 2¼	17 0	15 1¼	19 11¾	17 11	2·0	2·0	O. (E.)	0	Äste trocken. (Branches dry.)
18	”	19 7	21 7¾	16 1⅓	14 10½	17 6¾	41 8¼	9 2⅓	17 0	15 1⅓	19 11¾	18 1	— 0·2	— 0·2	O. (E.)	0	” ”
19	”	19 7¼	21 7¾	16 2½	14 10	17 7⅓	41 9	9 2¼	17 1	15 2¼	20 1	18 2	1·4	2·9	W. (W.)	0—1	” ”
20	”	19 7	21 7⅓	16 1½	14 10	17 7	41 9	9 2⅓	17 1	15 1¾	20 0½	18 2	1·5	2·5	W. (W.)	0	” ”
21	”	—	—	—	—	—	—	—	—	—	—	—	0·4	1·2	W. (W.)	1—2	” ”
22	”	—	—	—	—	—	—	—	—	—	—	—	2·1	2·1	S.W. (S.W.)	2	” ,
23	”	19 8	21 8½	16 2⅓	14 11⅓	17 7	41 9	9 2½	17 1½	15 1⅓	20 0½	18 3	1·3	2·5	S.O. (S.E)	0	” ”
24	”	19 6½	21 5¾	15 9½	14 5	17 6¾	41 7	9 1¾	16 10¾	15 1	20 0¼	17 11¼	— 0·1	1·5	S.W. (S.W.)	0	Starker Nebel. Äste mit Tropfen bedeckt, welche sie hinabgedrückt haben. (Thick mist. Many drops of water hang on the branches, which are depressed by them.)
25	”	19 7⅓	21 6⅔	15 11¾	14 7¾	17 7	41 7½	9 1¾	16 11	15 1½	20 0	18 0½	1·7	2·0	N.W. (N.W.)	0	Etwas Nebel. Einige Tropfen auf den Ästen. (Light mist; some drops of water on the branches.)
26	”	—	—	—	—	—	—	—	—	—	—	—	0·8	0·8	S.W. (S.W.)	1—2	
27	”	18 7½	22 2¼	16 5¾	15 2¾	17 5⅓	41 7¾	9 3¼	17 1½	14 11¾	20 0	18 7¼	— 2·8	— 2·2	S.W. (S.W.)	0	Äste trocken. (Branches dry.)
28	”	19 7	21 6¼	15 10¼	14 7	17 6¾	41 7½	9 1¾	16 11¼	15 1	20 0	18 0	0·4	1·2	W.S.S. (S.S.W.)	0	Starker Nebel. Tropfen auf den Ästen. (Thick fog. Drops of water on the branches.)
29	”	—	—	—	—	—	—	—	—	—	—	—	— 1·0	— 0·7	S.W. (S.W.)	1—2	

* Die Minima vom 29 November bis 16 December habe nicht ich im botanischen Garten, sondern Professor Luther auf der benachbarten Sternwarte beobachtet. (The minima from the 29th November till the 16th December were not observed by me in the Botanic Gardens, but by Professor Luther in the Royal Observatory close by.)

BEOBACHTUNGEN (OBSERVATIONS)—*fortgesetzt.*

Zeit. (Time.)	1 Tilia parvifolia Ehr.	2 Æsculus Hippocastanum L.	3 Carpinus Betulus L.	4 Rhamnus catharticus L.	5 Pterocarya caucasica C.A.M.	6 Tilia parvifolia L.	7 Pavia rubra Lam.	8 Pinus Laricio Poir.	9 Pinus Larix L.	10 Pinus Strobus L.	11 Acer Negundo L.	Wärme Temperature. Min. voriger Nacht. (Min. of last night.)	Wärme Temperature. Gegen 8 Uhr. M. (At about 8h., a.m.)	Windesrichtung. (Direction of the wind.)	Windesstärke. (Force of the wind.)	
1865.	" '''	" '''	" '''	" '''	" '''	" '''	" '''	" '''	" '''	" '''	" '''	° R.	° R.			
30 December	18 8¾	22 3	16 5½	15 3	17 5⅓	41 7	9 3¼	17 1⅓	14 10¾	19 11	18 5¾	— 3·1	— 3·0	S.O. (S.E.)	0—1	Äste trocken. (Branches dry.)
31 "	19 8	21 9⅓	16 3½	15 2¾	17 6½	41 7¾	9 2¾	17 3⅓	15 2¾	20 1	18 1	— 2·5	0·1	S. (S.)	0—1	" "
1866. 1 Januar (January)	—	—	—	—	—	—	—	—	—	—	—	— 0·2	0·6	S.W. (S.W.)	1—2	" "
2 "	19 8¾	21 8¾	16 1	14 7¾	17 7¼	41 7	9 2½	17 1½	15 2	20 0¾	17 10¾	— 0·5	1·0	S.W.W. (W.S.W.)	0—1	Regen seit 6 Uhr M. Tropfen auf den Asten. (Rain since 6h. a.m. Drops of water on the branches.)
3 "	19 9¾	21 8¾	16 2½	15 0¾	17 7	41 8	9 2½	17 2¾	15 2	20 0¼	18 2	— 1·0	— 0·1	S.O. (S.E.)	0—1	Äste trocken. (Branches dry.)
4 "	19 8¾	21 8¾	16 3	14 10⅓	17 7¾	41 7	9 2½	17 1	15 2⅓	20 1½	18 1½	0·2	3·1	W. (W.)	0—1	Äste feucht, da es in der Nacht geregnet hat, jedoch ohne Tropfen. (Branches moist from rain, which fell during night-time, but no drops of water upon them.)
5 "	19 9½	21 9½	16 2½	15 1¾	17 7½	41 7	9 2½	17 3¼	15 2¾	20 1¼	18 2¾	0·2	0·6	O. (E.)	0	Äste trocken. (Branches dry.)
6 "	—	—	—	—	—	—	—	—	—	—	—	0·3	1·1	S.O. (S.E.)	1—2	" "
7 "	19 2	22 1¾	16 4	15 2¾	17 5½	41 6½	9 3⅓	17 2¼	14 10½	19 9	18 6¼	— 2·5	— 2·5	S. (S.)	1	" "
8 "	17 9	22 5	16 7	15 7	17 10½	40 5¾	9 4	16 6½	14 6	19 6	18 11¼	— 5·4	— 4·8	S.O. (S.E.)	1	" "
9 "	18 7¾	21 9¾	16 4¼	15 3½	17 5½	40 6½	9 3¾	16 9½	15 0	19 10½	18 6⅓	— 3·1	— 0·1	Oben S.W. Unten S.O. (Above S.W. Below S.E.)	1	In der Nacht etwa 1" tief Schnee gefallen, der jedoch auf den Ästen nicht liegt, ausser etwas auf 6 und 8. (At nighttime about 1" of snow fell, which nevertheless did not lie on the branches, except a little on 6 and 8.)
10 "	—	—	—	—	—	—	—	—	—	—	—	0·0	0·5	S.S.W. (S.S.W.)	1—2	
11 "	19 10¾	21 9	—	15 2¼	17 7¼	41 3¼	9 3¼	17 2¼	15 2¼	20 1	18 2¾	— 1·3	0·0	S.W. (S.W.)	0—1	Auf den Ästen kein Schnee. (No snow on the branches.)
12 "	19 9½	21 9	16 4⅓	15 1¼	17 7⅓	41 4	9 3½	17 2¼	15 2½	20 0½	18 0½	— 1·0	— 0·3	S.O. (S.E.)	0	Äste trocken. (Branches dry.)
13 "	—	—	—	—	—	—	—	—	—	—	—	— 1·0	— 0·3	S.W. (S.W.)	1—2	" "

14	,,	18 6⅓	22 2½	16 7⅓	15 4⅓	17 6⅓	41 2⅔	9 4⅓	16 11	14 10	19 10⅔	18 7⅓	— 3·7	— 3·7	O.S.S. (S.S.E.)	0	,, ,,
15	,,	19 8¾	21 6	15 11¾	14 7	17 7½	41 2	9 2½	16 7½	15 0¼	20 0	17 9¾	— 0·1	2·5	S.W. (S.W.)	0—1	Hat geregnet. Wassertropfen auf den Ästen. (Rain last night; drops of water on the branches.)
16	,,	—	—	—	—	—	—	—	—	—	—	—	2·0	2·4	S.W. (S.W.)	2	
17	,,	19 10	21 7¼	16 8¼	15 1¾	17 8¾	41 8	9 8	17 2⅛	15 2	20 0½	18 2¼	1·2	2·0	S.W. (S.W.)	0—1	Äste von Thau feucht, jedoch ohne Tropfen. (Branches moist from dew, but no drops of water upon them.)
18	,,	19 10	21 7¾	16 8½	15 2¾	17 8½	41 4¼	9 8	17 8	15 8	20 2	18 2½	0·8	1·6	N.W.W. (W.N.W.)	0	Äste trocken. (Branches dry.)
19	,,	—	—	—	—	—	—	—	—	—	—	—	2·0	8·7	S.W. (S.W.)	1—2	
20	,,	—	—	—	—	—	—	—	—	—	—	—	2·75	8·2	S.W. (S.W.)	2	
21	,,	—	—	—	—	—	—	—	—	—	—	—	—	8·6	S.W.W. (W.S.W.)	1—2	
22	,,	19 9½	21 7¾	16 3¾	15 2½	17 7¾	41 2½	9 8	17 2⅛	15 2½	20 1½	18 1½	— 2·5	2·8	S.W. (S.W.)	1	Äste nass ohne Tropfen. (Branches moist without drops of water.)
23	,,	—	—	—	—	—	—	—	—	—	—	—	8·8	8·8	S.W. (S.W.)	1—2	
24	,,	19 10	21 7¼	16 8¼	15 2	17 8¾	41 8	9 2½	17 2¾	15 8	20 2¼	18 2½	0·0	0·7	S.W.W. (W.S.W.)	0	Äste trocken. (Branches dry.)
25	,,	19 10	21 7¼	16 8	15 1½	17 8¼	41 8	9 2½	17 2½	15 8	20 2⅛	18 2½	0·4	0·4	N. (N.)	0—1	,, ,,
26	,,	—	—	—	—	—	—	—	—	—	—	—	— 0·5	8·8	S.W. (S.W.)	1—2	
27	,,	—	—	—	—	—	—	—	—	—	—	—	8·8	4·4	W. (W.)	2—8	
28	,,	—	—	—	—	—	—	—	—	—	—	—	2·9	2·9	W. (W.)	1—2	
29	,,	19 10¾	21 9	16 4	15 1½	17 9½	41 2⅛	9 8	17 8¾	15 8¼	20 2½	18 8	1·7	2·2	S.W. (S.W.)	0—1	Äste trocken. (Branches dry.)
30	,,	—	—	—	—	—	—	—	—	—	—	—	0·9	2·1	S.W.W. (W.S.W.)	8	
31	,,	18 10	22 1	16 5⅛	15 6	17 6¼	41 1¼	9 8¼	16 11¼	15 0	20 1	18 6¾	— 2·2	— 2·0	N.W. (N.W.)	0	½″ Schnee gefallen. Etwas Schnee auf den Ästen. (½″ of snow fallen; a little snow upon the branches.)
1	Februar	18 0	22 4½	16 8¾	15 9⅛	18 1⅛	40 9½	9 4	16 10	14 9¼	19 11	18 11	— 5·0	— 4·4	S.O. (S.E.)	0	Äste trocken, kein Schnee mehr darauf. (Branches dry; no snow upon them.)
2	,,	19 8½	21 9½	16 4½	15 8¼	17 8	41 4	9 3½	17 1½	15 2⅛	20 1	18 4	— 1·5	— 0·4	S.O. (S.E.)	1	Etwas Schnee in der Nacht vom 1—2. gefallen. Einzelne Flocken auf den Ästen. (A little snow fallen in the night of the 1st—2nd, but only a few flakes upon the branches.)
3	,,	—	—	—	—	—	—	—	—	—	—	—	0·5	8·8	S.W. (S.W.)	1—2	

BEOBACHTUNGEN (OBSERVATIONS)—*fortgesetzt*.

Zeit. (Time.)	1 Tilia parvifolia Ehr.	2 Æsculus Hippocastanum L.	3 Carpinus Betulus L.	4 Rhamnus catharticus L.	5 Pterocarya caucasica C.A.M.	6 Tilia parvifolia L.	7 Pavia rubra Lam.	8 Pinus Laricio Poir.	9 Pinus Larix L.	10 Pinus Strobus L.	11 Acer Negundo L.	Wärme Temperature. Min. vorigen Nacht. (Min. of last night.)	Wärme Temperature. Gegen 8 Uhr. M. (At about 8h., a.m.)	Windesrichtung. (Direction of the wind.)	Windesstärke. (Force of the wind.)	
1866.	" '''	" '''	" '''	" '''	" '''	" '''	" '''	" '''	" '''	" '''	" '''	° R.	° R.			
4 Februar	—	—	—	—	—	—	—	—	—	—	—	0·0	1·0	S.W. (S.W.)	1—2	
5 "	—	—	—	—	—	—	—	—	—	—	—	1·0	2·3	W. (W.)	2	
6 "	—	—	—	—	—	—	—	—	—	—	—	0·0	1·3	W. (W.)	2	
7 "	—	—	—	—	—	—	—	—	—	—	—	2·5	3·8	W. (W.)	2	
8 "	—	—	—	—	—	—	—	—	—	—	—	2·2	3·2	W. (W.)	3—4	
9 "	—	—	—	—	—	—	—	—	—	—	—	1·7	2·9	W. (W.)	2	
10 "	19 10½	21 8¼	16 4½	15 2½	17 8⅙	41 3¼	9 8	17 4½	15 8¾	20 2⅜	18 1¼	— 1·4	6·0	S. (S.)	0	Äste trocken. (Branches dry.)
11 "	19 9½	21 5⅙	16 1½	14 7	17 7⅗	41 1⅜	9 1⅕	16 11½	15 8	20 2¼	17 11	2·9	3·0	S.W. (S.W.)	0	In der Nacht starker Regen. Äste ganz voll Tropfen. (Last night much rain; branches laden with drops of water.)
12 "	—	—	—	—	—	—	—	—	—	—	—	— 0·7	— 0·3	S.O. (S.E.)	1—2	
13 "	—	—	—	—	—	—	—	—	—	—	—	1·3	2·7	S.W. (S.W.)	1—2	
14 "	19 11	21 9	16 5	15 2¾	17 9	41 4½	9 2½	17 4	15 8	20 2½	18 8	— 0·6	0·8	S.W. (S.W.)	0—1	Äste trocken. (Branches dry.)
15 "	19 10	21 9	16 5	15 2¾	17 9	41 3¾	9 8	17 4	15 8¾	20 2½	18 8	— 1·5	— 1·0	W.S.S. (S.S.W.)	0—1	" "
16 "	19 4¼	22 0½	16 6¾	15 3¼	17 6¼	41 4	9 8¼	17 4½	15 2¼	20 1¾	18 5	— 2·4	— 1·8	S.O. (S.E.)	0	Am 14 Febr. bei Tage Wind 3, daher No. 6 am 15. tiefer als der Wärme entspricht und am 16., da die Windstille Aufrichtung erlaubte, höher als am 15., trotz geringerer Wärme. (On the 14th February, during the daytime, force of wind 3; therefore, No. 6 on the 15th was lower than the temperature of that day would account for, and on the 16th higher than on the 15th, although the temperature had gone down, as the absence of wind during the night between the 15th and 16th allowed the branch to recover its natural height.)

17	„	18 10¾	22 1	16 6¾	15 4½	17 5⅜	41 8	9 8¾	17 2¾	15 0½	20 0½	18 7	— 2·8	— 2·5	S.W. (S.W.)	0—1	Äste trocken. (Branches dry.)
18	„	18 11¼	21 9½	16 8½	15 2	17 2⅓	41 2¼	9 8⅓	15 4½	15 1⅓	19 11¾	17 9½	— 2·7	— 1·2	S.O. (S.E.)	0—1	Am 17. und in der Nacht vom 17/18. sind 3 bis 4″ Schnee gefallen. Der Schnee bis 8‴ hach auf den Ästen, die hinabgebeugt sind. (On the 17th, and in the night between the 17th and 18th, 3-4″ of snow has fallen. The snow on the branches is as much as 8‴ deep, and presses them down.)
19	„ 8 U.M. (8h. A.M.)	17 11¼	22 2	16 7	15 6	17 6¾	41 0½	9 8⅓	16 6¼	14 8¼	19 9	18 8½	— 5·5	— 5·2	S.O. (S.E.)	0—1	Der Wind hat den Schnee von allen Ästen hinabgeweht, bloss auf 4, 5, 8, 11 liegt etwas. (The snow has been blown off by the wind; only very little now remains upon Nos. 4, 5, 8, 11.)
19	Februar 5 U.N. (5h. P.M.)	17 4½	22 2¼	16 7	15 6⅝	18 0½	40 2½	9 3⅓	16 3	14 5	19 7½	18 10	—	— 8·3	N.O.O. (E.N.E.)	0—1	Es hat den ganzen Tag fein geschneit und ist dabei immer kälter geworden. Auf 4, 6, 11 etwas Schnee, jedoch kaum der Rede werth, da er nur einzelne Flocken sind. 5 und 8 haben etwas mehr Schnee auf sich. (Very small flakes of snow fell all the day long, whilst the cold increased. Only a few flakes of snow upon 4, 6, 11, but so little, that it is scarcely worth mentioning; a little more snow is lying upon 5 and 8.)
20	Februar	16 5	22 4¼	16 3	15 7½	18 6⅝	38 0¾	9 1⅛	15 11⅛	14 8¼	19 6⅓	19 2¼	—11·7	— 9·8	N.O.O. (E.N.E.)	0—1	Etwas Schnee auf 1, 4, 5, 6, 8, 11.
21	„	16 1⅛ 2½	22 5⅓ 3½	15 7¼ 7	15 4⅛ 2¾	18 9 6½	36 2¾ —	9 0 5¼	15 5¾ 4½	13 11⅛ 4 2	19 2⅓ 4	19 4⅓ 4	—16·0	—15·2	N.O.O. (E.N.E.)	0	Auf 1, 4, 5, 6, 11 etwas Schnee, d. h. einige Flocken. Alle Äste mit unmessbarer Kruste warzigen Reifs bedeckt. Am Nachmittag des 21. wird der Schnee von allen Ästen abgefegt. (Upon 1, 4, 5, 6, 11, a little snow—*i. e.*, some flakes. All the branches covered by an immeasurably thin crust of tuberculated hoar frost. In the afternoon of the 21st the snow was swept from all the branches.)
22	„	16 0½ 8	21 11¾ 3¾	15 5⅛ 6¼	15 6⅛ 3	18 5¾ 7 1	36 0 —	9 1⅓ 5¼	15 8¼ 4½	14 8 4 2	19 4½ 4	19 4 4	—10·8	—10·3	S.O. (S.E.)	0—1	In der Nacht vom 21/22. fällt ½″ höchst feiner Schneeklümpchen, ½‴ höchstens im Durchmesser; sie liegen in sehr geringer Menge auf 3, 4, 5, 6, 7, 8, 11; am Nachmittag des 22. wird der Schnee von

BEOBACHTUNGEN (OBSERVATIONS)—*fortgesetzt.*

Zeit. (Time.)	1 Tilia parvifolia Ehr.	2 Æsculus Hippocastanum L.	3 Carpinus Betulus L.	4 Rhamnus catharticus L.	5 Pterocarya caucasica C.A.M.	6 Tilia parvifolia L.	7 Pavia rubra Lam.	8 Pinus Laricio Poir.	9 Pinus Larix L.	10 Pinus Strobus L.	11 Acer Negundo L.	Wärme Temperature. Min. vorigen Nacht. (Min. of last night.)	Wärme Temperature. Gegen 8 Uhr. M. (At about 8h., a.m.)	Windesrichtung. (Direction of the wind.)	Windesstärke. (Force of the wind.)	
1866.	'' '''	'' '''	'' '''	'' '''	'' '''	'' '''	'' '''	'' '''	'' '''	'' '''	'' '''	° R.	° R.			allen Ästen abgefegt. (Between the 21st and 22nd, at night, about ½'' very small flakes of snow fell, at the most ½''' in diameter; a small quantity of them is lying upon the branches of 3, 4, 5, 6, 7, 8, 11. In the afternoon of the 22nd all snow was swept off from the branches.)
23 Februar	15 9½ 2	21 11½ 3 1	15 2⅓ 7 2	15 5 3 1	18 9 7 1	35 2½ —	9 0¾ 5 6	15 4½ 4 7	13 11⅓ 4 2	19 2 4 4	19 5⅘ 4 3	—15·6	—15·0	S.O. (S.E.)	0	Kein Schnee auf den Ästen. (No snow upon the branches.)
24 „	15 10½ 2 9	21 7⅓ 2 7	15 2 7 0	15 7½ 3 6	18 6⅘ 7 8	35 1 —	9 2 5 6	15 8½ 4 8	14 2⅓ 4 2	19 2½ 4	19 7½ 4 6	—13·8	— 9·3	S.O. (S.E.)	1	Gegen Morgen fällt zartflockiger Schnee bis zu Mittag, der Wind wird S.W. oder W., ist bei Tage 2 bis 3 stark und Nachmittags tritt Thauwetter ein. Etwas Schnee auf 4, 5, 8, 9, 10, 11. (Towards morning very thin flakes of snow fell till midday; the wind shifted to S.W. or W., and had during the daytime a force of 2-3. In the afternoon the snow began to thaw. A little snow upon 4, 5, 8, 9, 10, 11.)
25 „	—	—	—	—	—	39 1½	—	—	—	—	—	— 0·8	0·3	S.W. (S.W.)	2	Alle Äste nähern sich der normalen Stellung; durch Trägheit ist 6 noch zurück. (All the branches again approached their normal direction.
26 „	20 1 5 6	21 2¾ 4 6	16 2⅓ 4 6	15 3½ 4 9	18 1 5 6	40 1 —	9 3¾ 4 3	17 5¾ 4 3	15 3 3 9	20 1½ 3 8	18 1¾ 3 6	— 1·9	— 1·5	S.W. (S.W.)	0—1	Kein Schnee auf den Ästen. Äste trocken. (No snow upon the branches; branches dry.)
27 „	18 2¾	21 10⅓	16 5¼	15 6⅔	17 11⅓	40 4¾	9 4½	17 1	14 9⅔	19 10¾	18 8	— 5·2	— 3·7	S.O. (S.E.)	Fast 0 Nearly 0	„ „ „
28 „	19 10¾	21 3⅘	16 3	15 3	18 0¼	40 7	9 4	17 6¼	15 3½	20 2½	18 1	— 2·1	— 0·7	S.O. (S.E.)	0	„ „ „
1 März (March)	20 0⅓	21 4⅓	16 2	15 2	18 1¾	40 9	9 3⅔	17 5½	15 3¼	20 2⅓	18 1¼	0·9	1·1	S.O. (S.E.)	0	„ „ „

2	„	20 0½	21 4½	16 2½	[illegible]	[illegible]	1½ 40 10	9 8½	17 [illegible]	15 [illegible]	20 [illegible]	18 [illegible]	[illegible]	[illegible]	[illegible]	[illegible] Nearly 0	[illegible] Abend [illegible] gen. Äste trocken. Bloss im Laube von 8 einige Tropfen. (Rain last night. Branches dry; a few drops of water between the leaves of No. 8 only.)
3	„	20 0	21 2¼	16 2¾	15 2¼	18 0¾	40 10	9 4	17 6	15 4	20 3½	18 0½	— 1·6	— 0·5	S.O. (S.E.)	0—1	Äste trocken. (Branches dry.)
4	„	19 11	21 3¾	16 2¾	15 2¼	18 1	40 10	9 4	17 6¼	15 3½	20 2½	18 0	— 1·6	— 0·8	N.W. (N.W.)	0	„ „
5	„	19 10½	21 4	16 2¾	15 2	18 0½	40 9½	9 4	17 7½	15 8¾	20 2½	18 0½	— 2·8	0·0	S.O. (S.E.)	0—1	„ „
6	„	19 7	20 4½	14 9½	13 11	17 11½	40 8½	9 8½	17 1¼	15 0¾	20 0¼	17 0	— 0·6	— 0·2	W.S.S. (S.S.W.)	0	Zarter Schnee gefallen. Auf allen Ästen 1 bis 2‴ Schnee. (Thin flakes of snow fallen. On all the branches 1-2‴ of snow.)
7	„	18 9	21 7¼	16 4½	15 3½	17 10½	40 9½	9 4¾	17 3¼	15 1	20 1½	18 4¾	— 3·3	— 2·0	N.O.O. (E.N.E.)	0—1	Kein Schnee mehr auf den Ästen. (No more snow upon the branches.)
8	„	19 8¾	20 10½	15 8½	14 4½	17 9¾	40 5	9 2½	16 7½	15 2	20 2¼	17 2½	0·0	0·9	S.O. (S.E.)	0	Am 17. März starker Schneefall; am 8. jedoch der Schnee von den dünnen Ästen abgethaut, er liegt bloss noch auf den dickern Theilen bei allen. Nos. 9 und 10 ohne Schnee. Alle Äste voll Tropfen. (Much snow fell in the course of the 7th. On the 8th the snow thawed away from the thin branches, lying only on the thicker parts of the branches. Nos. 9 and 10 without snow. Drops of water hung on all the branches.)
9	„	19 11¾	21 2	16 1½	14 11¼	18 1½	40 8½	9 3¼	17 3¾	15 4	20 3½	17 11½	0·3	0·8	N.O.(N.E.)	0	Äste feucht, ohne Tropfen und Schnee. (Branches moist, without drops of water and snow.)
10	„	20 0	21 3	16 2	15 1½	18 1½	40 9½	9 3¾	17 7	15 4	20 4	17 11¾	— 1·2	— 1·0	N.O.O. (E.N.E.)	Fast 0 Nearly 0	Äste trocken. (Branches dry.)
11	„	17 4¾	21 7	16 4	15 5¾	18 1½	40 5	9 4¼	17 2¾	14 10½	20 0	18 8½	— 6·1	— 2·5	Unten S.O. Oben N.W (Below S.E. Above N.W.)	0	**Äste trocken. Spur von Reif auf allen Ästen. (Branches dry. Traces of hoar frost on all branches.)**
12	„	19 6¼	20 3	14 8½	13 8½	17 10	40 4½	9 2¼	16 5	14 11¾	20 2½	16 1½	— 1·2	0·7	N. (N.)	0	**Starker Schneefall in der Nacht vom 11/12., 2 bis 6‴ Schnee auf allen Ästen, auch den kleinen. (Heavy snowfall in the night of the 11th—12th. 2-6‴ of snow on all branches, even on the small ones.)**
13	„	18 10	21 7	16 4	15 3¾	17 10½	40 5	9 4½	17 0¾	15 0¾	20 0	18 3	— 2·8	— 1·2	S (S.)	0—1	**In der Nacht vom 12/13. wieder Schneefall. Etwas Schnee liegt auf allen Ästen, ausser 2. (Again a heavy snowfall in the night of the 12th—13th. A small quantity of snow upon all branches except No. 2.)**

BEOBACHTUNGEN (OBSERVATIONS)—*fortgesetzt.*

Zeit. (Time.)	1 Tilia parvifolia Ehr.	2 Æsculus Hippocastanum L.	3 Carpinus Betulus L.	4 Rhamnus catharticus L.	5 Pterocarya caucasica C.A.M.	6 Tilia parvifolia L.	7 Pavia rubra Lam.	8 Pinus Laricio Poir.	9 Pinus Larix L.	10 Pinus Strobus L.	11 Acer Negundo L.	Wärme Temperature. Min. voriger Nacht. (Min. of last night.)	Wärme Temperature. Gegen 8 Uhr. M. (At about 8h., a.m.)	Windesrichtung. (Direction of the wind.)	Windesstärke. (Force of the wind.)	
1866.	" '''	" '''	" '''	" '''	" '''	" '''	" '''	" '''	" '''	" '''	" '''	° R.	° R.			
14 Marz	—	—	—	—	—	—	—	—	—	—	—	—	0·7	S.O. (S.E.)	1—2	
15 "	18 $5\frac{3}{4}$	21 $7\frac{1}{3}$	16 $5\frac{2}{3}$	15 $5\frac{1}{2}$	17 $11\frac{1}{4}$	40 8	9 $4\frac{1}{3}$	17 $6\frac{3}{8}$	15 $1\frac{1}{2}$	20 $2\frac{3}{4}$	18 4	— 3·5	— 3·2	N.W. (N.W.)	0—1	In der Nacht vom 14/15. 2 bis 3''' Schnee gefallen. Etwas Schnee auf allen Ästen, ausser auf 2, 6, 7. (Snow fell in the night between the 14th and 15th. A little snow upon all branches except 2, 6, 7.)
16 "	17 3	21 $8\frac{1}{2}$	16 $4\frac{5}{8}$	15 $9\frac{3}{4}$	18 $9\frac{1}{4}$	40 3	9 $4\frac{7}{8}$	17 $2\frac{7}{8}$	14 $11\frac{1}{2}$	20 $1\frac{1}{4}$	18 10	— 7·5	— 5·0	O.N.N. (N.N.E.)	0	Kein Schnee auf den Ästen. Spur von Reif. (No snow upon the branches. Slight hoar frost.)
17 "	19 4	21 $4\frac{3}{4}$	16 3	15 $2\frac{3}{4}$	17 $11\frac{1}{4}$	40 $8\frac{3}{4}$	9 $4\frac{1}{4}$	17 $5\frac{1}{2}$	15 $3\frac{1}{4}$	20 $2\frac{1}{2}$	18 1	— 3·9	— 0·8	O. (E.)	0—1	" " "
18 "	20 $0\frac{3}{4}$	21 $3\frac{1}{2}$	16 $1\frac{1}{3}$	15 $2\frac{1}{3}$	18 $1\frac{3}{4}$	40 $8\frac{3}{4}$	9 4	17 8	15 $3\frac{7}{8}$	20 $3\frac{1}{3}$	17 11	— 0·6	— 0·1	S.O. (S.E.)	0—1	" " "
19 "	20 $0\frac{3}{4}$	21 3	16 2	15 2	18 $2\frac{1}{4}$	40 $9\frac{3}{4}$	9 $4\frac{1}{4}$	17 8	15 $4\frac{1}{3}$	20 $3\frac{3}{4}$	17 $10\frac{3}{4}$	— 0·4	0·1	O. (E.)	0	" " "
	5 5	4 3	5 2	4 2	4 10	—	4 3	4 4	0 10	3 9	3 2					
20 "	20 $0\frac{3}{4}$	21 3	16 2	15 2	18 $2\frac{1}{4}$	40 $9\frac{3}{4}$	9 $4\frac{1}{4}$	17 $10\frac{1}{4}$	15 $4\frac{1}{3}$	20 $3\frac{3}{4}$	17 $10\frac{3}{4}$	— 0·1	0·6	O. (E.)	0	" " "
21 "	20 $0\frac{1}{2}$	21 $1\frac{3}{4}$	16 $1\frac{1}{4}$	14 $11\frac{1}{4}$	18 $2\frac{1}{4}$	40 $8\frac{1}{2}$	9 4	17 $7\frac{1}{2}$	15 $4\frac{1}{4}$	20 $3\frac{3}{4}$	17 $9\frac{1}{4}$	0·1	1·1	N.W. (N.W.)	0	Hat in der Nacht geschneit; der Schnee abgethaut, daher alle Äste voll Tropfen. (Snow fell at night. Snow thawed away; therefore, drops of water on all branches.)
22 "	20 $0\frac{3}{4}$	21 $2\frac{3}{4}$	16 2	15 $1\frac{1}{4}$	18 $2\frac{1}{2}$	40 $9\frac{1}{2}$	9 4	17 $10\frac{1}{8}$	15 $0\frac{1}{4}$	20 $3\frac{3}{4}$	17 11	— 0·8	— 0·7	N.O.(N.E.)	0	Trocken. (Dry.)
23 "	19 $7\frac{1}{4}$	21 3	16 $2\frac{1}{4}$	15 2	18 $0\frac{1}{4}$	40 9	9 $4\frac{1}{3}$	17 10	15 $2\frac{1}{2}$	20 $2\frac{1}{4}$	17 $9\frac{3}{4}$	— 2·0	— 1·2	N.W.W. (W.NW.)	0	Trocken. Auf allen Ästen einige lockere Graupelkörner. (Dry. On all the branches a few grains of hail of a loose texture.)
24 "	16 $11\frac{1}{3}$	21 0	15 9	15 $2\frac{1}{3}$	17 10	40 $8\frac{3}{4}$	9 $4\frac{1}{4}$	17 0	14 $9\frac{3}{4}$	19 $10\frac{1}{3}$	18 $1\frac{3}{4}$	— 7·0	— 1·7	S.O. (S.E.)	0	Schnee in der Nacht gefallen und auf allen Ästen 1 bis 9''' hoch. (Snow fell at night-time. Snow on all the branches 1''9'''deep.)

Um die Beobachtungen anschaulicher zu machen, ist auf Tafel II., III., IV., graphisch der Gang der Wärme und der Richtungsänderung der Aste dargestellt.

Bevor ich die Ergebnisse zusammenstelle, will ich einige Worte über die Störungen der Beobachtungen durch Wind, Regen, Schnee, Glatteis, Reif bemerken.

Was den Wind anbetrifft, so sind nur solche Beobachtungen, die bei O der Windesstärke gemacht sind, völlig genau, die, welche bei 1 gemacht sind, nicht ganz sicher, obgleich sie kaum um $\frac{1}{2}'''$ zu hoch oder zu niedrig sein mögen. Wenn der Wind 2, 3, oder gar 4 war, zumal, wenn er einige Tage anhielt, war es mir oft bemerkbar, dass die Aste wegen der starken Ablenkung die sie erlitten hatten, ihre Richtung am Tage nach dem heftigen Winde in Folge von Trägheit noch nicht wieder gewonnen hatten; so am 12. November nach dem Sturme vom 11. Am 14. Februar hatte ein heftiger S.W., der bei Tage mit Stärke 3 wehte, den Ast Nro. 6, *Tilia parvifolia*, so niedergedrückt, dass er am 15. Februar bei—1·0 um 8 Uhr (Minimum:—1·5 in der Nacht) tiefer stand, als am 16. Februar bei geringerer Wärme—1·8 (Minimum:—2·4 in letzter Nacht) nachdem er bei dem geringen Winde am 15. Februar und in der windstillen Nacht vom 15. bis 16. Februar Zeit gefunden hatte, sich zu erheben.

Starker Thau, welcher Tropfen macht, und besonders Regen drücken die Äste, jedoch nur um wenige Linien, hinab, z. B. am 2. December im Vergleich mit dem 1., am 24. und 25. December im Vergleich mit dem 23., u. s. w. Glatteis kam nur einmal am 9. December, und auch da nur in unmessbar dünner Schicht auf den Asten vor. Auf den graphischen Darstellungen sind die Tage, an welchen ich die Äste durch Regen oder überhaupt durch anhängende Wassertropfen hinabgedrücke fand, mit *r* bezeichnet, Glatteis mit *g*. Waren die Äste bloss von Thau oder in Folge von Regen feucht ohne Tropfen zu zeigen, so ist diess mit *n* bemerkt.

Viel stärker als Regen drückt der Schnee die Äste hinab. Besonders bei dünnen Ästen, wie bei 1. *Tilia parvifolia*, 2. ***Æsculus Hippocastanum***, 3. ***Carpinus Betulus***, 4. ***Rhamnus catharticus***, u. s. w. ist die Wirkung des Schnees, z. B. am 6. und 12. März sehr ersichtlich. Fand jedoch bei starkem Schneefall Kälte statt, so zeigte sich trotz der Schneelast bei den in der Kälte steigenden Ästen, eine Erhebung. So am 24. März bei 4. ***Rhamnus catharticus*** und 11. *Acer Negundo*. Am 23. März fiel bei Tage mit S.W. und N.W.W. etwas Schnee. Es thaute dabei etwas und er schmolz zum Theil auf den . sten. Abends fing es bei SO. an frühzeitig zu frieren. Um 8 Uhr Abends fegte ich bei —4° R. den Schnee von den Ästen ab, was jedoch, weil der gethaute zu Tropfen gefroren war, nicht recht gelang. In der Nacht vom 23. bis 24. März war das Minimum—7° R., morgens 8 Uhr noch—1·7°; es war in der Nacht bald bezogen, bald klar und schneite viel; die Aste waren alle bis auf die kleinsten Zweige mit 1''' bis 9''' tiefem Schnee bedeckt und trotzdem standen ***Rhamnus catharticus*** und

Acer Negundo um 8 Uhr morgens bezüglich $\frac{1}{8}'''$ und $3\frac{3}{4}'''$ höher als am 20. März, an welchem Tage es bei Windstille viel wärmer (morgens 8 Uhr 0·6° R., Minimum in voriger Nacht—0·1°), die Äste völlig trocken und schneelos waren. Ich sammelte den Schnee von dem beobachteten Ast und dessen Zweigen beider Bäume sorgfältig in Tellern, und seine Last, mit der die Äste bei der Kälte gestiegen waren, betrug nach der Wägung meines Collegen, Professor Werther, bei dem *Rhamnus* 44 Gramm (0·088 Zollvereinspfund), und beim *Acer Negundo* gar 61 Gramm (0·122 Zollvereinspfund).

Auf den graphischen Tafeln ist Schnee mit *s* bezeichnet. Oft waren jedoch nur einige, wenige Flocken auf den Ästen, die nur hie und da einzeln lagen, also unmöglich den Ast hinunterdrücken konnten, so z. B. am 19. und 21 Februar.

Die Beobachtungen liefern nun folgende Ergebnisse in Betreff der Richtungsveränderung der Äste bewirkt durch Kälte :—

1. Die Äste aller Bäume zeigen eine Veränderung der Richtung nach der Seite hin. Am 21. bis 24. Februar zur Zeit stärkster Kälte und am 19. März, nachdem einige milde Tage gewesen waren, maass ich die Abstände der Äste von den Pfählen. Die Zahlen stehen in den Beobachtungen der genannten Tage unter denen, welche die Höhe angeben. Der Unterschied zwischen der Stellung am 19. März und der grössesten Abweichung an einem der Tage zwischen dem 21. bis 24. Februar zeigte eine Bewegung *nach links* bei : 2. *Æsculus Hippocastanum* um 1″ 8‴, 3. *Carpinus Betulus* um 2″, 7. *Pavia rubra* um 1″ 3‴, 11. *Acer Negundo* um 1″ 4‴, *nach rechts* bei: 1. *Tilia parvifolia* um 3″ 5‴, 4. *Rhamnus catharticus* um 1″ 5‴, 5. *Pterocarya caucasica* um 1″ 8‴, 8. *Pinus Laricio* um 4‴, *Pinus Larix* um 3″ 4‴, 10. *Pinus Strobus* um 7‴. Der grosse Ast der zweiten Linde (6. *Tilia parvifolia*) ging auch sehr ersichtlich nach links, obgleich ich den Abstand aus Mangel an Vorkehrung nicht messen konnte. Diese seitliche Bewegung blieb sich bei den Ästen bei jedem tiefern Frostgrade in der Richtung gleich. Der Umfang der Bewegung wuchs mit dem Grade des Frostes.

2. Ausser der seitlichen Bewegung zeigte sich zugleich bei mehreren ein Fallen bei Eintritt von Kälte, und zwar ein desto tieferes, je stärker die Kälte war. Dahin gehören 1. und 6. *Tilia parvifolia*, 8. *Pinus Laricio*, 9. *Pinus Larix*, 10. *Pinus Strobus*. Die graphische Darstellung giebt eine Anschauung von der Thatsache. Der Umfang der Bewegung, abhängig von dem Grade der Krümmung und dem Abstande des beobachteten Punkts vom Astgrunde, ist bei den beobachteten Bäumen bei 6. *Tilia parvifolia* am grössesten gewesen: 6″ 8‴ ; bei *Pinus Laricio* war er 2″ $3\frac{1}{2}'''$, bei *Pinus Larix* 1″ $3\frac{5}{12}'''$, bei *Pinus Strobus* 1″ $\frac{3}{8}'''$. Bei 1. *Tilia parvifolia*, deren beobachteter Ast ein tertiärer ist, war die Wirkung eine zusammengesetzte, da die Beugung dreier Äste zugleich sich geltend machte, der Umfang betrug 4″ $3\frac{3}{10}'''$. Absolut betrachtet beugte sich *Pinus Laricio* am stärksten, schwächer *Tilia parvifolia*, noch schwächer *Pinus Larix* ; *Pinus Strobus* am schwächsten.

3. Bei andern Baumarten fand ich, dass der beobachtete Ast bei eintretender Kälte aufstieg, und zwar desto höher, je grösser die Kälte war. Diess zeigt 5. ***Pterocarya caucasica*** und 11. ***Acer Negundo*** (vergleiche die graphischen Darstellungen). Der Umfang der Bewegung bei 5. ***Pterocarya caucasica*** war 3″ 4½‴ und bei ***Acer Negundo*** 1″ 6½‴. In beiden Fällen war sie das Gesammt ergebniss mehrerer Astfolgen.

4. Bei noch anderen Baumarten zeigten die beobachteten Äste bei geringerer Kälte ein Steigen, bei heftigerer ein Fallen, so bei 2. ***Æsculus Hippocastanum***, 3. ***Carpinus Betulus***, 4. ***Rhamnus catharticus***, 7. ***Pavia rubra***. Der Umfang der ganzen Bewegung war bei ***Æsc. Hipp.*** 1″ 8¼‴; bei ***Carp. Betul.*** 1″ 5‴, bei ***Rham. cath.*** 1″ 11¾‴, bei ***Pav. rub.*** bloss 4⅞‴. Bei allen war sie das Ergebniss der Bewegung mehrerer Astfolgen. Der Grad der Kälte, bei welcher ein Sinken eintritt, kann wegen Mangel stündlicher Beobachtungen und Beobachtungen der Kälte des Holzes selbst im Innern nicht sicher angegeben werden. ***Carpin. Bet.***, ***Rham. cathart.*** und ***Pav. rub.*** senkten ihren Ast als am 20. Februar, morgens 8 Uhr — 9·8° (Minimum der vorhergehenden Nacht — 11·7°) waren, dagegen ***Æsculus Hippocastanum*** erst als es am 21. Februar morgens 8 Uhr — 15·2° (Minimum des Nachts — 16° R.) fror.

Da sich erst in Folge des Eindringens der stattfindenden Wärme in den Baum die Bewegung, sei es eine sinkende oder steigende, zeigt, tritt sie früher bei dünneren als bei dickeren sten ein. Obenein vermehrt die grössere Trägheit der grösseren Masse dickerer Aste die Verzögerung der Wirkung.

Auffallend war es mir, dass wenn die Bewegung eines Astes in einer Richtung der stattfindenden Wärme entsprechend begonnen hat, er in ihr selbst noch bei einigen Graden entgegengesetzt wirkenden Wärme beharrte (vergleiche ***Pterocarya caucasica*** zwischen dem 6. und 13. Decbr.) und die erlangte Höhenstellung beibehielt, ja noch vermehrte. Auch haben mehrere Aste zur Zeit als ich diess schreibe, jetzt im Frühjahr bei denselben Wärmegraden, z. B. + 1° R eine ganz andere Stellung als im Anfange der Beobachtungen im Winter. 1. *Tilia parvifolia*, 3. *Carpinus Betulus*, 4. ***Rhamnus catharticus***, 5. ***Pterocarya caucasica***, 7. ***Pavia rubra***, 8. ***Pinus Laricio***, 9. ***Pinus Larix***, 10. ***Pinus Strobus*** stehen jetzt höher als im Anfange; 2. ***Æsculus Hippocastanum*** und 11. ***Acer Negundo*** stehen jetzt so hoch als im Anfange, und 6. ***Tilia parvifolia*** steht jetzt niedriger als im Anfange. Auch äusserte derselbe Kältegrad zu verschiedenen Zeiten verschiedene Wirkung, obgleich ich nicht immer eine verschiedene Dauer desselben erkennen konnte.

Was ist die Ursache dieser Richtungsveränderung der Äste bei verschiedenen Wärmegraden? Die Frage lässt sich gegenwärtig nicht beantworten. Die Erscheinung lehrt jedoch, dass die verschiedenen Seiten der ste sich ungleich in der Längenrichtung bei niederen Wärmegraden zusammen ziehen, natürlich auf der Seite, nach welcher die Bewegung stattfindet, stärker als auf den anderen. Ob diese Verkürzung jedoch bloss am Ansatzpunkt des Astes oder seiner ganzen Länge nach statt findet, welches letztere wahrscheinlich ist, kann ich vorläufig nicht sicher sagen. Der Versuch mittelst einer Camera obscura, ein genaues Bild der Äste zu verschiedenen Wärmegraden auf zunehmen und durch Vergleichung der Bilder die Verkürzungsstelle zu ermitteln, misslang, da die zu kleinen Bilder sich deckten. Vielleicht ist die Seitenbewegung dadurch veranlasst, dass der Länge des Astes nach eine Verkürzung bloss in einer Gruppe oder in einem Striche zusammenhängender, fortlaufender Holzzellen statt findet, die in Folge von dem schiefen und schraubigen Verlauf der Holzzellen (A. Braun, Monatsbericht der Berliner Akademie, 7. Aug., 1854) sich auf verschiedenen Seiten des Astes an verschiedenen Orten äussert. Dass das frische Holz sich in der Richtung des Umfanges und Halbmessers an verschiedenen Stellen verschieden in der Kälte zusammenzieht, ohne dass ich ein Gesetz finden konnte, habe ich früher (Botan. Zeitung zon v. Mohl. und v. Schlecht, 1857, 329 ff.) gezeigt.* Die Ausdehnung des frischen Holzes in der Längenrichtung ist, soweit ich weiss, bisher nicht untersucht; sie muss jedenfalls die des trockenen Holzes, dessen Coefficient der Ausdehnung für 1° F. Kater beim Tannenholz (White deal) auf 0,0000022685 und Struve auf 0,0000028444 bestimmte (Bot. Zeitung von v. Mohl und v. Schlecht, 1855, 494) beträchtlich übertreffen.

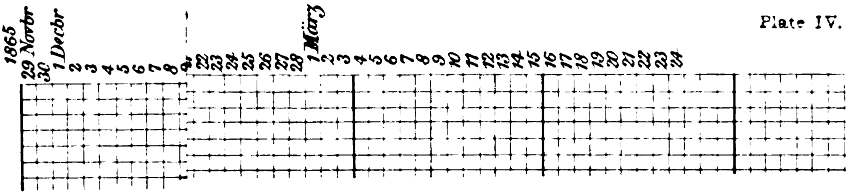
Es könnte die Meinung gehegt werden, dass Feuchtigkeitsverhältnisse die Richtungsveränderung der Aste bedingten, da Kälte bei uns meist mit Ostwind, einem sehr trockenen Winde kommt und somit zufällig oft Zeiten grösserer Trockenheit mit der Kälte und somit mit der Richtungsveränderung der Aste zusammen fallen. Die kältesten Zeiten zeigten folgende Feuchtigkeitsverhältnisse, deren Angabe ich Professor Luther verdanke :—

		Relative Feuchtigkeit.		Dunstdruck in paris. Linien.		Wärme (Minimum).
5. December, 1865	...	89	...	1·59	...	— 1·9
6. „ „	...	75	...	1·08	...	— 2·8
7. „ „	...	72	...	0·73	...	— 9·6

* Ich benutze die Gelegenheit um die Coefficienten der Ausdehnung, die ich l. c. 370 für eine untersuchte frische Scheibe von Buchenholz und Eichenholz für 1° C. angab, zu verbessern. Statt $\frac{1}{934}$ (0,001071), des Coefficienten der linearen Ausdehnung in tangentialer Richtung der Buche I, lies $\frac{1}{2837}$ (0,0003521) und statt $\frac{1}{937}$ (0,001067), des Coefficienten der Ausdehnung des Halbmessers, lies $\frac{1}{2872}$ (0,00034819). Für $\frac{1}{327}$ 0,00306) den Coefficienten der Ausdehnung des Umfanges der Eiche VII., lies $\frac{1}{1037}$ (0,0009643), and statt $\frac{1}{515}$ (0,00194), des des Halbmessers, lies $\frac{1}{3288}$ (0,0003041). Diese Coefficienten der Ausdehnung beziehen sich bloss auf die Grade zwischen + 0·7 und — 11·3 R., welche die Extreme während der dort angegebenen Untersuchung waren, und ich wiederhole, was ich schon früher an der angegebenen Stelle sagte, dass sie keine sichern Werthe sind, da aus mehr als einem Grunde solche aus jenen Untersuchungen nicht abgeleitet werden können und sich für einen so ungleichmässigen Körper, wie Holz, vielleicht überhaupt nicht gewinnen lassen; ich stellte sie jedoch auf, um annähernd zu zeigen, woran ich festzuhalten jede Ursache habe, dass der Coefficient der Ausdehnung des frischen Holzes in der Richtung des Umfanges und Halbmessers den aller festen Körper, selbst den des Zinks und Eisens weit übertrifft und nur von dem der Luft übertroffen wird.

Plate II.

Plate IV.


1865
29 Novbr
30
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1 März
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	Relative Feuchtigkeit.	Dunstdruck in paris. Linien.	Wärme (Minimum).
8. December, 1865 ...	89 ...	0·98 ...	—10·0
9. " " ...	96 ...	1·61 ...	— 6·0
15. Februar, 1866 ...	83 ...	1·68 ...	— 1·5
16. " " ...	85 ...	1·18 ...	— 2·4
17. " " ...	84 ...	1·44 ...	— 2·8
18. " " ...	94 ...	1·87 ...	— 2·7
19. " " ...	86 ...	0·92 ...	— 5·5
20. " " ...	81 ...	0·61 ...	—11·7
21. " " ...	77 ...	0·52 ...	—16·0
22. " " ...	80 ...	0·60 ...	—10·8
23. " " ...	76 ...	0·48 ...	—15·6
24. " " ...	84 ...	1·33 ...	—13·8
25. " " ...	83 ...	1·73 ...	— 0·8

Diese Angaben über Feuchtigkeit sind Mittel aus drei täglichen Beobachtungen um 7 Uhr M. und 2 und 9 Uhr N.

Fallen hier sehr geringe Feuchtigkeitsgrade, Kälte und starke Richtungsveränderung der Aste einigermassen zusammen, so gehen doch die Feuchtigkeitsgrade anderwegen sehr mit den beiden letzteren, die stets zusammen fallen, auseinander. Die Minima der Feuchtigkeit in den Monaten Januar, Februar und März sind nämlich folgende :—

	Relative Feuchtigkeit.	Dunstdruck.	Wärme (Minimum).
31. Januar ...	67 ...	1·20 ...	—2·2
9. Februar ...	69 ...	1·81 ...	—1·7
15. März ...	72 ...	1·02 ...	—3·5

Es fallen die Minima der Feuchtigkeit dieser drei Monate also mit den Extremen der Kälte, die mit denen der Bewegung der Äste gleichzeitig eintraten (vergleiche die Beobachtungen und graphischen Darstellungen), nicht zusammen. Übrigens ist auch durchaus nicht abzusehen, wie die Bewegung der Feuchtigkeit die Astbewegung veranlassen soll.

Es hat einst K. F. Schimper in Schwetzingen hyponastiche, epinastische und diplonastiche Äste unterschieden, je nachdem sie "entweder unten, oder oben, oder oben, und unten zugleich excentrisch sich stärker ausbilden." (Baum und Listing. Amtlicher Bericht über die 31. Versammlung deutscher Naturforscher und Ärzte in Göttingen, Septbr. 1854. Göttingen, 1860. 87.) Die ungleichseitige Verdickung der Äste scheint jedoch nicht mit ihrer Richtungsänderung in der Kälte in Zusammenhang zu stehen. Die sehr stark hyponastischen Zweige der *Tilia parvifolia*, die an sehr alten Bäumen fast brettartig flach sind, gehen nach unten, während die hyponastischen Zweige von *Carpinus Betulus* bei gelinderem Frost steigen und erst bei stärkerem fallen, und die meist hyponastischen von *Acer Negundo* und *Pterocarya caucasica*, so weit beobachtet, bei jedem Frost steigen.

Ob die Weise der Richtungsänderung bei jeder Baumart feststehend ist, haben fernere Untersuchungen zu entscheiden.

ON THE FLORAL ENVELOPES OF LAURACEÆ.

By BENJAMIN CLARKE, F.L.S., Hampstead.

THE flower of *Laurus* is described as tetramerous, the stamens being alternate with the sepals; but a careful examination has convinced me that it is trimerous, as in the generality of the genera, and it serves to show that the three inner sepals of this family are sepaloid petals. The sepals are four, but one is smaller and internal to the others, and is, I doubt not, one of three, the other two of which have become stamens, and this circumstance has occasioned this genus to be described as having the stamens alternate with the sepals. This appears to me to be clearly proved by the occurrence of flowers with six sepals, three inclosing three (the petals) much more than in most of the genera, and by the stamens in these cases being opposite the sepals. One good instance I met with, had six stamens opposite six sepals, three (the petals) entirely within three, and one of the internal still retained its antheriferous character so far as to bear half an anther on one side. It is common to find flowers with five sepals, and it was sufficiently evident in all the instances examined, that one of the stamens was missing, having become the additional sepal, *i.e.*, a sepaloid petal.

Litsœa is dimerous, the two sepals in æstivation inclosing the two petals, from which, however, they cannot well be distinguished after expansion. The stamens are six, the outer four, which are usually glandless, being opposite and adherent to the sepals and petals; and the remaining two, which have glands at their base, are opposite the sepals, being within the first two, and, like them, adherent to the middle of the sepal near its base. The female flower has six barren stamens, and their position is more obvious.

A comparison of *Lauraceæ* with *Hernandia*, which is very near that family, scarcely differing, except in the ovary being adherent and the anthers opening by valves turned inwardly instead of directly upwards, confirms this view of the structure of *Lauraceæ*, as the six sepals of that genus, which are placed three within three, are sometimes increased to four within four and five within five, thus making up the usual calyx and corolla of the Exogens. *Hernandia* is, however, so very near *Illigereæ*, that it may with confidence be referred to that family, especially as it does not appear to have any other affinity except with *Lauraceæ*; and this being admitted, it will follow that its floral envelopes consist of both calyx and corolla, if those of *Illigera*, which are coloured and placed five within five, are in reality calyx and corolla. The sepaloid floral envelopes of *Illigereæ* might, however, still be regarded as a double calyx, but the very close affinity of that family to *Combretaceæ* supplies good evidence in support of the inference that the inner series represent petals.

The petals of the Endogens are often sepaloid, as in the instance of *Paris quadrifolia*, which, like *Hernandia*, is capable of increasing its sepals and petals to five, of which I have seen a specimen; and sometimes they are, in fact, less distinguishable from sepals, and less like petals, than those of *Illigera*.

The similarity in the structure of the ovary in *Lauraceæ*, *Illigereæ*, and *Combretaceæ*, gives some further support to the very close connexion existing between these families. Thus, in *Lauraceæ*, the ovary most usually consists of a single carpel, containing one pendulous ovule having a dorsal raphe; and this is exactly the structure of *Hernandia* and *Illigereæ*, while in *Combretaceæ*, it is certain that where the ovules are several, some of them have the raphe dorsal. And when in *Lauraceæ* the carpels are two, which not unfrequently occurs in *Sassafras officinale*, growing in Kew Gardens, the agreement in structure is still kept up, for in this instance the carpels are united by their margins so as to form most frequently a one-celled ovary, or occasionally a very imperfect dissepiment is formed, the styles being nearly or quite distinct.* This agrees with *Combretaceæ*, which are reputed to have sometimes a compound ovary with parietal placentæ (J. G. Agardh, Theor. Syst. Plant., p. 162), but this is a point I have not examined further than to learn that it is not without exception compound, as in *Combretum purpureum*, which has the style distinctly and sometimes deeply furrowed on one side.

A further resemblance between *Lauraceæ* and *Combretaceæ* may be traced in the leaves of *Actinodaphne*, which, although alternate, are sometimes crowded at some parts so as to appear clustered or whorled. As this occurs also in *Combretaceæ*, the conclusion appears unavoidable, that *Lauraceæ* are *Combretaceæ* with a superior ovary and sepaloid petals.

ON SOME POINTS CONNECTED WITH THE ORCHIDACEÆ.

By H. G. Reichenbach, Professor of Botany, Hamburgh.

I had the pleasure of showing to the Congress at Amsterdam a monstrous flower-spike of *Selenipedium caudatum*, one flower of which had nearly a flat, ribbon-like lip. (See "Bulletin du Congrés International de Botanique et d'Horticulture." Amsterdam, 1865, p. 62.) I now exhibit a single flower of *Cypripedium* with a stamen under the stigma, as in *Uropedium*, so that it is tetrandrous, the staminodium being included. If I remember rightly, a similar case has also been observed by Pyramus de Candolle. In the next place I would remark, that Mr. Wallis, Mr. Linden's collector, has dis-

* In these ovaries the ovules were erect, but in the ovaries consisting of a single carpel, the ovule is suspended from the side rather above the middle, so that its attachment is at some little distance from the base of the style.

covered in South America a new species of *Uropedium*, growing on trees. It is a pity that he has not dried even a single flower.

As to malformations, I do not believe that any use can be made of them for breaking down the limits of genera.

ON SAUNDERSIA, A NEW GENUS OF ORCHIDACEÆ.

The grand days of Orchidology are gone for ever—the days when every month afforded a new genus. There appear to be very few new genera to be discovered; the greater then is the pleasure to see an old, long-known plant at length taking its place in the annals of science.

Among the drawings of Descourtilz, made more than thirty years ago, mostly near Bananal, in Brazil, there was one representation of a cæspitose plant, with ligulate leaves, no developed bulbs, basilar sub-capitate racemes of yellowish-white flowers striped with brown, and long tongue-like, bifid lips. Dr. Lindley took a copy of this plate, which is now in his Herbarium at Kew; and I remember well, that he and I looked despairingly on the mystery, as on one not to be solved, for no details as to the pollen, &c. were known. My astonishment was great when I found an excellent representation, made by Mr. W. Wilson Saunders, at Hillfield House, near Reigate, from the living plant. This gentleman had even prepared careful dissections; but the apex of the pollen apparatus had escaped his observation, and I did not know whether the plant belonged to the *Vandeæ* or to the *Epidendreæ*.

At length, shortly before the International Exhibition, Mr. Saunders, at my repeated request, sent me the "*rarissima avis*," which proved, as no one could have suspected, nearly allied to *Trichocentrum*, but very well distinguished as a genus by the spur being adnate to the ovary, by the pyriform solid pollen masses, and by the long narrow glandula. I dedicate the genus to the above-named gentleman, whose attachment to science and gardening is so well-known, and whose highly interesting gardens and stoves are quite unique. The technical characters are the following:—

SAUNDERSIA *Rchb. fil Nov. Gen.*—Ovarium hispidum canaliculatum, calcari cylindraceo optime adnato. Sepala oblonga apiculata, concava, extus carinata. Sepala subæqualia, minora, dorso carinata, omnia recte seu subrecte inserta. Labellum plus duplo longius, æstivatione inflexum, lineari-ligulatum, apice flabellato dilatatum, bifidum, cruribus oblique rhombeis, carina crassa utrinque in limbo medio marginante. Columna brevis, crassa, androclinium immersum in rostellum subulato bifidum extensum. Alula ciliolata utrinque juxta foveam obcelata ab alis quadratis, maximis, oblongo retusis protensis. Anthera oblonga, apice attenuata, unilocularis, septulis minutissimis. Pollinia gemina pyriformia in caudicula lineari ac glandulâ subposita ligulata.

Saundersia mirabilis: planta ebulbis. Folia cuneato ligulata, obtuse acuta. Pedunculus cephalotes, squamis vestitus oblongis, acutis, scariosis, superne capitato racemosus uti diximus. Flores erecti. Ovarium purpureum, sepala et petala flaveola, purpureo zebrina, labellum eboraceum.

In Brasilia legerunt *Descourtilz* (icones Mus. Delessert) et

Blunt, mercatoris excellentissis. Low, Claptonensis, collector, unde in Hort. Saundersianum, introducta est nitida planta.

ON THE INFLORESCENCE OF ORCHIDS.

It is a highly interesting fact, that Orchids are very constant in their inflorescence. It might be thought that racemose species would easily become panicled, and that such species as are one-flowered would often have more flowers; the one-flowered inflorescences generally being nothing but abortive racemes. In those genera, where some of the species have normally branched inflorescences, it sometimes happens that certain species, which ordinarily are unbranched become branched. Thus we are not astonished at a branched *Odontoglossum grande* or *Insleayi.** But in those genera where there are no species normally branched the branching of the ordinarily unbranched inflorescences is very rare.

Considering the extraordinary luxuriance of our stove Orchids, it might be expected that more anomalies in the inflorescence would occur than in the places where Orchids grow wild. Yet if the number of normal inflorescences be considered, and the relatively very few higher developments that take place, it will easily be admitted that when they do occur they are very extraordinary. It is a singular thing indeed to make me responsible for these very few exceptions to a general rule, to which nobody has alluded before me, so far as I know. To say that there is nothing striking in the fact of such generally unbranched inflorescences becoming branched, is to regard the matter from the point of view of a theoretical botanist rather than from that of an observer, who takes things as they are, not as they should be if they were good enough to conform to his theories.

I add here some remarks on the inflorescence of the Orchidaceæ in general.

MONANDROUS.—*Ophrydeæ.* I have only seen one highly developed specimen of *Orchis Morio*, *L.*, near Tharand, in Saxony, among thousands, giving the meadow a purplish hue, which might be seen at a distance. The same specimen had three developed tuberidia. I exhibit it in a dried state. It is represented in my Orchidographia europea, tab. 150. I was lately in the same place, and did not observe any trace of such a plant. I can only regard it as a monster, since the lateral branchlet is extra-axillary, so that the inflorescence would seem to be a bifurcation.

Ophrys aranifera, *Huds.*, has been observed with a branch "at least once" by Dr. Maxwell Masters; but the specimen was, unfortunately, not preserved.

Disa grandiflora L., is represented in Mr. Warner's book on Orchids with a panicle. Mr. Warner tells me he does not well recollect the circumstance; and the representation (by Andrews, as

* I may add, that I have now (September, 1866) before me two other anomalies in the shape of a fusion of the racemes of both *Odontoglossum grande* and *O. Schliperianum.*

stated twice on the plate, and as Mr. Warner assures me) represents something which I regard as impossible. There may have been a branchlet in an inflorescence which would have been highly curious; but that such a being as it represented is the product of fancy, every one will admit who has the least idea of orchidaceous morphology.

NEOTTIACEÆ.—There is a small group of these with grassy leaves and a frequently branched inflorescence: *Corymbis* P. Th. (*Heisteria Reinw, Rhynchanthera* Bl., *Macrostylis* Kuhl van Hass.), *Chloidia* Lindl., *Tropidia* Lindl. Excepting these in genera, I know of only one branched inflorescence ever observed in Neottiaceæ, and that is in the shape of a very beautiful strong raceme of *Macodes marmorata* Rchb. f. (*Anæctochilus Lowii* Hort.) which bears an extra-axillary branchlet near the summit. This is, no doubt, a case of bifurcation, such as may often be observed in racemes. The specimen is preserved in my herbarium.

OPERCULATÆ.—*Arethuseæ.* Some *Sobralias*, as the old *S. dichotoma* of Ruiz et Pav., have the inflorescence normally branched; some other species have sometimes exceptionally a branchlet to the raceme. The genus *Galeola* Lour. (*Erythrorchis* Bl., *Hæmatorchis* Bl. *Letcheria* F. Müll.) produce branched inflorescences usually of an extraordinary length.

These cases excepted, I know of no branched inflorescence in this small tribe, whether normal or abnormal.

VANDEÆ.—*Brassideæ* offer many instances of branched inflorescences—many *Oncidia*, many *Odontoglossa* have such. Hence it is no wonder at all that even these species, which usually have simple racemes, produce exceptionally panicles. Panicles are quite common among *Jonopsis*, *Trizeuxis*, *Quekettia*, *Diadenium*. They occur sometimes in *Rodriquezia*, *Notylia*, *Cryptarrhena;* often in *Comparettia*, *Sielochilus*, *Lockhartia*. I believe I have once seen a branchlet in *Zygostates pellucida.* I do not recollect ever to have seen any branched inflorescence in any *Trichopilia*, *Phymatidium*, *Macradenia*, *Trichocentrum*, *Ornithocephalus*, *Calanthe*, *Tipularia*.

Maxillarideæ.—Most *Polystachyas*, some *Eulophiads*, *Cyrtopodia*, *Ansellia*, *Grammatophylla*, are usually branched. A good many are commonly racemose. The one-flowered species bears sometimes two flowers, *e. g. Lycaste mesochlaena*, *Skinneri*, *Deppei;* some appear generally two-flowered, as *Bifrenaria atropurpurea*, *Harrissoniæ inodora*, *Lycaste tetragona*.

Eboriglossæ.—I do not remember to have ever seen any panicled inflorescence in any *Cycnoches*, *Gongora*, *Houlletia*, *Coryanthes*, *Catasetum*, *Mormodes*, *Stanhopea*, *Lacæna*, *Peristeria*, *Acineta*, *Schlimia*.

Podochilideæ.—Some species are panicled.

DIANDROUS.—Many species are generally panicled, and a good many racemose species show, in a state of luxuriance, adventitious branchlets.

CYPRIPEDIÆ.—The single-flowered *Cypripediæ* are sometimes two-flowered. There is a variety of *Cypripedium barbatum* which is generally two or even three-flowered. In the International Exhibition two-flowered specimens of *Cypripedium Hookeræ* and *C. hirsutissimum* were exhibited.

Species usually racemose, get sometimes panicled; finally *Selenipedium Lindleyanum* and *Schlimii*, develope, when in good health, panicles.

In the course of some remarks on certain of the subjects treated of in Professor Reichenbach's communication, DR. MASTERS took occasion to express his perfect concurrence with the views of Professor Reichenbach, as to the impropriety of founding generic distinctions, or of altering the limitations of established genera according to the exceptional data furnished by teratology.

With reference to the inflorescence of Orchids, Dr. Masters remembered to have seen at least one example of a branched spike in *Ophrys aranifera*. This spike was gathered, with many other variously malformed specimens of the same species, near Folkestone, in the summer of 1864, but unluckily it had not been preserved, Dr. Masters not being at the time aware of the rarity of such an occurrence.

Judging from analogy, there did not appear to be anything very striking in the branching of the spike of an *Ophrys* or of an *Orchis*, as a panicled inflorescence is so common a characteristic of other genera of the order. A prolongation of the axis within the flower (median prolification) had been observed by Dr. Moore, of Glasnevin, in *Orchis pyramidalis*, and had been described by him in Seemann's Journal of Botany, 1864, p. 319; and other flowers of the same species, presenting still greater deviations from the usual structure, were sent by Dr. Moore to Dr. Masters, by whom they were described in Seemann's Journal, 1864, p. 345. (See also Journal of the Linnean Society, vol. 8, 1865, p. 211.) Hence as the axis is prolonged in one direction in some Orchid flowers, it seems reasonable to suppose that it may become branched elsewhere, as there do not appear to be any structural reasons forbidding such an occurrence. At any rate Professor Reichenbach has done good service by drawing attention to the excessive rarity of this peculiarity.

ON THE PHYLLOID SHOOTS OF SCIADOPITYS VERTICILLATA.

By ALEXANDER DICKSON, M.D., Edinburgh.

BOTANISTS have long been familiar with plants where a very much reduced condition of the leaves is correlated with a leaf-like development of certain shoots, which, physiologically, may be said to play the part of leaves. These phylloid shoots, like the organs which they simulate, are very variable in form, some being flattened, as in *Xylophylla*, *Phyllocladus*, and *Ruscus;* others more or less cylindrical or needle-like, as in the abortive peduncles which perform leaf functions in *Asparagus*. These structures may be provided with rudimentary leaves springing from the margin, or some part of the surface, as in *Ruscus* and *Xylophylla*, from the axils of which flowers are frequently produced; while in others, such as *Danaida (Ruscus) racemosa* and *Asparagus*, these leaf-like shoots neither give origin to leaves nor flowers. Such shoots (with the exception of some in *Phyllocladus*) are invariably arrested in their longitudinal development by the atrophy of the *punctum vegetationis*. They are readily recognised by their position as axillary to true leaves.

In *Sciadopitys* I have to call attention to the fact that the leaves of the growing shoots (except in young plants) consist, as in *Pinus*, entirely of bud-scales. In each year's growth the lower scales are placed at some distance from each other, and, for the most part, do not produce axillary branches. The scales towards the extremity of the year's growth, on the other hand, are closely approximated to each other, and in their axils are produced those bodies which have hitherto been termed the leaves of this plant. These are green linear organs, bearing a considerable resemblance to the leaves of some other Conifers, and occur singly in the axils of the scales. They are slightly bifid at their extremity, and exhibit a pretty deep mesial furrow on both upper and under surface. On dissection they present two vascular bundles, one on either side of the middle line, in which respect they differ essentially from those scales which, in young specimens of this plant, are occasionally developed as elongated green leaves, and which invariably exhibit a mesial vascular bundle or midrib. The axillary bodies performing leaf functions in *Sciadopitys*, therefore, are distinguished from true leaves, not only by their position, but by their structure, and I think that most botanists will agree with me in referring them to the category of phylloid shoots analogous to those in *Phyllocladus*, etc.

THE CORONA OF NARCISSUS.

By W. G. SMITH, North Grove, West, Mildmay Park, London.

[Plate V.]

THE family *Amaryllidaceæ* contains about 110 genera; of these about 42 genera only, are distinguished by the presence of a corona, whilst all, without exception, have the permanent and unchanging characters of six perianthial segments and six stamens.

It is therefore reasonable to suppose that as the corona is only present in the smaller part of the family, it is in no way typical, but is probably some appendage of the other organs, for the six segments of the perianth and six stamens are always constant.

This leads me to the conclusion that the attempts to account for the presence of the corona by a duplication or triplication of the perianthial segments, or by an imperfect condition of an additional series of stamens, or two series, is indefensible; for there is as much reason to suppose the corona is an abnormal growth of an additional series of segments of the perianth when it is petal-like (Fig. 10), as it is to suppose it an abnormal condition of another series of stamens, or two series, when it bears anthers, as it commonly does; but it is far more reasonable to suppose it is neither when it can be shown that the corona may exist without encroaching upon or altering the permanent family characters of "six stamens, and six divisions to the perianth."

The transition of the leaf to the sepal, the sepal to the petal, the petal to the stamen, and the stamen to the pistil, has often been remarked, and is well known, but no attention has been paid to the metamorphoses of the leaf stipule; this is not often valuable as a generic distinction, but upon the observation of its occurrence or non-occurence in some plants I am led to found my hypothesis.

That these appendages are sometimes present in all the floral organs, seems to me clear from Figs. 1, 2, 3, and 4 (Plate V). The leaf-stipules of *Trifolium incarnatum* (Fig. 1) are almost repeated, with the exception of colour, in the petals of *Silene maritima* (Fig. 2); there is such a close resemblance in form and position in both appendages that it is impossible to doubt their being identical in character. A slightly modified form of stipule exists in the stamens of *Ornithogalum nutans* (Fig. 3); and they are very distinct and most characteristic in the stigma of *Iris pseudacorus* (Fig. 4). If reference be made to Fig. 2, and if the whole of the petal-stipules of the complete flower are imagined to be connate, we have a corona precisely resembling *Narcissus*.

The true explanation of the corona in a small section of the order, I believe, consists in the recognition of a series of confluent petal-stipules, leaving the normal six stamens and six petals, as in the rest of the Amaryllidaceæ. That there is nothing improbable in confluent stipules, I give examples of them, in all the floral organs: Fig. 5 is an example of confluent leaf-stipules in ***Græffia calyculata***, figured in Seemann's "Flora Vitiensis," Plate VI. (a somewhat analogous growth may be seen in many of the ***Euphorbiaceæ***). Fig. 6 shows one-half of a flower of ***Narcissus pseudo-narcissus***, shown with half a corona, *i.e.* half the series of confluent petal-stipules. If this figure be compared with Fig. 2, where the stipules are disconnected, it will be better understood. Fig. 7 shows a series of stamens in ***Lobelia Dortmanna***, confluent near the anthers, but disconnected below; if we imagine the two appendages of Fig. 3 to be connate, we would have such a growth as is here represented, with the filaments disconnected below. Fig. 8 gives an example of confluent pistil-stipules in ***Sarracenia purpurea***, and may be compared with the stigma of Iris in Fig. 4, where, if we imagine the appendages to be connected, we have an object similar to that represented in Fig. 8.

Dr. Masters, in Seemann's "Journal of Botany," Vol. III., p. 107, endeavours to show that the corona probably "consists intrinsically of two rows of stamens," and says, "in the species with lobed cups three of the lobes are opposite to the sepals and alternate with the petals (A.A. Fig. 11) and these three in æstivation decidedly overlap the three inner lobes which are opposite to the petals, and "alternate with the outer row of stamens," &c.

This appears to me only another proof of the stipulary nature of the corona, for if it be considered as an appendage of overlapping sepals and petals, the appendages would naturally overlap in a similar manner, as we really find it here, the outer segment of corona belonging to the outer segment of perianth, and the inner to the inner. The same author's observation regarding the not uncommon occurrence of the coronal segments being sometimes distinct and separate from each other, only reverts the corona to the somewhat more remote type of Fig. 2, with disconnected stipules.

It may be objected that stipules form no character of the natural order Amaryllidaceæ; but the answer is, that stipules have little or no value as a family character, as in Hederaceæ (or Araliaceæ). Stipules are present in some genera and absent in others; this I consider as exactly equivalent to the presence or absence of the corona in the smaller section of the genera of Amaryllidaceæ. That the corona of ***Narcissus*** sometimes more nearly approaches the true form of stipules may be seen in Fig. 9, drawn from abnormal growths of the plant in ***N.*** *poeticus* I have recently observed.

In ***Pancratium*** the corona is much modified, and altogether more stipule-like. Many anomalous appendages within the corolla, or attached to the other floral organs, may be accounted for in this manner, such, for instance, as the scales within the tube of ***Cuscuta***, &c., &c.

ig. 4.

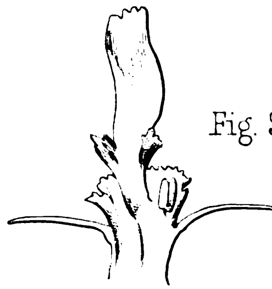

Fig. 9.

Abnormal growth of petal (in place of Anther) in Narcissus biflorus, on the abnormal anther is a stipule-like rudimentary corona.

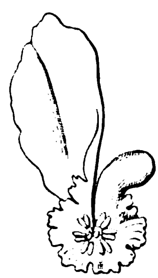

Fig. 10.

Petaloid growth of corona of Narcissus biflorus.

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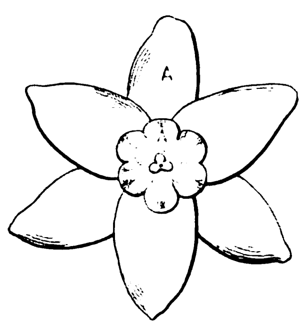


Narcissus pseudo-narcissus

Fig. 11.

EXPLANATION OF PLATE V.

Figs. 1, 2, 3, and 4. Examples of disconnected stipules:—
Fig. 1. Leaf from *Trifolium incarnatum*.
,, 2. Petal from *Silene maritima*.
,, 3. Stamen from *Ornithogalum nutans*.
,, 4. Stigma from *Iris pseudacorus*.
Figs. 5, 6, 7, and 8. Examples of confluent stipules:—
Fig. 5. Stipules from *Græffia calyculata*.
,, 6. Corona of *Narcissus pseudo-narcissus*.
,, 7. Stamens from *Lobelia Dortmanna*.
,, 8. Stigma of *Sarracenia purpurea*.
,, 9 and 10. Abnormal petaloid growths on corona of *Narcissus biflorus*, Fig. 9 with stipule-like appendages.
,, 11. Diagram of flower of *Narcissus pseudo-narcissus*.

NOTES ON DOUBLE FLOWERS.

By MAXWELL T. MASTERS, M.D., F.L.S., Lecturer on Botany at St. George's Hospital, London.

[Plates VI. and VII.]

THE especial object of the publication of these notes is to draw attention to the more important structural peculiarities of double flowers, in the hope that by so doing, some help may be afforded towards the understanding of the plan upon which flowers in general are constructed, and towards the detection of means, less empirical than any now in use, of producing these horticultural desiderata at pleasure. With reference to the first of these points, I may remark that the objections raised by M. Baillon and others to the employment of teratological data for the elucidation of morphology, on the ground that monstrosities either prove too much or prove nothing, that the evidence derived from them is conflicting and delusive, etc., seem rather to apply to those who make injudicious use of the facts presented to them, than to the intrinsic value of the facts themselves. There are few who would rely solely on teratology for the unravelling of problems of morphology or affinity, but most botanists gladly avail themselves of the clue which teratology gives, and of the assistance it renders, in conjunction with the organogeny and comparative anatomy of plants, to the study of vegetable morphology.

In the following remarks I have taken as a basis the list published in Dr. Seemann's *Journal of Botany*, vol. ii. p. 176. I have examined a large number of the flowers therein enumerated, and have studied them with special reference to the peculiar form of doubling presented by them respectively, and also with reference to the venation of the different parts of the flower.

The most common occurrence in the so-called double flowers is that which arises from a substitution of petals or petal-like bodies for some other organs, and this is called by the general name of PETALODY. Another very common mode of doubling is brought about by an augmentation in the number of petals, either by MULTIPLICATION or by (?) CHORISIS.

Some double flowers owe their peculiar state neither to a substitution of one part for another, nor to any positive increase in their number, but either to a splitting or subdivision of individual parts (FISSION), or to the isolation of organs which under ordinary circumstances are united together (ADESMY). In some few cases where flowers are prolified (PROLIFICATION) they are spoken of commonly as "double." It is obvious from what has been said that this term, as applied to flowers in ordinary language, includes several distinct conditions—distinct in their nature, and possibly arising from different causes.

In giving a summary of the results of my observations, I will first speak of those flowers which owe their doubled condition to a substitution of petals for some other organs.

PETALODY OF THE CALYX.—It will be remembered that many flowers in a natural condition have a coloured calyx—*Aconitum*, *Delphinium*, *Berberis*, etc., etc.—such flowers are not usually spoken of as double flowers. It may, however, be remarked that this coloration of the calyx under natural circumstances is more common among polysepalous plants than it is in gamosepalous plants; but, as an exceptional occurrence, the coloration of the calyx, or "calycanthemy," as it is sometimes termed, is more frequent in gamosepalous than in polysepalous flowers. In illustration of this may be mentioned the following genera as especially liable to this change—*Primula*, *Mimulus*, *Campanula*, etc.; *Azalea amœna* also affords a good illustration. I have frequently met with Calceolarias in which one or more of the sepals have been replaced by bag-like petals; M. Ch. Morren also noticed the same circumstance, and has remarked upon the desirability of fixing and perpetuating so curious an appearance. I have met with similar changes in *Syringa persica* and *Gloxinia*.

The advantages, in a horticultural point of view, of this change are sometimes great; as in the *Mimulus*, the corolla of which is naturally deciduous, while the calyx is persistent; so that we have here a flower which may be not only called double as to its form, but double also in the length of its duration. It has been stated that some of the varieties of *Primula* with coloured calyces are produced artificially by cutting away the corolla in a very early stage of its existence, the colouring matter proper to the corolla being then deposited in the calyx;* but this is certainly not necessary, as the abundance of such Primroses in cultivation, and in which no such mutilation has been practised, testify.

PETALODY OF THE STAMENS.—This is a far more frequent occurrence in double flowers than the preceding. It may exist by itself,

* Ch. Morren. Bull. Acad. Roy. Belg. xix. part 3, p. 94

without other material change in the flower, or it may exist in combination or in conjunction with an increased development of parts (Multiplication), or with a similar change in the carpels, and is either partial or complete. It is not necessary to do more than point out the fact that similar appearances are presented normally in several flowers —*Nymphæa*, *Lopezia*, *Canna*, *Dombeya*, etc. Considered teratologically, it occurs much more frequently among polypetalous plants, and in those which have many stamens, than in those which have fewer; and it occurs almost exclusively in those flowers the venation of whose segments resembles that of the sheath of the leaf rather than that of the blade. But what is interesting is, that when the petalody specially affects the anther, as in *Arbutus*, *Petunia*, *Fuchsia*, etc., the venation of the petal-like portion is very frequently laminar, thus tending to show that the anther in such cases is really a modification of the blade of the leaf; but as, on the other hand, we often find petal-like filaments bearing pollen sacs on their sides, it is clear that we must not attribute the formation of pollen to the blade of the leaf only, but we must admit that it may be formed in the filament as well. The petalody begins in some flowers with the filament, in others with the anther, in others, again, with the connective, as in some double Aquilegias, Petunias, etc. Even in the same plant all three modifications may be seen, as in Camellias, some of which may be found with petaloid filaments with anthers on the top, others with the filaments unchanged, but supporting petaloid anthers, while in others it is the connective alone which is petal-like. Where the flower naturally contains a large number of stamens, as in Mallows, Roses, Magnolias, etc., petaloid expansion of the filament is most common. A similar change in the anther and connective takes place more frequently in flowers where the number of stamens is smaller, but there are of course numerous exceptions to this rule. In those cases where there is more than one row of stamens, the outermost are most liable to this change: thus in *Saxifraga decipiens*, as shown by Ch. Morren,* the outer series of stamens—those opposite to the sepals—become first affected, and, at a more advanced stage, the inner row also; and this is the case in most flowers that have their stamens in two rows. Occasionally it happens that an outer series of stamens is abortive, or wholly suppressed, while the inner row becomes petalodic; this was the case in some flowers of *Lilium auratum* lately sent me by Messrs. Veitch. Those flowers in which only a portion of the stamens undergo this change are called semi-double, while in other cases that will be hereafter mentioned, not only are the stamens thus rendered petaloid, but their number is also augmented, as in most double Roses, Pinks, Anemones, Poppies, etc.

In some double flowers, in which the stamens assume more or less completely the appearance of petals, a singular appearance is afforded by the presence of four wing-like processes emanating from

* Bull. Acad. Roy. Belg., tome xvii.; and Lobelia, p. 65.

the central filaments, two on each side, so that the arrangement may be compared to two sheets of paper folded in the centre and adherent in that situation, though perfectly separate elsewhere, except sometimes at the top, where they form a sort of hood. This condition does not appear to have been observed: at least I have failed, up to the present time, to find any distinct mention of it in teratological works. The first illustrations that I met with of this peculiar mode of growth were so perfect that I was at a loss how satisfactorily to explain it; but less completely changed stamens, observed subsequently, showed that this change resulted from an imperfect petalody of the anther; the two wings on either side of a central vascular cord represent the front and back walls of an anther lobe, or rather of such portion of the anther as, under ordinary circumstances, produces pollen. In the malformed flowers no pollen is formed, at least in the more complete states of the malformation, but the walls of the anther lobe become preternaturally enlarged, and petaloid in texture and appearance. I have met with this change in some semi-double Rhododendrons, Azaleas, in Crocuses, and in a species of Violet from Mentone, presented to me by Mr. J. T. Moggridge [see Plate VI., figs. 1 to 8]. No doubt a similar structure exists in many other double flowers in which it has been, as it appears, overlooked.

That the explanation here given is correct is, I think, established by numerous intermediate forms wherein the wing-like processes may be traced all the way along the filament till they ultimately lose themselves in the anther lobes, with which they become continuous. In some cases, as in *Crocus* and *Rhododendron*, this is shown even more clearly, by the existence of two perfect pollen sacs or quarter-anthers, the remaining portions being petaloid and continuous with the dilated filament. Not unfrequently these semi-petaloid stamens adhere to the fronts of the petals, and then it appears, at a first glance, as if three organs were stuck together, one in front of another, while in reality there are but two. [See Plate VI., figs. 4 and 6.] The Rev. M. J. Berkeley attributes the peculiar appearance presented by some double Primroses to a production of appendages from the primary petals, in a similar way to that in which the additional laminæ of the leaves of *Xanthosoma appendiculatum* are produced, or as in those not unfrequent cases where Cabbage leaves produce an infinitude of small laminar out-growths from one or other surface of their leaves. Now, without in the least desiring to impugn the statement of so admirable an observer (indeed, I have myself seen something of the kind that he describes), I should yet be inclined to attribute most of these cases to such a petaloid condition of the anther as I have described. The great similarity in structure between the petaloid anthers in question and the small out-growths or scales on the petals of many *Caryophylleæ*, *e. g.*, *Silene*, and especially on those of many *Sapindaceæ*, *e. g.*, *Erioglossum*, etc., suggests the notion that these latter organs may be abortive anthers, a view borne out by semi-double flowers of *Sapo-*

naria, as figured by me in the *Journal of the Linnæan Society*, vol. i., 1857, p. 159. (See also, M. Müller's *Notice sur la Nature des Anthères*, Mem. Soc. Phys. et Hist. Nat., Genev, tom. xvii.)

The change in the anther, to which I have above alluded, must not be mistaken for that far more common one, in which only a small portion of the anther becomes petaloid, forming a sort of lateral wing or appendage to the polleniferous portion, as happens normally in *Pterandra*, and is common in some double Fuchsias. In this latter instance there is but a single wing, and the nature of the case is obvious.

One other condition demands at least a passing mention in connexion with petalody, in consequence of its frequent occurrence—I allude to the formation of horn-like or tubular petals. This funnel-like appearance of the petals may be brought about by simple infolding and union of the margins of a petal, or in other instances it may result from a partial petalody, the walls of the tube representing the walls of the anther, in which generally no pollen is formed, while the top of the anther is open from lack of union, not closed as it is generally. Some double Fuchsias show all intermediate stages between a spoon-shaped petal, a perfect anther, and a funnel-like or tubular petal. An instance of a similar kind is seen in (Plate VII., figs. 10 and 11), representing two stamens of *Anagallis cœrulea*. In *Convolvulus minor*, it is curious that the cup is formed apparently by the bending outwards of the margins of the supernumerary petal at its base (see Plate VII., figs. 12 and 13); but at present I have only examined a few of these flowers. In a year or two, as this flower "improves" by cultivation, other changes may be witnessed which may elucidate this peculiarity.

Referring to Dr. Seemann's list of double flowers, it would appear that petalody of the stamens, either complete or partial, is more frequently observed in plants with numerous distinct organs (Polypetalæ, Polyandria, Polygynia, etc.) than in other plants with a smaller number of parts, and which are more or less adherent one to the other. The tendency to petalification is, moreover, greater among such plants as have their floral elements arranged in spiral series, than among those where the verticillate arrangement exists; and in any given flower, if the stamens are spirally arranged and the pistils are grouped in whorls, the former will be more liable to petalody than the latter, and *vice versâ*. Again, it may be remarked, that this condition is far more common in plants whose petals, etc. have straight veins, as in the sheath of a leaf, than in those the venation of which is reticulate, as in the blade of the leaf. It must also be remembered that in the same genus, even in the same species, different kinds of doubling occur. Familiar illustrations of this are afforded in the case of Anemones, Columbines, Fuchsias, and other plants.

The existence of "compound stamens" in some flowers, as pointed out by Payer, and the researches of Dr. Alexander Dickson (whose paper on the staminal arrangement in *Potentilla*, etc., has been published in the *Journal of Botany* while these pages were passing through the press), confer additional importance on the subject of petalody, and necessitate the examination of double flowers with special reference to these compound stamens, and to the order of their development. [See Dickson on Diplostemonous Flowers, *Trans. Bot. Soc. Edin.*, vol. viii. p. 100; and on the Andræcium of *Mentzelia*, etc., in Seemann's *Journal of Botany*, vol. iii. p. 209, and vol. iv. (1866), p. 278 (*Potentilla*, etc.)] The presence of these compound stamens affords a satisfactory explanation of the appearances in some double *Malvaceæ*, wherein the tufts of adventitious petals are very liable to be mistaken for buds, produced by axillary prolification in the axils of the petals, but which are really merely compound and petaloid stamens. At other times, however, true axillary prolification exists in these flowers; but, then, the supplental florets have always a calyx, which is wanting in the other instances.

Petalody of the Pistils.—This is a less common change than that which occurs in the stamens. It generally affects the style and stigma only, as happens normally in *Petalostylis*. In some of the cultivated varieties of *Anemone* and *Ranunculus* all the parts of the flower remain in their usual condition, except the pistils, which become petaloid, but usually the stamens are similarly affected. In double Mallows it generally happens that the pistils are entirely unaffected, while most of the stamens are more or less petaloid. The practical importance of these matters to the hybridiser or the cultivator is of course great. The venation of the petaloid pistil is generally like that of the sheath, rather than that of the blade of the leaf.

Multiplication—or an increased number of the parts of the flower, is either real or apparent: real when there is an absolute increase in the number of parts; apparent when the augmentation is due to the subdivision of one or more usually entire parts into several segments (Chorisis), or to the inordinate development of parts, which, though present in the embryonic stage, are more or less completely suppressed in the adult condition, as when didynamous flowers become pentandrous. Real multiplication again takes place in two ways; either the number of individual organs in any one whorl is increased, or the number of whorls themselves is augmented. It is this latter case with which alone we have to do in treating of double flowers; but before speaking of the inner parts of the flower, it may be as well to allude to—

Multiplication of the Bracts—as constituting a form of "double" flower. In the Wheat-ear Carnation and in some Sweet Williams the bracts are much increased in number, but as they preserve their green colour it is perhaps hardly right to class them among double flowers, but where, as in a species of *Mæsa*, the bracts are coloured, it is allowable to consider the flowers as double. A similar occurrence takes place frequently in *Gentiana Amarella*, the upper leaves or bracts being increased in number, contracted in size, and purple in colour, while the parts of the flower proper are correspondingly diminished in number and size. Major Trevor Clarke met with an instance of the same kind in *Delphinium Consolida*.* This great number of the bracts occurs naturally in such flowers as *Godoya*.

An increase in the number of parts of the flower itself is one of the commonest modes by which flowers become double. It may take place in all the whorls of the flower, but in some much more frequently than in others; thus it is not so commonly met with in the calyx as in the corolla.

MULTIPLICATION OF THE CALYX—occurs in some double forms of Columbine, Larkspur, *Nigella*, *Berberis*, sometimes in double-flowered Saponarias, etc.

MULTIPLICATION OF THE PETALS.—An undue number of petals, either with or without substitution of petals for stamens, is also a common cause of "double" flowers. Where these additional organs alternate regularly with the other parts of the flower, their production seems to be due to a mere excess of development; thus in plums, almonds, cherries, it is not at all uncommon to find an extra number of petals, alternating in position with the ordinary ones, and not necessarily attended either by any substitution of petals for stamens, or by any diminution in the number of the latter organs—these are instances of true multiplication; but, there are other cases in which the additional petals do not alternate with the ordinary ones, but are placed in front of them. In such instances the theory of CHORISIS, as proposed by the French botanists Dunal, Moquin Tandon, and others, seems to have some importance. And this is more especially true in those gamopetalous flowers in which the corolla is repeated twice or even oftener, the segments being superposed to, not alternate with the primary petals, while the number of stamens often remains unaffected. In such instances the theory of chorisis appears at first sight to afford a more simple method of explanation than can be given under any other supposition, as, supposing these additional organs not to be formed by chorisis, we have then to find some other way of accounting for their position in front of the ordinary petals. One is that there has been a suppression of a series which ought to be placed between the two, so as to render the symmetry alternate; but this is pure assumption, at least in many instances. Another means that has been proposed of explaining this peculiarity is on the supposition that the axis of the flowers has undergone a slight twist, so as to bring the organs in front one of the other; but this again is an assumption, as no such torsion of the receptacle is visible. But to the doctrine of chorisis most English botanists have felt a strong repugnance, believing that, in some cases, the deviation from the law of alternation might be better explained by other means than by the assumption of a process which, though quite possible, is not often seen. In truth it is open to question whether botanists are not wrong in laying down the law of alternation so stringently, as if Nature were not quite as com-

* Gardeners' Chronicle, 1865, p. 769.

petent to produce the several organs of the flower in front one of the other as alternately, in the same way that the leaves of *Gasteria*, or the leaves of the singular *Pandanus* (*P. distichus*) exhibited in the International Horticultural Exhibition, are produced; no one would pretend to say in either of these cases that the upper leaves which stand immediately over the lower have been produced by chorisis. The so-called law of alternation is extremely useful in explaining certain structures, but we are by no means justified in supposing that no other arrangement is possible.

One argument used by the late Professor Henfrey against the notion of chorisis was derived from the double *Narcissus pseudo-Narcissus*, in which there are from forty to fifty petaloid organs, instead of fifteen only, and each piece exhibits a more or less perfect coronal lobe at the junction of the claw with the limb, showing that there is no chorisis here to account for the separate development of these lobes. The same author also refers to the case of some double Balsams, wherein an additional corolline whorl is produced, without the suppression of the stamens, in the following manner:—The ordinary stamens are replaced by petals, the carpels by stamens, while an additional series of carpels is produced at the summit of the axis. The doubling is in this case then distinctly due to multiplication, and not to chorisis.*

While disposed to agree with the majority of British botanists, that most of the cases of supposed chorisis may be more simply explained by the action of other agencies, I may, nevertheless, state that there are many malformed flowers whose parts do become multiplied by a process similar or identical with that called by Dunal and his followers chorisis. One difficulty in admitting the existence of such a lamination may have arisen from the forgetfulness of the tendency that the vascular framework of leaves, or of the leaf-stalk, occasionally manifests to ramify in more than one plane; thus I have seen Hazel leaves (*Corylus Avellana*) with two, or even three, distinct laminæ diverging from the end of the same petiole. Now, had these supplementary leaf-blades been pressed up against the surface of the primary leaf they would have given rise to an appearance like that of chorisis. A similar condition occurs normally in the bracts constituting the epicalyx of some species of *Hibiscus e. g. H. surattensis*, etc., while a similar formation of the petals, or of the petaloid stamens, is often met with in double flowers. I have already alluded to this luxuriance of leaf formation in the Cabbage, in *Xanthosoma*, etc. The Hedgehog Hollies may also be alluded to as showing how the ribs of a leaf may ramify in more than one direction. In truth, it seems likely that, had more attention been drawn to this division or forking of the fibrous cords, less objection would have been raised to the notion of chorisis, with which, as the term implies, a sort of cleavage or splitting process is necessarily connected. When a stem or a branch bifurcates it is not usual to speak of such a

* Henfrey, Journal of the Linnæan Society, Botany, vol. iii., p. 159.

division as due to chorisis, though it really is so. Many of these cases of so-called "chorisis" are simply, as Dunal himself said, instances of the bifurcation of the fibro-vascular bundles of the leaf or the leaf-stalk.

The apparent superposition is, in some cases, due merely to the existence of compound stamens, the several parts of which have been considered as so many distinct organs rather than as portions of one.

Multiplication of the petals to a great extent, either without, or generally with complete or partial petalody of the stamens, is a common occurrence in flowers that are normally polypetalous, as Roses, Anemones, Pinks, &c., and in flowers the venation of whose organs is more sheath-like than laminar. But in the case of gamopetalous flowers, it is more common to find what is called a "hose in hose" condition, *i. e.*, the formation of one or more additional corollas within the first, as in *Primula*, *Datura*, *Campanula;* and such flowers have often, though certainly not in all cases, their veins arranged more after the laminar than the vaginal manner, *e. g.*, *Epacris*, etc. Linnæus spoke of such flowers as duplicate or triplicate, "*flores duplicati*," while polypetalous flowers possessing an unusual number of petals were spoken of by him as "*flores multiplicati*." (*Phil. Bot.* §§ 120, 121.)

This duplication may either be accounted for on the theory of chorisis, above alluded to, or by supposing that the extra coralline whorl is really due to a series of confluent petalodic stamens; that the latter is the true explanation, in some cases at least, appears to me shown by some flowers of *Datura fastuosa* recently examined by me, in which the second corolla was partially staminal in its appearance, and bore nearly perfect anthers, in addition to the five ordinary stamens, which were unaltered either in form or position. Others of these double flowers of *Datura fastuosa* deserve special remark, inasmuch as they presented a series of five petal-like oblong lobes attached to the back or outer surface of the second corolla. These additional lobes were not alternate with, but opposite, or superposed alike to the lobes of the outer and of the inner corolla. The colour of these supplementary lobes was like that of the two corollas, pale on the outer (or lower surface) of a deeper violet on the inner (or upper) surface (Plate VII., fig. 14). I suppose these supernumerary lobes represent so many petaloid stamens connate below to the tube of the second corolla. In duplicate flowers of *D. cornigera*, *D. suaveolens*, etc., the supplemental corollas usually alternate one with another.

Multiplication of the Stamens and Pistils, when combined with a petalodic condition, has been already alluded to; when existing, as it often does, without petalody, the flowers can hardly be called "double" in the sense in which that word is generally used, and hence it is not necessary in this place to make further mention of such augmentation.

Fission, or Collateral Chorisis.—This is the process by which an organ, say a leaf or a petal, which is usually entire, becomes, in progress of growth, sometimes really, at other times apparently, split up into segments. This branching of a petal or other organ in the same plane, is of so frequent occurrence, that its existence is not often called into question. Double Hollyhocks afford excellent illustrations of it. In these flowers, frequently, intermediate organs may be found, the one half of which is entire and petaloid, while the other moiety is divided more or less perfectly into anther-bearing filaments (Plate VI., fig. 9). I have seen as many as ten filaments on one half-petal, the other half being undivided and perfectly petaline. In these instances the venation is radiating on the one side, and the interstices between the veins are filled in with cellular tissue; on the other side, the veins are detached, and only covered with a thin investment of cellular tissue, thus resembling perfectly the filament of an ordinary stamen. Such petals can hardly be said to be cleft, but they are interesting, as showing that one petal leaf may originate many anthers, and thus confirm the views held by Bischoff, Oliver, and others, that the anther sutures do not correspond to the margins of the anther leaf.

In these double Hollyhocks, as well as in numerous other cases which it is unnecessary to refer to here, it is abundantly well shown that the number of pollen-sacs on the same stamen leaf may be numerous and by no means necessarily confined to the two or four such organs that we generally see; and moreover it is evident that in Mallows at least, as urged by Duchartre, Asa Gray, and others, a single anther with its supporting filament is by no means the equivalent of the single stamens in most other flowers. These double-flowered Hollyhocks are most interesting objects of comparison with such Mallow-worts as *Sidalcea* or *Abutilon vitifolium*, wherein the filaments are united together into ten parcels, five in a whorl, the outer series alternating with the inner set.

Looking at the andræcium of *Hypericum* and the peculiar scales of *Parnassia*, it is difficult to avoid the conclusion that they too owe their peculiarities to the same cause as that to which the structure of the Mallows is due. But as I have no evidence to offer on this point, I dismiss it without further mention.

Many "double" flowers owe their peculiar appearance merely to this laciniation of their petals; for instance, I have seen flowers of the *Crocus* and the *Colchicum*, the segments of whose perianth were not really increased in number, neither were the stamens at all different from what is usual, and yet the flowers had an appearance of being very double, this appearance being due merely to the numerous deep and narrow segments into which the individual parts of the perianth were divided; but usually the subdivision is not carried to so great an extent. I am indebted to Mr. Wills for some flowers of *Verbena*, the heralds probably of a race of (horticulturally speaking) double Verbenas, and which owe their peculiarity to a similar increase in the number of the lobes of the petals or of some of them. In an ordinary garden *Verbena*, from whatever species derived, all the five petals are more or less lobed at the free or distal extremity; and some of them, that is the two lateral and the anterior or inferior lobes, present indications of additional lobes at their junction with the tube of the corolla. In Mr. Wills' specimens this tendency is increased to such an extent, that the supplementary lobes, from their size, are pushed into the centre of the flower, the lobe of one petal often uniting with the lobe of the adjacent petal, and forming either a fan-shaped appendage or, in other instances, a convolute body, like a curved tube or horn (Plate VII. figs. 15 and 16). The construction of these additional corolline lobes is thus similar to that of the appendages to the calyx in *Campanula medium*. In the ordinary state of things, the odd petal, that which is next to the bract, is innermost in æstivation, but in the flowers to which I have alluded, in which there are additional lobes to the petals, it sometimes happens that the two side petals are completely internal, and are overlapped by the odd petal instead of partially overlapping it.

Adesmy.—Professor Charles Morren introduced this word to express the permanent isolation of parts which under ordinary circumstances become united together after a certain time; it is hence a persistence of a condition which is generally peculiar to an early stage of development. There are two forms of adesmy, spoken of as homologous adesmy and heterologous adesmy, the one being applied to the separation of parts of the same whorl, the other to the disjunction of different whorls one from another; the former is thus the converse of cohesion, the latter of adhesion. Both these conditions are met with in double flowers, the isolation of the several petals of the corolla being of frequent occurrence, sometimes unattended by a petalodic condition of the stamens, *e. g.*, *Phlox*, *Rhododendron*, etc., but more often met with in connection with a petaloid condition of the stamens and an increase of their number, *e. g.*, some double *Campanulas*. The disjunction and separation of the stamens one from another is of constant occurrence in double Hollyhocks and other *Malvaceæ*, also in double-flowered *Papilionaceæ*, while the more or less complete detachment of stamens from the corolla is a frequent accompaniment of a petalodic condition of the former organs. This happens, to cite one or two instances only, in double Antirrhinums, double Orchids, and is hence interesting as showing how the flowers in question revert to the assumed normal type, according to which all the parts of the flower are distinct and uncombined. But as this lack of union is only indirectly of consequence in double flowers, it is not requisite to do more than allude to it.

Prolification, or the formation of a supernumerary leaf or flower bud on the inflorescence or within the flower, admits of several subdivisions,* but in this place it is only necessary to speak of median and axillary floral prolification. In the first a new flower bud is formed in the centre of the blossom, frequently occupying the place of the pistil, or at other times the flower is unaffected; while in the

* See Trans. Linn. Soc., vol. xxiii. pp. 359, 481, tabb. 34 et 54.

second, the new bud is formed in the axils of one or more of the sepals, petals, or other organs of the flower. Now, both these conditions are frequently met with in flowers that are not called double, but on the other hand they very frequently accompany a petalodic condition of the stamens or a multiplication of the petals: for instance in Roses. In my papers on median and axillary prolification in the Linnean Transactions, *loc. cit.*, I have treated of the subject at some length, and hence it is not necessary to repeat what is there stated; the less so, as I have little to alter in what is there set forth as to the kinds of plants most subject to these changes—the coincident alterations in structure in other parts of the blossom, the light thrown by prolification on the construction of certain flowers, etc. I may, however, remark that prolification of both kinds is a very frequent occurrence in double flowers, being probably due to a prolonged action of the same causes; for instance, it often happens that the earlier blooms that are produced on a plant are merely double, while those formed subsequently are not only double, but prolified. This was the case in some double Peas kindly forwarded to me [since the Congress] by Mr. Laxton, who, moreover, states that the flowers that were formed early in the season were all single, while those produced later in the year were double, and others later still in their development were the subjects of median prolification. In some of the specimens sent to me the earliest flowers were single, next in order of time came the double ones, then those that were not merely double but prolified, and at the ends of the branches, where the activity of vegetation was clearly declining, single blossoms were again produced; this is important with reference to the causes producing double flowers, as will be hereafter mentioned.

The more perfect forms of double Orchis, too,* are, so far as I have seen, generally associated with median or axillary prolification. Double-flowered Orchids, from the great peculiarities of the normal flower, are most interesting to the morphologist, and are not of such rare occurrence as has been supposed.

There is still one form of double flower to which I have not yet alluded, and which, in some respects, is the most curious of all—I allude to the double *Gloxinia*. In this case there is, outside the normal corolla, between it and the calyx, a series of supplementary lobes which, in the more perfect instances, become fused together into a "catacorolla." Professor Edward Morren is of opinion that each one of the supplementary lobes may be considered as the abortive rudiment of a separate flower axillary to the sepals, so that, when these additional lobes become fused together into a catacorolla, that organ is made up of the rudiments not of so many petals of one flower, but of so many rudimentary flowers (see Bull. Acad. Roy. Belg., 2me. ser. tom. xix., No. 2). I am not in a position to controvert this opinion, and hence accept it until further evidence is forthcoming; meanwhile, keeping in mind the peculiar

* Journal of the Linnæan Society, vol. viii. p. 207; and vol. ix. p. 349, tab. x. and xi.

lobes of the *Datura*, before mentioned, I cannot avoid thinking that some simpler mode of explanation will eventually be arrived at as to these peculiar Gloxinias.

Inducing Causes of the Production of Double Flowers.—It is hardly necessary to advert at any length to the various explanations that have been given of the phenomena in question, or to the modes which have been recommended by practical horticulturists to secure the formation of double flowers. I may, however, say, in a general manner, that the causes assigned by physiologists, and the plans proposed by cultivators, are reducible to three heads, which I may be allowed to call Plethora, Starvation, and Sterility. These three seem inconsistent one with the other, but are not so much so as they at first sight appear to be. The advocates of the plethora theory have much in their favour: for instance, the greater frequency of double flowers among cultivated plants than among wild ones. The great preponderance of double flowers in plants derived from the northern hemisphere, when contrasted with those procured from the southern, as alluded to by Dr. Seemann, seems to point to the effect of cultivation in producing these flowers. Now, although this is, to a large extent, due to the "selection" that has been for so long a period practised by gardeners, still that process will not account for the appearance of double flowers where no such selection has been exercised; as in the case of wild plants. The double Peas, before mentioned, appeared suddenly; they had not been selected or sought for, but they were produced, as it would appear, as a result of high cultivation, and, as has been stated, during the period when the plant was in greatest vigour; and as the energies of the plant failed, so the tendency to produce double flowers ceased. Indeed, in reference to this subject, it is always important to bear in mind the time at which double flowers are produced; thus, an annual plant subjected to cultivation will, it may be, produce single flowers for the first year or two, then a few partially double flowers are formed, and from these, by careful selection and breeding, a double-flowered race may be secured. Sometimes, as in the Peas before alluded to, in the same season the earlier blossoms are single, while later in the year double blossoms are produced. This happens, not only in annuals, but also in perennials, and is not infrequent in the Apple; an illustration of this occurrence in this tree is given in the *Gardeners' Chronicle* for 1865, p. 554. Sometimes the flowers on a particular branch are double, while those on the rest of the plant are single (see De Candolle, Plant. Rar. Genev., 1829, p. 91; and Alph. de Candolle, Géog. Bot. p. 1080).

On these points, the evidence furnished by a double White Hawthorn in the Royal Botanic Gardens at Edinburgh is important. Professor Balfour kindly wrote to me as follows, in reply to my inquiry respecting this plant:—"A double White Hawthorn in the Royal Botanic Gardens produced double flowers in spring. *It retained its leaves during autumn and winter*, until the following spring. It then flowered in the second spring, but produced *weak*, *single* flowers only, and has continued to do so ever since. The flowering has been always weak since this change of flowers from double to single. Mr. M'Nab attributes the change in the duration of the leaves to the filling up of the ground round the tree, to the height of a foot and a-half on the stem. He is now trying the effect of extra manure in giving extra vigour to the plant." Here, at least, the production of single flowers would seem to be the result of debilitating causes, connected with the unusual persistence of the leaves, &c., for while the tree was healthy double flowers were produced.

A similar illustration has lately come under my own notice. Some seedling Balsams, of a strain which from long selection and hereditary tendencies produces, year after year, double flowers, were this spring (1866) allowed to remain in the seed-pans for many weeks after they were ready to be potted off; they were hence partly starved, and when they bloomed they produced single flowers only. But these very same plants, when more liberally treated, produced an abundance of double flowers. Moreover, other seedlings of the same batch, but sown later, and potted off at the usual time, produced double flowers as usual. On the other hand, the way in which double Stocks are stated to be produced at Erfurt, viz., by giving the plants a minimum supply of water, and the experiments of Mr. Monro, go to show that, so far from plethora, the inducing cause must be more nearly allied to inanition, though the impoverishing process is, to a certain extent, counteracted by only allowing a few of the seed-pods to ripen, and thus concentrating in a small number of flowers the nutriment intended for many. Professor Edward Morren (Bull. Acad. Roy. Belg., 2me. ser. vol. xix. p. 224) considers the existence of true variegation in leaves, and the production of double flowers, as antagonistic one to the other; the former is a sign of weakness, the latter of strength. But it seems to me that the exceptions are so numerous—so many cases of the co-existence of variegated leaves and double flowers are known—that no safe inferences can be drawn as to this point.

Mr. Darwin* has thrown out the suggestion that the cause for the appearance of double flowers may be sought for in some previous state of things, bringing about sterility or imperfect formation, or functional activity of the genitalia of the flower, and consequent compensatory increase of the petaline element, either in the form of an increased number of bracts, petals, &c., or in the substitution of petals for stamens and pistils, &c.

In considering these points the question arises whether they can be reconciled one with another. And there is little doubt but what they may be. The production of a flower, for instance, is preceded by an arrest of vegetation; this is obvious: the current of the plant's life, so to speak, becomes changed, the growth of the leaves is checked, the lengthening of the branches is arrested as the flower-

* See Gardeners' Chronicle, 1843, p. 628.

bud forms; moreover, there is a close relationship in a large majority of flowers between the outer envelopes of the flower and the scales of a leaf-bud; this is especially so in regard to the venation, and is admitted by all morphologists. So far, then, we may say that the production of a flower, like that of a bud, is due to a diminution of vegetative action; and as in double flowers we have for the most part merely a repetition and exuberant formation of floral envelopes, so we may attribute their formation to a continuance of the same feeble vegetative action as that which produced the first or normal series. How, then, can a copious supply of *rich* food, such as is provided by cultivation, produce double flowers? To this question, according to our theory, the reply would be that the quantity of food is excessive, more than the plant can properly digest; and hence vegetative action is stopped, at least partially—pretty much as it would be if the plant were placed in the opposite condition of starvation. The effect of supplying a plant (or an animal) with an excessive supply of food, which it cannot assimilate, is in many respects similar to that which results from partially cutting off the supplies. And the same reasoning applies to sterility. If by high culture, or the supply of an undue quantity of nourishment, the constitution of the plant be impaired, if the plant be pampered, it would be no wonderful thing that sterility should ensue. Hence, then, may it not be asserted as a general principle that in the production of double flowers a partial arrest of development, if not of growth, however produced, is an essential preliminary? All the attendant phenomena, such as the obliteration of the stamens, the augmentation in the number of floral whorls, the occurrence of prolification, may be accounted for on the supposition of a primary arrest of development, more or less complete, as the case may be: at one time continued, and as it were permanent, at another time relaxed and intermittent, or in a third set of cases the vegetative activity or power of growth is restored, and from the centre of the flower springs a perfect branch with perfect leaves, the production of sheaths only being superseded by the development of leaves, in which all the parts —sheath, stalk, and blade—are present.

If these inferences be correct, the horticulturist should have the art of making a plant produce double flowers as much under his control as he has the power of inducing a "shy bloomer" to produce an abundance of blossom, or of making a plant flower out of its proper season.

When once the disposition to form double flowers is established from any cause, that tendency becomes hereditary; there are races of Stocks in which, out of hundreds of plants, scarcely one double-flowered form is met with; on the other hand, when the tendency is set up, single flowers become the exception: thus, in the Balsams before-mentioned, which have been carefully selected for many years, not one in fifty, under ordinary circumstances, now produces single flowers, and the seeds of these double Balsams produce double-flowered seedlings, with scarcely a "rogue" among them.

EXPLANATION OF THE PLATES.

[Plate VI.]

Fig. 1. Petaloid filament of *Rhododendron*, anther not developed.

Fig. 2. Similar filament from another flower, with a perfect anther at the top. 2*a*. Diagram of transverse section of filament.

Fig. 3. Petaloid stamen of *Rhododendron*, intermediate in character between such filaments as 1 and 2 and the ordinary petals.

Fig. 4. Petaloid stamen, etc., of *Rhododendron*, adherent to the face of a petal. 4*a*. Section of the same through the anther.

Fig. 5. Petaloid filament of *Azalea*. 5*a*. Section of the same below the anther.

Fig. 6. Diagram of the flower of *Crocus*, in which the three stamens were partially petaloid, and adherent to the *inner* segments of the perianth.

Fig. 7. Petalodic stamen of *Viola sp.*, with four projecting plates.

Fig. 8. Section of No. 7.

Fig. 9. Portion of "Compound" stamen of Hollyhock, partly petaloid.

[Plate VII.]

Figs. 10, 11. Tubular stamens of *Anagallis cœrulea*.

Figs. 12, 13. Similar stamens of *Convolvulus tricolor*.

Fig. 14. Portion of a flower of *Datura fastuosa;* the corolla is opened and thrown back so as to show the additional corolla, with its supplementary lobes attached to its outer surface.

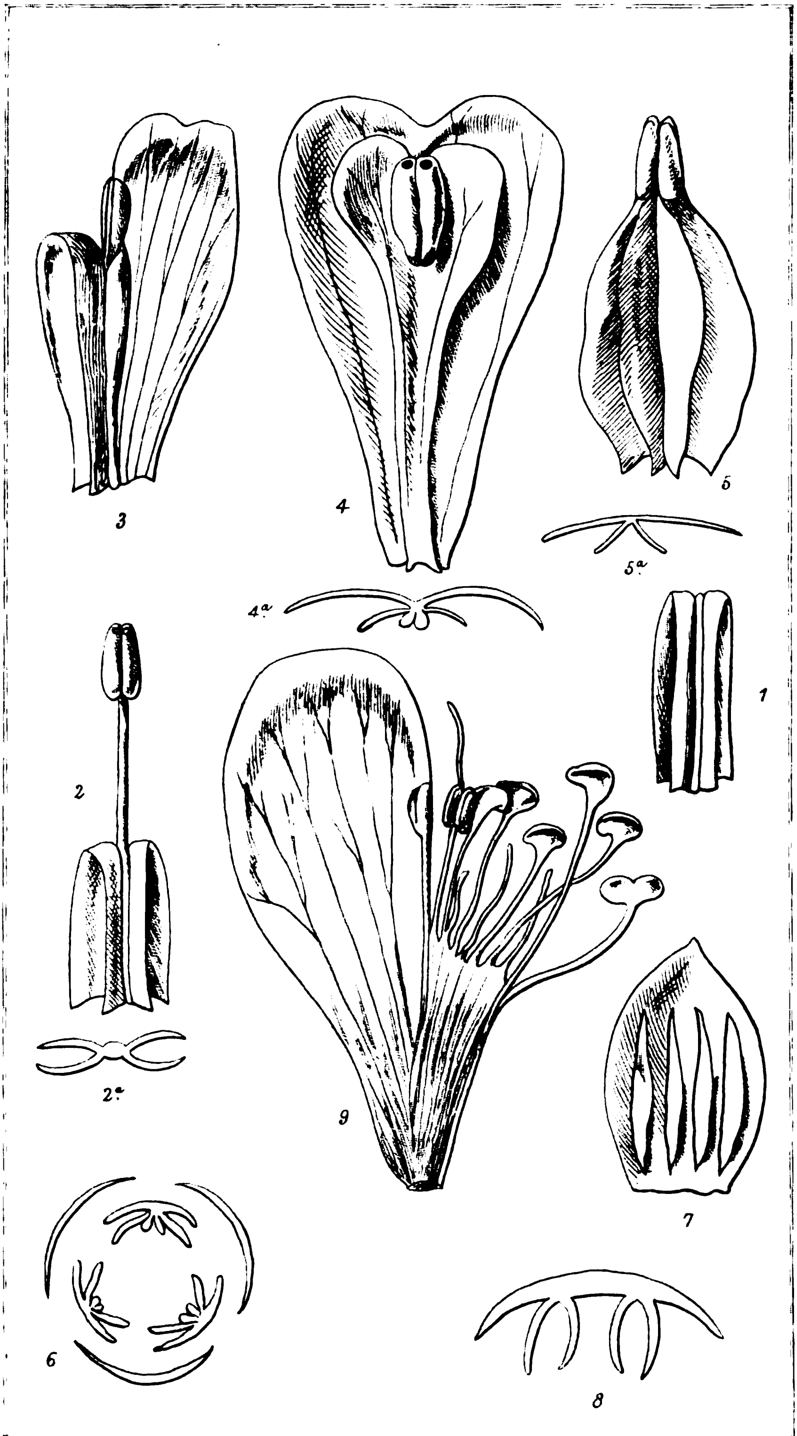
Fig. 15. Corolla of a *Verbena* seen from the side, the lobes of the corolla turned away to show the supplementary process.

Fig. 16. Diagrammatic section through one of the lateral, and through the anterior or inferior petal of a *Verbena*, to show that the supplementary process is the result of the coherence of the enlarged lobe of one petal with the corresponding portion of the other.

ON A CERTAIN PHENOMENON OF HYBRIDISM OBSERVED IN THE GENUS MATTHIOLA.

By Major Trevor Clarke, Daventry.

It has been a habit with me for many years, while engaged in horticultural pursuits, to examine minutely the seeds of a plant before committing them to the earth, being convinced that much has yet to be learned, from this practice alone. Amongst other things I have eagerly watched for any symptom of change in the appearance of seeds contained in such fruits as have been fertilised by other than their own pollen. During, however, a long course of observation, only one fact of interest has presented itself bearing upon this



Truscott, Son & Simmons, lith. Suffolk Lane E.C.

Truscott, Son & Simmons lith. Suffolk Lane, E.C.

subject, but this one is of so curious a nature as to be, I think, well worthy of the attention of physiologists.

About ten years since I took in hand the genus *Matthiola*, mainly for the purpose of improving it for garden purposes by cross-breeding, and of trying at the same time if any light could be thrown upon the subject of doubleness in flowers. Nothing, however, was effected in this direction worth mentioning.

Our large red-flowered biennial garden Stock, "Cocardeau" of the French, bears seeds of a light brown uniform tint, while, in the case of the purple branching "Queen Stock," a distinct race near the normal *M. incana*, they are of a violet black. Blossoms of the red Cocardeau having been fertilised by the pollen of the purple kind, the ripened pods were examined, and found to contain about fifty per cent. of *black* seeds.

The black and brown seeds, contained in one pod, were then sown in separate pots, and my satisfaction may be imagined, when I saw the young plants from the brown seed coming up with *green* stems, while those from the black were strongly tinged with *purple*. There was now no doubt of the ultimate result. The latter plants produced blossoms of a rich purple, while the former scarcely differed in habit, and not at all in colour, from the red seed-bearing parent. My observations upon the derivatives of these plants were not made with sufficient accuracy to enable me to speak on that subject, but the same curious habit of producing both colours from one seed-pod was certainly transmitted in the case of the purples through several generations.

The pre-potency, however, of the purple colouring matter was apparent, and is worthy of remark. Repeated infusions of red, or Cocardeau blood, only seemed to deepen, and enrich the purple colour, and it was not until after many generations of crossing, that a really *red* purple was obtained. I may add that I forwarded unopened seed vessels to Mr. Darwin, and that my results were verified by that distinguished physiologist.

Now, were the red seedlings pure emanations from the mother parent unaffected by the foreign pollen? I think not, for at the same period, I raised plants from the little annual glabrous-leaved Stock of the nurserymen, by the pollen of the large sort above mentioned. The effect was that one-half of the seedlings were glabrous, or "Wallflower-leaved," and the rest rough, like the male parent, no intermediate form occurring—that is, as far as texture of leaf was concerned; but the glabrous seedlings were no longer "miniature" Stocks, being of tall and strong habit. In this case also succeeding generations raised from rough-leaved derivatives produced a per centage of glabrous plants. The converse was not observed, and, I think, did not occur. These experiments were verified by repeated trials, followed by the same results in every case.

Note.—Since writing the above a fresh instance of the pre-potency of the purple colouring matter has come under my notice. Some years ago I made many crosses between red and purple sweet peas. The seedlings always came *purple*, and I concluded that, from imperfect manipulation, or the agency of insects, the cross fertilisation had not taken place. Last summer, however, I crossed a blossom of the beautiful new red sweet pea, called "Invincible," with the pollen of the common purple sort. All the seedlings are now (August, 1866) in blossom, and cannot be distinguished from the male or pollen parent. In this instance every precaution was taken to make an accurate experiment.

ON THE SPORTING OF PELARGONIUMS AND OTHER PLANTS.

By JOHN WILLS, Gardener, Huntroyde Park, Burnley.

I HAVE for many years watched the growth and development of plants from seed with great interest, and the producing of new forms has been to me a never-failing source of pleasure. I will, therefore, describe some of these curious phenomena, as witnessed by me; at the same time I do not wish to assume that the opinions I have formed thereon are correct, my principal object being to open up the subject, so that it may be brought under the notice of others more competent to deal with it.

The tendency to sport in the Pelargonium is highly developed in the three following kinds, namely: Flower of the Day, Brilliant, and Mrs. Pollock. The former was distributed to the public some fourteen or fifteen years ago, by the Messrs. J. & C. Lee, of Hammersmith, and from the very first year of its appearance up to the present time, I have noticed green sports frequently breaking out from it. This shows that the variety called Flower of the Day was originally derived from a sport, and was not produced direct from seed, and has a tendency to prove that the more delicate kinds of variegated plants cannot be perpetuated by seeds, but must be increased, and afterwards perpetuated, by propagating the sports as they occur. This constant habit of sporting in the plant above mentioned, shows, in my opinion, that the original parent was a green variety, probably Cerise Unique. The same propensity to sport is often seen in Brilliant; and, lastly, Mrs. Pollock will often produce sports of a dark green colour, with a deep bronze zone, showing probably that it was originally only a plain horse-shoe kind.

Having mentioned three kinds of variegated Pelargonium that are very much given to sporting, I will now state what I think may be attributed as one of the causes which brings about this phenomenon.

Three years ago some Pelargonium plants were placed in a little house used for hybridising purposes. This house was properly constructed, and placed in a position where it was not fully exposed to the direct rays of the sun, and where it had the advantage, when necessary, of the heat from a fire behind the wall which formed the back of the house. My object in placing the house in this aspect was to obviate the necessity for giving air, as much as possible, whilst the plants were undergoing the process of fertilisation, and every care was taken to prevent any distribution of pollen in the house; but after all my efforts, I found, during the following spring, after the seeds were sown and had in due course produced plants, that some adverse agency had been at work, and that I must have overlooked or neglected some important point, for the greater portion of the plants had come quite contrary to what I had anticipated. Instead of being, as I expected they would be from the parents used, beautifully variegated, the majority of them produced plants with green or dark-zoned foliage, with here and there a sport breaking out from the side of the stem. On looking about for the cause, I came to the conclusion that the small perforated zinc ventilators, which were put in different parts of the house for admitting air and excluding all kinds of insects, had not been covered over so as to prevent a current of air from passing in whilst the work of fertilisation was going on; that pollen from some other plants that were standing near must have been dispersed by the air or by insects; and that particles of it must have come in contact with the flowers just at the time I had been fertilising them. This struck me as being the probable cause of the seedling plants sporting so constantly as they did. The following year, for the purpose of testing the truth of this idea, I subjected the same plants to precisely the same treatment, and was sure the house was very much charged with pollen at the time I fertilised the plants, for a strong breeze was blowing at the time, and there was a good deal of ripe pollen on other plants standing in the vicinity of those I had been operating on. As soon as the seeds had germinated and the plants were sufficiently developed, I found that the phenomenon had occurred again. The same thing has taken place this year, under similar conditions; whilst of plants of the same kinds that had been fertilised, and where every care was taken to prevent any pollen coming in contact with them after they had been fertilised, none produced plants except in accordance with the parents used, and no sports in any instance occurred.

The above facts have led me to the conclusion that, if mixed pollen be used in fertilising a plant, it will produce sports more or less, as the case may be.

With regard to the production of variegated plants, my opinion is that the more delicate kinds are not perpetuated from seed, but by propagating the sports. The small seedling plants of almost every kind of variegated plant are so extremely delicate in texture, that they perish in a few days after the seeds have germinated. I have noticed this in thousands of instances with small seedling variegated Pelargoniums.

It frequently happens that one side of the seedling plant will come variegated, whilst the opposite part will be quite green, and in most instances the variegation breaks out in that part of the stem of the plant just at or a little above the position of the seed leaves. If the variegated portion of the plant is not too delicate, I have found by pinching the green part gradually away, the variegated portion will predominate as the plant grows, and in a short time will assume the mastery over the green portion. This operation, however, must be performed very gradually, by pinching or cutting away portions of the green leaves by degrees. The plant may then be perpetuated, and the work of propagation may be commenced as soon as it has sufficient strength to bear decapitating.

To further illustrate the difficulty of perpetuating variegated plants from seed, I may mention that three years ago I found a plant of the common Groundsel (*Senecio vulgaris*) beautifully variegated. I at once took means to prevent the birds from taking the seeds, and the plant from suffering any injury. I also frequently watched, so that I might secure all the seed; thinking I should be able to perpetuate it, and by fertilising the double garden varieties with it the following year, should be able to produce a new and very handsome variegated bedding plant. But I was doomed to disappointment. In the spring following, the seeds were sown, and tended with every care, and I believe nearly every seed grew, but not one lived more than three days after its appearance above the surface of the soil. Another variegated plant appeared the same year. A plant of the common Celery (*Apium graveolens*) became beautifully variegated; the seed was carefully preserved till the following year, when it was sown, and produced plants, the leaves of which were as white as milk; these lived till they had made the second pair of leaves, when they too died. Another case was that of a variegated Verbena. The plants from this also died. I could name many other instances which have come under my notice, but, I think, the above will be deemed sufficient for my present purpose.

I will now describe my experience with another class of plants that I have watched very minutely for many years past, to show their extraordinarily sportive character, not in the foliage, but in the flower.

The Verbena has been long and deservedly looked upon as one of the most useful plants in cultivation for flower-garden decoration. The plant being an especial favourite with me, I have, for many years, been trying a series of experiments in cross-breeding and hybridising it, and four years ago, I succeeded in producing a hybrid—the variety now known by the name of Velvet Cushion. This was, I believe, the first hybrid Verbena ever produced. It was obtained by crossing the old *Verbena venosa* with the garden varieties. For two years I could not get any seed from the plant; but other garden varieties that had been fertilised with the pollen from Velvet Cushion seeded very freely, and produced from ten to fifteen per cent. of plants of a similar suffruticose habit, with flowers of the same shape and substance, and in various shades of colour. Last year I gathered seeds from plants of Velvet Cushion growing in the open ground.

There were other plants of the ordinary kinds of Verbena, such as Purple King, &c., growing near them. These seeds have produced but very few of the Cushion varieties. Some are exactly like Purple King, both in habit and colour, the only difference at present perceptible is the elongation of the truss. Some have produced scarlet flowers, others plum or pink, and, in fact, nearly every shade of colour to be found in the Verbena. This I attribute to the Humming-bird moth (*Macroglossa stellatarum*), which was very plentiful last summer (1865). It seemed particularly fond of hovering over, and sipping the sweets from Velvet Cushion. I frequently sow as many as from ten to fifteen at one time on a small bed.

Plants of Velvet Cushion, carefully fertilised, this spring (1866) produced some extraordinary forms, some with flowers of immense size, others with small neat habit and liliputian flowers. These are from Velvet Cushion fertilised with the pollen of Maonetti. Princess Victoria, a most valuable plant for bedding purposes, I obtained, two years ago, by crossing Velvet Cushion with the pollen of Maonetti L'Impèratrice Elizabeth. The beautiful Scarlet Cushion was produced at the same time by crossing Velvet Cushion with the pollen of Foxhunter. Velvet Cushion has produced more than fifteen distinct forms of Verbena this season, of an intermediate section between the Cushion varieties and the Maonetti. Specimens of most of them I have laid before the Floral Committee of the Royal Horticultural Society.

Again, the plants of the common kinds have produced very different shades of colour from what they have ever done before with me. Some crimson flowers have produced shades of blue, violet, mauve, pink, rose, lilac, purple, &c. One plant, in particular, has produced almost every known shade of colour. This was a beautiful, striped variety which I raised last year, and as it was a flower of great promise, I fertilised it with pollen from a variety of the best flowers I had. Three of the florets on each truss were fertilised with the same kind of pollen, and care was taken that a clean brush was used for every sort of pollen. My idea was, that it would yield striped flowers in great abundance; but in this I have been deceived, for not a single striped flower has it produced, whilst flowers of the other varieties, fertilised with the pollen of the striped one, have produced many very fine stripes.

There is no plant, I ever heard of, so sportive and changeable in the character of its flowers, nor any plant I know that is so transformable, as the Verbena. One of the most extraordinary instances is the following:—A flower of the Princess Victoria (Maonetti) was fertilised with the pollen taken from Scarlet Cushion, with the view of its producing a scarlet Maonetti; instead of which it has produced a plant with foliage very similar to Purple King, and a flower as large as Foxhunter, and nearly of the same colour.

ON RAISING PEACHES, NECTARINES, AND OTHER FRUITS FROM SEED.

By Thomas Rivers, Sawbridgeworth.

It is now some forty years or more since I first entertained a peculiar theory that our old varieties of fruit trees had formed themselves into species, and would reproduce themselves from seed. I was well aware of the then existing practice of Thomas Andrew Knight, in cross breeding, and was also acquainted with the theory of Van Mons. I commenced operations by taking the Golden Pippin, and, ignoring the works of the bees and the winds in conveying foreign pollen to the blossoms of fruit trees, unless carefully protected by fine gauze or some other light material, I gathered some fine fruit from a Golden Pippin tree of great age, and sowed their pips. In the course of a few years, the young trees raised from them bore fruit. Alas! for my theory, they gave me apples, but not Golden Pippins—no, not one. Some, it is true, were apples of a yellowish tinge, but very unlike in size, shape, and flavour, to what I had hoped for. Some pips of the Ribston Pippin, sown the same year as the above, in due time produced trees, and the trees fruit; but in this instance the children were still further removed from the likeness of the parent, for they were apples of all shapes and sizes, and not one bearing any resemblance to our favourite apple, the Ribston Pippin.

In carrying out my idea, I soon after this sowed pips taken from the Autumn Bergamot pear, the fruit gathered from a very old tree, whose age was estimated at 800 years; now as this sort is supposed to have been in cultivation in England ever since the time of the Roman occupation, I looked forward with some hope as to the kind of pears my seedlings would produce. I was to a certain extent gratified, for my seedling Autumn Bergamot pears were all bergamots, i.e., they had the peculiar flattened shape by which we recognise that variety. One in particular was most remarkable; it was a monstrous bergamot, with the true shape and russet coat of its parent; its flavour, however, was not up to the mark, and although gratified to find an adherence to race according with my theory, I did not gain that which I hoped for—a hardy, free-bearing, improved variety. I may, however, except one raised from the same source a few years afterwards. This at first was dry and poor in flavour, but has annually improved in quality, so that from its hardiness and fertility it may be considered worthy of cultivation.

Although disappointed with my experiments with apples, I was a little comforted by the adherence to race which occurred in my bergamot pears, and I continued my experiments by sowing Green Gage plums, the opportunity happening in this wise:—before our country was gridironed with railways, there used to be occasionally what is called a glut in the markets of perishable fruits, such as plums, which could not be sent to long distances on account of their ripeness, and the supply being too large for the London consumption, many hundreds of bushels were often destroyed. Taking advantage of one of these gluts I once bought in Covent Garden a great number of bushels of Green Gage plums, at 1*s.* 6*d.* per bushel; the stones of these were sown, and produced many thousands of trees. I watched these young trees for some years with much interest; the greater part of them had the habit of their parent, and were to all appearance Green Gage plum-trees; some of them were, however, remarkable for thin, small leaves and spines, being more like sloes (*Prunus spinosa*) than plums. It seemed to me as if the Green Gage had returned to its normal state, that of a small green wild plum. In process of time a great number of these seedlings bore fruit; all that did so gave green fruit, but not one among them produced a sort worthy of a name. This adherence to race gave me much satisfaction; still I must acknowledge that since I sowed the large quantity of stones just mentioned, I have sown a few others which have produced trees bearing purple plums, showing that the adherence to race was not to be depended upon. Still clinging to my original idea, that an improved variety of a favourite kind of fruit, with all its good qualities, but with a thorough adaptation to our climate, might be raised, I took in hand another very old kind of plum, which has been cultivated in Touraine for many ages, and probably rivals the Green Gage as to the period of its production from seed. This is still well known as the Précoce de Tours. The trees of this variety, from the fruit of which I hoped to have raised an improved race were very large, having been planted by my grandfather, and stood so isolated that I hoped to raise seedlings from them, unstained by any other variety. They caught my attention from the curious fact that they bore a fair crop only about once in five years, their blossoms being delicate and generally suffering much from our spring frosts. It is now many years since I selected some fruit from these trees, and sowed their stones. In the course of time the trees raised from them bore fruit, and to my great delight, they were like their parent in colour and shape, varying only in size. One among them realised the idea I had so long entertained, that of reproducing the parent fruit, with a constitution adapted to our climate. This was named the Early Prolific plum, and is neither more nor less than the Précoce de Tours, vigorous in habit and abundantly prolific. I felt, and still feel amply rewarded for my almost obstinate adherence to a somewhat speculative theory, and for many years of careful culture. I must not leave this remarkable variety of plum without mentioning that I have lived to raise from my first seedlings of this kind three generations, none of them departing from the original parent in shape and colour, but varying much in quality. One among them, the exact form and size of its great-grand-parent, bids fair to be of much value; for whereas the Early Prolific and other seedlings from the same source ripened in 1865, about July 28th, this, although the tree stood on the north side of a hedge, in a shady place, ripened its fruit on July 14th; so that by continuing to breed from one race, generation after generation, I have raised the earliest plum known.

So attractive to me has this race of plums been, owing to its singular and rigid adherence to race, that it seems now, in my old age, to have been the greater portion of a life's pleasant study, still incomplete; for young trees of the fourth and fifth generation from the original trees of Précoce de Tours exist here, and are likely, ere long, to bear fruit.

At the earliest period of my essays in raising seedlings from old varieties of fruit, I sowed stones of the Noblesse peach, and planted the young trees they produced against a wall; in the course of eight or ten years they all bore fruit; all were so like their parent as not to be distinguishable from it.

Soon after the introduction of orchard-houses my attention was attracted by the facility with which young trees of peaches and nectarines could be made to bear fruit in pots. I at once determined to raise large numbers of trees from stones, and to carefully record the origin of each tree. My old instinct again came to the surface, and I fixed upon some of our most ancient varieties, intending to breed from generation to generation. Nearly, if not quite the first variety I took in hand was the White nectarine, for I considered it as belonging to one of the oldest of all races of nectarines, a white nectarine being mentioned in the *Paradisus in sole Terrestris* of Parkinson, upwards of two hundred years since; traditionally, it came from Asia, and probably from Northern Syria, the habitat of another kind of nectarine equally distinct in character, the Stanwick. My first family of seedlings from the White nectarine seemed, when the young trees blossomed, marvellously alike, and I began to look forward to another generation before I should find much change. I was now, however, agreeably disappointed, for among my little family of quasi white nectarine trees, I observed a large white peach, which, although a peach in appearance, had the racy, brisk flavour of its parent. This remarkable production aroused my attention, and from the first fruit it produced, the stones were taken and sown; several of the trees raised from them bore fruit when four years old; the greater number of them proved to be white nectarines, thus returning to the nature of their grand-parent, the White nectarine. Much, however, to my gratification, two among them produced peaches; one about the size of the Noblesse peach, and of the same colour, but ripening so early that in 1864, when its first fruit was presented to me on July 14th, quite ripe, I could scarcely believe it to be true, as the Red Nutmeg peach was at that time quite hard; in 1865, its fruit ripened on July 18th, and I then felt satisfied it was the earliest large peach known. The other peach, which made its appearance among the third generation from the White nectarine, as above mentioned, proved to be a large pale-coloured variety, ripening in the middle of September.

Both these kinds of peaches retain the flavour of the race, being remarkably piquant and agreeable when well ripened. From the experience thus gained, I feel convinced that to the White nectarine we owe those pale-skinned peaches, the Noblesse, the Malta, and the White Magdalen, all remarkable for their brisk flavour, and equally so for retaining in the trees the peculiar character of the White nectarine, producing large pale flowers irregular in their shape.

My next essay to "breed in and in," so as to establish a race of peaches, was with that large, handsome but, in England, worthless clingstone peach, the Pavie de Pompone. The first generation gave me one peach producing large flowers like its parent, but with a melting rich flesh perfectly its converse. This was named Princess of Wales. Another seedling of this generation proved to be a small-flowered sort, its fruit of medium size, the skin pale yellow, and the flesh so sweet (without the usual bitter almond flavour of most peaches) as to be too luscious. Here was at once a wide departure from the type in all respects, except the size of the flowers in Princess of Wales. Not at all put out by the vagaries of the first generation, and still hoping to raise a peach as large as the Pavie de Pompone, with tender flesh, and like that, a good keeper, so that in a well-managed fruit room good peaches might be preserved till November, I selected some fine fruit of the Princess of Wales, sowed the stones, and waited patiently. One of the first of this third generation produced, in September 1865, such late peaches as never before gladdened my eyes. One fruit measured twelve inches in circumference, its flesh melting, but firm and rich. This I felt to be a great triumph, and I named the fruit after Lord Palmerston, who was then happily with us.

That well-known nectarine, the Pitmaston Orange, next attracted my attention. Mr. Williams, of Pitmaston, always stated that this was raised from the Elruge nectarine, a variety so diametrically opposite in flowers and fruit, that I felt a strong wish to try and reproduce its parent, by going through two or three generations of seedlings. The first generation consisted of some twelve or eighteen seedlings from the Pitmaston nectarine, the parent tree growing in a pot in my orchard-house. I ought perhaps to have said that all my seedlings have been raised from fruit taken from my orchard-house trees, upwards of one hundred varieties growing in a house 100 feet long and 24 feet wide. All the trees of this generation, except one, gave Orange nectarines, like their parent; the trees also produced those large brilliant flowers peculiar to that sort. All, except one, I have said, and this to me was a remarkable exception, it was a large crimson peach, the tree producing small deep red flowers instead of those large brilliant ones borne by its brethren. I felt doubts, and concluded that a peach stone must have been by accident planted with the nectarine stones. To try and solve my doubts, I at once determined to take particular notice of this peach, to sow its stones, and to watch carefully what they would bring. Out of about twenty trees raised from them, the greater part bore peaches like their parent, the trees also producing small flowers; but to my great satisfaction, two of them bore Orange nectarines like their grand-parent, and the trees gave the same large flowers; but the most remarkable fact in this experiment was, that two trees bore white-fleshed nectarines, a little red at the stone, like the

Elruge nectarine, their great grand-parent, and the trees, like that variety, gave small flowers. Now, here was a strange and most interesting event in pomology. A white-fleshed nectarine, the Elruge, with Mr. Williams, had produced a seedling with orange-coloured flesh (the Pitmaston), which in its turn yielded here a large white-fleshed peach, and stones from that peach produced trees with the characters of four generations, viz., the Elruge nectarine, the Pitmaston nectarine, the peach (a child of the latter), and again the Pitmaston Orange nectarine.

The Psalmist might well exclaim, "How wonderful are Thy works!" The horticulturist who thinks and works—they are too often far apart, that thinking and working—must feel those few words always uppermost, always rising. I must not leave that fertile source of interest, the Pitmaston Orange nectarine, without adverting to one more curious fact. I have said that the greater portion of my first generation of seedlings from it were like the parent; there was one, however, which ripened ten days later, and had transparent flesh, so that it was named the Pine Apple nectarine. I was interested in this sort, seeing that it was inclined to leave the characters of the type. I therefore raised a number of seedlings from it; they are young, being only four years old. Yet, one among them bore some fruit last year (1865), of a most remarkable character—a peach of the largest size, with its skin green and beautifully marbled with red; its flesh of a pale lemon colour, melting, and much like a nectarine in flavour. This peculiar peach ripened September 30, 1865, and was at once dedicated to Lady Palmerston.

There is a very old kind of nectarine, known to pomologists as Fairchild's Early, a small yellow-fleshed sort, not larger than an Orleans plum. Now, although this sort has been in cultivation for 150 years, yet no gardener seems to have thought of improving it by raising seedlings from it. As it is the earliest of all the nectarines, and as a good very early nectarine is still lacking, I turned to it with much interest, and hoped to improve it in size and earliness, so as to create a new variety worthy of cultivation. My first generation consisted of some ten or twelve young trees; they all bore fruit in due course, and were all like the parent in leaves, flowers, and fruit. The latter varied slightly in size, but on the whole they were neither more nor less than reproductions of the parent. I confess to some little disappointment, but, encouraged by the facility of inducing young trees to come into bearing in a comparatively short period, by cultivating them in pots in my orchard-house, I selected some fruit from the seedling trees, sowed their stones, and again looked forward to the result. In 1865 I was, as far as regards curiosity, greatly rewarded, for no two trees of this second generation produced fruit exactly alike. Some gave orange-coloured peaches, one or two remarkably rich in flavour; some orange nectarines, as large as the Pitmaston, but quite different in flavour; and, most strange of all, some gave peaches of medium size, with rosy cheeks and the flesh white and melting, like that of the Noblesse peach. I failed in my object in obtaining a very early kind of nectarine, but at once some stones were selected, and trees of the third generation of Fairchild's Early nectarine are now in full growth. One very remarkable fact attended this experiment;—the trees, when in blossom in 1865, were all like their grand-parent, so that I was quite unprepared for the curious transformations I have above described.

The following singular changes have taken place here. The Roman nectarine, a variety which has been in cultivation in England for 200 years, has produced from seed a nice bright-red melting peach. George the Fourth peach, an American sort, in the first generation gave a late green nectarine. It is well known that American peaches in their own country, seldom or never produce nectarines; it is doubtless owing to the trees being confined in a house, and standing very near together, that such remarkable changes from the mixing of pollen have taken place here.

Among other curious gains that have occurred—too many to mention in detail—I may mention that a stone of Hunt's Tawny nectarine has produced an early peach, full-sized, and of the most delicious flavour, but without any yellow tinge in its flesh. This has the true nectarine flavour, which I may add is very common to peaches raised from nectarines. The Royal George and Shanghai peaches have produced melting peaches, with deep yellow flesh. The Early York, from which a great number of seedling trees were raised, reproduced itself with but little variation, with one exception, which is a tree with round glands, and not liable to mildew. Its fruit is of the most exquisite flavour, and as early as its parent. The Hardwicke nectarine, which has large flowers, has produced a peach of the most decided nectarine flavour; moreover, the tree gives small flowers.

I must, however, desist from giving a further record of other strange transformations; they have been too numerous for a paper on the subject, occurring, as they have done, among upwards of 250 seedling peaches and nectarines. I feel, however, constrained to mention one more curious fact. I have had some fine bearing trees of seedling Stanwick nectarines, differing but slightly from their parent, for this sort adheres rigidly to its race for two or three generations; they were growing in a house in which were some trees of the Elruge nectarine. Some stones of the latter were sown, and as nearly as possible, the sort was reproduced, but they were Elruge nectarines, with the Stanwick flavour. This is not a solitary instance of a new kind of fruit imparting some of its qualities to fruits raised from seed, without artificial impregnation. The bees, always very busy in orchard-houses, fertilise numerous flowers; hence the great variety in peaches and nectarines raised from the stones of trees growing in them. I must not omit to mention one more curious fact. The Balgowan nectarine, a sort highly esteemed, has produced from seed a peach rather small, but of the most delicious nectarine-like flavour.

Apricots raised from the stones of trees grown in orchard-houses have not given, and cannot be expected to give, the immense variety that peaches and nectarines produce; still, out of some scores of seedlings no two can be found exactly alike. The only beneficial variation that can be hoped for is in the time of ripening, so as to have varieties earlier and later than we have at present; for no apricot can be of much higher excellence than the variety known as the Peach Apricot. Some progress has, however, been made; a seedling tree from the Red Madeleine, one of the oldest and earliest varieties known, has given fruit larger and equally early; and a seedling tree from that curious, delicate-growing small, apricot, the Musch Musch, has given fruit much larger than its parent, and so full of delicious fragrant juice as to be, if possible, more grateful than the Peach Apricot. The Saint Ambroise, a variety rather early, has produced a seedling, the fruit on which ripened full a month later than any other kind; and, to conclude, the Large Red or Gros Rouge has given a seedling tree, the fruit of which ripened a full month before that produced by the parent tree. There is, therefore, some hope that in time a new race of apricots may be produced, differing in quality and season, from those at present under cultivation.

It will, I think, be seen by those who venture to read this paper, that my original and rather eccentric idea—that old varieties of fruits would reproduce themselves in an improved form if successive generations were raised from seed—has, to a great extent, been realised. My prevailing feeling is that of surprise that European, and more particularly English cultivators, have suffered many ages to pass without carrying out that which I have attempted: the idea seems to me so simple, and of such great interest. If all that I have done had been attempted a century ago, what progress would have been made in fruit culture! I ought, perhaps, to state, that in this paper I have given but a mere abstract of my experiments. A time may come, if life be spared, when I shall give more fully all that I have learned. I have a vague suspicion that our tender kinds of fruit, that blossom very early in spring, may be improved in hardiness by close attention to the form of the petals. Early in May of this year (1866) we had here 5 degrees of frost; the weather was dry, and no injury seemed to have been done to the blossoms of some cherry trees which I had under close observation, the germs were green, and the petals uninjured. I observed, however, that the extreme points of the pistils were killed from the petals being thrown back, fully expanded, so as to leave them exposed. The germs swelled, and I quite expected the fruit would come to perfection. Instead of this, however, all that were marked dropped off shortly afterwards. I confess I was disappointed at this, for I had calculated that complete fertilisation had taken place, and that no injury from a slight frost could then injure the fruit.

While making observations on these blossoms my attention was drawn to others, the petals of which were incurved, so as to protect the pistils; this slight protection preserved them from injury, and the fruit set healthily, and remained on the trees, swelling gradually, and bidding fair to ripen properly. On observing this, I could not help theorising, and asking myself the question, would it not be possible, by careful attention for a series of years, to originate varieties of fruits from seed, giving blossoms with large incurved petals, so as fully to protect the parts of fructification? The idea may be theoretical, but when one reflects on the licence which Nature gives us in allowing us to assist her by our art, we ought not to think it impossible.

I have devoted many years to the raising of seedling fruits, and have, as a matter of course, met with many disappointments, but also much gratification. There is, as I have found, much pleasure in watching, from year to year, the character of a seedling; it is true that, after great promise, there is often a failure, but with me it has always acted as an incitement to try again. At this moment I have hundreds of seedlings of all kinds of fruits, some from fertilised flowers, showing interesting features of cross-breeding, and many others raised from old and esteemed varieties; with my old hope partly fulfilled—that new varieties, with all the excellent qualities of the old, may and will be originated and, as it were, acclimatised, like the Early Prolific plum and its descendants, which are neither more nor less than hardy varieties of the Précoce de Tours. It is, I fear, too true that neither a peach, nectarine, or apricot will ever be originated with blossoms fully capable of resisting our spring frosts, for even the common sloe of our hedges succumbs to them; but it is quite probable that peach trees, bearing fruit equal in quality to our old favourite, the Grosse Mignonne peach, will be produced of a more hardy nature than the old sort; in fact, I have more than one proof of this here; to obtain this result, only the most robust-growing seedlings from old varieties should be retained. Again, much improvement will yet take place in raising early and late varieties. I have reason to believe, from what I see daily, that large and rich-flavoured cherries may be on our tables from early in June till the end of August; plums from July till far in November; and peaches, nectarines, and apricots in orchard-houses, from early in July till late in autumn. I may be accused of enthusiasm, but I look to the future for new races of fruits, with qualities far superior to the old, and the trees of so hardy a nature as to resist some of the unfavourable tendencies of our climate. I have formed this opinion on the solid basis of close observation, during a lifetime devoted to the culture of fruit trees in all stages of their growth.

OBSERVATIONS ON THE VARIATIONS EFFECTED BY CROSSING IN THE COLOUR AND CHARACTER OF THE SEED OF PEAS.

By Thomas Laxton, Stamford.

The specimens exhibited were selected for the purpose of illustrating the variations produced by crossing, in the colour and character of the seed of Peas, in the second and succeeding generations.

The results of experiments in crossing the Pea tend to show that the colour of the immediate offspring or second generation sometimes follows that of the female parent, is sometimes intermediate between that and the male parent, and is sometimes distinct from both; and although at times it partakes of the colour of the male, it has not been ascertained by the experimenter ever to follow the exact colour of the male parent. In shape, the seed frequently has an intermediate character, but as often follows that of either parent. In the second generation, in a single pod, the result of a cross of Peas different in shape and colour, the seeds are sometimes all intermediate, sometimes represent either or both parents in shape or colour, and sometimes both colours and characters, with their intermediates, appear. The results also seem to show that the third generation, that is to say, seed produced from the second generation or the immediate offspring of a cross, frequently varies from its parents in a limited manner—usually in one direction only, but that the fourth generation produces numerous and wider variations; the seed often reverting partly to the colour and character of its ancestors of the first generation, partly partaking of the various intermediate colours and characters, and partly sporting quite away from any of its ancestry. These sports appear to become fixed and permanent in the next and succeeding generations; and the tendency to revert and sport thenceforth seems to become checked if not absolutely stopped.

The experiments also tend to show that the height of the plant is singularly influenced by crossing; a cross between two dwarf peas, commonly producing some dwarf and some tall; but on the other hand, a cross between two tall peas does not exhibit a tendency to diminution in height.

No perceptible difference appears to result from reversing the parents; the influence of the pollen of each parent at the climax or fourth generation producing similar results.

ON THE NECESSITY FOR INSECT AGENCY IN THE FERTILISATION OF CORYDALIS CAVA.

By Dr. Hildebrand, Bonn.

Communicated by Charles Darwin, V.P.

There are some plants in which fertilisation, without the help of insects, is thought to occur, because, either in the bud or in the open flower, the opened anthers touch the stigma and press the pollen against it. Some of these plants, for instance the species of *Canna*, produce good seeds though protected from insects, but there are certainly others that require the crossing of different individuals to produce good seeds. I experimented this spring with *Corydalis cava*, and was very much surprised by the decided results which I obtained. The experiments, and their results, were as follows:—

1. I crossed the flowers of several individuals with the flowers of other individuals of the same colour, and got—

From	3	fertilised flowers,	3	capsules with	6, 7, 7	good seeds.
,,	4	,, ,,	4	,, ,,	1, 3, 3, 1	,,
,,	4	,, ,,	4	,, ,,	7, 6, 6, 5	,,
,,	4	,, ,,	3	,, ,,	2, 3, 6	,,
,,	3	,, ,,	3	,,	seeds not counted.	
,,	6	,, ,,	6	,,	,, ,,	
,,	5	,, ,,	4	,,	,, ,,	
,,	4	,, ,,	4	,,	,, ,,	
,,	9	,, ,,	8	,,	,, ,,	

2. I fertilised flowers of the red variety with flowers of the white variety, and got—

From	3	fertilised flowers,	3	capsules with	6, 7, 7	good seeds.
,,	2	,, ,,	1	,,	seeds not counted.	
,,	4	,, ,,	4	,,	,, ,,	

3. From individuals of the white variety, fertilised with the red, I obtained—

From	3	fertilised flowers,	3	capsules with	6, 1, 1	good seeds.
,,	5	,, ,,	4	,,	seeds not counted.	
,,	4	,, ,,	4	,,	,, ,,	

4. On five racemes produced by distinct plants, I fertilised on each two flowers, one with pollen from another individual, and one with pollen from the same individual. From the first I got seeds, 5, 5; 0, 3; 6, 7; 1, 3; 1, 1: from the last I obtained from the 10 flowers only 1 capsule, and that was bad.

5. I crossed the flowers of the same raceme with each other, and got—

From	3	fertilised flowers,	1	capsule with	2	good seeds.
,,	5	,, ,,	1	,, ,,	1	bad seed.
,,	4	,, ,,	0	capsule.		
,,	4	,, ,,	1	,, ,,	2	bad seeds.

6. I rubbed the pollen of each flower on its own stigma, and never got any capsule from 27 flowers.

7. I left 57 flowers quite untouched, and got not a single capsule, though the pollen tubes penetrated into the styles.

From the results of these experiments we see clearly, first, that the flowers of *Corydalis cava*, when protected from insects (fertilised with their own pollen) give no capsules; secondly, capsules are very seldom produced when the flowers of the same raceme are crossed with each other; and thirdly, it is only by crossing flowers produced by distinct individuals, that almost every flower sets good seeds. There seems to be no difference in the results when like-coloured and dissimilarly-coloured flowers are crossed.

This seems to me a most interesting case, where self-fertilisation does not take place, though the pollen immediately touches the stigma of the flower. The help of insects is here a necessity, and I actually observed the bees working with great activity; when putting their heads into the upper spurred petals, they removed the two inner petals from the stigma and the anthers, which were thus rubbed against the insects' abdomen. I seldom observed a flower in the open air, open some time, without the pollen having been removed from its original place, where it is accumulated round the stigma. Humble bees also visited the flowers, but they never entered them from the front, but, biting a hole into the spur, they sucked the nectar without touching the organs of fertilisation.

Besides *Corydalis cava*, I had a few plants of *Corydalis solida* in my room; here also the intercrossing of individuals seemed necessary to produce seeds; but of some plants of *Corydalis ochroleuca*, that were in my room, protected from insects, I got a few good capsules.

DE LA MIGRATION DES PLANTES DES MONTAGNES.

Par Henri Lecoq, Professeur à la faculté des sciences de Clermont; Correspondant de l'institut de France, etc.

Il est un fait aussi incontestable dans l'histoire de l'homme que dans celle de tous les êtres de la création, c'est que les espèces sont rarement nées sur le sol qu'elles habitent. Elles y ont été transportées par des moyens divers dont l'étude constitue la *Géographie des Migrations*. Ainsi, pour nous en tenir aux végétaux seulement, il est certain que les flores d'Angleterre et de France sont composées d'une foule de plantes dont l'origine ou le *paradis terrestre* se trouve ailleurs que dans ces deux contrées, et peut-être même, en dehors de l'Europe. Ce fait devient plus frappant encore quand on étudie les flores locales des Orcades, des Hébrides, et des Shetland, où l'on retrouve les émigrés de l'Ecosse et de l'Angleterre. Les plantes se sont propagées de proche en proche, s'arrêtant sur les points favorables à leur existence et employant de longues séries de siècles pour atteindre le but extrême de leurs voyages. Nous ne pouvons même pas assurer que les migrations soient arrêtées; il doit exister des espèces qui n'ont pas atteint les limites possibles de leur aire d'expansion.

Toutes ces questions touchent de très près à certains problèmes de géologie, car l'histoire des révolutions que la terre a subies se lie nécessairement à celle des végétaux qui, à toutes les epoques, sont venus embellir sa surface. Toutefois, nous ne pouvons remonter aux anciens âges du monde, et nous devons rechercher, pendant les périodes les plus récentes, les moyens que la nature a employés pour ces curieuses migrations. Il est évident qu'à l'epoque tertiaire, les continents n'offraient pas la configuration qu'ils présentent aujourd'hui; les plantes fossiles nous indiquent une végétation différente pour l'Europe; elles nous montrent des espèces Américaines ou Asiatiques mélangées à des types Européens, et la flore des Iles Canaries semblerait appuyer l'hypothèse de l'ancienne existence de l'Atlantide, ou du moins, d'une terre qui aurait relié l'Europe et l'Amerique.

Je n'ai nullement la prétention d'expliquer ces profonds mystères de la création et de la migration des espèces; mon seul but est d'attirer un instant l'attention sur un point de la terre où des faits géologiques encore récents, peuvent offrir de l'intérêt aux savants qui cherchent à résoudre le problême complexe des colonisations.

Le centre de la France, l'Auvergne, dont je veux parler, présentait à la fin de l'époque tertiaire un vaste plateau offrant quelques saillies peu importantes et une altitude moyenne de 800 à 900 mètres au plus [between 2000 and 3000 ft. English].

Alors les éruptions volcaniques se manifestèrent sur des points divers, des produits pulvérulents, des nappes de trachyte, des coulées basaltiques, des cones de scories et des courants de lave, inondèrent le plateau primitif et vinrent changer les conditions physiques et chimiques du sol offert aux émigrants. L'altitude de 800 mètres reçut en quelques endroits un exhaussement de 1,000 mètres. C'était plus qu'il n'en fallait pour modifier toutes les stations; c'était en créer de nouvelles et y appeler de nouveaux habitants.

Une surélévation aussi considérable changeait aussi les conditions météorologiques. Les nuages vinrent baigner les hautes cimes et s'y condenser; la neige s'y accumula pendant les hivers et d'innombrables ruisseaux, descendant en murmurant des sommets glacés, semblaient appeler une végétation étrangère à venir jouir de ces heureuses conditions.

Cet appel hospitalier fut entendu et cent espèces, complètement inconnues sur ces montagnes récentes, vinrent y établir leur domicile et payer de leurs fleurs éclatantes l'accueil qu'elles recevaient sur la terre des volcans.

C'est encore cette fraîche végétation qui couvre aujourd'hui nos montagnes et qui donne naissance à toutes nos richesses pastorales.

Mais ici se présente immédiatement ce problême de la colonisation;

d'où ces plantes sont-elles venues? Par quel moyen ont-elles été transportées aussi loin de leur véritable lieu de naissance, ou de leurs colonies les plus voisines?

La flore d'Auvergne est composée: 1° de plantes Européennes ou Asiatiques; 2° des espèces Mediterranéennes émigrées du Sud et s'arrêtant au pied des montagnes; 3° de quelques plantes littorales confinées autour des sources minérales; 4° des espèces boréales reléguées sur le sommet des montagnes; c'est de ces dernières seulement que nous aurons à nous occuper.

La portion de la flore d'Auvergne que nous appelons la flore *boréale* ou *montagnarde* est composée d'une centaine d'espèces qui n'ont pu arriver qu'après la surélévation produite par les terrains volcaniques; le point le plus élévé de la France centrale atteignant alors 1,886 mètres d'altitude [about 6000 ft. English].

Voici la nomenclature de ces plantes, telle que nous l'avons publiée dans nos études sur la géographie botanique de l'Europe, T. 2, page 402.

Liste des espèces du plateau central de la France qui ne descendent pas habituellement au-dessous de 1,400 *à* 1,500 *mètres* [*between* 4000 *and* 5000 *ft. English.*]

La lettre A indique les espèces qui habitent aussi les Alpes, la lettre P les Pyrénées, la lettre G le royaume de Grenade, la lettre L la Laponie.

Anemone vernalis, A. P. L.
Anemone alpina, A. P.
Braya pinnatifida, A. P.
Cardamine resedifolia, A. P. G.
Brassica montana, A. P. G.
Thlaspi alpestre, A. P.
Arabis cebennensis.
Arabis alpina, A. P. G. L.
Viola sudetica, A. P.
Viola biflora, A. P. L.
Viola palustris, A. P. G. L.
Astrocarpus sesamoïdes, P.
Silene ciliata, P.
Silene rupestris, A. P. G. L.
Dianthus cæsius, A.
Alsine verna, A. P.
Cerastium lanatum, P.
Cerastium alpinum, A. P. G. L.
Trifolium alpinum, A. P.
Trifolium spadiceum, A. P.
Trifolium badium, A. P.
Trifolium pallescens, A. P. G.
Genista Delarbrei, P.
Genista purgans, P.
Sorbus Chamæmespilus, A. P.
Geum montanum, A. P.
Alchemilla alpina, A. P. G. L.
Circæa alpina, A. P. L.
Epilobium trigonum, A.
Epilobium origanifolium, A. P. G. L.
Sedum annuum, A. P. G.
Sedum repens, A. P.
Sedum brevifolium, A. P. G.
Saxifraga exarata, A. P.
Saxifraga stellaris, A. P. G. L.
Saxifraga Aizoon, A. P. L.
Saxifraga rotundifolia, A. P.
Saxifraga bryoides, A. P.
Bupleurum longifolium, A.
Meum Mutellina, A. P.
Meum athamanticum, A. P.
Angelica pyrenaica, P.
Lonicera alpigena, A. P.
Galium saxatile, A. P.
Doronicum austriacum, P.
Adenostyles albifrons, A. P.
Senecio leucophyllus, P.

Senecio Doronicum, A. P. G.
Erigeron alpinum, A. P. G. L.
Gnaphalium supinum, A. P. L.
Gnaphalium norwegicum, P. L.
Petasites alba, A.
Cirsium rivulare, A. P.
Leontodon pyrenaicum, A. P.
Hieracium aurantiacum, A.
Hieracium longifolium, A. P.
Crepis grandiflora, A. P.
Crepis succisæfolia, P.
Sonchus alpinus, A. P. L.
Jasione perennis, P.
Campanula linifolia, A. P.
Phyteuma Halleri, A. P.
Phyteuma hemisphericum, A. P.
Empetrum nigrum, A. P. L.
Arbutus Uva-ursi, A. P. G. L.
Gentiana verna, A. P. G.
Gentiana angulosa, A. P.
Swertia perennis, A. P.
Ramondia pyrenaica, P.
Veronica alpina, A. P. G. L.
Bartsia alpina, A. P. L.
Pedicularis comosa, A. P. G.
Pedicularis foliosa, A. P.
Pedicularis verticillata, A. P. G. L.
Euphrasia minima, A. P. G.
Pinguicula grandiflora, A. P.
Androsace carnea, A. P.
Soldanella alpina, A. P.
Plantago alpina, A. P.
Rumex alpinus, A. P.
Salix herbacea, A. P. L.
Salix lapponum, P. ? L.
Salix repens, A. P.
Salix phylicifolia, A. P. L.
Juniperus nana, A. P. G. L.
Listera cordata, A. P. L.
Orchis globosa, A. P.
Orchis albida, A. P. L.
Crocus vernus, A. P.
Allium victoriale, A. P.
Streptopus amplexifolius, A. P.
Luzula spicata, A. P. G. L.
Luzula glabrata, P. L.
Juncus alpinus, A. P. G. L.
Carex pauciflora, A. L.
Carex filiformis, A. P. L.
Eriophorum alpinum, A. L.
Festuca rhætica, A. P.
Festuca spadicea, A. P. G.
Poa alpina, A. P. G. L.
Agrostis rupestris, A. P. L.
Phleum alpinum, A. P. L.
Allosorus crispus, A. P. G. L.
Lycopodium Selago, A. P. L.

Ces cent espèces représentent la flore la plus alpine de notre contrée, et si nous recherchons quelles sont les localités qui peuvent nous avoir envoyé ces espèces, nous ne trouvons que les Alpes, les Pyrénées, la Laponie ou les montagnes du royaume de Grenade. Toutes nos montagnes élevées sont placées, à des distances très inégales, entre ces quatre localités que nous pouvons considérer comme des centres d'émission.

En recherchant les relations qui existent entre nos espèces boréales du plateau central et celles des contrées que nous venons de citer, nous trouvons :—

16	espèces	communes aux quatre contrées comparées ;
82	,,	communes aux Alpes et aux Pyrénées ;
7	,,	propres aux Alpes et non aux Pyrénées ;
14	,,	propres aux Pyrénées, inconnues dans les Alpes ;
0	,,	propres aux montagnes de Grenade seulement ;
0	,,	propres à la Laponie seulement ;
10	,,	communes aux Alpes, aux Pyrénées, et aux montagnes de Grenade ;
21	,,	communes aux Alpes, aux Pyrénées, et à la Laponie.

Nous devons conclure de cet examen que la flore alpine du plateau central ne lui appartient pas, mais se compose, à l'exception de *l'Arabis cebennensis*, de plantes colonisées, et comme toutes ces espèces habitent également les Alpes ou les Pyrénées, nous devons supposer que ce sont ces deux chaînes de montagnes importantes qui ont peuplé les points suffisamment élevés de l'Auvergne. Nous n'avons pas besoin de rechercher si certaines plantes des Alpes n'ont pas eu leur paradis en Scandinavie, si des espèces du midi de l'Espagne ne se sont pas colonisées dans les Pyrénées, nous pouvons simplifier la question en admettant que nos montagnes ont été peuplées à une époque géologique très récente par des émigrés partis des Alpes ou des Pyrénées.

L'ensemble de la végétation du centre de la France a les plus grands rapports avec celle de la chaîne des Pyrénées ; ce sont les mêmes espèces, les mêmes variétés locales, et d'ailleurs, tandis que nous avons 14 espèces propres seulement aux Pyrénées, nous n'en avons que 7 existant dans les Alpes et non dans les Pyrénées.

Cet état de choses s'accorde parfaitement avec notre situation entre les Alpes et les Pyrénées. Là se trouvent les points de départ de toutes nos espèces, lesquelles, ainsi que nous l'avons dit, n'ont pu arriver en Auvergne, qu'après les éruptions volcaniques et par conséquent à une époque récente.

Les points de départ une fois incontestés, nous n'avons plus qu'à rechercher les moyens de transport.

Il ne faut pas oublier que de grands espaces séparent les montagnes de l'Auvergne de celles des Alpes et des Pyrénées, que ces espaces sont des plaines, sans aucune montagne qui puisse servir de point de répos ou de relai aux espèces émigrantes des chaînes primitives.

Une hypothèse, insoutenable selon nous, a été mise en avant par un savant dont nous adoptons d'ailleurs les idées sur l'origine des espèces, puisque nous avions publié avant lui des doctrines analogues (*Études sur la géographie botanique de l'Europe*, T. 1, page 140 et T. 4, pages 245 et 277).

M. Darwin, comme la plupart des géologues, admet sur la terre une période de froid ; " Le monde entier," dit-il, " ou du moins une grande partie de sa surface a subi un abaissement simultané de température pendant toute la durée de l'époque glaciaire."

Ceci admis, rien ne s'oppose à ce que les plantes alpines ou boréales, puissent voyager dans de bonnes conditions, traverser des plaines soumises aujourd'hui à une trop grand chaleur et se propager de proche en proche comme les espèces communes et robustes.

Plus tard, le climat venant à changer, les espèces boréales ne peuvent plus vivre dans les plaines, mais les individus se réfugient sur les sommets, où nous les trouvons encore de nos jours.

Or, comme l'époque glaciaire est postérieure à l'élévation de nos volcans, les plantes des Alpes et des Pyrénées, toujours dans cette supposition, seraient arrivées facilement sur les sommets du mont Dore et du Cantal.

C'est précisément cette periode de froid que nous voulons combattre, et il nous sera facile de prouver, tout en admettant l'ancienne extension des glaciers, que la cause de cette extension et de tous les phénomènes glaciaires n'est pas due à une période de froid, mais au contraire, à une température plus élevée que celle qui règne à notre époque.

Lorsque tout nous prouve sur la terre une diminution lente de la température depuis l'époque tertiaire jusqu'à nos jours, diminution évidemment due à une moindre radiation solaire, il y a presque un contresens à intercaler une période de froid.

Cette période frigorifique est d'autant moins nécessaire qu'elle est en opposition avec l'extension bien constatée des anciens glaciers. Les preuves, c'est que les glaciers sont formés par la neige et que la neige est le résultat de la condensation des vapeurs atmosphériques. Or, on n'est jamais parvenu à créer de la vapeur sans chaleur, et comme toute la masse des glaciers a été suspendue dans l'atmosphère, il a fallu, lors de leur extension, une évaporation plus active, et un climat plus chaud pour produire de plus grands résultats.

Nous ne nous étendrons pas davantage sur l'impossibilité d'obtenir des glaciers étendus par un abaissement de température, nous avons publié à ce sujet divers mémoires dans les comptes rendus de l'Académie des Sciences et un volume entier, portant la date de 1847 (Des Glaciers et des Climats, 1 vol. in 8).

Depuis lors et plus de dix ans après notre publication, des hommes de mérite, et notamment des savants Anglais tels que M. M. Frankland et Tyndall ont émis des idées analogues, et les ont trouvées si naturelles qu'il ont cru être les premiers à les émettre.

Nous ne pouvons donc pas considérer la période glaciaire comme résultant d'un abaissement de température ; nous ne pouvons non plus accepter l'extension des glaciers au delà d'un certain rayon autour des montagnes; l'hypothèse admise par M. Darwin sur la migration des plantes alpines à travers les plaines n'est donc pas soutenable.

Nous éliminons ainsi la migration par terre et nous sommes réduits aux voyages aëriens pour peupler les sommets de nos montagnes.

Si nous pouvons compter sur les insectes pour le transport du pollen des fleurs, nous ne pouvons pas supposer qu'ils aient jamais pu transmettre des graines à de grandes distances. Nous arrivons ainsi par voie d'élimination, aux seules causes qui aient pu servir la migration, *les oiseaux et les vents.*

Nous ne pouvons nier la dissémination à distance par les oiseaux. Ce sont eux qui ont aggrandi l'aire d'expansion des plantes aquatiques ; ce sont eux aussi qui ont dû transporter une partie des espèces des îles aëriennes.

Nous n'avons aucun doute pour les plantes dont les semences sont enfermées dans des baies alimentaires, puisque l'on sait depuis longtemps que certaines espèces s'avancent, dans les régions polaires, jusqu'à des latitudes où leurs fruits ne peuvent plus mûrir. Toutefois, nous n'avons sur nos montagnes qu'un petit nombre d'espèces à fruits charnus ; nous pouvons citer : le *Sorbus Chamæmespilus*, le *Lonicera alpina*, l' *Empetrum nigrum*, l' *Arbutus Uva-ursi*, le *Juniperus nana*, le *Streptopus amplexifolius*, nombre bien petit relativement à l'ensemble. Mais nous croyons que les oiseaux peuvent emporter avec eux, à leur insçu, une foule de semences tombées sur leurs plumes ou attachées à leurs pattes humides ou couvertes de boue. Il se peut donc que cette dissémination des sommets ne soit pas encore terminée et que nous puissions espérer encore de nouveaux émigrés.

Le transport par les oiseaux nous paraît d'autant plus possible que beaucoup d'entre eux changent chaque année deux fois de patrie. Quand les oiseaux des régions polaires sentent les vents du Sud qui viennent leur apporter de la chaleur, alors que les contrées qu'ils habitent se couvrent de neige, ils s'avancent contre le vent qui est leur boussole pour aborder de moins rudes climats. Au printemps, quand la chaleur se prononce, les vents du Nord les rappellent dans leur patrie, tandis que d'autres espèces, émigrées du Sud reviennent et s'arrêtent dans les pays que le printemps vient embellir de tous ses dons.

Il y a sans doute des rélais dans ces voyages, et la position des montagnes de l'Auvergne, situées à égale distance des Alpes et des Pyrénées, est certainement pour eux un lieu de repos momentané dont ils payent le séjour par l'abandon de richesses dont ils ignorent le prix.

Pourquoi ne pas admettre ces échanges et cette solidarité de tous les êtres de la création ? Quand on songe à cet admirable tableau de la vie, à cette animation qui règne sur la terre partout où le soleil vient la frapper de ses rayons, on reste convaincu de cette profonde vérité que tout s'enchaîne dans la série des êtres et qu'il existe entre eux une réciprocité de services incontestables. C'est l'équilibre de la vie, maintenu souvent par la destruction et la mort qui changent accidentellement les nuances du tableau sans en altérer les lignes et la composition générale.

Si maintenant nous demandons aux météores leur part d'action dans le peuplement de nos sommets volcaniques, nous reconnaîtrons que les courants aëriens, les vents, plus ou moins rapides, peuvent aussi être invoqués comme des messagers chargés par la nature d'importantes missions.

Quand on songe à tous les corps que les vents peuvent entraîner, à ces pluies extraordinaires colorées par le pollen des plantes ou des argiles ferrugineuses, à ces chûtes de Lichens, de Batraciens, etc., il faut bien reconnaître au vent une certaine puissance. Combien de fois n'avons nous pas vu, en Auvergne, les trombes, les ouragans, les cyclones, soufler avec violence pendant des journées tout entières et transporter au loin des corps sans contredit plus pesants que toutes les semences indiquées dans notre liste.

En effet, à l'exception des baies que nous avons citées, tout ces plantes ont des graines d'une extrême finesse. Les plus volumineuses sont celles des Légumineuses et des Ombellifères, et l'on ne peut méconnaitre que le vent soit capable de les transporter à de grandes distances; du moment où l'on admêt que les cyclones peuvent apporter jusqu'en Europe des infusoires d'origine Américaine ou des poussières du Sahara Africain, il n'y a pas de raison pour que ces violents courants aëriens ne se chargent pas aussi de la transmission des graines.

On exagère, dans la plupart des ouvrages de botanique, le rôle des aigrettes et des appendices attachés aux semences comme moyen de transport. Ainsi, en comparant dans notre ouvrage sur la géographie botanique de l'Europe (Tome 9, p. 423), l'étendue de l'aire d'expansion des espèces aigrettées et de celles qui sont dépourvues de cet appendice, nous avons trouvé une différence insignifiante, et M. de Candolle en faisant le même travail pour l'ensemble des espèces de la grande famille des Synanthérées a trouvé une puissance expansive plus grande pour les espèces sans aigrettes que pour celles qui en sont munies. On comprend d'autant mieux ce résultat que, presque toujours, l'aigrette se détache de la graine à sa maturité, et voyage seule dans l'atmosphère. Cet organe a probablement d'autres fonctions à remplir que celle de véhicule et le but réel des organes n'est pas toujours celui qui est le plus apparent.

Les plantes dont les graines elles-mêmes sont pourvues d'aigrettes ou de poils très-adhérents ont, en général, une aire d'expansion très-étendue, tels sont les *Salix*, les *Epilobium*, etc. Toutefois, malgré notre peu de confiance dans l'utilité des véhicules dont les graines peuvent se servir, il n'est pas moins rémarquable de voir que sur les 104 plantes arrivées récemment sur nos sommets volcaniques, on en compte 22 munies d'aigrettes de soies, ou d'appendices propres à faciliter leur transport.

Ce sont donc les vents et les oiseaux qui ont émaillé notre flore de ses plus brillants attributs; espérons que leur mission n'est pas terminée, et qu'ils ajouteront de nouvelles richesses à celles qu'ils nous ont dejà accordées.

ON THE CLIMATE, FLORA, AND CROPS OF IRELAND.

By DAVID MOORE, Ph. D., F.L.S., M.R.I.A., &c.; and ALEXANDER GOODMAN MORE, F.L.S, M.R.I.A., Glasnevin, Dublin.

[Plate VIII]

THE climate of Ireland is exceptional, as contrasted with that of Great Britain and of other parts of Europe lying under the same isothermal line, and is worthy of consideration both as affecting the flora of the country and some of its horticultural and agricultural crops.

The western and south-western parts of the island furnish the most remarkable meteorological phenomena, and are, consequently, those to which the following observations more particularly apply.

Whether we consider the average temperature of the whole year, the mean diurnal temperature, or the mean temperatures of summer and winter, each affords peculiarities which we believe to be without a parallel in any other part of Europe.

The most remarkable of these, and that which has the greatest effect on tender plants and the ripening of fruits, is the slight difference, comparatively, which has been found to occur between the average heat of the three summer months, June, July, and August, and the three winter months, December, January, and February.

The Rev. Dr. Lloyd, of Trinity College, Dublin, in his elaborate memoir, published in the Transactions of the Royal Irish Academy (vol. 22, part 5), has ably demonstrated that the winter temperature of Ireland is much higher than might be expected from the latitudinal position of the country, inasmuch as the mean thermic anomaly, or the excess of the mean temperature of the year, 50·3 degrees Fahrenheit, is 12½ degrees above the average temperature due to latitude 37·07. The corresponding excess of heat for the month of January is 27 degrees, so that the winter temperature in Ireland is nearly as high as if its place on the globe had been 15 degrees nearer to the equator. The difference between summer and winter temperatures is also the smallest in Europe. On the western side of Ireland the difference in some instances amounts only to 14 degrees Fahrenheit, while on the east coast at Dublin it is 17½ degrees, with a varying range of temperature inland, gradually rising as the west coast is approached, but lowering from the coasts towards the centre of the island.

The mean diurnal difference is also small, being on an average of the year about 11·07 degrees for the whole island, but on the west coast it falls as low as 10·03 degrees.

On the western and southern sides of Ireland the annual fall of rain and great amount of vapour or humidity held suspended in the air are very remarkable in a meteorological point of view. According to Dr. Lloyd's tables, already referred to, the average amount of rain which fell over the whole island during the year 1851 was 34½ inches. The least fall, being 21½ inches, occurred towards the east coast at Portarlington, in Queen's County, and the greatest fall at Cahirciveen, on the south coast, where the amount was 59·04 inches.

Over the whole island the average amount of humidity in the air is about 88 per cent. of what it is capable of holding, but on the west coast it rises as high as 90 per cent., a fact which, if considered alone, will be found sufficient to act prejudicially on the ripening of crops. But the chief cause of the high winter temperature, and of the slight difference which has been found to occur between the summer and winter means, on the west coast of Ireland, is no doubt principally owing to the influence of the Gulf Stream, which has been computed by Maury to flow at a rate averaging about 55 miles *per diem* in the middle of the Atlantic Ocean, its average heat being about 75 degrees. The warm vapour rising from so great a body of heated water is carried towards the British Islands by the prevailing south-west winds, but is more especially borne towards the west coast of Ireland. This vapour-laden air both absorbs the heat of the sun and prevents its rays of light from having the full effect in warming the earth which they would have if they passed through an atmosphere containing less vapour; besides, the frequent state of nebulosity of the sky on the west coast greatly diminishes the amount of sunshine there.

It has been ascertained that the portion of the Gulf Stream which sweeps along the western side of Ireland is warmer than the land by 3·8 degrees Fahrenheit on an average for the whole year; the difference between sea and land being greatest in winter, when it is about 5½ degrees, but in summer only about 1·08 degree.

Judging from these statements, it will be readily understood that vegetation must be greatly affected by such climatal peculiarities.

FIRSTLY, WITH REFERENCE TO THE INDIGENOUS FLORA.

The mild equable winter temperature on the south and western sides of Ireland spares and preserves some plants which, if cultivated, perish in many other parts of Britain, and which have been found to suffer even when removed from the west to the east coast of Ireland. But, when the climatal conditions and isolated position of the country are considered together, there are probably fewer native plants in Ireland which are absent from Great Britain than might be expected.

Very few can be quoted as being peculiar to the country, and the most remarkable among them is *Neottia gemmipara* Smith, which Professor Reichenbach, following Lindley, considers to be marked by structural characters sufficient to distinguish it from the well known *Spiranthes cernua* of North America. At the same time there are respectable authorities who believe that the Irish and American plants are one species. From not having had an opportunity of comparing living specimens of the two plants, we do not venture to offer an opinion on the merits of the case, and for the present can only invite attention to the opposite views held on the subject by equally eminent botanists.*

As other examples we might also cite—

Saxifraga elegans, Mackay.
Saxifraga hirta, Smith.
Saxifraga affinis, Don.
Saxifraga Andrewsii, Harvey, which are also supposed to be peculiar to Ireland, but exception has been taken to some of them respecting their merits to rank as distinct species.

The few which are natives of Ireland, and not found in Great Britain proper, are the following:

* Since this paper was read, we have learned from Professor Reichenbach, that the true Irish plant has been lately discovered on the north-west coast of America, and also in a valley among the Rocky Mountains.

MEDITERRANEAN Species.

Arbutus Unedo, L.

which is certainly indigenous in the counties of Cork and Kerry.

WEST EUROPEAN Species.

Erica mediterranea, L.
Daboecia polifolia, D. Don.
Helianthemum guttatum, Mill.
Saxifraga Geum, L.
Pinguicula grandiflora, Lam.
Erica Mackaiana, } Probably hybrids.
Saxifraga hirsuta, }

AZOREAN Species.

Neotinea intacta, Reich.
Asplenium acutum, Bory.

To these may be added Trichomanes radicans, Sw., which in the British isles is mostly confined to Ireland.

NORTH AMERICAN Species.

Sisyrinchium anceps, Lam.
Naias flexilis, Rostk,

which is more abundant in North America than it is in Europe.

To which will be added Neottia gemmipara, by those botanists who consider the Irish and American plants identical.

NORTH and MIDDLE EUROPEAN Species.

Carex Buxbaumii, Wahl.
Arenaria ciliata, L.
Inula salicina, DE C.

Among the more remarkable plants belonging to Watson's ATLANTIC type, occurring also in England, are the following :—

Meconopsis cambrica, Viguier.
Senebiera didyma, Pers.
Mathiola sinuata, R. Br.
Raphanus maritimus, Sm.
Viola Curtisii, Forst.
Linum angustifolium, Huds.
Lavatera arborea, L.
Erodium moschatum, Sm.
,, maritimum, Sm.
Sedum anglicum, Huds.
Cotyledon Umbilicus, L.
Carum verticillatum, Koch.
Crithmum maritimum, L.
Rubia peregrina, L.
Inula crithmoides, L.
Wahlenbergia hederacea, Reich.
Erica ciliaris, L.

Bartsia viscosa, Benth.
Sibthorpia europea, L.
Orobanche hederæ, Duby.
Pinguicula lusitanica, L.
Statice occidentalis, Lloyd.
Euphorbia hyberna, L.
,, Peplis, L.
,, portlandica, L.
,, Paralias, L.
Rhynchospora fusca, Sm.
Scirpus Savii, S. and M.
Carex punctata, Gaud.
Bromus madritensis, L.
Lastrea æmula, Brack.
Asplenium lanceolatum, Huds.
Adiantum capillus-veneris, L.
Hymenophyllum tunbridgense, Sm.
,, Wilsoni, Hook.
Trichomanes radicans, Sw. (before mentioned).

A very few plants belonging to Watson's Germanic type reach the eastern side of Ireland, but do not spread far to the south, with the exception of Potamogeton nitens. Under this head we notice

Turritis glabra, L.
Galium erectum, Huds.
Crepis taraxacifolia, Thuil.
Senecio viscosus, L.
Glyceria Borreri, Bab.
Hordeum sylvaticum, Huds.
Potamogeton nitens, Weber.

All these are very rare and local, and are included within a narrow space on the east side of Ireland, with the one exception.

Associated with these in the counties of Down and Antrim, occur also:

Hottonia palustris, L.
Hypericum montanum, L.
Adoxa moschatellina, L.
Chrysosplenium alternifolium, L.

all of which point to a probably more recent migration at the north end of St. George's Channel.

Astragalus Hypoglottis, L.
Monotropa Hypopitys, L.
Teucrium Scordium, L.
Orchis pyramidalis, L.
Bromus erectus, Huds.

are examples of plants belonging to the same type, but which extend to the west of Ireland.

The total Flora of Ireland (phænogamic plants and ferns together) may be estimated at about 990 species, some 18 of which are not found in Great Britain.

Taking the entire numbers of each, we shall have for Ireland about 1,000, to about 1,450 in Great Britain; a proportion less for Ireland than would probably occur if the two islands had remained still united.

In making these brief remarks on the Flora of Ireland, cut off from Great Britain and the north of France at a time when the immigration of species was incomplete, we cannot here avoid referring to the well-known and thoughtful essay of the late Edward Forbes,* whose genius first divined, and then partly proved, the former geological distribution of land, which effected the present dispersion of plants in Ireland and Great Britain. While we cannot but admire the originality of the views held by Forbes on these subjects, we think that even this brief paper has shown, that some of his groups or Floras are too little defined in nature, especially the north French and west French Floras, which may owe as much to climatal conditions as to geological changes. The western species have probably existed on the western margin of the great European continent from the time since first the arterial sea currents of the great Gulf Stream have run from south to north. Whether its warm vapours have tempered the coast of a former "Atlantis"—whether Kerry, Connemara, Mayo, and Donegal, are now the few remaining headlands, and as it were the last bulwarks of a coast that for ages past may have fronted the ever encroaching ocean, is problematic at the present time, and may for ever be hidden from our knowledge.

SECONDLY, WITH REFERENCE TO THE EFFECTS OF CLIMATE IN IRELAND ON RIPENING FRUITS AND CROPS.

In order to strengthen our own opinion, founded upon the observations and experience of many years, we have made a number of inquiries on this head, from competent persons residing in the different localities mentioned, whose replies to queries sent to them are herewith appended. They show generally that the warm, equable, and moist climate is not favourable for the ripening of fruits and seeds.

Dr. Molyneux, one of the earliest writers on Irish plants and crops, long ago made many accurate remarks on the effects of the climate of Ireland on crops. Referring to the wall fruits, he states, "If larger in size and more plumped up, the wall fruits are certainly not so sweet and highly flavoured as in the drier climate of England." But with reference to green crops he states, "Collyflouers, skirrets, apricocks, are certainly fairer, larger, and better in Ireland than in England, which must proceed from this country being moister than England." "Appendix to *Threlkeld's Synopsis Stirpium Hibernicarum*" (1726).

In any country where the surface is much undulated, like that of Ireland, there will always be a few scattered places favoured by soil,

* Edward Forbes, on the connexion between the distribution of the existing Fauna and Flora of the British Isles, and the Geological changes which have affected their area. GEOLOGICAL SURVEY of GREAT BRITAIN. Memoirs. Vol. 1, p. 336. 1846.

shelter, and climate, where fruits and other comparatively tender crops will grow and ripen well, but those exceptional cases are not sufficient to prove that the country is generally well adapted for such purposes. No doubt the nature of the soil is a very important condition, but the comparatively low summer temperature in Ireland, and especially the large amount of moisture which the air contains, on the western side of the island, are peculiarities in themselves sufficient to account for the uncertainty of ripening of fruits and other tender crops. A high winter temperature, when plants ought to lie in a partially dormant state, acts on them rather injuriously than otherwise, by keeping them excited; but in summer, when all their vital functions are in full vigour, a warm, moderately dry temperature, with a good amount of sunshine, are necessary for ripening and giving flavour to fruits as well as for ripening cereals. The principal difference between England and Ireland, in these respects, consists in the greater variation of the winter and summer temperatures, and also in the drier atmosphere of the former. The average temperature of the whole year is nearly equal in both countries, but in England the mean temperature of the three summer months is 60° Fahrenheit, whereas in Ireland it is only 58°. This difference of two degrees during summer renders the former country much more suitable for the cultivation of wheat, whilst our less warm, moister, and nebulous climate, often proves injurious to the wheat harvest. It has been shown by the Rev. Dr. Lloyd that in the centre of Ireland the deficiency of a single degree of summer temperature brings us to the very limit of wheat cultivation, while any greater deficiency is fatal to the crop. On the east coast of Ireland (as at Dublin), where the average temperature of the year is lower than it is on the west, and even the summer temperature hardly so high, yet the drier and clearer atmosphere which prevails on the east coast renders it much more suitable for the ripening of fruits and cultivation of wheat than on the west coast.

Nowhere in Ireland does the vine ripen fruit in the open air without protection, and in many places the more tender of stone fruits do not ripen regularly, and are, for the most part, deficient in flavour; yet the myrtle, *Myrtus communis*, survives the winter in the open air in Ireland, especially those parts that are near the sea coast. In the south, as at Castle Martyr, co. Cork, Camellias prove quite hardy, ripen their wood, and flower freely in the open air. Some plants which are natives of the north of India, and others from Australia and from the south of Europe, grow and flower well in the open air without protection, particularly in the southern and western counties. Among these we quote *Laurus nobilis*, *Erica arborea*, *Arundinaria falcata*, several species of *Eucalyptus* and New Holland *Proteaceæ*.

These facts, when compared with observations of a similar nature, made in parts of Europe lying under, or nearly under, the isothermal line of Dublin, prove this striking contrast—that in many countries where the vine is cultivated as a source of productive economy, yet the myrtle, *Laurus nobilis*, *Arbutus*, and, indeed, nearly all our beautiful hardy evergreen plants, require the protection of warm conservatories during winter.

We have still, however, to remark that plants are sometimes injuriously affected by the mildness of the Irish climate, which often continues up to a late period of the year. During the months of November and December our gardens are frequently quite gay with a profusion of Chrysanthemums, Arbutus, Laurustine, &c., all in full bloom at that time.

But when hard frosts occur after mild autumns, as frequently happens, on the eastern side of Ireland particularly, many plants suffer severely, in consequence of their young wood being soft and full of sap, by growth continuing active up to that late period of the year. Another circumstance which proves injurious to plants that are a little tender, is the great tendency in the Irish climate to change suddenly and frequently in winter. At Dublin we have occasionally experienced three changes of temperature, from freezing to thawing, within twenty-four hours, during which time Fahrenheit's thermometer ranged from 23 to 43 degrees.

Judging from these meteorological conditions which we have briefly noticed, it may be concluded that the Irish climate is not particularly favourable for the ripening of fruits and the wheat crop. But while that is the case, it may also be proved that owing to their combined influence Ireland is probably the most favourably circumstanced country in Europe for the cultivation of green crops and for the grazing of cattle. Turnips, mangel-wurtzel, carrots, and all the cabbage tribe, succeed to perfection when the soil suits them, and it is only too notorious that the great reliance which the peasantry of Ireland have so long placed on the cultivation of the potato, as almost the sole article of food, has often led to serious results.

The isothermal lines of mean annual temperature in Ireland, indicated on the map, have been taken from the "Atlantis." Mr. Hennessy, in his able article in that publication on the distribution of heat over the British islands, has pointed out that in Ireland they take the form of closed curves, according as the places traversed recede from the coast line, while at same time they are affected by their longitude and latitude.

In the answers from correspondents which follow, the degrees of temperature indicated are the nearest approximations to correctness we could make from the published data available on the subject.

The following answers to queries sent out have been received:—

County Cork.	Answers.
Place—Bantry House. Gardener—Robert Brennan. Latitude—51½ N. Longitude—10. W. Mean Annual temperature 52 degrees Fahrenheit. Mean Summer temperature—59·7. Mean Winter temperature—45·4.	Vine does not ripen fruit in open air. Peach and Nectarine ripen, but flavour not so good as when grown under glass. Sweet Chestnut does not ripen fruit. Observations: "This is not a good place for ripening fruits out of doors, as the latter part of summer is too cold and generally very wet, but we have not much frost in winter."

Answers.

Phormium tenax flowers and ripens seed. Veronica decussata, Veronica Andersoni, Desfontainea spinosa, Habrothamnus elegans, Mandevilla suaveolens, all grow well and flower. Laurus nobilis attains to a height of upwards of 30 feet. Escallonia macrantha makes a fine bush.

County Kerry.

Place—Killarney.
Gardener—Mr. Breeze.
Latitude—52 N.
Longitude—9½ W.
Mean Annual temperature—51.
Mean Summer temperature—59¾.
Mean Winter temperature—44½.

Vine does not ripen fruit in open air. Too much rain for Vines to succeed. Peaches do very well in many places of the country, and also Apricots. Have never seen the Nectarine grow in the open air in this neighbourhood. Figs succeed very well, especially near Tralee, as they also do in this neighbourhood. Apples and Pears ripen their fruit freely, and attain to a large size. They are, however, deficient in flavour, Pears especially. Walnuts and Sweet Chestnuts ripen their fruits wherever planted near Killarney. The Myrtle suffers sometimes in winter, but formerly there were large plants which grew in the open air here. Camellia japonica will do planted against a wall and slightly protected when the flowers are opening. Eugenia ugni fruits very freely here. Berberis japonica, Berberis Darwinii, Berberis Jamesoni, Ceanothus azureus, Ceanothus rigidus, Escallonia macrantha, and Veronicas flower very freely in open air, also Ozothamnus rosmarinifolius. Most of the fine hybrid Rhododendrons do remarkably well, also Azaleas. Many more would be likely to grow, if tried, of half-hardy plants. Lilium lancifolium, in its varieties, grows and flowers remarkably well in the open air here. Have seen 3000 flowers expanded at once in one bed of them.

County Galway

Clonbrock. About 20 miles from the Sea.
Gardener—Mr. McKenzie.
Latitude—53¼ N.
Longitude—9¼ W.
Mean Annual temperature—51.
Mean Summer temperature—58.
Mean Winter temperature—44.

The Vine does not ripen in the open air here. Peaches, Nectarines, and Plums ripen fruit freely in ordinary seasons on open walls. Sweet Chestnut and Walnut only ripen fruit in very good seasons. The better kinds of Apples and many of the hardier kinds of Pears ripen fruit on standards. Myrtle does not stand here without being injured, but nearer the sea coast it grows freely. Wheat does not ripen well at Clonbrock, but ripens freely in some parts of this county.

County Galway.

Castle Taylor, situated in the rocky limestone district, about six miles from the sea coast.
Gardener—Mr. W. Clark.

Peaches ripen every year with proper treatment, when planted against a wall facing the south. Nectarines ripen most years, but late varieties are very uncertain. Apricots ripen when planted against a south wall, but are not a certain crop. Figs ripen, but require protection after the leaves fall. Wheat ripens, but is generally somewhat deteriorated in quality by too much rain in autumn.

County Galway.	Answers.
Lough Cooter Castle. Gardener—Mr. McDermott. Latitude—same as Clonbrock, but only six miles from the sea.	Vine does not ripen fruit in open air. Peaches and Nectarines do not ripen with certainty on open walls. Apricots ripen only in sunny aspects, and in dry seasons. Various choice sorts of Apples and Pears ripen both on walls and as standards. Walnut ripens fruit annually at Lough Cooter. Sweet Chestnut ripens, occasionally, in fine summers only. Myrtle stands the winter, but is sometimes injured.
Moyen. Gardener—Mr. Carroll. Situated a short distance from the sea. Latitude, longitude, and temperature, nearly as at Clonbrock.	Vine does not ripen fruit in open air. Peaches ripen, Nectarines not so well. Good kinds of Apples and Pears ripen. Sweet Chestnut does not ripen. Myrtle, Aralia spinosa, Ceanothus azureus, Garrya elliptica, Skimmia japonica, Aristotelia Macqui, Buddlea globosa, Escallonia macrantha, Leycesteria formosa, Spiræa Lindleyana, Veronica Lindleyana, Araucaria imbricata, Cryptomeria japonica, Wellingtonia gigantea, Salisburia adiantifolia, Bambusa falcata, all grow freely. Hydrangeas and Fuchsias grow and flower well.
County Mayo.	
Westport House. Gardener—Mr. Dytch. Latitude—54 N. Longitude—9½ W. Mean Annual temperature—51·3. Mean Summer temperature—57·7. Mean Winter temperature—44·9.	Vine never ripens fruit here in open air. Plums, Apricots, and Figs ripened well in 1865, which was a very fine season. Sweet Chestnuts and Walnuts rarely ripen fruit. The Myrtle stands, but is sometimes injured by frosts. Laurus nobilis thrives, but is often greatly injured by gales of wind blowing from seaward. Hydrangeas and Fuchsias thrive and flower well.
Boat-haven Lodge, near Westport. Authority—Hugh Wilbraham, Esq.	Peaches do not ripen well except in good seasons, which is also the case with Nectarines and Apricots. Walnuts occasionally ripen. Sweet Chestnuts never do. Wheat only ripens well about every third year on an average. Veronicas, Hydrangeas, and Fuchsias thrive well without protection.
Hollymount. Authority—Mr. Simpson, a large and experienced farmer, and others. Situated similar to Westport, only 12 miles further from the sea.	Wheat seldom grown here. It ripens in ordinary seasons on limestone and gravel soils, but the early varieties do best, and require to be sown in winter to ensure a crop.
Belleck Manor House. Authority—Colonel Knox-Gore.	Peaches ripen every year. Nectarines ripen well in fine seasons. Apricots ripen annually. Figs ripen most years. Sweet Chestnut has ripened twice within the last fifteen years, viz., in 1857 and 1865. Wheat succeeds, but not well, on stiff soils.
County Sligo.	
Hazlewood. Gardener—Mr. John White. Latitude—54¼ N. Longitude—8½ W. Mean Annual temperature—47½. Mean Summer temperature—56½.	The Vine does not ripen fruit in open air. Peaches and Nectarines do not ripen fruit on open walls here freely. Apples and Pears do not ripen very freely. Walnut does not ripen, unless in very fine seasons. Hibiscus syriacus, Photinia serrulata,

Mean Winter temperature—39.

Answers.

Ozothamnus thyrsoidea, Ceanothus pallidus, Desfontainea spinosa, Thermopsis laburnifolia, Andromeda floribunda, Arundinaria falcata, Rhododendron arboreum, variety of. Woodwardia radicans and Adiantum pedatum, all grow freely without winter protection. Also Araucaria imbricata, Sequoia sempervirens, and Cryptomeria japonica. Some Evergreen Oaks make large trees.

County Fermanagh.

Florence Court.
Gardener—Mr. M'Donald.
Latitude—54¼ N.
Longitude—7½ W.
Mean Annual temperature—48·3.
Mean Summer temperature—56·5.
Mean Winter temperature—40·6.

The Vine does not ripen fruit in the open air. Peaches and Nectarines ripen fruit, but the trees do not prove quite hardy, even when planted on walls facing the south. Walnut seldom ripens fruit, although the trees grow freely. Sweet Chestnut does not ripen. Pears, such as Easter-beurré, Beurré-Rance, Beurré-Diel, Winter-nelis, ripen on open walls, but they are deficient in flavour. Myrtle does not stand in the open air. Tender plants do not grow well here: the mountain mists obscure the sun's rays in autumn, and prevent them from ripening their wood well, so that they are liable to be cut by frosts. Wheat is seldom cultivated here, but I have seen it ripen very well in some parts of this county.

County Donegal.

Lough Eske House.
Authority—Mrs. Brooke.
Latitude—55 N.
Longitude—8 W.
Summer temperature—58.
Winter temperature—41.

Have never heard of the Vine ripening fruit in the open air in county Donegal. Peaches in former years ripened their fruit in gardens at Lough Eske House, but not lately. They ripen well in the garden of Mrs. Hamilton, Fintree House, Killybegs, close on the sea coast. In the year 1859 a few Walnuts and Chestnuts ripened their fruit at Lough Eske, but we never knew of their doing so before or since. The large purple Bottle Fig ripens perfectly here, and also at Mrs. Hamilton's. The finer kinds of Apples and Pears ripen when planted against walls facing the south. At Lough Eske the Myrtle is either killed or greatly hurt in winter, but it lives through the winter close to the sea coast. Of the rarer plants, some of the scarlet-coloured and rose-coloured hybrid Rhododendrons grow and flower well. The Banksian Rose grows and flowers well. Solanum crispum grows as a standard, and is fourteen feet high, attached to a pole.

County Derry.

Coleraine.
Authority — Mr. Daly, Nursery and Seedsman.
Latitude—55¼ N.
Longitude—6¾ W.
Mean Annual temperature—48·8.
Summer temperature—56·0.
Winter temperature—41·5.

Vines are never planted out here; they would not do out of doors. Peaches do well here. Walnuts and Sweet Chestnuts do not ripen their fruit. The better kinds of Apples and Pears do well, both on standards and walls. Figs do not ripen fruit in the open ground; what wood they make in summer is killed again in winter. The Myrtle will not stand the winter in the open ground. The Wheat crop generally ripens well in this neighbourhood.

In the discussion which followed the reading of this paper, Professor Reichenbach, of Hamburg, made some remarks on *Neotinea intacta* (Reich. fil.) and on *Spiranthes gemmipara* (Lindl.), the substance of which is here given:—

As to *Neotinea,* Professor Reichenbach had been much struck with a careful drawing made from the living plant at Mentone, by Traherne Moggridge, Esq., a young and excellent English botanist. He had also felt a doubt as to whether there were two allied plants, or whether what he had seen in the Botanical Gardens of Leipsic was a malformation; for Mr. Moggridge had represented a very well marked bursicula and a rostellar process, as in an Orchis. Yet it happened that both Mr. Moggridge and Professor Reichenbach were right, the former gentleman having been kind enough to send living specimens to the latter. The truth is, that the apex of the whole of the rostellum is rolled inwards, and so produces quite the appearance of a bursicula. What seemed to be a rostellar process was nothing but a projection of the apex (nearly as represented in *Seemann's Journal of Botany,* 1866, tab. 25, fig. 5.) Professor Reichenbach took the opportunity of thanking Dr. Moore for a most precious gift of a dried Irish Neotinea, as well as for the equally precious present of a living *Spiranthes gemmipara* Lindl., which he had observed for weeks in all stages of expansion in his room. As to this plant, he could not agree with the eminent botanists who, since Professor Babington, had declared Lindley wrong in regarding the plant as different from *S. cernua.* Professor Reichenbach considered the species quite distinct. *S. Romanzoffiana,* the Unalashka plant, he regarded as identical with *S. gemmipara.* The plant had recently been found in the Rocky Mountains; and, speaking from memory, he said that the best distinguishing character was, that the lateral sepals were united at the base, as represented by Mr. Fitch in *Bot. Mag.* 5277, while they are free to the very base in the common *S. cernua.*

Since the meeting of the Congress, Dr. Asa Gray has favoured Professor Reichenbach with his opinions on the matter. Dr. Gray regards both species as quite distinct, and considers *S. Romanzoffiana* as identical with *S. gemmipara;* and has pointed out that *S. gemmipara* flowers earlier than *S. cernua.* In addition to the difference above alluded to between the two plants, Professor Reichenbach says, that the column is very broad under the stigmatic surface in *S. gemmipara,* while it is narrow in *S. cernua;* the callosities at the base of the lip (considered so important by the lamented Dr. Lindley) are quite adnate, and nowhere free and acute as in *S. cernua.* Finally, the rostellar teeth are slit in *S. gemmipara* quite down to the interior of the columnar body, while this is quite entire in *S. cernua.*

te VIII.

ON THE VEGETATION OF THE SOGNE FJORD, NORWAY.

By AXEL BLYTT, Christiania.

IN the immediate neighbourhood of this Fjord (or arm of the sea), and in the country bordering on it, all comprised under the name of Sogn, I have spent two summers in botanical researches. The variations in climate in that part of the western coast of Norway which lies to the south of lat. 63° being but trifling, most of what I have to say concerning Sogn will apply pretty generally to the whole of that portion of western Norway to which I have referred.

The Sogne Fjord stretches in lat. 61° N. from the Atlantic about 80 English geographical miles into the country, which, at this point, consists of an unbroken mountain plateau, rising to an average height of 4,000 feet. From the interior half of it, there branch off in all directions smaller Fjords, giving to the whole a resemblance to a tree, the trunk of which is called the Sogne Fjord, each of the branches having a separate name.

The inner portion of the Sogne Fjord is one of the most remarkable and grand districts in the whole of Norway. It is surrounded by steep, and often perpendicular mountain walls, from 3,000 to 4,000 feet in height. The eastern arms stretch far in among the wildest and most lofty of the mountain ranges of Scandinavia—the Jotunfjelds. They form an extensive table-land, which, at an average height of 4,000 feet, covers a space of more than 3,600 English square miles, and on which an endless number of sharp peaks, most of them more than 6,000 feet high, rise several thousand feet into the snow-region, from bases covered with eternal snow, and with black and inaccessible walls. The Skagastólstinderne, which reach the height of 8,400 feet, are distant only nine English miles from the Sogne Fjord.

On the plateau to the north of the Sogne Fjord is the Justedalsbræ, the largest mass of perpetual snow and glaciers on the European continent, covering a space of about 24 English geographical miles in breadth, and 56 in length.

In this manner Sogn is separated by uninhabitable mountains and wastes of snow from the other inhabited parts of Norway.

Such a physical construction must necessarily give rise to a no less characteristic vegetation. The proximity of the ocean, the vast mountain tracts and wastes of snow, have a powerful influence on vegetation. Between these masses of snow in the deep valleys an almost tropical heat is often developed in the summer, and the almost immediate proximity of physical influences, which have a directly opposite effect on vegetation, produces a most peculiar and multifarious Flora. Some of the more remarkable characteristics of the physical structure and the vegetation of the Sogn regions I will now attempt to portray.

From the Justedalsbræ, numerous glaciers stretch down into the valleys; some of them reach even nearly as far as the level of the sea; for instance, on the Fjærlands Fjord, one of the arms of the Sogne Fjord. In a valley rising from the shores of this Fjord is the extensive Suphellebræ, scarcely one English geographical mile from the sea. I found by the barometer that its lowest extremity was only 165 English feet above the level of the sea. There are scarcely any other glaciers which descend lower in the whole of Scandinavia. A nearly vertical mountain wall, from 3,000 to 4,000 feet high, rises above it, and at the top, with the sky in the back ground, is seen Justedalsbræ's wall of ice, cleft at the uppermost extremity into peaks and needle-like points of most singular and fantastic shapes. From the inexhaustible supply of ice from the principal glacier, the Suphellebræ is constantly being replenished with new ice as fast as the old thaws, and the peasants relate almost incredible stories of the frightful masses which at times come sweeping down, especially on warm summer days, when the thundering noise is heard for miles.

In another of the valleys of Fjærland, there is also a glacier extending far down—the Bojumsbræ. Its lowest extremity in the bottom of the valley I found to be only 423 feet above the level of the sea. This glacier, is, if possible, still finer than the Suphellebræ. A steep mountainous acclivity, of from 3,000 to 4,000 feet in height, is completely covered with the purest glacier ice, and on both sides of the enormous crystalline mass rise the wildest precipices.

On the moraines of these glaciers is found, at a slight elevation from the sea, a perfect Alpine Flora. On the moraines of the Suphellebræ, for instance, not more than 100 feet above the level of the sea, are found, amongst many other high Alpine plants, ***Agrostis rubra***, ***Salix herbacea***, ***Silene acaulis***, ***Veronica alpina***, &c. &c.

One would imagine that no luxuriant vegetation could thrive in these glacier valleys. But on the contrary, a most surprising luxuriance is often found here. The slopes of the mountains in the neighbourhood of Bojumsbræ's immense masses of ice are decked with so exuberant a vegetation, that in our cold northern climate it is difficult to find any other place more luxuriant. To an extent of about one English geographical mile, the mountain is covered from the bottom up to about 1,000 feet from the valley, with an extremely rich subalpine vegetation of ferns, often higher than the observer: for instance, the ***Asplenium Filix-fœmina***, ***Polystichum Filix-mas***, and ***P. Oreopteris***, as well as other plants, such as ***Digitalis purpurea***, ***Aconitum septentrionale***, ***Angelica sylvestris***, ***Ranunculus***, ***aconitifolius***, ***Mulgedium alpinum***, ***Campanula latifolia***, ***Hieracium prenanthoides***, ***Convallaria verticillata***, ***Milium effusum***, ***Phalaris arundinacea***, ***Chamænerion angustifolium***, ***Cirsium heterophyllum***, ***Stachys sylvatica***, &c. &c.

The glaciers are, however, not the only results of the perpetual winter in the valleys of Sogn. In the course of the winter and spring, frightful avalanches fall from the perpendicular mountain sides, and the snow sometimes accumulates in such masses in the bottom of the valleys, that the heat of the sun in the summer, however intense it may be, has but little effect upon it. In many places in Sogn there may be found, even in August and September, patches of snow, some of which, literally speaking, lie close down on the sea shore. Around these a few steps will take one through the whole circuit of the seasons, from the perpetual winter of the patch itself to the early spring at its edge, and thence to summer and late autumn only a few paces from it. At the edge of such patches I have found, even in the last days of August, *Viola palustris* and *canina*, and *Equisetum pratense*, flowering at the level of the sea.

The slight horizontal distance of the mountains from the sea is extremely favourable to those natural agencies which transport the alpine plants to lower regions. In Sogn, therefore, there are found almost everywhere, even on the rocks on the coast, plants which otherwise only grow on the high mountains. The numerous streams and torrents which often rush perpendicularly down a height of as much as 2,000 feet, from the tops of mountains to the bottom of the deepest valleys, carry with them in their impetuous course roots and seeds of plants peculiar to the higher regions. Many of these sprout and thrive remarkably well, even at the lowest elevations. One would suppose one's self in an arctic region, on perceiving such plants as *Saxifraga nivalis*, *Cerastium alpinum*, *Rhodiola rosea*, *Alchemilla alpina*, and many others, growing together with the sea-shore plants, and patches of snow in the immediate proximity, which remain unmelted in August and September. It will especially create surprise to learn that in these valleys of Sogn there are Vines, and Peach and Apricot trees, growing as espaliers, and yielding ripe fruit every summer, and likewise Walnut trees, which reach a greater size in Sogn than in any other part of Norway. Sogn is one of the best tracts for stone fruit; it is also the only place in Norway where wild woods of the *Prunus Avium* are found; here is also the largest orchard in Scandinavia (belonging to Mr. Formann). These narrow valleys among the lofty mountains, on the table-lands of which perpetual winter reigns, may in fact be considered as natural hothouses. Many of them are so narrow, and the surrounding mountains so high and projecting, that for more than half the year the sun never reaches them. I may mention, as something remarkable, that near the Næröfjord, one of the wildest branches of the Sogne Fjord, there is a small meadow or corn-field between the rocks, called by the peasants, "Sollöisa," which means "sunless," the place being so encompassed by projecting walls of rock, that the rays of the sun, even at midsummer, are unable to penetrate its depths. But in the summer, when the sun reaches the bottom of the valleys, the heated mountain walls produce an almost tropical temperature, which, together with the good supply of water, offers a ready explanation of the luxuriant vegetation, and shows how it is that such valuable kinds of trees can thrive.

I have now remarked on the influence which the mountains exert on vegetation; but that of the sea is also very powerful. In the western districts this influence is more obvious; it is shown negatively by the absence of many plants which in the eastern parts of Norway are among the commonest, and positively by the presence of several kinds of coast plants which are only found in the western parts of Norway, such as *Erica Tetralix* and *E. cinerea*, *Hypericum pulchrum*, *Digitalis purpurea*, *Ilex Aquifolium*, *Hymenophyllum Wilsoni*, *Centaurea nigra*, and *C. phrygia*, *Lysimachia nemorum*, *Primula acaulis*, *Bunium flexuosum*, &c., &c. The influence of the sea, however, cannot extend to the eastern extremity of the Sogne Fjord, for the high mountains and the tortuous course of the Fjord present a barrier to the sea fog and rainy clouds. With regard to the vegetation, there is a most striking difference between the barren rocks and promontories of the coast—totally deprived of trees or shrubs, gray and threatening, with innumerable swarms of sea fowl screaming around them, enveloped in impenetrable mist—and the fruitful valleys in the eastern parts of Sogn, shut in by majestic mountain walls, irrigated with murmuring streams, and heated with the summer sun of a more continental climate. In those coast regions all is barrenness; the vegetation consists of but little else than heath, covering bogs. In Inner (or Eastern) Sogn the steepest mountain sides alone are without vegetation, and the luxuriant growth at their base produces a most pleasant contrast for the eye. The trees consist chiefly of *Betula glutinosa*, *Alnus incana*, and *Pinus sylvestris*. It may here be mentioned that the Pine *(Pinus Abies)* is scarcely ever found in the west of Norway, from the Naze to Drontheim.

With regard to the power of coast plants to penetrate into the interior, I may say that I have never found one of the species peculiar to the west coast of Norway in the eastern parts of Sogn. The coast vegetation penetrates farther on the northern than on the southern side of the Sogne Fjord. This is the case with *Digitalis purpurea*, *Rubus fruticosus*, *Rumex obtusifolius*, *Narthecium ossifragum*, *Juncus squarrosus*, *Luzula maxima*, *Polystichum Oreopteris*, *Blechnum Spicant*, and others. Many of these species, which in reality are purely lowland plants, seem, in the eastern tracts more especially, to prefer the subalpine region, and leave the lowland parts for the mountain valleys, where the strong heat to which they are unaccustomed is considerably modified by the glaciers continually descending from the Justedalsbræ.

The sea exerts, too, a visible influence with regard to the height of the different lines of vegetation. The mountain vegetation is usually divided into belts; in Norway the belts are the limits for the cultivation of corn, and for the growth of the coniferous trees, the birch and the willows, and, lastly, the snow line. For a country like Sogn this division is scarcely suited; for these limits are not at equal altitudes everywhere in Sogn, and we may assume as a general rule, that the nearer the ocean, the lower these limits will descend. But this is not all; the relative distances change too, some limits descending more in the neighbourhood of the ocean than others.

This will be seen by reference to the following table, extracted from a more extensive one, of the limits of vegetation in Sogn.

The *limit of the Pine (Pinus sylvestris)*—

In Long.	23° 5′ E. (Ferro)	this tree reaches an altitude of 1,276 English feet above the sea.			
,,	24° 45′ E.	,,	2,774	,,	,,
,,	25° 35′ E.	,,	2,961	,,	,,

The *limit of the Birch (Betula glutinosa)*—

In Long.	23° 5′ E.	this tree reaches the same altitude as the fir, viz., 1,276 English feet above the sea.			
,,	23° 40′ E.	,,	1,944	,,	,,
,,	24° 15′ E.	,,	2,517	,,	,,
,,	24° 20′ E.	,,	2,878	,,	,,
,,	25° 20′ E.	,,	8,182	,,	,,
,,	25° 25′ E.	,,	3,412	,,	,,

The *limit of the Willows (Salix lanata, S. glauca,* &c.)—

In Long.	24° 20′ E.	,,	8,319	,,	,,

while that eastward of 25° Long. is nearly everywhere more than 4,200 feet above the sea, and that in Long. 25° 40′ is not lower than 4,677.

The *snow line* in Long. 24° 20′ is 4,749 feet above the sea, but in Long. 25° 10′ about 5,400 feet.

The distance between the limit of the birch and that of the pine varies thus considerably in different parts of Sogn, and the limit of the birch descends comparatively lower in the neighbourhood of the ocean than that of the pine. Whilst the limit of the birch in Inner (or Eastern) Sogn is 400 or 500 feet above that of the pine, both of the limits reach the same altitude in the most western districts.

In Justedalen, in the proximity of the glaciers, the limit of the pine sinks proportionately much lower than that of the birch. The limit of the pine, which in the same degree of longitude, but at a greater distance from the Bræ (or glaciers), reaches an altitude of 2,700 or 2,800 feet above the sea, descends here as low as 2,036 ; while the limit of the birch does not seem to be affected by the nearness of the Bræ.

The fluctuation of these limits, however, would not prevent their being applied to fix the limits of the vegetation, if the limits of the different herbaceous plants sank in the same proportion towards the west as those of trees and shrubs do. But this seems far from being the case.

Having carefully examined my measurements of altitude on the mountains in Western and Eastern Sogn, I have arrived at the conclusion that most of the herbaceous plants find their limit at an equal altitude in both parts of Sogn; their limits therefore rise higher in Western Sogn, when compared with that of trees and shrubs, than in Eastern. The proximity of the sea thus exerts a stronger influence in checking the ascent of arboreous and shrubby plants on the mountains than it does in limiting that of herbaceous ones, and the skerries are almost totally deprived of trees and shrubs.

Another difficulty in applying the generally received vegetation limits, which, however, is experienced not alone in Western Norway, consists in the lamentable fact that the limits of the birch and the pine on our mountains have, in the course of years, become much narrower; thus, thick pine roots are often dug up in mountain swamps at altitudes where not even the birch now grows, but where extensive forests of pine must once have existed. I could cite numerous instances of this fact, and I am afraid, if the matter were investigated in the different localities, it would be found universal. The principal reason of this lies in the improper manner in which the peasants treat these elevated forests, which, on account of the rigour of the climate, require to be especially protected. On these exposed spots it is difficult for them to shoot up again; they would, however, do so if the tender branches were not continually lopped off to serve as fuel at the chalêts.

ON THE STRUCTURE OF THE SEED IN SOLANACEÆ, &c.

By TUFFEN WEST, Frensham, Farnham.

[Plates IX., X., and XI.]

THE seeds of the *Solanaceæ* are remarkable for the rugosity of their surface, being scrobiculated or deeply pitted. Numerous observations were made under a binocular microscope of high power, and the structure was observed by making thin slices of the objects, longitudinally and transversely, by a sharp razor. The cancellated prominences seen around each depression, form sinuous intersecting bars, and are caused by the extreme thickening of the walls of the cells, owing to the deposition of solid matter upon the inner surface of the original cells, and the original cell itself may always be traced under the form of a very delicate pellicular membrane, seen not only over all the areolar spaces, but imbedded within the sinuous thickened ridges formed by the consolidated deposits upon the walls of each two adjoining cells. These depositions are considerably thicker towards the base of each cell, the lateral walls diminishing in thickness upwards, sometimes gradually, often rapidly, so as to present the appearance of a succession of rounded hillocks; this deposit, which has a corneous texture, is marked by a few slit pores. On the top of the ridges thus formed by the termination of each two contiguous walls fused together, prominences of different shapes are found, sometimes clavate, often in the form of eminences more or less elongated, such prominences being connected with one another by a band of structureless formation, which bridges over the spaces between them, the thickness of which is $\frac{1}{2000}$ inch. This is the general character of the seed in *Solanaceæ*.

In the *Scrophulariaceæ*, among forty species of different genera examined, the structure of the testa is essentially diverse: the cells are not so much elongated or irregularly angled, they are longer in the transverse than in the longitudinal direction, the sides of the intersecting walls are straighter, and the tubercular prominences that cover the integument, are formed of a resinous substance which fills the cavity of the somewhat bullated cells.

In the intermediate family, the *Atropaceæ*, which has been formed to embrace the many genera whose corolla have an imbricated æstivation, and which have been separated by Mr. Miers from the *Solanaceæ*, so as to render this last extensive family uniformly consistent in the valvate æstivation of the corolla, the structure of the testa is sufficiently distinct, although approaching nearer to the *Solanaceæ* than to the *Scrophulariaceæ*.

The following series of observations are arranged according to these three orders, and comprise the main facts hitherto observed.

SOLANACEÆ.—*Capsicum:* In *C. annuum* the compressed subreniform seeds have large depressions bounded by sinuous lines, the walls of the contiguous cells being enormously thickened by secondary deposit; in the middle of these walls may be seen the very thin lines formed by the original cells: on these lines are found projections that may be compared to nail heads when viewed as an opaque object under a moderate power of twenty-five to fifty diameters. In *C. baccatum* the testa with a similar structure has thick, yet translucent processes $\frac{1}{800}$ inch long, enlarging somewhat at their free ends, and which are occasionally united by fine oblique bands.

Lycopersicum has seeds remarkable for long hair-like processes proceeding from the sinuous cell-walls, which are constantly small; they attain a length of $\frac{1}{75}$ inch, and are shaped like a long sword-bayonet.

Cyphomandra: In *C. betacea* the ridges on the seed are of moderate height, closely set and covered, but not densely, with small granulations, the bars are numerous, and of extraordinary length ($\frac{1}{25}$ inch) along the edges of the seed, and one-half to two-thirds of that length over the general surface; they are $\frac{1}{2000}$ inch thick at their basal end, but taper a little more to their free extremities, which are slightly bifurcate; along their entire length are short projections, which appear as if shot out from the sides irregularly, and are sometimes slightly bifurcated. I consider these cross bars to represent a rudimentary form of netted tissue.

Solanum: The testa of *S. tuberosum* differs from all others of the genus in having straight sided, not sinuous, cell-walls to which are attached a few tapering processes $\frac{1}{500}$ inch long.—The testa of *S. capsicastrum* much resembles that of a *Capsicum;* the processes, however, do not reach the length of $\frac{1}{300}$ inch towards the end of the seed.—*S. melongena* has cells with extremely sinuous thick walls, and processes somewhat united together.—*S. auriculatum* nearly resembles the last, with the addition of pearly granules thickly scattered.—*S. giganteum* has numerous fine very tapering processes.—

S. indicum has the outer cell-wall beautifully marked with delicate curved lines, a continuation of the processes, which are very short, fusing into a translucent membrane, so as to form a barred tissue. Here, as in the following species, the cell-walls present a very unusual condition, the basal portion being thrown up into greatly-elevated ridges, along lines almost invariably sinuous, marking the original cell-walls: from the summit of these ridges, thickened by an excessive amount of secondary deposit, a peculiar form of barred tissue arises, in some cases simple, in others branched, which passes through a series of modifications into a complete netted tissue. These cell-walls are sometimes elevated two or three times the width of the cells above the apparent floor, the processes arising from it.—*S. laciniatum:* the rugose testa, viewed through a lens, seems covered by irregular, raised lines, which, under the microscope, are found to be the thick outlines of the cells: the basal portion is covered with fine elevated granules, without any definite arrangement; the lateral walls are formed by a strong irregularly-netted tissue, in continuation of which, over the outer cell-walls, the deposit becomes gradually thinner, the branches not unfrequently merge into the primitive cell-membrane, and so become lost.—*S. simile* has a structure like the last, but on a smaller scale, and finer.—*S. atropurpureum:* here the elevated portion, or cell-walls, are slightly ridged, laterally thickened only here and there with secondary deposit, forming when present, a strongly barred tissue tending to reticulation, the outer cell-wall being evanescent.—*S. jasminoides* has the inner cell-walls covered with large scattered tubercles, their thickened portion, or bars, are few, moderately long, slightly furcate, and rough with sharp projections.—*S. dulcamara:* the ridges have processes somewhat undulating, tapering, slightly hooked at their tips, and occasionally furcated.—*S. argenteum* has exceedingly short and inconspicuous processes on its very sinuous cell-walls.—In *S. nigrum* the processes are numerous and fine, of moderate length, and straight in their direction.—*S. Guineense* nearly corresponds with this in the structure of its testa, as well as in the outward appearance of the berry.—*S. citrullifolium* has a seed much resembling that of a *Datura*, of very dense horny texture, the ridges formed by the undulations of the greatly thickened cell-walls are $\frac{1}{100}$ inch deep, crowned by short close-set bars.

Physalis: in four out of five species examined, the inner cell-wall is thick, sinuous, pale yellow, with a texture of soft horn, with a few large slit pores in the basal part, the ridges being elevated $\frac{1}{150}$ inch, the bars of the lateral walls being represented only by fine short lines. In *P. alkakengi* traces of the thin pellicular outer cell-walls only are visible. In the fifth species (name unknown) the cells have a moderately sinuous outline, the inner walls being covered with fine granules, arranged without regularity: the lateral walls are represented by thin, broad, very transparent bars, spreading at their apices, to form an open network with rounded spaces: on the pellicular outer cell-wall, near their lines of union, two of these bars are in some instances connected together by a single transverse bar, a little nearer their origin than half-way.

Cestrum: in *C. aurantiacum* and *C. roseum* the testa is composed of cells moderately ridged along their boundary lines, and strengthened by a strong irregularly netted deposit; the lateral walls are thin, with a few stout centrifugal bars; the thin, pale, outer wall has seldom any distinct appearance of secondary deposit.

Habrothamnus has seeds with a testa not differing from that of *Cestrum*.

Vestia: the testa in *V. lycioides* resembles that of *Cestrum*, but the cells are four times greater in one direction than in the other, the longer sides being transverse with the axis; the edges of the cells are raised into gentle ridges, their floor being covered with a strong network, which becomes more open on the ridges, and which are irregular in width and height.

Fabiana: the testa of *F. imbricata* much resembles that of *Petunia*, but the floor of the cells is thicker, with deeper and more obtuse ridges; it is finely granular over this portion, as well as over the roof, which is $\frac{1}{6000}$ inch thick.

Atropaceæ.—Among the genera examined were the following:—

Lycium: The seeds of *L. barbarum* have a structure somewhat resembling that of *Capsicum*, but the parts are more delicate, the undulations of the cell-walls extremely elegant, the processes almost obsolete, and with difficulty detected in the transverse section, the translucent band connecting them being reduced to a somewhat irregular faint line.

Hyoscyamus has seeds with cavities of comparatively large size, bounded by thick sinuous walls; the ridges are $\frac{1}{250}$ inch deep, their sides thickly covered with sharp-pointed crystalline granules of a brown colour, a few of them running in irregular lines over the floor of the cells; the pellicular outer cell-wall is extremely thin, finely reticulated, often evanescent, and $\frac{1}{7500}$ inch distant from the top of the ridge, this space being the depth of the side-walls, which are represented by points rather longer than the rest of the granules.

Atropa Belladonna, in the structure of its testa, corresponds closely with *Hyoscyamus*.

Petunia has a thin testa with large angularly sinuated cells, of a pale brown colour, having very close and fine elevated punctulations: in *P. nyctaginiflora* the floor of the cells is $\frac{1}{2000}$ inch thick, their depth being double that: in *P. phœnicea* the floor is $\frac{1}{3000}$ inch thick, with very sharp-angled ridges above $\frac{1}{1000}$ inch deep, the roof of the cells being a pale translucent membrane, covered with close, elevated, minute punctulations.

Nierembergia: the cells of the testa in *N. filicaulis* are very irregular in size, with four, five, six, or seven straight sides, only $\frac{1}{3500}$ inch thick in the central depressed portion, the raised margins about the same thickness, and $\frac{1}{300}$ inch in the height of the ridges, all this portion being minutely punctated: the outer cell-wall very thin, and seldom distinguishable.

Salpiglossis and *Browallia* have seeds which seen under a low power, are covered with scattered tubercles, originating from the produced angles of rather smaller straight sides, the cells being irregular in figure, and in the number of their sides, of which the longer are transverse to the axis; the floors of the cells are slightly roughened with a few sharp-pointed projections, which are larger at the angles of the cells; the fragments of the outer walls are thin and transparent.

Datura: has a testa always thick, hard, and tough, towards the middle of the seed frequently not more than $\frac{1}{500}$ inch thick; by undulation to an excessive degree, the margins of the basal portion of the cells are raised into high ridges, which are strongly netted, as is also the central depressed portion, in which the bands are still thicker, and leave sub-angular interspaces; around the margins of the ridges formed by the raised edges of the cells, this portion of the cell-walls is wholly beset with bullate excrescences, over which a translucent structureless membrane is stretched, closely attached to the bullæ as it passes over them.

In *D. Ceratocaulon* a similar structure is seen, the ridges (apparent side-walls) are here excessively thick; the lateral walls are thickened in parts, especially at the junction-angles of the cells, by strong perpendicular bars, sometimes united by oblique processes. The primitive membrane of this and the outer walls of the cells, is easily recognised by its full yellow colour: in the mature seed it is generally seen only in shreddy traces: minute stellate crystals are frequent in the cell cavities.

Nicotiana: the inner walls of the cells of the testa are thin, $\frac{1}{2000}$ inch, with moderately-elevated ridges, $\frac{3}{1000}$ inch, of a rich brown colour, and covered with closely packed fine granules: the outer cell-wall is merely a pale brown pellicle, almost absent in the ripe seed, and seems to approach close to the top of the ridges.

Scrophulariaceæ: as before mentioned, forty different species were examined, and the general structure of the testa has been explained. The following are somewhat exceptional instances:—

Verbascum is placed among *Solanaceæ* by some authors, but is generally classed in *Scrophulariaceæ*. The external surface of the testa is greatly corrugated, leaving deep cavities, bounded by thick elevated ridges; the dark corrugated tuberculiform portion, or inner cell-walls, are thrown into deep ridges and hollows, while the lateral walls are merely indicated by long tubercles on the summit of the ridges, and the fenestrated pellicle, a thin membrane, can be separated from the surface, marked by slender waved lines in the direction of the axis, crossed by more delicate transverse bars: this is the wall of the original cell. This structure approaches that of the *Solanaceæ*.

Celsia: the testa of its seed resembles that of *Verbascum*.

Alonsoa: its seed has a structure more conformable with that of *Scrophulariaceæ;* it is covered with short truncated tubercles, formed of a resinous substance which fills the cavities of the small, straight-sided, somewhat bullate cells: the outer and lateral walls are much shrunk in dry seeds, but by maceration they swell out, so as to be easily recognisable.

From these facts it may be inferred, that in some genera the species are not to be distinguished by any character resident in the outer integument of the seed, while other genera are strongly characterised by a peculiar structure of the testa, and this is notably so in *Solanum;* and moreover it has been shown in fifteen species of this genus examined, that each is marked by its own peculiar features.

Note on the Development.—By the kindness of T. Moore, Esq., I have been enabled to examine the development of the testa in species belonging to several genera. The length of this communication forbids me entering into details, and it must suffice on the present occasion to say that the opinions above expressed, on the nature of the tissues found in the mature testa, have been very satisfactorily confirmed.

EXPLANATION OF THE FIGURES.

(In every case two figures are given: 1st, a transverse section of the testa taken at about the middle of the seed, indicated by the letter *a;* and 2ndly, a section parallel with the surface, which is referred to by the letter *b.*)

Plate IX.

Fig. 1.—*Capsicum annuum: p p,* processes representing lateral walls; *o o,* outer walls; *i w,* the space included between the brackets, represents the inner walls of the cells of the testa, elevated into ridges, which have been cut through in making the section, and have now the appearance of hillocks.

Fig. 2.—*Lycopersicum edule.*

Fig. 3.—*Cyphomandra betacea: c,* the outer-wall of one of the cells, showing attachment to it of the unusually long processes.

Fig. 4.—*Solanum tuberosum.*

Fig. 5.—*S. capsicastrum.*

Fig. 6.—*S. melongena.*

Fig. 7.—*S. auriculatum.*

Fig. 8.—*S. giganteum:* The processes are represented at *b* attached to a portion of two of the cells at the edge of a seed.

Fig. 9.—*S. indicum: b* shows sinuous lines of secondary deposit, passing from the lateral over the outer cell-walls.

Fig. 10.—*S. laciniatum:* The principal cell represented in *b* shows a completely reticulate structure on the outer cell-wall; in the other portions the granulations on the inner walls are shown.

Plate X.

Fig. 11.—*Solanum simile.*

Fig. 12.—*S. atropurpureum:* Here the secondary deposit on the lateral walls is only present at intervals in the form of masses of strongly barred tissue.

Fig. 13.—*S. jasminoides:* The lateral walls, reduced to occasional solitary bars, slightly furcate and granulate.

Fig. 14.—*S. dulcamara.*
Fig. 15.—*S. argenteum.*
Fig. 16.—*S. nigrum.*
Fig. 17.—*S. Guineense.*
Fig. 18.—*S. citrullifolium.*
Fig. 19.—*Physalis Peruviana.*
Fig. 20.—*P. sp.?*
Fig. 21.—*Cestrum aurantiacum: b*, portion of inner, *c*, of outer cell-walls.
Fig. 22.—*Habrothamnus aurantiacus: b*, portion of inner, *c*, of outer cell-walls.
Fig. 23.—*Vestia lycioides.*

PLATE XI.

Fig. 24.—*Fabiana imbricata.*
Fig. 25.—*Lycium barbarum.*
Fig. 26.—*Hyoscyamus niger.*
Fig. 27.—*Atropa Belladonna.*
Fig. 28.—*Petunia nyctaginiflora.*
Fig. 29.—*Nierembergia filicaulis.*
Fig. 30.—*Salpiglossis sinuata.*
Fig. 31.—*Browallia elata.*
Fig. 32.—*Datura stramonium:* At the upper part of fig. *b* the bullate excrescences have been alone removed, with a delicate pellicle attached; the former, I conceive, represent the lateral cell-walls, the latter the outer cell-wall.
Fig. 33.—*D. Wrightii.*
Fig. 34.—*D. Ceratocaulon.*
Fig. 35.—*Nicotiana rustica.*
Fig. 36.—*Verbascum thapsus.*
Fig. 37.—*Alonsoa Warscewiczii.*

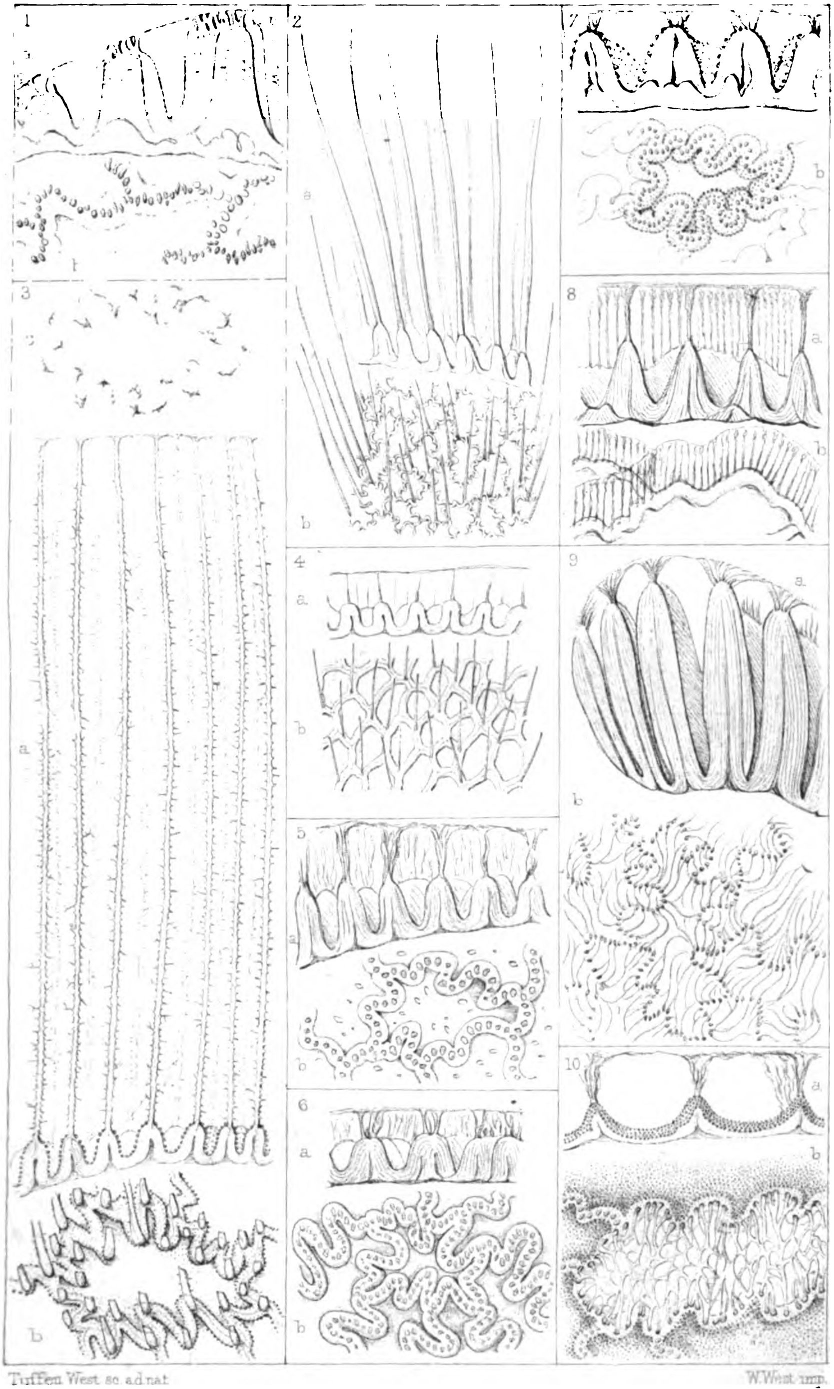
EINIGE DIE SYSTEMATIK BETREFFENDE VORSCHLÄGE.

Von Professor KARL KOCH, Berlin.

DER Missstände, mit denen die heutige Systematik zu kämpfen hat, sind zwar Mancherlei, doch vor Allem möchten es deren 3 sein, welche Bedeutung haben:

1. Der Wirrwarr in der Nomenklatur;
2. Die zerstreute Litteratur;
3. Die Einführung vieler Pflanzen durch Handelsgärtnereien mit beliebigem Namen.

Wenn der Einzelne auch hier wenig oder gar nichts vermag, so wird vielleicht ein Congress von Botanikern und Gärtnern, der jetzt in London versammelt ist, um so mehr im Stande sein, abzuhelfen,



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Testa of Solanaceæ &c.

Plate X.

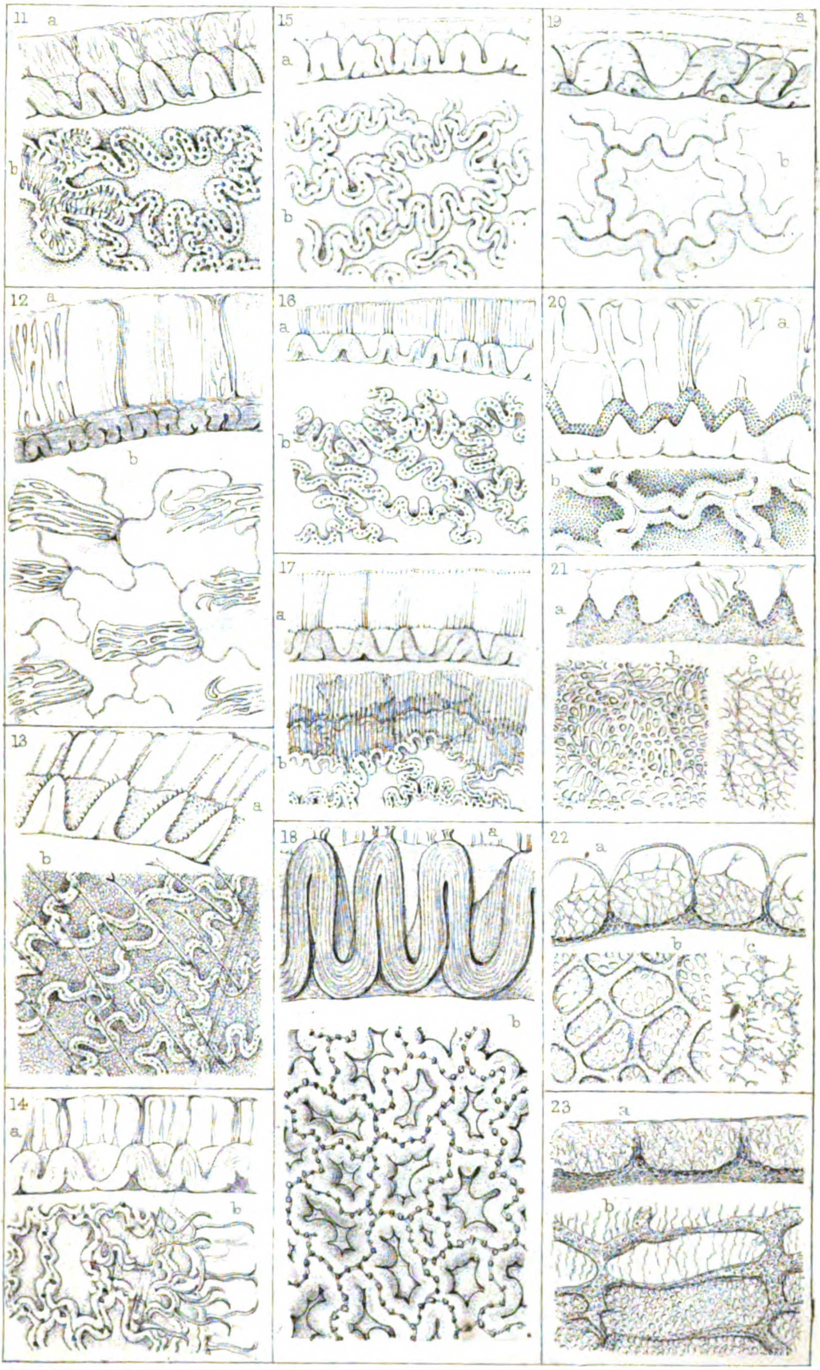

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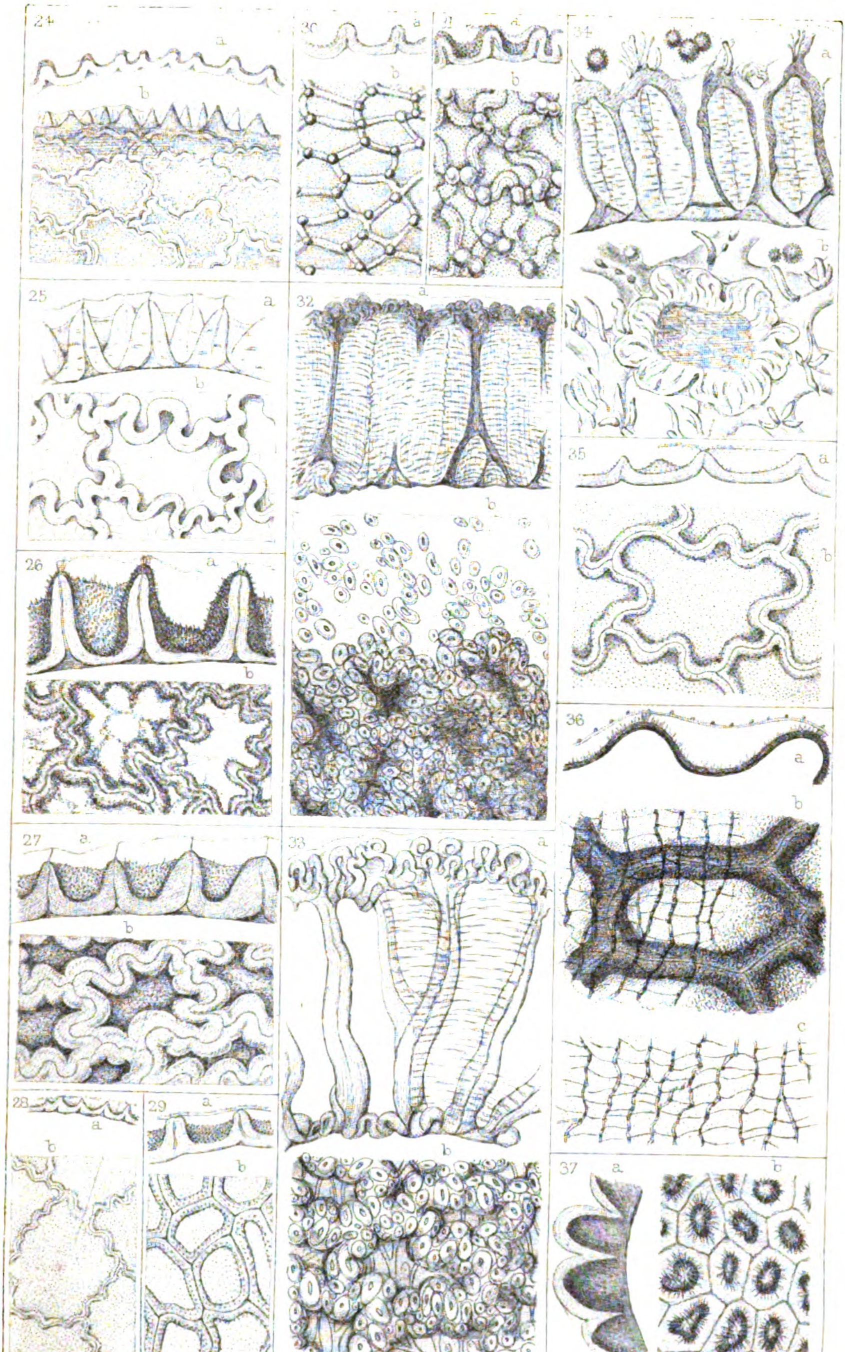
Plate XI



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oder doch seinen Einfluss zur Geltung zu bringen, als diese Übelstände bereits so drückend sind, dass sie eine geregelte Nomenklatur der Pflanzen fast zu den Unmöglichkeiten machen. Es kommt dazu, dass die botanische Wissenschaft einen solchen Umfang erhalten, dass ein Einzelner gar nicht mehr das Ganze umfassen kann, sondern sich auf kleinere oder grössere Theile jener Wissenschaft speciell beschränken muss. Bereits sind auch schon 2 Lager gebildet, aus denen bekanntlich die Einen die Pflanzen als solche und im Zusammenhange zu einander, sowie zu der Erdoberfläche, auf der sie vorkommen, betrachten, die Anderen aber die Erscheinungen und Ursachen ihres Daseins zu ergründen suchen. Systematik und Physiologie haben eine jede als besondere Wissenschaft bereits ihre Selbstständigkeit auch erlangt, sind aber natürlich in dem, was sie zu ergründen versuchen, immer auf einander gewiesen geblieben. Die Forscher im beiderseitigen Lager bedürfen sich einander. Der Einfluss, den alle Naturwissenchaften jetzt mehr oder minder auf die geistige und materielle Entwickelung des Menschen in der neueren Zeit auszuüben berufen sind, ist von Seiten der Botanik und ihren Jüngern am wenigsten zur Geltung gebracht. Im Vergleich zur Chemie, zur Physik und zur Mineralogie ist die Botanik zurückgeblieben; sie hat deshalb auch zum grossen Theil die Bedeutung und das Ansechen verloren, welche beide sie zur Zeit Linné's bis in die ersten Jahrzehnde dieses Jahrhundertes behauptete. Die Botanik war eine Zeit lang die Wissenschaft, der man vorzugsweise huldigte. So lange sie nicht aus ihrer Abgeschlossenheit heraustritt, und die Jünger den mystischen Mantel, mit dem sie oft ihre Wissenschaft umhüllen, nicht ablegen, so lange sie nicht auch die Fragen, welche mit dem Menschen und seinem Wohl im Zusammenhange stehen, in den Kreis ihrer Forschungen zieht, ja diese selbst in den Vordergrund stellt, wird sie weder das leisten, was sie sonst vermöchte, noch die Bedeutung erhalten, die ihr gebührt. Gartenbau und Landwirthschaft sind die angewandten Theile der botanischen Wissenschaft; demnach muss schliesslich dass Endstreben der Botaniker sein, ihre Kenntnisse in beiden Fächern zur Geltung zu bringen, diese selbst zur Wahrheit zu machen. Von Seiten der Botaniker ist in dieser Hinsicht bis jetzt wenig geschehen; was wir von dem Leben der Pflanze und ihrem Verhalten zum Boden, in den deren Wurzeln eindringen, sowie zur Luft, mit der hauptsächlich der Austausch der Stoffe vermittelt wird, jetzt wissen, verdanken wir weit weniger den Pflanzen-Physiologen, als vielmehr den Agrikultur-Chemikern. Die wichtigsten Entdeckungen haben hier die letzteren gemacht. Der Vorwurf, den Liebig vor Jahren aussprach, lastet heute noch.

In Betreff der Kenntniss der Pflanzen und ihres Erscheinens auf der Erdoberfläche haben sich aber auch die Systematiker mehr oder weniger isolirt. Sie sind ausserdem zum Theil nur Sammler, denen das höhere Streben, der philosophische Sinn des Vereinigens, des Kombinirens, oft fehlt, oder zum Theil solche, die über den vielen Einzelnen das Ganze aus dem Auge verloren haben. Es giebt Systematiker, welche auf Gartenpflanzen mit Verachtung blicken, als wenn diese ausserhalb der Natur lägen und gleich den nachgebildeten Luxusblumen nur Gegenstände der Kunst wären; es haben (allerdings nun vor Zeiten) Botaniker existirt, die nur mit getrockneten Pflanzen sich beschäftigen wollten. Hatte jener bekannte Pflanzen-Physiolog nicht demnach recht, wenn er von Heu sprach, was diese sammelten! Die geringeren oder grösseren Abweichungen, welche einzelne Pflanzen in der Kultur annehmen, sind ebenso naturwüchsig, als die, welche auf freiem Felde vorkommen. Schwierigkeiten mögen dadurch dem Forscher wohl entstehen; auf jeden Fall wird dieser aber schliesslich den Formenkreis der Art dann auch leichter festzustellen im Stande sein. Die Veränderungen einer Pflanze im Garten sind im Anfange der Kultur keineswegs so bedeutend, als man oft angiebt, sie werden erst mit der Zeit, nach Jahrzehnden, grösser. Es ist meiner Ansicht nach aber grade Aufgabe des Systematikers, den möglichen Formenkreis einer Art zu ergründen. Viele Formen finden sich auch in der freien Natur vor und werden für Arten gehalten. Eben deshalb sollten die Gärten, und vor Allem die botanischen, weit mehr von Seiten der Systematiker benutzt werden, als es bis jetzt geschieht. Es gab nach Linné eine Zeit, wo an der Spitze der botanischen Gärten Männer waren, welche ihre Aufgabe begriffen und zur Feststellung der Pflanzen-Art sehr viel geleistet haben. Männer wie Aiton, Salisbury, die Jussieu's, Desfontaines, Jacquin, Willdenow und viele andere haben Arbeiten geliefert, welche hauptsächlich auf den Untersuchungen an lebenden Pflanzen basirten und demnach auch jetzt noch nicht ihre Bedeutung, verloren haben. Seitdem aber die Director-Stellen an botanischen Gärten hier und da mit Männern besetzt werden, die keine Pflanzen kennen und deshalb zum Theil natürlich auch nicht die Bedeutung der ihnen untergebenen Institute begreifen, leisten auch manche botanische Gärten sehr wenig, obwohl sie viel Geld kosten. Es soll damit nicht etwa den Männern, welche jetzt dergleichen Instituten vorstehen, ein Vorwurf gemacht werden, denn sie füllen gewiss als Lehrer an der betreffenden Universität und sonst volkommen ihre Stelle aus, der Vorwurf trifft vielmehr die, welche Veranlassung zur Besetzung gegeben, Vorschläge dazu gemacht haben. Das erste Erforderniss, welches man an den Director eines botanischen Gartens zu stellen hat, ist und bleibt *Pflanzenkenntniss.*

Die Pflanzenkenntniss hat grade in der jetzigen Zeit eine grosse Bedeutung für den Menschen, speciell aber für die, welche Gartenbau und Landwirthschaft treiben. Der Praktiker hat nicht Zeit zu wissenschaftlichen Studien, er muss diese dem Manne, der sich der Botanik speciell gewidmet hat, überlassen. Die richtigen Namen der von Praktikern kultivirten Pflanzen nicht allein muss der Botaniker wissen, ihm liegt auch ob, sich mit deren Veränderungen möglichst vertraut zu machen, und schliesslich auch die anderen Pflanzen, welche zu den Kulturpflanzen in einem bisweilen feindlichen Verhältnisse stehen, in allen ihren Stadien, nicht allein wenn diese blühen, kennen. Grössere Ansprüche macht noch der Gärtner, weil die Zahl der von ihm kultivirten Pflanzen auch grösser ist. Bei ihm wird noch mehr die genaue Kenntniss der Pflanzen Hauptsache sein und bleiben. Es treten bei ihm aber noch andere Fragen heran, deren Beantwortung er wiederum vom dem Botaniker verlangt: Vaterland, Boden- und klimatische Verhältnisse, unter denen die Pflanzen wachsen, Art und Weise des Vorkommens u. s. w. Das Letztere ist namentlich für die Landschaftsgärtner von ausserordentlichem Werthe. Wir würden nicht so viele Verstösse in unseren Parks und Anlagen, wo die widersinnigsten Zusammenstellungen vorkommen, finden, als wir sehen. Wie der Maler diese für sein Bild nur aus der Natur entlehnt, so muss es nicht weniger der Landschaftsgärtner thun. In einer Zeit, wie die jetzige, wo grade die Verschönerungen in der nächsten Nähe, aber auch in der ganzen Landschaft, ein Bedürfniss des Menschen geworden sind, hat die Pflanzengeographie, und vor Allem der leider von den Jüngern der Wissenschaft noch ganz und gar vernachlässigte Theil, die Pflanzen-Physiognomik, eine grosse Bedeutung erhalten.

So will ich nun versuchen, auf die 3 Punkte, welche einer besseren Kenntniss der Pflanzen entgegenstehen, näher einzugehen, und schliesslich Vorschläge zu machen mir erlauben, um diesen Übelständen möglichst entgegenzutreten.

1. *Der Wirrwarr in der Nomenklatur.* In einer Zeit, wo man wenige Pflanzen kannte, wie noch in der Mitte des vorigen Jahrhunderts, war es möglich, dass ein einzelner Mann das Material beherrschte; und doch waren schon damals Zweifel über einzelne Pflanzen vorhanden. Mit der Erforschung fremder Länder wurde die Zahl der bekannten Pflanzen von Jahrzehnd zu Jahrzehnd grösser und erreichte schliesslich die Höhe, wie wir sie jetzt sehen, wo die Zahl 200,000 Arten nicht zu gering angegeben ist. Die Beschreibung dieser Arten war aber keineswegs immer in der Weise geschehen, dass man sie daraus hätte erkennen können; es kommt dazu, dass jede Art Veränderungen unterworfen ist, die für sich betrachtet, Veranlassung geben, dergleichen abweichende Formen für selbstständige Arten zu halten. Man gab sich leider selbst nicht einmal die Mühe, den Formenkreis einer Art zu erforschen und begnügte sich, getrocknete Exemplare allein zu studiren, anstatt im Freien die lebenden Pflanzen zu beobachten. Die Untersuchungen von Pflanzen aus fremden Ländern machte dieses an und für sich unmöglich, und so wurden noch mehr Formen als Arten beschrieben. Wo man dieses erkannte sind die Namen der Formen als Synonyme zu betrachten. Deren Zahl vermehrte sich um so mehr, als auch bei Bestimmungen einheimischer und fremder Pflanzen überhaupt nicht immer der richtige Name herausgefunden, schliesslich derselbe Name für 2 und mehr Pflanzen gebraucht wurde. Das führte zunächst wohl zu dem Gebrauche, den Namen des Botanikers, der die Pflanze unter einem bestimmten Namen beschrieben, noch hinter diesen zu setzen. Die Wissenschaft aber schritt vorwärts; manche Pflanzen waren zu einem falschen Genus gebracht und mussten daraus entfernt werden; die Genera selbst erhielten allmählig einen anderen Um-

fang, in Folge dessen der Genus-Name wiederum ein anderer wurde und neue Synonyme entstanden. Das in der That unglückliche Princip für den Begriff Genus, dass jede Abweichung in der Blüthe oder Frucht Grund giebt, ein neues Genus aufzustellen, hat dahin geführt, dass mit grossem Leichtsinn neue Genera gemacht wurden und dadurch neue Umänderungen von Namen entstanden. Die Synonymie ist bekanntlich auf diese Weise zu einer Höhe gelangt, dass man sich nicht wundern darf, wenn namentlich Laien abgeschreckt werden und zu den Botanikern alles Zutrauen verloren haben. Es kommt dazu, dass Eitelkeit mit ins Spiel kam und mehr oder weniger willkürlich Namens-Veränderungen vorgenommen wurden, nur damit der Autor derselben seinen Namen hinter dem der Pflanze setzen konnte. Diese willkürlichen Veränderungen des Genus-Namens führt weit mehr Unannehmlichkeiten mit sich, als die Aufstellung von Formen als Arten. Hier wird doch wenigstens mit der Form etwas Bestimmtes bezeichnet. Und am Ende ist es nur Ansicht, wenn Jemand eine Form für eine Art hält. "*Um diesem Übelstande abzuhelfen, geht mein Vorschlag dahin, den Art-Namen als solchen festzuhalten, und zwar den, der nach der Zeit zuerst gegeben ist, und den Genus-Namen, den die neuere Forschung verlangt, vor-, den Genus-Namen hingegen mit dem sie zuerst beschrieben wurde, in Parenthese dahinter zu setzen. Soll ein Autor-Name dabei sein, so verdient nur der des Autors, der zuerst die Pflanze bekannt gemacht hat, berücksichtigt zu werden. Unsere Nomenklatur beginnt mit Linné, daher alle früheren Botaniker als Autoren von Namen, auch für Genera, zu vermeiden sind. Linné hat beispielsweise* Ornithogalum luteum *beschrieben, Salisbury fand aber in ihr mit Recht den Typus eines eigenen Genus, was den Namen* Gagea *erhielt. Die Pflanze muss demnach jetzt heissen: Gagea lutea (Ornithogalum) L.*"

2. *Die zerstreute Litteratur.* Keine Wissenschaft gehört einem Volke an, am allerwenigsten die Botanik. Früher bediente man sich der lateinischen Sprache, die damals allen Gebildeten mehr oder weniger verständlich war; jetzt schreibt ein Jeder in seiner Muttersprache und der Botaniker ist gezwungen, wenigstens der deutschen, französischen, englischen und italienischen mächtig zu sein, um von den Fortschritten und Bereicherungen in der Wissenschaft Kenntniss zu nehmen. Es kommt aber dazu, dass die Veröffentlichungen neuer Pflanzen am Wenigsten durch selbstständige Werke geschieht, die schliesslich ein bemittelter Botaniker sich anschaffen könnte; am Meisten geschieht es in Zeitschriften, und zwar in solchen oft, wo man sie am Wenigsten vermuthet, auch in Gelegenheits-Schriften. Diese sind um so weniger zugänglich, als sie auch in anderen Erdtheilen gedruckt werden. Südafrika, Neuholland, Ostindien, Peru u. s. w. haben ihre eigene botanische Litteratur. Selbst die Botaniker in grösseren Städten, wie London, Paris, Berlin, Wien u. s. w., denen bedeutende Bibliotheken zu Gebote stehen, finden nicht immer alles litterarische Material, was sie aus fremden Ländern oder Erdtheilen bedürfen. Wir haben zwar in Deutschland die

Walpers'schen Annalen (früher Repertorium) als Sammelwerk für alle neu beschriebenen Arten, leider ist das rasche Erscheinen aber verhindert, weil nur ein Mann die riesige Arbeit aus Tausenden von Büchern und Zeitschriften, die noch in allen möglichen Sprachen geschrieben sind, die neu beschriebenen Pflanzen herauszusuchen, übernommen hat. Es ist ihm aber allein gar nicht möglich, die ganze Litteratur herbeizuschaffen. Es geht daher mein Vorschlag wiederum dahin:

> "*In allen Ländern Männer zu gewinnen, welche von den zerstreuten Bearbeitungen alter und neuer Pflanzen ihres Landes Kenntniss nehmen und von dem wirklich Neuen Excerpte machen lassen. Es wird eine General-Redaction in irgend einer Stadt Europa's, wo bedeutende Hülfsmittel zur Verfügung stehen, gebildet, an die aus allen Ländern die Excerpte gesendet werden. Die General-Redaction stellt alle Einsendungen wissenschaftlich zusammen und bringt sie zur Veröffentlichung. Da ein solches Sammelwerk ein grosses Bedürfniss ist, so unterliegt es wohl auch keinem Zweifel, dass ein Buchhändler, der dieses für den Druck übernähme, gefunden würde. Wie die Walpers'schen Annalen in lateinischer Sprache geschrieben sind, so müsste es auch bei diesem Sammelwerk geschehen.*"

3. *Die Einführung von Pflanzen durch Handelsgärtnereien.* Es ist eine bekannte Thatsache, dass alle Gegenstände, auch Pflanzen, sich leichter verkaufen, wenn sie einen Namen haben. Man darf sich deshalb nicht wundern, wenn Handelsgärtner, welche neue Pflanzen, besonders aus fremden Ländern einführen, willkürlich einen Namen geben und diese nun in den Handel bringen. Damit wären noch keine Nachtheile verbunden, die Synonymie würde nicht vermehrt, insofern nachträglich der Gärtner sich an einen Botaniker wendete, um den richtigen Namen zu erhalten. Es könnte nachträglich bekannt gemacht werden, dass der provisorische Name der Pflanze in den wissenschaftlichen umzuändern sei. Dabei kommen aber 2 Missstände zur Sprache. Selbst wenn dergleichen botanische Namen revidirt werden, wie es meinerseits oft geschehen ist, so nehmen sich die Gärtner leider oft gar nicht die Mühe, ihren provisorischen Namen mit dem wissenschaftlichen zu vertauschen, sondern führen den ersteren bei ihren Pflanzen weiter fort.

Der zweite Übelstand ist der, dass die Gärtner in der Regel nicht die Botaniker kennen, welche speciell gewisse Familien bearbeiten und auch nicht wagen, deren Hülfe in Anspruch zu nehmen. Aus dieser Ursache müsste es Aufgabe eines botanisch-gärtnerischen Kongresses sein:

> "*Hier die Vermittelung zu übernehmen. Unter den Systematikern befinden sich bereits in den verschiedenen Ländern eine Reihe von Männern, welche seit Jahren sich schon mit einzelnen Familien beschäftigt haben; es würde gut sein, wenn noch Andere den Entschluss fassen*

wollten, Familien, welche bisher keine besonderen Bearbeiter haben, zum genauerem Studium zu erwählen und sich deren specieller Bearbeitung zu unterziehen. Dergleichen Familien, die eine gründliche Revision bedürften, haben wir noch sehr viele. Es dürfte gut sein, wenn gleich hier unter den anwesenden Botanikern eine Verständigung geschähe und die Namen der Botaniker sowohl, als der Familien, welche diese bearbeiten wollen, zur Kenntniss der Gärtner kämen. Ich habe die feste Überzeugung, dass eine solche Arbeitstheilung unter den Systematikern zu einem erfreulichen Resultate führen würde. Die Astronomen haben bereits das Himmelsgewölbe in Betreff ihrer Forschungen unter sich getheilt; sollte es unter den Systematikern nicht gehen, dass diese sich in ihrer Bearbeitung unter die verschiedenen Familien theilten? In de Candolle's Prodromus ist est ja zum Theil geschehen; es gilt nur, dass die Theilung einen allgemeineren und bestimmteren Ausdruck erhielte. Es wüssten die Gärtner dann, an wen sie sich zu wenden hätten, wenn sie un- oder nicht mit Sicherheit bestimmte Pflanzen in den Handel bringen oder auch ältere in dieser Hinsicht revidiren wollten Den Botanikern müsste es selbst willkommen sein, wenn sie frisches Material tropischer und überhaupt exotischer Pflanzen zur Verfügung erhielten."

Das Untersuchen einzelner Pflanzen, ohne dass ein möglichst grosses Material zur Verfügung steht und ohne dass man dieses wissenschaftlich überwältigt hat, wird nur mangelhaft ausfallen können und zu Irrthümern führen. Es unterliegt keinem Zweifel, dass eine Reihe von Synonymen nur dadurch enstanden sind. Auch Botaniker thäten oft selbst besser, Pflanzen aus Familien, mit denen sie sich wenig oder gar nicht beschäftight haben, an die ihrer Collegen zu senden, von denen sie wissen, dass diese speciell mit deren Bearbeitung sich beschäftigen. Auf jeden Fall ist es rathsam, sich wenigstens mit diesen deshalb in Verkehr zu setzen.

Vor Allem hat ein einseitiges Bearbeiten einzelner Pflanzen, ohne wissenschaftlich Herr des Ganzen zu sein, zur Aufstellung von Genera geführt, die entweder auf Merkmalen, welche in Zusammenhange eine untergeordnete Bedeutung besassen, beruhten, oder schon Repräsentanten an anderen Stellen besassen, von denen man nichts wusste. Um dieses deutlicher zu machen, habe ich versucht, in eine der schwierigsten Gruppen von Pflanzen, in die der Genisteen, einiges Licht zu bringen, und die Abhandlung zum Drucke vorbereitet. In wie weit es mir geglückt ist, das mögen dann Andere beurtheilen.

Auf der einen Seite giebt es Botaniker, welche bei dem grösseren Material, was ihnen zur Verfügung stand, nicht im Stande waren, durchgreifende Merkmale zu finden, um *Genista* und *Cytisus* generisch zu unterscheiden; noch weniger vermochten sie die beiden

Genera abzurunden, so dass sie schliesslich sich gezwungen sahen, beide Genera zu vereinigen. Auf der anderen Seite haben wiederum Botaniker, denen dagegen nur vereinzeltes Material zur Verfügung stand, eine Reihe von Genera gemacht, die nothwendigerweise zum grössten Theil wieder einzuziehen oder zu denen ausserdem noch andere Arten unterzubringen sind. Es betrifft beispielsweise dieses *Retama*, zu dem noch eine Anzahl von Pflanzen gehören, die fortwährend noch zu *Genista* gerechnet wurden.

Bevor ich nun hiermit schliesse, möchte es mir erlaubt sein, noch einen wichtigen Gegenstand zur Sprache zu bringen. Bisher sind nur Merkmale aus der Blüthe und Frucht zur Unterscheidung der Genera benutzt worden. So lange man noch wenig Pflanzen kannte und die Erdoberfläche keineswegs so erforscht war, wie jetzt, mochte dieses ausreichen; jetzt genügt dieses nicht mehr. *Scilla* und *Anthericum* (*Phalangium*, Kth) sind 2 Genera, welche zweien Familien angehören, die man aber nur nach dem Habitus gruppirt hat; ohne diesen Habitus und durch die Blüthe allein können sie gar nicht unterschieden werden. *Scilla* und *Ornithogalum* unterscheiden sich ebenfalls nur durch die Farbe der Blüthen und doch hält man beide Genera fortwährend fest. *Genista* und *Cytisus* sind leichter daran zu erkennen, dass die Arten der ersteren einfache, die Arten des letzteren dreizählige Blätter haben. Rubiaceen und Caprifoliaceen unterscheiden sich schliesslich durch die An- und Abwesenheit der Nebenblätter allein. Ich habe deshalb bereits angefangen, in dem Character eines Genus jedes Merkmal, mag es in oder ausser der Blüthe liegen, aufzunehmen, insofern es nur unterscheidend ist. In meiner demnächst erscheinenden Dendrologie ist es auch bereits durchgeführt. Ich stelle es daher einem botanisch-gärtnerischen Kongresse anheim, in wie weit er meine Ansicht theilt, und ersuche ergebenst, dass auch hierüber Verhandlungen Statt finden, um eine Einigkeit in dieser sehr wichtigen Angelegenheit möglichst herbeizuführen.

OBSERVATIONS ON THE PRESENT STATE OF OUR KNOWLEDGE OF THE GENUS CINCHONA.

By JOHN ELIOT HOWARD, F.L.S., Tottenham.

I WISH in the present paper to approach the consideration of the Cinchonaceous plants from a practical rather than from an abstractedly botanical point of view, and to see if there be not a possibility of discriminating between forms which yield, in a therapeutic sense, wholly different products, and which may have been thrown together by systematic arrangements founded on insufficient data. The *Cinchona micrantha* of Huanuco, for instance, produces a "Grey Bark," characterised by its abundant yield of pure cinchonine, whilst the *C. micrantha* of Bolivia differs widely in its chemical contents. The pharmaceutist asks of the botanist, "Is it possible that these two plants, yielding such widely differing barks, can be one and the same?" The reply of the latter, as it seems to me, should rest on a reconsideration of the two plants, especially taking into account *the whole plant as studied in its living state*, and not disregarding either the microscopical or chemical examination of the bark. I have no doubt, since I have seen the *C. micrantha* of Huanuco developing itself from seeds brought by Pritchett, and have compared this with the dried specimens of Weddell, that the two forms are not identical, although capable of being considered in an abstractedly botanical sense as one species.

Again, the *Cinchona ovata* of Pavon and of Peru gives an entirely worthless bark, producing aricine or paracin, whilst the *Cinchona ovata*, var. *rufinervis* of Bolivia, is a plant allied in its products to the Calisaya, and the *var. erythroderma* of the same approaches to the plants producing red bark, and may probably (according to specimens in my possession) be actually one source of the product thus characterised.

I do not propose to found a diagnosis of species either on the chemical constituents of the barks, or on their microscopical constitution, but to follow out more fully and to a greater extent the consideration of the barks, as *assisting* in the discrimination of species and varieties, according to the precedent so well established by Dr. Weddell in his admirable "Histoire des Quinquinas." The more fully it is attempted to found a classification of the *Cinchonæ*, either on chemical or microscopical peculiarities *alone*, the more manifest is the failure in the result.*

I am, to a considerable extent, in accordance with Dr. Weddell and with M. Planchon, whose recently published work I regard as the most complete manual that has appeared on the subject,† in regarding "the cinchonas as forming a very natural genus, the different forms of which often pass from one into another by insensible transitions."

I regard it, however, as a point open for further investigation whether there may not, as stated by Dr. Karsten, be a sub-genus to which his plant *C. heterocarpa* belongs,‡ forming a point of transition between *Cinchona* and *Ladenbergia*.

* M. Planchon says very well,—"MM. Berg et Schmidt nous paraissent avoir été moins heureux" (que M. Weddell) "dans leur classification, en mettant en première ligne les caracteres tirés de la consideration des lacunes et des cellules a résine. Nous indiquerons sous forme de tableau la manière dont ces auteurs ont distribué les diverses espèces de quinquinas. Il est facile de voir que des espèces très différentes, au point de vue de leur affinités naturelles ou de leur richesse en alcaloïdes, sont réunies ensemble tandis que des espèces analogues sont distribuées dans les groupes différents."—*Planchon. des Quinquinas*, p. 35.

† Des Quinquinas, par Gustave Planchon. Savy, Paris, 1864.

‡ As also C. hirsuta, according to Pavon, "capsula a basi ad apicem dehiscens nonnullæ ab apice dehiscunt." Nueva Quin. sub voce. (La *Cinchona hirsuta* se aparta y diferencia *ictu oculi* de todas las demas Especies insertas en la Flora.—*Suplemento de la Quinologia*, p. 75.)

However this point may be decided by botanists, I think that a considerable section of the *Cinchonæ* are allied in their chemical and also in their microscopical characteristics to the *Ladenbergiæ*, whilst on the other hand some of the latter seem to reciprocate the alliance.*

As regards the transitions from one species to another, moreover, I cannot regard these as insensible, but rather as being made *by well marked and permanent intermediate forms*. I do not look upon the *Cinchonæ* as I should upon the *Salices*, for instance, in which latter family it seems immaterial how many or how few are the number of species or varieties recognised, since a willow is still essentially the same plant under whatever form. It was supposed that this was also the case with the *Cinchonæ* when the genus was first established. The *Quina primitiva* was supposed to have a kind of recognised typical character, and a superiority which led to very warm controversy in order to prove the existence of this same *Quina primitiva* in regions where it is not found.† It was thought sufficient to distinguish the few varying kinds of Cinchonaceous plants that were at first recognised by the prevalent form of the leaf, as *cordifolia*, *lancifolia*, *oblongifolia*, *ovalifolia*, &c.; thus confounding together even different genera through premature classification.

This systematising tendency has since led to the grouping together of kinds of *Cinchonæ* essentially different, since the reality of the case much more resembles what might be found if there existed amongst the varieties of *Salix* some which closely approximated in the timber and the bark to the oak, and others which, in these respects, counterfeited the hazel, or as if another variety were to surprise us *chemically*, by producing quinine instead of salicine.

Thus the ovate, or cordate, or lanceolate form of leaf may appear to link together species of *Cinchona*, which on more profound study may be seen to be, in their essential characteristics, very diverse.

I may be permitted to illustrate my meaning as to premature attempts at systematic nomenclature by reference to another department of science—taking as an instance the names of the alkaloids

* *Microscopically*, the reader may find illustration of this in comparing my (Fig. 17) microscopical section of the *Quina d'Azahar*, *C. magnifolia* Pavon, a *Ladenbergia* or *Cascarilla*, with (Fig. 14) *pata de Gallereta*, *C. ovata* Pavon, an unquestioned Cinchona; or in Berg's Anatomischer Atlas, Taf. xxix. 67, the *Cortex Ladenbergiæ magnifoliæ* (*C. magnifolia* Pavon) with Taf. xxxi. 72, *Cortex Cinchonæ ovatæ*, and 70, *Cortex Cinchonæ Pelletieranæ*; also Taf. xxxii. 75, *Cortex Cinchonæ luteæ*, in which, as in West's drawing of the same bark in my "Quinologia" the *lumen* in the centre of the section of the fibres is most striking, thus showing Schleiden's characteristic mark of the fibres of Ladenbergia pervading a section of *Cinchona*. *Chemically*, I refer to Winckler's examination of the bark (described in the Journal de Pharmacie for June, 1846) of *Ladenbergia Reideliana*, confirmed by my own experiments, as exactly reproducing that of *Cinchona ovata* Pav. by myself, and of *Cinchona lutea*, again by Winckler.

† Our London Hospitals have afforded me specimens (dating from the time of Mutis) of the bark of *C. lancifolia* so collected and dried as most to resemble Loja bark. The imitation is very imperfect, and not at all for the advantage of the patients in those days, who would have been far more speedily cured by the coarse, large bark of *C. lancifolia*, as since gathered, than by this factitious *Quina primitiva*.

produced by these same plants, which, according to first appearances,* ranged thus :—

Quinine.	Cinchonine.
Quinidine.	Cinchonidine.
Quinicine.	Cinchonicine.

Further and more careful examination shows a different arrangement, as indicated by their properties in reference to the ray of plane polarised light.

lœvogyrate.	dextrogyrate.	feebly dextrogyrate.
Quinine.	Cinchonine.	Cinchonicine.
Cinchonidine.	Quinidine.	Quinicine.

This latter being the true relation, as shown on chemical grounds † by Dr. Herapath, who even thinks quinine and cinchonidine " may be mutually convertible," and observes, that " closely as the quinine and cinchonidine salts agree among themselves, they differ widely from the quinidine and cinchonine compounds."

My own examination of specimens of bark grown in India ‡ seems to show that this is the order in which in the plants themselves these alkaloids are produced—normally in concert, and, under circumstances of changed locality supplemented by, or even superseded by each other. Thus the quinine-producing Calisaya, forms always some, and abnormally much cinchonidine, and the cinchonine-producing *C. micrantha* of Peru, forms in India a large per centage of quinidine.

THE BARKS OF BOLIVIA.

Cinchona Calisaya (Weddell).—This species certainly merits the first mention. It is beyond all question the first in importance in commerce, as furnishing the bark most largely used in the production of the precious medicine quinine. It contains this product in remarkable purity, with very little admixture of any other alkaloid—a fractional quantity of cinchonidine and cinchonine being (in the best specimens) the only exception.

It is not to be supposed that the products of wild forests should be kept carefully select in commerce, and consequently the rate of produce in alkaloid, from such mixed parcels of bark, falls below that of

* " L'une des bases," M. Pasteur says, " à laquelle je conserve le nom de Quinidine, est hydrateé, efflorescente, *isomère avec la quinine*, devie a droite le plan de polarisation et possède, a l'égal de son isomère la quinine, le charactere de la coloration verte par addition successive du chlore et de l'ammoniaque. L'autre base, à laquelle je donne le nom de cinchonidine est anhydre, *isomère de la cinchonine*, exerce à gauche son pouvoir rotatoire, et ne possède pas le caractere précité de la coloration verte." This is all excellent except the terminology, of which I can only say, I wish the descriptive names had been reversed.

† Researches on the Cinchona Alkaloids, by W. B. Herapath; from the Proceedings of the Royal Society for November 26, 1857.

‡ See Reports of Analysis sent to the Under-Secretary of State for India, and printed by order.

the genuine tree; but I have satisfied myself, by the examination of carefully chosen specimens of Calisaya, of the existence of alkaloid equal to five per cent., and in one or two specimens even seven or eight parts in a hundred, of sulphate of quinine. This is more than double the product assigned by the late M. Delondre, whose "Quinologie" I regard as a very valuable repository of knowledge, although (as is always the case) subject to some little correction.

The average produce of Calisaya bark in quinine,* though falling very far short of the exceptionally fine specimens before mentioned, is still considerably above that obtained by M. Delondre, and the product in cinchonine less by two-thirds than he states, only it may be that he includes the cinchonidine in the same category. These observations seem of importance in reference to the cultivation of the species in India. It must not be supposed that the large products obtained by Dr. De Vrij and myself, from the *Cinchona succirubra* grown by M'Ivor, are the measure of the superiority of this species over the Calisaya. In my opinion, the reverse is the truth, and though, from some cause, equal success has not been attained with the latter in the East Indies, I do not at all despair of seeing the Calisaya reassume there its rightful supremacy as the queen of all quinine-growing species.

I am the more confirmed in this hope, because the Calisaya, though found so delicate in India, is growing luxuriantly under double glass in my stoves,—one plant, two or three inches in height when first placed in the border,—having, in little more than two years, attained an elevation of more than seven feet, and spreading in every direction.†

Mr. Markham says,‡ "The *C. Calisaya*, the most famous of all

* Not contained in the bark as *sulphate*, as Delondre and Bouchardat's work might lead the reader to suppose.

† Dr. Hooker obligingly traced out for me the history of this plant, which was raised from seed sent him by Sir R. Murchison, who says, "The Cinchona seeds I sent you in 1864 were brought home by Mr. David Forbes, a brother of poor Edward, and a great explorer of the Peruvian and Chilian Andes. I know that he attached some value to these seeds, which he told me were from trees of the very first quality in their bark and fructification." The seeds were sown at Kew in May, 1864, and the plant, two or three inches in height, given to Mr. Howard, October, 1864. It is now in June, 1866, exactly 7 ft. 3 inches in height, with twelve lateral branches on each side. Mr. Forbes says, "I was in Peru during some three years, in daily contact with the cascarilleros of both Peru and Bolivia. I went with them on their bark-hunting expeditions far into the interior, and made a collection of plants, which were all lost in the siege of La Paz, in 1863. I only saved the bag of seeds, and which, fortunately, are from the district considered as the finest Cascarilla of Bolivia, the bark from that part (the head waters of the River Beni) fetching a far higher price than any other in South America, at least so the best bark merchants assured me. As I did not have sufficient knowledge of the trees myself (for there are various species of the tree growing everywhere) I trusted to some Indian cascarilleros whom I knew, and think they did not deceive me when they assured me that this was of the finest sort. The seeds were collected in the forests on the east side of the River Mapiri, in the province of Larecaja, lat. S. 14½°, long. 70½° W. The Bark Tree is not found along the rivers, but at from 1,000 to 4,000 feet higher up, either in single trees or small clumps among the other trees, easily recognisable by the particular green colour of the leaves.—*Extract, D. Forbes to Sir R. Murchison*, June 19, 1866.

‡ In letter to Secretary, etc., 16th January, 1866.

the South American bark trees, and which, in its native forests, is alike the most beautiful and the richest in quinine, has not been a success in India. I was grieved to see the plants of this species only five feet ten inches high, and six and a-half inches in girth, at an age of three years, while their stunted and shrubby appearance, with dim-coloured leaves, is as different as possible from the glorious Calisaya of the Caravayan forests."

I am endeavouring, in correspondence with Mr. M'Ivor, to ascertain the occasion of this contrast. It is not impossible that something may be due to the different effect of light passing twice through glass, by which means a large portion of the actinic power (about half, as ascertained by photographic effects) is arrested. Mr. Markham says,* that in a position which he examined "exposed to the full glare of the sun, there was a profusion of *Melastomaceæ* and no *Cinchonæ*," for "the latter evidently dislike very exposed situations;" and again he says, "the Calisaya avoids the banks of a river, never being found within several hundred feet of it; it prefers the steepest declivities of the mountain sides, and a great deal, though not too much shade." Mr. Markham speaks of "a locality well adapted for the growth of the Calisaya, where young plants receive shade from taller trees, while they also enjoy plenty of sunshine through the spreading branches." Perhaps this has not been sufficiently attended to in India.

It is further evident that there are very distinct varieties of the Calisaya, and that it is by no means certain that the kind hitherto cultivated by Mr. M'Ivor is the best, although it may be descended from seeds procured by Dr. Weddell himself, in the forests of Caravaya and Bolivia, since those of the inferior variety might germinate the most readily.

Dr. Weddell gave to one of these varieties (the *Calisaya morada*) the name of *C. Boliviana*, and described it as a separate species; but in an article communicated to the Botanical Society of France, in March, 1855, after having seen, in his second journey in Bolivia, new forms intermediate between the *C. Calisaya* and the *C. Boliviana*, this able botanist is disposed to regard the *morada* as a simple variety of *C. Calisaya*. This agrees with what we know of the different barks, which are all, including that of the *C. Boliviana*, equally collected and imported as Calisaya. The bark of the *Calisaya morada* is never classed separately in commerce, and, indeed, it appears in Delondre and Bouchardat's well-executed plate (i.) as typical Calisaya; while, on the other hand, we find another well-marked variety, the *Calisaya blanca*, equally well figured by Goebel in his Pharm. Waarenkunde (plate vii.), as also *China Calisaya*. Best executed and most characteristic of all, are Weddell's own figures of the bark, both of his *α. vera* and *β. Josephiana*. As far as I can judge, it is yet another variety which is now growing with me, the *Calisaya verde*, of which, as well as of the *naranjada fina*, *zambita*,

* Letter to the Under-Secretary for India, June 9th, 1860.

empedernida, and one or two others, Dr. Weddell gave me specimens resulting from his second excursion to Bolivia.

For further information respecting this variety, the *Calisaya verde*, we must (for the present) turn to the Report by Mr. Markham of his visit to collect plants of the *Cinchonæ* in 1860. He says,* "The bark collectors and other natives assured me that there are three kinds of Calisayas, namely, the *Calisaya amarilla*, or *fina* (*a. vera* of Weddell), the *Calisaya morada* (*C. Boliviana* of Weddell), and the *Calisaya verde* or *alta*,—not mentioned, as far as I am aware, by any author. They say that the latter is a very large tree, generally growing very far down the valleys, and in much lower situations than the other varieties. The veins of the leaves are never purple, but always a pale green, hence the name. The guide Martinez had cut a tree of this variety, yielding six or seven cwt. of bark, including canuto, or bark from the branches; and Gironda had seen a tree in the province of Munecas, in Bolivia, which yielded ten cwt. of tabla or trunk bark alone. The true Calisaya of Weddell only yields three or four cwt."

Such a tree as Gironda describes might probably be five feet in diameter; for Karsten, speaking of the *C. lancifolia* and *C. corymbosa*, says,† "trees are met with sixty feet in height, whose stems measure five feet in diameter. A single gigantic tree like this, which truly is not often seen, yields ten cwt. dried, or thirty cwt. fresh bark."

It is highly probable that this is the sort which ought to be introduced into India, where its larger size, and probably more rapid growth, might render it a more valuable acquisition than the *a. vera* itself. I am the more disposed to think this, since the size and appearance of the bark recently brought into this market from Bolivia, leads me to suppose that the collectors may have opened up fresh districts in which this kind abounds.

It is an important feature that the *verde* variety grows lower down the valley, and consequently in warmer regions than the other sorts. This may, at times, cause it to be less productive in quinine, but nevertheless, the richest specimens examined by me presented the characteristics of this variety.

I strongly doubt whether the Calisaya, cultivated up to a very recent period either in Java or in India, is other than the var. *Josephiana*.

The Calisayas of Bolivia seem to be most satisfactorily determined, and it remains only that Dr. Weddell should add to those labours, for which we are so much indebted to him, by publishing the materials which he has in hand to illustrate the remaining varieties of this species.

THE BARKS OF LOJA, OR "CROWN BARKS."

Cinchona officinalis, Linnæus, *a. Uritusinga*.—The term *officinalis* has been (I think most correctly) restored by Dr. Hooker to the

* Letter to the Under-Secretary for State, June 9th, 1860. Sec 44.
† Med Chinarinden, p. 28.

species which grew under his care from seeds sent by Don T. Riofrio, from the mountains of Uritusinga, near Loja. This is the *Cinchona Uritusinga* of Pavon, also the *Quina-quina* described by M. La Condamine, in 1738, and consequently the *C. academica* of Guibourt's Hist. des Drogues, and the *C. officinalis* of Woodville's Botany, vol. iii. p. 546. The plant flowered in the writer's possession in 1862, and a characteristic drawing, by Fitch, of the flowering branch, may be found in tab. 5,364 of Curtis's Bot. Mag., which may be compared with that of the same species in the "Nueva Quinologia."

A plant of the above, about 6 feet in height, was presented by myself to the Indian Government, and although it suffered from a sunstroke in the transit from Madras to Otacamund, and lost all its leaves, it was restored, and by the skill of Mr. M'Ivor increased by cuttings to the extent of now between 6,000 and 7,000 plants. It has since flowered, and a characteristic specimen has been brought home by Mr. Markham, together with a portion of the bark.

A sister plant of the above, together with another, its direct descendant, suffered from an irruption of smoke into the stoves in the past winter, and I was compelled to cut them down. This gave the opportunity for examining the bark, which yielded on percentage of the dried bark :—

Quinine (crystallizing both as sulphate and oxalate) . .	1·36
Cinchonine (part cryst. from sp. w., the rest cinchonicine)	0·57
Total . .	1·93

A produce very much the same that bark of the same kind and age might have yielded in its native climate, and probably the first extracted from bark grown in Europe.

Although this kind has nearly become extinct in its native regions, it may regain its place as the *C. officinalis* in pharmacy, as it seems well adapted to India, and flourishes on the Neilgherries at an elevation of about 6,000 feet.

Several other forms range themselves around this which we now constitute the central plant of the group, by restoring its original name. I venture to propose the following arrangement of these, as one rendered necessary for the distinction of the barks in commerce, as these will soon come from India, and as the only way that I can see to extricate the subject from the confusion into which it has been thrown by premature attempts at generalisation.

Cinchona officinalis, β. Condaminea.—I would drop the barbarous name *Chahuarguera*, given by Pavon to this plant, which is really the *Quina primitiva*, as having been traditionally the one which cured the Countess of Chinchon. It is therefore worthy to bear the name *Condaminea*, bestowed upon it, and also on other forms of the plant, by Humboldt and Bonpland, in whose "Plantes Equinoctiales" it is well shown in the unshaded branch, which is recognised by De Candolle as a form very distinct from the shaded flowering branch producing a different sort of bark, to be afterwards described.

The bark of *β. Condaminea* is the rusty crown bark of Pereira,* and of English commerce. M. Planchon agrees with me that the larger portions of the bark represent the *Quinquina noueux* of Joseph de Jussieu.

Cinchona officinalis, γ. Bonplandiana-colorata.—This form of Loja bark was called, in the time of the Spanish dominion, *Colorada del Rey.*† It is well represented, not only in the widely-dispersed herbarium of Pavon, but also by specimens sent home by Cross, both of a flowering branch and of the bark, from the ravines of Cajamuna, near Loja, in 1861. The seeds sent home by this collector have vegetated well in India, and so successful has been the cultivation, that M'Ivor has already sent home bark fit for the English market, according to the estimation of the most competent judges. The plant is figured and described in the "Illustrations of the Nueva Quinologia," as a variety of *Chahuarguera*, which name might very well be exchanged for the above.

γ. Bonplandiana-lutea.—These two sorts are probably merely the *macho* and *hembra* varieties (those in which the male or female element preponderates in the flower, etc.) of the same plant, but the barks produced are markedly different, and these differences have remained unchanged from La Condamine's day to this. They both deserve well their old reputation, and, though scarce, are still found in commerce; growing together, Pavon says, and often coming together (sometimes intermingled) to the English market; but, though so nearly allied, not confused by insensible transition.‡

Cinchona officinalis, δ. crispa.—This form of Loja bark was described and named by Tafalla as *Cinchona crispa*, and is described by myself under that head in my "Quinologia." Nevertheless, it is my opinion that it is so manifestly one of the forms of the Loja bark, as to be best looked upon as above. It is the *Quina crespilla*, or *carrasquena* of the older botanists, and the *Quina fina de Loja* of modern trade.

The plant was found growing by Cross in a deposit of peat on the summit of the highest mountains (the Sierra Grande) around Loja. These Loja barks are adapted to grow on the roughest and most elevated portions of the Neilgherries, and also to flourish in Ceylon, and, beyond other sorts, to bear well the climate of the sub-Himalayan ranges, and there can be little doubt of their successful and profitable cultivation.

Dr. Seemann found the plant at a lower elevation, and excellent specimens were brought back by both these travellers, including the bark, concerning the source of which, therefore, no doubt can remain.

* Confounded by Pereira with the *Huamalies mince et rougeâtre* of M. Guibourt, which seems to belong to *C. purpurea*.

† "The Spanish creoles still have the custom of giving the name *real* or *del Rey* to the best, most beautiful, and most valued articles; thus every place has its *Palma real*, *Quina del Rey*, etc." (Karsten.)

‡ Darwin has shown, in an able paper communicated to the Linnæan Society, that the form of the flower, in more than one order, is either *entirely macho*, or *entirely hembra*, not passing from one into the other.

It is to be regretted that from the present confusion of nomenclature in India, it is difficult to ascertain what is meant by the descriptive terms there in use. If the above arrangement could be admitted, it would greatly simplify the matter, and be practically useful in its results.

BARKS OF HUANUCO.

The Grey Barks.—This region possesses, according to Pritchett, a somewhat peculiar climate, and the *Cinchonæ* which have been chiefly collected, bear perhaps somewhat the impress of this in their external appearance, whence the barks collected have been called in commerce *grey barks*, and in their native country, where, according to the above collector, the appearance of the lichen-covered trees is strikingly lustrous and beautiful, the epithets *nitida* and *lustrosa*, have been bestowed upon them. Mr. Pritchett, before undertaking the collection of seeds on behalf of the Indian Government, received from me all the information I could give him, as derived (together with specimens) from Poeppig and others. He thoroughly explored the district, and brought back most characteristic specimens in larger and smaller branches, especially of the different trees producing the bark valued in commerce, of which the *nitida* inhabits the higher portions of the mountains, and the *micrantha* and another, called *Pata de Gallinazo*, which I have described and named as the *C. Peruviana*, the warmer and especially the more sunny aspects. The bark brought home by Pritchett represents in the *Peruviana* the very finest quality of grey bark; in the *micrantha*, that which abounds most in commerce; and in the *nitida* a kind now less common, but well represented in Poeppig's specimens. There cannot be any reasonable doubt of the complete success of this attempt to secure for India the genuine "grey barks," and as the seeds have germinated abundantly both in this country and in India, we have the opportunity which has not been enjoyed by many botanists, of seeing the development of the living plants, and the result is this, that in India all three sorts are looked upon as possessing so close a resemblance as to be classed together as *micrantha*. This family likeness might, indeed, well have been guessed by the specimens brought by Pavon and by Poeppig, since amongst those of the former we find one most characteristic section of the *C. Peruviana*, and in the specimens brought by Poeppig a confusion which can only be understood through the light afforded by Pritchett's researches.

It is not possible to admit the classification which is growing up in the East Indies, since the best kind, the Pata de Gallinazo, or *C. Peruviana* (of which a flowering branch has been brought home from India by Markham), has flowers exactly the same size as the Calisaya (which he also brought), as far as comparison of dried specimens permit the determination; and to speak of a "middling-sized flowering variety of a Cinchona with small flowers" would not seem very logical, besides which character of the flowers there are other points of resemblance in the bark to that of one of the varieties of Calisaya.

It is pretty evident from the description of the Spanish botanists themselves, that their determination of *C. nitida* as a distinct species was founded on insufficient data. "M. Ruiz had confounded, in his Quinologie, the *C. nitida*, Flor. Peruv., with the plant described by La Condamine. He returned from his error in his supplement to the Quinology" says M. Laubert, "but nevertheless I find a trace of the same in the Nueva Quinologia, where Pavon says (*sub voce C. nitida*), 'Hæc species magnam affinitatem cum *C. officinali* habet, an eadem species ?'" I do not think that any botanist conversant with the two living plants, and seeing them growing together as I have done, would venture to unite them. They differ quite as widely as the *C. officinalis* differs from the Calisaya. In this uncertainty I should reduce the *nitida* from a species to a variety.*

The proposition which I would submit to attempt to bring order where so much confusion has hitherto reigned, is this :

Let the grey barks (the *Peruviana* of Laubert, or *original Peruvian Bark*) be looked upon as the product of *Cinchona Peruviana*, of which all seem to be indeed but varieties ; thus—

C. Peruviana, *α. vera* (Pata de Gallinazo).
,, *β. nitida.*
,, *γ. micrantha* (*Provinciana*).
,, *δ. Reicheliana* ("*varietas alpestris*" *glandulifera*, Poeppig) ; *micrantha* var. Weddell ; *micrantha*, Klotzsch.

The *δ. Reicheliana*, the *glandulifera* of Poeppig, belongs (as the reader will see under the head *C. micrantha* in my Ills. Nueva Quin.) in the opinion both of Klotzsch and Weddell to *C. micrantha*, but the bark would range more under that of the Pata de Gallinazo. As drawn by Fitch, it looks like the *macho* form of which the *micrantha* is the *hembra*, and with this supposition accords Poeppig's terms of *negrilla* and *blanquilla*.

If the *C. scrobiculata* of Humboldt and Bonpland (Plant. Equinoc. B.) be the *C. micrantha* of Tafalla, as seems to be thought in Germany, then we have again a reason for reconsideration of the subject.

It may be contrary to precedent to reduce Tafalla's species *C. micrantha* to a mere variety, and to retain the name for the Bolivian *C. micrantha*, of which two varieties are described by Weddell. I have mentioned, however, (sub voce *micrantha* N. Q.) that the leaves of the specimens brought by Tafalla, Poeppig, and Pritchett, are decidedly more coriaceous than those of Weddell, and some slight difference may be traced in the form and size of the capsules, and that the bark differs widely. I may add that this appears to be simply one form, and that not the best, of the Peruvian Bark plant of Huanuco (by whatever name it may be called), whilst I have also shown, in the same place, that there is every reason to believe that

* Laubert does the same, but on different grounds, and in a different direction. Recherches sur le Quinquina, p. 50.

Weddell's *C. micrantha* passes by intermediate forms into the Calisaya, and ought therefore to be classified in connection with this species.

If it is necessary to establish a difference between the Peruvian and Bolivian species, it would be much the most convenient to the pharmaceutist to retain the species of Dr. Weddell, which he has so well described, and to reject that of Tafalla, which perhaps never ought to have been a species at all. But if, in obedience to botanical precedent, it must be retained as a species, then at all events the Peruvian and Bolivian sorts should be marked as distinct varieties.

BARKS OF CHICOPLAYA.

Cinchona like the Calisaya of Tafalla.—The district of Chicoplaya, though belonging to Huanuco, was not visited by Mr. Pritchett, as it did not lie within the compass of his mission, and hence the barks are not so fully determined as those of the more strictly grey-bark producing districts; but there was found in this locality by Tafalla,* and sent to his associates Ruiz and Pavon,† a form of *Cinchona* which is very remarkable and interesting, as it seems to indicate one of the links of transition between the barks of the Loja region and those of Bolivia. The plant was called by Tafalla *Cinchona parecida à la de Calisaya*, or in English as above. The botanists Ruiz and Pavon, to whom he sent his specimens, professed to find in these so much similarity to the bark of the Quina naranjada sent them by Lopez Ruiz from Santa Fé that they gave it another name, that of *parecida a la naranjada*, or resembling the orange bark of Mutis. The specimens of this bark in Pavon's collection in the British Museum arrested my attention as those of a very promising kind of bark, though not exactly Calisaya, and certainly not the orange bark of Mutis. I have since examined my own specimens from Pavon, and amongst these is one entitled Cortezon de la Quina anaranjada de Mutis, and ascribed to *C. lancifolia Mutis*, *C. angustifolia* R. and P., also with (?) to *C. Uritusinga* and *C. Condaminea* H. and B.; this exactly resembles an undescribed and very peculiar kind of Calisaya, which I have called for distinction's sake "woody or lancifolia-looking Calisaya," and comes, as I think, from Caravaya.

Another product of Chicoplaya is the *Cinchona glandulifera*, the product of which used to come in trade as *cascarilla negrilla*. It is nearly certain, as Klotzsch has remarked, that no difference can be discerned between Poeppig's specimens and those of *C. nitida*, which

* Suplemento de la Quinologia, pp. 17, 18, &c.. also p. 11.

† Apparently A.D. 1800, see p. 13.

The true Calisaya was first known in Spain about A.D. 1789, at which time the price of six and seven pistoreens was paid for it, or in France two Louis d'ors (the Spanish lb.); it was unknown in this country till 1793.—*Relph on Bark*, pp. 59, 70, &c.

"En 1790, dit M. Ræmer, M. le comte de Mercy recut de Cadiz des echantillons d'un nouveau Quinquina de Perou sous le nom de Calisaya."—*Laubert sur le Quinquina*, p. 60.

were also *negrilla*, and further, that his specimens do not at all correspond with his description, and perhaps even less with that of the Suplemento de la Quinologia. The obvious inference is that there has been confusion in his packets of samples, and that the true bark of the *C. glandulifera* is still unknown. I have shown that the so-named bark of *C. glandulifera* Pavon is, on his own showing, that of *C. villosa*, Pav., or the dark Jaen bark of the Germans.

I may add, that I have once met with bark which might correspond well with Poeppig's description of the product of *C. glandulifera*, but if so, it must be regarded as so scarce as to be practically unknown.

The botanical specimens of the *parecida a la Calisaya*, consisting of flowering branches, brought home by the Spanish botanists, show a form of the *C. officinalis var. Bonplandiana*, having reference in the general aspect and form of the leaf more to the *lutea* than the *colorada* sort, that is, to the form producing the cascarilla amarilla del Rey, which I have found to yield very pure quinine. It certainly seems to me that this may be one of the connecting links, as I have above stated, and the more especially because some of the specimens of Calisaya, as brought by Markham, seem to approximate in the more lanceolate form of the leaf more closely than the normal type towards the Loja barks; indeed, this tendency is already apparent to a small extent in the var. *β. Josephiana*, Wedd.

THE BARKS OF CUENCA.

Cuenca, as a centre of production, must be regarded as very distinct from Loja, and the *Cinchona macrocalyx*, which was the *Crespilla* of Cuenca, and, in another of its forms, the *Quina amarilla de Loja*, and consequently the source of the poor and inferior Loja bark, seems to me to be a form so different from the *C. officinalis*, and moreover itself the source of so many varieties, that I should look upon it as a different species from the latter.* Moreover it is not at all impossible that several other species of Pavon range themselves around this by much closer affinities than it bears to the *C. officinalis var. Condaminea*, which it most resembles of all the Loja barks.†

The *C. lucumæfolia*, *C. lanceolata*, *C. stupea*, *C. heterophylla*, seems to me to form a group around this species as a centre, and also (though possibly a little more remote) the *C. Palton*, the bark of which has recently become of some commercial importance as a source from whence quinine in no inconsiderable quantity is derived. Also from this district has been brought in large quantities, by way of Guayaquil, a sort of bark which simulates to some extent that of

* The chemical constituents differ widely from those of the Loja barks.

† The microscopic study of the *Cascarilla con hojas rendondas*, Pl. 1, Fig. 6, of my *Microscop. Sect.* has close analogy with that of *Cort. C. Chahuarguera.—Berg. Atlas Taf.* xxxiv. 81.

C. officinalis, but which is almost destitute of any therapeutic power. It is probably the product either of the *Cinchona rugosa*, yielding (according to Pavon) the "crespilla" bark of Cuenca. The name "crespilla" was given by Don T. Riofrio to my specimens, and from his account of the plant I think that it is the *C. rugosa*.

All this ground should be travelled over by some future botanist, and the plants studied *in situ*, before a decided judgment could be formed concerning their relations.

JAEN AND CUSCO BARKS.

BARKS PRODUCING ARICINE (OR PARACIN.)

Although I have looked upon different geographical centres as producing prevalent leading forms of *Cinchonæ*, I do not at all mean to imply that there is any uniformity to be traced in the whole of the species found growing together. On the contrary we find these from the reports of all careful observers to be often most dissimilar. The species of *Cinchona* to which I now call attention are an illustration of this contrariety, and it naturally occurs whether these are also referable to some common type, but in this I fear the tendency to systematise prematurely would again lead us wrong. I must, however, in order to explain myself, take the *C. Pelletierana* (separating it in so far from the nearly allied *C. pubescens*)* as the *Cinchona* in the examination of the bark of which Pelletier first found the remarkable diversity in chemical constituents, which is only partially told in the above description.† Around this are gathered other species of

* I do not object to Weddell's classification of these two varying forms in making the *Pelletierana* a variety of *pubescens*, which, on botanical precedent, may be correct enough, but, seeing that in its chemical aspect the *Pelletierana* is the plant so remarkable in its character, I shall call it *C. Pelletierana*, according to the first and perhaps most correct impressions of Weddell himself. It is the *true* Quina amarilla, of which the pubescens seems to be the variety.

† I subjoin Pelletier's letter, as given in the Annales de Chimie et de Physique, tome 42, page 330, 1829, showing that he was at once sensible he had to do with a peculiar species.

Lettre de M. PELLETIER *à* M. GAY-LUSSAC, *sur un nouvel alcaloïde.*

"MONSIEUR,—Je me proposais de vous remettre, pour publier dans vos excellentes Annales, l'analyse d'une écorce qu'au Perou même l'on mélange avec le quinquina *Calisaya*, par fraude, puisqu'elle ne paraît pas en avoir les propriétés médicinales: cette fraude est d'autant plus à signaler que cette écorce a entièrement l'aspect du quinquina, et possède une saveur presque analogue. Mais cette analyse n'est pas encore terminée; elle n'offrira même d'intérêt *que lorsque je pourrai séparer l'espèce botanique qui fournit l'écorce qui en est l'objet*; et cependant il est important de répandre la connaissance d'un fait qui intéresse toutes les personnes qui sont à même de se procurer du quinquina, soit pour l'employer en nature, soit pour en préparer du sulfate de quinine. Dans cette vue, je me permets de vous adresser un extrait de la notice que j'ai lue à l'Académie royale de médécine, et qui contient le précis des recherches que j'ai faites sur cette écorce et son alcaloïde, conjointement avec M. Coreal, pharmacien, contremaître de ma fabrique de products chimiques. En ce qui concerne l'écorce mûre, le meilleur moyen de la distinguer est de la boncher avec de l'acide nitrique concentré; elle devient d'un vert foncé. Le quinquina Calisaya, par la même épreuve, devient d'un rouge brun. Nous donnerons plus tard l'explication de ce caractère.

"Nous avons dit que l'écorce qui nous occupe contient un nouvel alcaloïde: pour

Cinchona (which, viewed in this light, constitute a very exceptional and anomalous group of plants), which most certainly belong to the genus, but in which the typical cinchonaceous elements are superseded by those corresponding to, and perhaps identical with, the

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obtenir cette substance, il faut traiter l'écorce qui la recèle comme si l'on agissait sur du quinquina gris pour en obtenir la cinchonine. Ce premier fait et la ressemblance qui se trouve entre ces deux substances nous avaient déja fait penser que c'etait de la cinchonine que nous avions obtenue ; mais un examen plus approfondi nous a démontré que nous avions obtenu une matière totalement différente. Comme la cinchonine, elle est blanche, transparente, cristalline ; mais elle ne se volatilise pas comme la cinchonine, lorsque, après l'avoir fondue par le calorique, on augmente la température.

"Elle est soluble dans l'alcool et l'ether, mais absolument insoluble dans l'eau ; aussi paraît-elle d'abord sans saveur ; cependant au bout de quelque temps elle laisse dans la bouche une impression de chaleur, mêlée d'amertume et d'astriction. Les acides développent sa saveur.

"C'est en la combinant aux acides qu'on peut surtout la distinguer de la cinchonine. Avec l'acide sulfurique, on sait que la cinchonine forme un sel qui cristallise en prismes rhomboïdaux. Le nouvel alcaloide se combine aussi avec l'acide sulfurique ; mais cette combinaison n'est point cristallisable par solution aqueuse. Lorsqu'on la dissout en proportion convenable dans l'eau bouillante, la solution se prend par le refroidissement en gelée tremblotante, semblable à ce que l'on nomme *blanc-manger*. La masse gélatineuse, desséchée, prend un aspect corné ; reprise par l'eau bouillante, elle redevient gélatineuse.

"Cette combinaison dissoute dans l'alcool bouillant, ne se prend plus en gelée par refroidissement, mais cristallise en aiguilles soyeuses qui ressemblent beaucoup au sulfate de quinine. Ces cristaux constituent une combinaison définie entre la nouvelle substance et l'acide sulfurique ; combinaison bien distincte de la matière alcaline elle même. En effet, les cristaux alcaloïdes sont insolubles dans l'eau ; les cristaux salins s'y dissolvent, surtout à chaud, et se prennent en gelée par le refroidissement. Les cristaux alcalins sont solubles dans l'ether ; les cristaux salins ne le sont pas ; l'action de l'acide nitrique sur notre nouvelle matière est des plus caractéristiques. Si l'acide est concentré, il se manifeste une couleur verte des plus intenses ; si l'acide est étendu d'eau, il y a dissolution, de la matière sans coloration. Dans le premier cas, la matiére est altérée dans sa constitution ; dans le second, il y a simplement combinaisòn entre l'alcaloïde et l'acide, combinaison que l'on peut détruire par une base salifiable plus puissante.

"Dans un mémoire sur cette matière, je donnerai l'analyse de l'écorce qui la fournit ; je l'examinerai elle même d'une manière plus approfondie, et j'en présenterai l'analyse élémentaire.

Ibidem tome 51, page 185. 1832.

"J'ai donné le nom d'aricine à une base salifiable organique, cristallisable, que j'ai découverte avec M. Coriol en 1829 par une circonstance assez singulière. Un différent s'était éléve entre deux négocians de Bordeaux, relativement à la qualité d'une partie de quinquina venue du Pérou ; l'écorce avait les caracteres du quinquina jaune, mais on prétendait qu'elle *ne donnait pas de quinine*. Je fus prié d'en faire l'analyse. Dans cette opération, *au lieu de quinine ou même de cinchonine*, j'obtins une base salifiable qui avait des caractères tout particuliers, que je fis connaitre dans un mémoire que je lus à l'Academie de Médécine, conjointement avec M. Coriol, qui alors coopérait aux travaux chimiques de mon laboratoire.

"Je ne reviendrai pas ici sur les propriétés de l'aricine, et je passerai de suite à son analyse élémentaire. Toutefois, comme j'avais annoncé, au nombre de ses propriétés, celle de former avec l'acide sulfurique une combinaison qui, plus soluble à chaud qu'à froid, se prenait en gelée par le refroidissement, je dois ajouter que, pour obtenir ce résultat, il faut que la liqueur soit neutre au tournesol ; mais si on ajoute un excès d'acide, il se forme un autre sulfate qui cristallise en aiguilles aplaties ; la cinchonine, au contraire, cristallise avec l'acide sulfurique dans des liqueurs sensiblement neutres."

Here follows the elementary analysis, showing that aricine differs only from quinine by one atom of oxygen.

products of other families of plants.* I have shown under the heads *C. lutea* and *C. decurrentifolia* in my Illust. of Nuev. Quin., how botanical and chemical researches illustrate and confirm each other, and how microscopical examination comes in to aid the examination of the barks, all tending to show the Ladenbergia-like character which pervades them; and under the *C. lutea* it appears that Pavon's careful observation of the living plant brings out indirectly the same fact. He says that "a milky juice flows out when the tree is cut down or amputated;" that is to say, the milk-sap cells are abundant and full of their peculiar product, in which the tree symbolises specially with the kindred genus. The species of Pavon, which seem to me to be associated the most distinctly with the *C. Pelletierana*† of Weddell, are the *C. lutea*,‡ *C. decurrentifolia*,§ *C. villosa*,‖ *C. ovata*,¶ and the *C. obovata*,** which is probably nothing more than a variety of the *C. ovata;* understanding by this last the plant which is the source of the Cascarilla Pata de Gallereta. Specimens both of the plant and of the bark of this were brought me by Pritchett from Huanuco, where the tree is called by the not inappropriate name *Lengua de Vaca*, or "cow's tongue," from the rough feel of the leaves. It contains only paracin 0.60 per cent.

My attention has been recently directed again to the *Cinchona lutea* Pav., not as an article of commerce, for which purpose it is ill adapted, but in consequence of a correspondence with Dr. de Vrij, who forwarded to me by letter a specimen of bark in which Dr. Winckler had found cinchonidine and paracin, which had led Dr. de Vrij to some interesting experiments with this latter substance in the polariscope, in the course of which he found paracin exceptionally

* The following examination by Dr. F. L. Winckler of the light Jaen Bark, was undertaken in order to obtain Manzini's cinchovatin:—"104 ozs. were taken, and the usual process followed, which also Manzini had adopted. The acid solutions showed nothing remarkable, but the precipitate with lime was much more voluminous than with good Cinchona barks, and on being dried and treated with spirit of wine a solution was obtained, *characterised by its highly intensive greenish yellow colour*. By evaporation the alkaloid was obtained in the form of a brown yellow resin, tasting extremely bitter, which was only distinguished from rough quinine by its *striking yellow colour*. His chief effort now was to obtain the alkaloid pure, to attain which object the common methods were insufficient, since the purification was hindered *by a yellow resin*. In the end he obtained from 60 drachms only 60 grains of pure alkaloid, which was certainly neither cinchonin nor quinine, but nothing else *than the same which Pelletier discovered* (aricine) and that which Dr. Winckler himself had more lately found, *cusconin*." So aricine, cinconin, and cinchovatine are the same body. My observations on aricine are identical with those published by M. Delondre in "Quinologie," pp. 38, 39, and also in his "Memoire présenté a l'Académie Impériale de Médicine, le 5 Nov., 1861." The bark I have used is the same, as a specimen from M. D.'s collection in my possession shows. The highly intensive greenish yellow colour proceeds from a peculiar modification of chlorophyll, if I may judge from indications met with in analysis.

† *Habitat*, in the forest of Cusco the *Pelletierana* grows almost always intermingled with the *C. pubescens*. Delondre, Quinologie, p. 39.

‡ Habitat in Yuta, et in Cuito Jaen Provincia Quitense.

§ Vilcatamba ditione, Lojâ Provincia.

‖ Jaen de Bracamoros.

¶ Pozuzu et Panas.

** Chinchao vico Sylvis.

inert towards the ray of light. The bark I was able to identify completely with the specimens in my possession of the *C. lutea*, from Pavon; thus confirming the opinion of this gentleman as to their being the "pale Jaen bark" of the Germans, and also adding new and forcible evidence to the observations I have made under the head of *Cinchona lutea*, in reference to these Aricine and Paracin producing barks. Dr. de Vrij, in a recent comparison of the two barks at my house, quite confirmed their identification; and I hope, in conjunction with this able chemist, to complete some further researches on the subject of their peculiar products.

I am not prepared to suggest any separation of the above species from the family of *Cinchona*, to which I have no doubt they most correctly belong, and moreover I do not imply that the peculiarities mentioned are limited to these species. On the contrary I find that in measure they extend to several other forms, and the chemical peculiarities even to some extent make themselves evident in the analysis of the leaves of the *C. succirubra* (as also in some cases in the bark). This is remarkable, because the *C. succirubra*, though in my opinion the most cinchonaceous of all the *Cinchonæ* (as being the most rich of all in the peculiar cinchotannic acid), and though its microscopical structure is singularly Calisaya-like, is yet botanically most closely allied to the *C. ovata*. Moreover, the *C. cordifolia* Mutis, and the *C. Tucujensis* Karsten, which might certainly seem to claim affinity here, the latter resembling in external port and aspect so greatly the *C. succirubra* as to be at once taken for the same plant, yet when brought to analysis, these have again, as also in their microscopic examination, quite different features. On a review of the whole I can only see fresh illustration of those singular crossings in the characteristic features which so often occur to disturb our preconceived ideas, and to link together distant and at first sight distinct units into one vast whole.

I have little doubt that the examination of kindred families would disclose other links of connection, as, for instance, may be seen in the analysis of the bark of *Chrysoxylon* (now *Howardia*) *febrifuga*, in which a (febrifuge ?) alkaloid is found accompanying a peculiar yellow colour, which again (if I mistake not) pervades certain *Cinchonæ*.

The practical use to be made of these observations, consequently, would be to avoid all the above aricine barks, and if, as I think the *C. obovata* has been propagated in India, to ascertain this fact, and prevent in so far a repetition of the mistake made in Java, where not indeed one of these barks, but a kind more nearly allied to, though differing from the *C. Carabayensis*, viz., the *C. Pahudiana*,* has led

* The *C. Pahudiana* bears the name of *Crespilla Chica* in the specimens which Hasskarl (who collected the seeds for the Dutch Government) has given to me. In the same collection, the *Crespilla Grande* is the *C. ovata*—thus indicating a connexion, by way of contrast, between the larger and smaller Crespilla Cinchona. This probably indicates the reason for its identification at an early date in Java, with the *C. ovata*. As far as I can make out its nearest affinity, however, is to the *C. rugosa*, which is again a Crespilla bark—the Crespilla de Cuenca. With this

to much unprofitable expense. Botanically, the use I should make of them, would be to allow the testimony of the bark thus far to have such weight as to separate entirely the *C. ovata* of Pavon (as being a yellow-substanced aricine-producing bark) from the *C. ovata*, var. *rufinervis*, and the var. *erythroderma* of Weddell. I could indeed wish that the term first introduced by Ruiz and Pavon for their *Cascarillo pallido*, namely, *Cinchona pallescens*, might supersede their later form, *Cinchona ovata*, which is so ambiguous.

Moreover, I should see the same reason for admitting the distinction between *C. lutea* Pavon, and *C. cordifolia* Mutis, as being well founded, on account of the specific difference in the barks of the respective trees.

BARKS OF CARABAYA AND HUAMALIES.

On similar grounds I believe also that *C. purpurea* should be separated from *C. Pelletierana* as a distinct form, and as most probably the central point around which may be arranged other forms both in Caravaya and in Huamalics.*

In regard to the barks of Huamalies, it seems pretty certain that they were the product of the *C. purpurea*, Pavon, and there is no doubt of their wide divergence from those of the *C. pubescens*, and still more from those of the *C. Pelletierana*. The Huamalies bark has been quite neglected for a long period of years—not less, I should suppose, than about half a century—and the only parcel of any consequence that I have been able to study had remained already some thirty years unsold in this country.

The same must be said of the kind called in commerce "Carabaya bark," and sometimes branded on the serons "Marcapata." This is well represented and described in Delondre's Quinologie, but is now quite a thing of the past. From 1847 to 1853 it was imported rather largely, and was used as a tolerably productive source for the extraction of quinine both in this country and on the

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bark it coincides also as to its chemical analysis, and consequently I think it a pity to destroy trees in Java, which produce bark as good as much that is sold in London as "crown bark," and probably in Germany as *C. Uritusinga suberosa!*

* Amongst these the quite new variety which Markham has described as the *var. Huinapu* of the C. pubescens as follows:—

"*C. pubescens* (var. *Huinapu*). This is a *Cinchona* which, as far as I can make out from my MS. abstract of his work, is not mentioned by Weddell. It differs from the Casc. amarilla* (*C. pubescens*, var. *Pelletierana*), the capsule of the latter being half the size, veins of the leaf much more purple, many more capsules on the panicles, growing at a much greater elevation, and under side of the leaf very much more hairy. The Huinapu grows from the banks of the river to just below and within the Calisaya region, where it is common. The tree is from thirty to forty feet high. Leaf one foot long by eight inches; broadly ovate; petiole two inches long; veins and mid rib pale above, petiole and mid rib purplish towards the base; leaf dark green above, pale below; veins and mid rib light purple beneath and pubescent in the axils of the veins. Panicle spreading and depauperated. Capsule three inches long, teeth erect, green, very slightly tinged with purple towards maturity, more or less ribbed, lanceolate."—*Letter from C. R. Markham to Under Sec. for India, June 9th*, 1860.

* The *C. Pelletierana* is described with *foliis utrinque viridibus*.—Weddell, in loco.

continent. The collection, however, proved a disastrous speculation to those engaged. The *Cascarilleros* advanced into the districts inhabited by the Chunchos, a warlike tribe of Indians, and the conflicts which ensued led to the loss of some fifty or sixty lives, and to the death of an Englishman (named Backhouse), who was their leader; and ultimately, according to my information, the matter was wound up with the loss of about £6000 sterling.

Berg derives this bark (without any reason that I can find) from *C. Condaminea.** The only knowledge we have of its origin is through Dr. Weddell, which would lead, if correct, to its probable identification with *C. purpurea.* I should be more disposed to treat M. Berg's assertion with serious attention, as having some foundation, though contrary to the manifest analogy of this bark with that of Huamalies, if it were not that I find in the "Anatomische Atlas" a number of other assertions as regards the derivation of barks in commerce, which differ entirely from all previous experience.

THE PALE BARKS OF PERU.

Cinchona pallescens Flor. Per. Ms. cum Icon. Quinologia, p. 74.

I wish the original name thus given by Ruiz and Pavon to their *Cascarillo pallido* could be reinstated as the origin of the "pale bark" of Peru, the more especially as it is evident that two forms of this were afterwards comprehended under the one species *Cinchona ovata* R. and P. The first form, the *C. pallescens*, is represented at Madrid by a specimen with leaves as cordate as the *C. cordifolia* of Weddell (not of Mutis), and exactly resembling the "crespilla grande" of Hasskarl, to which I should therefore attach this name. We might then have for the second form that of the *Cascarillo con corteza de color de Pata de Gallereta*, the name of *Cinchona pallescens*, var. *ovata*, and should thus separate the plant of Ruiz and Pavon from that of Weddell, which certainly seems to be different (in Weddell's specimens) from the *C. ovata* R. and P., as represented in the specimens of Pavon, from which my drawing in the Illust. Nueva Quinologia, as well as that in Plate 195 in the Flora Peruviana, were taken. This last being the source of the Cascarilla Pata de Gallereta is, I think, identical with Weddell's var. ined. *macrocarpa*, and if it should prove so, might in some way be included in the arrangement or rather re-arrangement of the *Cinchona ovata.* I throw out these suggestions as materials for future study, agreeing also with Karsten that the *C. cordifolia* of Weddell is a different form from that of Mutis, and stands as nearly related to the *C. pallescens* as it does to the plant of Mutis, forming a kind of connecting link between the two. I should for the present let them stand thus:

C. pallescens, α vera (Crespilla grande) R. and P.
β. ovata.
γ. obovata.

* Atlas, page 65.

and so forth, joining the *C. cordifolia* Weddell, either as var. *cordata*, or as Karsten proposes, as a var. *Peruviana* to the plant of Mutis.

C. cordifolia α. *vera*.
β. *microcarpa*.
γ. *macrocarpa*.
δ. *Peruviana*.

It will be seen on reference to their works, that the Spanish botanists were inclined to consider their *C. ovata* as one and the same with the *C. cordifolia* of Mutis. This is a kind of alliance more correct, in my opinion, than that which attaches the *C. rufinervis* and *C. erythroderma* to the plant of Pavon.*

The two species of Pavon, *C. microphylla* and *C. parabolica*, are classed together by Weddell as varieties of *C. Mutisii*. They are not "pale barks," but the former is sold as a sort of "crown bark," the latter in serons by itself. I know nothing of the relation of these very peculiar *Cinchonæ*.

BARKS OF ECUADOR.

The Red Barks.

There can no longer be any hesitation in admitting that the *Cinchona succirubra* of Pavon is the source of the true Red Bark. This fact had dawned upon the Spanish botanists, but had been forgotten, and indeed buried, till the re-examination of specimens of bark compared with botanical specimens of the flowering plants, and the guiding names of Colorada de *Huaranda*, and *Cinchona succirubra*, led to the truth being again brought to light. Nevertheless, it is quite true, that in this case also we have not yet the full and systematic statement of the truth; for it is evident that the *C. succirubra* itself has several varieties, as I have shown under this head in my Illustrations of Nueva Quinologia; and moreover that according to the specimens sent to me from the spot, one or two of the forms diverge widely from the normal type. These specimens seem to indicate a series that might be represented thus:

Cinchona succirubra, α. *vera*.
β. *pallida*.
γ. *erythroderma*.
δ. *conglomerata*.
ε. *Cuchicara*.
ζ. *Spruceana*.

The *C. succirubra* has improved wonderfully by cultivation, and already two sub-varieties, diverging in the colour of the flower, &c. (probably in the *macho* and *hembra* direction), have manifested themselves in the East Indian plantations. The red bark as

* Laubert says, "MM. Ruiz et Pavon ont reconnu l'identité de leur *C. ovata* et du *C. cordifolia* Mutis. * * * Il appartient a la premiere variété du *C. cordifolia*."

imported is singularly variable in its products when chemically examined, as it no doubt is the product of different varieties as above; and, though it is sometimes productive of a very large amount of alkaloid, is not to be depended upon, in general, for any such result. I have even found, in one exceptional specimen from a new district, quinidine taking the place of cinchonidine, a fact which I recently verified with Dr. de Vrij. In India the product seems very copious and uniform of both quinine and cinchonidine; and, though consisting too largely of the latter alkaloid, holds out great hope for the future. Indeed, Mr. M'Ivor is sanguine in his expectations of attaining even better results than he has yet achieved.

The price of *fine* red bark from South America has recently advanced in the London market, owing to its scarcity, to more than thirteen shillings the pound avoirdupois.

Mr. Markham prepared, when in India, an extract (by arrack spirit) from the leaves of the ***succirubra***. It was submitted to Dr. De Vrij and myself for analysis, and our results were very similar. Dr. De Vrij found 0·11 per cent. of alkaloid. He says, in a letter to me, "Although this quantity is very little, this investigation was nevertheless specially interesting for me, as I obtained from it a small quantity of very good crystalline white oxalate, from which I obtained *Quinine-herapathite*, which I enclose in this letter." Dr. De Vrij also found kinovic acid. I obtained from the same parcel 0·16 of alkaloid, soluble in ether, partially united with wax, and after separation of this, crystallizing with acetic acid, I also obtained kinovic acid and indications of cincho-tannic acid implicated with the wax. I refer to the "Return East India (Chinchona Plant)" Blue Book, 18th June, 1866, p. 30, for particulars of an earlier analysis made by myself in 1863, of the same leaves, from which I then obtained "a portion soluble in ether to the extent of 0·17 per cent. of the leaves, forming a clear yellow solution, which precipitates on the addition of a solution of oxalic acid in spirit of wine."

The leaves contain apparently chlorophyll (very fine) and xanthophyll, united to cincho-tannic acid, which gives a peculiar purplish tinge by reflected light to the etherial tincture, as I have elsewhere mentioned. This cincho-tannic acid, as is well-known, has a peculiar affinity for oxygen, and the mode in which it is preserved in the leaf from this action being too suddenly developed, seems to be that a thin varnish of vegetable wax is spread over the whole leaf in the Cinchona, as in many other plants, in some of which, as in sea-side plants (*e. g.*, Seakale), it forms an obvious protection from excessive moisture, but when removed by ether, the chlorophyll remains unchanged. In the Cinchona, however, it serves another purpose, for as soon as by immersion in ether, chloroform, spirit of wine, or even liquor ammoniæ, the waxy covering is removed, the oxygen of the air begins to attack the cincho-tannic acid, and the leaf, if mature, changes rapidly to a maroon or reddish brown colour, and the contents of the "*cellules epidermiques*" of Weddell (which cells remain uninjured) will be seen to partake of this brown tinge, which also penetrates deeply into the substance of the leaf. The chlorophyll, during this oxidizing process, is not destroyed, but slightly modified. If ether be the solvent used, there remains, when it is evaporated, a yellowish mass, out of which chloroform dissolves the wax, which gradually acquires a slight tinge of green, and the remainder, dissolved by acids and precipitated by ammonia, gives the pink colour and at length the precipitate of cinchona-red. It is probable that while these substances are thus held (in connexion with ammonia, which also exists in the leaf), in such a state of nicely balanced affinities, the alkaloids begin to form in some manner, through the gradual access of air by the stomata. I have tried leaves of *C. officinalis*, *Calisaya*, *nitida*, *micrantha*, &c. Chloroform is the most successful menstruum I have employed, as it dissolves the wax in great purity, and the change in the leaf begins immediately. The experiments may be followed up, I hope with success, in India, and may lead to fuller knowledge of the mode of formation of the alkaloids.

BARKS OF POPAYAN.

C. Pitayensis.

In the year 1753 M. de Santisteban had already discovered a species of Cinchona in the neighbourhood of Popayan,* but it was not till long after the year 1824, when Mr. Canning, then (I suppose) British Consul,† sent over this sort with specimens (some of which are now in my possession) that it came forward with any special prominence in commerce. Although so early met with, it has not yet been very fully described botanically. Mr. Weddell's description in his "Histoire" is no doubt correct as far as it goes, and I do not at all question that there are traces of alliance with the *C. officinalis* (probably passing through an intermediate form), but on the whole there seems to me little doubt that the *Cinchona Pitayensis* is entitled to be considered a distinct species. Indeed if Pitayo had happened to be the district first explored, this would have been reckoned the mother-plant of all the *Cinchonæ* from its therapeutic efficiency, its abundance, and the many varieties which group themselves around it. M. Rampon, who is a large importer of the barks of these districts, and resided as French Consul in New Granada, gives the following description.‡ "It is gathered on the western slope of the middle Cordillera, not in the province of Antioquia, where there are only false Quinquinas, but more to the south, in the province of Cauca, from Sumbico to Popayan, and especially in the neighbourhood of Pitayo, an Indian village from whence it derives its name. The sort is nearly exhausted in these regions. It is furnished by the *Cinchona Pitayensis*, a variety of the *Condaminea vera*, but it

* Laubert, Researches sur le Quinquina, p. 6.

† See Pereira, vol. ii. part ii., p. 1644 note, to which I may add that the samples in my possession were wrapped when I obtained them in a "Times" newspaper of July 15th, 1825, and marked "Bark from Bogota, Mr. Canning."

‡ Planchon des Quinquinas, p. 101.

differs essentially, contrary to the opinion of Mr. Weddell, from the *lancifolia* of Mutis."* M. Rampon proceeds further to describe the varieties, of which he considers that the red-brown variety and that of Almaguer form the transition to the red barks—an additional reason, as it seems to me, for looking upon a form so diversely allied as a separate species. Mr. Robert Cross, sent by the Indian Government to collect seeds, says† that three kinds of Pitayo were supposed to exist in Pitayo and the surrounding districts under the names *red* or *canela*, *yellow*, and *white*. The red commands the highest price, as the foreign buyers in Silvia find after repeated trials that it yields the greatest quantity of quinine; the yellow is held next in estimation, whilst the white brings the lowest price of all.

Mr. Cross gave his attention entirely to this red variety, and found it growing on a dark brown, friable loam mixed with small pebbles, and having a substratum of loose rock, which in some cases was of volcanic origin, and in others appeared as a kind of slate of a deep bluish colour. He was allowed to take up some suckers, none of which were thicker than a common walking stick; several of the young Indians were immediately set to work with knives and *machetes*, when, on clearing the earth away from the base of the suckers, they dug them up by the roots, and then handed the plants to an old Indian, who barked the roots and the lower portion of the stem. The barking is rather tedious work, for the bark cannot be taken off in lengths of a foot or so, but breaks away in little chips about two or three inches in length, which may in some measure account for its superior quality. This is the bark sent home by Cross for analysis, and I have taken the above particulars from the description of his journey. It occasioned some controversy about root bark, some being inclined to take it as an illustration of the superior quality of root bark, whilst I was disposed to take an opposite view, my previous knowledge of root bark from Bolivia having been such as not by any means to prejudice me in its favour. The root bark of Calisaya sells at a very low price. In the case of this Pitayo it is probable the large roots may run near the surface of the ground, and perhaps from being covered with moss they may thus contribute to the good quality of the whole product.‡

The amount of alkaloids was large, but was exceeded by that of a second specimen sent home by Cross last year with seeds from the Piñon de Pitayo, at about 8000 feet elevation above the sea.§

* Planchon, l. c. p. 102.

† Report to the Under-Secretary for India on the Pitayo Cinchona, &c., by R. Cross, 1865.

‡ Mr. M'Ivor says, in a letter to me:—"I have an impression that the bark you analysed was that from the collar, or the part of the stem joining the roots, where the bark was partially covered by the grass or earth. This produces nearly the same effect as mossing."

§ viz. Sulph. Quinine .... 5·85
Quinidine and Cinchonidine 4·19
Cinchonine .... 1·30
——11·34, or as *alkaloid* say 10 per cent.
See *Report*, Jan. 16, 1866.

These latter seeds were sent on in their original package to India, and have there failed to germinate. Had a small portion been retained in this country, the chances might have been that some might have vegetated. It will be seen how important a species this is when it is understood "that this *Cinchona* will bear three or four degrees of frost without being injured in any way," and further that the bark has (occasionally) commanded a price above that of Calisaya in the French market. From specimens in my possession from Pitayo of the *roja* it must sometimes have formed large trees, possibly at a lower elevation. The *canela*, or cinnamon-coloured bark, appears from specimens in my possession to grow on the volcanic mountain of Puracé, also at Sumbico, near Popayan, and other places. This kind, as also the *amarilla*, has yielded a fairly productive bark in immense quantities to the manufacturers of sulphate of quinine.

The supply of these barks seems for the present to be exhausted, and another and very inferior sort has taken their place from the canton of Almaguer.

The first specimens of this were brought to Paris by M. Engler in 1855. I have from this gentleman's collection characteristic pieces of this inferior sort, with the inscription :

"Canton d'Almaguer, Quina du Pongo, petites feuilles vert foncé cotes rouges saules."

This is all that is known to me of this sort of Pitayo bark, of which it may constitute a var. *Almaguerensis*.

THE BARKS OF NEW GRANADA.

The febrifuge barks of this region seem first to have been observed* in 1772 at Tena, and in 1773 at Honda, by Dr. D. Sebastian Josef Lopez Ruiz, and the *C. lancifolia* was afterwards so named and described in the periodicals of Bogota in 1793, by the celebrated Mutis, resulting in an active controversy, into the merits of which it is unimportant to enter. Sufficient for our purpose that Dr. Karsten has again brought before us the *C. lancifolia* in the elaborate work he is publishing,† and though unfortunately his specimens of bark have perished, the well-executed representation of the bark of the *C. lancifolia*, Mutis, brings before us with the greatest accuracy the Orange (naranjada) Bark of that country, in that form which specially acquired in the English market the name of "Caqueta Bark," as being understood to be collected on the banks of the River Caqueta.

Dr. Karsten has been good enough to send me specimens of his collection, amongst which one of the *C. lancifolia* compares well with a specimen in my possession, gathered by Mutis and presented by him to Humboldt. It seems to me that the *C. lancifolia* is best looked upon as a separate species, having ranged under it a number of

* Suplemento de la Quinologia, p. 113, &c.
† Karsten. Floræ Columbiæ Specimina Selecta. Fasciculus I., Berlin 1858.

varieties. Of these one of the most marked is the sort from Chiquinquera, to which Karsten has given the name *obtusata* or *obtusifolia*. This kind had not much reputation in commerce. Far more interesting, in respect of its therapeutic powers, is the variety *obovata*,* the so-called Calisaya of Santa Fé, which rivals the *C. Calisaya* itself in the excellence of its product. This kind certainly ought to be introduced into India, which as far as I know is not the case at present. The real *naranjada* is not sufficiently productive of quinine to make its naturalisation an object of desire, but it is otherwise with a third variety, which Karsten describes as "the broad leaved variety which we designated *discolor*."

Karsten says, "Seeds of this variety, containing two per cent. quinine in the bark, I gathered in order to send them, through Herr v. Landsberge, Governor of Curaçoa, to the Dutch government, for plantation in Java. These were sown by Dr. Hasskarl, and have thriven excellently in their new situation. The result of this plantation will be interesting, in a systematic, as well as especially in a pharmacological point of view; we shall probably, in due time, receive information of it from the Dutch government."—*Med. Chinarinden*, p. 55.

This is important information for the prospects of Indian cultivation, as I learn from Mr. Markham's Report that 160 plants derived through the favour of the Dutch government from the above source are already growing in India. I look upon this as one of the most promising kinds, always supposing that I am right in understanding from the descriptions of Karsten and Cross that this is the source of the "soft bark" of commerce, now so largely used in the preparation of quinine. The relative thickness of this bark and its apparently rapid growth, viewed in connection with the yield of quinine, recommend this plant much; and I should like to see this sort, together with the *C. officinalis* and the *C. Pitayensis*, naturalised also in Algeria, where they might probably succeed, as bearing slight frosts without injury.

After all the endeavours, from the time of Mutis to the present, to find an identity between the species inhabiting the range of mountains from Quito to the Lake of Maracaibo with those of Loja and Peru, I believe that there is not yet one instance in which such an identity is made out. Contrast and variety are the preponderating features. The *Cinchona lancifolia* of Mutis is a centre from which diverge many and abundant varieties, and is scarcely represented on the western side of the continent. The general information given by Dr. Karsten appears to me to be of more practical value than that given by any previous explorer of these northern districts, and the very beautiful botanical specimens of which he has had the goodness to make me a partaker, allow me to speak with more confidence the sentiments expressed above than could otherwise have been the case.

* Karsten says it can scarcely be distinguished from the typical form called *C. angustifolia*, by Ruiz, except by the somewhat smaller leaves.

It is a pity that the very expressive name *tunita* should not be retained for the distinctive appellation of the variety provided with the most complete clothing.

The *Cinchona lancifolia*, Mutis, might, with its varieties, be expressed in some such form as follows:—

Cinchona lancifolia, Mutis α. *vera*.
β. *obtusata*.
γ. *microphylla*.
δ. *obovata, &c.*

C. cordifolia, Mutis.

The *C. cordifolia* of Karsten is clearly that of Mutis, and in its beautifully heart-shaped leaves is well worthy of the name; but this plant has well and even strongly marked varieties (as shown by specimens sent by M. Restrepo, and now in the herbarium of Dr. Hooker), and, further, one at least of the varieties of *cordifolia* collected by M. Rampon, has furnished a very valuable bark for the manufacturers of quinine.* I was perhaps misled by system in looking on the bark as a variety of *lancifolia*. The *Cinchona Tucujensis* of Karsten has much analogy (as growing under my notice) with the port and aspect of this plant. I have also found the Maracaibo bark, which is its product, contrary to all *a priori* reasoning, occasionally productive of quinine.

The *Cinchona corymbosa* of Karsten is a very marked species, and is apparently the origin of a sort of bark of which a good deal has been imported since the period of Dr. Karsten's researches, but which will probably cease to be collected, as the price obtained cannot be remunerative.

The bark, which is called by Delondre *Quinquina rouge d'Ocana*, is not unfrequently imported. The botanical source from which it is derived is unknown, but I am inclined to think that it is not improbably represented by specimens of *Cinchonæ* from the neighbourhood of Velez, and Socorro, in the rich collection of Dr. Hooker (Cfr. Planchon des Quinquinas, p. 100).

CONCLUSION.

The chief cause of obscurity and confusion in our knowledge of the *Cinchonæ*, has, in my opinion, been the tendency which has prevailed from the very first, to systematise without having first made ourselves acquainted with the details of the question. From this natural tendency I was led to avoid carrying the enumeration of the pages in what would have been a far more convenient order for reference, viz., from beginning to end, through my Illustrations of the Nueva Quinologia. My hope was to have placed the species in something like a systematic arrangement, but I found this completely impossible. I may have attempted too much in the suggestions I now throw out, but I leave these questions to those whose accurate botanical knowledge enables them to cope with these subjects—

* Planchon, des Quinquinas, p. 98.

satisfied to labour in the discrimination of individual species and the barks resulting therefrom. I wish to direct especial attention to the spelling of the name of the genus, whether as *Cinchona* or as *Chinchona*—also to the name of an allied genus, whether as *Cascarilla* or as *Ladenbergia*. Nothing tends so well to settle these questions as the free expression of opinion at a Botanical Congress. I also invite attention to what seems to me the necessity for considering the markedly distinct forms as species, and not as varieties—such varieties having again varieties, until all ends in confusion. If this be admitted, the *Cinchona Pitayensis*, *Cinchona lancifolia*, *Cinchona Pelletierana*, *Cinchona purpurea*, *Cinchona erythroderma*, &c., would take their place as species, whilst others might, in my opinion, be best treated as varieties, as has been well decided by Dr. Weddell as to the *C. Boliviana*.

The varieties of *Cinchona Calisaya* I do not presume further to define, as I hope Dr. Weddell may add to the obligations we are under to him, by further elucidating this subject.

In conclusion I will express my opinion that every well-defined region of the Andes has its own prevalent and characteristic *Cinchonæ*, generally found in varied aspects, and incapable of being reduced to any one typical form. I do not think that any species has been clearly proved to prevail unchanged from end to end of the Cinchonaceous region, and I believe the plants which resemble each other in distant parts will be found analogous rather than identical.

This paper was illustrated by numerous drawings and specimens provided by Mr. Howard and Mr. Markham, and, in the discussion that followed, M. Weddell made some observations, the substance of which is here given.

Various occupations having now kept me away from Quinology for many years, the subject is much less familiar to me than it was. I cannot, however, after hearing the very kind words Mr. Howard has made use of in speaking of me, let pass the opportunity of expressing to him my sincere thanks; and I am most happy, at the same time, to do justice to the great impartiality that he has always shown, when having to deal with rather delicate subjects of controversy. I beg leave to add, that if my work on Quinology has rendered any service to science, not among the meanest ought to be ranked that of having contributed to call into the field so able and persevering an observer.

I cannot attempt to follow Mr. Howard through all the interesting details he has laid before the Congress, and shall make only one or two remarks: first, as to the spelling of the generic name of the bark-tree. Linnæus and almost every modern botanist write it *Cinchona*, while Mr. Howard, following in this respect Ruiz and Pavon, and other old Spanish botanists, would have it *Chinchona*. Which of these modes of spelling ought we to adopt? The last, undoubtedly, if it can be proved that Linnæus committed an error in dropping the first *h* of the Countess Chinchon's name; but this cannot even be surmised; he did so for the sake of euphony, just in the same way as he wrote *Jussiæa* instead of *Jussieua*, and so on. Now, the question of priority being undoubted, no further reason than this ought to be required for establishing the preference in favour of Linnæus. It may, however, be further argued that the spelling advocated by Mr. Howard does not in reality attain the end he has sought for better than the original one; the Spanish particle *ch*, to be pronounced as in the English word *church*, not being so pronounced in any other language than English. In Italian, indeed, the sound is given by *c* alone. Another disadvantage derived from the proposed change, would be that of creating a precedent to which, in numerous other cases, it would be absolutely impossible to adhere.* And after all, would Countess Chinchon's rights be in any way impaired by her name passing to posterity under a more agreeable form?

I perfectly concur with Mr. Howard as to the great variability of the species of the very natural genus now before us; so much so that, allowing for exaggeration, it might almost be said that all those described are but varieties or races sprung from one typical form. There is, in fact, no single one of them that can be distinguished from its neighbour by one absolute character; they can only be so by a certain *ensemble* which the eye may be unable to collect in a herbarium specimen. In these respects, I believe, a parallel may very well be established between *Cinchona* and many of our European genera. It is then to be expected that, as the number of specimens augments in herbaria, quinologists will have to contend with more than one difficulty arising from their peculiar tendency either to extend or to restrict. And it must be evident to any one who has handled these polymorphous plants that, if the multiplying or splitting system be adopted, Quinology must fall at last into an inextricable chaos. The only means, then, of unravelling the ruffled skein, would be for some intelligent botanist to devote some years of his life to the study of every so-called species in its native realm, and there settle, once for all, how many, or rather how few, must be the forms that would thenceforward have to be considered as typical, the others being ranked beneath them.

I confidently believe, that the very worst service that can be rendered to Quinology and to systematic botany in general, consists in a profligate multiplication of specific names. When vegetable forms, deserving to be distinguished, are ranked as varieties or sub-varieties, it is easy to see that a much more correct idea is conveyed of their filiation and of the amount of their differences than if they are treated as species, and thus made to appear of equal value and equally distant genealogically one from the other.

* When, for instance, two different genera have been dedicated to the same botanist, and their names have a common derivation, such as *Fontanesia* and *Desfontainea*, which, according to the proposed new rule, ought both to become *Desfontainesia*.

The SECRETARY then alluded to a note from Dr. FERD. MÜLLER "on the Cultivation of the Cinchona in the South of Europe," and which will be found at page 23.

Mr. HOWARD ultimately expressed his concurrence with the views of M. Weddell; and the above paper has been revised by the author, and the word *Cinchona* adopted by him, in accordance with the pledge given by him to the Congress.

RECHERCHES EXPÉRIMENTALES POUR DÉTERMINER L'INFLUENCE DE CERTAINS GAZ INDUSTRIELS, SPÉCIALEMENT DU GAZ ACIDE SULFUREUX, SUR LA VÉGÉTATION.

Par EDOUARD MORREN, Professeur de Botanique à l'Université de Liége.

[Planches XII. et XIII.]

INTRODUCTION.

NOUS avons été amené à instituer les recherches qui font le sujet de cette communication, par des travaux dont nous avions été chargé pour déterminer l'influence que certains établissements industriels peuvent exercer sur la végétation agricole de leur voisinage. Il en est résulté que nous avons considéré les faits dans leurs rapports avec la pratique et l'application. Cet ordre de phénomènes a été peu étudié par les savants, et dans les contestations judiciaires, les experts ont peu de renseignements pour se guider.

C'est ainsi qu'un préjugé assez généralement répandu attribue aux poussierès métalliques, charbonneuses ou autres qui se déposent sur le feuillage, une influence fatale pour la vie des plantes. Nous avons vu des personnes recueillir de cette poussière, particulièrement entre les fentes de l'écorce des arbres, l'analyser et après y avoir constaté la présence d'un métal, du zinc par exemple, conclure que la végétation était affaiblie par ce contact. Le moins qu'on dise est que cette poussière obstrue les pores des plantes, s'oppose à la transpiration et enraye les fonctions les plus élémentaires de la vie végétale.

Cette doctrine est, croyons-nous, erronée. La poussière, en tant que corps physique, est sans influence sensible sur la végétation dans les conditions ordinaires où celle-ci se développe. Elle est peut être désagréable, malpropre même, mais elle n'est pas toxique. On ne peut lui attribuer le malaise que les plantes semblent quelquefois éprouver dans l'intérieur des villes. En plein air, les pluies, les brouillards et la rosée lavent et rafraîchissent le feuillage. Dans l'intérieur des appartements la poussière s'accumule plus imperceptible et plus dense sur les feuilles, parce qu'on néglige souvent de les bassiner ou de les éponger comme le font les jardiniers dans les serres. La culture est difficile dans les appartements. Cependant il nous paraît que les résidus de l'émanation aqueuse, c'est-à-dire de la transpiration végétale, en se condensant dans l'épaisseur et surtout à la surface de l'épiderme, sont beaucoup plus à craindre que le dépôt superficiel de grossières poussières. Ces résidus consistent surtout en matières siliceuses et en substances grasses, dont le dépôt peut enrayer les fonctions ordinaires de la surface des feuilles.

Nous avons observé la végétation dans plusieurs localités où elle était constamment imprégnée de poussière, épaisse mais inerte au point de vue chimique, et nous n'avons constaté aucun dommage. Nous pouvons citer notamment le jardin du directeur d'un important établissement pour la réduction et la fonte de fer, situé au voisinage de Liége. Pendant toute l'année les feuilles de ce jardin tachent en noir les doigts qui les frottent. Cependant la végétation est florissante, fraîche, immaculée.

Il peut en être autrement quand l'influence des poussières se complique d'une action chimique. Cependant ce genre de dégâts est fort restreint. Nous avons badigeonné des poiriers, des pommiers et des cerisiers au blanc de zinc agglutiné avec de la gomme. Cet enduit a tenu sur le feuillage pendant une grande partie de l'été. Quant il se détachait les feuilles reparaissaient vertes et intactes.

L'ensemble de nos observations nous a conduit à considérer l'acide sulfureux comme le plus terrible ennemi de la végétation, comme le grand coupable dans presque tous les méfaits que les squares, les boulevards, les jardins, les champs et les vergers subissent au voisinage de notre industrie. Nous avons été amené à cette opinion par un grand nombre d'expériences que nous ne pouvons pas relater ici. L'acide sulfureux est un agent désastreux pour la vie des plantes. Il macule et perce le feuillage : il le ronge et le fait tomber en poussière. Il agit directement sans se transformer en acide sulfurique. Sa présence dans l'atmosphère, même à la dose d'un cinquante millième, se révèle par des caractères indélibiles sur la surface des feuilles. Toutes les sources d'acide sulfureux, et elles sont nombreuses, manifestent leur présence sur la végétation du voisinage. Autour de certains établissements industriels qui opèrent le grillage des sulfures ou qui consument des charbons pyriteux, le fléau répand la mort autour de lui. Son action est incessante. Partout où brûle un fourneau et où s'élève une cheminée cette action est sensible. Nous parlons de nos pays où l'on est dans l'usage de brûler des houilles plus ou moins pyriteuses. La plus modeste chaumière, isolée dans la campagne, influe sur le feuillage qui l'environne, et avec un peu d'habitude on cueille facilement çà et là quelques feuilles portant l'empreinte de l'acide sulfureux.

Bref, car nous ne pouvons pas entrer ici dans le détail de ces faits, nous attribuons à l'acide sulfureux presque tous les dommages que la végétation éprouve dans le voisinage de l'activité humaine. On peut établir un remarquable parallèle entre l'acide sulfureux et l'oxide de carbone. Le premier est aussi nuisible à la végétation que le second est funeste à l'homme. Reciproquement l'oxide de carbone est favorable aux plantes et l'acide sulfureux n'est pas *directement* fatal à la santé de l'homme : il irrite les muqueuses ; il peut incontestablement provoquer des accidents graves, mais nous voulons dire qu'il n'est pas, à proprement parler, toxique, tandis que l'oxide de carbone est mortel même à de très-faibles proportions. C'est, d'ailleurs, un fait général que l'influence toxique des gaz se manifeste inversement sur l'un et sur l'autre règne de la nature.

Les quelques expériences que nous allons relater et que nous avons détachées de l'ensemble de nos recherches, suffisent, nous paraît-il, pour établir la doctrine que nous venons d'énoncer. Elles montrent que les produits de la combustion et de la distillation de la houille sont inoffensifs quand le combustible est pur de tout mélange pyriteux; mais qu'ils sont, au contraire, désastreux quand le sulfure de fer, comme il arrive souvent, accompagne le combustible.

D'un autre côté, c'est un fait reconnu dans la pratique et facile à vérifier, que les végétaux ne sont pas tous également sensibles à l'action des gaz nuisibles. On l'attribue quelquefois à des différences de tempérament, à l'épaisseur de l'épiderme, à la durée du feuillage. Quant à nous, nous ne sommes pas, en général, disposés à croire à des influences vagues et indéterminées. Tout effet matériel, dans les manifestations vitales, a une cause matérielle. Ce que l'on appelle vulgairement les pores des plantes, comme nous disions tantôt, ne peuvent être que les stomates. Or, ces organes nous paraissaient, *à priori*, les ouvertures naturelles à travers lesquelles tous les gaz, nuisibles ou non, pénétraient dans l'économie végétale. L'observation a pleinement confirmé ces prévisions. Nous croyons pouvoir poser en principe que l'influence nuisible de l'acide sulfureux sur la végétation est directement proportionnelle, en rapidité et en intensité, avec le nombre moyen des stomates sur le feuillage des espèces. Nous avons déjà parlé de ce fait dans notre notice sur la "détermination du nombre des stomates," communiquée en 1864 à l'Académie Royale de Belgique, mais sans le développer. Une expérience que nous relaterons ici, établit que si les stomates sont obtrués ou bouchés l'action nuisible cesse de s'exercer.

Relativement au gaz d'éclairage, nos expériences ne sont pas encore assez complètes et nous les reprendrons. Cependant il nous paraît pouvoir en conclure que ce gaz éminemment complexe, n'est cependant pas essentiellement nuisible. Il le devient, en fait, parce que n'étant pas, en général, suffisamment épuré, il donne par sa combustion une plus ou moins grande quantité d'acide sulfureux.

Nous donnons, pour terminer cette introduction, la composition du gaz d'éclairage telle qu'elle nous a été communiquée par notre savant collègue de la chaire de Chimie à l'université de Liége. C'est à un pareil mélange que nos plantes ont été soumises dans certaines des expériences que l'on va lire.

Produits de la Distillation de la Houille

Produits	Groupe	Classe	Sous-classe	Substance	Formules	
Produits gazeux	Gaz d'éclairage	Parties éclairantes		Acétylène (1)	C^2H^2	C^nH^{2n-2}
				Benzine ou benzol	C^6H^6	C^nH^{2n-6}
				Parabenzol	C^6H^6	
				Naphtaline	$C^{10}H^8$	
				Gaz oléfiant ou etylène	C^2H^4	C^nH^{2n}
				Propylène ou tritylène	C^3H^6	
				Butilène ou tretylène (ditrétyle)	C^4H^8	
				Amylène	C^5H^{10}	
				Caproylène ou hexylène	C^6H^{12}	
				Ænanthylène ou heptylène	C^7H^{14}	
		Parties non éclairantes		Gaz des marais ou hydrure de méthyle	$C\ H^4$	C^nH^{2n+2}
				Hydrure de hexyle	C^6H^{14}	
				id. d'octyle	C^8H^{18}	
				id. de decyle	$C^{10}H^{22}$	
				Hydrogène	H	
				Oxyde de carbone	CO	
				Nitrogène ou azote	N	
	Impuretés			Acide carbonique	CO^2	
				Ammoniaque	H^3N	
				Hydrogène sulfuré	H^2S	
			en faibles proportions	Bisulfure de carbone	CS^2	
				Acide hydrocyanique	$H(CN)$	
				id. hydrosulfocyanique	$H(CN)S$	
Produits liquides	Goudron	Neutres	Solides	Naphtaline	$C^{10}H^8$	
				Paranaphtaline (anthracène)	$C^{14}H^{10}$	
				Paraffine (cératène)	$C^{27}H^{14}$	
				Chrysène	$C^{12}H^8$	
				Pyrène	$C^{15}H^{12}$	
			Liquides	Benzol (benzine) ou phenène	C^6H^6	C^nH^{2n-6}
				Parabenzol	C^6H^6	
				Toluol ou benzoène (toluène)	C^7H^8	
				Xylol ou xylène	C^8H^{10}	
				Cumol ou relinène (cumène)	C^9H^{12}	
				Cymol ou cymène	$C^{10}H^{14}$	
		Acides		Acide phénique ou phénol	C^6H^6O	
				id. crésylique ou crésol	C^7H^8O	
				id. phlorylique ou phlorol	$C^8H^{10}O$	
				id. rosolique	?	
				id. brunolique	?	
		Bases		Pyridine	$(C^5H^5)'''N$	
				Cespitine	$(C^5H^{13})'''N$	
				Picoline	$(C^6H^7)'''N$	
				Aniline	$(C^6H^7)'''N$	
				Lutidine	$(C^7H^9)'''N$	
				Toluïdine	$(C^7H^9)'''N$	
				Collidine	$(C^8H^{11})'''N$	
				Xylidine	$(C^8H^{11})'''N$	
				Parvoline	$(C^9H^{13})'''N$	
				Cumidine	$(C^9H^{13})'''N$	
				Coridine	$(C^{10}H^{15})'''N$	
				Cymidine	$(C^{10}H^{15})'''N$	
				Rubidine	$(C^{11}H^{17})'''N$	
				Viridine	$(C^{12}H^{19})'''N$	
				Chinoline ou leucoline	C^9H^7N	
				Lepidine	$C^{10}H^9N$	
				Cryptidine	$C^{11}H^{11}N$	
				Pyrrol	$C^{11}H^5N$ (?)	
	Eaux ammoniacales			Sesquicarbonate ammoniaque	$(H^4N)^4H^2(CO^3)^3 = \left.\begin{matrix}(CO)''^3\\(H^4N)^4\\H^2\end{matrix}\right\}O^6$	
				Sulfhydrate id.	$(H^4N)HS$	
				Cyanure id.	$(H^4N)Cy$	
				Sulfocyanure id.	$(H^4N)CyS$	
				Chlorure id.	$(H^4N)Cl$	
				Sulfate id.	$(H^4N)^2SO^4$	
				Sulfite id.	$(H^4N^2)SO^3$	
				Acetate id.	$C^2H^3(H^4N)O^2$	
Produits solides	Coke			Carbone.		
				Sulfure ferreux.		
				Cendres.		

(1) L'acetylène a été trouvé par M. Berthelot dans le gaz d'éclairage, qui en renferme à peine quelques dix millièmes. L'acetylène a une flamme fuligineuse, et son odeur est la plus caractéristique parmi celles dont le mélange constitue l'odeur du gaz d'éclairage. Quatre substances principales paraissent concourir à cette odeur: l'acétylène, le sulfure de carbone et les produits sulfurés auxquels il donne naissance, la benzine et la naphtaline.

ACTION DES PRODUITS DE LA *DISTILLATION* ET DE LA *COMBUSTION* DE LA HOUILLE PYRITEUSE ET NON-PYRITEUSE.*

L'Appareil.

Afin d'abréger nos descriptions et de les rendre aussi intelligibles que possible, nous croyons devoir décrire au préalable l'appareil que nous avons adopté. Il consiste en une cloche de verre reposant sur un socle, posé lui-même sur un support à plancher mobile, qui permet d'élever ou d'abaisser la cloche à volonté. Le support se compose de trois montants disposés en triangle et fixés par leur base dans un pied circulaire. Ces montants, percés de trous de cinq en cinq centimètres de distance, supportent un plancher mobile qu'on fixe à la hauteur voulue au moyen de chevilles.

Sur ce plancher on pose le pot avec la plante que l'on veut soumettre à l'action du gaz. Supposons-y une plante dont la tige soit ramifiée à une certaine hauteur de sa base, un jeune prunier par exemple. Pour emprisonner sous la cloche toute sa partie ramifiée ou feuillue, nous ferons d'abord passer celle-ci par le trou ménagé au milieu d'une seconde tablette mobile, qu'on fixera également à hauteur convenable, au moyen de trois chevilles fichées à même hauteur dans les montant du support. Ensuite le socle de la cloche qui est percé lui-même d'un trou égal à celui de la tablette dont nous venons de parler, sera placé sur cette tablette. Le trou circulaire dont est percé ce socle et qui a permis le passage des branches de la plante, sera fermé par une rondelle de bois de même circonférence et divisée en deux parties égales échancrées chacune de telle manière que dans leur rapprochement elles laissent une ouverture suffisante pour le passage de la tige seulement.

On complètera la fermeture au moyen d'un mélange ou mastic formé de parties égales de cire jaune et d'axonge qu'on appliquera sur les joints.

Enfin, la cloche sera posée sur son socle et ses bords qui s'engageront dans la rainure circulaire qui y est creusée, y seront maintenus et soigneusement mastiqués au moyen de la cire mentionnée plus haut.

Toute la partie feuillue de la plante se trouvera ainsi emprisonée sous la cloche hermétiquement fermée et il sera facile de la soumettre à l'action d'un courant de gaz. Pour cela il suffira de relier à un aspirateur le tube en verre, courbé à angle droit et dont la branche verticale solidement fixée et mastiquée dans le socle de la cloche, pénètre d'un centimètre seulement dans l'intérieur de celle-ci. En déterminant l'aspiration, le gaz sera appelé par un second tube également fixé, mais du côté opposé, dans le socle de la cloche. La branche verticale de ce tube s'élève à 30 ou 40 centimètres de hauteur dans l'intérieur de la cloche selon les dimensions de celle-ci,

* Bien que nous ayons constaté la présence de soufre dans toutes les houilles que nous avons employées, nous désignons par *non-pyriteuse* celle où le pyrite n'est pas visible à simple vue.

tandis que sa branche horizontale se relie, soit directement à l'appareil générateur du gaz, soit à un petit réservoir muni d'une prise d'air qu'on interpose entre la cloche et l'appareil à gaz, lorsqu'on désire que le dernier soit mélangé d'air avant de penétrer dans la cloche.

Le tube en communication avec ce réservoir s'élevant assez haut dans la cloche, les gaz ou fumées qu'on fait agir, s'y élèvent sous forme de colonne et redescendent en tourbillonnant pour sortir par le tube d'appel.

Un ou deux flacons laveurs placés entre l'aspirateur et la cloche, indiquent la marche de l'opération, et servent au besoin à retenir certains produits dont il est souvent utile de constater la présence par des réactions chimiques.

L'aspirateur reversible et à écoulement constant de M. Soubeiran, nous a paru d'un emploi très-commode pour nos expériences et nous l'avons adopté.

Cet aspirateur se compose de deux réservoirs cylindro-coniques mesurant douze litres de capacité chacun et superposés de telle sorte, que l'un se vidant, l'autre se remplit. De cette manière, dès que le réservoir supérieur s'est vidé dans le réservoir inférieur, ce qui a lieu toutes les 25 ou 80 minutes, selon qu'il est relié à 1 ou 2 flacons laveurs, il suffit de quelques secondes pour que, par un mouvement de bascule imprimé à l'appareil, le réservoir plein soit ramené au-dessus du réservoir vide et détermine par l'écoulement de l'eau une nouvelle aspiration.

Ce conduit, qui établit la communication entre les deux réservoirs, est muni d'une clé qui permet de régler ou d'arrêter l'écoulement du liquide et par suite l'aspiration des gaz. L'écoulement est rendu constant par la disposition de deux tubes qui plongent à peu près jusqu'au fond des réservoirs.

Ces tubes sont fixés par un bouchon de caoutchouc à la tubulure qui surmonte le cone par lequel se termine chacun des réservoirs.

En résumé, tels que nous venons de les décrire, la cloche et son support, les flacons laveurs et l'aspirateur forment, par leur ensemble, la partie postérieure de notre appareil. La partie antérieure qui vient s'y relier, se compose d'un tube en verre de Bohême ou en fer, long de 65 centimètres et d'un diamètre intérieur de 15 à 20 millimètres. Ce tube qui est placé sur un fourneau en tôle ou à réverbère, peut, selon le besoin, être porté à une très-haute température. Une de ses extrémités penètre et est fixée, au moyen d'un bouchon de liége et de lait de plâtre, dans le col d'un récipient ou d'une allonge destinée à retenir certains produits facilement condensables, tels que goudron, etc.

Cette allonge, ou ce récipient, est reliée, par son extrémité opposée, ou par une tubulure, au tube du petit réservoir mis directement en communication avec la tube de la cloche. Un second tube fixé au réservoir est destiné à une prise d'air, mais son diamètre est tel, que l'air admis ne peut suffire qu'imparfaitement au besoin de l'aspirateur.

C'est ainsi que les gaz produits dans le tube à combustion sont appelés eux-mêmes et viennent se mêler à de l'air dans le réservoir, pour de là pénétrer dans la cloche et se rendre enfin dans l'aspirateur.

1°. ACTION DES PRODUITS GAZEUX DE LA *DISTILLATION* DE LA HOUILLE NON-PYRITEUSE.

Le 17 Juillet, un jeune poirier est placé sous une cloche de 40 litres de capacité et on le soumet à l'action des produits gazeux résultant de la distillation de 20 grammes de houille grasse non-pyriteuse. Cette distillation s'opérait dans un tube de verre de Bohême qui fut porté au rouge sombre. Ce tube était chauffé sur un fourneau long en tôle et relié à la cloche : son autre extrémité était hermétiquement fermée. Dès que le tube fut chauffé, une fumée jaunâtre et très-dense s'en dégagea et vint d'abord remplir le récipient, puis passa immédiatement dans le réservoir, pour s'élever ensuite avec l'air aspiré dans la cloche. Bientôt celle-ci fut remplie de cette fumée et la plante disparut comme dans un nuage. L'opération dura 50 minutes, et 24 litres de gaz mêlé d'air furent aspirés pendant ce temps.

Après l'opération, les parois du récipient étaient recouvertes d'un enduit brun noirâtre de matières goudronneuses possédant une odeur de créosote très-prononcée. Quelques gouttes d'eau ammoniacale s'étaient également condensées dans ce récipient. Un léger enduit jaunâtre tapissait les parois des tubes abducteurs et quelques gouttelettes de matières goudronneuses brun-noirâtres étaient arrivées jusque dans le flacon laveur, dans lequel on avait mis de l'eau, simplement pour indiquer la marche de l'aspiration. Cette eau possédait, après l'expérience, une odeur empyreumatique très-prononcée.*

Résultat de l'expérience.—Le lendemain, quoique maintenue sous cloche, la plante se trouvait aussi saine et aussi vigoureuse que la veille.

On la remit ensuite en plein air et rien d'anormal ne se produisit par la suite dans son feuillage.

Le coke trouvé dans le tube et provenant de la distillation des 20 grammes de houille pesait 16 grammes. Il s'est donc produit 4 grammes de gaz et de matières goudronneuses.

* Les produits volatiles de la distillation de la houille sont :
Eau ;
Hydrogène proto-carboné $C^2 H^4$ (gaz des marais) ;
——— — bi-carbonné $C^4 H^4$ (gaz oléfiant) ;
Hydrogène ;
Oxyde carbonique ;
Azote ;
Hydro-carbures huileux très-volatiles : Benzine, Toluène, etc. ;
Quelques autres principes, tels que goudron, créosote, etc. ;
Sulfure d'hydrogène ;
Sulfure de carbone ;
Les produits de la condensation (goudron et eau) retiennent des sels ammoniacaux (carbonate, sulphydrate, cyanhydrate, chlorhydrate, acétate).

Le récipient fixé au tube dans lequel s'opérait la distillation, ne s'échauffe pas bien sensiblement ; au contact de la main il paraissait froid.

2° ACTION DES PRODUITS DE LA *DISTILLATION* DE LA HOUILLE PYRITEUSE.

Le 14 Août un jeune prunier, bien vigoureux est placé sous la cloche à expérience, mesurant 40 litres de capacité et soumis à l'action des produits résultant de la distillation d'un mélange en poudre formé de :

Houille maigre	14 grammes
Pyrite pulvérisée	1 ,, *

La distillation s'opère dans un tube en verre enveloppé dans une feuille de clinquant, pour prévenir sa déformation. Ce tube fermé à une de ses extrémités, est porté au rouge sur un fourneau en tôle.

Afin de prolonger la production du gaz, le tube fut chauffé-de proche en proche et petit à petit, en commençant par l'extrémité reliée à la cloche. †

Un peu de fumée jaunâtre se produisit au début de l'opération, puis les produits de la distillation devinrent incolores, leur décomposition s'achevant dans leur passage par la partie rougie du tube où la distillation s'était déjà opérée.

36 litres de gaz mêlés d'air furent aspirés pendant l'opération qui dura 1 heure 20 minutes.

Un thermomètre placé sous la cloche marquait 23° c. avant l'expérience : il s'éleva à la température de 26° 5′ c. pendant l'aspiration des gaz.

Dans leur passage de la cloche à l'aspirateur les gaz traversaient 2 flacons laveurs, le premier contenant de l'eau distillée et le second une solution étendue de potasse caustique.

Les liqueurs de lavage examinées immédiatement aprés l'expérience présentaient les caractères suivants :

Eau distillée, sans odeur, neutre, ne décolore nullement la solution de permanganate potassique et ne précipite nullement pas le chlorure barytique. Elle louchit faiblement par l'eau de chaux.

Solution potassique ; sans odeur, réaction très-alcaline, fait légèrement effervescence avec les acides.

Quelques gouttes d'eau ammoniacale et un léger dépôt de matières goudronneuses se sont condensées dans le récipient ; odeur de sulfide carbonique.

Dans le tube où s'opérait la distillation on retrouve un résidu charbonneux, pulvérulent pesant 13 grammes ; le poids des produits volatilisés serait donc de 2 grammes seulement. Il est à remarquer que nous avions employé de la houille maigre.

Un aimant promené dans le résidu enlevait des parcelles de sulfure de fer magnétique.

Résultat de l'expérience.—Le lendemain la plante ne présentait aucune espèce d'altération.

* 7 °/₀ de pyrite.

† Les produits de la distillation doivent contenir plus de sulfure d'hydrogène et de carbone que si la houille n'était pas visiblement pyriteuse. Les $\frac{2}{3}$ du soufre de la pyrite restent dans le coke à l'état de sulfure magnétique $3\,Fe\,S^2 = Fe^3\,S^4 + S^2$.

Trois jours plus tard, le 17 Août, la cloche fut enlevée et le prunier fut remis en plein air. Aucune espèce de tache ne s'était produite son ses feuilles; quelques unes d'entre elles seulement avaient perdu un peu de leur rigidité tout à fait comme si la plante avait manqué d'humidité.

Rien de particulier ne se manifesta par la suite.

3° ACTION DES PRODUITS DE LA *COMBUSTION* DE HOUILLE NON-PYRITEUSE.*

1re Expérience.

Le 18 Juillet, un jeune prunier, placé sous la cloche à expérience de 40 litres de capacité, est soumis à l'action des produits résultant de la combustion de 10 grammes de houille grasse. Cette combustion se produisait dans un tube de fer ouvert à ses deux extrémités, placé sur un fourneau en tôle et relié à la cloche. La prise d'air ménagée au réservoir est fermée, afin de faire passer par le tube à combustion la plus grande quantité d'air possible. L'aspiration de l'air étant produite, le tube fut porté immédiatement au rouge sur toute sa longueur.

Au début de l'opération une fumée dense, provenant du dégagement des produits carburés les plus volatils, se produisit et passa dans la cloche sous forme d'une colonne épaisse et se répandit en tourbillonnant dans le feuillage de la plante. Cette espèce de distillation terminée, la fumée disparut et d'autres gaz incolores (azote, acide et surtout oxyde carbonique) pénétrèrent dans la cloche.

Le tube à combustion fut maintenu à la température rouge pendant 1 h. 15 m. et 36 litres d'air furent aspirés pendant ce temps.

Une quantité notable d'acide carbonique se produisit dans cette combustion, car la liqueur contenue dans le flacon laveur était de l'eau de chaux et cette chaux fut complètement précipitée à l'état de carbonate. Une legère couche de goudron entraînée dans le début de l'opération couvre le fond du récipient.

Les 10 grammes de houille ont laissé dans le tube à combustion, un résidu charbonneux en grains arrondis pesant 7 gr. 1. Le poids des produits expulsés était donc de 2 gr. 9.

Résultat de l'expérience.—Le lendemain, 19 Juillet, la plante se retrouvait dans le même état qu'avant l'expérience ; elle fut remise en plein air et elle ne parut pas dans la suite avoir éprouvé la moindre alteration.

2e Expérience.

Un jeune prunier, placé sous la cloche mesurant seulement 12 l. 45 de capacité, est exposé, le 25 Juillet, à l'action d'un courant gazeux résultant de l'aspiration des produits de la combustion de 10

* Les produits de cette combustion sont variables suivant que l'air est en plus ou moins grande quantité par rapport au combustible. Dans tous les cas, au début de l'opération, alors que la température n'est pas suffisante pour déterminer la combustion les produits hydrocarburés les plus volatiles distillent avec de la vapeur d'eau. Quand il y a ignition, les produits sont, de l'eau, de l'azote et de l'oxyde ou de l'acide carbonique, suivant la proportion d'air intervenante.

grammes de houille demi-grasse, opérée dans un tube en fer comme pour l'expérience précédente.

L'aspiration fut maintenue pendant le temps nécessaire à l'application de 48 litres d'air, soit pendant 1 h. 45 m.

Afin d'obtenir une combustion plus complète que dans l'opération précédente, le tube fut chauffé partiellement et successivement en commençant par l'extrémité reliée à la cloche. Cette partie étant portée au rouge, on la maintint dans cet état pendant que le feu se propageait, petit à petit, jusqu'à l'extrémité opposée du tube.

Par ce moyen l'oxygène de l'air aspiré se portait seulement sur la portion de houille chauffée et la brûlait mieux. En effet, il ne se produisit que très-peu de fumée et seulement dans l'instant où l'on chauffait la première partie du tube. Dès que celle-ci fut portée au rouge toute fumée disparut; la combustion se faisant point par point, les gaz produits se trouvaient en présence d'une quantité d'air suffisante pour se brûler complètement pendant leur trajet dans les parties du tube portées les premières à la température du rouge vif.

Néanmoins le résidu trouvé dans le tube après son refroidissement était encore semblable aux précédents, c'est-à-dire, en grains arrondis et d'aspect métallique, mais son poids était de 5 gr. 5 seulement. La différence, 4 gr. 5, représente donc le poids des matières gazéifiées.

Une légère solution de soude contenue dans le flacon laveur placé entre la cloche et l'aspirateur, présentait après l'expérience les caractères suivants : odeur empyreumatique faible, réaction alcaline, fait une vive effervescence avec les acides, et les gaz ainsi mis en liberté par le chloride hydrique ou l'acide sulfurique répandent faiblement l'odeur de sulfide hydrique, noircissent l'argent et précipitent l'eau de chaux (acide carbonique).

La liqueur traitée par l'acide nitrique ne répand pas cette odeur sulfureuse, mais elle précipite ensuite par le nitrate barytique, alors même qu'il y a excès d'acide nitrique.

La solution de permanganate potassique est ramenée au vert par la liqueur de lavage ; d'où l'on peut conclure que la houille, quoique n'étant pas visiblement pyriteuse, renfermait néanmoins du soufre, lequel est arrivé dans le flacon laveur à l'état de sulfide hydrique, en dépit du courant d'air qui aurait dû l'oxyder dans le tube sous l'influence de la chaleur.

Résultat de l'expérience.—Le lendemain, 26 Juillet, rien n'était changé dans l'aspect de la plante.

Le 30 Juillet, aucune espèce d'altération ne s'étant manifestée, le prunier soumis à l'expérimentation fut remis en plein air.

L'observation ultérieure démontre que cette plante n'avait nullement souffert de l'action des gaz.

3e Expérience.

L'appareil étant disposé comme dans l'expérience précédente, une jeune plante d'aubépine placée sous la cloche de 40 litres de capacité est soumise, le 29 Juillet, vers 11 heures du matin, à l'action des gaz produits par la combustion de 10 grammes de houille demi-grasse pulvérisée et mélangée à 10 grammes d'oxide cuivrique.

L'emploi de ce dernier avait pour but de fournir une plus grande quantité d'oxygène et de rendre ainsi la combustion plus complète.

Le feu fut dirigé de manière à chauffer d'abord la partie antérieure (reliée à la cloche) du tube à combustion et à le porter au rouge ensuite sur toute sa longueur.

Quelques vapeurs d'eau provenant de l'humidité condensée dans le mélange, se dégagèrent d'abord. Aucune fumée ne se produisit.

L'aspiration des gaz fut déterminée dès l'apparition des vapeurs aqueuses et fut maintenue pendant une heure et demie. 41 litres de gaz furent ainsi appelés dans la cloche.

Après l'opération on recueillit dans le récipient trois centimètres cubes d'eau possédant une odeur empyreumatique; ce liquide chauffé en présence de la chaux dégageait un gaz (ammoniac), qui ramenait immédiatement au bleu le papier de tournesol rougi par un acide.

La solution de soude contenue dans le flacon laveur, placé entre la cloche et l'aspirateur, possédait aussi, après l'opération, une faible odeur empyreumatique. L'essai de cette liqueur ne décela nullement la présence de l'acide sulfureux, ni du sulfide hydrique.

Mais il résulte de son examen et de celui du gaz contenu dans l'aspirateur, que le mélange gazeux appelé dans la cloche devait se composer presque exclusivement d'azote et d'acide carbonique.

Le résidu, laissé dans le tube à combustion, se composait de cuivre réduit, plus ou moins fritté et mélangé d'une très-petite quantité de coke en petits grains arrondis. Ce résidu pesant 15 grammes, on peut en déduire que le poids des matières gazéifiées était de 5 grammes.

Résultat de l'expérience.—La plante n'a nullement souffert de ce traitement.

4° ACTION DES PRODUITS GAZEUX DE LA *COMBUSTION* DE LA HOUILLE PYRITEUSE.*

1re Expérience.

Le 21 Juillet, un jeune prunier est placé sous une cloche à experience de 40 litres de capacité et soumis à l'action des produits gazeux résultant de la combustion de 10 grammes de houille pyriteuse demi-grasse, pulvérisée et mêlée à quelques traces de pyrite.

La combustion s'opérait dans un tube en verre de Bohême ouvert à ses deux bouts et disposé sur un fourneau long.

L'aspiration étant déterminée de manière à faire passer un courant d'air dans le tube à combustion, celui-ci fut porté au rouge peu à peu sur toute la longueur du fourneau.

Une fumée dense, de teinte jaunâtre, se produisit au début de

* Si la combustion a lieu dans un excès d'air, le soufre provenant de la décomposition de la pyrite se transforme en acide sulfureux.

l'opération et vint tourbillonner dans le feuillage de la plante, mais elle ne tarda guère à se dissiper, en se mêlant aux produits gazeux incolores qui lui succédèrent. 48 litres de gaz furent ainsi aspirés dans l'espace de 95 minutes que dura l'opération.

Une couche de matières goudronneuses se déposa sur les parois du récipient et quelques gouttes d'eau ammoniacale s'y condensèrent.

L'eau distillée contenue dans le flacon laveur, placé entre la cloche et le récipient, possédait, après l'opération, une odeur de goudron, masquée en partie par celle de sulfide hydrique qui dominait. Cette eau possédait une réaction acide, décolorait la solution de permanganate potassique, et précipitait en noir les sels de fer au maximum d'oxydation. Un léger dépôt blanchâtre couvrait le fond du flacon.

D'où l'on peut conclure que dans les produits de la combustion et de l'espèce de distillation qui s'est opérée dans le tube, se trouvaient du sulfide hydrique et probablement de l'acide sulfureux. L'acide sulfureux et le sulfide hydrique s'entre-détruisant sous l'influence de l'eau, pour fournir de l'eau et du soufre qui se dépose, nous attribuons à cette réaction le dépôt formé dans le flacon laveur.

Dans tous les cas, le sulfide hydrique paraît s'y être trouvé en assez grande quantité, car les tubes de laiton plongeant dans les réservoirs de l'aspirateur furent complètement noircis.

Les 10 grammes de houille laissèrent dans le tube à combustion un résidu pesant 8 gr. 70, composé de coke en grains arrondis mêlé de parcelles de sulfure magnétique. Le poids des produits brûlés ou volatilisés pendant l'opération serait donc de 2 gr. 30 seulement.

Résultat de l'expérience.—Aussitôt l'opération terminée, libre accès fut donné à l'air dans la cloche (en laissant ouverts les tubes *(t)* et *(t')*. Dès ce moment on pouvait déjà remarquer qu'une des feuilles de la plante avait beaucoup perdu de sa rigidité et présentait sur ses bords trois petites taches d'un vert olivâtre très-manifeste.

Le lendemain matin, toutes les feuilles étaient mortes et avaient revêtu une teinte olive brunâtre très-uniforme.

2e Expérience.

Le 30 Juillet, un jeune prunier bien vigoureux est placé sous une cloche de 12 l. 85 de capacité et soumis à l'action des produits gazeux résultant de la combustion dans un tube de fer d'un mélange intime formé de

Houille demi-grasse	10	grammes	
Oxyde cuivrique	10	,,	
Pyrite pulvérisée	1	,,	50*

Le tube à combustion fut porté au rouge à son extrémité antérieure, d'abord (celle reliée à la cloche) et ensuite, peu à peu, sur toute sa longueur. Ce tube, étant ouvert à ses deux bouts, était traversé par un courant d'air déterminé par l'aspiration de l'appareil. De l'air

* Soit 15 % de pyrite.

froid admis par le tube (f') du réservoir (R) se mêlait aux produits de la combustion avant leur passage dans la cloche à expérience.

36 litres de gaz furent aspirés en 1 h. 10 m. que dura l'opération.

Aucune vapeur colorée ne se produisit.

Après refroidissement, le résidu laissé dans le tube à combustion pesait 14 gr. 20.

Le poids des matières gazéifiées, obtenu par différence, était donc de 7 gr. 30. L'essai de la liqueur de lavage (solution étendue de soude) y démontre l'absence complète de gaz sulfide hydrique et y décela, au contraire, la présence de l'acide carbonique et d'une quantité très-notable d'acide sulfureux.

Résultat de l'expérience.—Déjà avant la fin de l'opération, plusieurs feuilles paraissaient fortement altérées: les bords et la pointe du limbe passaient du vert à la teinte olive brunâtre et quelques taches de même nature maculaient la feuille.

Trois heures plus tard, toutes les feuilles étaient complètement brunies, sauf deux d'entre elles qui présentaient, sous forme de grandes taches d'un beau vert naturel, des parties du limbe qui avaient échappé à l'action des gaz.

Ces deux feuilles avaient été graissées sur leur face inférieure seulement, avant la mise en expérience, dans le but d'obstruer leurs stomates.

Le résultat obtenu tend donc à prouver que l'action de l'acide sulfureux s'exerce par les stomates des feuilles bien plutôt que par sa transformation en acide sulfurique et par sa condensation sous cet état sur la face supérieure des feuilles.

3e. Expérience.

Le 1er Août, un jeune plant d'aubépine, placé sous une cloche de 40 litres de capacité, est soumis à l'action des gaz produits par la combustion dans un tube de fer d'un mélange en poudre, formé de

Houille demi-grasse	10	grammes.
Oxyde cuivrique	12	„
Pyrite	1	„ *

Sauf l'emploi d'une cloche plus grande, l'appareil restait le même que dans l'expérience précédente. Le feu aussi fut dirigé de la même manière et la prise d'air menagée au réservoir (R) fut maintenue.

Le tube à combustion traversé lui-même par un courant d'air, fut chauffé au rouge pendant 1 h. 52 m. (de 11 h. 25 m. du matin à 1 h. 17 m.) et l'aspiration des gaz fut réglée de telle sorte que 60 litres de ces gaz passèrent par la cloche pendant l'opération.

La combustion s'opéra sans fumée apparente, sauf un léger nuage de vapeurs qui se produisit sous la première influence de la chaleur.†

* Soit 10% de pyrite.

† Les produits gazeux se composaient d'oxyde et d'acide carbonique, d'acide sulfureux, d'azote et de vapeurs d'eau. L'oxyde carbonique en faible proportion.

Après la combustion on retrouva dans le tube un résidu formé de cuivre réduit et de coke en grains arrondis et brillants. Ce résidu pesant 17 grammes, le poids des matières gazéifiées était donc de 6 grammes.

L'eau distillée contenue dans le flacon laveur, placé entre la cloche et l'aspirateur, possédait, après l'opération, une odeur faible mais nauséabonde. Elle présentait une réaction acide et les réactifs y décélaient la présence de l'acide sulfureux.

Résultat de l'expérience.—Le plant ne présentait pas d'altération apparente immédiatement après l'expérience. Une heure plus tard l'altération des feuilles devenait manifeste ; leurs bords présentaient une coloration olive virant déjà au brun, et de petites taches de même teinte prenaient naissance entre les nervures.

Le 4 Août, les feuilles présentaient encore quelques parties vertes, mais leurs bords se recoquillaient fortement.

ACTION DU GAZ D'ECLAIRAGE SUR LES PLANTES.

Des rameaux de prunier, de pommier, de poirier et d'aubépine, plongeant chacun par leur base dans une fiole pleine d'eau et dont le col fermé à la cire ne laisse passer que la base du rameau, sont disposés, le 13 Août, à la soirée, sous une grande cloche de verre empâtée sur son socle et d'une capacité de 39 litres.

On y fait ensuite passer 2¼ litres du gaz d'éclairage, pris au laboratoire de l'Université de Liége et condensé dans un gazomètre qu'on relie à un tube passant par le socle de la cloche. Un autre tube, également fixé dans le socle de la cloche, permet l'introduction du gaz en laissant échapper un égal volume d'air. L'expulsion de l'air par le gaz se fait d'autant mieux, que le premier tube débouche au sommet de la cloche, tandis que l'orifice du second affleure seulement la surface du socle dans lequel il se trouve engagé. Aussitôt le gaz introduit, on bouche les tubes, et la cloche reste hermétiquement close.

Le 14 Août matin, deux feuilles de la branche de prunier seulement présentent chacune sur leur bord, vers la pointe du limbe, une tache brunâtre d'environ 2 centimètres de longueur sur 5 millimètres de largeur.

Les feuilles des autres branches ne présentent pas d'altération appréciable.

Le 18 Août matin, c'est-à-dire, cinq jours après l'introduction des plants et du gaz sous la cloche, on trouve qu'à l'exception des rameaux de poirier et d'aubépine, tous les autres ont perdu leurs feuilles qui se sont désarticulées et gisent sur le sol. Toutes ces feuilles sont restées vertes et fraîches, comme si on venait de les cueillir. On enlève la cloche de son socle et au même instant toutes les feuilles de la branche de poirier se désarticulent et tombent. La branche de l'aubépine, au contraire, conserve parfaitment les siennes: la plupart de ses feuilles brunissent sur leurs bords et semblent vouloir se dessécher. De petites taches brillantes, ressemblant à des points micacés et paraissant être le résultat d'une exsudation des tissus, se trouvaient en assez grand nombre sur presque toutes les feuilles des branches soumises à l'expérience. La réaction de ces petites taches n'était nullement acide, au moins ne rougissaient-elles pas le papier bleu de tournesol.

Parmi les feuilles tombées on en remarquait quatre qui appartenaient à la branche du prunier, et qui se trouvaient tachées de brun olivâtre sur une assez grande surface. Dès qu'on eut enlevé la cloche de son socle, on put très-facilement reconnaître à l'odeur, que le gaz d'éclairage s'y trouvait en forte proportion.

Les résultats de cette expérience ne suffisent pas pour établir une doctrine. Ils tendent cependant à montrer que le gaz d'éclairage est nuisible par l'acide sulfureux qu'il renferme.

N.B. Une araignée verte qui se trouvait sur la branche d'aubépine a filé sa toile et n'a nullement paru incommodée de son séjour sous la cloche. Des pucerons qui s'étaient développés sur une des feuilles de la branche du prunier, ont également résisté à l'action de l'atmosphère dans laquelle ils se trouvaient plongés.

5° ACTION DES GAZ PRODUITS DANS LA RÉDUCTION DES MINÉRAIS DE ZINC.*

Un plant d'aubépine très vigoureux placé sous une cloche à expérience mésurant 12 lit. 70 de capacité, fut soumis, le 5 Août vers 11 heures du matin, à l'action des produits gazeux dégagés sous l'influence de la chaleur, par un mélange formé decalamine pulvérisée et calcinée, 25 grammes ; houille maigre pulvérisée 14 grammes.

La figure planche XIII. represente l'appareil employé pour cette expérience. La distillation s'opérait dans un tube en fer chauffé à blanc dans un fourneau à réverbère et dont l'extrémité postérieure *p*, était hermétiquement fermée.

Entre l'aspirateur et la cloche se trouvait placé un flacon laveur muni de 3 tubulures (Voy. Pl. XII.).

Les tubulures s' et s' étaient réliées : la 1ère à l'aspirateur, la 2de à la cloche. La tubulure centrale s'' était munie d'un tube droit plongeant dans l'eau de lavage plus profondément que le tube fixé à la tubulure s'.

Il en résultait ainsi que l'aspirateur fonctionnant, un vide tendait à se produire dans l'appareil ; mais alors une absorption d'air se produisait par le tube s'' et venait alimenter l'aspirateur.

Si, au contraire, l'aspirateur ne suffisait pas à entraîner les gaz au fur et à mesure de leur production dans l'appareil, une certaine pression en résultait et le tube s' devenait alors une espéce de soupape de sûreté ; l'élévation du liquide dans ce tube donnait aussi la mésure de la pression.

Par ces dispositions l'aspiration était continue et la diminution de

* Les produits gazeux résultant de cette distillation se composent principalement d'oxyde carbonique qui en grande partie vient bruler à l'air avec des vapeurs de zinc.

pression qui tendait à se produire dans l'appareil ne pouvait que favoriser la distillation. Quelques vapeurs aqueuses, bientôt suivies d'une fumée jaunâtre, se produisirent au début de l'opération et passérent rapidement dans la cloche en déposant sur les parois de l'allonge un enduit de matières goudronneuses ; mais dès que le tube à distillation fût arrivé à la température du rouge sombre, toute fumée disparût. Bientôt le tube fut porté au rouge blanc et on le maintint à cette température pendant 1 heure. L'aspirateur et le flacon laveur furent ensuite enlevés, mais la cloche fut maintenue en communication avec l'appareil distillatoire jusqu'à parfait refroidissement de ce dernier. Ce refroidissement opéré, on put constater la parfaite réduction du zinc, lequel s'était en grande partie condensé en gouttelettes volumineuses à l'extrémité du tube, qui débordait le fourneau et s'engageait dans le col de l'allonge.

Une infinité de petites grenailles de zinc se trouvait, en outre, disséminée dans le résidu noir-grisâtre laissé dans le tube. Ce résidu pesant 28 gr. 5, déduit du poids primitif du mélange, donnait 10 gr. 5 pour le poids des produits entraînés pendant la distillation.

Un thèrmomètre placé sous la cloche marquait 20° C. avant l'expérience. Pendant l'aspiration des gaz qui dura 1 h. 40 il s'éléva, au maximum, à la température de 23° C.

On operait en plein air.

Les réactifs n'accusérent dans l'eau de lavage, ni la présence de l'acide sulfureux, ni celle du zinc. Outre le goudron, quelques gouttes d'eau ammoniacale s'étaient condensées dans l'allonge.

Résultat de l'expérience.—La plante n'a nullement souffert. Elle fut remise en plein air le lendemain de l'expérience pour, être observée quelques temps ; mais rien d'anormal ne se produisit dans son état.

Deux expériences de même genre furent faites sur des plants de prunier, les 6 et 26 Août ; et nous démontrèrent l'inocuité des gaz produits dans la réduction des minérais de zinc par la houille, lorsqu'elle n'est point pyriteuse.

6° ACTION DE L'OXYDE ZINCIQUE SEUL.

Le 27 Août, un plant d'aubépine bien vigoureux fut placé sous une cloche de 12 lit. 70 de capacité et soumis ensuite à l'action d'un courant d'oxyde zincique. A cet effet, on avait relié directement la cloche, d'une part à un aspirateur, et d'autre part à un tube en fer muni d'une allonge et placé sur un fourneau long a réverbère, comme le montre la figure planche XIII.

On avait supprimé le flacon laveur afin d'obtenir un tirage plus rapide.

L'aspiration fut déterminée aussitôt que les 30 grammes de zinc qu'on avait placés dans le tube furent fondus. L'extrémite *p* de ce tube, fermée par un bouchon de liége, fut ouverte au même instant pour donner libre accès à l'air.

Une épaisse fumée blanche, résultant de l'oxydation du zinc, passa immédiatement dans la cloche, qui en fut bientôt complètement remplie.

Une épaisse couche d'oxyde zincique en poudre d'une ténuite extrême, se déposa peu-a-peu sur toute la plante ; la face inférieure même des feuilles en fut entièrement recouverte ; l'aubépine paraissait comme chargée de neige.

On maintint l'aspiration pendant une demi-heure et l'oxydation du zinc fut rendue à peu près complète en brassant le métal fondu au moyen d'une tige de fer. Un thermomètre placé sous la cloche marquait 20° C. avant l'expérience et la température maxima indiquée pendant l'opération fut de 24° 5 C. seulement. Cependant le tube à combustion était porté au rouge vif, et la distance du fourneau à la cloche n'était que de 45 centimètres.

Le point de fusion du zinc étant compris entre 450° et 500°, nous estimons que l'air appelé dans le tube s'y trouvait portée à une température d'au moins 600° par la combustion des vapeurs de zinc et le degré de chaleur auquel était porté le tube en fer lui même.

Résultat de l'expérience.—La plante étant complètement recouverte d'une couche d'oxyde zincique, la cloche à expérience fut enlevée.

L'aubépine fut ensuite placée prés d'une fenètre pendant 3 jours, aprés quoi on la sortit de l'appartement pour la remettre en plein air.

Le 11e jour après l'expérience une pluie vint laver les feuilles, et celles-ci se retrouvèrent intactes. La plante ne parut pas avoir souffert.

OXYDE ZINCIQUE ET ACIDE SULFUREUX.

1e Expérience.

Le 28 Août, un cerisier de Ste. Lucie (Prunus Mahaleb L.) placé sous une cloche à expérience de 40 litres de capacité, est recouvert d'une couche épaisse d'oxyde zincique par le procédé décrit dans l'expérience précédente. L'oxyde ainsi obtenu, se dépose sous forme de poudre excessivement tenue.

Après cette opération la cloche est enlevée pour en renouveler l'atmosphère, puis on la replace sur la plante en ayant soin de laisser libre accès à l'air dans l'appareil par les tubes *t* et *t'* fixés au socle de la cloche.

Le 2 Septembre la cloche est enlevée de nouveau, afin de pouvoir examiner la plante de plus près, quelques feuilles mémes furent lavées pour mieux les observer.

Aucune altération ne s'étant manifestée, la cloche est replacée sur la plante, puis soigneusement relutée sur son socle. 10 centimétres cubes d'acide sulfureux furent ensuite introduits petit à petit dans l'appareil, en même temps qu'on aspirait cinq litres d'air, afin de faire tourbillonner les gaz dans l'intérieur de la cloche.

Celle-ci fut ensuite maintenue hermétiquement fermée jusqu'au lendemain.

3 Septembre.—Pas d'altération. Il semble que l'acide sulfureux

a dû se condenser dans l'oxyde zincique et dans l'humidité qui recouvre les parois de la cloche.

La cloche étant reliée à l'aspirateur on y fait passer la quantité d'acide sulfureux produite par la combustion de 0 gr. 03 de soufre en canon, opérée dans un tube de verre fixé au tube t' de l'appareil.

L'aspiration est maintenue pendant 5 minutes, c'est-à-dire, jusqu'à disparition complète du soufre chauffé dans le tube à combustion.

Théoriquement ces 3 centigrammes de soufre auraient dû produire environ 20 centimètres cubes d'acide sulfureux, mais il n'en fut pas ainsi, une quantité notable de ce soufre s'étant volatilisée sans brûler.

Cette opération terminée la cloche fut maintenue hermétiquement fermée jusqu'au lendemain.

4 Septembre. — La cloche est enlevée. On constate que la plupart des feuilles sont altérées ; leurs bords prennent une teinte olive visant au brunâtre, qui s'étend sur un centimètre de largeur environ. Quelques taches de même teinte maculent la limbe de ces feuilles et particulièrement de celles où la couche d'oxyde a été enlevée.

Les réactifs décèlent la présence de l'acide sulfurique, et non de l'acide sulfureux dans l'eau qui ruissèle sur les parois internes de la cloche. Une certaine quantité d'oxyde zincique recueillie sur quelques-unes des feuilles de la plante fut traitée par l'eau distillée ; celle-ci après filtration fut essayée par les réactifs qui y décélèrent à peine des traces de sulfate zincique.

Les feuilles encore recouvertes d'oxyde furent ensuite arrosées avec de l'eau distillée sous forme de petites gouttelettes afin de favoriser l'action sur la plante de la petite quantité de sulfate qui pouvait s'être formée.

5 Septembre.—Quelques feuilles tendent à se recoquiller et les taches qui maculent leurs limbes s'étendent en largeur en prenant une teinte de plus en plus brunâtre.

Les feuilles non recouvertes d'oxyde ont plus souffert que les autres. Quant aux gouttelettes d'eau disposées sur les feuilles, dans le but de dissoudre le sulfate zincique qui pouvait exister, elles ne paraissent pas avoir eu d'effet sensible : les taches ne correspondent pas regulièrement aux points humectés et la feuille se retrouve intacte là même où la couche est très épaisse.

2e Expérience.

Un jeune plant de Grand Soleil bien ramifié et bien sain est placé, le 28 Août, sous une cloche de 12 l. 85 de capacité et soumis à l'action d'un courant d'oxyde zincique produit dans le tube à combustion mentionné dans les deux expériences précédentes.

Dès que les feuilles de la plante furent recouvertes d'une couche d'oxyde on produisit de l'acide sulfureux simultanément avec de l'oxide zincique.

Pour cela, on introduisit dans le tube à combustion, où s'opérait l'oxydation du zinc, 12 grammes de blende (sulfure zincique naturel) divisés en 4 morceaux. Bientôt la blende fut portée au rouge et presqu'aussitôt on put remarquer que les feuilles de la plante, qui un instant auparavant étaient bien turgides et bien étalées, devenaient flasques et plus ou moins pendantes.

L'aspiration fut maintenue pendant 5 minutes après l'introduction de la blende dans le tube à combustion, puis les communications avec la cloche furent rompues et libre accès fut donné à l'air par les tubes t et $t.'$

Résultat de l'expérience.—Le lendemain matin on retrouve la plante morte. Ses feuilles sont flasques et d'un jaune olivâtre; elles paraissent avoir été soumises à une espèce de coction. Il en est de même de la tige et des rameaux lesquels sont pendants, brisés et repliés sur eux-mêmes par leur propre poids.

Sous l'influence de cette désorganisation la couche d'oxyde zincique qui recouvrait la plante s'est humectée et semble être tombée en deliquium.

Le 31 Août on enlève la cloche et une odeur d'acide sulfureux très sensible s'en dégage.

Une bandelette de papier bleu de tournesol y rougit rapidement et pâlit ensuite considérablement (décoloration due à l'acide sulfureux).

Les feuilles et les rameaux de la plante sont enlevés avec précaution et on les fait macérerer pendant une heure dans de l'eau distillée afin de dissoudre les acides et les sels.

La liqueur filtrée puis traitée par le bi-carbonate sodique, n'a pas louchi d'une manière bien sensible (donc absence de sel zincique).

Le chlorure barytique y donne un précipité blanc abondant de *sulfite* barytique. La liqueur décolore une grande quantité de solution de permanganate potassique contenant 0 gr. 0005 de ce sel par centimètre cube.

Le nitrate mercureux y donne un précipité gris-ardoise foncé très abondant.

Toutes ces réactions tendent donc à prouver:

1° Que l'oxyde zincique ne s'est pas transformé en sulfate;

2° Que l'acide sulfureux ne s'est que bien peu ou point transformé en acide sulfurique, et

3° Que la destruction de la plante est due à l'acide sulfureux et non à l'acide sulfurique ou au sulfate zincique.

Cependant en examinant le contenu du tube à combustion, les morceaux de blende furent retrouvés en entier et recouverts seulement d'une couche mince d'un gris-jaunâtre, tandis que le noyau central conservait toute sa transparence.

Ce grillage superficiel n'a donc dû fournir qu'un volume assez faible d'acide sulfureux relativement à la quantité de blende employé.

Les réactifs accusèrent la présence d'une petite quantité de sulfure et de sulfate zinciques dans l'oxide, entraîné dans l'allonge.

3° Expérience.

Un cerisier Ste. Lucie, placé sous une cloche de 12 l. 70 de capacité est recouvert le 31 Août, d'une couche d'oxyde zincique produit comme il a été dit plus haut. L'air est ainsi renouvelé dans la cloche et 1$^{c.c.}$

d'acide sulfureux y est introduit par aspiration en même temps que 12 litres d'air. L'opération dure 22 minutes, après quoi la cloche est maintenue hermétiquement fermée.

3 Septembre.—On ne constate aucune espèce d'altération.

Une nouvelle aspiration de 1 c.c. d'acide sulfureux mêlé à 2½ litres d'air est faite dans l'espace de 5 minutes. La cloche est ensuite exactement refermée.

4 Septembre.—Pas d'altération. Les parois de la cloche sont recouvertes d'une couche de vapeurs aqueuses qui ruissèlent en gouttelettes jusqu'au socle de l'appareil.

On détermine une nouvelle aspiration et l'on fait pait passer dans la cloche les produits de la combustion de 1 centigramme de soufre* en même temps que 2½ litres d'air.

5 Septembre.—La cloche est enlevée. L'humidité condensée sur ses parois est fortement acide.

La plante est fortement alterée ; sur 19 feuilles, 8 sont atteintes et maculées de larges taches brunes ou olive-brunâtre ; mais il est à remarquer que l'altération ne porte que sur les feuilles qui se trouvaient directement exposées à l'action des gaz au moment où ils s'élevaient jusqu'au dôme de la cloche. Là, probablement tout l'acide sulfureux se condensait dans la couche de vapeurs d'eau, car les feuilles situées sur le passage du courant gazeux descendant, n'ont nullement souffert.

Des traces de sulfate zincique furent reconnues dans l'oxyde zincique déposé sur le socle et contre les parois de la cloche où l'humidité condensée venait l'humecter.

4e Expérience.

Le 1er Septembre, un jeune prunier placé sous une cloche de 39 litres de capacité, est soumis à l'action d'un courant d'oxyde zincique produit par la combustion de 20 grammes de zinc opérée dans un tube à combustion relié à la cloche. Bientôt, l'atmosphère de la cloche fut saturée d'oxyde zincique en poudre excessivement tenue et légère qui ne tarda pas à recouvrir entièrement les feuilles et les rameaux de la plante. Pendant cette opération 5 milligrammes de soufre furent insufflés dans le tube à combustion pour produire simultanément avec de l'oxyde zincique environ 3 c.c. 45 d'acide sulfureux.

L'aspiration ne fut déterminée qu'au moment de la fusion du zinc et pendant 15 minutes de temps seulement, après quoi libre accès fut donné à l'air dans la cloche par les tubes t et t'.

Plus d'une heure après l'expérience, l'atmosphère de la cloche se trouvait encore saturée d'oxyde zincique qui, grâce à sa légèreté, se maintenait en suspension dans les gaz.

2 Septembre.—Pas d'altération. On fait passer dans la cloche

* 1 centigramme de soufre, en théorie, donne en brûlant 6 c.c. 9. d'acide sulfureux mais par sa volatilité une partie du soufre échappe à la combustion.

les produits de la combustion de 1 centigramme de soufre en même temps que 5 litres d'eau sont aspirés.

3 Septembre.—La cloche est enlevée et on remarque sur les bords des feuilles quelques taches olivâtres paraissant brunes par transparence.

4 Septembre.—L'altération se propage.

Le limbe des feuilles est maculé de taches olivâtres virant au brun roux. La plupart des feuilles de cette plante se desséchèrent et tombèrent par la suite.

Nous n'avons pu constater positivement la sulfatisation de l'oxyde zincique et nous n'hésitons pas à attribuer à l'acide sulfureux l'altération produite.

Nous croyons devoir faire remarquer ici, que les expériences qui viennent d'être rapportées tendent à démontrer que l'action de l'acide sulfureux se trouve atténuée par la présence d'une couche d'oxyde zincique sur les feuilles. En effet, pour obtenir des résultats comparables, la proportion d'acide sulfureux doit, dans ce cas, être plus forte que si les feuilles étaient nues.

Mais nous ferons observer que ce fait ne prouve nullement la sulfatisation immédiate de l'oxyde zincique et nous croyons plutôt qu'il y a tout d'abord simple condensation du gaz dans l'oxyde, qui jouerait ici le rôle de corps poreux.

La sulfatisation ultérieure, que nous admettrions volontiers, se produisant probablement en présence d'un excès d'oxyde, doit donner lieu à un sulfate zincique basique dont l'action ne nous a pas encore été démontrée.

7°. ACTION DU SULFIDE HYDRIQUE.

1ère Expérience.

Un jeune prunier et un plant d'aubépine placé chacun sous une cloche mesurant 12 l. 85 de capacité sont soumis, le 8 Août vers midi, à l'action d'un courant de gaz hydrogène sulfuré mêlé d'air. Les 2 cloches reliées directement l'une à l'autre, étaient mises en communication, l'une avec un aspirateur, l'autre avec un appareil à gaz sulfhydrique. Entre ce dernier et la cloche une prise d'air se trouvait menagée par le petit réservoir que nous avons figuré dans notre planche sous la lettre R. 36 litres de gaz furent ainsi aspirés en une heure, puis les cloches furent hermétiquement fermées.

Résultat de l'expérience.—Le 10 Août matin, le prunier* se retrouve mort : toutes ses feuilles ont pris une teinte olive grisâtre très-uniforme. L'aubépine a également souffert : toutes ses feuilles ont revêtu une teinte vert-olive très-prononcée ; mais la plante paraît conserver un reste de vie.

2e Expérience.

Le 11 Août matin, on soumet deux nouvelles plantes à l'action d'un courant d'hydrogène sulfuré produit comme dans l'expérience

* Le prunier se trouvant sous la cloche reliée au générateur à gaz était plus directement exposé à l'action de ce dernier que l'aubépine.

précédente. L'aspiration des gaz est maintenue pendant 1 h. 10 m.; puis les cloches sont hermétiquement fermées. A 3 heures après midi, aucune altération ne s'étant manifestée, la cloche renfermant le plant d'aubépine est remise en rapport avec un appareil à gaz sulfhydrique et on laisse le dégagement se produire pendant 1½ heure.

Quant à la cloche sous laquelle se trouve placé le prunier, on la maintient tout simplement fermée.

12 Août.—Toutes les feuilles du prunier sont altérées d'une manière uniforme, elles passent de la teinte verte à l'olive grisâtre.

Le plant d'aubépine, quoique ayant été soumis à une seconde opération, semble avoir moins souffert; la teinte verte de ses feuilles s'est moins modifiée, plusieurs feuilles mêmes paraissent intactes. On enlève les cloches et les plantes sont remises en plein air.

13 Août.—L'altération est complète. Les feuilles des deux plantes sont mortes. Celles de l'aubépine présentent une teinte gris-olivâtre tout-à-fait distincte de celle du prunier, leur face supérieure a un aspect très luisant.

3e Expérience.

Le 13 Août, un Grand Soleil cultivé en pot, est disposé de telle façon que toute sa partie feuillue se trouve sous une cloche de 12 l. 70 de capacité susceptible d'être hermétiquement fermée. 10 centimètres cubes de gaz sulfhydrique sont ensuite introduits sous la cloche, puis celle-ci est exactement fermée.

L'operation se fait à 10½ h. du matin.

D'un autre côté, un plant d'aubépine placé sous une cloche de 12 l. 85 est soumis pendant 1 h. 15 m. à l'action directe d'un courant de sulfide hydrique. La cloche est ensuite hermétiquement fermée.

14 Août matin.—Les feuilles de l'aubépine présentent la même altération que celle produite dans l'expérience précédente. Elles ont pris une teinte olive grisâtre très prononcée et leur face supérieure semble revêtue d'une couche de vernis, ce qui lui donne un réflet brillant.

Le grande soleil n'offre pas d'altération appréciable.

14 Août 6 heures du soir.—Le limbe des feuilles du grand soleil se macule de taches très visibles et assez larges de teinte olive. La cloche est enlevée et la plante remise à l'air libre.

17 Août.—Les feuilles du grand soleil sont entièrement desséchées et de teinte jaune olivâtre. La tige, les rameaux et le petiole des feuilles restent turgides et de teinte naturelle.

Dans cette expérience la proportion de gaz sulfhydrique dans l'air était de $\frac{1}{1270}$.

4e Expérience.

Le 17 Août, un grand soleil, cultivé en pot, est placé sous une cloche de 39 litres de capacité. Une petite cage renfermant un moineau est également placé sous cette cloche.

30 centimètres cubes de sulfide hydrique sec sont ensuite introduits directement dans l'appareil et celui-ci est maintenu hermétiquement fermé pendant une demi-heure.

Après cela les tubes de communication de l'intérieur de la cloche avec l'extérieur, sont ouverts et une demi-heure plus tard l'oiseau, qui ne cessait de témoigner de son inquiétude par son agitation et ses cris, en est retiré.

Il ne parût nullement avoir souffert de son séjour dans le milieu où on l'avait placé. La cloche fut ensuite reposée sur son socle de manière à couvrir la plante, mais libre accès fut donné à l'air par les tubes abducteurs et par dessous les bords de la cloche qui ne furent pas relutés.

18 Août.—L'oiseau est aussi bien portant qu'avant l'expérience; la plante au contraire paraît avoir souffert; ses feuilles prennent une teinte olivâtre.

19 Août.—L'altération de la plante est très manifeste. L'oiseau paraît très bien portant.

25 Août.—Les feuilles du grand soleil sont mortes. L'oiseau vit toujours.

Dans cette expérience le gaz sulfhydrique entrait dans l'air pour $\frac{1}{1300}$, quantité qui a suffi pour donner la mort à un grand soleil, mais insuffisante paraît-il, pour tuer un moineau.*

Afin de nous assurer que les altérations produites dans nos expériences précédentes ne provenaient nullement du séjour de la plante sous une cloche de 12l. 70 de capacité hermétiquement fermée, et nous l'y avons maintenue du 14 au 27 Août, soit pendant 13 jours.

A cette dernière date, la cloche fut enlevée et on retrouve la plante aussi intacte qu'avant l'expérience.

8e. ACTION DU SULFIDE CARBONIQUE.

Un cerisier Ste. Lucie, cultivé en pot est placé le 9 Septembre sous une cloche de 39 litres de capacité pour être soumis ensuite à l'action d'un courant d'air chargé de vapeurs de sulfide carbonique.

La planche XIII. représente l'appareil. Dans le tube à distillation on a placé vers son extrémité *p*, qui est fermée, un tube en verre de Bohême† contenant 10 grammes de soufre en canon, puis des morceaux de charbon de bois de manière à le remplir.

Ce tube est ensuite porté au rouge à son extrémité antérieure d'abord, puis peu à peu jusqu'à son extrémité postérieure *p* où se trouve le soufre. Les vapeurs de ce dernier en traversant les charbons incandescents donnaient lieu à du sulfure de carbone qui passait à la distillation‡ et se trouvaient entraîné dans la cloche. Une prise d'air insuffisante pour répondre à l'appel de l'aspirateur était ménagée au petit réservoir *R* placé entre la cloche et l'allonge.

* Suivant M. Dupuytren et Thénart un verdier meurt immédiatement dans une atmosphère qui contient $\frac{1}{1500}$ de son volume de sulfide hydrique; $\frac{1}{800}$ fait périr un chien; $\frac{1}{200}$ a tué un cheval.

† L'emploi de ce tube avait pour but d'empêcher le contact du fer et du soufre pendant la fusion du dernier.

‡ Le sulfide carbonique distille à 48° C. et émet déjà des vapeurs à la température ordinaire.

L'aspiration fut maintenue pendant 45 minutes et pendant ce temps le tube fut porté au rouge presque blanc; 24 litres de gaz (air et vapeurs de sulfide de carbone) furent ainsi aspirés dans la cloche.

Dès qu'on arrêtait un instant l'aspirateur, les gaz refoulés aussitôt sortaient par la prise d'air et répandaient au dehors l'odeur infecte de sulfure de carbone.

Un thermomètre placé sous la cloche marquait avant l'expérience 17° C.; la température maxima indiquée pendant l'opération, n'a été que de 20° 8. C.

L'opération terminée, la cloche est maintenue hermétiquement fermée.

Résultat de l'expérience.—Pas d'altération sensible. La cloche est enlevée et la plante remise en plein air.

Dans le tube à distillation on ne retrouve que du charbon. Le tube de verre a été fondu et tout le soufre à disparu.

15 Septembre.—Toutes les feuilles de la plante sont mortes et bon nombre tendent à se recoquiller.

L'altération est tout-à-fait distincte de celles qui se rattachent à nos diverses expériences; ici les feuilles se sont desséchées en conservant une teinte verte et une macule d'un gris jaunâtre s'est produite au centre de leur limbe.

9e. ACTION DE L'OXYDE CARBONIQUE CHAUD.

Expérience du 9 Septembre.

Comme supplément à des expériences antérieures relativement à l'action de l'oxyde de carbone, expériences qui nous ont démontré l'inocuité de ce gaz, nous avons soumis à l'action d'un courant de ce gaz chaud, un jeune cerisier Ste. Lucie, placé sous une cloche, de 12 l. 85 de capacité.

La production de l'oxyde carbonique s'opérait en faisant passer l'air aspiré dans la cloche, à travers un tube en fer plein de charbon de bois et chauffé au rouge blanc sur un fourneau à réverbère.

36 litres de gaz (azote et oxyde carbonique) furent ainsi aspirés en 69 minutes de temps.

Un thermomètre placé sous la cloche s'éleva pendant l'opération à 27° C. au lieu de 17° C. indiqué avant l'expérience.

Le gaz recueilli dans l'aspirateur brûlait parfaitement avec la flamme bleue caractéristique de l'oxyde carbonique.

Aussitôt l'aspiration des gaz terminée la cloche fut hermétiquement fermée.

Résultat de l'expérience.—Le 11 Septembre après midi aucune altération ne s'étant manifestée, on enlève la cloche et la plante est remise à l'air libre.

20 Septembre.—Toutes les feuilles de la plante paraissent intactes, mais elles se désarticulent et se laissent facilement enlever.

CONCLUSIONS.

1. Les produits gazeux de la distillation de la houille non-pyriteuse sont sans influence nuisible sur le pommier.

2. Les produits gazeux de la distillation de la houille non-pyriteuse n'exercent sur le prunier aucune influence nuisible.

3. Les produits volatils de la combustion de la houille non-pyriteuse sont sans influence nuisible sur le prunier.

4. Les produits volatils de la combustion de la houille pyriteuse exercent un influence désastreuse sur la végétation du prunier.

Cette influence revêt tous les signes pathologiques de l'action de l'acide sulfureux.

5. L'influence nuisible est très rapide et fort énergique (aubépine) quand la pyrite se trouve mêlée au combustible dans la proportion de 15 %, de 10 % . . . . .

6. L'action nuisible s'exerce par l'intermédiaire des stomates que nous considérons comme les organes d'absorption des éléments gazeux de l'atmosphère.

Lorsque ces organes sont obstrués les gaz ne pénètrent pas dans les tissus.

7. L'acide sulfureux exerce directement et immédiatement son influence et non pas indirectement ou médiatement en passant d'abord par l'état d'acide sulfurique.

8. Les matières gazeuses qui se forment pendant la réduction de la calamine au contact de la houille non-pyriteuse ne sont pas nuisibles à la végétation.

9. L'oxyde de zinc, même sous la forme la plus ténue et en grande abondance, ne nuit pas à la végétation en se déposant à la surface des feuilles.

10. L'acide sulfureux conserve toutes ses propriétés délétères, même en présence de l'oxyde zincique.

Lorsque ces deux corps se trouvent ensemble en présence des végétaux, dans les conditions habituelles de l'atmosphère, on voit l'acide sulfureux agir directement sur les organes foliacés des plantes, sans passer à l'état d'acide sulfurique ni de sulfate zincique. Le passage de l'acide sulfureux à l'état de sulfate de zinc, a lieu dans ces conditions d'une manière très-lente et cette transformation a pour effet de diminuer les propriétés toxiques de ce gaz.

11. Le contact du gaz sulfide hydrique est nuisible à la végétation, même dans la proportion de $\frac{1}{1300}$ du volume de l'air et probablement au delà.

A cette dose il n'est pas mortel pour les animaux.

12. Le sulfide carbonique, produit volatil résultant de la combinaison du carbone et du soufre, est nuisible à la végétation.

13. Les altérations produites par l'acide sulfureux, le sulfide hydrique et le sulfide carbonique se reconnaissent respectivement à un diagnostic particulier.

Ainsi, l'acide sulfureux produit des taches olivâtres qui passent rapidement au brunâtre. Le sulfide hydrique transforme le vert des feuilles en une teinte olive jaunâtre persistante; le sulfide carbonique semble dessécher les feuilles sans modifier généralement leur teinte verte.

14. Le gaz oxyde de carbone est sans influence nuisible sur la végétation.

15. Les gaz et les vapeurs qui se produisent sous l'influence de températures élevées, perdent si rapidement dans l'atmosphère leur haute température, que l'on ne saurait attribuer au calorique l'effet que produisent certaines fumées.

LÉGENDE DES PLANCHES.

PLANCHES XII. & XIII.

D. Cloche de verre.
e. Socle de la cloche.
c. Planchers mobiles percés au centre.
a. Montants du support.
b. Plancher mobile pour le pot.
t. Tube pour relier la cloche à l'aspirateur.
G. Aspirateur à écoulement constant.
t'. Tube pour l'entrée des gaz.
r. Chambre à air.
f. Tube adducteur des gaz.
f'. Appel d'air atmosphérique.
l. Flacon laveur.
M. Allonge ou ballon pour la diffusion et le refroidissement des gaz.
F. Fourneau générateur dez gaz.
p. Prise d'air.
h. Clé pour régler l'écoulement de l'aspirateur.
z, *z'*. Tubes pour relier l'aspirateur à l'appareil.
s, *s'*, *s''*. Tubulures du flacon laveur.

ÜBER DEN STICKSTOFFGEHALT UND DEN URSPRUNG DES STICKSTOFFS IM TORF MIT BEZIEHUNG AUF DIE BENUTZUNG DES TORFS ALS DÜNGER BEI DER PFLANZENKULTUR.

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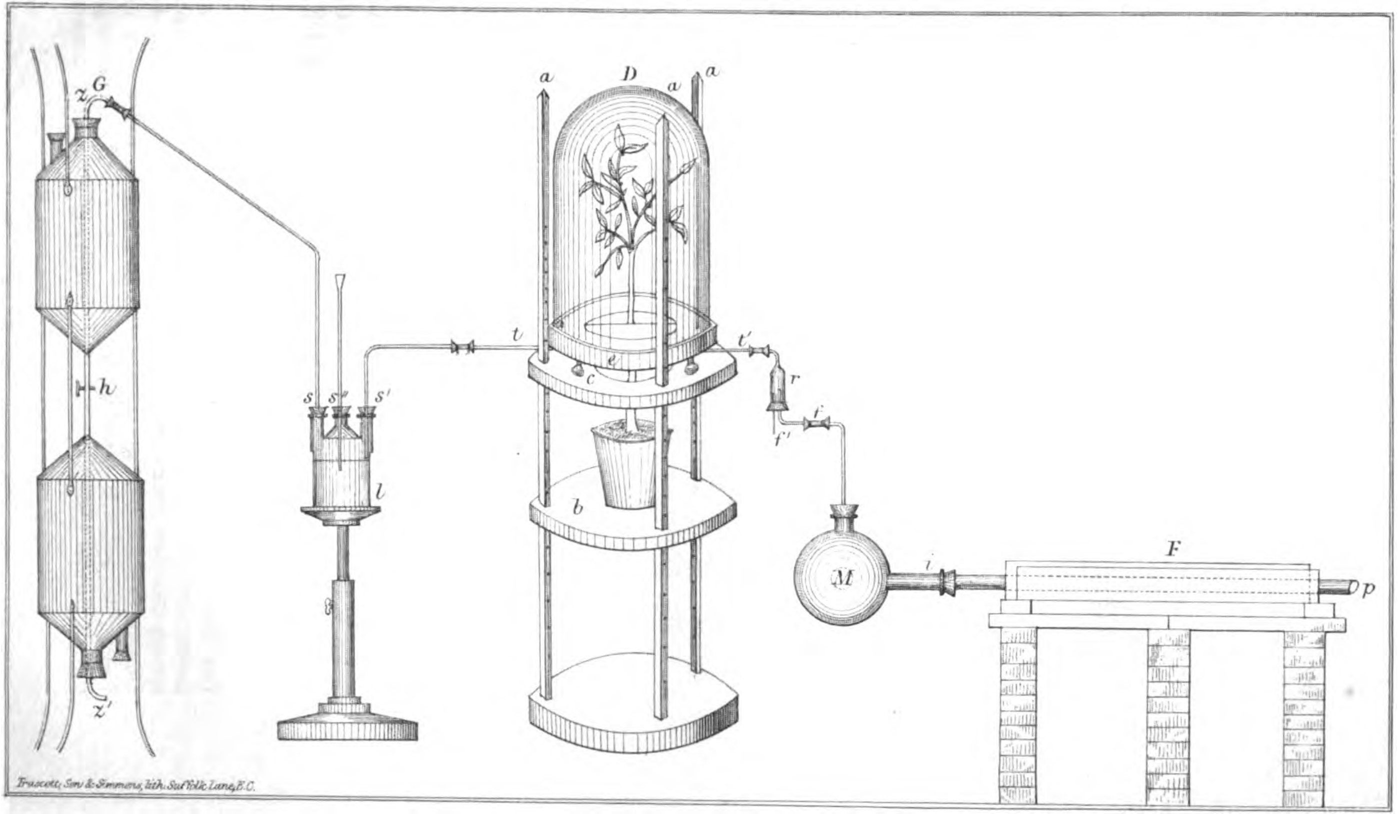
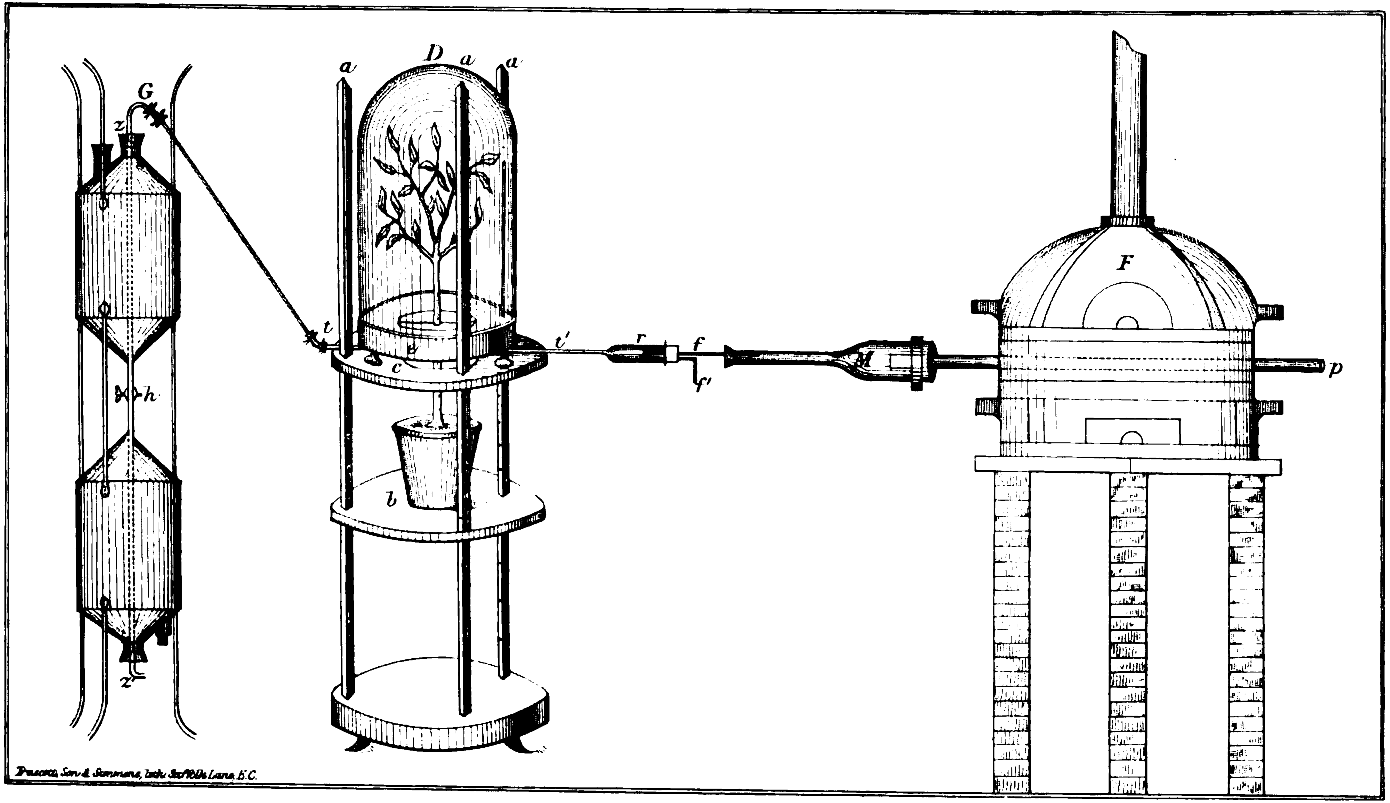
DIE Theorie der Pflanzenernährung aus der Luft, wie sie seit Ingenhouss und Saussure ausgebildet worden ist, steht ganz im Widerspruch mit der Praxis der Pflanzenkultur, und besonders mit der Düngerpraxis, indem die Praxis immerfort solche Substanzen als Dünger anzuwenden genöthigt ist, welche nach der Lufternährungstheorie für die Pflanzenkultur ganz überflüssig erscheinen müssen.



Truscott, Son & Simmons, lith. Suffolk Lane, E.C.



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Die Ingenhouss-Saussuresche Theorie, der die bedeutendsten neuern Autoritäten, wie Boussingault, Liebig u. a. folgen, lehrt dass der Kohlenstoff und Stickstoff, welche die Hauptmasse der Pflanzennahrung und des Baumaterials bilden, aus dem der Pflanzenkörper und namentlich das Holz und die Früchte desselben entstehen, aus der Luft und nicht aus dem Boden stammen, und dass demnach der vegetabilische und thierische Humus des Bodens nicht als Pflanzennahrung zu betrachten seien; dass vielmehr der Humus des Bodens erst durch Pflanzen erzeugt werde, und nicht wieder als Nahrung derselben dienen könne. Wenn auch über den Ursprung des Stickstoffs der Pflanzen aus dem Ammoniak der Luft eine Verschiedenheit der Ansichten herrscht, indem die sogenannten Stickstöffler den Stickstoff der Pflanzennahrung wenigstens theilweise aus dem Humus des Bodens herleiten; so ist doch über den Ursprung des Kohlenstoffs in der Theorie jetzt darin eine allgemeine Übereinstimmung, dass man den Kohlenstoff aus der Kohlensäure der Luft herleitet und demnach die Düngung des Bodens mit kohlenstoffigen Materien für gänzlich unnütz erklärt.

Trotz dieser Theorie hat aber die Praxis der Pflanzenkultur im Garten- wie im Landbau, wie seit dem Alterthum so noch heute, niemals ohne Düngung mit kohlenstoffreichen humösen, entweder vegetabilischen oder thierischen Düngungsmitteln, fertig werden können, und der Augenschein lehrt, dass der Kohlenstoff in den humösen Düngmitteln so sehr die Hauptrolle spielt, dass ohne Humus jede Pflanzenkultur unmöglich sein würde, indem alle künstlichen Bodenmischungen von den Humussubstanzen getragen sind, und mineralische Düngungsmittel ohne Humus sich in der Kulturpraxis als Unding erweisen. Die Ingenhoussche und Liebigsche Pflanzenernährungstheorie ist daher für die Praxis der Düngung vollkommen unbrauchbar.

Wir beurtheilen die Güte des Bodens nach seinem Humusgehalt; wir können den schlechtesten Boden durch Humus verbessern, wir können wohl Pflanzen in reinen Humus, aber niemals in gänzlich humusfreiem Sande kultiviren. Die winzigen Versuche, Pflanzen ohne festen oder gelösten Humus mit Kohlensäure zu kultiviren, zeigen nur, dass keimende Pflanzen eine Zeit lang von den Nährstoffen des Saamens leben können und dann absterben, nicht aber dass die Pflanzen aus der Luft leben könnten. Die Versuche mit der Orchideen-Kultur in der Luft haben die Orchideen-Züchter überzeugt, dass ohne humösen Boden auf die Dauer keine Orchideen-Kultur möglich ist.

Den sichersten Beweis dafür, wie sehr die Pflanzen sich der humösen Nährstoffe des Bodens bedienen, finden wir darin, dass wir es in der Hand haben, die verschiedenen Früchte, überhaupt die Producte des Pflanzenreichs durch Düngung mit verschiedenen Humussubstanzen zu ändern, zu verbessern oder zu verschlechtern, ohne dass die Luft den geringsten Einfluss darauf hätte, eben weil die verschiedene Fruchtbarkeit örtlich an den Boden und den Standort gebunden ist, während die Luft überall gleich erscheint, so dass es eine örtliche Verschiedenheit des Wachsthums nicht geben könnte, wenn die Luft das Nährmaterial der Pflanzen lieferte. Durch Düngung des Bodens mit überwiegend kohlenstoffhaltigem Dünger (Brache, Lupinen) können wir den Kohlenstoffgehalt der Früchte, durch Düngung mit vorherrschend stickstoffhaltigem Dünger den Stickstoffgehalt der Pflanzen ändern. Einen Beweis hierfür liefern die Getreidearten, der Taback, die Kartoffeln. Durch den mehr stickstoffhaltigen Schaaf- und Pferdedünger wird das Korn des Weitzens und' der Gerste so kleberreich, dass es sich mehr für Bäcker eignet, während eine mehr kolenstoffhaltige Gründüngung (Brache, Lupinen) ein kleberarmes und stärkmehlreiches Korn liefert, das sich mehr für Brauer eignet. Der Taback erhält durch frische thierische Düngung einen so starken Stickstoff (Ammoniak) gehalt, dass er beim Rauchen den angenehmen Geschmack verliert und stinkend wird, so dass er nur als Schnupftaback dienen kann; während eine vegetabilische Moder- oder Gründüngung ihm einen angenehmen Geruch beim Rauchen verleiht. So hängt auch die Güte der Kartoffeln nicht von der Luftbeschaffenheit, sondern allein vom Boden und seiner Düngung ab. Der Abtrittsdünger giebt den Kartoffeln einen widrigen ammoniakalischen Geschmack, während sie am schönsten nach Gründung werden, wie verschieden auch die mineralischen Bestandtheile des Bodens sein mögen.

Alle diese *praktischen* Erfahrungen stehen mit der Ingenhouss-Saussure-Liebigschen *Theorie* der Pflanzenernährung aus der Luft völlig im Widerspruch. Solche Erfahrungen werden von den Anhängern der Lufternährungstheorie übersehen oder ignorirt, während die ganze Aufmerksamkeit auf die chemischen Erklärungen der Kohlensäurezersetzung gerichtet gewesen sind, die in der Düngerpraxis keinerlei Anwendung finden können.

Die Düngertheorie ist dadurch in grosse Verwirrung gerathen, dass sie, mit Übergehung der humösen Düngermaterialien, nur auf den Ersatz der mineralischen Aschenbestandtheile des Bodens ausgeht, die doch sämmtlich in so unerschöpflicher Menge in jedem Boden vorhanden sind, dass eine Erschöpfung des Bodens an diesen Bestandtheilen, und selbst an phosphorsaurem Kalk niemals nachgewiesen und nur als theoretisch angenommen worden; das Dasein von phosphorsauren Salzen und Metalloxyden in jahrtausende lang cultivirtem Boden vielmehr eine erwiesene Sache ist, daher auch alle Boden und Flusswässer mehr oder weniger reich an phosphorsaurem Kalk und an allen Salzen sind, die sich in den Aschen der Pflanzen finden; so dass die Erschöpfung des Bodens nur eine Erschöpfung an Humusbestandtheilen ist.

Es scheint daher ein Bedürfniss für die Praxis des Land- und Gartenbaues, und insbesondere für die Düngerpraxis, die Aufmerksamkeit auf thierische wie vegetabilische Humusdüngung zu richten, von der von jeher alle Pflanzenkultur getragen worden ist, indem alle Kultur praktisch darauf hinausläuft, die Humusbestandtheile des Bodens aufzuschliessen oder zu vermehren. In diesem Betracht ist es, dass wir den Torf als Düngmittel einer nähern Betrachtung unterziehen wollen, und zwar in praktischer Beziehung seiner Leistungen, wie in theoretischer Beziehung wegen seines Kohlenstoff- wie Stickstoffgehalts und seines Gehalts an phosphorsaurem Kalk.

Der Torf eignet sich wie meine eigenen Beobachtungen sowohl als auch die des Hofgärtners Herrn Fintelmann auf der Pfaueninsel bei Potsdam, sowie derjenigen Gärtner Berlins, welche sich des Torfs bei der Pflanzenkultur auf meine Anregung bedient haben, gezeigt haben, zur Düngung leichter wie schwerer Bodenarten; ebenso hat er sich zu Bodenmischungen für Topfgewächse, sowohl für die Orangerie, als für die Ericineen, wie überhaupt für diejenigen Pflanzen, welche einen lockeren Boden verlangen, wirksam gezeigt. Er wird in zerkleinertem Zustande als Torfmüll angewendet, am besten nachdem er den Winter über an der Luft gelegen und zu verwittern begonnen hat. Für Orchideen können auch grössere Stücke genommen werden, an welche diese anwurzeln.

Der Torf wirkt um so besser auf die Vegetation, je leichter er verwittert und vermodert, was bei den lockeren, zum Brennen am wenigsten geeigneten Sorten der Fall ist. Meistens sind es die wohlfeileren leichten Torfsorten, welche sich am besten zur Düngung eignen. Der Boden erhält durch Torfdüngung ein grösseres Absorptionsvermögen für die Luftfeuchtigkeit. In Folge der Verwitterung bilden sich mehr Humussäure und Quellsäure, welche im Bodenwasser gelöst das Pflanzennahrungsmaterial bilden, so dass die Torfmasse durch Vermoderung nach und nach aufgelöst wird. Bei schweren verwitternden Torf tritt die Wirkung, wenn er frisch angewendet wird, oft erst im nächsten Zahre ein.

Aller Torf ist mehr oder weniger ammoniak—odor stickstoffhaltig. Dadurch entsteht der stinkende Geruch des Torfs beim Verbrennen. Iemehr der Torf beim Verbrennen riecht, desto grösser ist der Stikstoffgehalt. Wegen des Stickstoffgehalts ist der Torf zur Salmiakfabrikation benutzt worden, weil er bei der trockenen Destillation mehr oder weniger ammoniakhaltiges Wasser giebt. Die Menge des Stickstoffs ist jedoch in den verchiedenen Torfarten verschieden. Der Torf in der Umgegend von Nauen und Friesack enthält so wenig Stickstoff, dass er sich zur Salmiakfabrikation nicht eignet; während der belgische Torf eine grössere Ausbeute giebt. Der Stickstoffgehalt macht den Torf besonders werth als Düngmittel für Getreide wie für Gartenpflanzen.

Achard, Buchholz, Suersen erhielten 20 bis 30 Prozent ammoniakhaltiges Wasser aus Torf. Nach meinen Berechnungen der bei der Salmiakfabrikation aus belgischem Torf erhaltenen Ammoniakmengen 4 bis 5 % kohlensaures Ammoniak. Je stickstoffhaltiger der Torf desto mehr nähert er sich der thierischen Düngung. Der beim Brennen am meisten stinkende Torf eignet sich zur Düngung am besten. Durch den Stickstoffgehalt ersetzt der Torf zugleich die thierische Düngung, und eignet sich besonders für solche Pflanzen, welche ein starke thierische Düngung nicht ertragen, oder in ihrer Stoffbildung unzweckmässig verändert werden, wie Ericineen, Orangen, Cruciferen, Taback.

Eine wichtige Frage ist nun zunächst, welches die Quelle des Stickstoffs im Torfe ist. Die gewöhnliche Ansicht ist, dass sich, wie bei der Salpeterbereitung und der Humusgährung überhaupt Kohlenwasserstoff entwickelt, dessen Wasserstoff sich bei der Entstehung mit dem Stickstoff der Luft zu Ammoniak verbindet. Gegen diese Ansicht spricht indessen, dass der Stickstoff in der Quellsäure so wenig als im Torf selbst in Form von Ammoniak vorhanden ist, das Ammoniak sich vielmehr erst bei der trockenen Destillation des Torfs, wie ähnlich bei der trockenen Destillation thierischer Theile entwickelt, woraus hervorgeht, dass der Stickstoff im Torf sich in einem ähnlichen Zustande wie in thierischen Körpern, z. B. Horn, Knochen, Eiweiss, Fleisch befinden muss. In der That lässt sich nachweisen, dass der Stickstoff des Torfs wirklich von thierischen Körpern die im Torf leben oder gelebt haben, herrührt, und deren zum Theil noch lebende, zum Theil abgestorbene, sogar fossile Ueberreste sich im Torfe finden. Es sind besonders Thierleichen aus den Klassen der Evertebraten: Infusorien, Polypen, Würmer, Mollusken, Crustaceen und Insecten, die durch ihre massenhafte Entwickelung in Torfbrüchern den Stickstoffgehalt des Torfs hervorbringen. Dazu gehören:—

1. Aus der Klasse der *Infusorien*, die Monaden, Cyklidien, Bursarien, Paramaecien, Vorticellen, ferner die Panzerinfusorien, Bacillarien, Closterien, Naviculaceen, Gallionellen, Echinellen; ferner die Räderthiere: Brachionus, Rotifer, und selbst die Foraminiferen oder Rhizopoden.
2. *Polypen*. Die Hydra, Alcyonella, Cristatella-Arten.
3. *Würmer*. Lumbricineen, Hirudineen.
4. *Mollusken*. Arten der Gattungen: Cyclostoma, Paludina, Planorbis, Valvata, Lymnaeus, Physa, Pupa, Vitrina, Helix, Limax; ferner die Muscheln: Unio, Mya, Mytilus, Anodonta, Cyclas, deren massenhaftes Vorkommen auf überschwemmten Torfwiesen oft grossen Gestank durch Fäulniss nach dem Ablaufen des Wassers verursacht, und auch die stinkenden thierischen Düngermassen in den Charen, die unter dem Namen: Post zum Dünger verwendet werden, bildet.
5. *Crustaceen*. Die Gattungen: Gammarus, Asellus, Oniscus, Porcellio, Branchipus, Apus, Daphnia, Cypris, Cyclops.
6. *Arachniden*. Argyronecta aquatica, Hydrachna, Lycosa, Acarus-Arten.
7. *Insecten*. Unter diesen—

    (*a*) Die *Hemipteren*, insbesondere die Wasserwanzen: Notonecta, Corisa, Naucoris, Nepa, Hydrometra, Ranatra, ferner die Larven der auf Wasserpflanzen lebenden Tettigonien, Typhlocybien, Livia, Psylla-Arten.

    (*b*) *Diptera*. Die Mehrzahl der Mücken- und Schnackengattungen: Culex, Chironomus, Tipula, Limnobia, deren Larven im Wasser leben, die Larven von Stratiomys, Dolichopus, Syrphus, Eristalis, Helophilus, ferner die Larven der Muscinengattungen: Anthomya, Cordylura, lassen durch ihre Larvenhäute und Excremente Massen thierischen Düngers im Torf zurück.

(*c*) *Neuroptera.* Massenhaft sind die Larven der Phryganeen, Libellen, Ephemeren, ferner die Poduriden in den Torfsümpfen.

(*d*) *Lepidoptera.* Von den Schmetterlingen leben zahlreiche Raupen an und in Sumpf- und Wasserpflanzen der Torfwiesen: Cossus arundinis, Nonagria Typhae, Sparganii, Noctua somniculosa auf Andromeda, Vaccinium oxycoccos, Noctua rumicis, Noctua auricoma an Menyanthes, Comarum, ferner die Mottenlarven der Cambriden an Lemna, Stratiotes, Typha, deren Lebensresiduen thierischen Dünger geben.

(*e*) *Hymenoptera.* Aus dieser Ordnung kommen nur die an Sumpfpflanzen lebenden Tenthredo-Arten und die auf Sumpfinsectenlarven schmarotzenden Ichnemoniden in Betracht.

(*f*) *Coleoptera.* Von den Gattungen: Hydrophilus, Dytiscus, Gyrinus, Sphaeridium, Staphilinus, leben die Käfer selbst im Wasser oder an feuchten Orten; von anderen, wie den Curculionen-Gattungen und Lixus, Phytonomus, Erirhinus, Bagus, Hydronomus, Mononychus, u.a., leben die Larven an Sumpfgewächsen, wie Lythrum, Comarum, Menyanthes, Iris, Typha, Arundo, Cicuta, Stratiotes, und geben, wie die zahlreichen Larven der Gattungen: Donacia, Chrysomela, Galleruca, Cassida, zur Bildung von stickstoffigen thierischen Beimengungen zum Torf Veranlassung.

Wir bedürfen also zur Erklärung des Stickstoffgehaltes des Torfes einer Anziehung des Stickstoffs der atmosphärischen Luft durchaus nicht; da die massenhaften Thierleichen eine so reichliche thierische Naturdüngung geben, als sie durch Ammoniakbildung aus der Luft niemals entstehen könnte. Daraus ist ersichtlich, dass durch Düngung mit Torf mittelst der Vermoderung desselben eine reiche Pflanzennahrung geschaffen werden kann, welche die als Pflanzennahrung angenommene Kohlensäure und das Ammoniak der Luft um so mehr entbehrlich machen, als beide nur in so winzigen Mengen in der Atmosphäre der Felder vorkommen, dass eine Fruchtbarkeit der Luft darin nicht gefunden werden kann.

Die Torfdüngung wirkt nicht so stark treibend als die Düngung mit Stallmist, weil der Torf weniger schnell vermodert; allein seine Wirkung ist durch die langsame Zersetzung nachhaltiger, und eignet sich daher besonders für langsamer wachsende Pflanzen wie Ericineen, Orchideen, Agrumen. Die Kartoffeln erhalten nach Torfdüngung einen besonders reinen und schönen Geschmack und werden wie Weizen, Gerste, sehr mehlreich.

Zur Beurtheilung der Düngerkraft des Torfs ist noch der Gehalt desselben an phosphorsaurem Kalk zu gedenken. Liebig hat die Behauptung aufgestellt, dass der Torf nur unter der Bedingung pflanzennährend wirke, dass ihm noch phosphorsaurer Kalk beigemischt werde, und dass dann seine düngende Kraft mehr in dem zugesetzten phosphorsauren Kalk, als im Torfe selbst, liege. Diese Ansicht erweist sich schon darum als irrig, dass der Torf selbst hinreichende Mengen von phosphorsaurem Kalk enthält, und dass, wenn die düngende Kraft überhaupt von phosphorsaurem Kalk herrührte, auch diese im Torf an sich gefunden werden müsste, so dass die Beimischung von phosphorsaurem Kalk zum Torf für die Düngung hiernach völlig überflüssig erscheint. In der That haben alle meine Versuche mit Torfdüngung gezeigt, dass der Zusatz von Knochenerde ohne Wirkung blieb. Der Gehalt an phosphorsaurem Kalk zeigt sich am deutlichsten in der Asche des Torfs. Die Torfasche ist sogar sehr reich an phosphorsaurem Kalk, was schon den älteren Chemikern bekannt war. Einhof und Thaer fanden in der Asche des braunen Torfs 9·5 % ; in der des schwarzen Torfs 15·0 % phosphorsauren Kalk. Schübler hat in der Asche eines stark riechenden Torfs aus der Gegend von Schwetzingen 34·0 % phosphorsauren Kalk und 29·6 % Gips gefunden. Der phosphorsaure Kalk lässt sich sehr leicht aus der Torfasche abscheiden, wenn man sie mit wässigrer Salzsäure extrahirt und die darin aufgelöste Knochenerde mit Ätzammoniak niederschlägt. Ich habe auf diese Weise aus der Asche verschiedener Sorten Linummer Torfs zwischen 3 bis 6 % Knochenerde erhalten. Diese Menge ist grösser als man sie durch Knochendüngung dem Boden geben kann, und wenn es darauf ankäme eine wohlfeile Knochenerde-düngung zu bewerkstelligen, so würde sich dazu nichts besser als eben die Torfasche eignen. Dass man von der Düngung mit Torfasche, trotz ihres grossen Gehalts an phosphorsaurem Kalk niemals eine merkliche Wirkung gesehen hat, hat darin seinen Grund, dass in jedem Boden wie in jedem Fluss- und Quellwasser hinreichende Mengen von Knochenerde oder anderen phosphorsauren Salzen vorhanden sind. Wo aber die Düngung mit Torfasche wie auf Kleefelder, einige Wirkung gezeigt hat, möchte diese mehr dem grossen Gehalt an Gips in der Torfasche zuzuschreiben sein.

Fragen wir nach dem Ursprung des phosphorsauren Kalkes im Torf, so kommt in Betracht, dass viele Torfaschen nicht mehr phosphorsauren Kalk als die Holzaschen enthalten und dass diese geringe Menge phosphorsauren Kalks aus dem Bodenwasser stammt, dass allen Pflanzen zur Nahrung dient. Wo aber so grosse Mengen phosphorsauren Kalks wie sie Schübler, Einhof und Thaer in einigen Torfarten gefunden haben, vorkommen, da möchten diese von den Knochen vermoderter Fische herrühren, die in Torfsümpfen gelebt haben, und sich in den aus vielen Landseen abgesetzten Mergelkalken ebenso wie im Torfe finden. Jedenfalls ist bei der hinreichenden Menge des phosphorsauren Kalkes im Boden und den Bodenwässern das Bedürfniss des phosphorsauren Kalkes im Dünger nicht so gross, als es die Mineraltheorie glaubt.

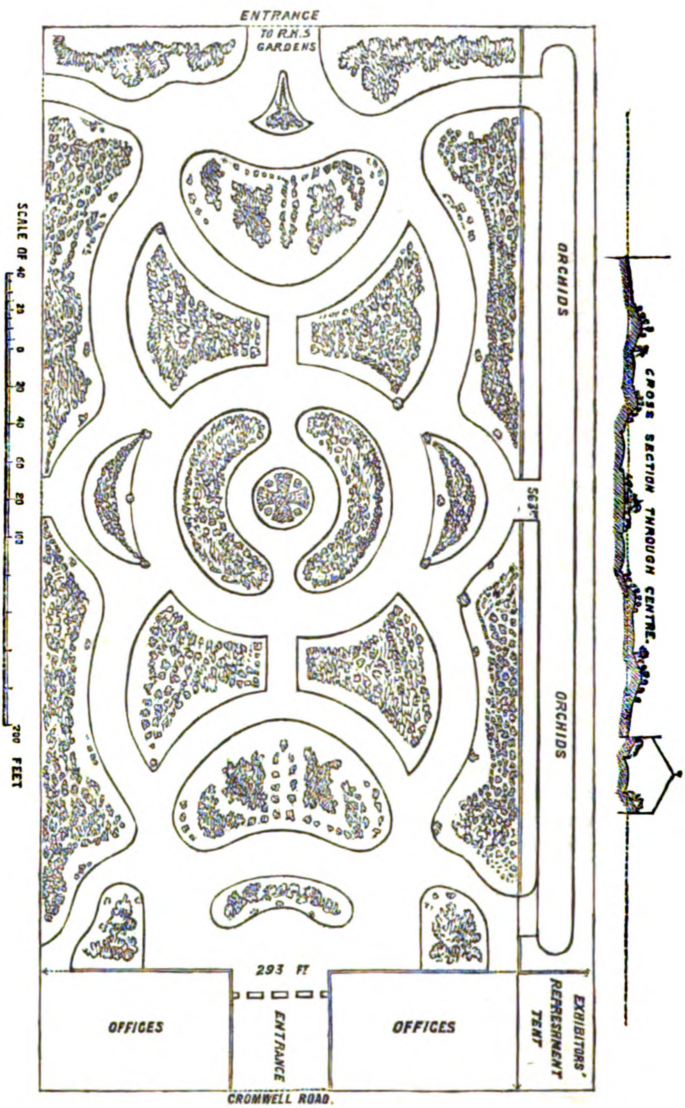
Offenbar ist in der Theorie, der Praxis entsprechend, das Hauptgewicht auf den Kohlenstoff und Stickstoffgehalt des Düngers zu legen, und die erste Frage ist daher, welches die Quellen des Kohlenstoffs und Stickstoffs der Pflanzennahrung sind.

Die Humusdüngung im Allgemeinen und die Düngung mit Torf- und Pflanzenmoder im Besonderen zeigt nun zunächst unwiderleglich, dass die Pflanzennahrung eine einheitliche Substanz bildet, die in den Kohlenstoff, Wasserstoff, und Stickstoff enthaltenden Humussäuren repräsentirt ist, und dass die Pflanze gar nicht nöthig hat, sich den Kohlenstoff und den Stickstoff aus verschiedenen Quellen zusammen zu holen und ihre Nahrung aus den elementaren Bestandtheilen erst zusammen zu setzen; dass vielmehr der Kohlenstoff wie der Wasserstoff und der Stickstoff allein aus dem Humus des Düngers stammt. Die Annahme der Ingenhousschen Lufternährungs theorie, dass die Pflanze sich den Kohlenstoff und Stickstoff ihrer Nahrung aus verschiedenen Quellen zussammen holen, und demgemäss diese Nahrung immer erst aus einfachen chemischen Elementen zusammensetzen müsse, hat daher immer auf unlösliche Widersprüche geführt, so dass sowohl in der Kohlensäure- als in der Stickstoff- und Mineraltheorie über die Zusammensetzung der Pflanzennahrung alles streitig bleibt; und gerade hier die Theorie mit der Praxis der Düngung in die grössten Widersprüche geräth. Die Lufternährungs theorie kann nicht erklären wie, wenn der Kohlenstoff aus der Kohlensäure der Luft stammt, es möglich ist, durch vegetabilischen Humus das Stärkmehl des Korns zu vermehren und wie, wenn der Stickstoff aus dem Ammoniak der Luft stammen soll, durch thierische Düngung der Klebergehalt sich steigern sollte, oder wie auf den verschiedenen Abtheilungen eines und desselben Feldes je nach den verschiedenen Graden und Arten der Düngung die Stoffe der Pflanzen in derselben Luft, die alle Pflanzen des ganzen Feldes umweht, sich nur der humösen Düngung entsprechend ändern sollten.

Die Einheit der Pflanzennahrung in der Kohlenstoff, Wasserstoff, und Stickstoff im Humus ursprünglich verbunden sind, erklärt das ganze Wunder einfach und natürlich. Was hilft uns die Verpönung der Humustheorie aus chemischen Gründen; was hilft das Pochen auf die Kohlensäure- und Ammoniaktheorie der Lufternährung, wenn unsere ganze Düngerpraxis auf der Beschaffung von humösen Düngermaterialien beruht und niemand jemals im Stande gewesen ist, mit Kohlensäure und Ammoniak praktisch Pflanzen zu ernähren und zu kultiviren?

Auf die Theorie des Urhumus, sowie auf das Verhältniss der Pflanzenernährung zur Respiration der Pflanzen gehen wir hier nicht ein. Die hierher gehörigen Fragen sind von uns in der Schrift, "Die Entdeckung der wahren Pflanzennährung, mit Aussicht zu einer Agriculturphysiologie. Berlin, 1844," so wie in dem Werke über "Pflanzenernährung, Bodenerschöpfung und Bodenbereicherung mit Beziehung auf Liebig's Ansicht der Bodenausraubung, Berlin, 1864," behandelt. Hier kam es nur auf die praktische Anwendung des Torfs als Dünger und deren Begründung an.

PLAN AND SECTION OF THE EXHIBITION TENT.



REGULATIONS FOR THE EXHIBITION.

1.—The Executive Committee reserves the right of deciding in all cases not specially provided for by these Regulations.

AS TO THE OBJECTS EXHIBITED.

2.—The Prizes in the Schedule [see p. 261] are alike open to competition amongst Home and Foreign cultivators.

3.—All Plants, Flowers, Fruits, or Vegetables must be distinctly labelled with their botanical or garden names.

4.—In the case of newly-introduced plants, the date of their introduction to Europe, and the name of the country from whence they were introduced, must be stated.

5.—The Objects exhibited in one Class cannot compete in any other.

6.—When the number of Objects in any Class is fixed, no other number can be received.

7.—Stove Plants, Cut Flowers, Fruits, and Vegetables will be received up to 7 o'clock on the morning of Tuesday, the 22nd of May, but may be sent in on the previous day.

8.—All other Objects MUST be sent in by the evening of Monday, the 21st of May. Hardy Plants will be received at any time during the week previous, and are INVITED to be sent early.

9.—Cut Flowers and Soft Perishable Fruits may be renewed daily.

10.—Prices may be affixed to the Plants and other Objects exhibited.

11.—The Objects displayed may be removed after 7 o'clock on the evening of Friday, the 25th of May, and the whole MUST be cleared by 7 P.M. on the following day.*

12.—The Executive Committee will take all possible care of the Objects shown, but will not be responsible for any loss or damage which may arise from any cause whatever.

AS TO EXHIBITORS.

13.—Exhibitors must in all cases conform to the Rules.

14.—Every Exhibitor must be prepared to declare that the Objects he exhibits are his own property, or that of his employer.

* [NOTE.—It was afterwards determined to keep the show open until May 31st.]

15.—Amateurs and Nurserymen exhibit together on equal terms in all the Classes, excepting those specially limited.

16.—No person can exhibit both as an Amateur and as a Nurseryman.

17.—Those persons who intend to take part in the Exhibition must signify their intention to do so by letter, post-paid, addressed to the Exhibition Secretary. (See Rule 18.)

18.—Every Exhibitor must specify exactly the Classes in which he intends to compete, and the space (in square feet) his Exhibitions will occupy. This must be done on printed forms, which will be sent on application, and must be returned on or before the 1st of May.

19.—The Exhibitors will, on the morning of the 22nd of May, be furnished with cards corresponding with the notice sent in by them, according to Rule 18, in order to distinguish their Exhibitions in the respective Classes, which cards they are to place before the several Objects competing, previous to their being examined by the Jury.

20.—The Exhibitors will themselves be responsible for the correct placing of these cards, and no mistakes arising from their being improperly placed can be rectified after the Judges have commenced their duties.

21.—Every Exhibitor must retire at 9 o'clock on the morning of May 22, when the Jurors will commence their duties.

AS TO ARRANGING THE PLANTS, &c.

22.—The Executive Committee will charge a Sub-Committee with the duty of receiving all Objects presented for Exhibition, and of distributing them according to the degree of temperature they require. Tropical Plants will be placed in a building suitably heated.

23.—The Sub-Committee will have power to refuse to admit any Objects which they may consider unworthy of a place in the Exhibition.

24.—All Exhibitions, whether collections or specimens, must be grouped or arranged subject to the direction of the Executive Committee.

AS TO THE CATALOGUE.

25.—A catalogue of the Objects exhibited, with the prices of the plants when desired, and with a list of the Prizes awarded, will be prepared, and will be on sale in the Exhibition.

26.—For the purpose of compiling this Catalogue, detailed and exact lists of the Objects intended to be exhibited must be sent, post-paid, to the Secretary, on or before the 8th of May.* Those who have complied with Rules 17 and 18 will have the necessary blank forms for this purpose sent to them.

* [NOTE.—This Rule was generally complied with—quite sufficiently so to show that if all Exhibitors would but take the small trouble of making accurate and punctual returns, the issue of a Catalogue of Entries by the opening of a show, is quite practicable.]

AS TO TRANSIT.

27.—The Executive Committee will endeavour to make arrangements with the several Railway and Steamboat Companies*, to convey all Objects for the Exhibition at a reduced rate.

28.—All Packages addressed to the care of the Executive Committee must be delivered CARRIAGE PAID.

29.—The Executive Committee will endeavour to obtain from the several Railway Companies the concession that Gardeners proceeding to the Exhibition may travel at excursion fares.

AS TO THE JURY.

30.—A Jury of distinguished Horticulturists will be constituted to judge the Objects sent for competition.

31.—The Jury will assemble at 9 o'clock on the morning of Tuesday, the 22nd of May. Its decisions will be absolute.

AS TO THE PRIZES.

32.—The rewards will consist of Money Prizes only.

33.—One Prize only can be taken by one Exhibitor in each Class, except amongst New Plants and Seedlings.

34.—Any Prize fraudulently obtained will be forfeited, and the name of the Exhibitor published.

35.—The Prizes will be paid on the last day of the Exhibition.

AS TO ADMISSIONS.

36.—The Opening of the Exhibition will take place at One o'clock in the afternoon of Tuesday, the 22nd of May, when Subscribers' and Guarantors' tickets only, besides those of such persons as may be specially invited, or furnished with Guinea tickets, will be admitted.

37.—Subscribers of £1 1*s.* and upwards, and Guarantors to the extent of £25, will have a single personal non transferable admission-ticket, available for the Opening and during the continuance of the Exhibition, as well as to the Conversazione and Congress.†

38.—Subscribers of £5 5*s.*, or Guarantors of £50, will have one such personal non-transferable ticket, and three other tickets for the Opening or subsequent days; and two cards for two friends to the Conversazione.

39.—Subscribers of £10 10*s.* will have one such personal non-transferable ticket, and seven others available either for the Opening or subsequent days; besides a card for the Banquet, and two cards for two friends to the Conversazione.

* [NOTE.—For the result see page 9.]

† [NOTE.—The issue of *Personal Non-transferable Admission Tickets* was found practically inconvenient. A preferable plan would have been to have given separate tickets for each day to each subscriber, to have been given up on entry.]

40.—*Bonâ fide* Gardeners will be admitted by tickets, as follows: —On Wednesday at 2*s*. 6*d*., and on Thursday at 1*s*. Application for these tickets must be made, with remittance, previous to May 1.*

41.—The public will be admitted to the Opening (Tuesday afternoon) only by tickets, which will be charged One Guinea each, and must be obtained not later than Saturday, May 19. On other days the Exhibition will be open between the hours of 10 A.M. and 7 P.M., and the admission will be:—On Wednesday, 10*s*.; on Thursday, 2*s*. 6*d*.; on Friday, 1*s*.†

42.—The Exhibitors, with their necessary attendants, will be admitted for the purpose of giving the requisite attention to their plants, &c., by means of special passes, during the days the Exhibition is open, between the hours of 6 and 9 in the morning, at which hour the building will be cleared.

43.—These Exhibitors' special passes will be issued as follows:—

For a Collection of 12 plants or upwards	3
For a Collection of 6 plants or upwards	2
For any smaller number of plants, or for cut flowers .	1
For Collections of fruit	2
For 2 or more dishes of fruit	1

But no one Exhibitor can take more than 6 passes in all; and no passes will be given to Exhibitors of single dishes of Fruit, Seedlings, Florists' Flowers, or of Objects not invited.

44.—Refreshment tickets will be furnished to Exhibitors and their attendants on the morning of the opening day (Tuesday) as at the other metropolitan Exhibitions.

45.—The personal admission of Exhibitors after 9 A.M. (exclusive of the opening day) will be regulated by tickets distributed with the entry cards on the morning of May 22nd, as may be arranged by a Sub-Committee specially appointed. Exhibitors of single specimens, cut flowers, single dishes of fruits, seedlings, and uninvited articles will not be entitled to this admission.

* [NOTE.—The *Gardeners' Tickets* would have been more convenient had they been of a more distinct character; and admission should have been arranged for at one particular entrance. The time for purchase was extended to May 8.]

† [NOTE.—The show was kept open five days longer at the following rates of admission:—On Saturday, May 26, 2*s*. 6*d*.; on Monday, May 28, 1*s*.; on Tuesday, 1*s*.; on Wednesday, 1*s*.; and on Thursday, the final closing day, 1*s*.]

CATALOGUE
OF
ENTRIES FOR THE EXHIBITION,
AND
SCHEDULE OF PRIZES.

*** *A Committee consisting of M. de Candolle, Mr. James Bateman, and Mr. W. Wilson Saunders, was appointed to decide on any questions on which the Jurors might think themselves without special instructions.*

§ I.—GENERAL COLLECTIONS.

Steward:—PROFESSOR BENTLEY, F.L.S.

Jurors.

Classes 1 to 6.	M. Van Houtte, Ghent. Dr. Moore, Glasnevin. Mr. Smith, Kew. Mr. A. Henderson, Wellington Road.	Classes 14 to 18.	M. Barillet, Paris. Mr. Mitchell, Hamilton. Mr. Findlay, Manchester. Mr. Brown, Tooting.
Classes 7 to 13.	M. Ortgies, Zurich. Mr. W. Barnes, Camberwell. Mr. Bruce, Tooting. Mr. Walker, Upper Clapton.	Classes 19 to 26.	Mr. L. Booth, Hamburg. Mr. Masters, Canterbury. Mr. Shaw, Manchester. Mr. Methven, Edinburgh.

CLASS.

(1.)—6 NEW PLANTS, in or out of Flower, introduced into Europe by the exhibitor, and not found in commerce.—1st Prize, 6*l.*; 2nd Prize, 5*l.*; 3rd Prize, 4*l.*; 4th Prize, 3*l.* (*Open*).

M. JOHN LINDEN, Royal Zoological Gardens, Brussels. [*1st Prize.*]
Anthurium regale, *Lind.*—Eastern Peru, 1866.
Bignonia ornata, *Lind.*—Rio Negro, 1866.
Cyanophyllum spectandum, *Lind.*—Maynas, 1866.
Dichorisandra musaica, *Lind.*—Maynas, 1866.
Maranta (Calathea) Lindeni, *Wallis.*—Peru, 1866.
Philodendron Lindeni, *Wallis.*—Ecuador, 1866.

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*2nd Prize.*]
Maranta Veitchii.—Peru, 1864.
Aphelandra sp. nov.—Peru, 1866.
Aralia sp. nova.—New Caledonia, 1866.
Acalypha tricolor.—New Hebrides, 1866.
Rhododendron Brookeanum.—Borneo.
Dracæna albo-marginata.—Solomon Islands, 1866.

M. JOHN LINDEN, Royal Zoological Gardens, Brussels. [*3rd Prize.*]
Echites rubro-venosa, *Lind.*—Rio Negro, 1866.
Eranthemum igneum, *Lind.*—Maynas, 1866.
Maranta illustris, *Lind.*—Upper Amazon, Peru, 1866.
Maranta roseo-picta, *Lind.*—Upper Amazon, 1866.
Psychotria nivosa, *Lind.* (Rudgea nivosa, *Berk.*)—Campos de Parana, 1866.
Tradescantia undata, *Lind.*—Peru, 1866.

[NOTE.—In Classes 1–4 the word *New* would have been better omitted, as being unnecessary, and practically undefinable.]

CLASS 1.

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*4th Prize.*]
Aralia sp. nov.—New Caledonia, 1866.
Coleus sp.—New Caledonia, 1866.
Dieffenbachia Pearcei.—Peru, 1866.
Croton sp.—New Hebrides, 1866.
Phyllanthus variegatus.
Croton sp.—Solomon Islands, 1866.

M. JOHN LINDEN, Royal Zoological Gardens, Brussels.
Apocynea nova.—Eastern Peru, 1866.
Gesneracea nova.—Peru, 1866.
Maranta princeps, *Lind.*—Upper Amazon, 1866.
Maranta velutina, *Lind.*—Upper Amazon, 1866.
Maranta virginalis, *Lind.*—Eastern Peru, 1866.
Smilax marmorea, *Lind.*—Rio Negro, 1866.

(2.)—3 NEW PLANTS, distinct, shown for the first time in Flower.—1st Prize, 4*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*1st Prize.*]
Aphelandra sp.—Peru, 1865.
Palava flexuosa.—Peru, 1866.
Begonia Pearcei.—Peru, 1865.

Mr. WILLIAM BULL, King's Road, Chelsea. [*2nd Prize.*]
Bertolonia margaritacea.—Brazil, 1864.
Malope australis.—Australia, 1865.
Siphocampylus fulgens.—S. America, 1864.

(3.)—1 NEW PLANT, in Flower, introduced into Europe by the exhibitor, and not found in commerce.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

M. JOHN LINDEN, Brussels. [*1st Prize.*]
Psychotria nivosa, *Lind.* (Rudgea nivosa, *Berk.*)—Prov. of St. Catherine, Campos del Parana, 1866.

Mr. JOHN STANDISH, Royal Nursery, Ascot, Berks; and 52, St. George's Place, Knightsbridge. [*2nd Prize.*]
Clematis Fortunei cœrulea.—Japan, 1862.

Messrs. JAMES VEITCH & SONS, Chelsea. [*3rd Prize.*]
Darwinia fimbriata.—Australia, 1865.

M. JOHN LINDEN, Brussels.
Gesneracea nova.—Oriental Peru, 1866.

J. A. TINNÉ, ESQ., Briarley, Aigburth. (G. Forbes, gardener.)
Tinnea æthiopica, *Kotschy & Peyritsch.*—Central Africa, 1865. A Shrub, with deep coloured reddish-brown violet-scented flowers, constituting a new genus.

Messrs. JAMES VEITCH & SONS, Chelsea.
Eranthemum sp.—Solomon Islands.

M. AMBROISE VERSCHAFFELT, 50, Rue du Chaume, Ghent.
Gomphocarpus grandiflorus.—South Africa, 1866.

HORATIO L. MICHOLLS, Esq., Summerfield, Bowdon. (T. Baines, gardener.)
Ixora species, No. 4.—Moulmein.

(4.)—1 NEW PLANT, not in Flower, introduced into Europe by the exhibitor, and not found in commerce.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

M. JOHN LINDEN, Brussels. [*1st Prize.*]
Dichorisandra musaica, *Lind.*—Maynas, 1866.

M. JOHN LINDEN, Brussels. [*2nd Prize.*]
Maranta (Calathea) Lindeni, *Wallis.*—Eastern Peru, 1866.

Messrs. JAMES VEITCH & SONS, Chelsea. [*2nd Prize.*]
Maranta Veitchii.—Peru, 1864.

CLASS 4.

Messrs. **James Veitch & Sons**, Chelsea. [*3rd Prize.*]
Thuja sp.—Japan, 1864.

Mr. **John Standish**, Royal Nursery, Ascot, Berks; and 52, St. George's Place, Knightsbridge. [*3rd Prize.*]
Athyrium Göringianum pictum.—China or Japan, 1862.

Mr. **R. M. Stark**, Edinburgh.
Aspidium fragrans.

W. B. **Kellock**, Esq., Stamford Hill, London.
Euphorbia sp.; introduced from Japan, 1864; native country probably Mexico.

J. A. **Tinné**, Esq., Briarley, Aigburth. (G. Forbes, gardener.)
Gardenia Tinneana, *Kotschy & Peyritsch.*—Central Africa, 1865. A herbaceous plant with subterraneous stems.

Messrs. **Thibaut & Keteleer**, Rue de Charonne, 146, Paris.
Rhus glabra laciniata.—North America, 1863.

Mr. **George Davies**, Stanley Nurseries, Old Swan, Liverpool.
Thuja Stanleyana; raised from seed received from Australia in 1854; hardy, having stood out, without protection or injury, the severe winter of 1860.

M. **John Linden**, Brussels.
Eranthemum igneum, *Lind.*—Maynas, 1866.

M. **Ambroise Verschaffelt**, Ghent.
Zamia villosa (*Hort. Versch.*)—South Africa, 1866.

Messrs. **James Veitch & Sons**, Chelsea.
Croton sp.—New Hebrides, 1866.
Aphelandra sp. nova.—Peru, 1866.

Mr. **Thomas Shortt**, Fulham.
Livistonia Dennisonii.—Clarence River, Australia, 1865.
Lomaria gibba var. Bellii.—New Caledonia, 1865.

Mr. **Robert T. Veitch**, Nurseryman, Exeter.
Adiantum farleyense.

Mr. **William Bull**, King's Road, Chelsea.
Phajus grandifolius fol. variegatis.—China, 1865.

*** The Jurors awarded two Second and two Third Prizes in this Class.

(5.)—12 New Plants, of any description, in or out of Flower, distinct.—1st Prize, 6*l.*; 2nd Prize, 5*l.*; 3rd Prize, 4*l.*; 4th Prize, 3*l.* (*Open.*)

Messrs. **James Veitch & Sons**, King's Road, Chelsea. [*1st Prize.*]

Coleus Gibsoni.—New Caledonia, 1866.
Darwinia fimbriata.—Australia, 1865.
Bertolonia guttata.—Madagascar, 1865.
Aracea.—Banks' Island, 1866.
Aphelandra sp. nov.—Peru, 1866.
Maranta Veitchii.—Peru, 1864.
Begonia Pearcei.—Peru, 1865.
Acalypha tricolor.—New Hebrides, 1866.
Bertolonia sp.—Peru, 1866.
Primula cortusoides amœna.—Japan, 1863.
Aralia sp. nov.—New Caledonia, 1866.
Dieffenbachia Pearcei.—Peru, 1866.

M. **John Linden**, Royal Zoological Gardens, Brussels. [*2nd Prize.*]
Anthurium regale, *Lind.*—Peru, 1866.
Bignonia ornata, *Lind.*—Rio Negro, 1866.
Eranthemum igneum, *Lind.*—Peru, 1866.
Echites rubro-venosa, *Lind.*—Rio Negro, 1865.
Dieffenbachia Wallisii, *Lind.*—Upper Amazon, 1866.
Manettia metallica, *Lind.*—Peru, 1866.
Maranta virginalis, *Lind.*—Maynas, 1866.
Maranta roseo-picta, *Lind.*—Upper Amazon, 1865.
Dichorisandra vittata, *Lind.*—Rio Negro, 1865.
Philodendron Lindeni, *Wallis.*—Ecuador, 1866.
Scindapsus pictus, *Ad. Brongn.*—Philippine Isl., 1866.
Tradescantia undata, *Lind.*—Maynas, 1866.

CLASS

(6.)—6 **New Plants**, of any description, in or out of Flower, distinct.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open, the exhibitor not showing in No. 5.*)

Mr. William Bull, King's Road, Chelsea. [*1st Prize.*]

Eranthemum argyroneurum.—Peru, 1865.
Urospatha splendens.—Para, 1864.
Urospatha spectabilis.—Para, 1864.
Bertolonia margaritacea.—Brazil, 1864.
Dieffenbachia eburnea.—S. America, 1865.
Samyda nobilis.—St. Catharine's, 1864.

Mr. B. S. Williams, Victoria and Paradise Nurseries, Holloway. [*3rd Prize.*]

Dieffenbachia gigantea
Gleichenia sp.
Statice robusta.
Teleianthera ficoidea versicolor.
Maranta splendida
Calamus Impératrice Marie.

Messrs. Arthur Henderson & Co., Pine-apple Nursery, Edgware Road.

Rhynchospermum jasminoides variegatum.
Gardenia florida variegata.
Peperomia arifolia.
Bambusa Fortunei variegata.
Rhapis flabelliformis foliis variegatis.
Peperomia maculosa.

Mr. R. M. Stark, Edinburgh.

Asclepias quadrifolia.
Callirhöe triangularis.
Pyxidanthera barbulata.
Viola delphinifolia.
Echium angustifolium.
Œnothera tricolor.

Mr. John Standish, Royal Nursery, Ascot, Berks; and 52, St. George's Place, Knightsbridge.

Juglans macrophylla.—China, 1851.
Lomaria dura.—Chatham Islands, 1859.
Retinospora filiformis.—Japan, 1863.
Pinus tabulæformis.—Tartary, 1862.
Rhododendron Lindleyanum.—Bhotan, China, &c., 1854.
Clematis Fortunei cœrulea.—Japan, 1862.

*** Second Prize withheld by the Jurors.

(7.)—16 **Stove or Greenhouse Plants**, in Flower, distinct.—1st Prize, 25*l.*; 2nd Prize, 20*l.*; 3rd Prize, 15*l.*; 4th Prize, 10*l.*—(*Amateurs.*)

H. L. Micholls, Esq., Summerfield, Bowdon. (T. Baines, gard.) [*1st Prize.*]

Azalea (indica) Iveryana.
Azalea (indica) Extranii.
Azalea (indica) Criterion.
Erica Cavendishiana.
Erica ventricosa coccinea minor.
Erica tricolor Eppsii.
Ixora coccinea.
Ixora aurantiaca.
Genetyllis tulipifera.
Acrophyllum venosum.
Eriostemon buxifolius, 8*l.*
Franciscea confertiflora.
Aphelexis macrantha purpurea.
Dipladenia crassinoda.
Epacris Eclipse.
Boronia pinnata, 8*l.*

Mrs. Tredwell, St. John's Lodge, Norwood. (B. Peed, gard.) [*2nd Prize.*]

Allamanda grandiflora.
Erica Cavendishiana.
Eriostemon intermedius.
Eriostemon buxifolius.
Epacris miniata splendens.
Azalea (indica) Criterion.
Azalea (indica) Gledstanesii (union plant).
Chorozema cordatum splendens.
Tetratheca ericifolia.
Aphelexis sesamoides superba.
Polygala acuminata.
Dracophyllum gracile.
Pimelea Hendersoni.
Genetyllis Hookeriana.
Acrophyllum venosum.
Ixora alba.

CLASS 7.

J. PHILPOTT, Esq., Stamford Hill. (J. Wheeler, gardener.) [3rd Prize.]

Azalea (indica) Duchess Adelaide de Nassau.
Azalea (indica) purpurea macrantha.
Aphelexis rosea.
Acrophyllum venosum.
Erica Cavendishiana.
Erica mutabilis.
Epacris miniata.
Eriostemon buxifolius.
Eriostemon pulchellus.
Genetyllis fuchsioides.
Boronia serrulata.
Dracophyllum gracile.
Leschenaultia formosa.
Chorozema varium nanum elegans.
Clerodendron Thomsonæ.
Franciscea eximia.

The EARL PERCY, Albury Park, Guildford. (W. Kemp, gard.) [4th Prize.]

Erica Cavendishiana.
Coleonema rubrum.
Aphelexis humilis.
Rhynchospermum jasminoides.
Azalea Chelsoni.
Hoya Paxtoni.
Clerodendron Thomsonæ.
Leschenaultia biloba major.
Dracophyllum gracile.
Acrophyllum venosum.
Pimelea spectabilis.
Pimelea Hendersoni.
Polygala Dalmaisiana.
Boronia serrulata.
Erica westphalingia.
Diosma speciosa.

Sir F. H. GOLDSMID, Bart., M.P., St. John's Lodge, Regent's Park. (George Wheeler, gardener.)

Azalea Louise Margottin.
Pimelea Hendersoni.
Genetyllis macrostegia.
Gompholobium polymorphum splendens.
Aphelexis macrantha purpurea.
Boronia serrulata.
Chorozema Henchmanni.
Tetratheca verticillata.
Azalea Broughtoni.
Azalea vivicans.
Erica Cavendishiana.
Eriostemon neriifolius.
Erica coccinea minor.
Epacris miniata splendens.
Boronia tetrandra.
Franciscea eximia.
Polygala Dalmaisiana.
Statice Holfordii.
Statice profusa.

(8.)—12 STOVE or GREENHOUSE PLANTS, in Flower, distinct.—1st Prize, 15*l.*; 2nd Prize, 10*l.*; 3rd Prize, 7*l.*; 4th Prize, 5*l.* (*Nurserymen.*)

Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith. [1st Prize.]

Azalea (indica) Iveryana.
Azalea (indica) Juliana.
Erica ventricosa coccinea minor.
Boronia serrulata.
Eriostemon buxifolius.
Aphelexis macrantha superba.
Acrophyllum venosum.
Dracophyllum gracile.
Adenandra fragrans.
Erica Cavendishiana.
Medinilla magnifica.
Genetyllis tulipifera.

Mrs. E. COLE & SONS, Withington, near Manchester. [2nd Prize.]

Franciscea confertiflora.
Ixora coccinea.
Eriostemon neriifolius.
Erica Cavendishiana.
Erica depressa.
Phænocoma prolifera Barnesii.
Pimelea Hendersoni.
Polygala Dalmaisiana.
Aphelexis macrantha purpurea.
Aphelexis macrantha rosea
Azalea (indica) Juliana.
Azalea (indica) variegata.

Mr. O. RHODES, Nurseryman, Sydenham. [3rd Prize.]
(No particulars furnished.)

(9.)—10 STOVE or GREENHOUSE PLANTS, in Flower, distinct.—1st Prize, 15*l.*; 2nd Prize, 10*l.*; 3rd Prize, 7*l.*; 4th Prize, 5*l.* (*Amateurs.*)

J. G. BARCLAY, Esq., Leyton. (D. Donald, gardener.) [1st Prize.]

Adenandra fragrans.
Statice Holfordii.
Erica tricolor elegans.
Polygala Dalmaisiana.
Rhynchospermum jasminoides.
Stephanotis floribunda.
Epacris grandiflora.
Azalea (indica) Gledstanesii.
Eriostemon linearifolius.
Allamanda cathartica.

T. CANNING, Esq., Westbury-on-Trym, Bristol. (A. Morse, gard.) [2nd Prize.]

Ixora javanica.
Clerodendron Thomsonæ.
Erica Cavendishiana.
Erica tricolor elegans.
Aotus gracillima.
Leschenaultia biloba major.
Statice profusa.
Pimelea Hendersoni.
Pimelea elegans.
Azalea (indica) Extranii.

CLASS 9.

J. J. BLANDY, Esq., Highgrove, Reading. (A. Ingram, gr.) [*3rd Prize.*]

Erica Cavendishiana.	Clerodendron Thompsonæ.	Azalea (indica) carminata.
Erica coccinea minor.	Aphelexis purpurea grandiflora.	Dracophyllum gracile.
Rhynchospermum jasminoides.	Aphelexis macrantha rosea.	Leschenaultia intermedia.
		Allamanda Aubletii.

The EARL of LOVELACE, East Horsley Towers. (Wm. Kaile, gr.) [*4th Prize.*]

Franciscea eximia.	Aphelexis macrantha purpurea.	Rhynchospermum jasminoides.
Vinca rosea alba.	Pleroma elegans.	Azalea (indica) Iveryana.
Adenandra speciosa.	Polygala Dalmaisiana.	Erica Cavendishiana.
Eriostemon pulchellus.		

EDWARD WOOD, Esq., Newbold Revel, Rugby. (T. Coysh, gardener.)

Allamanda neriifolia.	Begonia nitida alba.	Begonia semperflorens.
Statice Holfordii.	Polygala Dalmaisiana.	Erica tricolor Alberti.
Statice macroptera.	Rhynchospermum jasminoides.	Boronia tetrandra.
Azalea (indica) Model.		

Entered but did not exhibit:—

T. P. W. BUTT, Esq., Arle Court, Cheltenham. (James May, gardener.)

Ixora coccinea.	Erica Cavendishiana.	Leschenaultia biloba major.
Ixora javanica floribunda.	Boronia serrulata.	Rhynchospermum jasminoides.
Franciscea eximia.	Franciscea calycina.	
Erica tricolor Wilsoni.	Chorozema varium nanum.	

(10.)—6 STOVE or GREENHOUSE PLANTS, in Flower, distinct.—1st Prize, 7*l.*; 2nd Prize, 5*l.*; 3rd Prize, 4*l.*; 4th Prize. 2*l.* (*Amateurs, not showing in Nos.* 7 *or* 9.)

W. R. G. FARMER, Esq., Cheam. (S. M. Carson, gardener.) [*1st Prize.*]

Pimelea Hendersoni.	Polygala Dalmaisiana.	Eriostemon myoporoides.
Azalea (indica) Apollo.	Rhododendron formosum.	Eriostemon intermedius.

JULIUS SICHEL, Esq., Lark Hill, Timperley. (J. Stevenson, gr.) [*1st Prize.**]

Aphelexis macrantha purpurea.	Dracophyllum gracile.	Azalea Sir Charles Napier.
Pimelea mirabilis.	Bougainvillæa glabra.	Stephanotis floribunda.

WM. LEAF, Esq., Park Hill, Streatham. (Thomas Page, gr.) [*2nd Prize.*]

Allamanda grandiflora.	Eriostemon intermedius.	Erica Cavendishiana.
Acrophyllum venosum.	Genetyllis tulipifera.	Azalea (indica) Iveryana.

J. MCHENRY, Esq., Oak Lodge, Kensington. (A. Wilkie, gr.) [*3rd Prize.*]

Aphelexis humilis.	Genetyllis Hookeri.	Azalea (indica) Perryana.
Dracophyllum gracile.	Chorozema varium nanum.	Rhynchospermum jasminoides.

T. HOBSON, Esq., Pownall Hall, Wilmslow, Cheshire. (W. Kelland, gardener.)

Azalea (indica) Iveryana.	Genetyllis tulipifera.	Rhynchospermum jasminoides.
Bougainvillæa glabra.	Boronia serrulata.	Erica tricolor Alberti.
Erica depressa.		

Entered but did not exhibit:—

Miss SAVAGE, Tetbury Lodge, Cheltenham. (James Cypher, gardener.)

Erica Cavendishiana, 6 ft. high, 5 ft. across.	Aphelexis macrantha rosea, 4 ft. high, 4 ft. over.
Genetyllis tulipifera, 5 ft. high, 5 ft. across.	Polygala, 4 ft. high, 3½ ft. over.
Red Azalea, 5 ft. high, 4½ ft. over.	Leschenaultia biloba major, 3 by 3.

(11.)—6 STOVE or GREENHOUSE PLANTS, in Flower, distinct.—1st Prize, 6*l.*; 2nd Prize, 5*l.*; 3rd Prize, 4*l.*; 4th Prize, 3*l.* (*Nurserymen, not showing in No.* 8.)

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [*1st Prize.*]

Genetyllis Hookeri.	Eriostemon buxifolium.	Azalea Empress Eugénie.
Rhynchospermum jasminoides.	Chorozema varium Chandleri.	Pimelea Hendersoni.

* Duplicate award owing to an official error (through incomplete address) in entering the collection in Class 11, in which the Jurors awarded it the 1st prize.

CLASS 11.

Messrs. S. GLENDINNING & SONS, Nurserymen, Chiswick. [*2nd Prize.*]

Genetyllis tulipifera.	Aphelexis macrantha rosea.	Diosma capitata.
Vinca rosea oculata.	Acrophyllum venosum.	Pimelea Hendersoni.

Messrs. THOMAS JACKSON & SON, Nurserymen, Kingston. [*3rd Prize.*]

Erica Cavendishiana.	Aphelexis macrantha purpurea.	Eriostemon linearifolius.
Imantophyllum miniatum, 25*l.*	Clerodendron Kæmpferi.	Azalea Bianca, 7*l.* 7*s.*

Mr. R. BAXINDINE, Nurseryman, Guildford. [*4th Prize.*]

Bossiæa Hendersoni.	Epacris miniata splendens.	Erica Cavendishiana.
Chorozema varium Chandleri.	Rhynchospermum jasminoides	Polygala oppositifolia.

Mr. W. C. DRUMMOND, Nurseryman, Bath.

Erica Cavendishiana.	Phænocoma prolifera Barnesii	Pimelea elegans.
Rhynchospermum jasminoides.	Genetyllis tulipifera.	Tetratheca verticillata.

Messrs. ARTHUR HENDERSON & Co., Pine Apple Nursery, Edgware Road.

Boronia pinnata.	Oxylobium arborescens.	Rhynchospermum jasminoides.
Pimelea spectabilis.	Dracophyllum gracile.	Boronia pinnata.

Mr. J. RANSLEY TANTON, Nurseryman, Epsom, Surrey.

Aphelexis macrantha purpurea.	ChorozemaLawrenceanum.	Polygala Dalmaisiana.
Azalea (indica) Gem.	Erica ventricosa breviflora.	Dracophyllum gracile.

Entered but did not exhibit :—
Messrs. CUTBUSH & SON, Nurserymen, Highgate.

(12.)—6 STOVE OR GREENHOUSE CLIMBING PLANTS, in Flower, distinct.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Entered but did not exhibit :—
Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith.

(13.)—The finest STOVE OR GREENHOUSE PLANT, in or out of Flower, and not under 12 feet in height.—1st Prize, 5*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*1st Prize.*]
Brownea erecta.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [*2nd Prize.*]
Rhopala De Jonghei.

Mr. WILLIAM BULL, F.L.S., King's Road, Chelsea. [*3rd Prize.*]
Araucaria excelsa, 20 feet high, 10 guineas.

JAMES YATES, Esq., Lauderdale House, Highgate. (W. Taylor, gardener.)
Cycas circinalis.

Messrs. JAMES VEITCH & SONS, Chelsea.
Araucaria Cunninghamii.

Mr. WILLIAM BULL, F.L.S., King's Road, Chelsea.
Dracæna australis, 15 feet high, 10 guineas.
Aralia quinquefolia, 13 feet high, 5 guineas.

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener.)
Rhopala corcovadensis.

(14.)—12 FINE-FOLIAGED STOVE OR GREENHOUSE PLANTS, without reference to Flowers, distinct, including Variegated Plants, Begonias and Caladiums excepted.—1st Prize, 15*l.*; 2nd Prize, 10*l.*; 3rd Prize, 5*l.*; 4th Prize, 3*l.* (*Amateurs.*)

CLASS 14.

H. L. MICHOLLS, Esq., Summerfield, Bowdon. (T. Baines, gr.) [*1st Prize.*]

Croton variegatum.
Croton variegatum longifolium.
Alocasia metallica.
Theophrasta imperialis.
Rhopala corcovadensis.
Dasylirion acrotrichum.
Cordyline indivisa.
Yucca variegata pendula.
Aralia leptophylla.
Anthurium magnificum.
Dicksonia antarctica pendula.
Gleichenia Speluncæ.

J. YATES, Esq., Lauderdale House, Highgate. (W. Taylor, gr.) [*2nd Prize.*]

Dion edule.
Cycas revoluta.
Chamærops humilis.
Encephalartos latifrons.
Zamia Calocomya.
Ceratozamia mexicana.
Littæa juncea.
Sabal Blackburnianum.
Yucca aloifolia.
Rhopala corcovadensis.
Encephalartos horridus.
Croton variegatum.

The DUKE OF NORTHUMBERLAND, Syon House, Isleworth. (G. Fairbairn, gardener.) [*3rd Prize.*]

Alocasia Lowii.
Alocasia macrorhiza.
Alocasia metallica.
Anthurium acaule.
Coccobola sp.
Croton angustifolium.
Cycas revoluta.
Dracæna sp.
Maranta zebrina.
Pandanus elegantissimus.
Thamnopteris Nidus.
Zamia lanuginosa.

The RIGHT HON. LOUISA, LADY ASHBURTON, Melchet Park, Romsey, Hants. (William Cross, gardener.) [*4th Prize.*]

Alocasia metallica.
Dracæna terminalis.
Dicksonia squarrosa.
Sphærogyne latifolia.
Maranta fasciata.
Ananassa sativa variegata.
Cibotium princeps.
Dracæna australis Veitchii.
Corypha australis.
Cycas revoluta.
Cyperus alternifolius variegatus.
Latania Jenkinsii.

Madame C. LEGRELLE D'HANIS, Berchem, Anvers. (F. Vervoort, gr.) [*4th Prize.*]*

Areca Verschaffeltii.
Theophrasta macrophylla.
Yucca cornuta.
Astrocaryum rostratum.
Latania borbonica.
Arenga saccharifera.
Chamærops argentea.
Chamærops excelsa.
Ceratozamia mexicana.
Areca rubra.
Pandanus utilis.
Corypha australis.

J. W. TAYLOR, Esq., River House, Woodberry Down, Seven Sisters Road, Stoke Newington. (Henry Barnard, gardener.)

Alocasia metallica.
Anthurium magnificum.
Croton pictum.
Chamærops humilis.
Cordyline indivisa.
Sphærostema marmoratum.
Dracæna Draco.
Dicksonia antarctica.
Pandanus elegantissimus.
Pandanus javanicus variegatus.
Philodendron pinnatifolium.
Aspidistra lurida variegata

*** Extra 4th Prize allowed by the Committee, in consideration of Yucca cornuta not being regarded as hardy in Belgium.

(15.)—12 FINE-FOLIAGED STOVE OR GREENHOUSE PLANTS, without reference to Flowers, distinct, including Variegated Plants, Begonias and Caladiums excepted.—1st Prize, 15*l.*; 2nd Prize, 10*l.*; 3rd Prize, 5*l.*; 4th Prize, 3*l.* (*Nurserymen.*)

Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith. [*1st Prize.*]

Alocasia metallica.
Alocasia Lowii.
Theophrasta imperialis.
Latania rubra.
Croton variegatum.
Pandanus elegantissimus.
Oreopanax dactylifolium.
Rhopala corcovadensis.
Rhopala De Jonghei.
Cyathea Smithii.
Cibotium princeps.
Yucca aloifolia variegata.

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*2nd Prize.*]

Cycas revoluta.
Croton pictum.
Croton variegatum.
Pandanus distichus (Veitchii.)
Pandanus reflexus.
Theophrasta imperialis.
Sabal umbraculifera.
Seaforthia elegans.
Rhopala corcovadensis.
Anthurium magnificum.
Dracæna indivisa lineata.
Corypha australis.
Latania borbonica.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [*3rd Prize.*]

Cibotium princeps.
Dracæna lineata.
Cordyline indivisa.
Yucca aloifolia variegata.
Theophrasta imperialis.
Latania borbonica.
Pandanus javanicus variegatus.
Dion edule.
Cycas circinalis.
Croton variegatum.
Croton angustifolium.
Alocasia metallica.

CLASS 15.

M. JOHN LINDEN, Royal Zoological Gardens, Brussels.

Colea Commersoni.	Stadmannia sorbifolia.	Theophrasta imperialis.
Crescentia regalis.	Theophrasta angustifolia.	Theophrasta latifolia.
Oreopanax dactylifolium.	Theophrasta attenuata.	Theophrasta nobilis.
Oreopanax platanifolium.	Theophrasta crassipes.	Theophrasta undulata.

Messrs. ARTHUR HENDERSON & Co., Pine Apple Place.

Oreopanax dactylifolium.	Alocasia metallica.	Cyanophyllum magnificum.
Jacaranda filicifolia.	Rhopala magnificans.	Pandanus utilis.
Pandanus elegantissimus.	Rhopala corcovadensis.	Pandanus ornatus.
Hippomane longifolia.	Croton angustifolium.	
Acer atropurpureum.		

(16.)—6 FINE-FOLIAGED STOVE or GREENHOUSE PLANTS, without reference to Flowers, distinct, including Variegated Plants, Begonias and Caladiums excepted.—1st Prize, 7*l.*; 2nd Prize, 5*l.*; 3rd Prize, 3*l.*; 4th Prize, 2*l.* (*Amateurs, not showing in No.* 14.)

JULIUS SICHEL, Esq., Lark Hill, Timperley. (J. Stevenson, gr.) [*1st Prize.*]

Alocasia metallica.	Croton angustifolium.	Cibotium princeps.
Croton variegatum.	Yucca aloifolia variegata.	Latania borbonica.

Miss BURDETT COUTTS, Holly Lodge, Highgate. (C. Hutt, gr.) [*2nd Prize.*]

Latania borbonica.	Pandanus utilis.	Cyathea dealbata.
Cibotium Schiedei.	Cycas revoluta.	Maranta zebrina.

W. H. STONE, Esq., M.P., Leigh Park, Havant. (G. Young, gr.) [*3rd Prize.*]

Latania rubra.	Cordyline indivisa.	Cycas revoluta.
Theophrasta macrophylla.	Dracæna umbraculifera.	Alsophila australis.

J. J. BLANDY, Esq., Highgrove, Reading. (A. Ingram, gr.) [*4th Prize.*]

Croton variegatum.	Anthurium magnificum.	Sanseviera javanica.
Croton pictum.	Yucca aloifolia variegata.	Alocasia Lowii.

Mrs. ALSTON, Elmdon Hall, near Birmingham. (Wm. Brown, gardener.)

Croton variegatum.	Maranta Warscewiczii.	Dracæna ferrea.
Maranta zebrina.	Sphærogyne latifolia.	Cyanophyllum magnificum

J. G. BARCLAY, Esq., Leyton. (D. Donald, gardener.)

Croton variegatum.	Beaucarnea glauca.	Pandanus elegantissimus.
Cordyline indivisa.	Neottopteris vulgaris.	Yucca aloifolia variegata.

W. B. KELLOCK, Esq., Stamford Hill, London.

Puya coarctata.	Pandanus elegans.	Lomatophyllum borbonicum.
Yucca tricolor.	Ananassa sativa variegata.	Dracæna Draco.

EDWARD WOOD, Esq., Newbold Revel, Rugby. (T. Coysh, gardener.)

Maranta zebrina.	Hydrangea japonica variegata.	Hibiscus sinensis variegatus.
Dracæna terminalis.		Croton variegatum.
Dracæna marginata.		

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener.)

Latania sp.	Dieffenbachia maculata.	Alocasia metallica.
Maranta zebrina.	Yucca aloifolia variegata.	Colocasia albo-violacea.

P. L. HINDS, Esq., The Lodge, Byfleet, Surrey. (J. Carr, Gardener.)

Pandanus javanicus variegatus.	Gymnogramma aurea major.	Laurus Cassia.
Alocasia metallica.	Musa vittata variegata.	Dracæna terminalis.

Sir F. H. GOLDSMID, Bart., M.P., St. John's Lodge, Regent's Park. (George Wheeler, gardener.)

Dicksonia antarctica.	Alocasia metallica.	Dracæna Veitchii.
Pandanus jav. variegatus.	Croton pictum.	Yucca aloifolia variegata.

CLASS 16.

Entered but did not exhibit:—

T. HOBSON, Esq., Pownall Hall, Wilmslow, Cheshire. (W. Kelland, gardener.)

Croton variegatum.
Croton angustifolium.
Anthurium magnificum.
Cordyline indivisa.
Yucca quadricolor.
Monstera deliciosa.

J. PHILPOTT, Esq., Stamford Hill. (J. Wheeler, gardener.)

(17.)—12 VARIEGATED TENDER PLANTS, distinct, Caladiums and Begonias excepted.—1st Prize, 10*l.*; 2nd Prize, 7*l.*; 3rd Prize, 5*l.*; 4th Prize, 3*l* (*Open.*)

Messrs. JAMES VEITCH & SONS, Royal Exotic Nursery, Chelsea. [*1st Prize.*]

Croton longifolium.
Croton pictum.
Phormium tenax variegatum.
Maranta Veitchii.
Maranta fasciata.
Dieffenbachia variegata.
Alocasia macrorhiza variegata.
Cissus discolor.
Cyperus alternifolius variegatus.
Ananassa sativa variegata.
Yucca aloifolia variegata.
Maranta vittata.

Mr. B. S. WILLIAMS, Victoria & Paradise Nurseries, Holloway. [*2nd Prize.*]

Yucca Stokesii.
Yucca quadricolor.
Yucca aloifolia variegata.
Phormium tenax variegatum.
Pavetta borbonica.
Croton variegatum.
Croton pictum.
Ananassa sativa variegata.
Aralia Sieboldii variegata.
Franciscea confertiflora variegata.
Dracæna ferrea grandis.
Gymnostachium Verschaffeltii.

MME. C. LEGRELLE D'HANIS, Berchem, Anvers. (F. Vervoort, gr.) [*4th Prize.*]

Dieffenbachia gigantea.
Dracæna terminalis.
Dracæna ferrea.
Rhapis flabelliformis foliis variegatis.
Croton pictum variegatum.
Croton longifolium variegatum.
Aspidistra elatior foliis variegatis.
Anthurium magnificum.
Maranta zebrina.
Cossignea borbonica.
Dracæna Cooperi.
Campylobotrys discolor.

Messrs. ARTHUR HENDERSON & Co., Pine-apple Nursery, Edgeware Road.

Maranta fasciata.
Croton variegatum.
Croton pictum.
Cissus porphyrophyllum.
Cissus discolor.
Alocasia macrorhiza variegata.
Pandanus javanicus variegatus.
Alocasia zebrina.
Aralia Sieboldii variegata.
Acer polymorphum marginatum.
Musa zebrina.
Musa vittata (new.)

Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith.

Ananassa sativa variegata.
Ananassa pinangensis variegata.
Yucca quadricolor.
Yucca aloifolia variegata.
Croton pictum.
Croton variegatum.
Phormium tenax variegatum.
Agave americana variegata.
Agave americana striata.
Agave americana mediopicta.
Dracæna terminalis stricta.
Dieffenbachia sp. N. Grenada.

⁎ Third Prize withheld by the Jurors.

(18.)—20 ECONOMICAL and MEDICINAL PLANTS, distinct.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

M. JOHN LINDEN, Royal Zoological Gardens, Brussels. [*1st Prize.*]

Calophyllum Calaba.—East Indian Tacamahac.—East Indies.
Calophyllum Limoncillo.—Gamboge from Chiapas.
Carapa guianensis.—Carapa oil.—Guinea.
Caryocar brasiliensis.—Pekea nut.—Brazils.
Caryophyllus aromaticus.—Clove tree.—Moluccas.
Castilloa elastica.—India rubber (Ule).—South America.
Cinchona nobilis.—Quinquina.—Ecuador.
Cinnamomum sericeum.—Japanese Cinnamon.
Citrosma Lindeni, *Seemann*.—New Tea from South Brazils.
Erythroxylon Coca.—the celebrated Coca from Peru.
Guaiacum officinale.—Lignum vitæ.—Venezuela.
Hæmatoxylon campechianum.—Logwood.—Tabasco.
Machærium firmum.—the true Jacaranda or Palissandra.—Brazils.
Myrica pimentoides.—Pimento.—Guayana.
Myristica grandifolia.—Nutmeg, from Guaiana.
Myroxylon balsamiferum.—Tolu balsam.—Colombia.

Nectandra Puchury.—Pichurim Bean —Rio Negro.
Sapota Mülleri.—Gutta percha, from Guayana.
Strychnos Cabalonga.—Nux vomica, from Chiapas.
Theobroma Cacao.—Cocoa.—South America.

Mr. WILLIAM BULL, King's Road, Chelsea. [*2nd Prize.*]

Amomum Cardamomum.—Cardamon.—East Indies.
Andropogon Schœnanthus.—Lemon Grass.—East Indies.
Arenga saccharifera.—Sugar Palm.—East Indies.
Bixa Orellana.—Arnotto dye plant.—Tropical America.
Caryophyllus aromaticus.—Clove tree.—Moluccas.
Cinchona nobilis.—Bark.—Tropical America.
Cinnamomum verum.—Cinnamon.—Ceylon.
Coffea arabica.—Coffee.—Yemen.
Dorstenia Contrayerva.—Contrayerva root.—South America.
Eugenia Pimenta.—Allspice.—West Indies.
Euterpe edulis.—Cabbage Palm.—Brazil (Para).
Maranta arundinacea.—Arrowroot.—South America.
Myristica moschata.—Nutmeg.—East Indies.
Myroxylon peruiferum.—Balsam of Peru—Peru.
Piper Cubeba.—Cubeb Pepper.—West Tropical Africa.
Ravenala madagascariensis.—Travellers' tree.—Madagascar.
Saccharum officinarum —Sugar cane.—India.
Smilax Sarsaparilla.—Sarsaparilla.—North America.
Stillingia sebifera.—Tallow tree.—China.
Vanilla aromatica.—Vanilla.—South America.

Messrs. OSBORN & SONS, Fulham Nursery. [*3rd Prize.*]

Bixa Orellana.—Arnotto tree.
Coffea arabica.—Coffee tree.
Ficus elastica.—Indian rubber tree.
Gossypium arboreum.—Cotton tree.
Laurus Camphora.—Camphor tree.
Laurus Cinnamomum.—Cinnamon tree.
Laurus Sassafras.—Sassafras tree.
Olea europæa.—Olive.
Oryza sativa.—Rice.
Phormium tenax.—New Zealand Flax.
Piper nigrum.—Black Pepper.
Pistacia Lentiscus.—Mastich tree.
Quercus Suber.—Cork tree.
Rhamnus catharticus.—Purging Buckthorn.
Rhus copallina.—Copal varnish tree.
Smilax Sarsaparilla.—Medicinal Smilax.
Styrax officinale.—Storax tree.
Thea viridis.—Tea tree..
Theobroma Cacao.—Chocolate or Cocoa tree.
Zingiber officinale.—Ginger..

Entered but did not exhibit:—

M. H. J. VAN HULLE, Curator, Botanic Garden, Ghent, Belgium.

Camphora officinalis, *Nees*,—Camphor tree.
Canella alba, *Murr.*—White Canella.
Cephaëlis Ipecacuanha, *Rich.*—Ipecacuanha.
Cinchona lanceolata, *Mutis.*—Quina, Jesuit's bark.
Cinnamomum Cassia, *Nees.*—Cassia tree.
Coffea arabica, *L.*—Coffee tree.
Dorstenia Contrayerva, *L.*—Contrayerva.
Gossypium arboreum, *L.*—Cotton plant.
Guiaicum arboreum, *D. C.*—Lignum-vitæ tree.
Hæmatoxylon campechianum, *L.*—Campeachy wood, Logwood.
Maranta arundinacea, *L.*—Arrow root.
Piper Betel, *L.*—Betle Pepper.
Piper Cubeba, *L. fil.*—Cubeb Pepper.
Piper nigrum, *L.*—Black Pepper.
Quassia amara, *L.*—Quassia wood.
Saccharum officinarum, *L.*—Sugar-cane.
Smilax Sarsaparilla, *L.*—Sarsaparilla.
Thea Bohea, *L.*—Tea plant.
Theobroma Cacao, *L.*—Cocoa, Chocolate nut.
Zingiber officinale, *Rosc.*—Ginger.

CLASS
(19.)—20 Hardy Deciduous Shrubs, in Flower, distinct, Azaleas excepted.—1st Prize, 10*l.*; 2nd Prize, 7*l.*; 3rd Prize, 5*l.*; 4th Prize. 3*l.* (*Open.*)

Mr. Charles Turner, Royal Nurseries, Slough. [*1st Prize.*]

Cerasus alba flore-pleno.	Pæonia Moutan.	Syringa persica.
Cistus sp.	Philadelphus mexicanus.	Viburnum plicatum.
Deutzia gracilis.	Philadelphus grandiflorus.	Viburnum Opulus sterile.
Deutzia scabra.	Ribes aureum.	Weigela amabilis.
Deutzia crenata flore-pleno.	Staphylea pinnata.	Weigela amabilis variegata
Hydrangea Hortensia variegata.	Elæagnus argentea.	Weigela alba.
	Syringa vulgaris.	Weigela hortensis nivea.

Mr. Wm. Paul, Paul's Nurseries, Waltham Cross. [*2nd Prize.*]

Spartium pallidum.	Viburnum plicatum.	Cytisus secundus.
Weigela rosea.	Viburnum Opulus.	Cytisus albus.
Weigela Stelzneri.	Spiræa trilobata.	Coronilla Emerus.
Robinia hispida.	Spiræa opulifolia lutea.	Syringa persica.
Pæonia arborea Athlete.	Berberis vulgaris.	Syringa vulgaris.
Hydrangea jap. variegata.	Genista purgans.	Cratægus, new double pink
Deutzia gracilis.	Cytisus elongatus.	Cratæg. Gumpperi bicolor.

(20.)—20 Hardy Deciduous Trees and Shrubs, shown for the beauty of their foliage, distinct, Conifers excepted.—1st Prize, 10*l.*; 2nd Prize, 7*l.*; 3rd Prize, 5*l.*; 4th Prize, 3*l.* (*Open.*)

Mr. Wm. Paul, Paul's Nurseries, Waltham Cross. [*3rd Prize.*]

Acer Negundo variegatum.	Ailantus glandulosus.
Acer platanoides laciniatum.	Quercus Cerris variegata.
Aralia spinosa.	Æsculus Hippocastanum dissectum.
Acer variegatum novum.	Magnolia acuminata.
Fraxinus aucubæfolia.	Sambucus nigra foliis aureis.
Ulmus microphylla pendula.	Corylus Avellana purpurea.
Hippophäe rhamnoides.	Symphoricarpus variegatus.
Alnus imperialis asplenifolia.	Castanea vesca variegata.
Magnolia tripetala.	Fagus sylvatica purpurea.
Populus argentea.	Paulownia imperialis.

⁂ First and Second Prize withheld by the Jurors.

(21.)—20 Hardy Evergreen or Deciduous Climbing Plants, in or out of Flower, distinct.—1st Prize, 7*l.*; 2nd Prize, 5*l.*; 3rd Prize, 3*l.* (*Open.*)

Mr. Wm. Paul, Paul's Nurseries, Waltham Cross. [*1st Prize.*]

Clematis rubro-violacea.	Aristolochia Sipho.	Hedera Helix rhombea variegata.
Clematis florida.	Menispermum canadense.	Hedera Helix minor marmorata.
Clematis Hendersoni.	Hedera Rœgneriana.	Hedera Helix donerailensis minor.
Clematis Viticella.	Hedera Helix foliis aureis.	Vitis Labrusca fol. variegatis.
Clematis Viticella venosa.	Hedera Helix sagittæfolia.	
Lonicera aureo-reticulata.	Hedera Helix taurica.	
Lonicera brachypoda.	Hedera Helix digitata.	
Lonicera flexuosa.	Hedera Helix latifolia maculata.	

Mr. Charles Turner, Royal Nurseries, Slough. [*2nd Prize.*]

Ampelopsis hirsuta.	Clematis Sophia fl. pl.	Lonicera, early Dutch.
Ampelopsis hederacea.	Clematis Standishii.	Lonicera Ingramii.
Bignonia grandiflora.	Clematis rubro-violacea.	Lonicera brachypoda.
Clematis Fortunei.	Hedera Helix maculata.	Lonicera aureo-reticulata.
Clematis Helena.	Hedera Helix foliis argenteis.	Lonicera flexuosa.
Clematis Jackmanni.	Hedera Helix latifolia maculata.	Lonicera fragrantissima.
Clematis lanuginosa.	Hedera Rœgneriana.	Lonicera pubescens major.
Clematis Sophia		Passiflora cœrulea.

CLASS 21.

Messrs. JAMES IVERY & SON, Dorking and Reigate. [*3rd Prize.*]

Wistaria sinensis.
Wistaria sinensis alba.
Jasminum ochroleucum.
Jasminum Wallichianum.
Akebia quinata.
Aristolochia Sipho.
Clematis montana.
Clematis cœrulea grandiflora.
Clematis Viticella venosa.
Clematis Fortunei.
Clematis Standishii.
Honeysuckle, early cream.
Periploca græca.
Lonicera flexuosa.
Lonicera pubescens.
Lonicera brachypoda.
Lonicera aureo-reticulata.
Rose Céline.
Rose Amadis.
Virginian creeper.

(22.)—20 HARDY EVERGREEN TREES and SHRUBS, distinct, Conifers excepted.—1st Prize, 10*l.*; 2nd Prize, 7*l.*; 3rd Prize, 5*l.*; 4th Prize, 3*l.* (*Open.*)

Messrs. GEORGE JACKMAN and SON, Woking Nursery, Surrey. [*1st Prize.*]

Berberis Darwinii
Laurus nobilis.
Ilex dipyrena.
Ilex Aquifolium scotica.
Ilex Aq. Watereriana.
Ilex Aq. albo-marginatum.
Phillyrea angustifolia.
Phillyrea ilicifolia.
Arbutus Unedo.
Arbutus Rollissoni.
Berberis undulata nana.
Viburnum Tinus.
Quercus Ilex.
Quercus glabra.
Aucuba japonica.
Buxus sempervirens.
Buxus balearica.
Buxus argentea nova.
Magnolia grandiflora (Exmouth variety).
Cerasus lusitanica.

Mr. JOHN STANDISH, Royal Nursery, Ascot, Berks; and 52, St. George's Place, Knightsbridge. [*2nd Prize.*]

Aucuba himalaica.
Aucuba japonica vera.
Aucuba jap. masc. viridis.
Aucuba jap. albo-variegata.
Aucuba jap. latimaculata.
Aucuba jap. macrophylla.
Aucuba jap. serratifolia.
Aucuba jap. longifolia.
Aucuba jap. latifolia varieg.
Fagus betuloides.
Fagus Cunninghami.
Laurus caucasica.
Ligustrum coriaceum.
Ilex latispina.
Ilex serratifolia
Ilex balearica hybrida.
Ilex balearica recurva.
Ilex ascotensis.
Ilex myrtifolia.
Berberis stenophylla.
Berberis japonica vera.

Messrs. J. and C. LEE, Royal Vineyard Nursery, Hammersmith. [*3rd Prize.*]

Aucuba japonica maculata fœmina, in berry.
Aucuba japonica obtusifolia.
Buxus sempervirens.
Buxus sempervirens hardwicensis.
Laurus nobilis.
Ilex Aquifolium.
Ilex Aquifol. pendulum.
Laurus caucasica.
Viburnum Tinus.
Magnolia grandiflora nannetensis.
Magnolia grandiflora obtusifolia.
Magnolia grandiflora præcox.
Cerasus lusitanica myrtifolia.
Cerasus Laurocerasus.
Ilex Aquifolium argenteum marginatum.
Quercus Fordii.
Ilex balearica.
Ilex maderensis.
Elæagnus reflexa variegata.
Rhaphiolepis ovata.

(23.)—12 NEW HARDY EVERGREEN TREES and SHRUBS, distinct, Conifers excepted.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Messrs. JAMES VEITCH and SONS, King's Road, Chelsea. [*1st Prize.*]

Ilex Fortunei.
Osmanthus Aquifolium.
Osmanthus Aquifolium variegatus nanus.
Elæagnus japonica aureo-variegata.
Rhaphiolepis ovata.
Euonymus radicans variegatus.
Aucuba japonica limbata.
Aucuba japonica longifolia.
Euonymus japonicus aureo-variegatus.
Ligustrum glabrum variegatum.
Skimmia oblata.
Ternströmia, sp.

Mr. JOHN STANDISH, Royal Nursery, Ascot, Berks; and 52, St. George's Place, Knightsbridge. [*2nd Prize.*]

Aucuba japonica vera,
Aucuba japonica mascula.
Aucuba jap. marmorata.
Aucuba jap. undulata.
Ligustrum coriaceum.
Osmanthus Aquifolium.
Osmanthus Aquifolium variegatus.
Osmanthus Aquifolium variegatus nanus.
Raphiolepis ovata.
Skimmia oblata.
Skimmia fragrans.
Euonymus radicans variegatus.

CLASS 23

Mr. **William Bull**, King's Road, Chelsea. [*3rd Prize.*]

Aucuba japonica mascula bicolor.
Aucuba japonica mascula angustata.
Aucuba japonica mascula macrophylla.
Aucuba japonica mascula maculata.
Aucuba japonica mascula viridis.
Aucuba japonica mascula aurea.
Aucuba japonica fœmina latifolia.
Aucuba japonica fœmina elegans.
Aucuba japonica fœmina limbata.
Aucuba japonica fœmina macrophylla.
Aucuba japonica fœmina longifolia.
Aucuba japonica fœmina longifolia var.

(24.)—50 Hardy Alpine and Herbaceous Plants, in Flower, distinct.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Messrs. **James Backhouse & Son**, Nurseries, York. [*1st Prize.*]

Myosotis sylvatica.
Viola sp., North America (new).
Primula involucrata.
Trollius europæus.
Scilla campanulata.
Iberis "gibraltarica" (coriacea?).
Draba tridentata.
Phlox verna.
Lithospermum fruticosum.
Phlox frondosa.
Orchis militaris.
Anemone fulgens.
Orchis fusca.
Primula verticillata.
Andromeda tetragona.
Orchis macra.
Saxifraga Cymbalaria.
Myosotis rupicola.
Pulmonaria virginica.
Primula farinosa.
Saxifraga affinis.
Polygala Chamæbuxus.
Alyssum saxatile.
Iris pumila.
Iberis sempervirens.
Erica australis.
Scilla umbellata.
Anemone alpina.
Primula longifolia (new).
Orchis mascula.
Narcissus juncifolius.
Iberis carnosa.
Aubrietia Campbellii.
Dodecatheon integrifolium.
Androsace villosa.
Gentiana acaulis.
Silene acaulis alba.
Ranunculus glacialis.
Geum montanum.
Cypripedium acaule.
Pinguicula vulgaris.
Globularia nudicaulis.
Fritillaria pyrenaica.
Anemone alpina sulphurea.
Corbularia Bulbocodium.
Daphne Cneorum.
Phlox Nelsoni.
Myosotis montana.
Andromeda fastigiata.
Viola palmata.

(25.)—50 Hardy Variegated Alpine and Herbaceous Plants, distinct.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Mr. **John Salter**, Versailles Nursery, William Street, Vale Place, Hammersmith. [*1st Prize.*]

Achillea Millefolium, fol. var.
Ajuga reptans, fol. var.
Aquilegia formosa, fol. var.
Arabis alpina, fol. var.
Arabis mollis, fol. var.
Arabis procurrens, fol. var.
Artemisia vulgaris, fol. var.
Arum italicum, fol. var.
Arum maculatum, fol. var.
Arundo colorata, fol. var.
Aspidistra elatior, fol. var.
Aubrietia deltoidea, fol. var.
Ballota nigra, fol. var.
Barbarea vulgaris, fol. var.
Bellis perennis, fol. var.
Cacalia suaveolens, fol. var.
Chrysanthemum Leucanthemum, fol. var.
Convallaria majalis, fol. var.
Dactylis glomerata, fol. var.
Fragaria chilensis, fol. var.
Funkia cucullata albo-marginata.
Funkia cucullata viridi-marginata.
Funkia japonica cordata, fol. var.
Funkia ovata, fol. var.
Funkia undulata, fol. var.
Glechoma hederacea, fol. var.
Gynerium roseum, fol. var.
Heracleum Sphondylium, fol. var.
Hemerocallis fulva, fol. var.
Hemerocallis Kwanso fl. pleno, fol. var.
Humulus Lupulus, fol. var.
Lamium album, fol. var.
Lilium candidum, fol. var.
Luzula sylvestris, fol. var.
Melica cœrulea, fol. var.
Melissa grandiflora, fol. var.
Melissa officinalis, fol. var.
Phlox decussata Salteri, fol. var.
Polygonatum multiflorum, fol. var.
Pulmonaria sibirica, fol. var.
Ranunculus repens, fol. var.
Reineckia carnea, fol. var.
Sedum Fabaria, fol. var.
Sedum Sieboldii, fol. var.
Sedum Telephium, fol. var.
Spirea Ulmaria, fol. var.
Symphytum officinale, fol. var.
Tussilago Farfara, fol. var.
Trifolium repens, fol. var.
Veronica spicata, fol. var.

CLASS

(26.)—9 Boxes of ANNUALS shown for effect, as a representation of Parterre Gardening.—1st Prize, 8*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

(No entry.)

§ II.—COLLECTIONS REPRESENTING GENERA.

Steward:—Mr. WILLIAM PAUL.

Jurors.

Classes 27 to 35.	Professor Reichenbach, Hamburgh. Mr. Anderson, Meadow Bank. Mr. Lawrence, Farnham. Mr. W. Rollisson, Tooting.	Classes 42 to 54.	M. Ambroise Verschaffelt, Ghent. Mr. Clarke, Glasgow. Mr. Parker, Tooting. Mr. Page, Streatham.
Classes 36 to 41.	M. Wendland, Herrenhausen. Mr. McNab, Edinburgh. Mr. Jno. Smith, Levensholme.	Classes 55 to 60.	M. Thibaut, Paris. Mr. Ewing, Sheffield. Mr. G. Thomson, Stansted Park. Mr. Green, Hillfield, Reigate.

Classes 61 to 64, including 65 and 66. Mr. Barnes, Bicton. Mr. Barron, Borrowash. Mr. Frost, Dropmore.

(27.)—50 EXOTIC ORCHIDS, of any kind, in Flower.—1st Prize, 30*l.*; 2nd Prize, 15*l.*; 3rd Prize, 10*l.* (*Open.*)

ROBERT WARNER, Esq., Broomfield, Chelmsford. [*1st Prize.*]

Aërides Fieldingii.
Aërides virens.
Cattleya Mossiæ (5).
Cattleya Mossiæ elegans.
Cattleya Mossiæ fimbriata.
Cattleya Mossiæ flammea.
Cattleya Mossiæ Lawrenceana.
Cattleya Mossiæ lobata.
Cattleya Mossiæ marmorata.
Cattleya Mossiæ Napoleonis.
Cattleya Mossiæ purpurata.
Cattleya Mossiæ Rothschildiana.
Cattleya Mossiæ Victoriæ.
Cattleya Skinneri (2).
Chysis lævis.
Chysis Limminghii.
Cypripedium barbatum.
Cypripedium barbatum superbum.
Cypripedium hirsutissimum.
Cypripedium Hookeræ.
Cypripedium villosum.
Dendrobium crepidatum.
Dendrobium densiflorum.
Dendrobium giganteum.
Dendrobium macrophyllum.
Dendrobium nobile.
Lælia cinnabarina.
Lælia purpurata.
Lælia Schilleriana.
Odontoglossum citrosmum.
Odontoglossum Karwinskii.
Oncidium ampliatum majus.
Oncidium sphacelatum majus.
Phajus Wallichii.
Phalænopsis amabilis (2).
Phalænopsis grandiflora (2).
Phalænopsis grandiflora aurea (2).
Phalænopsis Schilleriana.
Phalænopsis intermedia var. Portei.
Trichopilia crispa.
Trichopilia tortilis.
Vanda insignis (2).
Vanda suavis (3).
Vanda tricolor.
Vanda tricolor superba.
Vanda tricolor formosa.

28.)—20 EXOTIC ORCHIDS, distinct, in Flower.—1st Prize, 25*l.*; 2nd Prize, 20*l.*; 3rd Prize, 15*l.*; 4th Prize, 10*l.* (*Amateurs.*)

A. TURNER, Esq., Bow Bridge, Leicester. (Robt. Bullen, gr.) [*1st Prize.*]

Brassia verrucosa major.
Dendrobium formosum giganteum.
Dendrobium densiflorum album.
Dendrobium Parishii.
Dendrobium Paxtoni.
Lælia purpurata.
Oncidium ampliatum majus.
Cattleya Skinneri.
Cattleya Mossiæ.
Cattleya Aclandiæ.
Cattleya intermedia.
Cypripedium barbatum superbum.
Oncidium altissimum.
Lycaste Skinneri.
Phalænopsis grandiflora.
Odontoglossum Pescatorei.
Odontoglossum nævium.
Odontoglossum cordatum.
Saccolabium guttatum.
Dendrobium Paxtoni.

CLASS 28.

W. LEAF, Esq., Park Hill, Streatham. (Thomas Page, gard.) [*2nd Prize.*]

Phalænopsis grandiflora.
Phalænopsis amabilis.
Dendrobium Dayanum.
Dendrobium formosum.
Aërides Warneri.
Aërides virens.
Lycaste Skinneri.
Oncidium ampliatum majus.
Saccolabium Blumei.
Lælia purpurata.
Cypripedium barbatum.
Cypripedium barbatum nigrum.
Cattleya intemedia.
Oncidium flexuosum.
Vanda insignis.
Vanda teres.
Calanthe veratrifolia.
Vanda suavis.
Aërides Fieldingii.
Saccolabium curvifolium.

Mrs. TREDWELL, St. John's Lodge, Norwood. (B. Peed, gard.) [*3rd Prize.*]

Cypripedium barbatum.
Cypripedium barbatum superbum.
Lælia purpurata (2 vars.).
Vanda insignis (2 vars.).
Vanda suavis.
Aërides odoratum (2 vars.).
Cattleya Mossiæ.
Oncidium Baueri.
Oncidium sessile.
Aërides Fieldingii.
Brassia verrucosa major.
Dendrobium nobile.
Epidendrum crassifolium.
Aërides crispum.
Dendrobium densiflorum.
Cypripedium hirsutissimum.
Dendrobium pulchellum.

WENTWORTH W. BULLER, Esq., Strete Ralegh, Exeter. (Emanuel Culley, gardener.) [*4th Prize.*]

Aërides Warneri.
Aërides crispum.
Burlingtonia fragrans.
Cattleya Aclandiæ.
Cattleya amethystina.
Cattleya Mossiæ.
Cypripedium Hookeræ.
Cypripedium caudatum.
Cypripedium Lowii.
Cypripedium superbiens.
Cypripedium barbatum.
Dendrobium formosum giganteum.
Dendrobium Parishii.
Epidendrum odoratum.
Lælia purpurata.
Phalænopsis amabilis.
Saccolabium retusum.
Saccolabium curvifolium.
Phalænopsis grandiflora.
Phalænopsis Luddemanniana.
Uropedium Lindenii.

GEORGE COOPER, Esq., Alpha House, Coburg Road, Old Kent Road. (J. Robson, gardener.)

Aërides Lindleyanum.
Aërides Fieldingii.
Aërides virens superbum.
Brassia verrucosa major.
Cypripedium Lowii.
Cypripedium Hookeræ.
Cattleya intermedia.
Cattleya Mossiæ superba.
Cattleya Skinneri.
Epidendrum crassifolium.
Dendrobium formosum giganteum.
Lycaste Skinneri.
Oncidium crispum grandiflorum.
Oncidium leucochilum.
Oncidium Phillipsianum.
Oncidium sphacelatum.
Phalænopsis grandiflora.
Phalænopsis Luddemanniana.
Phalænopsis amabilis.
Saccolabium præmorsum.

(29.)—12 EXOTIC ORCHIDS, distinct, in Flower.—1st Prize, 10*l.*; 2nd Prize, 7*l.*; 3rd Prize, 5*l.*; 4th Prize, 3*l.*—(*Nurserymen.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*1st Prize.*]

Odontoglossum nævium.
Odontoglossum Pescatorei.
Cypripedium villosum.
Cypripedium barbatum superbum.
Cattleya Mossiæ.
Cattleya elegans.
Phalænopsis grandiflora.
Dendrobium densiflorum.
Saccolabium guttatum.
Lælia purpurata.
Vanda tricolor superba.
Epidendrum vitellinum majus.

Mr. B. S. WILLIAMS, Paradise and Victoria Nurseries, Holloway. [*2nd Prize.*]

Cypripedium barbatum superbum.
Cypripedium Hookeræ.
Saccolabium retusum.
Vanda insignis.
Cattleya Mossiæ superba
Cattleya lobata.
Vanda teres.
Phalænopsis Luddemanniana.
Phalænopsis grandiflora.
Aërides Fieldingii.
Dendrobium clavatum.
Cypripedium Stonei.

Mr. WILLIAM BULL, King's Road, Chelsea. [*4th Prize.*]

Aërides Fieldingii.
Aërides odoratum.
Anguloa Clowesii.
Anguloa uniflora.
Cypripedium barbatum grandiflorum.
Cypripedium superbiens.
Phalænopsis grandiflora.
Cypripedium Veitchii.
Uropedium Lindenii.
Oncidium Phillipsianum.
Lycaste Deppei.
Vanda suavis.

*** Third Prize withheld by the Jurors.

CLASS

(30.)—10 Exotic Orchids, distinct, in Flower.—1st Prize, 12*l.*; 2nd Prize, 10*l.*; 3rd Prize, 7*l.*; 4th Prize, 5*l.* (*Amateurs, not showing in Nos.* 28 *or* 31.)

H. H. Gibbs, Esq., St. Dunstan's, Regent's Park. (C. Penny, gard.) [*1st Prize.*]

Lælia purpurata.	Aërides Fieldingii.	Dendrobium Dayanum.
Odontoglossum nævium majus.	Cypripedium barbatum nigrum.	Trichopilia crispa.
Oncidium sarcodes.	Cypripedium lævigatum.	Saccolabium retusum.
		Phalænopsis grandiflora.

Wm. Marshall, Esq., Clay Hill, Enfield. (Wm. Wilson, gard.) [*2nd Prize.*]

Dendrobium nobile.	Selenipedium caudatum.	Eriopsis rutidobulbon.
Dendrobium densiflorum album.	Oncidium Phillipsianum.	Dendrobium tortile roseum.
Cypripedium villosum.	Cattleya Mossiæ.	Cattleya Skinneri.
	Dendrobium Dalhousianum.	

Julius Sichel, Esq., Lark Hill, Timperley. (J. Stevenson, gard.) [*3rd Prize.*]

Lælia purpurata.	Aërides Fieldingii.	Anguloa Clowesii.
Lælia elegans Turneri.	Dendrobium densiflorum album.	Phalænopsis Luddemanniana.
Cypripedium lævigatum.	Odontoglossum nævium majus.	Vanda suavis.
Cypripedium barbatum superbum.		

J. Philpott, Esq., Stamford Hill. (J. Wheeler, gardener.) [*4th Prize.*]

Lælia purpurata.	Phalænopsis grandiflora.	Saccolabium curvifolium.
Aërides crispum.	Cypripedium barbatum.	Oncidium leucochilum.
Cattleya Mossiæ.	Oncidium sphacelatum.	Lycaste Skinneri.
Aërides odoratum majus		

(31.)—6 Exotic Orchids, distinct, in Flower.—1st Prize, 6*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.*; 4th Prize, 2*l.* (*Amateurs, not showing in Nos.* 28 *or* 30.)

J. Brand, Esq, Bedford Hill, Balham. (W. Howard, gardener.) [*1st Prize.*

Cattleya Mossiæ.	Dendrobium chrysotoxum.	Phalænopsis grandiflora.
Cattleya Aclandiæ.	Burlingtonia fragrans.	Saccolabium curvifolium.

The Duke of Northumberland, Syon House. (G. Fairbairn, gr.) [*2nd Prize.*]

Cattleya Mossiæ.	Oncidium ampliatum majus.	Phalænopsis grandiflora.
Cypripedium barbatum.		Vanda tricolor.
Dendrobium nobile.		

W. H. Stone, Esq., M P., Leigh Park, Havant. (G. Young, gard.) [*3rd Prize.*]

Cattleya Mossiæ.	Dendrobium nobile.	Vanda insignis.
Calanthe veratrifolia.	Phalænopsis Schilleriana.	Vanda suavis.

J. J. Blandy, Esq., Highgrove, Reading. (A. Ingram, gardener.) [*4th Prize.*]

Cattleya amethystina.	Lælia purpurata.	Oncidium ampliatum majus.
Cattleya Mossiæ superba.	Cypripedium barbatum.	Dendrobium nobile.

W. Beck, Esq., Worton Cottages, Isleworth. (John Wiggins, gardener.)

Cypripedium barbatum superbum.	Cypripedium hirsutissimum.	Aërides Fieldingii.
Cypripedium villosum.	Cattleya Skinneri.	Epidendrum vitellinum.

(32.)—6 Exotic Orchids, distinct, in Flower.—1st Prize, 5*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.*; 4th Prize, 2*l.* (*Nurserymen, not showing in No.* 29.)

Messrs. J. & C. Lee, Royal Vineyard Nursery, Hammersmith. [*1st Prize.*]

Dendrobium nobile.	Odontoglossum citrosmum.	Lælia purpurata.
Saccolabium guttatum.	Oncidium altissimum.	Cattleya Mossiæ.

Mr. Osman Rhodes, Nurseryman, Sydenham. [*2nd Prize.*]

(No particulars furnished.)

Messrs. Thomas Jackson & Son, Nurserymen, &c., Kingston. [*4th Prize.*]

Cattleya Skinneri.	Cypripedium Hookeræ.	Aërides odoratum.
Phaius Wallichii.	Lælia purpurata.	Phalænopsis amabilis.

*** Third Prize withheld by the Jurors.

CLASS
(33.)—1 New Orchid, shown for the first time in Flower.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

M. John Linden, Royal Zoological Gardens, Brussels. [*1st Prize.*]
Aërides japonicum, *Rchb. fil.*
Messrs. James Veitch & Sons, King's Road, Chelsea. [*2nd Prize.*]
Angræcum citratum, *Bateman.*
Messrs. James Backhouse & Son, Nurseries, York. [*Commended.*]
Oncidium concolor.—Venezuela.
Messrs. James Backhouse & Son, Nurseries, York.
Maxillaria leptosepala.—New Grenada, 1865.
Messrs. James Backhouse & Son, Nurseries, York.
Odontoglossum sp.—Venezuela.
Messrs. James Veitch & Sons, Chelsea.
Cypripedium lævigatum.
Robert Warner, Esq., Broomfield, Chelmsford.
Dendrobium Wardianum.
Robert Warner, Esq., Broomfield, Chelmsford.
Cattleya Mossiæ Marianæ.
Mr. B. S. Williams, Victoria and Paradise Nurseries, Holloway.
Vanda cristata superba.
Mr. B. S. Williams, Victoria and Paradise Nurseries, Holloway.
Phalænopsis Luddemanniana superba.
James Bateman, Esq., Biddulph Grange. (J. Stanton, gardener.)
Miltonia spectabilis var.

*** Third Prize withheld by the Jurors.

(34.)—1 Exotic Orchid, in Flower.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Robert Barnett, Esq., Blackheath Park. (T. Charles, gardener.) [*1st Prize.*]
Phalænopsis Luddemanniana.
The Duke of Northumberland, Syon House. (G. Fairbairn, gr.) [*2nd Prize.*]
Phalænopsis grandiflora.
A. Turner, Esq., Leicester. (Robert Bullen, gardener.) [*3rd Prize.*]
Dendrobium nobile.
J. W. Miles, Esq., Kingsweston, Bristol. (Richard Webb, gardener.) [*4th Prize.*]
Ansellia africana.
James Bateman, Esq., Biddulph Grange. (J. Stanton, gard.) [*Commended.*]
Dendrobium taurinum.
Mr. B. S. Williams, Victoria and Paradise Nurseries, Holloway.
Cattleya Mossiæ.

Entered but did not exhibit:—
T. P. W. Butt, Esq., Arle Court, Cheltenham. (James May, gardener.)
Aërides Lindleyanum.
W. W. Buller, Esq., Strete Ralegh, Exeter. (Emanuel Culley, gardener.)
Phalænopsis amabilis.

(35.)—10 Variegated Orchids, including Anæctochilus, Physurus, Macodes, Goodyera, &c., distinct.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Mr. B. S. Williams Victoria and Paradise Nurseries, Holloway. [*1st Prize.*]

Anæctochilus intermedius.	Anæctochilus querceticola.	Goodyera pubescens.
Anæctochilus xanthophyllus.	Anæctochilus Turneri.	Physurus argenteus pictus.
	Anæctochilus setaceus.	Phalænopsis Schilleriana.
Anæctochilus Petola.	Anæctochilus Lowii.	

Messrs. S. Glendinning & Sons, Chiswick. [*4th Prize.*]

Anæctochilus Lowii.	Anæctochilus intermedius.	Anæctochilus allosurus picta.
Anæctochilus Veitchii.	Anæctochilus xanthophyllus.	
Anæctochilus grandis.		Anæctochil. marantaceus.
Anæctochilus setaceus.	Anæctochilus Petola.	Anæctochilus sp. Java.

*** Second and Third Prizes withheld by the Jurors.

CLASS

(36.)—6 PALMS, distinct.—1st Prize, 15*l.*; 2nd Prize, 10*l.*; 3rd Prize, 5*l.* (*Open.*)

DUKE OF NORTHUMBERLAND, Syon House. (G. Fairbairn, gard.) [1*st Prize.*]

Areca sp.	Cocos nucifera.	Phœnix farinifera.
Ceroxylon andicola.	Latania borbonica.	Seaforthia robusta.

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [2*nd Prize.*]

Corypha australis.	Latania Jenkinsiana.	Chamærops excelsa.
Thrinax elegans.	Chamærops humilis.	Phœnicophorium sechellarum.

M. AMBROISE VERSCHAFFELT, 50, Rue du Chaume, Ghent. [3*rd Prize.*]

Cocos australis.	Livistona Hoogendorpii.	Areca Verschaffeltii.
Latania Verschaffeltii.	Calamus Impératrice Marie.	Phœnicophorium sechellarum.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway.

Chamærops humilis.	Livistonia Jenkinsiana.	Phœnicophorium sechellarum.
Seaforthia elegans.	Areca lutescens.	
	Areca Verschaffeltii.	

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener.)

Thrinax elegans.	Martinesia caryotifolia.	Caryota urens.
Phœnix dactylifera.	Chamærops chinensis.	Latania borbonica.

Mr. WILLIAM BULL, King's Road, Chelsea.

Calamus dealbata. 20 guineas.	Seaforthia elegans. 3 guineas.
Latania Commersoni. 5 guineas.	Latania borbonica. 8 guineas.
Geonoma Ghiesbreghti. 8 guineas.	Thrinax elegans. 4 guineas.

(37.)—3 PALMS, distinct.—1st Prize, 7*l.*; 2nd Prize, 5*l.*; 3rd Prize, 3*l.* (*Open.*)

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [1*st Prize.*]

Chamærops humilis. | Seaforthia elegans. | Latania borbonica.

Messrs. T. JACKSON & SON, Nurserymen, &c., Kingston. [2*nd Prize.*]

Phœnix sylvestris. 10*l.* 10*s.* | Elăis guineensis. | Latania borbonica. 10*l.* 10*s.*

Mr. WILLIAM BULL, King's Road, Chelsea. [3*rd Prize.*]

Latania borbonica. 8 guineas. | Brahea dulcis. 10 guineas.
Astrocaryum mexicanum. 5 guineas.

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener.)

Martinesia caryotifolia. | Chamærops chinensis. | Thrinax elegans.

(38.)—The largest and finest PALM.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener.) [1*st Prize.*]
Phœnix dactylifera.

Mr. WILLIAM BULL, King's Road, Chelsea. [2*nd Prize.*]
Latania borbonica.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [3*rd Prize.*]
Chamærops humilis.

(39.)—3 CYCADS (Cycas, Zamia, Dion, &c.), distinct.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

M. A. VERSCHAFFELT, 50, Rue du Chaume, Ghent. [1*st Prize.*]

Zamia Verschaffeltii. | Zamia Caffra. | Zamia cycadæfolia.

J. YATES, Esq., Lauderdale House, Highgate. (W. Taylor, gard.) [2*nd Prize.*]

Cycas revoluta. | Zamia muricata. | Encephalartos Caffra.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [3*rd Prize.*]

Dion edule. | Zamia pungens. | Cycas revoluta.

Mr. WILLIAM BULL, King's Road, Chelsea.

Cycas Riuminiana.—Philippines. 6*l.* 6*s.* | Cycas plumosa.—Australia. 8*l.* 8*s.*
Zamia cycadæfolia.—Port Natal. 3*l.* 3*s.*

CLASS

(40.)—3 PANDANADS (Pandanus, Carludovica, &c.), distinct.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*1st Prize.*]
Pandanus javanicus variegatus. | Pandanus elegantissimus. | Pandanus ornatus.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [*2nd Prize.*]
Pandanus utilis. | Pandanus reflexus. | Freycenetia imbricata.

Messrs. T. JACKSON & SON, Nurserymen, &c., Kingston. [*3rd Prize.*]
Pandanus Candelabra. 3 guineas. | Pandanus imbricatus. 3 guineas.
Pandanus javanicus variegatus. 3 guineas.

Mr. WILLIAM BULL, King's Road, Chelsea.
Pandanus furcatus. 4 guineas. | Pandanus elegantissimus. 2 guineas.
Pandanus glaucescens. 1½ guineas.

(41.)—The largest and finest PANDANAD.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd. Prize, 1*l.* (*Open.*)

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener). [*1st Prize.*]
Pandanus elegantissimus.

J. G. BARCLAY, Esq., Knott's Green, Leyton. (D. Donald, gard.) [*2nd Prize.*]
Pandanus javanicus variegatus.

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*3rd Prize.*]
Pandanus utilis.

M. JOHN LINDEN, Royal Zoological and Horticultural Gardens, Brussels.
Pandanus elegantissimus, *Linden.*—"True; perfectly distinct from the P. elegantissimus of the trade."

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway.
Pandanus utilis.

(42.)—12 STOVE or GREENHOUSE FERNS, distinct.—1st Prize, 10*l.*; 2nd Prize, 7*l.*; 3rd Prize, 5*l.*; 4th Prize, 3*l.* (*Amateurs.*)

H. L. MICHOLLS, Esq., Summerfield, Bowdon. (T. Baines, gard.) [*1st Prize.*]

Dicksonia antarctica.	Gleichenia flabellata.	Platycerium grande.
Alsophila excelsa.	Davallia bullata.	Cheilanthes elegans.
Cyathea medullaris.	Davallia tenuifolia.	Asplenium fœniculaceum.
Cibotium princeps.	Pteris scaberula.	Davallia pyxidata.

R. HANBURY, Esq., The Poles, Ware. (Isaac Hill, gardener.) [*2nd Prize.*]

Alsophila australis.	Cyathea dealbata.	Todea africana.
Cibotium princeps.	Thamnopteris Nidus.	Marattia elegans.
Drynaria morbillosa.	Platycerium grande.	Marattia cicutæfolia.
Cibotium Schiedei.	Cyathea boconensis.	Hemitelia horrida.

J. W. TAYLOR, Esq., River House, Woodberry Down, Seven Sisters' Road, Stoke Newington. (Henry Barnard, gardener.) [*3rd Prize.*]

Cyathea medullaris.	Cyathea elegans.	Blechnum corcovadense.
Cyathea Cooperi.	Gleichenia Speluncæ.	Thamnopteris australasica
Cyathea boconensis.	Todea africana.	Dicksonia antarctica.
Cyathea dealbata.	Cibotium princeps.	Alsophila Miquelii.

J. YATES, Esq., Lauderdale House, Highgate. (W. Taylor, gard.) [*4th Prize.*]

Adiantum formosum	Cyathea medullaris.	Phlebodium aureum.
Asplenium bulbiferum.	Davallia bullata.	Microlepia strigosa.
Marattia cicutæfolia.	Cibotium princeps.	Dicksonia antarctica.
Platycerium alcicorne.	Nephrolepis davallioides.	Todea africana.

THE MARQUIS TOWNSHEND, Ball's Park, Hertford. (H. Morgan, gardener.)

Asplenium bulbiferum.	Blechnum corcovadense.	Alsophila australis.
Asplenium Veitchianum.	Gymnogramma tartarea.	Platycerium alcicorne.
Adiantum cuneatum.	Phlebodium aureum.	Lomaria gibba.
Blechnum australe.	Pteris cretica.	Woodwardia radicans.

CLASS 42.

E. WOOD, Esq., Hanger Hill House, W. (F. Preece, gardener.)

Pteris longifolia.	Adiantum formosum.	Nephrolepis exaltata.
Pteris tremula.	Dennstædtia cicutaria.	Nephrodium molle.
Pteris argyræa.	Pteris cretica albo-lineata.	Pteris serrulata.
Gymnogramma sp.	Asplenium bulbiferum.	Onychium lucidum.

R. BARCLAY, Esq., Highgate. (W. Young, gardener.)

Cibotium princeps.	Adiantum formosum.	Pteris cretica albo-lineata.
Cyathea medullaris.	Davallia elegans.	Pteris longifolia.
Phlebodium aureum.	Davallia bullata.	Stenochlæna tenuifolia.
Platycerium alcicorne.	Blechnum brasiliense.	Gymnogramma Laucheana.

(43.)—12 STOVE OR GREENHOUSE FERNS, distinct.—1st Prize, 7*l.*; 2nd Prize, 5*l.*; 3rd Prize, 3*l.*; 4th Prize, 2*l.* (*Nurserymen.*)

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [*1st Prize.*]

Todea africana.	Lomaria gibba.	Alsophila contaminans.
Dicksonia antarctica.	Platycerium grande.	Cibotium Schiedei.
Cibotium princeps.	Gleichenia semivestita.	Gleichenia flabellata.
Cyathea dealbata.	Gleichenia microphylla.	Woodwardia radicans.

Mr. WILLIAM BULL, King's Road, Chelsea. [*2nd Prize.*]

Cibotium princeps. 10 guineas.	Alsophila contaminans. 8 guineas.
Dicksonia antarctica. 10 guineas.	Gleichenia semivestita. 15 guineas.
Dicksonia antarctica cinnamomea. 10 guineas.	Gleichenia microphylla. 8 guineas.
Cyathea medullaris. 5 guineas.	Dicksonia squarrosa. 5 guineas.
Cyathea dealbata. 6 guineas.	Marattia elegans. 5 guineas.
Alsophila australis. 5 guineas.	Todea pellucida. 5 guineas.

(44.)—6 STOVE OR GREENHOUSE FERNS, distinct.—1st Prize, 4*l.*, 2nd Prize, 3*l.*; 3rd Prize, 2*l.*; 4th Prize, 1*l.* (*Amateurs; not showing in No.* 42.)

W. H. STONE, Esq., M.P., Leigh Park, Havant. (G. Young, gard.) [*1st Prize.*]

Dicksonia antarctica.	Cyathea dealbata.	Cyathea australis.
Alsophila australis.	Cyathea excelsa.	Cibotium princeps.

The Right Honorable LOUISA, LADY ASHBURTON, Melchet Park, Romsey, Hants. (William Cross, gardener.) [*2nd Prize.*]

Cibotium Schiedei.	Gleichenia flabellata.	Cyathea Smithii.
Dicksonia antarctica.	Cheilanthes lendigera.	Platycerium grande.

WILLIAM MARSHALL, Esq., Clay Hill, Enfield, Middlesex. (William Wilson, gardener.) [*3rd Prize.*]

Dicksonia antarctica.	Cibotium Schiedei.	Platycerium grande.
Neottopteris australasica.	Balantium Culcita.	Adiantum cardiochlæna.

J. J. BLANDY, Esq., Highgrove, Reading. (A. Ingram, gardener.) [*4th Prize.*]

Asplenium bulbiferum.	Gymnogramma chrysophylla var.	Lomaria gibba.
Adiantum cuneatum.		Platycerium alcicorne.
Aspidium pectinatum.		

Mrs. ALSTON, Elmdon Hall, Birmingham. (W. Brown, gr.) [*Commended.*]

Blechnum corcovadense.	Gymnogramma Wettenhalliana.	Pteris scaberula.
Gymnogramma peruviana argyrophylla.	Pteris serrulata cristata.	Gymnogramma Wettenhalliana var.

W. R. G. FARMER, Esq., Nonsuch Park, Cheam. (S. M. Carson, gardener.)

Microlepia polypodioides.	Pteris cretica albo-lineata.	Adiantum cuneatum.
Davallia novæ zelandiæ.	Adiantum trapeziforme.	Blechnum corcovadense.

Miss WOOD, the Elms, Hanger Hill, Ealing. (Edward Fountain, gardener.)

Adiantum formosum.	Asplenium bulbiferum.	Pteris serrulata.
Adiantum Capillus-veneris.	Davallia dissecta.	Pteris cretica albo-lineata.

CLASS

(45.)—6 STOVE or GREENHOUSE FERNS, distinct.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Nurserymen, not showing in No.* 43.)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [1*st Prize.*]

Marattia Cooperi.
Lomaria gibba.
Leptopteris superba.
Cibotium princeps.
Asplenium Nidus.
Trichomanes radicans.

Messrs. THOMAS JACKSON & SON, Nurserymen, &c., Kingston. [2*nd Prize.*]

Todea africana.
Gleichenia hecistophylla.
Angiopteris evecta.
Alsophila australis.
Lonchitis aurita.
Thamnopteris australasica.

(46.)—6 NEW TENDER FERNS, distinct.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Messrs. JAMES BACKHOUSE & SON, York Nurseries. [1*st Prize.*]

Asplenium anisophyllum.—Natal, 1865.
Gleichenia cryptocarpa.—Chili, 1863.
Asplenium resectum.—Mauritius, 1863.
Trichomanes fœniculaceum.—Java, 1865.
Asplenium alternans.—Tibet, &c., 1865.
Lindsæa sp.—Java, 1865.

Messrs. JAMES VEITCH & SONS, Royal Exotic Nursery, Chelsea. [2*nd Prize.*]

Gleichenia cryptocarpa.—Chili, 1865.
Davallia alpina.—Borneo, 1865.
Lomaria ciliata.—New Caledonia, 1865.
Asplenium novæ caledoniæ.—New Caledonia, 1866.
Asplenium sp.—New Caledonia, 1866.
Cheilanthes sp.—Peru, 1865.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [3*rd Prize.*]

Gleichenia sp.
Polystichum ordinatum.
Alsophila sp.
Cyathea sp.
Adiantum sp.
Lomaria dura.

Mr. WILLIAM BULL, King's Road, Chelsea.

Athyrium costale dissectum.
Litobrochia tripartita. 2 guineas.
Litobrochia undulata. 2 guineas.
Pteris flabellata ascensionis. 2 guineas.
Adiantum velutinum. 5 guineas.
Adiantum Lindenii.

(47.)—6 NEW HARDY FERNS, distinct.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Messrs. JAS. IVERY & SON, Nurserymen, Dorking and Reigate. [1*st Prize.*]

Athyrium Filix-fœmina pulcherrimum.
Athyrium Filix-fœmina pulchellum.
Lastrea Filix-mas Ingrami.
Asplenium Trichomanes Mouleii.
Polystichum angulare bulbiferum.
Polystichum angulare parvissimum.

Mr. WILLIAM BULL, King's Road, Chelsea. [2*nd Prize.*]

Polystichum angulare Holeanæ.
Athyrium Filix-fœmina Vernoniæ.
Athyrium Filix-fœmina reversum.
Athyrium Filix-fœmina pulchrum.
Athyrium Filix-fœmina sagittatum elegans.
Scolopendrium vulgare Cousensii.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [3*rd Prize.*]

Lastrea Filix-mas Barnesii.
Polypodium vulgare multifidum.
Polystichum angulare Holeanæ.
Polystichum angulare Youngii.
Asplenium elegantulum.
Athyrium Filix-fœmina multiforme.

(48.)—24 HARDY FERNS, species or varieties, distinct.—1st Prize. 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.*; 4th Prize, 1*l.* (*Open.*)

Messrs. J. IVERY & SON, Nurserymen, Dorking and Reigate. [1*st Prize.*]

Athyrium Filix-fœmina Applebyanum.
Athyrium Filix-fœmina diffissum multifidum.
Athyrium Filix-fœmina Fieldiæ lancifolium.
Athyrium Filix-fœmina fissido-angustifrons.

Athyrium Filix-fœmina Frizelliæ nannm.
Athyrium Filix-fœmina grandiceps.
Athyrium Filix-fœmina Iveryanum.
Athyrium Filix-fœmina mucronatum.
Athyrium Filix-fœmina plumosum.
Athyrium Filix-fœmina ramo-cristatum.
Athyrium Filix-fœmina Vernoniæ.
Athyrium Filix-fœmina Victoriæ.
Lastrea Filix-mas abbreviata cristata.
Lastrea Filix-mas grandiceps.
Lastrea montana Nowelliana.
Polystichum aculeatum acrocladon.
Polystichum angulare attenuato-cristatum.
Polystichum angulare decurrens.
Polystichum angulare laciniatum.
Polystichum angulare lineare.
Polystichum angulare plumosum.
Polystichum angulare pterophorum.
Polystichum angulare Holeanæ.
Blechnum Spicant crispum.

Mr. JOHN SALTER, Versailles Nursery, William St., Hammersmith. [*2nd Prize.*]

Asplenium angustifolium.
Asplenium fontanum.
Adiantum pedatum.
Athyrium Filix-fœmina thyssanotum.
Athyrium Filix-fœmina corymbiferum.
Athyrium Filix-fœmina crispum.
Cystopteris bulbifera.
Lastrea Thelypteris.
Lastrea dilatata collina.
Lastrea Filix-mas.
Onoclea sensibilis.
Osmunda Claytoniana.
Osmunda cinnamomea.
Osmunda regalis.
Osmunda regalis rubra.
Osmunda spectabilis.
Polypodium Robertianum.
Polystichum angulare.
Polystichum angulare subtripinnatum.
Scolopendrium vulgare crispum.
Scolopendrium vulgare marginatum.
Scolopendrium vulgare laceratum.
Scolopendrium vulgare polycuspis.
Struthiopteris pennsylvanica.

Mr. WILLIAM BULL, King's Road, Chelsea. [*3rd Prize.*]

Athyrium Filix-fœmina diffissum multifidum.
Athyrium Filix-fœmina plumosum.
Athyrium Filix-fœmina thyssanotum.
Athyrium Filix-fœmina Vernoniæ.
Osmunda regalis cristata.
Lastrea Filix-mas Jervisii.
Woodwardia orientalis.
Lastrea Standishii.
Hymenophyllum tunbridgense.
Polystichum angulare Holeanæ.
Polystichum lobatum.
Polystichum setosum.
Athyrium Filix-fœmina conioides.
Athyrium Filix-fœmina coronatum.
Athyrium Filix-fœmina dareoides.
Athyrium Filix-fœmina Victoriæ.
Athyrium Filix-fœmina sagittatum.
Athyrium Filix-fœmina diffissum subcristatum.
Lastrea erythrosora.
Polystichum angulare proliferum.
Lastrea atrata.
Polystichum angulare Wollastoni.
Lastrea opaca.
Trichomanes radicans.

Messrs. JAMES IVERY & Son, Nurserymen, Dorking and Reigate.

Athyrium Filix-fœmina conioides.
Athyrium Filix-fœmina corymbiferum.
Athyrium Filix-fœmina Fieldiæ.
Athyrium Filix-fœmina multifidum.
Athyrium Filix-fœmina decompositum.
Athyrium Filix-fœmina fissidens.
Athyrium Filix-fœmina Frizelliæ.
Athyrium Filix-fœmina glomeratum.
Athyrium Filix-fœmina Grantiæ.
Athyrium Filix-fœmina multiceps.
Athyrium Filix-fœmina plumosum.
Athyrium Filix-fœmina thyssanotum.
Struthiopteris germanica.
Lastrea Filix-mas Bollandiæ.
Lastrea Filix-mas cristata.
Lastrea Filix-mas Jervisii.
Polypodium alpestre flexile.
Osmunda regalis cristata.
Polystichum aculeatum acrocladon.
Polystichum aculeatum proliferum.
Polystichum angulare ovatum.
Polystichum angulare Wackleyanum.
Polystichum angulare proliferum Wollastoni.
Scolopendrium vulgare fissum latum.
Scolopendrium vulgare scalpturatum.

Mr. JABEZ JAY CHATER, Gonville Nurseries, Cambridge.
(No particulars furnished.)

(49.)—12 HARDY FERNS, species or varieties, distinct.—1st Prize, 4*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.*; 4th Prize, 1*l.* (*Amateurs, not showing in No.* 48.)

W. MARSHALL, Esq., Clay Hill, Enfield. (W. Wilson, gardener.) [*1st Prize.*]

Trichomanes radicans.
Hymenophyllum tunbridgense.
Cystopteris montana.
Polypodium Phegopteris.
Polypodium Dryopteris.
Athyrium Filix-fœmina cristatum.
Athyrium Filix-fœmina plumosum.
Athyrium Filix-fœmina Fieldiæ.
Polypodium flexile.
Asplenium marinum.
Scolopendrium vulgare multifidum.
Polystichum angulare proliferum.

CLASS 49.

The EARL of LOVELACE, East Horsley. (W. Kaile, gardener.) [*2nd Prize.*]

Polystichum angulare proliferum.
Osmunda regalis.
Blechnum Spicant.
Athyrium Filix-fœmina Fieldiæ.
Athyrium Filix-fœmina Frizelliæ.
Athyrium Filix-fœmina molle.
Athyrium Filix-fœmina diffissum.
Lastrea Filix-mas cristata angustata.
Adiantum Capillus-veneris.
Scolopendrium vulgare ramosum.
Scolopendrium vulgare multifidum.
Polypodium vulgare cambricum.

The EARL PERCY, Albury Park, Guildford. (W. Kemp, gardener.) [*3rd Prize.*]

Adiantum Capillus-veneris.
Polypodium Dryopteris.
Scolopend. vul. multiforme.
Asplenium Trichomanes.
Polystichum angulare proliferum Wollastoni.
Asplenium fontanum.
Athyrium Filix-fœmina multifidum.
Athyrium Filix-fœmina Fieldiæ.
Blechnum Spicant strictum.
Scolopendrium vulgare marginatum.
Scolopendrium vulgare subcornutum.
Lastrea Filix-mas cristata.

E. WOOD, Esq., Hanger Hill House, Ealing. (F. Preece, gardener.)

Polystichum aculeatum.
Lastrea Filix-mas.
Blechnum Spicant.
Blechnum Spicant var.
Osmunda regalis.
Asplenium marinum.
Lastrea dilatata.
Onoclea sensibilis.
Athyrium Filix-fœmina.
Polystichum angulare proliferum.
Polystichum angulare imbricatum.
Scolopendrium vulgare.

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener.)

Scolopendrium vulgare.
Adiantum Capillus-veneris.
Lastrea Standishii.
Allosorus crispus.
Cystopteris dentata.
Athyrium Filix-fœmina Fieldiæ.
Scolopendrium vulgare cristatum.
Scolopendrium vulg. marginatum.
Cystopteris fragilis.
Athyrium Filix-fœmina depauperatum.
Athyrium Filix-fœmina laciniatum lineatum.
Lastrea Filix-mas cristata.

*** Fourth Prize withheld by the Jurors.

(50.)—6 TREE FERNS, not fewer than 3 species.—1st Prize, 15*l.*; 2nd Prize, 10*l.*; 3rd Prize, 5*l.* (*Open.*)

Mr. T. WILLIAMS, Interior Gardens, Crystal Palace, Sydenham. [*1st Prize.*]

Cyathea medullaris (2). | Cyathea dealbata (2). | Dicksonia antarctica (2).

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*2nd Prize.*]

Dicksonia antarctica.
Alsophila australis.
Alsophila contaminans.
Alsophila Macarthuri.
Cyathea dealbata.
Cyathea medullaris.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [*3rd Prize.*]

Dicksonia antarctica (2).
Dicksonia squarrosa.
Alsophila australis.
Cyathea dealbata.
Cyathea Smithii.

Mr. JOHN WATSON, New Zealand Nursery, St. Alban's.

Dicksonia squarrosa.
Cyathea medullaris.
Cyathea Smithii (3).
Cyathea dealbata.

(51.)—3 TREE FERNS, distinct.—1st Prize, 7*l.*; 2nd Prize, 5*l.*; 3rd Prize, 3*l.* (*Open, for exhibitors not showing in No. 50.*)

Mr. WILLIAM BULL, King's Road, Chelsea. [*2nd Prize.*]

Dicksonia antarctica. | Alsophila australis. | Cyathea medullaris.

Miss BURDETT COUTTS, Holly Lodge, Highgate. (C. Hutt, gard.) [*3rd Prize.*]

Dicksonia antarctica. | Cyathea dealbata. | Alsophila australis.

*** First Prize withheld by the Jurors.

(52.)—The finest TREE FERN.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Mr. T. WILLIAMS, Interior Gardens, Crystal Palace, Sydenham. [*1st Prize.*]
Cyathea medullaris.

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*2nd Prize.*]
Dicksonia antarctica.

Mr. WILLIAM BULL, King's Road, Chelsea. [*3rd Prize.*]
Dicksonia antarctica.

H. L. MICHOLLS, Esq., Summerfield, Bowdon. (T. Baines, gardener.)
Dicksonia antarctica.

T. HOBSON, Esq., Pownall Hall, Wilmslow, Cheshire. (W. Kelland, gardener.)
Cyathea dealbata.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway.
Dicksonia antarctica.

(53.)—12 LYCOPODS, distinct.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

J. W. TAYLOR, Esq., River House, Woodberry Down, Seven Sisters Road, Stoke Newington. (Henry Barnard, gardener.) [*1st Prize.*]

Selaginella stolonifera.	Selaginella apoda.	Selaginella denticulata.
Selaginella Martensii.	Selaginella erythropus.	Selaginella variabilis.
Selaginella Galeottii.	Selaginella Danielsiana.	Selaginella cuspidata.
Selaginella cæsia.	Selaginella umbrosa.	Selaginella Willdenovii.

The DUKE OF NORTHUMBERLAND, Syon House, Isleworth. (George Fairbairn, gardener.) [*2nd Prize.*]

Selaginella africana.	Selaginella dichrous.	Selaginella Martensii.
Selaginella Avilæ.	Selaginella filicina.	Selaginella pubescens.
Selaginella cæsia.	Selaginella formosa.	Selaginella umbrosa.
Selaginella caulescens.	Selaginella inæqualifolia.	Selaginella apoda.

Mrs. BARCHARD, Putney Heath. (M. Higgs, gardener.) [*3rd Prize.*]

Selaginella varia.	Selaginella plumosa.	Selaginella stolonifera.
Selaginella umbrosa.	Selaginella africana.	Selaginella densa.
Selaginella erythropus.	Selaginella inæqualifolia.	Selaginella Martensii.
Selaginella lævigata.	Selaginella Schottii.	Selaginella Galeottii.

(54.)—6 LYCOPODS, distinct.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*1st Prize.*]

Selaginella Martensii variegata.	Selaginella japonica variegata.	Lycopodium sp. nov. Solomon Islands.
Selaginella japonica.	Selaginella rubricaulis.	Selaginella formosa.

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener.) [*2nd Prize.*]

Selaginella cuspidata.	Selaginella plumosa.	Selaginella Martensii.
Selaginella Willdenovii.	Selaginella Schottii.	Selaginella microphylla.

W. R. G. FARMER, Esq., Nonsuch Park. (S. M. Carson, gard.) [*Commended.*]

Selaginella apoda.	Selaginella caulescens.	Selaginella Martensii.
Selaginella brasiliensis.	Selaginella stolonifera.	Selaginella umbrosa.

Mrs. BARCHARD, Putney Heath. (M. Higgs, gardener.)

Selaginella densa.	Selaginella Schottii.	Selaginella cæsia.
Selaginella Martensii.	Selaginella Galeottii.	Selaginella lævigata.

J. H. BUCHAN, Esq., The Grove, Hanwell. (G. Venner, gardener.)

Selaginella uncinata.	Selaginella apoda.	Selaginella umbrosa.
Selaginella formosa.	Selaginella denticulata.	Selaginella (seedling).

J. J. BLANDY, Esq., Highgrove, Reading. (A. Ingram, gardener.)

Selaginella formosa.	Selaginella cæsia.	Selaginella stolonifera.
Selaginella Galeottii.	Selaginella erecta.	Selaginella umbrosa.

(55.)—10 ARADS (Alocasia, Colocasia, Philodendron, Xanthosoma, Dieffenbachia, &c.,—Caladium excepted), distinct.—1st Prize, 7*l.*; 2nd Prize, 5*l.*; 3rd Prize, 3*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*1st Prize.*

Alocasia zebrina.	Alocasia gigantea.	Dieffenbachia grandis.
Alocasia Veitchii.	Dieffenbachia variegata.	Aglaonema commutatum variegatum.
Alocasia Lowii.	Dieffenbachia Baraquiniana.	
Alocasia longiloba.		

CLASS 55.

Madame C. LEGRELLE D'HANIS, Berchem. (F. Vervoort, gardener.) [2nd Prize.]

Philodendron crassipes.	Arisæma serotinum.	Anthurium cordifolium.
Philodend. pinnatifolium.	Anthurium Augustinianum.	Anthurium lucidum.
Philodendron pertusum.	Anthurium leuconeurum.	Pothos crassinervium.
Monstera cannæfolia.		

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway.

Alocasia metallica.	Dieffenbachia seguina picta.	Philodendron cannæfolium.
Alocasia Lowii.	Alocasia zebrina.	Dieffenbachia gigantea.
Colocasia macrorhiza variegata.	Dieffenbachia grandis.	Philodendron pertusum.
		Xanthosoma vivipara.

*** Third Prize withheld by the Jurors.

(56.)—6 EXOTIC ARALIADS (Aralia, Sciadophyllum, Oreopanax, Didymopanax, &c.), distinct.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [1st Prize.]

Aralia papyrifera.	Sciadophyllum sp.	Oreopanax platanifolium.
Aralia Sieboldii.	Oreopanax peltatum.	Oreopanax dactylifolium.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [2nd Prize.]

Aralia Sieboldii.	Aralia quinquefolia.	Tupidanthus calyptratus.
Aralia trifoliata.	Aralia punctiloba.	Aralia farinifera.

(57.)—6 BROMELIADS (Billbergia, Tillandsia, Vriesia, Pouretia, Æchmea, &c.), distinct, in Flower.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

(No entry.)

(58.)—12 MARANTADS (Maranta, Phrynium, Calathea, &c.), distinct, —1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [1st Prize.]

Maranta Veitchii.	Maranta argyræa.	Maranta Jagoriana.
Maranta zebrina.	Maranta striata.	Maranta tubispatha.
Maranta vittata.	Maranta Porteana.	Maranta Van den Heckii.
Maranta splendida.	Maranta regalis.	Maranta fasciata.

Madame C. LEGRELLE D'HANIS, Berchem, Anvers. (F. Vervoort, gr.) [2nd Prize.]

Phrynium maculatum.	Maranta ornata picta.	Maranta Jagoriana.
Phrynium Van den Heckii.	Maranta orbifolia.	Maranta roseo-lineata.
Maranta truncata.	Maranta pulchella.	Maranta zebrina.
Maranta ornata.	Maranta variegata.	Maranta majestica.

(59.)—25 DWARF CACTI (Mamillaria, Echinocactus, &c.), distinct. 1st Prize, 5*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.* (*Open.*)

M. CH. PFERSDORFF, 78, South Row, Kensal New Town, London; and 110, Avenue de St. Ouen, Batignolles, Paris. [1st Prize.]

Mamillaria centricirra, *Lem.*	Echinocactus myriostigma, *Salm.*
Mamillaria elephantidens, *Lem.*	Echinocactus Pfeifferi, *Zucc.*
Mamillaria formosa, *Scheidw.*	Echinocactus Pfersdorffi, *Lemaire.*
Mamillaria hystrix, *Mart.*	Echinocactus platyceras, *Lem.*
Mamillaria Muehlenpfordtii, *Först.*	Echinocactus Pottsii, *Scheer.*
Mamillaria pyrrhocephala, *Scheidw.*	Echinocactus recurvus, *Otto.*
Melocactus communis, *D. C.*	Echinocactus setispinus, *Engelm.*
Echinocactus Echidne, *D. C.*	Echinocactus Wislizenii, *Engelm.*
Echinocactus Cumingii, *Salm.*	Echinopsis Eyriesii, *Zucc.*
Echinocactus gibbosus, *D. C.*	Echinopsis valida, *Monv.*
Echinocactus hyptiacanthus, *Lem.*	Echinopsis Zuccariniana, *Pfr.*
Echinocactus macrodiscus, *Mart.*	Pilocereus senilis, *Lemaire.*
Echinocactus Monvillii, *Lem.*	

CHARLES HOLLAND DUTTON, Esq. 25, Milsom Street, Bath. (Thomas Escott, gardener.) [*2nd Prize.*]

Echinocactus Scopa.
Echinocactus helophorus.
Echinopsis multiplex.
Echinopsis Decaisneana.
Echinopsis Eyriesii.
Echinopsis formosa.
Echinopsis Zuccariniana.
Cereus chilensis.
Cereus peruvianus monstrosus.
Cereus cinerascens.
Cereus candicans.
Cereus strigosus.
Mammillaria discolor.
Mammillaria dolichocentra.
Mammillaria Stella aurata.
Mammillaria rhodantha.
Mammillaria rhodantha cristata.
Mammillaria angularis.
Mammillaria kewensis.
Mammillaria gracilis.
Mammillaria stellaris.
Opuntia cylindrica multiformis.
Opuntia missouriensis.
Opuntia corrugata.
Pilocereus senilis.

Mrs. PATTISON, Wrackleford House, Dorchester. (G. Winzer, gard.) [*3rd Prize.*]

Mamillaria senilis.
Mamillaria centricirra.
Mamillaria orthacantha.
Mamillaria Scopa.
Mamillaria Scopa gracilis.
Mamillaria Oderii.
Mamillaria Schiediana.
Mamillaria pectinifera.
Mamillaria straminea.
Mamillaria lanifera.
Mamillaria aureiceps.
Mamillaria gladiata.
Mamillaria virens cristata.
Mamillaria dolycantha.
Mamillaria Fischerii.
Cereus senilis.
Mamillaria maschalantha.
Mamillaria dolycantha.
Echinocactus recurva.
Echinocactus hexaedrophorus.
Echinocactus fulvispina.
Echinocactus ingens.
Echinocactus subulifera.
Echinocactus chiliensis.
Echinocactus niger.

A. MONGREDIEN, Esq., Forest Hill, Sydenham. (Charles E. Waters, gardener.)

Mamillaria quadrispina variegata nivea.
Mamillaria Mystax.
Mamillaria bicolor.
Mamillaria fuscata.
Mamillaria crocidata.
Mamillaria Hermanni.
Mamillaria bocasana.
Mamillaria Senkii.
Mamillaria aureiceps.
Mamillaria Ludwigii.
Mamillaria dolichocentra spinis nigris.
Mamillaria amphimelæna.
Mamillaria polyedra.
Mamillaria guttata.
Mamillaria Muhlenpfordtii.
Pilocereus fossulatus.
Malacocarpus erinaceus.
Malacocarpus Courantii.
Echinocactus electracantha.
Echinocactus sinuatus.
Echinocactus Pottsii.
Echinocactus theiacanthus.
Echinopsis Eyriesii.
Echinopsis Zuccariniana.
Echinopsis Zuccariniana Rholandii.

W. B. KELLOCK, Esq., Stamford Hill, London.

Mamillaria viridis cristata (2).
Mamillaria uncinata.
Mamillaria crucigera.
Mamillaria Ludwigii.
Mamillaria Palmeri.
Mamillaria cornifera.
Mamillaria Galeottei.
Mamillaria sphærotricha.
Mamillaria nivea.
Mamillaria Polei.
Mamillaria Schiedeana.
Mamillaria Shelhassii.
Mamillaria elephantidens.
Mamillaria senilis.
Mamillaria polyedra.
Mamillaria Cumingii.
Mamillaria formosa.
Mamillaria gracilis.
Mamillaria monstrosa.
Echinocactus Scopa.
Echinocactus hexædrophorus.
Echinocactus Monvillii.
Echinocactus gibbosus nobilis.
Echinocactus setispinus.

(60.)—6 TALL CACTI (Epiphyllum, Cereus, &c.), distinct, in Flower. —1st Prize, 5*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.* (*Open.*)

Entered but did not exhibit:—
Mr. H. POTTER, Nurseryman, Sutton.

(61.)—12 HARDY TAXADS (Taxus, Cephalotaxus, Torreya, &c.), distinct.—1st Prize, 5*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*1st Prize.*]

Arthrotaxis selaginoides.
Cephalotaxus Fortunei.
Cephalotaxus drupacea.
Cephalotaxus pedunculata.
Taxus adpressa.
Taxus japonica.
Taxus baccata variegata aurea.
Taxus baccata elegantissima.
Taxus fastigiata.
Taxus erecta.
Torreya myristica.
Torreya nucifera.

CLASS 61

Messrs. **WATERER & GODFREY**, Nurserymen, Knaphill, Woking. [*2nd Prize.*]
(No particulars furnished.)

Messrs. **PAUL & SON**, Old Cheshunt Nurseries, Cheshunt. [*3rd Prize.*]

Taxus adpressa.
Taxus fastigiata.
Taxus nigra.
Taxus striata.
Taxus Dovastoni.
Taxus elegantissima.
Taxus elegantissima foliis argenteis nova.
Taxus baccata foliis aureis.
Taxus pyramidalis variegata.
Podocarpus japonica.
Podocarpus andina.
Cephalotaxus Fortunei.

Messrs. **JOHN & CHARLES LEE**, Royal Vineyard Nursery, Hammersmith.

Podocarpus andina.
Taxus baccata Dovastoni.
Taxus baccata fastigiata.
Taxus baccata aurea.
Taxus adpressa.
Taxus baccata Crowderi.
Taxus baccata erecta.
Taxus baccata elegantissima.
Taxus canadensis dumosa.
Taxus japonica.
Taxus ericoides.
Fitzroya patagonica.

Mr. **JOHN STANDISH**, Royal Nursery, Ascot, Berks; and 52, St. George's Place, Knightsbridge.

Taxus koraiana.
Taxus adpressa.
Taxus adpressa stricta.
Taxus baccata fastigiata aurea.
Taxus ericoides.
Taxus Crowderi.
Taxus Daviesii.
Arthrotaxis Doniana.
Arthrotaxis imbricata.
Cephalotaxus Fortunei robusta.
Cephalotaxus drupacea.
Torreya grandis.

Mr. **WILLIAM PAUL**, Paul's Nurseries, Waltham Cross.

Taxus cheshuntensis.
Taxus Dovastoni.
Taxus elegantissima.
Taxus Jacksoni.
Taxus nigra.
Taxus nana.
Taxus variegata.
Taxus adpressa.
Taxus fastigiata.
Taxus erecta.
Cephalotaxus Fortunei.
Podocarpus andina.

(62.)—25 HARDY CONIFERS, distinct, Taxads excepted.—1st Prize, 15*l.*; 2nd Prize, 10*l.*; 3rd Prize, 5*l.* (*Open.*)

Messrs. **JAMES VEITCH & SONS**, King's Road, Chelsea. [*1st Prize.*]

Araucaria imbricata.
Biota orientalis aureo-variegata.
Cedrus Deodara robusta.
Cryptomeria japonica Lobbii.
Cupressus Lawsoniana.
Larix Kæmpferi.
Libocedrus tetragona.
Juniperus chinensis.
Picea amabilis.
Picea bracteata.
Picea lasiocarpa.
Picea nobilis magnifica.
Picea Pinsapo.
Pinus Benthamiana.
Pinus macrocarpa.
Retinospora lycopodioides.
Retinospora pisifera.
Thujopsis dolabrata.
Thujopsis borealis.
Thuja aurea.
Thuja gigantea.
Thuja Lobbii.
Thuja japonica.
Thuja pendula.
Wellingtonia gigantea.

Messrs. **WATERER & GODFREY**, Nurserymen, Knaphill, Woking. [*2nd Prize.*]
(No particulars furnished.)

Mr. **JOHN STANDISH**, Royal Nursery, Ascot, Berks; and 52, St. George's-place, Knightsbridge. [*3rd Prize.*]

Abies nobilis.
Abies Pinsapo.
Abies Lowii.
Abies Kæmpferi.
Abies Douglasii.
Abies inverta.
Abies grandis.
Abies Nordmanniana.
Abies nobilis magnifica cœrulea.
Abies Albertiana.
Abies Pichta.
Cedrus Deodara.
Cupressus Lawsoniana.
Pinus densa.
Pinus parviflora.
Pinus Jeffreyi.
Pinus Lambertiana.
Retinospora obtusa.
Retinospora pisifera.
Retinospora filiformis.
Thuja gigantea.
Thuja Lobbii.
Thuja compacta aureo-variegata.
Thujopsis dolabrata.
Juniperus rigida.
Wellingtonia gigantea.

(63.)—12 HARDY CONIFERS, distinct, Taxads excepted.—1st Prize, 7*l.*; 2nd Prize, 5*l.*; 3rd Prize, 3*l.* (*Open, for exhibitors not showing in No.* 62.)

Messrs. J. and C. **LEE**, Royal Vineyard Nursery, Hammersmith. [*1st Prize.*]

Arceuthos drupacea.
Wellingtonia gigantea.
Picea Pinsapo.
Picea nobilis.
Picea grandis.
Picea lasiocarpa.
Picea Nordmanniana.
Abies excelsa aurea.
Abies excelsa finedonensis.
Abies Wittmanniana.
Thuja gigantea.
Thujopsis borealis.

CLASS 63

Messrs. GEORGE JACKMAN and SON, Woking Nursery, Surrey. [2nd Prize.]

Thujopsis borealis.	Araucaria imbricata.	Juniperus virginiana.
Cedrus Deodara.	Picea Pinsapo.	Pinus Cembra.
Thuja gigantea.	Picea Nordmanniana.	Abies orientalis.
Thuja Wareana.	Cupressus Lawsoniana.	Wellingtonia gigantea.

Mr. CHARLES TURNER, Royal Nurseries, Slough. [3rd Prize.]

Abies Albertiana.	Picea nobilis.	Retinospora pisifera.
Cupressus Lawsoniana erecta.	Picea Nordmanniana.	Pinus pygmea.
Picea Lowiana.	Pseudolarix Kæmpferi.	Thujopsis borealis.
	Retinospora obtusa.	

Mr. WILLIAM PAUL, Paul's Nurseries, Waltham Cross.

Pinus Pallasiana.	Wellingtonia gigantea.	Juniperus thurifera.
Abies Deodara.	Araucaria imbricata.	Thujopsis borealis.
Picea Nordmanniana.	Pinus Lambertiana.	Thuja gigantea.
Picea nobilis.	Pinus Cembra helvetica.	Thuja aurea.

Messrs. PAUL and SON, Old Cheshunt Nurseries, Cheshunt.

Thujopsis borealis.	Juniperus phœnicea.	Fitzroya patagonica.
Thuja gigantea.	Cupressus Lawsoniana.	Pinus Fremontiana.
Picea Pinsapo.	Abies orientalis.	Araucaria imbricata.
Picea nobilis.	Juniperus virginiana striata.	
Picea Nordmanniana.		

(64.)—12 GREENHOUSE CONIFERS (Araucaria, Dammara, &c.), not fewer than 6 species.—1st Prize, 10*l.*; 2nd Prize, 7*l.*; 3rd Prize, 4*l.* (*Open.*)

Mr. WILLIAM BULL, King's Road, Chelsea. [1st Prize.]

Araucaria Bidwillii (2). 15 guineas each.
Araucaria excelsa (2). 10 guineas and 8 guineas each.
Araucaria Cunninghamii (2). 10 guineas each.
Araucaria Cunninghamii glauca (1). 5 guineas.
Araucaria Cookii (2). 3 guineas each.
Araucaria brasiliana (1). 2 guineas.
Libocedrus Doniana (2). 3 guineas each.

III.—COLLECTIONS REPRESENTING GENERA.

Steward:—Mr. CHARLES TURNER.

Jurors.

Classes 67 to 79. { M. Linden, Brussels. Mr. Vair, Dangstein. Mr. Hill, Keele Hall, Newcastle. Mr. Williams, Crystal Palace.

Classes 80 to 86. { Mr. Richards, Grimston Park, Tadcaster. Mr. Carson, Cheam. Mr. Bisset, Croxteth Park, Liverpool.

Classes 87 to 97. { M. Krelage, Haarlem. Mr. A. McKenzie, Alexandra Park. Mr. Clark, Studley Royal. Mr. W. H. Baxter, Oxford.

(65.)—10 EVERGREEN BERBERIS, including Mahonia, not fewer than 5 species or varieties.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

(No entry).

(66.)—3 AUCUBAS in Berry, any kind.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith. [1st Prize.]

Aucuba japonica maculata (3).

CLASS 66.

Messrs. **Waterer & Godfrey**, Knaphill, Woking. [*2nd Prize.*]

Aucuba himalaica. | Aucuba japonica vera.
Aucuba japonica latimaculata.

Messrs. **James Veitch & Sons**, King's Road, Chelsea. [*3rd Prize.*]

Aucuba japonica vera (3).

Mr. **John Standish**, Ascot, Berks; and 52, St. George's Place, Knightsbridge.

Aucuba japonica vera. | Aucuba himalaica.
Aucuba japonica albo-variegata.

Mr. **William Bull**, King's Road, Chelsea. (Two entries.)

Aucuba japonica maculata (3). | Aucuba japonica fœmina viridis (3).

(67.)—2 Musas.—1st Prize, 4*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

P. L. **Hinds**, Esq., The Lodge, Byfleet, Surrey. (J. Carr, gardener.)

Musa Cavendishii (2).

R. **Barclay**, Esq., West Hill, Highgate. (W. Young, gardener.)

Musa Cavendishii. | Musa sapientum.

*** Prizes withheld by the Jurors.

(68.)—12 Caladiums, distinct.—1st Prize, 7*l.*; 2nd Prize, 5*l.*; 3rd Prize, 3*l.* (*Open.*)

A. **Wattenbach**, Esq., Camberwell. (A. Goodwin, grrdener.) [*1st Prize.*]

Caladium bicolor splendens.	Caladium Chantinii.	Caladium rubricaule.
Caladium Belleymei.	Caladium Houllettii.	Caladium Wightii.
Caladium Brongniartii.	Caladium mirabile.	Caladium hæmatostigma.
	Caladium picturatum.	Caladium bicolor.
	Caladium pœcile.	

Messrs. **Arthur Henderson & Co.**, Pine Apple Place. [*2nd Prize.*]

Caladium argyrites.	Caladium picturatum.	Caladium Wightii.
Caladium Belleymei.	Caladium pœcile (kewense).	Caladium Cannartii.
Caladium bicolor magnificum.	Caladium Houllettii.	Caladium mirabile.
Caladium Chantinii.	Caladium Troubetskoyi.	Caladium formosum.

The **Duke of Northumberland**, Syon House. (G. Fairbairn, gr.) [*3rd Prize.*]

Caladium amabile.	Caladium Chantinii.	Caladium Lemaireanum.
Caladium argyrites.	Caladium discolor.	Caladium mirabile.
Caladium Belleymei.	Caladium hæmatostigma.	Caladium pictum.
Caladium bicolor major.	Caladium Houllettii.	Caladium Wightii.

Mdme. **Caroline Legrelle d'Hanis**, Berchem, Anvers. (F. Vervoort, gard.)

Caladium bicolor splendens.	Caladium Chantinii.	Caladium Brongniartii.
Caladium Verschaffeltii.	Caladium hæmatostigma.	Caladium pœcile.
Caladium Wightii.	Caladium albo-punctatissimum.	Caladium regale.
Caladium Cannartii.	Caladium bicolor.	Caladium Troubetskoyi.

M. **Ambroise Verschaffelt**, 50, Rue du Chaume, Ghent.

Caladium Duc de Nassau.	Caladium amabile.	Caladium Fredericii.
Caladium Leopoldii.	Caladium Schillerianum.	Caladium Lemonierii.
Caladium Cannartii.	Caladium Thelemannii.	Caladium Hendrickxii.
Caladium albo-conspersum.	Caladium Williamsii.	Caladium egregium.

P. L. **Hinds**, Esq., the Lodge, Byfleet, Surrey. (J. Carr, gardener.)

Caladium argyrites.	Caladium Belleymei.	Caladium pœcile.
Caladium bicolor splendens.	Caladium Lowii.	Caladium Wightii.
Caladium bicolor Cannartii.	Caladium mirabile.	Caladium Chantinii.
	Caladium Brongniartii.	Caladium distillatorium.
	Caladium regale.	

CLASS

(69.)—3 ANTHURIUMS, distinct, in Flower or not.—1st Prize, 3*l*, 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [1*st Prize.*]

Anthurium magnificum. | Anthurium Scherzerianum. | Anthurium leuconeurum.

MR. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [2*nd Prize.*]

Anthurium acaule. | Anthurium magnificum. | Anthurium Scherzerianum.

Messrs. ARTHUR HENDERSON & Co., Pine Apple Place. [3*rd Prize.*]

Anthurium Augustinianum. | Anthurium magnificum. | Anthurium leuconeurum.

(70.)—6 NEPENTHES, distinct.—1st Prize, 8*l.*; 2nd Prize, 6*l.*; 3rd Prize, 4*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [1*st Prize.*]

Nepenthes Rafflesiana.	Nepenthes Dominiana.	Nepenthes Phyllamphora.
Nepenthes Hookeri.	Nepenthes lævis.	Nepenthes sp.

Entered but did not exhibit:—

Mrs. ALSTON, Elmdon Hall, Birmingham. (W. Brown, gardener.)

(71.)—The finest NEPENTHES.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [1*st Prize.*]
Nepenthes Rafflesiana.

W. W. BULLER, Esq., Strete Ralegh, Exeter. (E. Culley, gardener.) [2*nd Prize.*]
Nepenthes Dominiana.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [3*rd Prize.*]
Nepenthes Phyllamphora.

(72.)—9 SARRACENIAS, not fewer than 6 species.—1st Prize, 10*l.* 2nd Prize, 7*l.*; 3rd Prize, 5*l.* (*Open.*)

H. L. MICHOLLS, Esq., Summerfield, Bowdon. (T. Baines, gard.) [1*st Prize.*]

Sarracenia Drummondii alba.	Sarracenia variolaris.	Sarracenia purpurea rubronervia.
Sarracenia Drummondii rubra.	Sarracenia flava (2).	Sarracenia sp.
	Sarracenia purpurea.	
	Sarracenia sp.	

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [2*nd Prize.*]

Sarracenia Drummondii (2).	Sarracenia purpurea major.	Sarracenia flava picta.
Sarracenia Drummondii alba.	Sarracenia flava.	Sarracenia rubra.
Sarracenia purpurea.		Sarracenia variolaris.

(73.)—10 BEGONIAS, distinct, with Ornamental Foliage.—1st Prize, 4*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.*; 4th Prize, 1*l.* (*Open.*)

W. H. STONE, Esq., M.P., Dulwich Hill. (R. Smee, gardener.) [1*st Prize.*]

Begonia Keramis.	Begonia Victor Lemoine.	Begonia Secretaire Kegeljan.
Begonia Madame Allwardt.	Begonia President Van den Hecke.	Begonia grandis.
Begonia Helen Uhder.	Begonia Manoel da Silva Briscky.	Begonia Van Roon.
Begonia Comte Alfred de Limminghe.		

Sir F. H. GOLDSMID, Bart M.P., St. John's Lodge, Regent's Park. (George Wheeler, gardener.) [2*nd Prize.*]

Begonia Victoria.	Begonia Wheeleri.	Begonia splendida argentea.
Begonia President Van den Hecke.	Begonia Duchesse de Brabant.	Begonia Rex.
Begonia Cloth of Silver.	Begonia grandis.	Begonia Mdme Allwardt.
		Begonia Queen Victoria.

CLASS 73.

J. H. BUCHAN, Esq., The Grove, Hanwell. (G. Venner, gardener.) [3rd *Prize*.]

Begonia argentea splendens.
Begonia grandis.
Begonia Lord Clyde.
Begonia Marshallii.
Begonia Queen Victoria.
Begonia Victor Lemoine.
Begonia Madame Albert.
Begonia SecretaireMorren.
Begonia Mine d'Argent.
Begonia Rex.

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener.) [4th *Prize*.]

Begonia Marquis de St. Innocent.
Begonia President Van den Hecke.
Begonia Manoel da Silva Brisckу.
Begonia Keramis.
Begonia ricinifolia.
Begonia Madame Thibaut.
Begonia Duchesse de Brabant.
Begonia imperialis.
Begonia Griffithii.
Begonia Richardsonii.

(74.)—6 BEGONIAS, distinct, in Flower.—1st Prize, 3*l*.; 2nd Prize, 2*l*.; 3rd Prize, 1*l*. (*Open*.)

FELIX PRYOR, Esq., Digswell, Welwyn. (W. Earley, gardener.) [1st *Prize*.]

Begonia odorata.
Begonia manicata.
Begonia Saundersii.
Begonia delicata.
Begonia digswelliensis.
Begonia hybrida Earleyi.
} Garden hybrids.

(75.)—1 ALLAMANDA, in Flower.—1st Prize, 2*l*.; 2nd Prize, 1*l*. (*Open*.)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [1st *Prize*.]
Allamanda cathartica.

Exhibited but did not enter :—

Messrs. A. HENDERSON & Co., Pine Apple Nursery, Edgware Road.
Allamanda grandiflora.

Entered but did not exhibit :—

Miss SAVAGE, Tetbury Lodge, Cheltenham. (James Cypher, gardener.)
Allamanda grandiflora.

Mrs. TREDWELL, St. John's Lodge, Norwood. (B. Peed, gardener.)
Allamanda grandiflora.

Madame LEGRELLE D'HANIS, Berchem. (F. Vervoort, gardener.)

(76.)—1 CROTON.—1st Prize, 2*l*.; 2nd Prize, 1*l*. (*Open*.)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [1st *Prize*.]
Croton variegatum.

Mrs. ALSTON, Elmdon Hall, Birmingham. (Wm. Brown, gr.) [2nd *Prize*.]
Croton variegatum.

Entered but did not exhibit :—

Madame CAROLINE LEGRELLE D'HANIS, Berchem, Anvers. (F. Vervoort, gardener.)
Croton angustifolium.

H. L. MICHOLLS, Esq., Summerfield, Bowdon. (T. Baines, gardener.)
Croton variegatum.

(77.)—1 CLERODENDRON, in Flower.—1st Prize, 2*l*.; 2nd Prize, 1*l*. (*Open*.)

Mr. ROBERT PARKER, Exotic Nursery, Tooting, Surrey. [1st *Prize*.]
Clerodendron Balfourianum.

Messrs. A. HENDERSON & Co., Pine Apple Nursery, Edgware Rd. [2nd *Prize*.]
Clerodendron Kæmpferi.

HORATIO L. MICHOLLS, Esq., Summerfield, Bowdon. (T. Baines, gardener.)
Clerodendron Thompsonæ.

Entered but did not exhibit :—

Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith.

CLASS
(78.)—1 IXORA, in Flower.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*1st Prize.*]
Ixora amboinensis.

Entered but did not exhibit:—
T. P. W. BUTT, Esq., Arle Court, Cheltenham. (James May, gardener.)
Ixora coccinea.
H. L. MICHOLLS, Esq., Summerfield, Manchester. (T. Baines, gardener.)
Ixora amboinensis.
Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith.
Ixora coccinea superba.
Mrs. TREDWELL, St. John's Lodge, Norwood. (B. Peed, gardener.)
Ixora alba.

(79.)—1 DIPLADENIA, in Flower.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

Entered but did not exhibit:—
H. L. MICHOLLS, Esq., Summerfield, Bowdon, Cheshire. (T. Baines, gardener.)
Dipladenia crassinoda.

(80.)—3 GREENHOUSE RHODODENDRONS, distinct, in Flower.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*1st Prize.*]
Rhododendron jasminiflorum. | Rhododendron Gibsoni.
Rhododendron Veitchii lævigatum.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [*2nd Prize.*]
Rhododendron Maddeni. | Rhododendron Boothii. | Rhododendron Gibsoni.

Mr. WILLIAM BULL, King's Road, Chelsea. [*3rd Prize.*]
Rhododendron Falconeri. | Rhododendron Princess Beatrice. | Rhododendron salmonium.

(81.)—10 GREENHOUSE ERICAS, distinct, in Flower.—1st Prize, 10*l.*; 2nd Prize, 7*l.*; 3rd Prize, 5*l.*; 4th Prize, 3*l.* (*Open.*)

Mrs. TREDWELL, St. John's Lodge, Norwood. (B. Peed, gardener.) [*1st Prize.*]

Erica eximia superba.	Erica Devoniana.	Erica affinis.
Erica perspicua nana.	Erica depressa.	Erica tortuliflora.
Erica florida.	Erica ventricosa magnifica.	Erica Cavendishiana.
Erica mutabilis.		

Mr. OSMAN RHODES, Nurseryman, Sydenham. [*2nd Prize.*]
(No particulars furnished.)

Messrs. THOMAS JACKSON & SON, Kingston, Surrey. [*3rd Prize.*]

Erica depressa, £10 10*s.*	Erica Webbiana.	Erica elegans.
Erica Cavendishiana.	Erica depressa multiflora.	Erica vent. coccinea minor.
Erica Victoriæ.	Erica perspicua nana.	Erica florida.
Erica fastigiata lutescens.		

(82.)—6 GREENHOUSE ERICAS, distinct, in Flower.—1st Prize, 6*l.*; 2nd Prize, 5*l.*; 3rd Prize, 3*l.*; 4th Prize, 2*l.* (*Amateurs.*)

J. J. BLANDY, Esq., Highgrove, Reading. (A. Ingram, gardener.) [*1st Prize.*]

Erica Cavendishiana.	Erica perspicua nana.	Erica propendens.
Erica Lindleyana.	Erica Spenceriana.	Erica ventricosa magnifica.

J. PHILPOTT, Esq., Stamford Hill. (J. Wheeler, gardener.) [*2nd Prize.*]

Erica florida.	Erica coccinea minor.	Erica depressa.
Erica magnifica.	Erica Cavendishiana.	Erica Alberti.

CLASS 82.

W. LEAF, Esq., Park Hill, Streatham. (Thos. Page, gardener.) [*3rd Prize.*]

Erica elegans.	Erica ventricosa magnifica.	Erica vasiflora.
Erica ventricosa coccinea.	Erica depressa.	Erica depressa multiflora.

W. H. STONE, Esq., M.P., Leigh Park, Havant. (G. Young, gard.) [*4th Prize.*]

Erica Cavendishiana.	Erica Beaumontiæ.	Erica tricolor Jacksoni.
Erica tortuliflora.	Erica mundula.	Erica ventricosa carnea.

The EARL OF LOVELACE, Horsley Towers, Surrey. (Wm. Kaile, gardener.)

Erica Devoniana.	Erica ventricosa coccinea.	Erica ventricosa magnifica.
Erica Victoria Regina.	Erica elegans.	Erica ventricosa grandiflora.

(83.)—20 GREENHOUSE ERICAS, in Flower, in pots not more than 10 inches across, not fewer than 10 kinds.—1st Prize, 7*l.*; 2nd Prize, 5*l.*; 3rd Prize, 3*l.*; 4th Prize, 2*l.* (*Open.*)

Messrs. THOMAS JACKSON & SON, Kingston, Surrey. [*1st Prize.*]

Frica Spenceriana (2).	Erica perspicua nana (2).	Erica ampullacea scotica.
Erica Devoniana (2).	Erica ventricosa coccinea minor (2).	Erica candidissima.
Erica mirabilis (2).	Erica Beaumontiæ.	Erica tricolor Wilsonii.
Erica mutabilis (2).	Erica dilecta.	Erica Candolleana.
Erica Victoriæ (2).		

Entered but did not exhibit:—

Mr. O. RHODES, Nurseryman, Sydenham.

Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith.

(84.)—1 GREENHOUSE ERICA, in Flower.—1st Prize, 3*l.*; 2nd Prize, 2*l.* (*Open.*)

Mrs. TREDWELL, St. John's Lodge, Norwood. (B. Peed, gardener). [*1st Prize.*]
Erica obbata.

T. CANNING, Esq., Westbury-on-Trym, Bristol. (A. Morse, gr.) [*2nd Prize.*]
Erica Cavendishiana.

Mrs. E. COLE & SONS, Fog Lane Nurseries, Withington, Manchester. [*3rd Prize.*]
Erica suaveolens superba.

T. HOBSON, Esq., Pownall Hall, Wilmslow, Cheshire. (W. Kelland, gardener.)
Erica aristata superba.

Entered but did not exhibit:—

T. P. W. BUTT, Esq., Arle Court, Cheltenham. (James May, gardener.)
Erica jasminiflora alba.

J. J. BLANDY, Esq., Highgrove, Reading. (A. Ingram, gardener).

(85.)—10 GREENHOUSE YUCCAS, BEAUCARNEAS, DASYLIRIUMS, &c. —1st Prize, 10*l.*; 2nd Prize, 7*l.*; 3rd Prize, 5*l.*; 4th Prize, 3*l.* (*Open.*)

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [*1st Prize.*]

Yucca albo-spica.	Yucca quadricolor.	Dasylirium latifolium.
Yucca aloifolia variegata.	Beaucarnea recurvata.	Yucca aloifolia.
Yucca Stokesii.	Beaucarnea glauca.	Yucca canaliculata.
	Dasylirium acrotrichum.	

M. JEAN VERSCHAFFELT, 43, Rue de la Caverne, Ghent. [*2nd Prize.*]

Yucca quadricolor.	Beaucarnea recurvata.	Yucca aloifolia filamentosa.
Yucca aloifolia variegata.	Dasylirium longifolium.	Dasylirium serratum.
Yucca cornuta arborea.	Yucca albo-spica.	
Beaucarnea glauca.	Bonapartea gracilis.	

CLASS 85.

W. B. KELLOCK, Esq., Stamford Hill, London. [3rd Prize.]

Dasylirium acrotrichum.	Beaucarnea stricta.	Yucca ciliata.
Dasylirium acrotrichum brevifolium.	Beaucarnea recurvata.	Yucca canaliculata.
Dasylirium Hartwegianum.	Yucca tricolor.	Yucca filifera.
	Yucca aloifolia variegata.	

Mr. WILLIAM BULL, King's Road, Chelsea. [4th Prize.]

Yucca aloïfolia (1). 4 guineas.	Beaucarnea glauca (2). 4 guineas the pair.
Yucca aloïfolia variegata (2). 10 guineas each.	Dasylirium longifolium (1).
Yucca canaliculata (2). 6 guineas the pair.	Yucca quadricolor (1). 2 guineas.
Beaucarnea recurvata (1). 4 guineas.	Yucca quadricolor reflexa (1).

(86.)—10 DRACÆNAS or CORDYLINES, distinct.—1st Prize, 10*l.*; 2nd Prize, 7*l.*; 3rd Prize, 5*l.*; 4th Prize, 3*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [1st Prize.]

Dracæna Eschscholtziana.	Dracæna Draco.	Dracæna robusta.
Dracæna indivisa lineata.	Dracæna ferrea.	Dracæna Cooperi.
Dracæna austr. latifolia.	Dracæna Knerckii.	Cordyline indivisa.
Dracæna nigrescens.		

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [2nd Prize.]

Dracæna lineata.	Dracæna ensifolia.	Dracæna ferrea.
Dracæna indivisa.	Dracæna marginata.	Dracæna cannæfolia.
Dracæna Rumphii.	Dracæna Cooperi.	Cordyline indivisa.
Dracæna Draco Böerhavii.		

Messrs. THOMAS JACKSON & SON, Kingston, Surrey. [3rd Prize.]

Dracæna australis.	Dracæna ensifolia.	Dracæna excelsa.
Dracæna ferrea.	Dracæna Draco.	Cordyline australis.
Dracæna ferrea variegata.	Dracæna reflexa.	Cordyline heliconifolia.
Dracæna Rumphii.		

Mr. WILLIAM BULL, King's Road, Chelsea. [4th Prize.]

Dracæna australis.	Dracæna Cooperi.	Dracæna marginata.
Dracæna australis latifolia.	Dracæna Ehrenbergi.	Dracæna nigricans.
Dracæna australis Veitchii.	Dracæna terminalis latifolia pendula.	Dracæna arborea.
Dracæna ferrea variegata.		

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener).

Dracæna indivisa.	Dracæna terminalis.	Dracæna stricta variegata.
Dracæna australis.	Dracæna stricta.	Dracæna marginata.
Dracæna ferrea.	Dracæna rubra.	Cordyline indivisa.
Dracæna Cooperi.		

(87.)—6 LILIUMS, in Flower, not fewer than 3 sorts.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Mr. CHARLES TURNER, Royal Nurseries, Slough. [1st Prize.]

Lilium auratum.	Lilium japonica Brownii.	Lilium fulgidum.

(88.)—6 Pots of LILIUM AURATUM, in Flower, the pots not more than 10 inches across.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Mr. CHARLES TURNER, Royal Nurseries, Slough. [1st Prize.]
Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [2nd Prize.]
Mr. WILLIAM BULL, King's Road, Chelsea. [3rd Prize.]

Entered but did not exhibit:—

Mr. JOHN STANDISH, Royal Nursery, Ascot, Berks; and 52, St. George's Place, Knightsbridge.

Messrs. BARR & SUGDEN, King Street, Covent Garden.

CLASS

(89.)—24 AGAVES, not fewer than 12 species or varieties.—1st Prize, 10*l.*; 2nd Prize, 7*l.*; 3rd Prize, 5*l.*; 4th Prize, 3*l.* (*Open.*)

M. JEAN VERSCHAFFELT, 43, Rue de la Caverne, Ghent. [1*st Prize.*]

Agave filifera.
Agave chloracantha.
Agave sp. Jalapa.
Agave schidigera.
Agave Noacki.
Agave Milleri.
Agave Ghiesbreghtii.
Agave univittata.
Agave Jacobiana.
Agave coccinea.
Agave lætevirens marginata.
Agave heteracantha.
Agave virginica.
Agave americana medio-picta.
Agave stenophylla.
Agave ferox.
Agave Verschaffeltii var.
Agave Verschaffeltii crenata.
Agave Kerchovei.
Agave amœna.
Agave xalapensis.
Agave americana, fol. var.
Agave sp. ?
Agave Ousselghemiana.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [2*nd Prize.*]

Agave heteracantha longifolia.
Agave americana.
Agave americana variegata.
Agave americana aureo-striata.
Agave Salmiana.
Agave filifera.
Agave filifera longifolia.
Agave excelsa.
Agave schidigera.
Agave univittata.
Agave medio-picta.
Agave dealbata.
Agave Bonapartea.
Agave cœrulescens.
Agave picta longifolia.
Agave chlorocantha.
Agave longæva.
Agave lophantha.

M. CHARLES PFERSDORFF, 73, South Row, Kensal New Town, Paddington, London; and 110, Avenue de St. Ouen, Batignolles, Paris. [3*rd Prize.*]

Agave americana, *L.*
Agave americana medio-lutea.
Agave americana striata.
Agave americana variegata.
Agave amœna, *Hort.*
Agave angustifolia, *Haw.*
Agave applanata, *Hort.*
Agave Celsiana, *Hook.*
Agave chloracantha, *Salm.*
Agave coccinea, *Roezl.*
Agave densiflora, *Hook.*
Agave filifera, *Salm.*
Agave filifera longifolia.
Agave Ghiesbreghtii, *Lem.*
Agave heteracantha cœrulescens, *Zucc.*
Agave hystrix, *Salm.*
Agave mexicana, *Lem.*
Agave mexicana picta.
Agave potatorum, *Zucc.*
Agave Salmiana, *Otto.*
Agave schidigera, *Lem.*
Agave univittata, *Haw.*
Agave xylinacantha, *Lem.*
Agave yuccæfolia, *Red.*

(90.)—10 AGAVES, distinct.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [1*st Prize.*]

Agave interrupta.
Agave aurea striata.
Agave densiflora.
Agave schidigera.
Agave medio-picta.
Agave filifera longifolia.
Agave univittata.
Agave filifera.
Agave heteracantha.
Agave americana variegata.

M. JEAN VERSCHAFFELT, 43, Rue de la Caverne, Ghent. [2*nd Prize.*]

Agave filifera.
Agave dealbata.
Agave schidigera.
Agave Verschaffeltii var.
Agave stenophylla.
Agave coccinea.
Agave sp. Chiapas.
Agave Kerchovei.
Agave Ghiesbreghtii.
Agave filifera compacta.

W. B. KELLOCK, Esq., Stamford Hill, London. [3*rd Prize.*]

Agave ensiformis.
Agave yuccæfolia.
Agave potatorum.
Agave cœrulea.
Agave striata.
Agave variegata.
Agave applanata.
Agave filifera.
Agave univittata.
Agave juncea filamentosa.

M. AMBROISE VERCHAFFELT, 50, Rue du Chaume, Ghent.

Agave applanata.
Agave nigro-dentata.
Agave Ghiesbreghtii.
Agave angustifolia, fol. eleganti-variegatis.
Agave Verschaffeltii.
Agave Verschaffeltii streptacantha.
Agave Verschaffeltii spectabilis.
Agave Verschaffeltii compacta.
Agave Verschaffeltii elegans.
Agave dealbata.

CLASS 90

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener.)

Agave americana.	Agave geminiflora.	Agave americana medio-picta.
Agave americana variegata.	Agave coccinea.	Agave applanata.
Agave americana variegata striata.	Agave univittata.	Agave schidigera.
	Agave filifera.	

(91.)—12 AMARYLLIS, distinct, in Flower.—1st Prize, 4*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [*1st Prize.*]

Amaryllis Souvenir d'un Ami.	Amaryllis Queen of the Netherlands.	Amaryllis Anderson.
Amaryllis Goliath.	Amaryllis Panthéon.	Amaryllis Hereditaire.
Amaryllis Belladona.	Amaryllis Madame Goldsmidt.	Amaryllis Enfant Chéri.
Amaryllis Fair Helen.		Amaryllis Madlle. Rachel.
		Amaryllis Stephenson.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway. [*2nd Prize.*]

Amaryllis robusta.	Amaryllis Quartermaster.	Amaryllis Princess Helena.
Amaryllis Ackermanni pulcherrima.	Amaryllis Cleopatra.	Amaryllis Evening Star.
Amaryllis Favourite.	Amaryllis Williamsii.	Amaryllis exquisita.
Amaryllis Holfordii.	Amaryllis Flora.	Amaryllis grandis.

Mr. ROBERT PARKER, Exotic Nursery, Tooting, Surrey. [*3rd Prize.*]

Amaryllis Ackermanni pulcherrima.	Amaryllis formosa.	Amaryllis Quartermaster.
Amaryllis vittata amabilis.	Amaryllis Holfordii.	Amaryllis Splendens.
Amaryllis Delicata.	Amaryllis Johnsonii psittacina.	Amaryllis Sultan.
Amaryllis Favourite.	Amaryllis Matilda.	Amaryllis Sweetii.
		Amaryllis vittata rubra.

(92.)—6 AMARYLLIS, distinct, in Flower.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Amateurs.*)

Entered but did not exhibit :—

R. BARCLAY, Esq., West Hill, Highate, N. (W. Young, gardener.)

T. CANNING, Esq., Westbury-on-Trym, Bristol. (A. Morse, gardener.)

(93.)—1 ORANGE TREE, in Flower or Fruit.—1st Prize, 5*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.* (*Open.*)

Mr. WILLIAM BULL, King's Road, Chelsea. [*2nd Prize.*]
A specimen Orange Tree. 15 guineas.

Messrs. OSBORN & SONS, Fulham Nursery. [*3rd Prize.*]
A large Bush Orange Tree.

Miss WOOD, The Elms, Hanger Hill, Ealing. (Edward Fountain, gardener.)
Seville Orange; a dwarf tree in flower and fruit.

Mrs. BARCHARD, Putney Heath. (M. Higgs, gardener.)
A Standard Myrtle-leaved Orange Tree.

E. OATES, Esq., Bydorp House, Hanwell. (Richard Marcham, gardener.)
A Mandarin Orange Tree.

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener.)
A large Standard St. Michael's Orange Tree.

Rev. A. H. BRIDGES, Beddington House, Croydon. (James August, gardener.)
(No particulars furnished.)

Messrs. A. HENDERSON & Co., Pine Apple Nursery, Edgware Road.
(No particulars furnished.)

*** First Prize withheld by the Jurors.

(94.)—12 ORANGE TREES, &c., in Flower or Fruit.—1st Prize, 7*l.*; 2nd Prize, 5*l.*; 3rd Prize, 3*l.* (*Open.*)

Mr. WILLIAM BULL, King's Road, Chelsea. [*3rd Prize.*]
Price of the trees, 2 guineas each.

*** First and Second Prizes withheld by the Jurors.

CLASS

(95.)—6 Bougainvillæas, in Flower, any species.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Mr. Charles Turner, Royal Nurseries, Slough. [*1st Prize.*]
Bougainvillæa glabra.
Bougainvillæa speciosa.

(96.)—1 Tuberous Tropæolum, in Flower.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

(No entry.)

(97.)—12 Cape Pelargoniums, distinct, in Flower.—1st Prize, 4*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Mr. Jabez J. Chater, Gonville Nurseries, Cambridge. [*1st Prize.*]

Pelargonium quinquevulnerum.
Pelargonium ardens.
Pelargonium odoratissimum majus (Prince of Orange).
Pelargonium glutinosum.
Pelargonium hederæfolium.
Pelargonium hybridum.
Pelargonium grossulariæfolium variegatum; and others.

IV.—COLLECTIONS REPRESENTING SPECIES AND VARIETIES.

Stewards:— (Classes 98—125) Mr. Charles Edmonds.
(Classes 126—154) Mr. Robert Fortune.

Jurors.

Classes 98 to 101.	Mr. M. Young, Milford. Mr. Neilson, Falkirk. Mr. Laing, Forest Hill.
Classes 102 to 109.	Mr. Kinghorn, Richmond. Mr. W. Thomson, Dalkeith. Mr. G. Baker, Stamford Hill.
Classes 110 to 117.	Mr. Z. Stevens, Trentham. Mr. Keynes, Salisbury. Mr. Perry, Sawbridgeworth.
Classes 118 to 125.	Mr. W. Ingram, Belvoir Castle. Mr. Gordon, Crystal Palace. Mr. Roger, Berry Hill, Maidenhead.
Classes 126 to 130.	M. Sello, Potsdam. Rev. Joshua Dix, Camden Town. Mr. W. Earley, Digswell. Mr. R. Roser, Tulse Hill.
Classes 131 to 136.	Mr. G. W. Hoyle, Reading. Mr. G. Smith, Phœnix Park, Dublin. Mr. H. May, Bedale.
Classes 137 to 146.	Mr. W. Dean, Shipley. Mr. J. Sladden, Ash, Sandwich. Mr. C. Lidgard, Hammersmith.
Classes 147 to 154.	Mr. G. Smith, Hornsey Road. Mr. G. Clarke, Streatham. Mr. H. Chilman, Ringwood.

(98.)—3 Standard Hardy Rhododendrons, in Flower.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Messrs. Waterer & Godfrey, Knaphill Nursery, Woking. [*1st Prize.*]
(No particulars furnished.)

(99.)—1 Standard Hardy Rhododendron, in Flower.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Mr. John Standish, Royal Nursery, Ascot, Berks; and 52, St. George's Place, Knightsbridge. [*1st Prize.*]
Rhododendron papilionaceum.

CLASS

(100.)—30 Hardy Rhododendrons, in Flower, not fewer than 15 varieties.—1st Prize, 15*l.*; 2nd Prize, 10*l.*; 3rd Prize, 7*l.*; 4th Prize, 5*l.* (*Open.*)

Mr. John Standish, Royal Nursery, Ascot, Berks; and 52, St. George's Place, Knightsbridge. [*1st Prize.*]

Rhododendron mirabilis.
Rhododendron Neilsoni.
Rhododendron Leviathan.
Rhododendron Gen. Lee.
Rhododendr. fimbriatum.
Rhododendron chianoides.
Rhododendr. Sir J. Moore.
Rhododendron Schiller.
Rhododendron Star of England.
Rhododendron Marquis of Downshire.
Rhododendron Paxtoni.
Rhododendron Fireball.
Rhododendron Exquisite.
Rhododendron Lady E. Cathcart.
Rhododendron Mme. Miolan-Carvalho.
Rhododendron Minnie.
Rhododendron candidissimum.
Rhododendron Bylsianum.
Rhododendron Lady Godiva.
Rhododendron Iago.
Rhododendron limbatum.
Rhododendron Amilcar.
Rhododendron The Gem.
Rhododendron Flora Macdonald.
Rhododendron Rosabelle.
Rhododendron Brayanum.
Rhododendron Dr. Blount.
Rhododendron The Ceyx.
Rhododendron Mrs. Mangles.
Rhododendron Portia.

Messrs. H. Lane & Son, Nurserymen, Great Berkhampstead. [*2nd Prize.*]

Rhododendron coriaceum.
Rhododendron Apollon.
Rhododendron flos pictus.
Rhododendron Mentor.
Rhododendron Empress Eugénie.
Rhododendron maximum blush.
Rhododendron album grandiflorum.
Rhododendron maculatum superbum.
Rhododendron Evereatianum.
Rhododendron Queen of the West.
Rhododendron giganteum.
Rhododendron Victoria, (*Lee*).
Rhododendron Nashville.
Rhododendron Moorei.
Rhododendron Bylsianum.
Rhododendron fastuosum, fl. pl.
Rhododendron album elegans.
Rhododendron delicatissimum.
Rhododendron macranthum.
Rhododendron Victoria, (*Pince*).
Rhododendron Towardii.
Rhododendron Blandyanum.
Rhododendron Vervaeneanum.
Rhododendron Sherwoodianum.
Rhododendron Étendard de Flandres.
Rhododendron perspicuum.
Rhododendron Nobleanum bicolor.
Rhododendron Duc de Brabant, (*Van Houtte*).
Rhododendron Archimedes.
Rhododendron Madame Miolan-Carvalho.

Entered but did not exhibit:—
Messrs. Waterer & Godfrey, Knaphill Nursery, Woking.

(101.)—12 Hardy Rhododendrons, distinct, in Flower.—1st Prize, 6*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.*; 4th Prize, 2*l.* (*Open, for exhibitors not showing in No.* 100.)

(No entry.)

(102.)—8 Greenhouse Azaleas, distinct, in Flower.—1st Prize, 12*l.*; 2nd Prize, 10*l.*; 3rd Prize, 7*l.*; 4th Prize, 5*l.* (*Amateurs.*)

W. R. G. Farmer, Esq., Nonsuch Park, Cheam. (S. M. Carson, gr.) [*1st Prize.*]

Azalea (indica) speciosissima.
Azalea (indica) Broughtonii.
Azalea (indica) Iveryana.
Azalea (indica) Malvina.
Azalea (indica) Murrayana.
Azalea (indica) Symmetry.
Azalea (indica) Exquisite.
Azalea (indica) formosa superba.

Thos. Canning, Esq., Westbury-on-Trym, Bristol. (A. Morse, gr.) [*2nd Prize.*]

Azalea (indica) Criterion.
Azalea (indica) Empress Eugénie.
Azalea (indica) Duke of Devonshire.
Azalea (indica) Gem.
Azalea (indica) optima.
Azalea (indica) speciosissima.
Azalea (indica) Etoile de Gand.
Azalea (indica) Gledstanesii.

CLASS 102

H. H. GIBBS, Esq., St. Dunstan's, Regent's Park. (C. Penny, gr.) [*3rd Prize.*]

Azalea (ind.) Kinghornii.
Azalea (indica) lateritia.
Azalea (indica) Juliana.
Azalea (indica) Iveryana.
Azalea (indica) Gledstanesii.
Azalea (indica) Magnet.
Azalea (indica) Criterion.
Azalea (indica) Extranii.

Mrs. TREDWELL, St. John's Lodge, Norwood. (B. Peed, gardener.) [*4th Prize.*]

Azalea (indica) Prince Albert.
Azalea (indica) Constantia rosea.
Azalea (indica) Iveryana.
Azalea (indica) Extranii.
Azalea (indica) Criterion.
Azalea (indica) Juliana.
Azalea (indica) Jenkinsii superba.
Azalea (indica) optima.

Madame C. LEGRELLE D'HANIS, Berchem, Anvers. (F. Vervoort, gardener.)

Azalea (indica) papilionacea.
Azalea (indica) Donna Maria.
Azalea (indica) Exquisite.
Azalea (indica) Madèle.
Azalea (indica) optima.
Azalea (indica) Symmetry.
Azalea (indica) Louise Margottin.
Azalea (indica) Alexandre II.

(103.)—8 GREENHOUSE AZALEAS, distinct, in Flower.—1st Prize, 12*l.*; 2nd Prize, 10*l.*; 3rd Prize, 7*l.*; 4th Prize, 5*l.* (*Nurserymen.*)

Mr. CHARLES TURNER, Royal Nurseries, Slough. [*1st Prize.*]

Azalea (indica) Perryana.
Azalea (indica) illustris nova.
Azalea (indica) variegata.
Azalea (indica), Sir C. Napier.
Azalea (indica) Criterion.
Azalea (indica) Barclayana.
Azalea (indica) Iveryana.
Azalea (indica) Chelsoni.

Messrs. JAMES VEITCH & SONS, Chelsea. [*2nd Prize.*]

Azalea (indica) Magnificent.
Azalea (indica) Criterion.
Azalea (indica) Extranii.
Azalea (indica) Juliana.
Azalea (indica) Trotteriana.
Azalea (indica) carnea superba.
Azalea (indica) Chelsoni.
Azalea (indica) Cedo nulli.

Mr. O. RHODES, Nurseryman, Sydenham. [*3rd Prize.*]
(No particulars furnished.)

(104.)—6 GREENHOUSE AZALEAS, distinct, in Flower.—1st Prize, 7*l.*; 2nd Prize, 5*l.*; 3rd Prize, 3*l.*; 4th Prize, 2*l.* (*Amateurs, not showing in No.* 102.)

E. J. COLEMAN, Esq., Stoke Park, Slough. (J. Chalmers, gard.) [*1st Prize.*]

Azalea (indica) præstantissima.
Azalea (indica) Perryana.
Azalea (indica) rosea punctata.
Azalea (indica) Criterion.
Azalea (indica) Gem.
Azalea (indica) lateritia alba suprema.

J. PHILPOTT, Esq., Stamford Hill. (J. Wheeler, gardener.) [*2nd Prize.*]

Azalea (indica) Gledstanesii.
Azalea (indica) formosa.
Azalia (indica) Juliana.
Azalea (indica) Criterion.
Azalea (indica) Iveryana.
Azalea (indica) Symmetry.

J. J. BLANDY, Esq., Highgrove, Reading. (A. Ingram, gardener.) [*3rd Prize.*]

Azalea (indica) Criterion.
Azalea (indica) Sir Charles Napier.
Azalea (indica) rosea superba.
Azalea (indica) Exquisite.
Azalea (indica) Iveryana.
Azalea (indica) Glory of Sunninghill.

JULIUS SICHEL, Esq., Lark Hill, Timperley. (J. Stevenson, gr.) [*4th Prize.*]

Azalea (indica) Juliana.
Azalea (indica) Magnificent.
Azalea(indica)Trotteriana.
Azalea (indica) Gem.
Azalea(indica)Distinction.
Azalea (indica) Apollo.

R. HUDSON, Esq., Clapham Common. (Thomas Todman, gardener.)

Azalea (indica) Juliana.
Azalea (indica) Magnificent
Azalea (indica) delicatissima.
Azalea (indica) Holfordii.
Azalea (indica) Beauty of Europe.
Azalea (indica) Criterion.

CLASS 104

EDWARD WOOD, Esq., Newbold Revel, Rugby. (T. Coysh, gardener.)

Azalea (indica) Beauty of Europe.	Azalea (indica) striata formosissima.	Azalea (indica) variegata.
Azalea (indica) Magnificent.	Azalea (indica) Glory of Sunninghill.	Azalea (indica) Perryana.

(105.)—6 GREENHOUSE AZALEAS, distinct, in Flower.—1st Prize, 6*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.* (*Nurserymen, not showing in No.* 103.)

Messrs. H. LANE & SON, Nurserymen, Great Berkhamstead. [1*st Prize.*]

Azalea (indica) præstantissima.	Azalea (indica) alba melior.
Azalea (indica) semi-duplex maculata.	Azalea (indica) lateritia.
Azalea (indica) Broughtonii (Smith's).	Azalea (indica) Chelsonii.

Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith. [2*nd Prize.*]

Azalea (indica) Leeana.	Azalea (indica) purpurea.
Azalea (indica) perfecta elegans.	Azalea (indica) Iveryana.
Azalea (indica) Maria Louisa.	Azalea (indica) Gem.

Messrs. S. GLENDINNING & SONS, Nurserymen, Chiswick. [3*rd Prize.*]

Azalea (indica) Extranii.	Azalea (indica) Madame Meillez.
Azalea (indica) Eulalie.	Azalea (indica) optima.
Azalea (indica) Murrayana.	Azalea (indica) alba lutescens.

Messrs. JAMES IVERY & SON, Dorking and Reigate. [4*th Prize.*]

Azalea (indica) Flower of the day.	Azalea (indica) Baron de Vriere.
Azalea (indica) Empress Eugénie.	Azalea (indica) Criterion.
Azalea (indica) petuniæflora.	Azalea (indica) violacea superba.

Messrs. WILLIAM CUTBUSH & SON, Nursery, Highgate.

Azalea (indica) Alexander II.	Azalea (indica) Sir Charles Napier.
Azalea (indica) præstantissima.	Azalea (indica) Minerva.
Azalea (indica) Holfordiana.	Azalea (indica) optima.

Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway.

Azalea (indica) alba magna.	Azalea (indica) Prince Albert.
Azalea (indica) lateritia.	Azalea (indica) perfecta elegans.
Azalea (indica) Magnet.	Azalea (indica) coronata.

(106.)—3 GREENHOUSE AZALEAS, distinct, in Flower.—1st Prize, 4*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Amateurs, not showing in Nos.* 102 *or* 104.)

The EARL OF LOVELACE, East Horsley Towers. (W. Kaile, gard.) [1*st Prize.*]

Azalea (indica) Iveryana. | Azalea (indica) Jennerii.
Azalea (indica) Beauty of Europe.

The EARL PERCY, Albury Park, Guildford. (W. Kemp, gard.) [2*nd Prize.*]

Azalea (indica) Queen Victoria.	Azalea (indica) Broughtoni.	Azalea (indica) Criterion.

SIR F. H. GOLDSMID, Bart., M.P., St. John's Lodge, Regent's Park. (George Wheeler, gardener.) [3*rd Prize.*]

Azalea (indica) Prince of Wales. | Azalea (indica) Broughtoni.
Azalea (indica) Beauty of Europe.

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener.)

Azalea (indica) alba.	Azalea (indica) macrantha purpurea.
Azalea (indica) Flag of Truce.	

Entered but did not exhibit:—

T. P. W. BUTT, Esq., Arle Court, Cheltenham. (James May, gardener.)

Azalea (indica) Perryana. | Azalea (indica) Extranii. | Azalea (indica) Criterion.

Miss SAVAGE, Tetbury Lodge, Cheltenham. (James Cypher, gardener.)

Azalea (indica) white. | Azalea (indica) salmon. | Azalea (indica) deep red.

CLASS

(107.)—3 Greenhouse Azaleas, distinct, in Flower.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Nurserymen, not showing in Nos.* 103 *or* 105.)

Messrs. John Dobson & Sons, Woodlands Nursery, Isleworth. [*1st Prize.*]

Azalea (indica) Murrayana.
Azalea (indica) Perryana.
Azalea (indica) Magnificent.

Mr. R. Baxindine, Nurseryman, Guildford. [*2nd Prize.*]

Azalea (indica) formosissima.
Azalea (indica) Model.
Azalea (indica) Iveryana.

Mr. W. C. Drummond, Nurseryman, Weston Road, Bath. [*3rd Prize.*]

Azalea (indica) Magnificent.
Azalea (indica) Beauty of Europe.
Azalea (indica) præstantissima.

Mrs. E. Cole & Sons, Fog Lane Nurseries, Withington, Manchester.

Azalea (indica) Sir Charles Napier.
Azalea (indica) Gledstanesii formosa.
Azalea (indica) Hendersoni.

(108.)—1 Greenhouse Azalea, in Flower.—1st Prize, 3*l.*; 2nd Prize, 2*l.* (*Open.*)

Mr. Charles Turner, Royal Nurseries, Slough. [*1st Prize.*]
Azalea (indica) Etoile de Gand.

Messrs. James Veitch & Sons, King's Road, Chelsea. [*2nd Prize.*]
Azalea (indica) President.

W. R. G. Farmer, Esq., Nonsuch Park, Cheam. (S. M. Carson, gr.) [*3rd Prize.*]
Azalea sinensis.

Thomas Canning, Esq., Westbury-on-Trym, Bristol. (Abraham Morse, gard.)
Azalea (indica) Gledstanesii.

Messrs. H. Lane & Son, Nurserymen, Great Berkhamstead.
Azalea (indica) President Humann.

(109.)—20 Greenhouse Azaleas, distinct, in Flower, in pots not more than 12 inches across, not fewer than 10 varieties.—1st Prize, 10*l.*; 2nd Prize, 7*l.*; 3rd Prize, 5*l.*; 4th Prize, 3*l.* (*Open.*)

Mr. Charles Turner, Royal Nurseries, Slough. [*1st Prize.*]

Azalea (indica) Duc de Nassau.
Azalea (indica) Duchesse Adelaide de Nassau.
Azalea (indica) Cedo nulli.
Azalea (indica) Perfection.
Azalea (indica) Madame Meillez.
Azalea (indica) Louis Napoleon.
Azalea (indica) Comte de Hainault.
Azalea (indica) salmonia albo-cincta.
Azalea (indica) Flower of the day.
Azalea (indica) Waxwork.
Azalea (indica) President.
Azalea (indica) Mars.
Azalea (indica) Louise von Baden.
Azalea (indica) Kinghornii.
Azalea (indica) Madame Ambroise Verschaffelt.

Messrs. James Ivery & Son, Dorking and Reigate. [*2nd Prize.*]

Azalea (indica) ardens.
Azalea (indica) Baron de Vriere (2).
Azalea (indica) Extranii.
Azalea (indica) Charles Enke.
Azalea (indica) Criterion (2).
Azalea (indica) Duc d'Aremburg.
Azalea (indica) Duchesse Adelaide de Nassau.
Azalea (indica) Empress Eugénie.
Azalea (indica) Etoile de Gand (2).
Azalea (indica) Flower of the day.
Azalea (indica) Gem.
Azalea (indica) Iveryana.
Azalea (indica) Madame Michel.
Azalea (indica) Mad. A. Verschaffelt.
Azalea (indica) President Claëys.
Azalea (indica) Extranii.
Azalea (indica) Roi Leopold.
Azalea (indica) variegata superba.

Messrs. H. LANE & SON, Nurserymen, Great Berkhamstead. [*3rd Prize.*]

Azalea (indica) Mars (2).	Azalea (indica) Magnificent (2).
Azalea (indica) Chelsoni (2).	Azalea (indica) Mad. A. Verschaffelt.
Azalea (indica) Gledstanesii.	Azalea (indica) Rosalie Van Geert.
Azalea (indica) elegantissima.	Azalea (indica) Leopold I.
Azalea (indica) Gem.	Azalea (indica) Perfection.
Azalea (indica) Iveryana.	Azalea (indica) Criterion.
Azalea (indica) Juliana.	Azalea (indica) Roi Leopold (2).

Messrs. J. and C. LEE, Royal Vineyard Nursery, Hammersmith. [*4th Prize.*]

Azalea (indica) Admiration.	Azalea (indica) petuniæflora.
Azalea (indica) Juliana (2).	Azalea (indica) Stanleyana.
Azalea (indica) Holfordii (2).	Azalea (indica) Criterion (2).
Azalea (indica) Grieswoodiana.	Azalea (indica) Mars.
Azalea (indica) Miltoni.	Azalea (indica) President.
Azalea (indica) Eulalie (2).	Azalea (indica) Extranii.
Azalea (indica) Frostii.	Azalea (indica) Iveryana.
Azalea (indica) Glory of Sunninghill.	Azalea sinensis.

(110.)—10 ROSES, in Flower, distinct, in pots not more than 13 inches across.—1st Prize, 12*l* ; 2nd Prize, 7*l*.; 3rd Prize, 5*l*. ; 4th Prize, 3*l*. (*Open.*)

Mr. CHARLES TURNER, Royal Nurseries, Slough. [*1st Prize.*]

H.P. Victor Verdier.	H.P. General Jacqueminot.	H.P. Anna Alexieff.
B. Souvenir de Malmaison.	H.P. Madame Boll.	H.P. Baronne Prevost.
Tea, Souvenir d'un Ami.	Tea, Madame Damaizin.	H.C. Chas. Lawson.
H.P. Vicomte Vigier.		

Mr. WM. PAUL, Paul's Nurseries, Waltham Cross. [*2nd Prize.*]

H.B. Paul Perras.	Tea, Madame de St. Joseph.	Tea, Madame Villermoz.
H.C. Juno.	H.P. Baronne Prevost.	Tea, Souvenir d'un Ami.
H.P. General Jacqueminot.	H.P. Comtesse de Chabrillant.	H.P. Louise Odier.
H.P. Caroline de Sansal.		

Messrs. PAUL & SON, Old Cheshunt Nurseries, Cheshunt. [*3rd Prize.*]

H.P. John Hopper.	Tea, Madame Villermoz.	Nois. Céline Forestier.
H.P. Madame Julie Daran.	Tea, Niphetos.	H.C. Paul Ricaut.
H.P. Victor Verdier.	Tea, Madame de St. Joseph.	H.C. Chas. Lawson.
Tea, Souvenir d'un Ami.		

Messrs. E. P. FRANCIS & CO., Nurseries, Hertford. [*4th Prize.*]

Tea, Souvenir d'un Ami.	H.P. Triomphe de Paris.	H.P. Jules Margottin.
Tea, Madame Villermoz.	H.P. Madame Hector Jacquin.	H.P. Gen. Jacqueminot.
Tea, Souvenir d'Elise Vardon.	H.P. Baronne Prevost.	H.B. Paul Perras.
		H.C. Chénédolé.

Messrs. H. LANE & SON, Nurserymen, Great Berkhamstead.

H.P. Victor Verdier.	H.P. General Jacqueminot.	H.P. Baronne Prevost.
H.C. Charles Lawson.	H.P. Charles Lefebvre.	H.P. Anna de Diesbach.
H.B. Paul Perras.	H.B. Paul Ricaut.	Tea, Vicomtesse de Cazes.
H.C. Chénédolé.		

(111.)—6 ROSES, in Flower, distinct, in pots not more than 13 inches across.—1st Prize, 7*l*.; 2nd Prize, 4*l*.; 3rd Prize, 2*l*. (*Amateurs.*)

A. G. PULLER, Esq., Youngsbury, Ware. (T. Terry, gardener.) [*1st Prize.*]

H.C. Charles Lawson.	H.C. Paul Ricaut.	Tea, Vicomtesse de Cazes.
H.B. Paul Perras.	H.P. Baronne Prevost.	Tea, Madame Villermoz.

E. J. COLEMAN, Esq., Stoke Park, Slough. (J. Chalmers, gard.) [*2nd Prize.*]

H.P. Charles Lawson.	H.P. La Reine.	H.P. Vicomte Vigier.
H.P. Gen. Jacqueminot.	H.P. Mad. Cambacères.	H.P. Victor Verdier.

Entered but did not exhibit :—

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener.)

CLASS

(112.)—6 New Roses, not sent out previous to 1863-4, in Flower, in any sized pot.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Mr. William Paul, Paul's Nurseries, Waltham Cross. [*1st Prize.*]

H.P. Kate Hausburg.
H.P. Madame de Stella.
H.P. Pierre Notting.
H.P. Alpaide de Rotalier.
H.P. Paul de la Meilleray.
H.P. Elizabeth Vigneron.

Messrs. Paul & Son, Old Cheshunt Nurseries, Cheshunt. [*2nd Prize.*]

H.P. Achille Gonod.
H.P. Alpaide de Rotalier.
H.P. Princess Mary of Cambridge.
H.P. Lord Clyde.
H.P. Mad. Victor Verdier.
H.P. Madame de Stella.

Mr. Charles Turner, Royal Nurseries, Slough. [*3rd Prize.*]

H.P. Madame Victor Verdier.
H.P. Alpaide de Rotalier.
Tea, Jaune d'Or.
H.P. Charles Wood.
H.P. Maréchal Souchet (Damaizin).
H.P. Mons. Boncenne.

Messrs. H. Lane & Son, Nurserymen, Great Berkhamstead.

H.P. Laurent Descours.
H.P. Jean Goujon.
H.P. Pierre Notting.
B. Baronne Gonella.
H.P. Lord Clyde.
H.P. Princess of Wales.

(113.)—1 Rose, in Flower.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

Mr. Charles Turner, Royal Nurseries, Slough. [*1st Prize.*]
H.P. Comtesse de Chabrillant.

Mr. William Paul, Paul's Nurseries, Waltham Cross. [*2nd Prize.*]
Tea, President.

Messrs. E. P. Francois & Co., Nurseries, Hertford.
Tea, Souvenir d'un Ami.

Messrs. Paul & Son, Old Cheshunt Nurseries, Cheshunt.
H.P. Lælia.

Messrs. H. Lane & Son, Nurserymen, Great Berkhamstead.
H.P. Chénédolé.

(114.)—20 Roses, in Flower, distinct, in pots not more than 8 inches across.—1st Prize, 6*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.*; 4th Prize, 2*l.* (*Open.*)

Mr. Charles Turner, Royal Nurseries, Slough. [*1st Prize.*]

Tea, President.
H.P. Charles Lawson.
H.P. Victor Verdier.
Nois. Céline Forestier.
H.P. Gen. Jacqueminot.
H.P. Professor Koch.
Tea, Souvenir d'un Ami.
H.P. Leopold Hausburg.
Tea, Madame Damaizin.
H.P. Madame Caillat.
H.P. Prince C. de Rohan.
H.P. Vicomte Vigier.
H.P. Auguste Mie.
H.P. John Hopper.
H.P. Charles Lefebvre.
Tea, Alba rosa.
H.P. Paul de la Meilleray.
H.P. Alphonse Belin.
Tea, Vicomtesse de Cazes.
H.P. Madame Falcot.

Mr. William Paul, Paul's Nurseries, Waltham Cross. [*2nd Prize.*]

H.P. Le Rhone.
H.P. Mad. Charles Wood.
H.P. Bernard Palissy.
H.P. Pierre Notting.
H.P. Madame Clemence Joigneaux.
H.P. Elizabeth Vigneron.
H.P. Victor Verdier.
H.P. Beauty of Waltham.
H.P. Madame Alfred de Rougemont.
H.P. Kate Hausburg.
H.P. Rev. H. Dombrain.
H.P. John Hopper.
H.P. Madame Victor Verdier.
Tea, President.
Tea, Comtesse de Brossard.
Tea, Souvenir d'Un Ami.
H.P. S. de St. Bernardin de St. Pierre.
H.P. Modele de Perfection.
Tea, Alba rosa.
Bourb. Souvenir de la Malmaison.

Messrs. Paul & Son, Old Cheshunt Nurseries, Cheshunt. [*3rd Prize.*]

H.P. Olivier Delhomme.
H.P. Anna Alexieff.
H.P. Baronne Adolphe de Rothschild.
H.P. Beauty of Waltham.
H.P. John Hopper.
H.P. Lord Clyde.
H.P. Lælia.
H.P. Madame A. de Rougemont.
H.P. Xavier Olibo.
H.P. Carol de Sansal.
H.P. Belle Normandie.
H.P. Princess Mary of Cambridge.
H.P. Duchesse de Caylus.
H.P. Victor Verdier.
Tea, Alba rosa.
Tea, Mad. Villermoz.
Tea, President.
HBP. Michel Bonnet.
HBP. Catherine Guillot.
HC. Charles Lawson.

CLASS 114

Entered but did not exhibit:—

Messrs. H. LANE & SON, Nurserymen, Great Berkhamstead.

H.P. Baron de Rothschild.	H.P. Madame Derreux Douville.	H.P. Jean Goujon.
H.P. Gloire de Chatillon.	H.P. John Hopper.	H.P. Reynolds Hole.
H.P. Madame Victor Verdier.	H.P. Madame Julie Daran	H.P. Professor Koch.
H.P. Madame Boutin.	H.P. Madame A. de Rougemont.	H.P. Madame Vidot.
H.P. Duchesse de Morny.	H.P. Louise Darzens.	H.P. La Brillante.
H.P. Beauty of Waltham.	H.P. Pierre Notting.	H.P. L'Eblouissante.
		H.P. Bernard Palissy.
		H.P. Rev. H. Dombrain.

(115.)—6 STANDARD ROSES, in pots, in Flower, distinct.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Mr. WM. PAUL, Paul's Nurseries, Waltham Cross. [1*st Prize.*]

H.P. Vicomte Vigier.	H.B. Paul Perras.	H.P. Charles Lawson.
H.P. Elizabeth Vigneron.	H.B. Juno.	Nois. Narcisse.

Mr. CHARLES TURNER, Royal Nurseries, Slough. [2*nd Prize.*]

H.P. Senateur Vaisse.	Tea, Vicomtesse des Cazes.	H.P. Olivier Delhomme.
H.P. Charles Lefebvre.	Tea, Madame Bravy.	H.P. François Lacharme.

F. PRYOR, Esq., Digswell, Welwyn. (W. Earley, gardener). [3*rd Prize.*]

Tea, Gloire de Dijon.	Tea, Madame de St. Joseph.	H.P. Anna Alexieff.
H.B. Paul Ricaut.	H.P. Jules Margottin.	Tea, Adam.

Messrs. PAUL & SON, Old Cheshunt Nurseries, Cheshunt.

Tea, Souvenir d'Elise Vardon.	Tea, Devoniensis.	H.P. Madame Derreux Douville.
Tea, Alba rosa.	H.P. Baron de Rothschild.	
	H.P. King's Acre.	

(116.)—25 ROSES, distinct, 3 trusses of cut blooms of each.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Messrs. PAUL & SON, Old Cheshunt Nurseries, Cheshunt. [1*st Prize.*]
(No particulars furnished.)

Mr. WM. PAUL, Paul's Nurseries, Waltham Cross. [2*nd Prize.*]
(No particulars furnished.)

Mr. JAMES MITCHELL, Pilt Down Nurseries, Maresfield. [3*rd Prize.*]
(No particulars furnished.)

Entered but did not exhibit—

Messrs. H. LANE & SON, Nurserymen, Great Berkhamstead.

(117.)—12 ROSES, distinct, 3 trusses of cut blooms of each.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Amateurs.*)

E. J. COLEMAN, Esq., Stoke Park. (J. Chalmers, gardener.) [1*st Prize.*]
(No particulars furnished.)

JOHN HOLLINGWORTH, Esq., Maidstone. [2*nd Prize.*]
(No particulars furnished: flowers grown without the aid of glass.)

Entered but did not exhibit:—

T. LAXTON Esq., Stamford.
G. ORME, Esq., Broadwater. (J. Bristow, gardener.)
E. OATES, Esq., Bydrop House, Hanwell. (R. Marcham, gardener.)
C. J. PERRY, Esq., Castle Bromwich.

CLASS
(118.)—30 HOLLIES, distinct.—1st Prize, 10*l.* 2nd Prize, 7*l.*; 3rd Prize, 5*l.*; 4th Prize, 3*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, King's Road, Chelsea. [1*st Prize.*]

Ilex cornuta.
Ilex dipyrena.
Ilex balearica.
Ilex Aquifolium Hodginsii.
Ilex Aquifolium laurifolia.
Ilex Aquifolium tortuosa.
Ilex Aquifolium latispina.
Ilex Aquifolium scotica.
Ilex Aquifolium ovata.
Ilex Aquifolium angustifolia.
Ilex Aquifolium myrtifolia.
Ilex Aquifolium Shepherdi.
Ilex Aquifolium pendula.
Ilex Aquifolium monstrosa.
Ilex Aquifolium donningtonensis.
Ilex weeping silver edge.
Ilex Waterer's gold (standard).
Ilex gold milkmaid.
Ilex gold blotch hedgehog.
Ilex dark golden.
Ilex golden edge, few prickles.
Ilex golden edge, dark young shoots
Ilex silver milkmaid.
Ilex silver edge, long leaf.
Ilex silver edge.
Ilex Queen golden variegated.
Ilex maderensis, gold blotch.
Ilex dark silver edge.
Ilex silver edge hedgehog.
Ilex green hedgehog.

Messrs. WATERER & GODFREY, Knaphill Nursery, Woking. [2*nd Prize.*]
(No particulars furnished.)

Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith. [3*rd Prize.*]

Ilex Aquifolium pendula.
Ilex Aquifolium pendula variegata.
Ilex Aquifolium donningtonensis.
Ilex Aquifolium latispina.
Ilex Aquifolium argenteo-marginata.
Ilex Aquifolium argenteo-marginata latifolia.
Ilex Aquifolium argenteo-marginata heterophylla.
Ilex Aquifolium argenteo-marginata longifolia.
Ilex Aquifolium argenteo-marginata rhomboidea.
Ilex Aquifolium ferox argenteo-marginata.
Ilex Aquifolium aurea dubia.
Ilex Aquifolium longifolia dentata argenteo-marginata.
Ilex Aquifolium compacta argenteo-marginata.
Ilex Aquifolium parvifolia conspicua argenteo-marginata.
Ilex Aquifolium intermedia argenteo-marginata.
Ilex Aquifolium argenteo-marginata handsworthensis.
Ilex Aquifolium medio-picta aurea.
Ilex Aquifolium medio-picta aurea pallida heterophylla.
Ilex Aquifolium latimaculata aurea.
Ilex Aquifolium longifolia argenteo-marginata.
Ilex Aquifolium medio-picta pallida.
Ilex Aquifolium heterophylla aureo-marginata.
Ilex Aquifolium myrtifolia aureo-marginata.
Ilex Aquifolium aureo-cincta.
Ilex Aquifolium aureo-cincta lucida.
Ilex Aquifolium regina aurea.
Ilex Aquifolium Watereriana.
Ilex Aquifolium aureo-marginata compacta.
Ilex Aquifolium aurifodina.
Ilex maderensis atrovirens.

Messrs. OSBORN & SONS, Fulham Nursery.

Ilex Aquifolium latispina.
Ilex Aquifolium latifolia.
Ilex Aquifolium Hodginsii.
Ilex Aquifolium ovata.
Ilex Aquifolium marginata.
Ilex Aquifolium donningtonensis.
Ilex Aquifolium ciliata.
Ilex Aquifolium ciliata minor.
Ilex Aquifolium recurva.
Ilex Aquifolium serratifolia.
Ilex Aquifolium crispa.
Ilex Aquifolium ferox.
Ilex Aquifolium ferox argentea.
Ilex Aquifolium crassifolia.
Ilex Aquifolium senescens.
Ilex Aquifolium lutescens.
Ilex Aquifolium albo-marginata.
Ilex Aquifolium aureo-marginata.
Ilex Aquifolium aureo-compacta.
Ilex Aquifolium argenteo-compacta.
Ilex Aquifolium albo-picta.
Ilex Aquifolium laurifolia.
Ilex Aquifolium fol. varieg. fructu luteo.
Ilex Aquifolium, Handsworth silver striped.
Ilex balearica.
Ilex opaca.
Ilex dipyrena.
Ilex cornuta.
Ilex Perado.
Ilex crenata.

CLASS 118

Mr. WILLIAM PAUL, Paul's Nurseries, Waltham Cross, London, N.

Ilex Aquifolium fructu luteo.
Ilex Aquifolium platyphylla.
Ilex Aquifolium hybrida.
Ilex Aquifolium Shepherdi.
Ilex Aquifolium scurtica.
Ilex Aquifolium Hendersoni.
Ilex Aquifolium recurva.
Ilex Aquifolium angustifolia.
Ilex Aquifolium balearica.
Ilex Aquifolium japonica.
Ilex Aquifolium laurifolia.
Ilex Aquifolium myrtifolia.
Ilex Aquifolium ferox.
Ilex Aquifolium aurea angustifolia.
Ilex Aquifolium ferox argentea.
Ilex Aquifolium aureo-vestita.
Ilex Aquifolium argentea angustifolia.
Ilex Aquifolium albo-marginata.
Ilex Aquifolium walthamensis.
Ilex Aquifolium speciosa.
Ilex Aquifolium bicolor.
Ilex Aquifolium aureo-marginata.
Ilex Aquifolium aurea pumila.
Ilex Aquifolium aurea scotica.
Ilex Aquifolium flammea angustifolia.
Ilex Aquifolium picta.
Ilex Aquifolium recurva variegata.
Ilex Aquifolium albo-lineata.
Ilex Aquifolium alba pendula.
Ilex dipyrena.

Entered but did not exhibit—
Mr. J. STANDISH, Royal Nursery, Ascot
M. A. KOSTER, Boomkweeker, Boskoop.

(119.)—1 Pair of STANDARD LAURUSTINUS.—1st Prize 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Mr. WILLIAM BULL, King's Road, Chelsea. [1*st Prize.*]

Entered but did not exhibit—
Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith.
Messrs. A. HENDERSON & CO., Pine Apple Nursery, Edgware Road.

(120.)—1 Pair of PYRAMIDAL BAY TREES.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Messrs. VEITCH & SONS, Chelsea. [1*st Prize.*]

Mr. WILLIAM BULL, King's Road, Chelsea. [2*nd Prize.*]
Price 12 guineas the pair.

Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith. [3*rd Prize.*]

Entered but did not exhibit—
Messrs. A. HENDERSON & Co., Pine Apple Nursery, Edgware Road.

(121.)—1 Pair of STANDARD BAY TREES.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

M. JEAN VERSCHAFFELT, 43, Rue de la Caverne, Ghent, Belgium. [1*st Prize.*]

Messrs. JAMES VEITCH & SONS, Chelsea. [2*nd Prize.*]

Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith. [3*rd Prize.*]

Messrs. A. HENDERSON & Co., Pine Apple Nursery, Edgware-road.

SIR F. H. GOLDSMID, Bart., M.P., Regent's Park. (G. Wheeler, gardener.)

Mr. WILLIAM BULL, King's Road, Chelsea.

(122.)—1 PAIR of STANDARD PORTUGAL LAURELS.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith. [1*st Prize.*]

Mr. W. BRAGG, Slough, Bucks. (Disqualified.)

CLASS
(123.)—1 Pair of STANDARD HOLLIES.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Messrs. GEORGE JACKMAN & SON, Woking Nursery, Surrey. [*1st Prize.*]
Ilex Aquifolium Watereriana.

Messrs. JAMES VEITCH & SONS, Chelsea. [*2nd Prize.*]
Waterer's gold variegated Holly.

Messrs. WATERER & GODFREY, Knaphill, Woking. [*3rd Prize.*]
Waterer's Holly.

Messrs. GEORGE JACKMAN & SON.
Ilex Aquifolium albo-marginata.

Messrs. GEORGE JACKMAN & SON.
Ilex Aquifolium pendula variegata.

Messrs. JOHN & CHARLES LEE, Royal Vineyard Nursery, Hammersmith.
Variegated Holly.

Entered but did not exhibit—
M. A. KOSTER, Boomkweeker, Boskoop.

(124.)—1 Pair of STANDARD BOX TREES.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Messrs. JAMES VEITCH & SONS, Chelsea. [*1st Prize.*]
Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith. [*2nd Prize.*]

Entered but did not exhibit—
Messrs. ARTHUR HENDERSON & Co., Pine Apple Nursery, Edgware Road.

(125.)—1 Pair of any STANDARD EVERGREEN TREE, excepting those invited in Nos. 119 to 124.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Mr. WILLIAM BULL, King's Road, Chelsea. [*1st Prize.*]
Myrtle. Price 20 guineas the pair.

Messrs. JAMES VEITCH & SONS, Chelsea. [*2nd Prize.*]
Golden Yew.

Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith. [*3rd Prize.*]
Taxus adpressa.

Messrs. GEORGE JACKMAN & SON, Woking Nursery, Surrey.
Taxus fastigiata and elegantissima.

Messrs. G. JACKMAN & SON.
Taxus fastigiata and adpressa.

Messrs. PAUL & SON, Old Cheshunt Nurseries, Cheshunt.
Taxus elegantissima.

Mr. WM. PAUL, Paul's Nurseries, Waltham Cross.
Taxus elegantissima.

Messrs. WATERER & GODFREY, Knaphill, Woking.
Pyramidal Golden Yew (elegantissima).

Entered but did not exhibit—
Messrs. ARTHUR HENDERSON & Co., Pine Apple Place.
Myrtle.
M. A. KOSTER, Boomkweeker, Boskoop.

(126.)—12 ZONAL PELARGONIUMS, distinct, in Flower, Nosegay and Variegated sorts excepted.—1st Prize, 6*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.* (*Open.*)

Mr. JOHN FRASER, Lea Bridge Road Nurseries. [*1st Prize.*]

Mons. Barré.	Mons. G. Natchet.	Herald of Spring.
Beauté de Parterre.	Rose Rendatler.	Marie Virgo.
The Clipper.	Lord of the Isles.	Eugène Mézard.
Madame Werle.	Emile Licau.	Malakoff.

Mrs. LERMITTE, Senr., Finchley. (John Catlin, gardener.) [*2nd Prize.*]

Tintoret. Scarlet Globe. Rubens. Eugène Mézard. Vivid. St. Fiacre. Lord of the Isles. Stoddarti. Evening Star. Madame Vaucher. Admiration. Mons. Tisserand.

Mr. CHARLES TURNER, Royal Nurseries, Slough. [*3rd Prize.*]

Dr. Lindley. Marie Virgo. Madame Vaucher. St. Fiacre. Souvenir de Basseville. Attraction. Victor de Puebla. Enamel. Amelina Grisau. M. Martin. Magnet. Princess Mathilde.

Mr. W. C. DRUMMOND, Nurseryman, Bath.

Boule de Neige. Bonnie Dundee. Dr. Lindley. Eugène Mézard. Marquis de St. Innocent. Clipper. Mons. Barré. Rosamond. Effie. Fanty. Eva. Provost.

Mrs. TREADWELL, Golder's Green, Hendon. (James Winter, gardener.)

Madame Vaucher. Scarlet Globe. Cerise Unique. Tom Thumb. Lady Middleton. Cottage Maid. Queen of Roses. Cloth of Gold. Senator. Commander-in-chief. Boule de feu. Tintoret.

EDW. WOOD, Esq., Newbold Revel, Rugby. (T. Coysh, gardener.)

Christine. Cerise Unique. Madame Vaucher. Countess of Bective. Mons. Martin. Conqueror of Europe. Lord Palmerston (6 plants)

Entered but did not exhibit—

Mr. JOHN SALTER, Versailles Nursery, William-street, Hammersmith.
Mrs. WOOD, Twyford Abbey, Acton. (H. Beasley, gardener.)

(127.)—12 NOSEGAY or HYBRID NOSEGAY PELARGONIUMS, distinct, in Flower.—1st Prize, 6*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.* (*Open.*)

Mr. WILLIAM PAUL, Paul's Nurseries, Waltham Cross. [*1st Prize.*]

Wood Nymph. Alexandra. Dr. Hogg. Crimson Queen. Waltham Seedling. Duchess. Orange Nosegay. Cybister. Multiflora. Scarlet Dwarf. Amy Hogg. Tiara.

Entered but did not exhibit—

Mr. JOHN SALTER, Versailles Nursery, Hammersmith.

(128.)—12 VARIEGATED PELARGONIUMS, distinct.—1st Prize, 6*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.* (*Open.*)

Messrs. E. G. HENDERSON & SON, St. John's Wood. [*1st Prize.*]

Beauty of Guestwick. Gold Pheasant. Italia Unita. Lady Cullum. Lucy Grieve. Mrs. Pollock. Oriana superb. Queen of Queens. Rosette. Rose Queen. Sophia Cusack. Sunset.

Mr. JOHN FRASER, Lea Bridge Road Nurseries. [*2nd Prize.*]

Argus. Italia Unita. Gold Pheasant. Mountain of Snow. Flower of Spring. Glow-worm. Mrs. Pollock. Fontainebleau. Golden Vase. Annie. Yellow Belt. Variegated Nosegay.

Messrs. SALTMARSH & SON, Moulsham Nursery, Chelmsford. [*3rd Prize.*]

Burning Bush. Golden Tom Thumb. Variegated Tom Thumb. Mrs. Pollock. Alma. Rainbow. Variegated Nosegay. The Hon. Mrs. Mildmay. Cloth of Gold. The Countess. Electric. Bird of Paradise.

Mr. JOHN HALLY, Nurseryman, Turner Road, Lee, Blackheath.

Flora's Gem.	Mrs. Pollock.	Princess of Wales.
James Sherman.	Sirius.	Flower of Spring.
Mrs. Benyon.	Mirth.	Burning Bush.
Sunset.	Pride of Summer.	Man of Kent.

J. H. LERMITTE, Esq., Knightons, Finchley. (W. Birse, gardener.)

Brilliant.	Cloth of Gold.	Mrs. Pollock.
Countess of Warwick.	Burning Bush.	Rosette.
Flower of Spring.	Queen of Queens.	Meteor.
Silver Chain.	Golden Chain.	Little Beauty.

Mr. JABEZ J. CHATER, Gonville Nurseries, Cambridge.

Albion Cliffs.	Flambeau.	Quadricolor.
Mrs. Pollock.	Saturn's Ring.	Burning Bush,
Zephyr.	Talisman.	and others.

Mr. V. I. LANGLOIS, St. Helier's, Jersey.
Seedling unnamed varieties.

(129.)—6 STANDARD ZONAL PELARGONIUMS, distinct, in Flower.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

J. H. LERMITTE, Esq., Knightons, Finchley. (W. Birse, gr.) [1*st Prize.*]

Monsieur Martin.	Rubens.	Admiration.
Tintoret.	Madame Lemoine.	Snowball.

Mr. WM. PAUL, Paul's Nurseries, Waltham Cross. [2*nd Prize.*]
Seedlings.

(130.)—6 STANDARD VARIEGATED PELARGONIUMS, distinct.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Mr. WM. PAUL, Paul's Nurseries, Waltham Cross, London, N. [1*st Prize.*]

Queen of Queens.	Cloth of Gold.	Golden Circle.
Flower of the day.	Countess of Warwick.	Mrs. Pollock.

(131.)—12 SHOW PELARGONIUMS, distinct, in Flower, in pots not larger than 8 inches across.—1st Prize, 10*l.*; 2nd Prize, 7*l.*; 3rd Prize, 5*l.*; 4th Prize, 3*l.* (*Nurserymen.*)

Mr. CHARLES TURNER, Royal Nurseries, Slough. [1*st Prize.*]

Fairest of the Fair.	Beacon.	Puck.
Royal Albert.	Desdemona.	Celeste.
Lady Canning.	Pericles.	Rosa Bonheur.
Lilacina.	Fair Rosamond.	Butterfly.

Mr. JOHN FRASER, Lea Bridge Road Nurseries. [2*nd Prize.*]

Sir Colin Campbell.	Pericles.	Ariel.
Candidate.	Peacock.	Norma.
Lilacina.	Pizarro.	Rose Celestial.
Leander.	Desdemona.	Empress Eugénie.

Messrs. JOHN DOBSON & SONS, Woodlands Nursery, Isleworth [3*rd Prize.*]

Attraction.	Favourite.	Mademoiselle Patti.
Desdemona.	General.	Majestic.
Distinction.	Leotard.	Queen of England.
Caractacus.	Maid of Honour.	Sir Colin Campbell.

CLASS

(132.)—10 SHOW PELARGONIUMS, distinct, in Flower, in pots not larger than 8 inches across.—1st Prize, 10*l.*; 2nd Prize, 7*l.*; 3rd Prize, 5*l.*; 4th Prize, 3*l.* (*Amateurs.*)

T. T. DRAKE, Esq., Shardeloes, Amersham, (T. Bailey, gardener.) [*1st Prize.*]

Sanspareil.	Etna.	Mulberry.
Desdemona.	Spotted Gem.	Royal Albert.
Sir Colin Campbell.	Ariel.	Lady Canning.
The Belle.		

(133.)—6 SHOW PELARGONIUMS, distinct, in Flower, in pots not larger than 8 inches across.—1st Prize, 5*l.*; 2nd Prize, 4*l*; 3rd Prize, 3*l.*; 4th Prize, 2*l.* (*Amateurs, not showing in No.* 132.)

F. G. WILKINS, Esq., The Poplars, Leyton. (J. Ward, gardener). [*1st Prize.*]

Osiris.	Viola.	Fairest of the Fair.
Etna.	Peacock.	Fair Rosamond.

A. J. DOXAT, Esq., Putney Heath. (J. Shrimpton, gardener.) [*2nd Prize.*]

Rose Celestial.	Peacock.	Gaspard.
Sylph.	Madame Patti.	Monarch.

W. BECK, Esq., Worton Cottage, Isleworth. (John Wiggins, gr.) [*3rd Prize.*]

Maid of Honour.	Empress Eugénie.	Royalty.
President.	Princess of Denmark.	Maggie.

Mrs. HODGSON, The Elms, Hampstead. (James Weir, gardener.) [*4th Prize.*]

Prince of Prussia.	Virginia.	The Belle.
Rose Celestial.	Lord Clyde.	Sir Colin Campbell.

(134.)—6 FANCY PELARGONIUMS, distinct, in Flower, in pots not larger than 8 inches across.—1st Prize, 5*l.*; 2nd Prize, 4*l*; 3rd Prize, 3*l.*; 4th Prize, 2*l.* (*Nurserymen.*)

Mr. JOHN FRASER, Lea Bridge Road Nurseries, N.E. [*1st Prize.*]

Roi des Fantaisies.	Celestial.	Clara Novello.
Lady Craven.	Cloth of Silver.	Delicatum.

Mr. CHARLES TURNER, Royal Nurseries, Slough. [*2nd Prize.*]

Evening Star.	Delicatum.	Ellen Beck.
Roi des Fantaisies.	Clemanthe.	Lady Craven.

(135.)—6 FANCY PELARGONIUMS, distinct, in Flower, in pots not larger than 8 inches across.—1st Prize, 5*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.*; 4th Prize, 2*l.* (*Amateurs.*)

T. T. DRAKE, Esq., Shardeloes, Amersham. (T. Bailey, gardener.) [*1st Prize.*]

Delicatum.	Godfrey Turner.	Lucy.
Lady Craven.	Ellen Beck.	Evening star.

Mrs. HODGSON, The Elms, Hampstead. (James Weir, gardener.) [*2nd Prize.*]

Madame Sontag.	Evening Star.	Carminatum.
Celestial.	Attraction.	Mrs. Stewart Hodgson.

J. G. BARCLAY, Esq., Knott's Green, Leyton. (D. Donald, gr.) [*3rd Prize.*]

Rosabella.	Queen of the valley.	Ellen Beck.
Clara Novello.	Maroon.	Lady Craven.

CLASS
(136.)—1 PELARGONIUM, in Flower.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

T. T. Drake, Esq., Shardeloes, Amersham. (T. Bailey, gardener.) [1*st Prize.*]
Rose Celestial. Price 2*l.* 2*s.*

Mr. CHARLES TURNER, Royal Nurseries, Slough. [2*nd Prize.*]
Desdemona.

Mr. JOHN FRASER, Lea Bridge-road Nurseries.
Sylph.

(137.)—12 HERBACEOUS CALCEOLARIAS, in Flower.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

W. F. WATSON, Esq., Spring Grove, Isleworth. (J. James, gr.) [1*st Prize.*]

Apollo.	Gratitude.	Brilliant.
Mrs. Harvey.	Ensign.	Zuleika.
Picturata.	Master Farnell Watson.	Prince of Wales.
Regalia.	Louisa.	Satisfaction.

Messrs. J. DOBSON & SONS, Woodlands Nursery, Isleworth. [2*nd Prize.*]
Seedlings.

Mr. CHARLES TURNER, Royal Nurseries, Slough. [3*rd Prize.*]
Seedlings.

Messrs. DOWNIE, LAIRD, & LAING, Forest Hill, Sydenham.
Seedlings.

EDWARD WOOD, Esq., Newbold Revel, Rugby. (T. Coysh, gardener.)
Seedlings.

Madame LEGRELLE D'HANIS, Berchem, Anvers. (F. Vervoort, gardener.)
(No particulars furnished.)

(138.)—8 SHRUBBY CALCEOLARIAS, distinct, in Flower.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Entered but did not exhibit—
T. T. DRAKE, Esq., Shardeloes, Amersham. (T. Bailey, gardener.)

(139.)—12 PANSIES, distinct, in Flower, in 6-inch pots.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

W. F. WATSON, Esq., Spring Grove, Isleworth. (J. James, gr.) [1*st Prize.*]
(No particulars furnished.)

Mr. HENRY HOOPER, Vine Nursery, Widcombe Hill, Bath. [2*nd Prize.*]

James Veitch.	Alexander the Great.	Mrs. H. Hooper.
Dr. Smith.	Golden Noble.	Harry.
Flower of Spring.	Novelty.	J. B. Downie.
Lord of the Manor.	Princess Helena.	John Laing.

Mr. JOHN SHACKELL, Old Field Nursery, Bath. [3*rd Prize.*]
(No particulars furnished.)

Mr. THOMAS SMITH, Nurseryman, Long Wittenham, Abingdon.

Eclipse.	Defiance.	Gladiator.
Exhibitor.	Flora.	Marion.
Excelsior.	Fairy.	Black Prince.
Enchantress.	Berkshire Hero.	Volunteer.

Messrs. DOWNIE LAIRD & LAING, Forest Hill, Sydenham.
(No particulars furnished.)

Mr. W. BRAGG, Slough.
(No particulars furnished.)

CLASS
(140.)—12 FANCY PANSIES, distinct, in Flower, in 6-inch pots.—
1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

Mr. HENRY HOOPER, Vine Nursery, Widcombe Hill, Bath. [*1st Prize.*]

Giant.	The Queen.	Fancy Queen.
Mrs. Milsom.	Annie.	Princess Alice.
Lord Leigh.	Maid of Honour.	Mrs. R. Dean.
Butterfly.	Village Maid.	Firefly.

Mr. JOHN SHACKELL, Old Field Nursery, Bath. [*2nd Prize.*]
(No particulars furnished.)

(141.)—24 PANSIES, distinct, cut blooms.—1st Prize, 1*l.* 10*s.*
2nd Prize, 1*l.*; 3rd Prize, 10*s.* (*Open.*)

Messrs. DOWNIE LAIRD & LAING, Forest Hill, Sydenham. [*1st Prize.*]
(No particulars furnished.)

Mr. HENRY HOOPER, Vine Nursery, Widcombe Hill, Bath. [*2nd Prize.*]

James Veitch.	Cream of the Creams.	Perfect Model.
Dr. Smith.	New Colour.	Flower of Spring.
Princess Helena.	Golden Noble.	Yellow Beauty.
Discolor.	Annie Chater.	Ranger.
Harry.	Mr. Gladstone.	Mrs. Kingston.
Lord of the Manor.	Champion.	Prince Arthur.
Alexander the Great.	Mrs. H. Hooper.	Frances Law.
Novelty.	Clara.	Snowball.

Mr. JOHN SHACKELL, Old Field Nursery, Bath. [*3rd Prize.*]
(No particulars furnished.)

Mr. JOHN M'PHERSON, Nurseryman, Polmuir, Aberdeen, N.B.

W. B. Speirs.	Lord Cardigan.	John Inglis.
Emily Lyle.	Rev. H. Dombrain.	Alexander Tait.
Maggie Ritchie.	J. B. Downie.	Miss E. Cochrane.
Cupid.	Yellow Queen.	Gmelina.
Miss Muir.	Ophir.	Isa Craig.
Kinleith.	Lord Clyde.	General Early.
Alexander W. Hammond.	Rev. T. Findlay.	Alexander Eadie.
Narcissa.	General Ewell.	Perfection.

Rev. A. H. BRIDGES, Beddington House, Croydon. (James August, gardener.)

Jesse.	Dr. Stuart.	Homer.
Miss Ramsey.	Seraph.	White Queen.
Vesta.	Seedling.	Queen of Whites.
Rubens.	Ajax.	Miss Downie.
W. Austen.	Black Prince.	Miss Muir.
W. Dean.	Peeress.	Tennyson.
Alice.	Victor.	Concord.
Cupid.	Cherub.	Andrew Smith.

E. J. LOWE, Esq., Highfield House, near Nottingham.
Seedlings of own raising.

J. HOPE, Esq., Belmont, Murrayfield, near Edinburgh. (J. Fraser, gardener.)
(No particulars furnished.)

Mr. WILLIAM CHATER, Nurseries, Saffron Walden.
(No particulars furnished.)

W. F. WATSON, Esq., Spring Grove, Isleworth. (J. James gardener).
(No particulars furnished.)

Mr. JABEZ JAY CHATER, Gonville Nurseries, Cambridge.
(No particulars furnished.)

Mr. W. BRAGG, Slough.
(No particulars furnished.)

CLASS
(142.)—50 TULIPS, cut blooms, not less than 25 varieties, Bizarres, Byblœmens, and Roses.—1st Prize, 8*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Mr. CHARLES TURNER, Royal Nurseries, Slough. [*1st Prize.*]

Duchess of Sutherland.	Polyphemus.	Maid of Orleans.
Dr. Horner.	Triomphe Royale.	Lord Canning.
Pactolus.	Thalia.	King.
Sarah Headley.	Meteor.	Magnum Bonum.
Vivid.	Victoria Regina.	Alexander Magnus.
George Hayward.	Emily.	Queen Charlotte.
Norah Creina.	Maid of Falaise.	Elizabeth.
Princess Royal.	Mary Headley.	Lady Waldegrave.
Queen of Hampton.	Mountain Sylph.	Lady Stanley.
Aglaia.	Anastatia.	Hamlet.

Mr. THOMAS WESTBROOK, Abingdon, Berkshire. [*2nd Prize.*]

Elthiron.	Sarah Headley.	Triomphe Royale.
Delaforce's King.	Bizarre (seedling).	Pilot.
Victoria Regina.	Premier.	Bion.
Belle Forme.	Rembrandt.	President.
Lord Raglan.	Arlette.	Rose Emily.
Thalia.	Glory of Abingdon.	Thalia.
Glory of Abingdon.	Maid of Orleans.	Dreadnought.
Rose Emily.	Ellen (seedling Rose).	Elthiron.
Shakespear.	Delaforce's King.	Princess Royal.
Pandora.	George Hayward.	Beauty of the Plain.
Rosa (seedling Rose).	Vicar of Radford.	Claude.
Everard.	Lord Raglan.	Glory of Abingdon.
Isabella (seedling).	Lady C. Gordon.	Mountain Sylph.
Sir Charles Napier.	Henry Groom.	Maid of Athens.
Aglaia.	Thalia.	No. 6, Byblœmen (seedling).
Thalia.	General Barnovelde.	Vivid.
David.	Sir J. Cathcart.	

Mr. JAMES BATTEN, Florist, Brook Street, Clapton. [*3rd Prize.*]

Byblœmens.	*Bizarres.*	*Roses.*
General Barnovelde.	Pilot.	Aglaia.
Mrs. Beecher Stowe.	Hamlet.	Heroine.
Salvator Rosa.	Vivid.	Lachesis.
Nora Creina.	Dr. Horner.	Triumph Royal.
Commodus.	Marcellus.	Ariadne.
Sir H. Smith.	Polyphemus.	Cerise a Belle Forme.
Princess Royal.	Prince of Orange.	Camuse.
Lalla Rookh.	Turriff.	Page's Charlotte
Clark's Susan.	Sir E. Knatchbull.	Claudiana.
Princess Alice (May).	Earl Stamford.	Mary Lamb.
Hercules (May).	Duke of Devonshire.	Lady Boyle (Zuill).
La Belle Nariene.	Leopold.	Catherine Gibbon.
Elegance.	Prince Albert (May).	Queen Caroline.
Van Amburgh.	Platoff.	Miss Fanny.
Maid of Athens.	Stater Flora.	Rose Ami du Cœur.
Plantagenet (Hooker).	Delaforce's King.	Rose Lac.

Entered but did not exhibit—
Mr. HENRY HOOPER, Vine Nursery, Widcombe Hill, Bath.
Mr. N. NORMAN, Florist, 98, Crescent Road, Plumstead.

(143.)—12 Pots of MIGNONETTE, in Flower, in 5-inch pots.—1st Prize, 1*l.*; 2nd Prize, 15*s.* (*Open.*)

Mr. GEO. MACINTOSH, Nurseryman, Hammersmith. [*1st Prize.*]

Entered but did not exhibit—
Messrs. ARTHUR HENDERSON & Co., Pine Apple-place.
The Rev. A. H. BRIDGES, Beddington. (J. August, gardener.)
Mr. G. GREEN, Nurseryman, 8, Douglas-place, East Greenwich.

CLASS

(144.)—3 TREE MIGNONETTES, in Flower.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Mr. C. EWART, The Grove, Alexandra-park, Muswell Hill. [1*st Prize.*]
C. LEACH, Esq., King's Road, Clapham Park. (W. Watson, gr.) [2*nd Prize.*]
Mrs. BARCHARD, Putney Heath. (M. Higgs, gardener.) [3*rd Prize.*]
Mrs. TREADWELL, Golder's Green, Hendon. (James Winter, gardener.)
Mrs. HODGSON, The Elms, Hampstead. (James Weir, gardener.)

Entered but did not exhibit—
Messrs. A. HENDERSON & Co., Pine Apple Nursery, Edgware-road.
Mr. W. BRAGG, Slough.

(145.)—3 STANDARD HELIOTROPES, in Flower.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

Mr. CHARLES TURNER, Royal Nurseries, Slough. [1*st Prize.*]
Reine des Heliotropes. | Jean d'Amour.
Gloire de Montpensier.

Mr. W. BRAGG, Nurseryman, Slough. [2*nd Prize.*]
(No particulars furnished.)

Entered but did not exhibit—
Mr. CHARLES EWART, The Grove, Alexandra Park, Muswell Hill.

(146.)—6 HELIOTROPES, distinct, in Flower.—1st Prize, 2*l.*; 2nd Prize, 1*l.*; 3rd Prize, 10*s.* (*Open.*)

Mr. CHARLES TURNER, Royal Nurseries, Slough. [1*st Prize.*]

Jean d'Amour.	Reine des Heliotropes.	Gem.
Mons. Cassenave.	Peruvianum.	Mons. Faucillon.

(147.)—6 FUCHSIAS, distinct, in Flower, in pots not larger than 13 inches across.—1st Prize, 4*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.*; 4th Prize, 1*l.* (*Nurserymen.*)

Mr. H. CANNELL, Fuchsia Nursery, Woolwich. [1*st Prize.*]

La Favorita (Banks).	Gipsey Girl (Banks).	War Eagle.
Minnie (Banks).	Puritani (Banks).	Prince Alfred (Banks)

Price £1 10*s.* each.

Also Enoch Arden; War Eagle; La Traviata; and Tom Thumb. These were not staged for competition, but to show the immense difference between new and old kinds.

Mr. CHARLES TURNER, Royal Nurseries, Slough. [3*rd Prize.*]

Othello.	Miss Hawtrey.	Madame Cornelissen.
Schiller.	Sir C. Campbell.	One unnamed.

Entered but did not exnibit—
Mr. G. GREEN, Nurseryman, East Greenwich.

*** Second Prize witheld by the Jurors.

(148.)—6 FUCHSIAS, distinct, in Flower, in pots not larger than 13 inches across.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.*; 4th Prize, 1*l.* (*Amateurs.*)

Rev. A. H. BRIDGES, Beddington House, Croydon. (J. August, gr.) [1*st Prize.*]

Aurora.	Lord Elcho.	Sir Colin Campbell.
Rose of Castille.	Sensation.	Eclat.

CLASS 148

Rev. C. H. SPURGEON, Nightingale Lane, Clapham. (W. Fay, gr). [*2nd Prize.*]

Rifleman.	Souvenir de Chiswick.	Little Bo-peep.
Sir Colin Campbell.	President.	Fairest of the Fair.

(149.)—8 STANDARD FUCHSIAS, distinct, in Flower.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Rev. A. H. BRIDGES, Beddington House, near Croydon, Surrey. (James August, gardener.) [*1st Prize.*]

Schiller.	Antagonist	Lord Elcho.

Rev. C. H. SPURGEON, Nightingale Lane, Clapham. (W. Fay, gr). [*2nd Prize.*]

Sir Colin Campbell.	Rose of Castille (2).

Mrs. BARCHARD, Putney Heath. (M. Higgs, gardener.) [*3rd Prize.*]

Venus de Medici.	Banks' Glory.	Rose of Castille.

Mr. CHARLES TURNER, Royal Nurseries, Slough.

Sir C. Campbell.	Rose of Castille.	Tristram Shandy.

Mr. W. BRAGG, Slough.
(No particulars furnished.)

(150.)—25 GLADIOLI, cut spikes, distinct.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

(No entry.)

(151.)—6 TREE CARNATIONS, distinct, in Flower.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

Cut flowers only shown—

Mr. H. HOOPER, Vine Nursery, Widcombe Hill, Bath.

Mayor of Nottingham.	Lady Stanley.	Excellent.
Constance.	Beautiful.	Juno.

Entered but did not exhibit—

Mr. C. TURNER, Royal Nursery, Slough.

(152.)—12 EARLY PINKS, in Flower, in pots, three or more varieties. —1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

Mr. CHARLES TURNER, Royal Nurseries, Slough. [*1st Prize.*]

Rubens.	Blondin.	Victory.
Minnie.	The Pride of Colchester.	Miss Eaton.
Sarah.	Elcho.	

T. T. DRAKE, Esq., Shardeloes, Amersham. (T. Bailey, gardener.) [*2nd Prize.*]

Rubens.	Moss.	White.

Cut flowers only shown—

Mr. HENRY HOOPER, Vine Nursery, Widcombe Hill, Bath.

Attraction.	Gladiator.	Anna Boleyn.
Mrs. Moore.	Annie Keynes.	Gem of Scarlets.
Charles Turner.	Champion.	Lucy.
Beauty of Bath.	Lady Allen.	Queen of the Valley.

(153.)—6 HERBACEOUS PÆONIES, distinct, in Flower, in pots.—1st Prize, 3*l.*; 2nd Prize. 2*l.*; 3rd Prize, 1*l.* (*Open.*)

(No entry.)

CLASS
(154.)—6 pots of LILY of the VALLEY, in Flower.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

Mr. J. SALTER, Versailles Nursery, Hammersmith. [1*st Prize.*]

Messrs. JAMES VEITCH & SONS, Chelsea. [2*nd Prize.*]

Messrs. PAUL & SON, Old Cheshunt Nurseries, Cheshunt.

Mr. CHARLES TURNER, Royal Nurseries, Slough.

Entered but did not exhibit—

T. T. DRAKE, Esq., Shardeloes, Amersham, Bucks. (T. Bailey, gardener.)
Mrs. HODGSON, The Elms, Hampstead. (James Weir, gardener.)
Mr. O. RHODES, Nurseryman, Sydenham.

§ V.—SEEDLINGS.*

Steward:—Mr. THOMAS OSBORN.

Jurors.

Class 155.	Dr. Sankey, Sandywell Park. Mr. A. Parsons, Danesbury. Mr. W. Holmes, Hackney.	Classes 156 and 157.	Mr. J. Fraser, Lea Bridge-road. Mr. Arthur Henderson, Pine Apple Nursery. Mr. T. Ingram, jun., Frogmore.

(155.)—SEEDLING FLORISTS' FLOWER, of any kind named.—Certificates. (*Open.*)

Messrs. JOHN DOBSON & SONS, Woodlands Nursery, Isleworth.

Messrs. R. GADD & SON, Salvington Nurseries, Worthing.
Calceolaria striata; shrubby seedling of 1865.

G. W. HOYLE, Esq., Reading.
Seedling Pelargoniums.

T. HOBSON, Esq., Pownall Hall, Wilmslow, Cheshire. (W. Kelland, gardener.)
Seedling Calceolaria.

E. J. LOWE, Esq., Highfield House, Nottingham.
Seedling Pansies.

Mr. WM. PAUL, Paul's Nurseries, Waltham Cross, London, N.
Seedling Pelargoniums (zonal).

Messrs. S. PERKINS & SONS, Park Nursery, Coventry.
Seedling Pelargonium, Queen Victoria (tricolor-leaved).
Seedling Pelargonium, Gipsy Queen (white-edged).
Seedling Verbena, Shakspeare (intense scarlet).

Messrs. JAMES VEITCH & SONS, Chelsea.
Pelargonium Volunteer.

Messrs. F. & A. SMITH, Nurserymen, Dulwich.
Zonal Pelargoniums (second year of blooming):—

Etna.	Omega.	Victory.
Mr. Eyles.	Andromeda.	Claude.
Lucy.	Magnet.	General Grant.
Rising Sun.	Mrs. Longman.	Orion.

Rev. ROBERT HOLLIS, Spalding.
Zonal Pelargonium, Mrs. Hollis. The seedling is from a pan of seed of Madame Vaucher, inoculated with pollen from Mrs. Pollock.

* For Certificates awarded in Section V., see List of Awards, pp. 376-7.

CLASS 155

Messrs. SALTMARSH & SON, Nurserymen, Chelmsford.

Seedling Zonal Pelargoniums :—

Meteor.	Crown Jewel.	Golden Queen.
Sunrise.	Queen of the Fairies.	Bird of Paradise.
Electric.	Vesuvius.	Etna.

M. AMBROISE VERSCHAFFELT, 50, Rue du Chaume, Ghent.
Azalea indica seedlings (2).

Mr. V. J. LANGLOIS, St. Heliers, Jersey.
Zonal Pelargonium, Lady Neynett.

Messrs. JAMES IVERY & SON, Nurserymen, Dorking and Reigate.
Azaleas: Fascination, Favourite, Beauty of Dorking.

Mr. CHARLES TURNER, Royal Nurseries, Slough.

Alpine Auricula Vivid.	Calceolaria International.
Alpine Auricula Bertha.	Calceolaria Leviathan.
Calceolaria Success.	Also 16 seedling Pelargoniums.

Messrs. S. GLENDINNING & SONS, Nurserymen, Chiswick.
Azalea Prince Albert Victor.

Mr. WILLIAM BULL, King's Road, Chelsea.
Azalea, Madame Cannart d'Hamale.

Entered, but did not exhibit :—

THOMAS LAXTON, Esq., Stamford.
Seedling Perpetual Rose (cut blooms)—May Queen.

(156.)—NEW GARDEN HYBRID, named, exclusive of Florists' flowers. —Certificates. (*Open.*)

F. PRYOR, Esq., Digswell, Welwyn. (W. Earley, gardener.)

Begonia hybrida phyllomaniaca.—A curious hybrid Begonia, raised between B. incarnata and B. ricinifolia, and remarkable for being feathered over with minute buds and leaves upon the main stem, leaf-stalk, upper and lower leaf-surface, and flower-stalk.

Messrs. JAMES VEITCH & SONS, Chelsea.

Rhododendron Henryanum.	Caladium tricolor.
Caladium albo-maculatum.	Caladium Sedeni.
Caladium Chelsoni.	Nepenthes (hybrida) maculata.
Caladium fulgens.	Anœctochilus Dominii—cross between A.
Caladium rubro-maculatum.	xanthophyllus and Goodyera discolor.

Mr. WILLIAM BULL, King's Road, Chelsea.
Rhododendron Princess Beatrice.

(157.)—NEW GARDEN VARIETY, not included in Nos. 155 or 156, named.—Certificates. (*Open.*)

Rev. W. H. GIRDLESTONE, Gwydyr, Ryde, Isle of Wight.
Athyrium Filix-fœmina var. Girdlestoni. Found in the Western Highlands, 1864.

Messrs. JAMES GARAWAY & Co., Durdham Down Nursery, Bristol.

Tricolor-leaved Pelargoniums :—

Ada Mayes.	Fascination.	Queen of Tricolors.
Bird of Paradise.	Juliet.	Princess Lichtenstein.
Bronze Queen.	Mars.	
Comet.	Magnet.	

Zonal variegated-leaved Pelargonium—L'Africaine.

Mr. JOHN HALLY, Nurseryman, Turner Road, Lee, Blackheath.

Gold-laced variegated Pelargoniums (very distinct and curious):

Variegated Rose of Lee	Sirius.
Fire King.	Mirth.
Queen of the Pixies.	Red Gauntlet.
Harlequin.	Queen of Sheba.

CLASS 157

Messrs. F. & A. Smith, Nurserymen, Dulwich.

Tricolor-leaved Pelargoniums, second year:—

Princess of Wales.	Amulet.	Souvenir de Sir Joseph Paxton.
Aurora.	Glory of Dulwich.	Murillo.
George Peabody.	Phœnix.	Prince of Wales.
Gem.	L'Empèreur.	Dawn.
Attraction.	Eclipse.	Meteor.
Beauty of Surrey.	Unique.	Jetty Lacy.
Admiration.	Marvellous.	Pet.
Magnet.	Imperatrice Eugénie.	Robert Fortune.
Triumphans.	Princess Mary.	Refulgens.
Queen Victoria.	Louisa Smith.	Lady Paxton.
Ensign.	Resplendent.	Memnon.
Queen Mab.	Alpha.	Defiance.
Monarch.	Grandis.	Hope.
Sunray.	Ariel.	Standard.
Wonderful.	Queen of the Fairies.	

Golden-leaved Geraniums, with vandyke-brown zones:—

Mrs. Chas. Barry.	Gipsy Queen.	King.
Bronze Shield.	Jason.	Sol.
Bronze Belt.	Vandyke.	

Golden variegated Geranium—Crystal Palace Gem.
Silver variegated Geranium—Silver Cloud.

M. Alfred Bleu, 48, Route d'Italie, Paris.

Nouveaux Caladiums, obtenus de semis—

Alphonse Karr, produit par le C. Chantinii et Verschaffeltii.
Baron de Rothschild, produit par le C. pœcile et Neumanni.
Charles Verdier, produit par le C. pœcile et Neumanni.
Docteur Lindley, produit par le C. Houllettii et Baraquinii.
Edouard Moreau, produit par le C. bicolor et Verschaffeltii.
Imperatrice Eugénie, produit par le C. Brongniartii et Houllettii.
Isidore Leroy, produit par le C. pœcile et Chantinii.
Keteleerii, produit par le C. bicolor et argyrospilum.
Napoleon III., produit par le C. pœcile.
Prince Imperial, produit par le C. Houllettii et Baraquinii.
Reine Victoria, produit par le C. Belleymei et Verschaffeltii
Rossinii, produit par le C. Chantinii et Verschaffeltii.

Messrs. Wm. Cutbush & Son, Nurserymen, Highgate.

Aucuba japonica aureo-maculata—a garden sport, originated in the Highgate nurseries, and has proved constant for seven years.

Mr. William Groom, Ipswich.

Tricolor-leaved Pelargoniums.

Mr. Richard Hartland, The Lough Nurseries, Cork.

A group of 12 plants of Wellingtonia gigantea aureo-variegata.—The original tree is now 11 ft. 10 in., high, with a circumference of branches 30 ft. 6 in., circumference of trunk 2 ft. 5 in., and last season's shoot 2 ft. 10 in. The variegation is of a rich golden colour, constant, and found on every shoot of every branch.

Messrs. Fisher, Holmes, & Co., Handsworth Nursery, Sheffield.

Taxus hibernica fastigiata (*Gard. Chron.* 1863, 580). A beautiful golden variety of the erect Irish Yew; the leaves golden yellow with a green rib.

Mr. Wm. Paul, Paul's Nurseries, Waltham Cross.

Taxus walthamensis.	Hedera Helix walthamensis.
Hedera Helix gracilis.	Hedera Helix arborescens lancifolia.

Messrs. James Ivery & Son, Nurserymen, Dorking and Reigate.

Athyrium Filix-fœmina lanceolatum.	Lastrea Filix-mas abbreviato-cristata.
Athyrium Filix-fœmina formosum cristatum.	Polystichum angulare attenuato-cristatum.
Athyrium Filix-fœmina pterophorum.	Polystichum angulare tenue.
Athyrium Filix-fœmina obtusum.	Asplenium Trichomanes Moulei.
Lastrea Filix-mas Ingramii.	

CLASS 157

Mr. JABEZ J. CHATER, Gonville Nurseries, Cambridge.
Tricolor-leaved Pelargoniums:—

Senior Wrangler.	Alice B. Chater.
Mrs. J. J. Chater.	Albion Cliffs.
George Willers.	Pallida.
Chef d'œuvre.	Sensation.
Princess of Wales.	Bracelet; and others.

Messrs. E. G. HENDERSON & SON, Wellington Road Nursery, St. John's Wood.
Tricolor-leaved Pelargoniums.

Messrs. PAUL & SON, Old Cheshunt Nurseries, Cheshunt.
Paul's new double scarlet Thorn (Cratægus Oxyacantha coccinea plena).

The Lord DYNEVOR, Dynevor Castle, Llandilo. (James Ticehurst, gardener.)
Gymnogramma lanata, var. monstrosa.

Mr. ROBERT REA, Nurseryman, &c., Ipswich.
Variegated Pelargoniums of the Cloth of Gold section: Commodore Nutt; Minnie Warren. Both have gold-coloured leaves with dark brown zones, and scarlet flowers.

Mr. THOMAS SMITH, Nurseryman, Long Wittenham, Abingdon, Berks.
Smith's Perfection Lobelia. Price 12*s*. per dozen.

Messrs. JAMES VEITCH & SONS, Chelsea.
Celosia tricolor angustifolia.
Gynerium argenteum variegatum.
Oncidium bifolium superbum—branching variety.
Retinospora Veitchii.
Retinospora plumosa.

Messrs. WATERER & GODFREY, Knaphill Nursery, Woking.
Cupressus Lawsoniana argentea (3).
Cupressus Lawsoniana gracilis.

Messrs. PETER SMITH & Co., Hamburg.
Thuja occidentalis, var. globosa gracilis.—A seedling sport of the common Arborvitæ.

Messrs. SALTMARSH & SONS, Chelmsford.
Variegated, tricolor-leaved, and Zonal Pelargoniums.

Mr. WILLIAM BULL, King's Road, Chelsea.
Pelargonium lateripes, Silver Gem.
Myosotis, Imperatrice Elizabeth.

Mr. C. TURNER, Royal Nurseries, Slough.
Pelargonium Rising Sun.

Mr. J. WATSON, Nurseryman, St. Albans.
Variegated Pelargonium, Brilliant Superb.

Messrs. J. CARTER & Co., Crystal Palace Nursery, Sydenham.
Tricolor-leaved Pelargoniums:—

Oberon.	Helena.	Pyramus.
Titania.	Thisbe.	Theseus.
Hermia.	Lysander.	Marian.
Red Gauntlet.	Buck.	Red Gauntlet.

New striped Maize.

R. BARCLAY, Esq., West-hill, Highgate. (William Young, gardener.)
New Gloxinias:—

Blair Athol.	Rival.	Sensation.
Gladiateur.	Beauty.	Prince of Wales.

Messrs. PETER LAWSON & SON, Edinburgh.
Rhododendron Edinæ.

(158.)—SEEDLING FRUIT, of any kind, named.—Certificates. (*Open.*)

Mr. CHARLES TURNER, Royal Nurseries, Slough.
Cherry, Frogmore Early Forcing (Ingram's).

Entered but did not exhibit:—
T. LAXTON, Esq., Stamford.

CLASS
(159.)—**Seedling Vegetable, of any kind, named.—Certificates.** (*Open.*)

The Lady MARY C. N. HAMILTON, Bloxholm Hall, Sleaford. (David Lumsden, gardener.)
Leek, Bloxholm flag.
Messrs. JAMES IVERY & SON, Dorking and Reigate.
Lettuce International.
Entered did but not exhibit :—
T. LAXTON, Esq., Stamford.

§ VI.—FRUITS.

Steward:—Mr. HARRY J. VEITCH.

Jurors.

Classes 160 to 170, including 158 and 159.	Mr. J. Webster, Gordon Castle. Mr. G. Tillyard, Stanmore. Mr. T. Bailey, Shardeloes.
Classes 178 to 180.	Mr. J. Freeman, Knowsley. Mr. A. Cramb, Tortworth. Mr. A. Fowler, Castle Kennedy.
Classes 171 to 177.	Mr. J. Cox, Redleaf. Mr. W. Carmichael, Sandringham. Mr. A. Henderson, Thornton Heath.
Classes 185 to 192.	Mr. R. Thompson, Chiswick. Mr. D. Judd, Hawkstone Park. Mr. T. Jones, Petworth.
Classes 193 to 200.	Rev. T. C. Bréhaut, Guernsey. Mr. T. Rivers, Sawbridgeworth. Mr. C. Ewing, Bodorgan.

(160.)—**Forced Fruits, 10 dishes; not more than 2 dishes of any one kind of Fruit admitted.—1st Prize, 10*l.*; 2nd Prize 7*l.*; 3rd Prize, 5*l.*** (*Open.*)

Mr. CHARLES TURNER, Royal Nurseries, Slough. [*1st Prize.*]

Queen Pine.	Hunt's Tawny Nectarine.	Jamaica Pine.
Muscat Grape.	Rogers' Early Melon.	President Strawberry.
Black Hambro' Grape.	Victory of Bath Melon.	May Duke Cherry.
Grosse Mignonne Peach.		

Entered but did not exhibit—
Mr. H. KNIGHT, Jardinier-en-chef, Chateau de Ponchartrain, Seine-et-Oise.

(161.)—**Pineapple, 1 Fruit of the "Queen."—1st Prize, 2*l.*; 2nd Prize, 1*l.*** (*Open.*)

The DUKE of RICHMOND, Goodwood. (G. Cameron, gardener.) [*1st Prize.*]
Queen.
Rev. J. N. MICKLETHWAIT, Taverham Hall, (R. Carr, gardener.) [*2nd Prize.*]
Common Queen.
Mrs. BARCHARD, Putney Heath. (M. Higgs, gardener.) [*3rd Prize.*]
Moscow Queen.
J. DIXON, Esq., Astle Park, Congleton. (John Wallis, gardener.)
Queen.
Entered but did not exhibit—
JOSEPH GARSIDE, Esq., Carlton House, Worksop (J. Jefferson, gardener.)
Queen.
E. P. SHIRLEY, Esq., Eatington-park, Stratford-on-Avon. (W. Gardiner, gard.)
Moscow Queen.
W. H. STONE, Esq., M.P., Dulwich Hill. (Robert Smee, gardener.)
Queen.
W. LEAF, Esq. Park Hill, Streatham. (T. Page, gardener.)

CLASS
(162.)—PINEAPPLE, 1 Fruit of "Smooth Cayenne."—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

The LADY ROLLE, Bicton, Budleigh-Salterton. (J. Barnes, gr.) [*1st Prize.*]

The DUKE OF RICHMOND, Goodwood. (G. Cameron, gardener.) [*2nd Prize.*]

Entered but did not exhibit—
R. A. CARTWRIGHT, Esq., Edgcott House, Banbury. (T. Neale, gardener.)

(163.)—PINEAPPLE, 1 Fruit of "Providence."—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

Mr. J. MEREDITH, The Vineyard, Garston, near Liverpool. [*1st Prize.*]

Entered but did not exhibit—
J. G. RIDDELL, Esq., Hermeston Grange, Worksop. (J. H. Cawkell, gardener.)
The VISCOUNT FOLKESTONE, Longford Castle, Salisbury. (C. Penford, gardener.)

(164.)—PINEAPPLE, 1 Fruit of "Charlotte Rothschild."—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

(No entry.)

(165.)—PINEAPPLE, 1 Fruit of any other kind.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

W. LEAF, Esq., Park Hill, Streatham. (T. Page, gardener.) [*1st Prize.*]
Prickly Cayenne.

J. DIXON, Esq., Astle Park, Congleton. (John Wallis, gardener.) [*2nd Prize.*]
Black Prince.

Mrs. CUBITT, Denbies, Dorking. (J. Drewett, gardener.) [*3rd Prize.*]
Black Jamaica.

JOHN GOTT, Esq., Armley House, near Leeds. (Andrew Batger, gardener.)
Sugar Loaf.

Mrs. TREDWELL, St. John's Wood, Lower Norwood. (B. Peed, gardener.)
Black Jamaica.

E. P. SHIRLEY, Esq., Eatington Park, Stratford-on-Avon. (W. Gardiner, gardener.)
Black Jamaica.

W. H. STONE, Esq., M.P., Dulwich Hill. (Robert Smee, gardener.)
Black Prince.

Entered but did not exhibit—
R. T. CRAWSHAY, Esq., Cyfarthfa Castle, Merthyr Tydvil. (J. Hannan, gardener.)
Black Prince.
CRAWSHAY BAILEY, Esq., M.P., Aberaman Park, Aberdare. (T. Young, gardener.)
Prickly Cayenne.
Mr. C. TURNER, Royal Nurseries, Slough.

(166.)—GRAPES, 5 kinds, 1 bunch of each.—1st Prize, 5*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.* (*Open.*)

The Lord BAGOT, Blithfield, Rugeley. (T. Bannerman, gardener.) [*1st Prize.*]

Black Hamburgh.	Black Prince,	Chasselas Musqué.
Black Teneriffe.	Golden Hamburgh.	

HENRY AKROYD, Esq., Doddington Park, Nantwich. (J. Allport, gr.) [*2nd Prize.*]

Black Hamburgh.	Muscat Hamburgh.	Ingram's Prolific Muscat.
Black Frontignan.	West's St. Peter.	

CLASS 166

Mr. GEORGE OSBORNE, Manager, Kay's Nursery, Finchley. [*3rd Prize.*]

Black Hamburgh.	Buckland Sweetwater.	Bowood Muscat.
Pope's Hamburgh.	Muscat of Alexandria.	

Captain GLEGG, Withington Hall, Chelford. (Charles Allen, gardener.)

Black Hamburgh.	Royal Muscadine.	Frankenthal.
Grizzly Frontignan.	Buckland Sweetwater.	

The EARL OF STAIR, Castle Kennedy, Stranraer, N. B. (A. Fowler, gardener.)

Golden Hamburgh.	Rivers' Sweetwater.	Black Hamburgh.
Chasselas Musqué.	Black Lombardy.	

Mr. JOHN STANDISH, Royal Nursery, Ascot, Berks; and 52, St. George's Place Knightsbridge.

Muscat of Alexandria.	White Frontignan.	Black Hamburgh.
Muscat Trovéren.	Buckland Sweetwater.	

Entered but did not exhibit—

Mr. JOHN MONRO, Osborne Park Gardens, Barnet.

Buckland Sweet-water.	White Frontignan.	Gros Guillaume (Barbarossa of gardens)
Golden Hamburgh.	Black Hamburgh.	

G. H. TURNBULL, Esq., The Rookery, Down, Kent. (J. Horwood, gardener.)

Muscat of Alexandria.	Champion Hamburgh.	Lady Downes'.
Black Hamburgh.	Golden Hamburgh.	

SIR G. H. BEAUMONT, Bart., Cole Orton Hall, Ashby-de-la-Zouch. (M. Henderson, gardener.)

RALPH SNEYD, Esq, Keele Hall, Newcastle-under-Lyne. (W. Hill, gardener

Mr. J. MEREDITH, The Vineyard, Garnston, Liverpool.

(167.)—GRAPES, 6 bunches.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

R. SNEYD, Esq., Keele Hall, Staffordshire. (W. Hill, gardener.) [*1st Prize.*]
Black Prince.

Mr. GEORGE OSBORNE, Manager, Kay's Nursery, Finchley. [*2nd Prize.*]
Black Hamburgh.

The Lord BAGOT, Blithfield, Rugeley. (T. Bannerman, gardener.) [*3rd Prize.*]
Black Hamburgh.

E. J. G. HOPWOOD, Esq., Hopwood Hall, Manchester. (Wm. Allen, gardener.)
Black Hamburgh.

Mrs. WOOD, Twyford Abbey, Acton. (Henry Beasley, gardener.)
Black Hamburgh.

The EARL OF STAIR, Castle Kennedy, Stranraer, N. B. (A. Fowler, gardener.)

Frankenthal.	Black Hamburgh.	Victoria Hamburgh.

SIR G. H. BEAUMONT, Bart., Cole Orton Hall, Ashby-de-la-Zouch. (M. Henderson, gardener.)

Golden Hamburgh (3).	Black Hamburgh (3).

Mr. C. TURNER, Royal Nurseries, Slough.
Muscat of Alexandria.

J. DIXON, Esq., Astle Park, Congleton. (John Wallis, gardener.)
Black Hamburgh.

The Lord FOLEY, Worksop Manor, Notts. (John Miller, gardener.)
Black Hamburgh.

Mr. D. CLEMENT, Chase Side, East Barnet.
Black Hamburgh.

Entered but did not exhibit—

The VISCOUNT FOLKESTONE, Longford Castle, Salisbury. (C. Penford, gardener.)
Black Hamburgh.

G. H. TURNBULL, Esq., The Rookery, Down, Kent. (J. Horwood, gardener.)
Muscat of Alexandria.

J. DREW, Esq., Hornsey. (John Embery, gardener.)

CAPTAIN GLEGG, Withington Hall, Cheshire. (C. Allen, gardener.)

Mr. J. MEREDITH, The Vineyard, Garnston, Liverpool.

CLASS
(168.)—GRAPES, 3 bunches of "Black Hamburgh."—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

H. AKROYD, Esq., Doddington Park, Nantwich. (J. Allport, gr.) [*1st Prize.*]
Mr. CHARLES TURNER, Royal Nurseries, Slough. [*2nd Prize.*]
Sir G. H. BEAUMONT, Bart., Cole Orton Hall. (M. Henderson, gr.) [*3rd Prize.*]
CAPTAIN GLEGG, Withington Hall, Chelford. (C. Allen, gardener.)
J. H. LERMITTE, Esq., Knighton's, Finchley. (W. Birse, gardener.)
WM. JONES LOYD, Esq., Langleybury, Watford. (W. Cruickshank, gardener.)
Messrs. R. GADD & SON, Salvington Nurseries, Worthing.
JOSEPH GARSIDE, Esq., Carlton House, Worksop. (J. Jefferson, gardener.)
Mr. JAMES LOUDEN, The Quinta, Chirk, Salop.
The LORD BAGOT, Blithfield, Rugeley. (T. Bannerman, gardener.)
Mr. GEORGE OSBORNE, Manager, Kay's Nursery, Finchley.
The LORD ST. JOHN, Melchbourne Park, Higham Ferrars. (J. Rabbitt, gardr.)
J. DIXON, Esq., Astle Park, Congleton. (John Wallis, gardener.)
Mr. D. CLEMENT, Chase Side, East Barnet.
J. GILLETT, Esq., The Grove, Stanmore. (W. Lewis, gardener.)
Mrs. WOOD, Twyford Abbey, Acton. (Henry Beasley, gardener.)

Entered but did not exhibit—
Mrs. CUBITT, Denbies, Dorking. (J. Drewett, gardener.)
Fruit from pot vine.
The EARL OF STAIR, Castle Kennedy, Stranraer. (A. Fowler, gardener.)
Frankenthal.
The VISCOUNT FOLKESTONE, Longford Castle, Salisbury. (C. Penford, gardener.)
The LORD FOLEY, Worksop Manor, Notts. (J. Miller, gardener.)
J. DREW, Esq., Haringey Park, Crouch End, Hornsey. (J. Embery, gardener.)
RALPH SNEYD, Esq., Keele Hall, Newcastle-under-Lyne. (W. Hill, gardener.)
A. MOSS, Esq. Chadwell Heath, Essex. (C. Tansley, gardener.)
THOMAS H. MORTEN, Esq., Clarence Lodge, Clapham Road. (John Sutton, gr.)
T. GRISSELL, Esq., Woking Park, Dorking. (H. Downing, gardener.)
E. J. G. HOPWOOD, Esq., Hopwood Hall, Manchester. (W. Allen, gardener.)
G. H. TURNBULL, Esq., The Rookery, Down, Bromley. (J. Horwood, gardener.)
Mr. J. MEREDITH, The Vineyard, Garnston, Liverpool.
The EARL OF CAWDOR, Stackpole, Pembroke. (G. Sclater, gardener.)

(169.)—GRAPES, 3 bunches of any other Black kind, having the Muscat flavour.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

H. AKROYD, Esq. Doddington Park, Nantwich. (J. Allport, gr.) [*1st Prize.*]
Black Frontignan.
The LORD FOLEY, Worksop Manor. (J. Miller, gardener.) [*2nd Prize.*]
Black Frontignan.
The EARL OF STAIR, Castle Kennedy, Stranraer. (A. Fowler, gr.) [*3rd Prize.*]
Muscat Hamburgh.
The DUKE OF HAMILTON, Easton Park Wickham Market. (T. D. Irving, gard.)
Ingram's Hardy Prolific Muscat.
Mrs. HODGSON, The Elms, Hampstead. (J. Weir, gardener.)

Entered but did not exhibit—
R. SNEYD, Esq., Keele Hall, Staffordshire (William Hill, gardener).
Snow's Muscat Hamburgh.
The EARL OF CAWDOR, Stackpole, Pembroke. (G. Sclater. gardener.)

(170.)—GRAPES, 3 bunches of any other Black kind, not having the Muscat flavour.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

R. SNEYD, Esq., Keele Hall, Staffordshire. (W. Hill, gardener.) [*1st Prize.*]
Black Prince.

CLASS 170

H. AKROYD, Esq., Doddington Park, Nantwich. (J. Allport, gr.) [2nd Prize.]
West's St. Peter's.

WM. J. LOYD, Esq., Langleybury, Watford. (W. Cruickshank, gr.) [3rd Prize.]
Black Prince.

Entered but did not exhibit—

E. J. G. HOPWOOD, Esq., Hopwood Hall, Manchester. (W. Allen, gardener.)
Champion Hamburgh.

The EARL OF STAIR, Castle Kennedy, Stranraer. (A. Fowler, gardener.)
Black Lombardy.

Mr. GEORGE OSBORNE, Manager, Kay's Nursery, Finchley.
Pope's Hamburgh.

G. S. FOLJAMBE, Esq., Osberton Hall, Worksop. (E. Bennett, gardener.)

The LORD FOLEY, Worksop Manor. (J. Miller, gardener.)

Mr. JOHN MONRO, Osborne Park Gardens, Barnet.

(171.)—GRAPES, 3 bunches of "Muscat of Alexandria."—1st Prize, 3*l.*; 2nd Prize. 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Mr. CHARLES TURNER, Royal Nurseries, Slough. [1*st Prize.*]

H. FOWLER, Esq., Woodford, Essex. (S. Chambers, gardener.) [2*nd Prize.*]

Mrs. WOOD, Twyford Abbey, Acton. (H. Beasley, gardener.) [3*rd Prize.*]

Entered but did not exhibit—

G. H. TURNBULL, Esq., The Rookery, Down, Kent. (J. Horwood, gardener.)

The DUKE OF NORTHUMBERLAND, Syon House. (G. Fairbairn, gardener.)

(172.)—GRAPES, 3 bunches of any other White kind, having the Muscat flavour.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Mr. JOHN STANDISH, Royal Nursery, Ascot, Berks.; and 52, St. George's Place, Knightsbridge. [1*st Prize.*]
Muscat Trovéren.

The EARL OF STAIR, Castle Kennedy, Stranraer. (A. Fowler, gr.) [2*nd Prize.*]
Chasselas Musqué.

The VISCOUNTESS PALMERSTON, Brockett Hall. (R. Ruffett, gr.) [3*rd Prize.*]
Chasselas Musqué.

E. OATES, Esq., Bydorp House, Hanwell. (Richard Marcham, gardener.)
White Frontignan.

(173.)—GRAPES, 3 bunches of any other White kind, not having the Muscat flavour.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Mr. GEORGE OSBORNE, manager, Kay's Nursery, Finchley. [1*st Prize.*]
Buckland Sweetwater.

The EARL OF STAIR, Castle Kennedy, Stranraer. (A. Fowler, gr.) [2*nd Prize.*]
Golden Hamburgh.

The LORD BAGOT, Blithfield, Rugeley. (T. Bannerman, gr.) [3*rd Prize.*]
Golden Hamburgh.

The VISCOUNTESS PALMERSTON, Brockett Hall, Herts. (R. Ruffett, gardener.)
Dutch Sweetwater.

Mrs. CHILD, The Nurseries, Station Road, Whetstone. (G. Thomas, manager.)
Dutch Sweetwater.

Mr. CHARLES TURNER, Royal Nursery, Slough.
Sweetwater.

Entered but did not exhibit—

G. H. TURNBULL, Esq., The Rookery, Down, Kent. (J. Horwood, gardener.)
Buckland Sweetwater.

CLASS 173

Sir G. H. BEAUMONT, Bart., Cole Orton Hall, Ashby-de-la-Zouch. (Montgomery Henderson, gardener.)
Golden Hamburgh.

Mr. J. MONRO, Osborne Park Gardens, Barnet.

E. J. G. HOPWOOD, Esq., Hopwood Hall, Manchester. (W. Allen, gardener.)

The EARL OF CAWDOR, Stackpole, Pembroke. (G. Sclater, gardener.)

(174.)—GRAPES, the best single bunch of any Black kind.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

H. AKROYD, Esq., Doddington Park, Nantwich. (J. Allport, gr.) [*1st Prize.*]
Black Hamburgh.

Mr. GEORGE OSBORNE, manager, Kay's Nursery, Finchley. [*2nd Prize.*]
Black Hamburgh.

Mr. D. CLEMENT, Chase Side, East Barnet. [*3rd Prize.*]
Black Hamburgh.

The EARL of STAIR, Castle Kennedy, Stranraer. (Archibald Fowler, gardener.)
Black Hamburgh.

Mr. JAMES LOUDEN, the Quinta, Chirk, Salop.
Black Hamburgh.

J. DIXON, Esq., Astle Park, Congleton. (John Wallis, gardener.)
Black Hamburgh.

J. GILLETT, Esq., The Grove, Stanmore. (W. Lewis, gardener.)
Black Hamburgh.

Entered but did not exhibit—

The LORD ST. JOHN, Melchbourne Park, Higham Ferrars, Northamptonshire. (John Rabbitt, gardener).
Black Hamburgh.

R. SNEYD, Esq., Keele Hall, Newcastle-under-Lyne. (W. Hill, gardener.)

J. DREW, Esq., Haringey Park, Crouch End, Hornsey. (John Embery, gard.)

(175.)—GRAPES, the best single bunch of any White kind.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

Mr. CHARLES TURNER, Royal Nurseries, Slough. [*1st Prize.*]
Muscat of Alexandria.

Mr. GEORGE OSBORNE, manager, Kay's Nursery, Finchley. [*2nd Prize.*]
Buckland Sweetwater.

Mr. JOHN STANDISH, Royal Nursery, Ascot, Berks; and 52, St. George's-place, place, Knightsbridge. [*3rd Prize.*]
Muscat Trovéren.

The EARL OF STAIR, Castle Kennedy, Stranraer. (Archibald Fowler, gardener.)
Chasselas Musqué.

Sir G. H. BEAUMONT, Bart., Cole Orton Hall, Ashby-de-la-Zouch. (Montgomery Henderson, gardener.)
Golden Hamburgh.

The LORD ST. JOHN, Melchbourne Park Higham Ferrars. (J. Rabbitt, gardener.)
Buckland Sweetwater.

The LORD BAGOT, Blithfield, Rugeley. (T. Bannerman, gardener.)
Chasselas Musqué.

E. J. G. HOPWOOD, Esq., Hopwood Hall, Manchester. (W. Allen, gardener.)
Golden Hamburgh Grape.

The DUKE of HAMILTON, Easton Park, Wickham Market. (T. D. Irving, gard.)
Foster's Seedling.

Entered but did not exhibit—

G. H. TURNBULL, Esq., The Rookery, Downe, Kent. (G. Horwood, gardener.)
Muscat of Alexandria.

A. MOSS, Esq., Chadwell Heath, Essex. (C. Tansley, gardener.)
Muscat of Alexandria.

CLASS

(176.)—4 VINES IN POTS, in Fruit, distinct.—1st Prize, 5*l.*; 2nd Prize, 4*l.*; 3rd Prize, 3*l.* (*Open.*)

Messrs. H. LANE & SON, the Nurseries, Berkhamstead. [1*st Prize.*]
Alicante. | Foster's Seedling.
Buckland Sweetwater. | Frankenthal.

Entered but did not exhibit—
Mr. JOHN STANDISH, Royal Nurseries, Ascot.

(177.)—2 VINES IN POTS, in Fruit, distinct.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Lieut.-Col. LOYD, Hawkhurst, Kent. (T. Record, gardener.) [1*st Prize.*]
Buckland Sweetwater. | Royal Muscadine.
These Vines were twelve months old on the 1st of May, 1866.

Entered but did not exhibit—
The DUKE of NORTHUMBERLAND, Syon House, Isleworth. (G. Fairbairn, gard.)
Mr. JOHN STANDISH, Royal Nurseries, Ascot.

(178.)—MELON, 1 Fruit of any Green-fleshed kind.—1st Prize, 1*l.*; 2nd Prize, 15*s.*; 3rd Prize, 10*s.* (*Open.*)

H. LITTLEDALE, Esq., Liscard Hall, Cheshire. (G. Smith, gard.) [1*st Prize.*]
Hybrid Cashmere.

G. S. FOLJAMBE, Esq., Osberton Hall, Worksop. (E. Bennett, gr.) [2*nd Prize.*]
Excelsior.

Mrs. HOPE, the Deepdene, Dorking. (J. B. Whiting, gard.) [3*rd Prize.*]
Simmonds's Green-fleshed.

J. H. LERMITTE, Esq., Knighton's, Finchley. (W. Birse, gardener.)
Meredith's Hybrid Cashmere.

Rev. J. MICKLETHWAIT, Taverham Hall, Norwich. (R. Carr, gardener.)
Golden Perfection.

Disqualified from having entered in the wrong class—
WM. JONES LOYD, Esq., Langleybury, Watford. (W. Cruickshank, gardener.)
(A scarlet-fleshed variety shown.)
JOHN MILES, Esq., Whetstone. (W. Lane, gardener.)
(A scarlet-fleshed variety shown.)
THOMAS CANNING, Esq., Westbury-on-Trym, Bristol. (A. Morse, gardener.)
(A scarlet-fleshed variety shown.)
G. SANDARS, Esq., Chesterford Park, Saffron Walden. (C. Tyler, gardener.)
(A scarlet-fleshed variety shown.)

Entered but did not exhibit—
The LORD BAGOT, Blithfield, Rugeley. (T. Bannerman, gardener.)
Trentham Hybrid Cashmere.
JOHN NOBLE, Esq., Berry Hill, Taplow, Bucks. (Alex. Roger, gardener.)
Hybrid Green-fleshed.
The LORD CREWE, Crewe Hall, Cheshire. (Wm. Whitaker, gardener.)
Hybrid Cashmere.
The LORD FOLEY, Worksop Manor, Notts. (J. Miller, gardener.)
Mr. JOHN GADD, Castle Garden, Dorking.
J. S. PHILLIPS, Esq., Culham House, Abingdon. (T. Lockie, gardener.)
Rev. J. WILLIAMS, Tring Park, Herts. (J. Murray, gardener.)
Messrs. R. GADD & SON, Salvington Nurseries, Worthing.

(179.)—MELON, 1 Fruit of any Scarlet-fleshed kind.—1st Prize, 1*l.*; 2nd Prize, 15*s.*; 3rd Prize, 10*s.* (*Open.*)

JOHN MILES, Esq., Whetstone. (W. Lane, gardener.) [1*st Prize.*]
Scarlet Gem (crossed).

JOHN GOTT, Esq., Armley House, Leeds. (A. Batger, gardener.) [*2nd Prize.*]
Excelsior.

Messrs. R. GADD & SON, Salvington Nurseries, Worthing. [*3rd Prize.*]
Scarlet Cantaloupe.

G. S. FOLJAMBE, Esq., Osberton Hall, Worksop. (E. Bennett, (gardener.)
Osberton Hybrid.

J. S. PHILLIPS, Esq., Culham House, Abingdon. (T. Lockie, gardener.)
Malvern Hall.

Disqualified from having entered in the wrong class—
G. SANDARS, Esq., Chesterford Park, Saffron Walden. (C. Tyler, gardener.)
(A green-fleshed variety shown.)
T. CANNING, Esq., Westbury-on-Trym, Bristol. (A. Morse, gardener.)
(A green-fleshed variety shown.)

Entered but did not exhibit—
The LORD CREWE, Crewe Hall, Cheshire. (William Whitaker, gardener.)
Scarlet Gem.
Mr. JOHN GADD, Castle Garden, Dorking.
W. JONES LOYD, Esq., Langleybury, Watford. (W. Cruikshank, gardener.)

(180.)—PEACHES, 8 kinds, in threes.—1st Prize, 4*l.*; 2nd Prize, 8*l.*; 8rd Prize, 2*l.* (*Open.*)

Entered but did not exhibit—
Mr. HOUSE, Eastgate Nursery, Peterborough.
The DUKE of PORTLAND, Welbeck, Worksop. (W. Tillery, gardener.)
Mr. J. MONRO, Osborne Park Gardens, Barnet.
The DUKE of NEWCASTLE, Clumber Park, Worksop. (J. Tegg, gardener.)
The EARL of DARNLEY, Cobham Hall, Gravesend. (R. Budd, gardener.)

(181.)—PEACHES, 6 of any kind.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

Sir G. PHILLIPS, Bart., Shipton-on-Stour. (W. Gardner, gard.) [*1st Prize.*]
(No particulars furnished.)

Mr. CHARLES TURNER, Royal Nurseries, Slough. [*2nd Prize.*]
Grosse Mignonne.

C. N. NEWDEGATE, Esq., M.P., Arbury, Nuneaton. (Samuel Evans, gardener.)
Violette Hâtive.

The EARL of SHAFTESBURY, St. Giles, Cranbourne, Dorset. (Jas. Dawson, gr.)
Grosse Mignonne.

The DUKE of NEWCASTLE, Clumber Park, Worksop. (J. Tegg, gardener.)
Bellegarde.

Entered but did not exhibit—
E. P. SHIRLEY, Esq., Eatington Park, Stratford-on-Avon. (W. Gardiner, gard.)
Royal George.
E. J. G. HOPWOOD, Esq., Hopwood Hall, Manchester. (William Allen, gard.)
Royal George.
Mrs. HODGSON, the Elms, Hampstead. (J. Weir, gardener.)
G. S. FOLJAMBE, Esq., Osberton Hall, Worksop. (E. Bennett, gardener.)
Mr. J. HOUSE, Eastgate Nursery, Peterborough.
The LORD CREWE, Crewe Hall, Cheshire. (William Whitaker, gardener.)
Mr. J. MONRO, Osborne Park Gardens, Barnet.
The EARL of DARNLEY, Cobham Hall, Kent. (R. Budd, gardener.)

(182.)—NECTARINES, 8 kinds, in threes.—1st Prize, 4*l.*; 2nd Prize, 8*l.*; 8rd Prize, 2*l.* (*Open.*)

C. N. NEWDEGATE, Esq., M.P., Arbury, Nuneaton. (S. Evans, gr.) [*1st Prize.*]
Elruge. | Violette Hâtive. | Red Roman.

CLASS 182

Entered but did not exhibit—

The DUKE of PORTLAND, Welbeck, Worksop. (W. Tillery, gardener).
Mr. J. MONRO, Osborne Park Gardens, Barnet.
Mr. J. HOUSE, Eastgate Nursery, Peterborough.

(183.)—NECTARINES, 6 of any kind.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

Mr. CHARLES TURNER, Royal Nurseries, Slough. [*1st Prize.*]
Hunt's Tawny.

The DUKE OF NEWCASTLE, Clumber Pk., Worksop. (J. Tegg, gr.) [*2nd Prize.*]
Elruge.

C. N. NEWDEGATE, Esq., M.P., Arbury, Nuneaton. (Samuel Evans, gardener.)
Violette Hâtive.

RALPH SNEYD, Esq., Keele Hall, Newcastle. (W. Hill, gardener.)
Elruge.

Entered but did not exhibit—

M. G. THOYTTS, Esq., Sulhamstead House, near Reading. (G. Curd, gardener.)
Mrs. CUBITT, Denbies, Dorking. (James Drewett, gardener.)
Mr. J. HOUSE, Eastgate Nursery, Peterborough.
Captain GLEGG, Withington Hall, Chelford. (C. Allen, gardener).
Mr. WILLIAM CHATER, Nurseries, Saffron Walden.
Mr. J. MONRO, Osborne Park Gardens, Barnet.

(184.)—FIGS, 6 of any kind.—1st Prize, 1*l.*; 2nd Prize, 15*s.*; 3rd Prize, 10*s.* (*Open.*)

The DUKE of NORTHUMBERLAND, Syon House. (G. Fairbairn, gr.) [*1st Prize.*]
Brown Turkey.

The DUKE OF NEWCASTLE, Clumber Park, Worksop. (J. Tegg, gr.) [*2nd Prize.*]
Brown Turkey.

The Countess COWPER, Wrest Park, Ampthill. (S. Snow, gr.) [*3rd Prize.*]
Lee's Perpetual.

THOMAS ALCOCK, Esq., Kingswood Warren, Epsom. (W. Beech, gardener.)
Brown Turkey.

Entered but did not exhibit—

The VISCOUNTESS PALMERSTON, Brockett Hall, Herts. (R. Ruffett, gardener.)
Lee's Perpetual.
Rev. J. N. MICKLETHWAIT, Taverham Hall, Norwich. (R. Carr, gardener.)
Lee's Perpetual.
The EARL of STAIR, Castle Kennedy, Stranraer. (Archibald Fowler, gardener.)
Castle Kennedy.
Mr. J. STANDISH, Royal Nurseries, Ascot.
Mrs. HODGSON, The Elms, Hampstead. (J. Weir, gardener.)
Mr. C. TURNER, Royal Nurseries, Slough.
The LORD FOLEY, Worksop Manor, Notts. (J. Miller, gardener.)
Sir E. KERRISON, Bart., M.P., Oakley Park, Suffolk. (W. Robins, gardener.)

(185.)—STRAWBERRIES, 6 kinds, 25 Fruits of each,—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

J. H. BARNES, Esq., Rickmansworth. (J. Widdowson, gr.) [*1st Prize.*]

Sir Harry.	Sir Charles Napier.	Oscar.
President.	Empress Eugénie.	Keens' Seedling.

Entered but did not exhibit—

Mr. HOUSE, Eastgate Nursery, Peterborough.
Mr. J. STANDISH, Royal Nurseries, Ascot.
The DUKE OF HAMILTON, Easton Park, Wickham. (T. D. Irving, gardener.)

CLASS
(186.)—**Strawberries**, 3 kinds, 25 of each.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

R. P. King, Esq., Brislington, Bristol. (M. O'Brien, gardener.) [1*st Prize.*]
Trollope's Victoria. | Duc de Malakof. | Oscar.

Entered but did not exhibit—
The Lord St. John, Melchbourne Park, Higham Ferrars. (J. Rabbitt, gardener.)
Empress Eugénie. | Eleanor. | Marguerite.
The Duke of Hamilton, Easton Park, Suffolk. (T. D. Irving, gardener.)
Oscar. | Alice Maud. | Marguerite.
Mr. John Standish, Royal Nursery, Ascot, Berks; and 52, St. George's-place, Knightsbridge.
The Lord Foley, Worksop Manor, Notts. (J. Miller, gardener.)
Mr. J. House, Eastgate Nurseries. Peterborough.
The Marquis of Ailesbury, Savernake Forest, Marlborough. (A. Johnson, gardener.)
The Duke of Portland, Welbeck, Worksop. (W. Tillery, gardener.)

(187.)—**Strawberries**, any kind, 25 Fruits. 1st Prize, 1*l.* 10*s.*; 2nd Prize, 1*l.*; 3rd Prize, 15*s.* (*Open.*)

Mrs. Cubitt, Denbies, Dorking. (James Drewett, gardener.) [1*st Prize.*]
Alice Maud.

R. P. King, Esq., Brislington, Bristol. (M. O'Brien, gardener.) [2*nd Prize.*]
Trollope's Victoria.

The Duke of Hamilton, Easton Park Suffolk. (T. D. Irving, gr.) [3*rd Prize.*]
British Queen.

Coles Child, Esq., Bromley Palace, Kent. (J. McIndoe, gardener.)
Marguerite.

The Duke of Northumberland, Syon House, Isleworth. (G. Fairbairn, gr.)
Keens' Seedling.

W. E. Hubbard, Esq., St. Leonard's Lodge, Horsham. (S. Ford, gardener).
Viscomtesse Héricart de Thury.

The Lady M. C. N. Hamilton, Bloxholm Hall, Sleaford. (D. Lumsden, gr.)
Keens' Seedling.

R. A. Cartwright, Esq., Edgcott House, Banbury. (T. Neale, gardener.)
Keens' Seedling.

The Marquis Townshend, Ball's Park, Hertford. (H. Morgan, gardener.)
Keens' Seedling.

Lieut.-Colonel Loyd, Hawkhurst, Kent. (T. Record, gardener.)
British Queen.

The Duke of Portland, Welbeck, Worksop. (W. Tillery, gardener.)
Empress Eugénie.

Mr. J. House, Eastgate Nurseries, Peterborough.
Mixed Sorts

Mr. Charles Turner, Royal Nurseries, Slough.
Sir Joseph Paxton.

Charles Cannon, Esq., Kidderpore Hall, Hampstead. (J. Hepper, gardener.)
Keens' Seedling.

Entered but did not exhibit—
Mr. John Standish, Royal Nursery, Ascot, Berks.; and 52, St. George's Place, Knightsbridge.
G. Orme, Esq., South Farm Mansion, Broadwater. (J. Bristow, gardener.)
The Lord Foley, Worksop Manor, Notts. (J. Miller, gardener.)
Rev. J. N. Micklethwait, Taverham Hall, Norwich. (R. Carr, gardener.)
Sir W. R. Farquhar, Bart., Polesden, Dorking. (O. Goldsmith, gardener.)
Sir E. Kerrison, Bart., M.P., Oakley Park, Suffolk. (W. Robins, gardener.)
A. Moss, Esq., Chadwell Heath, Essex. (C. Tansley, gardener.)
John Hollingworth, Esq., Maidstone.

CLASS

(188.)—10 pots of STRAWBERRIES, in Fruit.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

The DUKE OF NORTHUMBERLAND, Syon House. (G. Fairbairn, gr.) [*1st Prize.*]
Keens' Seedling.

Entered but did not exhibit—
Mrs. HODGSON, The Elms, Hampstead. (James Weir, gardener.)
Keens' Seedling.
Mr. J. HOUSE, Eastgate Nursery, Peterborough.
Mr. J. STANDISH, Royal Nursery, Ascot; and 52, St. George's Place, Knightsbridge.
Mr. C. TURNER, Royal Nurseries, Slough.
C. CANNON, Esq., Kidderpore Hall, Hampstead. (J. Hepper, gardener.)

(189.)—CHERRIES, 30 of any Black kind.—1st Prize, 1*l.*; 2nd Prize, 15*s.*; 3rd Prize, 10*s.* (*Open.*)

The VISCOUNTESS PALMERSTON, Brockett Hall. (R. Ruffett, gr.) [*1st Prize.*]
Empress Eugénie.
Captain GLEGG, Withington Hall, Chelford. (C. Allen, gard.) [*2nd Prize.*]
Black Superb.
M. G. THOYTTS, Esq. Sulhamstead House, Reading. (G. Curd, gr.) [*3rd Prize.*]
Knight's Early Black.
E. J. G. HOPWOOD, Esq., Hopwood Hall, Manchester. (W. Allen, gardener.)
May Duke.
C. N. NEWDEGATE, Esq., M.P., Arbury, Nuneaton. (S. Evans, gardener.)
Black Circassian.

Entered but did not exhibit—
JOHN NOBLE, Esq., Berry Hill, Taplow, Bucks. (A. Roger, gardener.)
Circassian.
Mr. J. STANDISH, Royal Nurseries, Ascot.
Mr. C. TURNER, Royal Nurseries, Slough.
CHARLES CANNON, Esq., Kidderpore Hall, Hampstead. (J. Hepper, gardener.)
Sir E. KERRISON, Bart., M.P., Oakley Park, Suffolk. (W. Robins, gardener.)

(190.)—CHERRIES, 30 of any White kind.—1st Prize, 1*l.*; 2nd Prize, 15*s.*; 3rd Prize, 10*s.* (*Open.*)

M. G. THOYTTS, Esq. Sulhamstead House, Reading. (G. Curd, gr.) [*3rd Prize.*]
Elton.

Entered but did not exhibit—
JOHN NOBLE, Esq., Berry Hill, Taplow, Bucks. (A. Roger, gardener.)
Elton.
The EARL OF CAWDOR, Stackpole, Pembroke. (G. Sclater, gardener.)
T. LAXTON, Esq., Stamford.
Sir E. KERRISON, Bart., M.P., Oakley Park, Suffolk. (W. Robins, gardener.)
*** First and Second Prizes withheld by the Jurors.

(191.)—RASPBERRIES, 30 of any Red kind.—1st Prize, 1*l.*; 2nd Prize, 15*s.*; 3rd Prize, 10*s.* (*Open.*

E. J. G. HOPWOOD, Esq., Hopwood Hall. (W. Allen, gardener.) [*2nd Prize.*]
Prince of Wales.

Entered but did not exhibit—
Mrs. HODGSON, The Elms, Hampstead. (James Weir, gardener.)
Falstaff.
M. G. THOYTTS, Esq., Sulhamstead House, Reading. (G. Curd, gardener.)
Red Antwerp.
*** First Prize withheld by the Jurors.

CLASS
(192.)—RASPBERRIES, 80 of any White kind.—1st Prize, 1*l.*; 2nd Prize, 15*s.*; 3rd Prize, 10*s.* (*Open.*)

E. J. G. HOPWOOD, Esq., Hopwood Hall. (W. Allen, gardener.) [2*nd Prize.*]
White Antwerp.
*** First Prize withheld by the Jurors.

(193.)—Collection of ORANGES, LEMONS, CITRONS, POMELLOS, SHADDOCKS, &c., of foreign growth.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)
(No entry.)

(194.)—6 TANGIERINE ORANGE TREES, in Fruit, in pots or boxes.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)
(No entry.)

(195.)—Collection of FOREIGN FRUITS.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)
(No entry.)

(196.)—BANANAS, heaviest bunch.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

P. L. HINDS, Esq., The Lodge, Byfleet, Surrey. (J. Carr, gr.) [1*st Prize.*]
Musa Cavendishii; weight about 76 lbs.
JOHN GOTT, Esq., Armley House, Leeds. (A. Batger, gard.) [2*nd Prize.*]
Banana, or Chinese Bread Fruit, Musa Cavendishii.

(197.)—6 FRUIT TREES, showing the modes of training for walls or espaliers.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

MM. JAMIN & DURAND, The Nurseries, Bourg-la-Reine, Paris. [1*st Prize.*]
Apricot Viart—Palmette, with two lateral main shoots.
Apricot Jacques—Palmette, with six lateral main shoots.
Cherry Duchess of Palluau—Palmette, with six lateral main shoots.
Peach Acton Scot—Palmette, with two lateral main shoots.
Pear Beurré Sterckmans, or Belle Alliance—Palmette, with eight lateral main shoots.
Pear Beurré Hardy—Palmette, with eight lateral main shoots.
Entered but did not exhibit—
M. A. KOSTER, Boomkweeker, Boskoop.

(198.)—6 FRUIT TREES, showing the modes of training for open-ground culture.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

MM. JAMIN & DURAND, The Nurseries, Bourg-la-Reine, Paris. [1*st Prize.*]
Pear Martin Sec, with two horizontal shoots to be trained on wire.
Apple Reinette du Canada, with two horizontal shoots to be trained on wire.
Pear White Doyenné, trained in the spindle form.
Pear Suzette de Bavay, trained in the spindle form.
Pear Beurré Sterckmans, or Belle Alliance, trained in the pyramidal form.
Pear Doyenné d'Alençon, trained in the pyramidal form.

CLASS 198

Entered but did not exhibit—

M. A. KOSTER, Boomkweeker, Boskoop.

(199.)—12 ORCHARD HOUSE TREES, in Fruit (not necessarily ripe), in pots—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Messrs. LANE & SON, Nurserymen, Great Berkhamstead. [1*st Prize.*]

Plum (1 tree).	Peach (2 trees).	Orange (3 trees).
Fig (3 trees).	Nectarine (2 trees).	Cherry (1 tree).

(200.)—6 ORCHARD HOUSE TREES, in Fruit (not necessarily ripe), in pots.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

THOMAS H. MORTEN Esq., Clarence Lodge, Clapham-road. (J. Sutton, gardener. [1*st Prize.*]

Four Nectarines and two Peach trees, fruiting in pots. Price for the six trees, £10 10*s.*

Entered but did not exhibit—

The LORD FOLEY, Worksop Manor, Notts. (J. Miller, gardener.)

§ VII.—VEGETABLES.

Steward:—Mr. BENJAMIN S. WILLIAMS.

Jurors.

Classes 201 to 208.	Mr. R. Ruffett, Brockett Hall. Mr. J. Trotter, Badminton. Mr. W. Forsyth, Gunnersbury.	Classes 209 to 220.	Mr. W. Dodds, Ashton Court. Mr. J. Taplin, Chatsworth. Mr. A. F. Barron, Chiswick.

(201.)—FORCED VEGETABLES, 6 kinds, Salading excepted.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Rev. J. N. MICKLETHWAIT, Taverham Hall, Norwich. (R. Carr, gr.) [1*st Prize.*]

Potato, Ash-leaved Kidney.	Carrot, French Horn.	Turnip, Early White Dutch.
French Bean, Fulmer's.	Mushroom.	Pea, Tom Thumb.

The EARL of DARNLEY, Cobham Hall, Gravesend. (R. Budd, gr.) [2*nd Prize.*]

French Bean.	Mushroom.	Carrot.
Tomato.	Vegetable Marrow.	Potato.

Entered but did not exhibit—

M. G. THOYTTS, Esq., Sulhamstead House, Reading. (G. Curd, gardener.)

Tomato, Powell's Early.	Potato, Lapstone Kidney.	Carrot, Early French Horn.
French Bean, Newington Wonder.	Potato, Early Oxford.	Capsicum, erect.

COLES CHILD, Esq., Bromley Palace, Kent. (J. Mc Indoe, gardener.)

French Bean.	Carrot.	Mushroom.
Vegetable Marrow.	Turnip.	Pea.

The VISCOUNT FOLKESTONE, Longford Castle, Salisbury. (C. Penford, gardener.)

French Bean, 50 pods of Dun.	Potato, 24 Ash-leaf Kidney	Pea, half-peck Carter's First Crop.
Mushroom, 1 Punnet.	Vegetable Marrow, 12.	Carrot, 24 Early Horn.

The DUKE of NEWCASTLE, Clumber Park, Worksop. (J. Tegg, gardener.)

(No particulars furnished.)

CLASS

(202.)—**Vegetables, not Forced, 6 kinds, Salading excepted.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)**

T. T. Drake, Esq., Shardeloes, Amersham. (T. Bailey, gr.) [*1st Prize.*]

Cabbage, Bailey's Superb.	Asparagus, Giant.	Carrot, Early Horn.
Broccoli, Knight's Protecting.	Leek, Ayton Castle.	Potato.

Mrs. Hope, The Deepdene, Dorking. (J. B. Whiting, gardener.) [*2nd Prize.*]

Asparagus.	Cabbage.	Potato.
Spinach.	Broccoli.	Yam.

The Earl of Darnley, Cobham Hall, Gravesend. (R. Budd, gr.) [*3rd Prize.*]

Asparagus.	Leek.	Onion.
Cabbage.	Carrot.	Broccoli.

Mr. John Cattell, Nurseryman, Westerham, Kent.

Broccoli, Cattell's Eclipse.	Leek, Cattell's Kent Flag.	Beet, Cattell's Purple Top.
Cabbage, Cattell's Reliance.	Cauliflower, Early Erfurt.	Beet, Silver Curled.

Coles Child, Esq., Bromley Palace, Kent. (J. McIndoe, gardener.)

Carrot, Early Horn.	Asparagus.	Potato, Royal Ashleaf.
Spinach, Summer.	Cabbage, Early York.	Leek, Ayton Castle.

F. Pryor, Esq., Digswell, Welwyn. (W. Earley, gardener.)

Broccoli, Snow's.	Potato, Noble's Hard Cash.	Shallot.
Asparagus, Giant.	Cabbage, Premier.	Lettuce, Nicholson's Cabbage.

Mr. James Moore Mason, Market Gardener, Napier Villas, Old Woolwich Road.

Asparagus.	Beet.	Spinach.
Carrot.	Leek.	Horse radish.

Lieut.-Col. Loyd, Hawkhurst, Kent. (T. Record, gardener.)

Carrot, Early Horn.	Asparagus, 1 bundle.	Broccoli, 6 heads Leslie's Late White.
Cabbage, 6 heads Early Barnes.	Potato, 1 dish Early Albion Ash-leaved	Sea Kale, 1 dish.

W. Egerton Hubbard, Esq., St. Leonard's Lodge, Horsham. (S. Ford, gr.)

Cabbage, Wheeler's Imperial.	Broccoli, Carter's Champion.	Potato, Wyatt's Prolific Ash-leaf Kidney (of 1865).
Asparagus.	Potato, Ash-leaf Kidney (new).	
Spinach, Prickly.		

J. J. Blandy, Esq., Highgrove, Reading. (A. Ingram, gardener.)

Asparagus.	Carrot, Intermediate.	Cabbage, Enfield Market.
Onion, Tripoli.	Broccoli, Leslie's Late.	Rhubarb, Berkshire Seedling.

The Rev. J. Micklethwait, Taverham Hall, Norwich. (Richard Carr, gardener.)

Potato, Ash-leaved Kidney.	Asparagus.	Cauliflower, Early London.
Artichoke, Globe.	Spinach, Prichly.	Onion, Tripoli.

M. G. Thoyts, Esq., Sulhamstead House, Reading. (George Curd, gardener.)

Cabbage, Enfield Market.	Asparagus Reading Giant.	Spinach, Round.
Broccoli, Carter's Champion.	Carrot, Intermediate.	Potato, Racehorse.

Entered but did not exhibit—

Mme. Caroline Legrelle d'Hanis, Berchem, Anvers. (F. Vervoort, gardener.)

T. Laxton, Esq., Stamford.

The Duke of Newcastle, Clumber Park, Worksop. (J. Tegg, gardener.)

(203.)—**Salading, 10 sorts.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)**

Mr. James M. Mason, Market Gardener, Old Woolwich Road. [*1st Prize.*]

Mustard.	Onion.	Mint.
Cress.	Endive.	Cucumber.
Lettuce, two varieties.	Radish, two varieties.	Celery.

CLASS 203

The EARL OF DARNLEY, Cobham Hall, Gravesend. (R. Budd, gr.) [*2nd Prize.*]

Lettuce.	Mustard.	Celery.
Cucumber.	Onion.	Endive.
Radish.	Beet.	Chicory.
Cress.		

LADY M. C. N. HAMILTON, Bloxholm Hall, Sleaford. (D. Lumsden, gr.) [*3rd Prize.*]

Cucumber.	Endive.	Cress.
Celery.	Chicory.	Radish.
Beet.	Mustard.	Water Cress.
Lettuce.		

Rev. J. N. MICKLETHWAIT, Taverham Hall, Norwich. (Richard Carr, gardener.)

Celery, Incomparable White.	Mustard, White.	Tarragon.
Lettuce, London White Cos.	Cress, Curled.	Onion, (young).
Radish, Long Scarlet.	Chervil.	Cucumber, Conqueror of the West.
	Beet, Pine Apple.	

M. G. THOYTTS, Esq., Sulhamstead House, nr. Reading. (George Curd, gardener.)

Lettuce, Black Seeded.	Water Cress.	Chervil.
Endive, White Lettuce-leaved.	Mustard, Common.	Cucumber, Improved Market Favourite
Radish, Red & White Turnip, and Olive-shaped.	Golden Cress.	Cress, Common.
	Beet, Pine Apple Short-top.	

COLES CHILD, Esq., Bromley Palace, Kent. (J. McIndoe, gardener.)

Lettuce, Sutton's Superb Cos.	Beet, Dark Red.	Onion (Young).
Mustard, White.	Cucumber, McIndoe's Hybrid.	Tarragon.
Cress, Curled.	Water Cress.	Borage.
		Radish, Turnip.

Entered but did not exhibit—

E. WOOD, Esq., Hanger Hill House, Ealing. (F. Preece, gardener.)

Cucumber, Star of the West.	Mustard.	Chervil.
Lettuce, Bath Cos.	Cress.	Beet.
Lettuce, Victoria Cabbage.	Radish, Early Frame.	Onion.
	Radish, Turnip-rooted.	

*** Third Prize awarded by the Jurors.

(204.)—ASPARAGUS, 50 heads.—1st Prize, 1*l.*; 2nd Prize, 15*s.*; 3rd Prize, 10*s.* (*Open.*)

MR. GEORGE TIPPETT HASELL, Barton Hill, Bristol. [*1st Prize.*]
Hasell's Improved Giant.

The COUNTESS COWPER, Wrest Park, Ampthill. (S. Snow, gr.) [*2nd Prize.*]
Giant.

J. COCKLE, Esq., West Moulsey Lodge. (J. Penfold, gardener.) [*3rd Prize.*]
Giant.

The DUKE OF HAMILTON, Easton Park, Suffolk. (T. D. Irving, gardener.)
Giant.

Miss WOOD, The Elms, Hanger Hill, Ealing. (Edward Fountain, gardener.)
Giant.

G. ORME, Esq., South Farm Mansion, Broadwater. (J. Bristow, gardener.)
Sussex Green.

Mrs. TURNER, Rook's Nest, Godstone. (J. Squibbs, gardener.)

Entered but did not exhibit—

MRS. HOPE, The Deepdene, Dorking. (J. B. Whiting, gardener.)
Mr. JOHN SHACKELL, Old Field Nursery, Bath.
Mr. G. GREEN, Nurseryman, Douglas-place, East Greenwich.

(205.)—ASPARAGUS, 12 largest heads.—1st Prize, 1*l.*; 2nd Prize, 15*s.*; 3rd Prize, 10*s.* (*Open.*)

MR. GEORGE TIPPETT HASELL, Barton Hill, Bristol. [*1st Prize.*]
Hasell's Improved Giant.

CLASS 205

J. COCKLE, Esq., West Moulsey Lodge. (J. Penfold, gardener.) [*3rd Prize.*]
Giant.

Mrs. TURNER, Rook's Nest, Godstone. (J. Squibbs, gardener.) [*3rd Prize.*]
(No particulars furnished.)

Entered but did not exhibit—

Sir WALTER R. FARQUHAR, Bart., Polesden, Dorking. (O. Goldsmith, gardener.)
Giant.

W. ROGERS, Esq., Red Hill. (J. Beach, gardener.)
Giant.

*** Second Prize withheld, and duplicate Third Prize awarded by the Jurors.

(206.)—MUSHROOMS, 1 punnet.—1st Prize, 10*s.*; 2nd Prize, 5*s.* (*Open.*)

The EARL OF DARNLEY, Cobham Hall, Gravesend. (R. Budd, gr.) [*1st Prize.*]
Common.

E. J. G. HOPWOOD, Esq. Hopwood Hall, Manchester. (W. Allen, gr.) [*2nd Prize*]
Common.

F. PRYOR, Esq., Digswell, Welwyn. (W. Earley, gardener.)
Common.

The DUKE OF HAMILTON, Easton Park, Suffolk. (T. D. Irving, gardener.)
Common.

The LADY MARY C. N. HAMILTON, Bloxholm Hall, Sleaford. (D. Lumsden, gr.)
Common.

Mrs. HODGSON, The Elms, Hampstead. (James Weir, gardener.)

Entered but did not exhibit—

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener.)
Milltrack.

Mrs. ALSTON, Elmdon Hall, Birmingham. (W. Brown, gardener.)
E. OATES, Esq., Bydorp House, Hanwell. (Richard Marcham, gardener.)
The LORD FOLEY, Worksop Manor, Notts. (J. Miller, gardener.)
Rev. J. WILLIAMS, Tring Park, Herts. (J. Murray, gardener.)
Sir E. KERRISON, Bart., M.P., Oakley Park, Suffolk. (Wm. Robins, gardener.)
The DUKE OF NEWCASTLE, Clumber Park, Worksop. (J. Tegg, gardener.)
Mrs. HOPE, The Deepdene, Dorking. (J. B. Whiting, gardener.)
Mr. JOHN SHACKELL, Old Field Nursery, Bath.

(207.)—POTATOS, FORCED, 24 of any Kidney kind.—1st Prize, 10*s.*; 2nd Prize, 5*s.* (*Open.*)

The EARL FITZWILLIAM, Coollattin Park, Carnew. (H. Cordle, gr.) [*1st Prize.*]
Prince of Wales.

The LADY M. C. N. HAMILTON, Bloxholm Hall. (D. Lumsden, gr.) [*2nd Prize.*]
Mona's Pride.

Mrs. HOPE, The Deepdene, Dorking. (J. B. Whiting, gardener.) [*3rd Prize.*]
Ash-leaf Kidney.

F. PRYOR, Esq., Digswell, Welwyn. (W. Earley, gardener.)
Mona's Pride.

Sir WALTER FARQUHAR, Bart., Polesden, Dorking. (Oliver Goldsmith, gard.)
Early Sussex Kidney.

The DUKE of HAMILTON, Easton Park, Suffolk. (T. D. Irving, gardener.)
Rivers' Royal Ash-leaf.

The DUKE of PORTLAND, Welbeck, Worksop. (W. Tillery, gardener.)
Mona's pride.

J. COCKLE, Esq., West Molescy Lodge. (J. Penfold, gardener.)
Walnut-leaved Kidney.

The EARL of DARNLEY, Cobham Hall, Gravesend. (R. Budd, gardener.)
Mona's Pride.

CLASS 207

W. E. HUBBARD, Esq., St. Leonard's Lodge, Horsham. (S. Ford, gardener.)
Ash-leaf Kidney.

R. A. CARTWRIGHT, Esq., Edgcott House, Banbury. (T. Neale, gardener.)
Myatt's Prolific.

Mrs. WOOD, Twyford Abbey, Acton. (Henry Beasley, gardener.)
Gloucestershire Kidney.

Entered but did not exhibit—

Mrs. ALSTON, Elmdon Hall, near Birmingham. (William Brown, gardener.)
Arbury Kidney.

The Hon. A. Z. ASHLEY, Copt Hall, Epping, Essex. (B. Porter, gardener.)
Albion Kidney.

M. G. THOYTTS, Esq,, Sulhamstead House, Reading. (G. Curd, gardener.)
Lapstone.

The MARQUIS of AILESBURY, Savernake Forest, Marlborough. (A Johnson, gardener.)

The LORD FOLEY, Worksop Manor, Notts. (J. Miller, gardener.)

Rev. J. N. MICKLETHWAIT, Taverham Hall, Norwich. (R. Carr, gardener.)

Rev. J. WILLIAMS, Tring Park, Herts. (J. Murray, gardener.)

The COUNTESS COWPER, Wrest Park, Ampthill, Beds. (Seward Snow, gardener.)

The DUKE of NEWCASTLE, Clumber Park, Notts. (J. Tegg, gardener.)

_ Third prize awarded by the Jurors.

(208.)—POTATOS, FORCED, 24 of any Round kind.—1st Prize, 10*s.*; 2nd Prize, 5*s.* (*Open.*)

Mr. THOMAS WESTBROOK, Abingdon, Berkshire. [1*st Prize.*]
Royal Albert.

The COUNTESS COWPER, Wrest Park, Ampthill. (S. Snow, gr.) [2*nd Prize.*]
Early Betty.

T. ALCOCK, Esq., Kingswood Warren, Epsom. (W. Beech, gardener.)
Early Handsworth.

F. PRYOR, Esq., Digswell, Welwyn. (W. Earley, gardener.)
Giant King.

Sir WALTER FARQUHAR, Bart., Polesden, Dorking. (O. Goldsmith, gardener.)
Early Handsworth.

The DUKE of HAMILTON, Easton Park, Suffolk. (T. D. Irving, gardener.)
Early Handsworth.

Mrs. WOOD, Twyford Abbey, Acton. (Henry Beasley, gardener.)
Early Handsworth.

The EARL of DARNLEY, Cobham Hall, Gravesend. (R. Budd, gardener.)
Hogg & Wood's Seedling.

R. A. CARTWRIGHT, Esq., Edgcott House, Banbury. (Thomas Neale, gardener.)
Giant King.

Mrs. TURNER, Rook's Nest, Godstone. (J. Squibbs, gardener.)
Early Frame.

Entered but did not exhibit—

M. G. THOYTTS, Esq., Sulhamstead House, Reading. (G. Curd, gardener.)
Early Oxford.

W. EGERTON HUBBARD, Esq., St. Leonard's Lodge, Horsham. (S. Ford, gard.)

Rev. J. WILLIAMS, Tring Park, Herts. (J. Murray, gardener.)

The DUKE of NEWCASTLE, Clumber Park, Notts. (J. Tegg, gardener.)

Mrs. HOPE, The Deepdene, Dorking. (J. B. Whiting, gardener.)

(209.)—FRENCH BEANS, Forced, 50 pods.—1st Prize, 1*l.*; 2nd Prize, 15*s.*; 3rd Prize, 10*s.* (*Open.*)

JOHN SIMS OATES, Esq., Floral Villa, Hanwell. [1*st Prize.*]
Negro.

CLASS 209

E. OATES, Esq., Bydorp House, Hanwell. (R. Marcham, gard.) [2nd Prize.]
Syon House.

JOHN GOTT, Esq., Armley House, Leeds. (A. Batger, gard.) [3rd Prize.]
Early Dun.

T. ALCOCK, Kingswood Warren, Epsom. (W. Beech, gardener.)
Fulmer's Forcing.

M. G. THOYTTS, Esq., Sulhamstead House, Reading. (G. Curd, gardener.)
Fulmer's Forcing.

Sir WALTER FARQUHAR, Bart., Polesden, Dorking. (O. Goldsmith, gardener.)
Early Dun.

The Lady MARY C. N. HAMILTON, Bloxholm Hall, Sleaford. (D. Lumsden, gr.)
Syon House.

The LORD ST. JOHN, Melchbourne Park, Higham Ferrars. (John Rabbitt, gr.)
Newington Wonder.

The DUKE of PORTLAND, Welbeck, Worksop. (William Tillery, gardener.)
Fulmer's Forcing.

Mrs. TURNER, Rook's Nest, Godstone. (J. Squibbs, gardener.)
Early Forcing.

H. LITTLEDALE, Esq., Liscard Hall, Cheshire. (George Smith, gardener.)
Syon House.

The EARL OF DARNLEY, Cobham Hall, Gravesend. (R. Budd, gardener.)
Syon House.

The EARL VANE, Seaham Hall, Durham. (R. Draper, gardener.)
French Bean from Canada.

CHARLES CANNON, Esq., Kidderpore Hall, Hampstead. (J. Hepper, gardener.)
Fulmer's Forcing.

Mrs. CUBITT, Denbies, Dorking. (James Drewett, gardener.)
(No particulars furnished.)

Entered but did not exhibit—

The VISCOUNT FOLKESTONE, Longford Castle, Salisbury. (C. Penford, gardener.)
Early Dun.

The MARQUIS of AILESBURY, Savernake Forest, Marlborough. (A. Johnson, gardener.)

The LORD FOLEY, Worksop Manor, Notts. (J. Miller, gardener.)

Rev. J. N. MICKLETHWAIT, Taverham Hall, Norwich. (R. Carr, gardener.)

Mrs. W. TETLEY, Armley Lodge, Leeds. (T. Dale, gardener.)

Rev. J. WILLIAMS, Tring Park, Herts. (J. Murray, gardener.)

Sir E. KERRISON, Bart., M.P., Oakley Park, Suffolk. (W. Robins, gardener.)

The DUKE of NEWCASTLE, Clumber Park, Notts. (J. Tegg, gardener.)

JAMES HUNT, Esq., Sydenham Hill, S. E. (W. Reid, gardener.)

(210.)—PEAS, half a peck.—1st Prize, 1*l.*; 2nd Prize, 15*s.*; 3rd Prize, 10*s.* (*Open.*)

Mr. CHARLES TURNER, Royal Nurseries, Slough. [1st Prize.]
Little Gem.

Entered but did not exhibit—

T. ALCOCK, Esq., Kingswood Warren, Epsom. (W. Beech, gardener.)
Tom Thumb.

The DUKE of HAMILTON, Easton Park, Wickham Market, Suff. (T. D. Irving, gr.)
Essex Rival.

J. COCKLE, Esq., West Moulsey Lodge. (J. Penfold, gardener.)

Messrs. R. GADD & SON, Salvington Nursery, Worthing.

(211.)—EARLY CARROTS, 1 bunch of 24.—1st Prize, 15*s.*; 2nd Prize, 10*s.* (*Open.*)

The COUNTESS COWPER, Wrest Park, Ampthill. (S. Snow, gr.) [1st Prize.]
Early Horn.

CLASS 211

Mrs. HOPE, The Deepdene, Dorking. (J. B. Whiting, gard.) [*2nd Prize.*]
French Horn.

W. E. HUBBARD, Esq. St. Leonard's Lodge, Horsham. (S. Ford, gr.) [*3rd Prize*]
French Horn.

M. G. THOYTTS, Esq., Sulhamstead House, Reading. (G. Curd, gardener.)
James's Intermediate.

T. ALCOCK, Esq., Kingswood Warren, Epsom. (William Beech, gardener.)
Early Horn.

REV. J. N. MICKLETHWAIT, Taverham Hall, Norwich. (R. Carr, gardener.)
Early Horn.

Entered but did not exhibit—

COLES CHILD, Esq., Bromley Palace, Kent. (J. McIndoe, gardener.)
Early Horn.

Mr. J. M. MASON, 4, Napier Villas, Old Woolwich Road, S.E.

Sir E. KERRISON, Bart., M.P., Oakley Park, Suffolk. (W. Robins, gardener.)

Mrs. TURNER, Rook's Nest, Godstone. (J. Squibbs, gardener.)

JOHN HOLLINGWORTH, Esq., Maidstone.

*** Third prize awarded by the Jurors.

(212.)—EARLY TURNIPS, 1 bunch of 24.—1st Prize, 15*s.*; 2nd Prize, 10*s.* (*Open.*)

The Rev. J. N. MICKLETHWAIT, Taverham Hall, Norwich. (R. Carr, gardener.)
Early Dutch.

Entered but did not exhibit—

F. PRYOR, Esq., Digswell, Welwyn. (W. Earley, gardener).
White Stone.

Mr. J. M. MASON, Market Gardener, Napier Villas, Old Woolwich Road.

Mrs. HOPE, The Deepdene, Dorking. (J. B. Whiting, gardener.)

*** No award made by the Jurors.

(213.)—CUCUMBERS, 1 brace.—1st Prize, 1*l.*; 2nd Prize, 15*s.* (*Open.*)

The LORD ST. JOHN, Melchbourne Park. (J. Rabbitt, gardener.) [*1st Prize.*]
Hamilton's Invincible.

H. LITTLEDALE, Esq., Liscard Hall, Cheshire. (G. Smith, gr.) [*2nd Prize.*]
Hybrid Kenyon.

T. ALCOCK Esq., Kingswood Warren, Epsom. (W. Beech, gardener.)
Masters' Prolific.

Mr. H. CARR, Jeffries' Arboretum Nurseries, Ipswich.
Jeffries' Arboretum Gem.

The EARL FITZWILLIAM, Coollattin Park, Carnew. (H. W. Cordle, gardener.)
Masters' Prolific.

The EARL VANE, Seaham Hall, Durham. (R. Draper, gardener.)
Seaham Seedling (new).

Messrs. R. GADD & SON, Salvington Nurseries, Worthing.
Gadd's Electric.

The DUKE of HAMILTON, Easton Park, Wickham Market, Suff. (T. D. Irving, gr.)
Irving's Early Frame.

Mr. JOHN JENNINGS, Nurseryman, Shipston-on-Stour, Worcestershire.
Worcestershire Champion (white spine).

E. OATES, Esq., Bydorp House, Hanwell. (Richard Marcham, gardener.)
Bydorp House Black Spine.

Sir H. C. MONTGOMERY, Bart., Burnham Grove, Maidenhead. (C. Neave, gard.)
Rifleman.

Mrs. HODGSON, The Elms, Hampstead. (James Weir, gardener.)
Weir's Prolific White Spine.

Mrs. W. TETLEY, Armley Lodge, Leeds. (T. Dale, gardener.)
Dale's Conqueror.

CLASS 213

J. S. PHILLIPS, Esq., Culham House, Abingdon. (T. Lockie, gardener.)
Berkshire Challenge.

The COUNTESS COWPER, Wrest Park, Ampthill, Beds. (Seward Snow, gardener.)
Snow's Horticultural Prize.

JOHN SIMS OATES, Esq., Floral Villa, Hanwell.
Volunteer.

Mrs. CHILD, The Nurseries, Station Road, Whetstone. (G. Thomas, Manager.)
Blyth Hall Prolific (white spine).

Messrs. JAMES IVERY & SON, Dorking and Reigate.
Ivery's Winter Champion.

Mr. JOHN HOUSE, Eastgate Nursery, Peterborough.
Telegraph.

J. H. BARNES, Esq., Chorley Wood House, Rickmansworth. (J. Widdowson, gardener.)
Volunteer.

Mrs. TURNER, Rook's Nest, Godstone. (J. Squibbs, gardener.)
Kirklees Hall Defiance.

J. COCKLE, Esq., West Molesey Lodge. (J. Penfold, gardener.)
Barr's Prolific.

F. PRYOR, Esq., Digswell, Welwyn. (W. Earley, gardener.)
Telegraph.

Sir W. R. FARQUHAR, Bart., Polesden, Dorking. (O. Goldsmith, gardener.)
Kirklees Hall Defiance.

CHAS. CANNON, Esq., Kidderpore Hall, Hampstead. (J. Hepper, gardener.)
Sir Colin Campbell.

Entered but did not exhibit—

M. G. THOYTTS, Esq., Sulhamstead House, Reading. (G. Curd, gardener.)
Dr. Livingstone.

J. J. BLANDY, Esq., Highgrove, Reading. (A. Ingram, gardener.)
Armstrong Gun.

The VISCOUNT FOLKESTONE, Longford Castle, Salisbury. (C. Penford, gardener.)
Formosa.

Mr. JOHN CATTELL, Nurseryman, Westerham, Kent.
Cattell's Gladiateur.

THOMAS FAIR, Esq., Lytham, Lancashire. (Richard Barnes, gardener.)
Linley.

Lieut.-Col. LOYD, Hawkhurst, Kent. (T. Record, gardener.)
Stanley's Winter Prolific.

J. A. ROSE, Esq, Fern Side, Wandsworth Common. (W. Wisker, gardener.)
Fern Side Prolific.

Mr. JOHN MONRO, Osborne Park Gardens, Barnet.
Monro's Rabley.

E. P. SHIRLEY, Esq., Eatington Park, Stratford-on-Avon. (W. Gardiner, gard.)
Himalaya.

E. WOOD, Esq., Hanger Hill House, W. (F. Preece, gardener.)
Berkshire Challenge.

Mrs. ALSTON, Elmdon Hall, Birmingham. (W. Brown, gardener.)
T. LAXTON, Esq., Stamford.
Mr. J. M. MASON, Old Woolwich Road.
The LORD FOLEY, Worksop Manor, Notts. (J. Miller, gardener.)
J. N. FLEMING, Esq., Kilkerran, near Maybole. (T. Barnwell, gardener.)
The Rev. J. N. MICKLETHWAIT, Taverham Hall, Norwich. (R. Carr, gardener.)
The Hon. A. Z. ASHLEY, Copt Hall, Epping. (B. Porter, gardener.)
Mr. JOHN WALKER, Nurseryman, Thame, Oxon.
JAMES HUNT, Esq., Sydenham Hill, Kent. (W. Reid, gardener.)

(214.)—CUCUMBER, the handsomest.—1st Prize, 10*s.*; 2nd Prize, 5*s.* (*Open.*)

The LORD ST. JOHN, Melchbourne Park. (J. Rabbitt, gardener.) [*1st Prize.*]
Hamilton's Invincible.

Mr. H. CARR, Jeffries' Arboretum Nurseries, Ipswich. [*2nd Prize.*]
Jeffries' Arboretum Gem.

Mr. JOHN JENNINGS, Nurseryman, Shipton-on-Stour. [*3rd Prize.*]
Worcestershire Champion (white spine).

The DUKE OF HAMILTON, Easton Park, Wickham Market. (T. D. Irving, gard.)
Hamilton's Invincible.

Sir H. C. MONTGOMERY, Bart., Burnham Grove, Maidenhead. (C. Neave, gard.)
Neave's Incomparable.

The Earl FITZWILLIAM, Coollattin Park, Carnew. (H. W. Cordle, gardener.)
Masters' Prolific.

The EARL VANE, Seaham Hall, Durham. (R. Draper, gardener).
Seaham Seedling (new).

Mrs. TURNER, Rook's Nest, Godstone. (J. Squibbs, gardener.)
Telegraph.

Mr. J. HOUSE, Eastgate Nursery, Peterborough.
Telegraph.

J. COCKLE, Esq., West Moulsey Lodge. (J. Penfold, gardener.)
Barr's Prolific.

CHARLES CANNON, Esq., Kidderpore Hall, Hampstead. (J. Hepper, gardener.)
Empress Eugenie.

Entered but did not exhibit—

J. J. BLANDY. Esq., Highgrove, Reading. (A. Ingram, gardener.)
Armstrong Gun.

The VISCOUNT FOLKESTONE, Longford Castle, Salisbury. (C. Penford, gardener.)
Formosa.

Mr. JOHN CATTELL, Nurseryman, Westerham, Kent.
Cattell's Gladiateur.

THOMAS CANNING, Esq., Westbury-on-Trym, Bristol. (A. Morse, gardener.)
Model.

J. A. ROSE, Esq., Fern Side, Wandsworth Common. (W. Wisker, gardener.)
Telegraph.

E. WOOD, Esq., Hanger Hill House, Ealing. (F. Preece, gardener.)
Smith's Fine Frame.

M. G. THOYTTS, Esq., Sulhamstead House, Reading. (G. Curd, gardener.)
Dr. Livingstone.

Mr. JOHN MONRO, Osborne Park Gardens, Barnet.
Monro's Rabley.

The LORD FOLEY, Worksop Manor, Notts. (J. Miller, gardener.)
J. N. FLEMING, Esq., Kilkerran, Ayrshire. (J. Barnwell, gardener.)
Messrs. JAMES IVERY & SON, Nurserymen, Dorking and Reigate.
Mr. J. M. MASON, Market Gardener, Old Woolwich Road.
Rev. J. WILLIAMS, Tring Park, Herts. (J. Murray, gardener.)
JOHN SIMS OATES, Esq., Floral Villa, Hanwell.
Messrs. R. GADD & SON, Salvington Nurseries, Worthing.
The Hon. A. Z. ASHLEY, Copt Hall, Epping. (B. Porter, gardener.)
Mr. JOHN WALKER, Nurseryman, Thame, Oxon.
J. HUNT, Esq., Sydenham Hill. (W. Reid, gardener.)
Mrs. W. TETLEY, Armley Lodge, near Leeds. (T. Dale, gardener.)

*** Third Prize awarded by the Jurors.

(215.)—CUCUMBER, the longest.—1st Prize, 10*s.*; 2nd Prize, 5*s.* (*Open.*)

J. COCKLE, Esq., West Moulsey Lodge. (J. Penfold, gardener.) [*1st Prize.*]
Alma.

W. TETLEY, Esq., Armley Lodge, Leeds. (T. Dale, gardener.) [*2nd Prize.*]
Dale's Conqueror.

Mr. JOHN HOUSE, Eastgate Nursery, Peterborough. [*3rd Prize.*].
Telegraph.

Mr. H. CARR, Jeffries' Arboretum Nurseries, Ipswich.
Jeffries' Arboretum Gem.

Sir H. C. MONTGOMERY, Bart., Burnham Grove, Maidenhead. (C. Neave, gard.)
Neave's Incomparable.

Mr. JOHN JENNINGS, Nurseryman, Shipton-on-Stour.
Worcestershire Champion.

CLASS 215

The EARL VANE, Seaham Hall, Durham. (R. Draper, gardener.)
Seaham Seedling.

Mrs. TURNER, Rook's Nest, Godstone. (J. Squibbs, gardener.)
Telegraph.

Entered but did not exhibit—

COLES CHILD, Esq., Bromley Palace, Kent. (J. McIndoe, gardener.)
McIndoe's Hybrid.

J. A. ROSE, Esq., Fern Side, Wandsworth Common. (W. Wisker, gardener.)
Fern Side Prolific.

E. WOOD, Esq., Hanger Hill House, Ealing. (F. Preece, gardener.)
Telegraph.

Mr. JOHN MONRO, Osborne Park Gardens, Barnet.
Monro's Prolific.

J. N. FLEMING, Esq., Kilkerran, Ayrshire. (J. Barnwell, gardener.)
W. ROGERS, Esq., Red Hill, Reigate. (J. Beach, gardener.)

(216.)—RHUBARB, heaviest 12 stalks.—1st Prize, 1*l.*; 2nd Prize, 15*s.*; 3rd Prize, 10*s.* (*Open.*)

Mrs. HOPE, The Deepdene, Dorking. (J. B. Whiting, gardener.) [*1st Prize.*]
Victoria.

Mr. JOHN CATTELL, Nurseryman, Westerham. [*2nd Prize.*]
Myatt's Victoria.

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gr.) [*3rd Prize.*]
Myatt's Victoria.

COLES CHILD, Esq., Bromley Palace, Kent. (J. McIndoe, gardener.)
Victoria.

E. OATES, Esq., Bydorp House, Hanwell. (Richard Marcham, gardener.)
Linnæus.

J. J. BLANDY, Esq., Highgrove, Reading. (A. Ingram, gardener.)
Berkshire Seedling (12 stalks, weighing 21 lbs. 9 oz.)

F. PRYOR, Esq., Digswell, Welwyn. (W. Earley, gardener.)
Early Ilford.

G. ORME, Esq., South Farm Mansion, Broadwater, Sussex. (J. Bristow, gardener.)
Myatt's Victoria.

Mr. JAMES MOORE MASON, Market Gardener, Napier Villas, Old Woolwich Road.
Myatt's Victoria.

Mrs. WOOD, Twyford Abbey, Acton. (Henry Beasley, gardener.)
Myatt's Victoria.

W. EGERTON HUBBARD, Esq., St. Leonard's Lodge, Horsham. (S. Ford, gard.)
Myatt's Victoria.

Entered but did not exhibit.

R. A. CARTWRIGHT, Esq., Edgcott House, Banbury, Oxon. (T. Neale, gardener.)
W. ROGERS, Esq., Red Hill, Reigate. (J. Beach, gardener.)
J. COCKLE, Esq., West Moulsey Lodge. (J. Penfold, gardener.)

(217.)—CABBAGE, 3 heads.—1st Prize, 15*s.*; 2nd Prize, 10*s.* (*Open.*)

The COUNTESS COWPER, Wrest Park, Ampthill. (S. Snow, gr.) [*1st Prize.*]
Snow's Nonpareil.

F. PRYOR, Esq., Digswell, Welwyn. (W. Earley, gardener.) [*2nd Prize.*]
Beck's Premier.

T. T. DRAKE, Esq., Shardeloes, Amersham. (Thomas Bailey, gardener.)
Bailey's Superb.

T. ALCOCK, Esq., Kingswood Warren, Epsom. (W. Beech, gardener.)
Champion.

Mr. JOHN CATTELL, Nurseryman, Westerham, Kent.
Cattell's Reliance

Messrs. E. P. FRANCIS & Co., Nurseries, Hertford.
Hill's Incomparable Dwarf.

CLASS 217

Miss WOOD, The Elms, Hanger Hill, Ealing. (E. Fountain, gardener.)
Nonsuch.

Sir WALTER R. FARQUHAR, Bart., Polesden, Dorking. (O. Goldsmith, gr.)
Early Fulham.

COLES CHILD, Esq., Bromley Palace, Kent. (J. McIndoe, gardener.)
Early York.

Lt.-Col. LOYD, Hawkhurst, Kent. (T. Record, gardener.)
Early Barnes.

Mrs. HOPE, The Deepdene, Dorking. (J. B. Whiting, gardener.)
Cattell's Reliance.

J. J. BLANDY, Esq., Highgrove, Reading. (A. Ingram, gardener.)
Enfield Market.

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener.)
Cattell's Reliance.

J. COCKLE, Esq., West Moulsey Lodge. (J. Penfold, gardener.)
Fulham.

E. OATES, Esq., Bydorp House, Hanwell. (R. Marcham, gardener.)
Battersea.

The DUKE OF HAMILTON, Easton Park, Wickham Market. (T. D. Irving, gard.)
Hill's Incomparable.

Mrs. TURNER, Rook's Nest, Godstone. (J. Squibbs, gardener.)
Cattell's Reliance.

The EARL of DARNLEY, Cobham Hall, Gravesend. (R. Budd, gardener.)
Cattell's Reliance.

Mrs. CUBITT, Denbies, Dorking. (James Drewett, gardener.)
Denbies Superb.

W. EGERTON HUBBARD, Esq., St. Leonard's Lodge, Horsham. (S. Ford, gard.)
Wheeler's Imperial.

M. G. THOYTTS, Esq., Sulhamstead House, Reading. (G. Curd, gardener.)
Shilling's Queen.

Entered but did not exhibit—

The VISCOUNT FOLKESTONE, Longford Castle, Salisbury. (C. Penford, gardener.)
Norris' Superb.

The Hon. A. Z. ASHLEY, Copt Hall, Epping. (B. Porter, gardener.)
Wheeler's Imperial.

The LORD FOLEY, Worksop Manor, Notts. (J. Miller, gardener.)
Mr. GEORGE TIPPETT HASELL, Barton Hill, Bristol.
Mr. JOHN JENNINGS, Nurseryman, Shipton-on-Stour.
Rev. J. WILLIAMS, Tring Park, Herts. (J. Murray, gardener.)
Sir E. KERRISON, Bart., M.P., Oakley Park, Suffolk. (William Robins, gardener.)

(218.)—CAULIFLOWER, 3 heads.—1st Prize, 15*s.*; 2nd Prize, 10*s.* (*Open.*)

Mr. JOHN CATTELL, Nurseryman, Westerham, Kent. [*1st Prize.*]
Early Erfurt.

The COUNTESS COWPER, Wrest Park, Ampthill. (S. Snow, gard.) [*2nd Prize.*]
Early London Market.

Rev. J. N. MICKLETHWAIT, Taverham Hall, Norwich. (R. Carr, gardener.)
Early London.

The EARL of DARNLEY, Cobham Hall, Gravesend. (R. Budd, gardener.)
Early London.

Entered but did not exhibit—

T. T. DRAKE, Esq., Shardeloes, Amersham. (Thomas Bailey, gardener.)
Walcheren.

The VISCOUNT FOLKESTONE, Longford Castle, Salisbury. (Charles Penford, gr.)
Early London.

COLES CHILD, Esq., Bromley Palace, Kent. (J. McIndoe, gardener.)
Walcheren.

Sir W. R. FARQUHAR, Bart., Polesden, Dorking. (O. Goldsmith, gardener.)
Mr. J. M. MASON, Market Gardener, Napier Villas, Old Woolwich Road.
Sir E. KERRISON, Bart., M.P., Oakley Park, Suffolk. (W. Robins, gardener.)

CLASS

(219.)—**Broccoli, 3 heads.—1st Prize, 15s.; 2nd Prize, 10s.** (*Open.*)

Mr. John Cattell, Nurseryman, Westerham, Kent. [*1st Prize.*]
Cattell's Eclipse.

Mrs. Hope, The Deepdene, Dorking. (J. B. Whiting, gard.) [*2nd Prize.*]
Cattell's Champion.

Lieut.-Col. Loyd, Hawkhurst, Kent. (T. Record, gardener.) [*3rd Prize.*]
Leslie's Late White.

T. T. Drake, Esq., Shardeloes, Amersham. (T. Bailey, gardener.)
Frogmore Protecting.

T. Alcock, Esq., Kingswood Warren, Epsom. (W. Beech, gardener.)
Carter's Champion.

Mrs. Cubitt, Denbies, Dorking. (Jas. Drewett, gardener.)
Chandler's Late White.

W. Wiltshire, Esq., The Frythe, Welwyn. (J. H. Fitt, gardener.)
Fitt's May Champion.

Messrs. E. P. Francis & Co., Nurseries, Hertford.
Hill's June Brocoli (new).

The Lady Mary C. N. Hamilton, Bloxholm Hall, Stratford. (D. Lumsden, gr.)
Dilcock's Bride.

Mrs. Turner, Rook's Nest, Godstone. (J. Squibbs, gardener.)
Cattell's Eclipse.

The Countess Cowper, Wrest Park, Ampthill. (Seward Snow, gardener.)
Snow's Late White Nonpareil.

R. A. Cartwright, Esq., Edgcott House, Banbury. (T. Neale, gardener.)
Carter's Champion.

M. G. Thoytts, Esq., Sulhamstead House, Reading. (G. Curd, gardener.)
Carter's Champion.

Entered but did not exhibit—

Messrs. James Garaway & Co., Durdham Down Nursery, Bristol.
Garaway's Late White.

R. Barclay, Esq., West-hill, Highgate. (W. Young, gardener.)

W. Rogers, Esq., Red Hill, Reigate. (J. Beach, gardener.)

The Duke of Newcastle, Clumber Park, Notts. (J. Tegg, gardener.)

(220.)—**Newly Introduced Vegetable, distinct, cultivable in this country, and not a garden variety.—Certificates.** (*Open.*)

W. J. Loyd, Esq., Langleybury, Watford. (W. Cruickshank, gr.) [*1st Class Cert.*]
Dioscorea Batatas (6).

Mr. William Bull, King's-road, Chelsea. [*1st Class Cert.*]
Raphanus caudatus.

Messrs. James Ivery & Son, Dorking and Reigate. [*1st Class Cert.*]
Dioscorea Batatas (12).

M. Morin, Fontainebleau. [*1st Class Cert.*]
Dioscorea Batatas.

§ VIII.—BOUQUETS AND OBJECTS OF ORNAMENT IN NATURAL FLOWERS.

Steward:—Mr. John Fleming.

Jurors.

Classes 221 to 230.
M. Bergman, Ferrières.
Mr. W. Thomson, City of London Club.
Mr. John G. Veitch, Chelsea.
Mr. J. Robson, Linton Park.

(221.)—**Dinner-Table Decorations, 3 Pieces, ornamented with Flowers.—1st Prize, 7l.; 2nd Prize, 5l.; 3rd Prize, 3l.** (*Open.*)

Mrs. Lermitte, Knighton's, Finchley. [*1st Prize.*]

Messrs. LUCKING BROS., 37, Westbourne Grove. [*2nd Prize.*]

T. C. MARCH, Esq., Ambassador's Court, St. James's Palace. [*3rd Prize.*]
Three Epergnes for the dinner table, arranged with cut flowers.

Messrs. JAMES POWELL & SONS, Glass Works, Whitefriars. [*Highly Commended.*]
Three pieces, ornamented with flowers.

Mr. JAMES GREEN, Cut Glass Manufacturer, 35, Upper Thames-street, London,
Three Helena table decorations for flowers or fruit, complete, with plateaux. (Registered.)

Mr. W. C. DRUMMOND, Nurseryman, Bath.

Entered but did not exhibit—

Mr. H. W. CORDLE, gardener to the Earl Fitzwilliam, Coollattin Park, Carnew, Wicklow.
Three pieces with cut flowers of various kinds.

(222.)—TABLE PLATEAU, ornamented with Flowers.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.* (*Open.*)

Miss F. A. WINT, 15, Bedford-place, Brighton. [*2nd Prize.*]

The LADY ROKEBY, Portman Square.

Messrs. JAMES POWELL & SONS, Glass Works, Whitefriars.

Mr. ALFRED SALTER, William-street, Hammersmith.
Plateau with flowers, and ancient Venice glass ornaments.

*** First and Third Prizes withheld by the Jurors.

(223.)—FLOWER-STANDS for the DRAWING-ROOM TABLE, furnished.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

T. C. MARCH, Esq., Ambassador's Court, St. James's Palace. [*1st Prize.*]
Three Flower Stands.

Messrs. JAMES POWELL & SONS, Glass Works, Whitefriars. [*Highly Commended.*]
Three Flower Stands.

Mr. HENRY HOWLETT, Chelsea.
Three Rustic Flower Stands for the drawing-room, entrance hall, &c., designed for the display of such flowers and ornamental foliage as are not adapted for deep vases.

Mr. JOHN J. WHEELER, 189, Fulham Road, London.
Glass Flower Supports.
Tubes for cut flowers, &c. &c.

Messrs. BARR & SUGDEN, King-street, Covent Garden.
Flower Stands for drawing-room table.

(224.)—PLANT CASE for the DRAWING-ROOM, furnished with suitable Plants.—1st Prize, 3*l.*; 2nd Prize, 2*l.*; 3rd Prize, 1*l.* (*Open.*)

Mr. GEO. MACINTOSH, Nurseryman, Hammersmith. [*1st Prize.*]
Case with mixed Plants.

Messrs. CLAUDET HOUGHTON, & SON, 89, High Holborn. [*2nd Prize.*]
Plant Case and Stand for the Drawing-room, fitted with suitable Plants and Ferns.

Messrs. BARR & SUGDEN, 12, King-street, Covent Garden. [*3rd Prize.*]
Twenty different Plant Cases, furnished.

Messrs. JAMES CARTER & Co., 237 and 238, High Holborn.
Case filled with Ferns and ornamental-foliaged Plants.

CLASS 224

Mr. GEORGE A. CHRISTMAS, 3, Cromwell-place, Clerkenwell-close.
Circular Case, made by G. A. Christmas, from Roman cement (original), containing a choice named collection of Ferns, grown by himself.—Price, complete, £1.
Circular Case, made from Roman cement, by G. A. Christmas (original), containing a collection of named Cacti.—Price, complete, 16*s*.

Mr. HENRY JENNINGS, 7, New-terrace, Park-road, Clapham.
3 Fern Cases, filled.
3 Round Fern Stands, filled.

M. CH. PFERSDORFF, 13, South-row, Kensal New Town, London; and 110, Avenue de St. Ouen, Batignolles, Paris.
A Case of Succulent Plants, suitable for Drawing-rooms.

(225.)—WINDOW JARDINET, furnished with suitable Plants.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

Mr. GEORGE MACINTOSH, Nurseryman, Hammersmith.
Window Jardinet filled with mixed Plants.

Messrs. BARR & SUGDEN, 12, King-street, Covent Garden.
Window Jardinet.

*** No award made by the Jurors.

(226.)—WINDOW BOX, for external decoration, furnished with suitable Plants, the box to be of any material, but not to exceed 3 feet 6 inches long by 10 inches wide.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

Messrs. WM. CUTBUSH & SON, Nurserymen, Highgate. [*1st Prize.*]
Window Box filled with mixed plants.

Messrs. ARTHUR HENDERSON & Co., Pine Apple Nursery, Edgware-road.

Mr. GEORGE MACINTOSH, Nurseryman, Hammersmith.
Window Box furnished with mixed Plants.

Messrs. F. & G. ROSHER, Queen's-road West, Chelsea.
Window Box for external decoration, made of indurated artificial stone, inlaid with coloured porcelain tiles.

Messrs. BARR & SUGDEN, 12, King Street, Covent Garden.

*** Second Prize withheld by the Jurors.

(227.)—3 HANGING BASKETS, furnished with suitable Plants.—1st Prize, 2*l.*; 2nd Prize, 1*l.* (*Open.*)

Messrs. WM. CUTBUSH & SON, Nursery, Highgate. [*2nd Prize.*]
Hanging Baskets of wire, filled with flowering and drooping Plants.

Messrs. JAMES CARTER & Co., 237 and 238, High Holborn.
Hanging Baskets filled with Plants.

Mr. GEORGE MACINTOSH, Hammersmith.
Hanging Baskets filled with mixed Plants.

Messrs. ARTHUR HENDERSON & Co., Pine Apple Nursery, Edgware Road.

Messrs. JAMES POWELL & SONS, Glass Works, Whitefriars.

Messrs. BARR & SUGDEN, 12, King-street, Covent-garden.

Messrs. NAYLOR & Co., 7, Princes-street, Cavendish-square.

*** First Prize withheld by the Jurors.

CLASS
(228.)—1 WEDDING BOUQUET.—1st Prize, *2l.*; 2nd Prize, *1l.* (*Open.*)

Messrs. LUCKING BROS., 37, Westbourne Grove, [*1st Prize.*]

Mr. JOHN DELAMERE, Nurseryman, Holm-lane, Oxton, Cheshire. [*2nd Prize.*]

Mr. WM. BEECH, Gardener to T. Alcock, Esq., Kingswood Warren, Epsom.

Mr. W. C. DRUMMOND, Nurseryman, Bath.

Mr. H. DOWNING, Gardener to Thomas Grissell, Esq., Norbury Park, near Dorking, Surrey.
Wedding Bouquet, in white satin holder.

Mr. D. T. FISH, Hardwicke House, Bury St. Edmunds, Suffolk.

Mr. C. T. HARDING, "Royal Bouquet maker," No. 29, Maddox-st., Regent-st.
Bride's Bouquet, in glass case.

Mrs. LERMITTE, Knighton's, Finchley.

Miss MARY LEYS, 1, Rue de la Chaux, Ghent.
Wedding Bouquet of natural orange buds, Flemish fashion—Price 4 guineas.

Mr. PREECE, Gardener to E. Wood, Esq., Hanger Hill House, Ealing.

Mr. RICHARD S. YATES, Sale, Cheshire.

Mr. JOHN HOUSE, Eastgate Nursery, Peterborough.

Entered but did not exhibit—
Mr. JOHN WALKER, Nurseryman, Thame, Oxon.

(229.)—3 BOUQUETS for BALLS.—1st Prize, *2l.*; 2nd Prize, *1l.* (*Open.*)

Mr. RICHARD S. YATES, Sale, Cheshire. *1st Prize.*]

Messrs. LUCKING BROS., 37, Westbourne Grove. [*2nd Prize.*]

Mr. JOHN DELAMERE, Nurseryman Holm-lane, Orton, Cheshire.

Mr. H. DOWNING, Gardener to Thomas Grissell, Esq., Norbury Park, near Dorking, Surrey.

Mr. W. C. DRUMMOND, Nurseryman, Bath.

Mr. D. T. FISH, Hardwicke House, Bury St. Edmunds, Suffolk.

Mr. F. PREECE, Gardener to E. Wood, Esq., Hanger Hill House, Ealing.

Mr. A. ROGER, Gardener to J. Noble, Esq., Berry Hill, Maidenhead.

Mr. JOHN HOUSE, Eastgate Nursery, Peterborough.

Entered but did not exhibit—
Mr. JOHN WALKER, Nurseryman, Thame, Oxon.

(230).—3 HEAD-DRESSES or WREATHS.—1st Prize, *2l.*; 2nd Prize, *1l.* (*Open.*)

Mr. RICHARD S. YATES, Sale, Cheshire. [*2nd Prize.*]

Mr. W. C. DRUMMOND, Nurseryman, Bath.

Entered but did not exhibit—
Mr. JOHN WALKER, Nurseryman, Thame, Oxon.

*** First Prize withheld by the Jurors.

§ IX.—IMPLEMENTS, DESIGNS, &c.

*** The COUNCIL of the SOCIETY of ARTS *offered Prizes to the extent of 50l. for Objects exhibited in Classes* 231 (A *to* H) *and* 232 (A *to* B).

Steward:—Mr. EDWARD EASTON.

Jurors.

Classes 231 to 233.	Mr. David Thomson, Archerfield. Mr. C. Pilcher, Wandsworth. Mr. R. Fish, Putteridgebury.	Classes 234 to 237.	Mr. E. Kemp, Birkenhead. Mr. R. Marnock, Regent's Park. Mr. Markham Nesfield, Regent's Park.

CLASS
(231.)—GARDEN IMPLEMENTS.—Certificates. (*Open.*)

Mr. RICHARD READ, 35, Regent-circus, Piccadilly, London. [*1st Class Cert.*]
Patent Garden Watering Engine, complete, 7*l.* 10*s.*
„ Ditto ditto, smaller size, 6*l.*
„ Pail Engine (lever action), 4*l.* 10*s.*
„ Suction Pumps, 2*l.* 2*s.*, 2*l.* 12*s.* 6*d.*, and 3*l.* 3*s.*
„ Conservatory Pumps, 2*l.* 2*s.* and 2*l.* 12*s.* 6*d.*
Garden Syringe, with three caps, 1*l.* 8*s.*
Ditto, with additional angle branch, 1*l.* 14*s.*
Ditto, with one rose, 1*l.*
Ditto (ladies' size), two roses, 18*s.*
Ditto ditto, small size, 12*s.*

Mr. JAMES GRAY, Danvers-street, Chelsea. [*1st Class Cert.*]
Oval Tubular Boiler, designed to economise fuel. It has been proved to do the same work as a round boiler with a third less fuel, both having the same superficies of heating surface.

Messrs. JOHN WARNER & SONS, Brass and Bell Founders to Her Majesty, 8, Crescent, Cripplegate, London. [*2nd Class Cert.*]
Double-barrel Garden Engine in wood tub, holding 36 gallons, 11*l.* 15*s.*
Garden Engine, wood tub, 24 gallons, 6*l.* 10.
Ditto, fitted with spreaders for watering lawns, extra, 1*l.* 4*s.*
Garden Engine, wood tub, 14 gallons, 5*l.* 10*s.*
Ditto, galvanised iron tub, 28 gallons, 5*l.* 10*s.*
Ditto, fitted with lawn spreader, extra, 1*l.* 4*s.*
Garden Engine, galvanised iron tub, 24 gallons, 4*l.* 19*s.*
Ditto, ditto, 16 gallons, 3*l.* 14*s.*
Ditto, ditto, 10 gallons, 2*l.* 19*s.*
Ditto, ditto, 6 gallons, 2*l.* 10*s.*
Swing Water Barrow, of galvanised iron, 50 gallons, 5*l.* 12*s.*
Ditto, ditto, 38 gallons, 3*l.* 17*s.*
Ditto, ditto, 30 gallons, 2*l.* 13*s.*
Ditto, ditto, 20 gallons, 2*l.* 2*s.*
American Garden Engine, for conservatories or vineries, 2*l.* 2*s.*: if required to draw from a tank, Suction-pipe, 6 feet long, with rose, 12*s.*
Garden Engine, to be used with a swing barrow or pail, 3*l.* 6*s.*
Orchid Bath and Force Pump, 7*l.*
Portable Force Pump, with branch pipe and suction rose, 5*l.* 10*s.*
Rubber Delivery Hose, per foot, 1*s.* 8*d.*
Ditto Suction-pipe, per foot, 2*s.* 11*d.*: one man can throw the water 40 feet.
Portable Force Pump, double action, suitable for two men, 6*l.* 6*s.*
Rubber Delivery Hose, per foot, 1*s.* 5*d.*
Ditto Suction-pipe, per foot, 2*s.* 11*d.*
The Aquaject, for watering plants, washing fruit trees, &c. &c., complete with suction and delivery pipe, for using with a pail or can, 1*l.* 10*s.*
Small Aquaject, to be used in the hand; very useful for ladies, 18*s.*
Collection of Brass Syringes, from 7*s.* 6*d.* to 18*s.* 6*d.*
Collection of Fountain Designs, from 5*s.* 6*d.* to 22*s.*
Collection of Branch Pipes, with cocks and roses, for watering gardens.
Iron Reel, for winding rubber hose, 3*l.*
Collection of Rubber Hose, of all sizes.
Galvanised Iron Portable Manure Pump, 2*l.* 15*s.*
Two-inch Rubber Suction-pipe, in 10, 12, or 15 feet lengths, per foot, 2*s.* 11*d.*

CLASS 231

Cast Iron Pump, 4 inches diameter, 2*l.* 14*s.*
Ditto, 3½ inches diameter, 2*l.* 6*s.*
Ditto, 3 inches diameter, 2*l.* 1*s.*
Ditto, 2½ inches diameter, 1*l.* 8*s.* 6*d.*
Ditto, short barrel, 2½ in. diameter, for sinks or tanks in plant houses, 1*l.* 1*s.*
Spary's Fumigator, for destroying mildew in vineries, 1*l.* 5*s.*
Copper Fumigator and Bellows, 10 inch, 13*s.* 6*d.*
Metallic String, for tying trees, flowers, or vines—affords no harbour for insects—various sizes, from 10*d.* per lb.

Messrs. BARNARD, BISHOP, & BARNARD, Norwich. [*3rd Class Cert.*]
Garden seats, &c.

Mr. ELISHA THOMAS ARCHER, 7, Great Trinity Lane, Cannon-street, London.
Frigi Domo Canvas.

Mr. GEORGE BIRKETT, Cleckheaton, near Normanton.
Improved Fumigator.

Messrs. HUNT & PICKERING, Leicester.
13-inch improved Lawn Mower, manufactured by H. & P., price, 4*l.* 10*s.*
16-inch ditto ditto, 6*l.*
19-inch ditto ditto, 7*l.*
22-inch ditto ditto, 7*l.* 10*s.*
Leicester Garden Seat, designed and manufactured by H. & P. No 2, 4 feet, 18*s.*
Ditto ditto. No. 6, 5 feet, 1*l.* 2*s.*
Ditto ditto. No. 2, 5 feet, with arms, 1*l.* 3*s.* 6*d.*
Ditto ditto. No 6, 5 feet, with arms, 1*l.* 5*s.* 6*d.*
Ditto ditto. No 4, real oak, 5 feet, with arms, 1*l.* 10*s.* 6*d.*
Rustic Garden Seat. No. 2, 5 feet, 1*l.* 1*s.*
Ditto ditto. No. 3, 6 feet, 1*l.* 15*s.*
Ditto ditto. No. 4, 6 feet, 2*l.*
Ditto ditto. No. 5, 6 feet, 2*l.* 2*s.*
Leicester Garden Table, painted green, with lines, 1*l.* 5*s.*
Ditto ditto, real oak varnished, ditto, 1*l.* 10*s.*
Iron Garden Table, imitation rustic oak, 1*l.* 10*s.*
Improved angular-headed steel tooth Garden Rake, 3*s.* 6*d.*

Messrs. HEREMAN & MORTON, 7, Pall Mall East, London.
A model of the late Sir J. Paxton's Patent Glass Roofs, as sold by Messrs. Hereman and Morton, under the title of "Hothouses for the million."

Mr. M. HENDERSON, gardener to Sir G. H. BEAUMONT, Bart., Cole Orton Hall.
A simple, inexpensive, and most efficient invention instead of boots for the horse in lawn-mowing, rolling, &c.

Messrs. CUMMING & EDMONDS, Stamford Bridge, Brompton.
Three Patent Tubular Saddle Boilers.

Messrs. BURY & POLLARD, Park Iron Works, 17, New Park-st., Southwark, London.
Hot Water Conical Boiler with furnace stand complete, for greenhouses. Price 6*l.*

Mr. JOHN MILBURN, Hollingworth near Hadfield.
Lawn Mowing, Rolling, and Collecting Machine, &c.

Mr. A. ROGER, gardener to J. NOBLE, Esq., Berry-hill, Maidenhead.
A revolving Watering Machine, for lawns, flower-beds, &c.

Mr. W. EARLEY, gardener to F. PRYOR, Esq., Digswell, Welwyn.
Pocket Fern or Botanist's Trowel and Sheath. Price 5*s.* each.

Mr. JOHN WEBSTER, Gardener, Gordon Castle, Fochabers, N.B.

Mr. CHARLES T. WELLS, 24, Bouverie-street, London.
Wells' Patent Folding Ground Vinery, with slate bottom, for growing and ripening Grapes without artificial heat. Awarded a silver medal at the Exposition of Horticulture, Nice, 1865.
No. 1, to open on one side only.
No. 1, large size, both sides to open.
No. 1, large size, with top ventilation, with vine growing in same.
No. 3, for two Vines.

M. HARDIVILLÉ, Cutler, 218, Rue St. Jacques, Paris.
The Hardivillé Numerator. An instrument for marking garden labels.

Messrs. J. B. BROWN & Co., 18, Cannon-street, London.

Mr. F. A. HAAGE, Jun., Erfurt, Prussia.

CLASS

(231 A.)—Half-size Model showing the best principle of construction for a TENT for HORTICULTURAL EXHIBITIONS, capable of being extended by a multiplication of the parts exhibited. —Society of Arts' Prize of 10*l*.

(No entry).

(231 B.)—The best TRANSPLANTING MACHINE for weights of 8 tons and upwards.—Society of Arts' Prize of 10*l*.

(No entry.)

(231 C.)—The best TRANSPLANTING MACHINE for ½-ton weights and upwards to 2 tons.—Society of Arts' Prize of 5*l*.

Mr. J. McINDOE, gardener, Bromley Palace, Kent. [*Soc. of Arts' Prize.*]
Transplanting Machine, invented by J. McIndoe.

Mr. CHARLES LEE, 12, Warwick-crescent, Kensington.
A Two-wheeled Transplanting Machine, to carry from half a ton to two tons. The loading is effected by leverage. This machine has lifted about 100 trees successfully, some of which weighed three tons. Can be built for £20.

(231 D.)—The best method of VENTILATING PLANT STRUCTURES, to be shown by a model.—Society of Arts' Prize of 5*l*.

Messrs. SANDERS, FREWER, & Co., Bury St. Edmunds. [*Soc. of Arts' Prize.*]
A model of Beard's Patent Metallic Non-conducting Glass Houses, shewing the patent system of perfect ventilation, and patent method of glazing, whereby breakage from expansion and contraction is prevented, and facility given for immediate reparation by any ordinary labourer.

Mr. JOSEPH NEWTON, Landscape Architect, 30, Eastbourne-terrace. Office, 14, Carey-street, Lincoln's Inn Fields, London.
Ventilating Horticultural Structures by warming with hot water, and free circulation of air:—

1 Model in wood of stove and boiler.
1 Model in copper of stove and boiler.
1 Model of glass structure for open lights.
1 Model of building, showing an improved plan of ventilation in connection with the horticultural structures.

Messrs. HEREMAN & MORTON, 7, Pall Mall East, London.
A working model of a Glass Roof for all horticultural purposes, patented by the late Sir J. Paxton, sold under the title of "Hothouses for the Million."

Mr. T. H. P. DENNIS, Chelmsford.
A model Greenhouse, exhibited for the purpose of illustrating Dennis's new patent system of ventilation for garden structures.

(231 E.)—The best GARDEN WHEELBARROW as to principle of construction.—Society of Arts' Prize of 3*l*.

Mr. A. ROGER, Berry Hill, Maidenhead.
Garden Wheelbarrow, the legs being so constructed as to tie the frame together.

Mr. CHARLES LEE, 12, Warwick Crescent, Kensington.
A Box Garden Wheelbarrow, shown for construction. Price, varnished, 28*s.*; unvarnished, 26*s.*

*** No Award made by the Jurors.

(231 F.)—The best SUNSHADE for garden seats.—Society of Arts' Prize of 3*l*.

Mr. THOMAS L. SCOWAN, Patent Canopy maker by special appointment to the Queen, Allen-road, Stoke Newington. [*Soc. of Arts' Prize.*]
Four Sunshades, for garden seats.

CLASS

(231 G.)—The best GUARD for protecting young trees from animals, in parks, orchards, and pleasure-grounds.—Society of Arts' Prize of 3*l*.

Mr. W. EARLEY, gardener to F. Pryor, Esq., Digswell, Welwyn. [*Soc. of Arts' Prize.*]
A Guard, for protecting young trees from animals, in parks, orchards, and pleasure grounds. Price 30*s*., as shown.

(231 H.)—The best instruments for working to LEVELS and SLOPES in garden-ground work.—Society of Arts' Prize of 2*l*.

(No entry.)

(232.)—GARDEN ORNAMENTS.—Certificates. (*Open.*)

Mr. HENRY LOVEGROVE, Slough, Bucks. [1*st Class Cert.*]
Ornamental Garden Chairs.
Rustic Seats.
Summer House.
Flower Baskets.

Messrs. F. & G. ROSHER, Queen's Road West, Chelsea. [1*st Class Cert.*]
Garden Ornaments in Artificial Stone, consisting of Vases, Jardinets, Fountains, Figures, Garden Border Edgings, &c.
Garden Border Edging Tiles of many designs, in various materials.
Ornamental Beaded Garden Wall Bricks for Training Fruit-trees (Foxley's patent.)

Mr. J. J. THOMAS, 133, Edgware Road, Paddington. [1*st Class Cert.*]
Model of a Wire Rose Temple.
Wire Arches for gravel walks, &c.
Flower Stands for the conservatory, drawing-room, or garden.
Suspending Wire Baskets, Chairs, and Garden Seats.
Wire Trainers.
Wire Netting and Trellis for training plants against a wall.
Wire Bordering for lawns, &c.
Zinc Boxes, with Tiles, for windows, balconies, &c.

Mr. E. A. PUIG, 21, Grove Terrace, St. John's Wood. [2*nd Class Cert.*]
Two designs in Ornamental Rockwork for Out-door Ferneries:—
An Imitation of Ruin; and an Imitation of Cragged Rock.
Price of Designs, each 5l. 5s.

Messrs. HUNT & PICKERING, Leicester.
One Leicester newly designed and patented Garden Vase, B, 4 ft. 6 in. diameter, 4*l*. 15*s*.
This vase is formed of ribs of iron, bent to about one-third of a circle and fitted into a circular casting on the top of a handsome pedestal. The outer ends of the bars are about two inches asunder, and when they are all fitted into what may not be inaptly termed a wheel they are bound together with a strap of iron, having slot-holes to fit on a button cast on each of the iron sections. The inside of the skeleton vase is then coated with thinly pared turf, the grass side outwards, and the compost for the flowers is filled in.
Ditto, ditto, C, 3 ft. 6 in. diameter, 3*l*. 15*s*.
Ditto, ditto, D, 5 ft. diameter, 3*l*. 15*s*.
Ditto, ditto, E, 4 ft. diameter, without Tiles, 3*l*. 15*s*.
Ditto, ditto, F, 5 ft. long by 1 ft. 6 in. wide, 3*l*. 15*s*.
Ditto, ditto, G, 5 ft. 6 in. diameter, 6*l*. 10*s*.

Mr. WILLIAM BULL, King's Road, Chelsea.
Six Italian Baskets filled; and one without Plants, to show the make.

(232 A.)—EARTHENWARE BOXES for EDGINGS, capable of producing any length of straight and curved lines for borders in Conservatories.—Society of Arts' Prize of 3*l*.

(No Entry.)

CLASS
(232 B.)—ORNAMENTAL FLOWER POTS of large dimensions, of common red clay, for specimen plants, and for terraces.—Society of Arts' Prizes of 3*l.*, 2*l.*, and 1*l.*

Mr. J. SHEPPARD, gardener, Wolverstone Park, Warwick.
Red Clay Pots, ornamented with Portland cement, and coloured.

*** No award made by the Jurors.

(233.)—TUBS for ORANGE TREES, &c.—1st Prize, 5*l.*; 2nd Prize, 3*l.* (*Open.*)

Mr. W. ABRAHAM, manager to Messrs. DONALD & SONS, Goldworth Nursery, Woking, Surrey.
An Orange Tub, of octagon shape, and so constructed that any portion, or the whole, may be taken to pieces without disturbing the plant.

Mr. WILLIAM STUTTLE, Ironfounder, Shrewsbury.
The Orange Tub, or Conservatory Pot, as exhibited, is so arranged that either side can be taken down (by the removal of three screws) at pleasure, to examine the state of the roots, for the removal of the old soil, or for top-dressing; also, for repotting. The tree can be repotted without being removed or disturbing the soil on the present base plate. Made to order to any design, to suit the architecture of the building or conservatory; of any dimensions, in shape either square, hexagon, or octagon; and painted, lined with slate, galvanized, or enamelled with glass on the inside.

Mr. JAMES GRAY, Danvers-street, Chelsea.
Orange Tub or Pot, designed by Mr. George Rothie. This tub or pot is constructed so that it may be enlarged to any size, by inserting one or more panels as required without disturbing the mould.

Mr. A. ROGER, gardener to JOHN NOBLE, Esq., Berry Hill, Taplow, Bucks.
Two Round Orange Tubs.

*** No award made by the Jurors.

(234.)—DESIGN for LAYING OUT a PUBLIC GARDEN, on a scale of 40 feet to the inch; the space, form, and position of the Garden of the Royal Horticultural Society at South Kensington to be taken as a basis.—1st Prize, 10*l.*; 2nd Prize, 5*l.*; 3rd Prize, 3*l.* (*Open.*)

Mr. W. ABRAHAM, Goldworth Nursery, Woking.

Mr. EDWARD BROWN, Slough, Bucks.

*** No award made by the Jurors.

(235.)—DESIGN for LAYING OUT a PRIVATE GARDEN and GROUNDS, indicating site of House and Offices, on a scale of 40 feet to the inch; the space a rhomboid of 20 acres.—1st Prize, 10*l.*; 2nd Prize, 5*l.*; 3rd Prize, 3*l.* (*Open.*)

Mr. J. W. CHAPMAN, Hermitage-road, Richmond. [*2nd Prize.*]
With sketches to illustrate the design.

Mr. EDWARD BROWN, Slough, Bucks.

Mr. THOMAS J. CAPARN, King's Road Nursery, Newark-on-Trent.

Mr. HENRY HOWLETT, Chelsea.

Mr. WILLIAM GREENSHIELDS, gardener, Culzean Castle, Maybole, Ayrshire, N.B.

Mr. W. ABRAHAM, Goldworth Nursery, Woking.

Mr. J. FLEMING, gardener, Cleveden, Maidenhead.

*** First and Third Prizes withheld by the Jurors.

CLASS
(236.)—DESIGN for LAYING OUT a VILLA GARDEN and GROUNDS, indicating site of House and Offices, on a scale of 10 feet to the inch ; the space an oblong of 5 acres.—1st Prize, 5*l.*; 2nd Prize, 3*l.* (*Open.*)

Mr. THOMAS J. CAPARN, King's Road Nursery, Newark. [*2nd Prize.*]
Mr. A. ANDERSON, gardener to J. KNOWLES, Esq., Lytham, Lancashire.
Mr. EDWARD BROWN, Slough, Bucks.
Mr. JOHN FLEMING, Cliveden, Maidenhead.

*** First Prize withheld by the Jurors.

(237.)—WATER-COLOUR DRAWING of any Plant, British or Exotic, natural size, with the usual Magnified dissections; to be drawn or mounted on folio paper, and to combine scientific accuracy with artistic treatment.—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.*

Mr. F. A. SLOCOMBE, South Kensington Museum. [*1st Prize.*]
Drawing of Rhododendron Nuttallii.
Mrs. HENRY HILL, School of Art, Cork. [*2nd Prize.*]
Drawing of Vanda suavis, and of Oncidium Papilio.
Miss AGNES BOYD, School of Art, Edinburgh. [*3rd Prize.*]
Drawing of a group of Columbines.
Mr. A. CHANDLER, 1, Devonshire-terrace, Fulham-road.
Drawing of Maranta Veitchii.
Miss S. MCNAB, School of Art, Edinburgh.
Drawing of Primula sinensis.
Miss S. GERTRUDE HEANE, School of Art, Gloucester.
Drawing of Camellia.
Miss CHARLOTTE KEMP, School of Art, Gloucester.
Drawing of Pelargonium.
Miss MARY A. DAVID, School of Art, Lincoln.
Drawing of Fritillaria Meleagris.
Miss ELLEN E. CHILD, School of Art, Lincoln.
Drawing of Azaleas.
Miss BEATRICE OSBORN, School of Art, Birmingham.
Drawing of Apple blossom.
Miss KATE CRAIG, School of Art, Cork.
Drawing of Vinca major, and of Rhododendron decorum.
Miss ANNIE FORBES, School of Art, Edinburgh.
Drawing of Ribes sanguineum, and of Deutzia gracilis.
Miss ANNIE RAY, Keyworth, Reading.
Drawing of Fritillaria Meleagris.
Miss CATHERINE SPRAGGE, South Kensington Museum.
Drawing of Dielytra spectabilis.
Miss ELIZABETH POLLOCK, School of Art, Edinburgh.
Drawing of Kalmia latifolia.
Miss MARY H. IRVINE, School of Art, Edinburgh.
Drawing of Helleborus.
Miss CHRISTINA DEAN, School of Art, Edinburgh.
Drawing of Polyanthus.
Miss ISABELLA S. ROSS, School of Art, Edinburgh.
Drawing of Dielytra spectabilis.
Mrs. G. C. CHARLES, South Kensington Museum.
Drawing of Dielytra spectabilis.
Miss EMMA FOTHERGILL, Old Shirley, Southampton.
Drawing of Vermillon Brillant Tulip, and of a Single Red Hyacinth.

§ X.—MISCELLANEOUS SUBJECTS.

Steward:—Mr. CHARLES LEE.

Jurors.

Class 238. { Mr. D. T. Fish, Bury St. Edmunds.
Mr. W. Buckley, Tooting.
Mr. John Peel, Twickenham.

CLASS
(238.)—MISCELLANEOUS PLANTS, FLOWERS, or FRUITS, not specially invited.—1 Prize of 5*l.*; 2 Prizes of 4*l.*; 4 Prizes of 3*l.*; 6 Prizes of 2*l.*; 6 Prizes of 1*l.* (*Open.*)

The ACCLIMATISATION SOCIETY of Great Britain, B. Waterhouse Hawkins, Secretary.
Brazilian Arrowroot, grown in England. [The plant shown was an Arum.]

JOHN ALLISON, 8, Lawrence Pountney Lane, City.
Japan Flax, for tying Plants.
China Flax, for tying Plants.
Polished Canes, for supporting fine Flowers in Pots, &c.
Samples of Elastic Flower Pot Covers.
Samples of Bamboos, for Staking Plants in Hot-houses or Grounds.
Sample Evergreen Portable Shade, made from Bamboo Canes.
Flower-pot Stands (square and round), made from Polished Bamboo Canes, for small and large Flowers.

The Right Hon. LOUISA, LADY ASHBURTON, Melchet Park, Romsey, Hants, (W. Cross, gardener).
A box of cut blooms of Rhododendron Nuttallii.

Mrs. ROBERT T. AUSTIN, 29, Wilmott-road, Dalston.
Group of Rice Paper Flowers, with artificial Lake and Water Lilies.

Messrs. JAS. BACKHOUSE & SON, Nurserymen, York. [*Commended.*]
A Collection of Trichomanes and Hymenophyllum.

M. BALTET FRÈRES, Horticulteurs à Troyes. (France.)
Hêtres monstrueux (Fagus sylvatica monstrosa).

R. BARCLAY, Esq., West Hill, Highgate. (W. Young, gardener.)
Group of Gloxinias.

Mr. WILLIAM BARTLETT, Shaftesbury Road, Hammersmith.

Adiantum cuneatum.	Todea superba.	Trichomanes radicans.
Adiantum venustum.	Todea hymenophylloides	And other plants.

HENRY BARWELL, Esq., Bound's Green, Colney Hatch.
Twelve Begonias for foliage.
An improved Steam Generator called the "Victoria Steam Jet," especially adapted for horticultural purposes.

JAMES BATEMAN, Esq., Biddulph Grange. (J. Stanton, gr.) [*Prize of* 3*l.*]
Dendrobium Falconeri.

Mrs. BARCHARD, Putney Heath. (Matthew Higgs, gardener.)
Dish of English-grown Oranges and Lemons.

J. J. BLANDY, Esq., Highgrove, Reading. (A. Ingram, gardener.)
Two specimen plants of Dacrydium cupressinum.
Monizia edulis, the Carrot-tree of Madeira.

Messrs. BOETTNER BROTHERS, Greussen (Germany).
Tableaux of Dried Natural Flowers.

The Rev. W. B. GARNETT BOTFIELD, Decker Hill, Shiffnal. (J. Barnett, gardnr.)
Pear, Beurré Rance.
Apples: Dumelow's Seedling; Norfolk Stone Pippin.

J. BRAND, Esq., Bedford Hill, Balham. (W. Howard, gardener.) [*Prize of* 3*l.*]
3 magnificent specimens of Eucharis amazonica.

CLASS 238

J. H. BUCHAN, Esq., The Grove, Hanwell. (G. Venner, gr.) [*Commended.*]

Miscellaneous Collection of Plants :—

Petunia inimitabilis flore pleno.
Coleus Verschaffeltii.
Calceolaria, Prince Teck, half shrubby.
Calceolaria, aurea floribunda.
Azalea, Sir Charles Napier.
Azalea, Stanleyana.
Cineraria, Queen Victoria.
Cineraria, Mrs. Tomlin.
Cattleya zebrina.
Gloxinias.
Coleus marmoratus.

Mr. WILLIAM BULL, King's Road, Chelsea.

Collection of New Plants :— [*Prize of* £3.]

Eranthemum argyroneurum (Fittonia argyroneura).—Peru.
Terminalia nobilis.—Madagascar.
Verschaffeltia splendida.—Seychelles.
Maranta splendida.—Para.
Ananas Porteana.—Philippines.
Dioscorea Anæctochilus.—Amazon.
Urospatha grandis.—Para.
Urospatha picturata.—Para.
Sedum azoideum variegatum.
Amorphophallus nobilis.—Java.
Pitcairnia tabulæformis.—South America.
Podocarpus macrophyllus albo-variegatus.—Japan.
Ophiopogon spicatus fol. arg. marginatis.—Japan.
Zea Curagua variegata.—Japan.
Habenaria margaritacea.—South America.
Pandanus ornatus.
Sarcoglottis zebrina.—South America.
Bignonia argyræa violascens.—New Grenada.
Selaginella Martensii albo-variegata.
Litobrochia tripartita.—Feejees.
Nidularium Pinelii.—Brazil.
Pteris flabellata ascensionis.—Ascension.
Costus zebrinus.—South America.
Phœnicophorium sechellarum.—Seychelles.
Dieffenbachia species.—Brazil.
Aspidistra angustifolia variegata.—Japan.
Brownea grandiceps.—Caraccas.
Salvadora persica, The Mustard Tree of Scripture.—East Indies.
Asplenium myriophyllum.—Mexico.
Goodyera japonica.—Japan.
Latania rubra (true).—Mauritius.
Amorphophallus nobilis.
Pandanus furcatus.
Zamia cycadæfolia, &c., &c.

Italian Pan of New Petunias. [*Commended.*]

1 Pair Dracæna australis—30 guineas the pair.
Italian Basket of New Duplex-flowered Mimulus.
Collection of Zonal Pelargoniums.

WENTWORTH W. BULLER, Esq., Strete Ralegh, Exeter. (E. Culley, gardener.)
Cypripedium caudatum.

Mr. H. CANNELL, Fuchsia Nursery, Woolwich.
Basket of Verbenas.

M. CAPEINICK, Ghent.
Fruits of the season 1865.

Poires :—Bergamotte Pentecôte, Angora, Beurré Brétonneau, Suzette de Bavay, Beurré Rance.

Pommes :—Calville blanc à cotes d'hiver, Court pendu rouge, Joseph de Ghelpu, Franc catu de Mars, Reinette de Brétagne, Reinette Cerdeghem, Pomme de la tour, Reinette Perlé, Pomme monstre, Reinette Capeinick, Souvenir Donkelaer, Reinette Triomphant, Edouard Bieswal.

Messrs. CARTER & Co., Crystal Palace Nursery, Forest Hill, Sydenham.
A group of Ornithogalum thyrsoides album.
Group of Ferns and Ornamental-foliaged Plants.

Mr. JABEZ JAY CHATER, Gonville Nurseries, Cambridge.
Miscellaneous collection of Pelargoniums.

CLASS 238

E. J. COLEMAN, Esq., Stoke Park, Slough. (J. Chalmers, gardener.)
A group of 6 greenhouse Azaleas.

Messrs. COLLYER & ROBERTS, 54, St. John Street, Clerkenwell.
Tobacco Tissue, for destroying red spider, mealy bug, thrip, and all other insects, by fumigation, without the assistance of blowing.

The COUNTESS COWPER, Wrest Park, Ampthill. (Seward Snow, gardener.)
Collection of Apples:— [*Prize of £4.*]

Winter Queen.	Sturmer Pippin.	Old Green Nonpareil.	Reinette du Canada.
Newtown Pippin.	Wellington.	Court Pendu Plat.	Boston Russet.
Aromatic Pippin.	Scarlet Nonpareil.		

Dish of Warden Pears.
Lettuces:—6 Snow's Matchless Green Cos; 3 Snow's Imperial Summer-Cabbage Lettuce.

Mrs. CUBITT, Denbies, Dorking. (James Drewett, gardener).
Cut Roses: White Banksia; Fortune's.

Mr. GEORGE CURD, Gardener, Sulhamstead House, near Reading.
Preserved Fruits.

Cherries—Morello.	Currants—White Dutch.	Plum—Pond's Seedling.
Cherries—Late Duke.	Raspberries—Red Antwerp.	Plum—Greengage.
Currants—Red Dutch.	Pears—Catillac.	

Jams.

Apricots—Moor Park.	Currants—Black Naples.	Quince marmalade.
Apricots—green.	Gooseberries.	Plum—Greengage.
Currants—Red Dutch.	Medlars.	Plum—Mussel.
Currants—White Dutch.	Orange marmalade.	Raspberry.

Jellies.

Apricot.	White Currant.	Raspberry.	Red Currant.

Messrs. DOWNIE, LAIRD, & LAING, Sydenham & Edinburgh. [*Commended.*]
Stand of cut blooms of Fancy Pansies.

Mr. W. C. DRUMMOND, Nurseryman, Bath.
Twenty-four bunches of cut flowers.

Mrs. WILLIAM EARLEY, Digswell, Welwyn.
Bottle of English-grown home-made mixed Pickles. Price 15*s*.

Mr. CHARLES EWART, The Grove, Alexandra Park, Muswell Hill.
Four standard Cupheas.

Messrs. FISHER, HOLMES, & Co., Handsworth Nurseries, Sheffield.
Berberis stenophylla. A very hardy hybrid Berberis, between Darwinii and empetrifolia. The branches are hairy; the spines 3-parted; the leaves are very dark green, about half an inch long, pale beneath, tipped with a short spine, and rolled backward at the edge, so as not to appear flat, but to look almost cylindrical. The flowers are in racemes, and of the same charming apricot colour as that which renders Darwinii so ornamental, but they are smaller. The bushes become laden with purplish black berries, which add greatly to their beauty, as well as prolong indefinitely the period of their effectiveness as ornamental shrubs.

G. S. FOLJAMBE, Esq., Osberton Hall, Worksop. (E. Bennett, gardener.)
Dish of Vanilla. [*Prize of £1.*]
Dish of perfumed Grapes.
The following new plants of 1865, entered in one group, as valuable acquisitions for the decoration of the Flower Garden:—
Teleianthera ficoidea versicolor—India.
Alternanthera spathulata—Brazil.
Alternanthera sessilis amœna—Brazil.

Mr. JOHN FRASER, Lea Bridge Road Nurseries, London.
Collection of large specimen plants:—

Phœnocoma prolifera Barnesii, 4 feet by 5 feet.	Eriostemon linearifolius, 3 feet by 3 feet.
Allamanda cathartica, 4 feet by 2½ feet.	Azalea Etoile de Gand, 2½ feet by 2 feet.
Clerodendron Thompsonæ, 4 feet by 2½ feet.	Prostranthera lasianthos, 3 feet by 3 feet.
Azalea Beauty of Reigate, 2½ feet by 3 feet.	Aphelexis humilis, 2 feet by 2 feet.
	Azalea variegata, 5 feet by 2½ feet.
Boronia pinnata, 3 feet by 2½ feet.	Polygala Dalmaisiana, 3 feet by 2½ feet.

CLASS 238

Eriostemon pulchellum, 3½ feet by 3 feet.
Acacia eriocarpa, 3 feet by 3 feet.
Azalea Perryana, 3½ feet by 2½ feet.
Azalea lateritia, 3½ feet by 2½ feet.
Eriostemon buxifolius, 3 feet by 3 feet.
Eriostemon intermedius, 3½ feet by 3 feet.
Pleroma elegans, 4 feet by 3½ feet.
Azalea Comte de Hainault, 4 feet by 2½ feet.
Azalea variegata, 4 feet by 2 feet.
Polygala Dalmaisiana, 3½ feet by 3 feet.
Azalea Perryana, 4 feet by 2½ feet.
Eriostemon neriifolius, 5 feet by 4 feet
Azalea lateritia, 4 feet by 2½ feet.

Messrs. R. GADD & SON, Salvington Nurseries, Worthing.
Beet—Gadd's Nonpareil, dwarf green top, six roots.

Mr. JOHN FRANCIS GARDINER, Belgrave-road, Leicester.

Skeleton Leaves, &c. :—

Holly.	Scotch Rose.	Lygodium scandens.
Mountain Laurel.	Phillyrea, broad-leaved.	Adiantum assimile.
Box.	Phillyrea, narrow-leaved.	Pteris rubro-nervia.
Camellia japonica.	Passion flower.	Adiantum cuneatum.
Ivy, various.	Asplenium Filix-fœmina.	Adiantum trapeziforme.
Cheilanthes lendigera.	Adiantum Capillus-veneris.	Pteris crispa.
Poplars.	Aspidium Filix-mas	Lygodium Willdenovii.
Orange.	Onychium japonicum.	Lygodium volubile.

Glass case of anatomized plants: Holly, Box, Ivy various, Cheilanthes lendigera. Phillyrea broad-leaved and narrow-leaved, Hyoscyamus niger.

Glass cases of Leaves, Ferns, and Seed Vessels; Datura Stramonium, Physalis viscosa, Hyoscyamus niger, and Hydrangea.

The DUKE of HAMILTON, Easton Park, Suffolk. (T. D. Irving, gardener.)
Leeks: Ayton Castle.

The Lady M. C. N. HAMILTON, Bloxholm Hall, Sleaford. (D. Lumsden, gardener.)

Twelve varieties Table and Kitchen Apples :—

Dutch Mignonne.	Alfriston.	Pearmain Herefordshire
Boston Russet.	Cluster Golden Pippin.	Bess Pool.
Wellington.	Sturmer Pippin.	Cox's Orange Pippin.
Gloria Mundi.	Norfolk Stone Pippin.	Northern Greening.

Mr. R. HARDWICKE, 192, Piccadilly, London.
Drawings from Sowerby's English Botany.
Botanical publications.

Mr. WILLIAM HASELWOOD, Hoddesdon, Herts.
Lemons (6) and Oranges (6) of British growth.

Messrs. ARTHUR HENDERSON & Co., Pine Apple Place, Edgware Road.

Collection of Miscellaneous Plants :—

Sonerila margaritacea superba.	Agave americana medio-picta.	Araucaria Rulei.
Begonia imperialis.	Mussænda frondosa.	Aralia leptophylla.
Begonia smaragdina.	Maranta bicolor.	Aristolochia leuconeura.
Begonia dædalea.	Cryptomeria elegans.	Gleichenia dicarpa.
Chameranthemum verbenaceum.	Bonapartea juncea.	Sphærogyne latifolia
Cissus amazonica.	Agave schidigera.	Ananassa sativa variegata
Campylobotrys refulgens.	Dammara Moorei.	Elæagnus japonica variegata.
Campylobotrys regalis.	Coccoloba platyclada.	Doryanthes excelsa.
Cyanophyllum magnificum	Cossignea borbonica.	Dracæna Cooperi.
Yucca quadricolor.	Sphærogyne cinnamomea.	Begonia inimitabilis
Gardenia radicans variegata.	Rhodea japonica macrophylla.	Caladium Wallisii } new
		Caladium formosum } new

Large Case for conservatory, filled with fine-foliage plants.
One standard Shaddock.

Messrs. E. G. HENDERSON & SON, Wellington Nursery, St. John's Wood.
Collection of New Variegated and Hardy Plants. [*Prize of* 2*l.*]

F. C. HILLS, Esq., Denmark Hill, Camberwell. (W. Frankcombe, gardener.)
Two suspension baskets of Ferns.

P. L. HINDS, Esq., The Lodge, Byfleet, Surrey. (J. Carr, gardener.)

Saccharum officinarum, 2 varieties—the Striped West Indian, and Transparent West Indian.
Coffea arabica.
Thea—Bohea and assamica.
Psidium pomiferum.
Cinnamomum verum, or Cinnamon.
Zingiber officinalis, or Ginger.
Peach Mango, and Cocoa, small.
Chrysophyllum Cainito, or Purple Star Apple.
Avocado Pear—Barbados.
Cymbopogon Schœnanthus.

Mrs. HODGSON, The Elms, Hampstead. (James Weir, gardener.)
Three imported Epidendrums, from South America.
An Alocasia, from the Neilgherries.

Mr. HENRY HOOPER, Vine Nursery, Widcombe Hill, Bath.
A stand of twenty-four Ranunculuses.

Messrs. HOOPER & Co., Covent Garden Market.
A miscellaneous collection of Ornamental-foliaged and bedding plants, &c.; also ferns, under glass, arranged as for house decoration.

Mrs. HOPE, The Deepdene, Dorking. (J. B. Whiting, gardener.)
Collection of Potatos.
Collection of Apples. [*Highly Commended.*]

E. J. G. HOPWOOD, Esq., Hopwood Hall, Manchester. (W. Allen, gardener.)
Miniature Mushroom beds.
Collection of Royal George Peaches.

W. E. HUBBARD, Esq., St. Leonard's Lodge, Horsham. (S. Ford, gardener.)
Collection of Apples (38 dishes, named) and of Pears (4 dishes, named). [*Prize of 3l.*]
3 dishes of Oranges, Lemons, and Limes
3 glass cases of dried Ferns: 2 of Exotics, and 1 of British.
1 case of Selaginellas.
Potatos, collection of six kinds of 1865.
Potatos, collection of four kinds (forced)
Six pots of Lilium from Japan.

Messrs. GEORGE JACKMAN & SON, Woking Nursery, Surrey.
Collection of hardy trees:—

Abies pyramidalis.
Abies humilis.
Abies pygmæa.
Abies excelsa parviformis.
Abies orientalis.
Cupressus Lawsoniana nana.
Cupressus Lawsoniana stricta.
Picea (amabilis) magnifica.
Picea Nordmanniana.
Picea (grandis) sp. from Vancouver's Island.
Picea Pinsapo.
Picea lasiocarpa.
Picea nobilis.
Juniperus thurifera.
Juniperus fragrans.
Juniperus drupacea.
Taxus baccata erecta.
Taxus adpressa.
Taxus baccata aurea variegata.
Cephalotaxus (coriacea) japonica.
Cephalotaxus Fortunei.
Thuja gigantea.
Thuja aurea.
Thuja Lobbii.
Thuja japonica.
Araucaria imbricata.
Thujopsis borealis.
Libocedrus chilensis.
Pinus Cembra.
Retinospora ericoides.

Mr. JOHN JENNINGS, Nurseries, Shipton-on-Stour, Worcestershire.
12 Dwarf Herbaceous Calceolarias.

W. B. KELLOCK, Esq., Stamford Hill, London.

Agave maculosa.
Dyckia ramosa
Enkolirion Jonghii
Gasteria nigricans crassifolia, etc.

Small Tray of Miscellaneous Plants.

Mr. H. KNIGHT, Jardinier-en-Chef, Château de Pontchartrain, Seine-et-Oise.
4 Plants of a Hybrid Amaranthus. [*Commended.*]

Messrs. H. LANE & SON, Nurserymen, Great Berkhamstead.
Miscellaneous collection of Rhododendrons. [*Prize of 2l.*]
Miscellaneous collection of Azaleas. [*Commended.*]
Specimen of Araucaria imbricata, with 28 young cones.

CLASS 238

THOMAS LAXTON, Esq., Stamford.
Samples of Seed Peas, illustrating the effects of crossing on the colour and character of the Seed, &c.

M. J. LINDEN, Royal Zoological Gardens, Brussels.
25 Marantas introduced by Exhibitor, and not yet in Trade:— [*Prize of* 4*l.*]
Maranta amabilis, Hort. Linden.—Rio Bruma, Brazil, 1866.
Maranta argentea, Hort. Linden.—Rio Purus, Brazil, 1866.
Maranta chimboracensis, Hort. Linden.—Ecuador, 1866.
Maranta cinerea, Hort. Linden.—Subandine Peru, 1866.
Maranta delicata, Hort. Linden.—Subandine Peru, 1866.
Maranta eburnea, Hort. Linden.—Rio Negro, 1866.
Maranta illustris, Hort. Linden.—Upper Amazon, 1866.
Maranta lætevirens, Hort. Linden.—Subandine Peru, 1866.
Maranta Legrelleana, Hort. Linden.—Subandine Peru, 1866.
Maranta leucocentra, Hort. Linden.—Subandine Peru, 1866.
Maranta Lindeni, Hort. Linden.—Subandine Peru, 1866.
Maranta Mazeli, Hort. Linden.—Subandine Peru, 1866.
Maranta membranacea, Hort. Linden.—Rio Bruma, 1866.
Maranta nobilis, Hort. Linden.—Upper Amazon, 1866.
Maranta pusilla, Hort. Linden.—Upper Amazon, 1866.
Maranta princeps, Hort. Linden.—Peru, 1866.
Maranta roseo-picta, Hort. Linden.—Upper Amazon, 1866.
Maranta setosa, Hort. Linden.—Upper Amazon, 1866.
Maranta transparens, Hort. Linden.—Rio Bruma, 1866.
Maranta velutina, Hort. Linden.—Upper Amazon, 1866.
Maranta virginalis, Hort. Linden.—Subandine Peru, 1866.
Maranta sp. 1.—Subandine Peru, 1866.
Maranta sp. 2.—Subandine Peru, 1866.
Maranta sp. 3.—Subandine Peru, 1866.
Maranta sp. 4.—Subandine Peru, 1866.

M. J. LINDEN, Brussels.
Collection of 20 Tropical Fruit Trees:— [*Prize of* 1*l.*]
Anona Cherimoya.—Cherimoyer.—Mexico and Peru.
Anona aromatica.—West Indies.
Artocarpus incisa.—Bread fruit tree.—East and West Indies.
Averrhoa Carambola.—Carambola.—East Indies.
Couroupita guianensis.—Cannon-ball tree.—Guaiana.
Durio Zibethinus.—Durion.—East Indies.
Chrysophyllum Cainito.—Star Apple.—West Indies.
Eugenia Mitchelli.—Pitanga.—Brazils.
Euphoria Longan.—Longan Fruit.—China.
Flacourtia Ramoutchi.—Madagascarian Plum.
Garcinia Mangostana.—Mangosteen.—East India.
Jambosa vulgaris.—Rose Apple.—East India.
Labatia macrocarpa.—Guaiana.
Lecythis Ollaria.—Sapucaya.—Brazils.
Lucuma mammosum.—Marmalade.—West Indies.
Mimusops Elengi.—Medlar.—Guayana.
Persea pitotolensis.—New Avocada Pear from Chiapas.
Platonia insignis.—Bacuru Uva.—Para.
Spondias Monbin.—Hog Plum Tree.—West Indies.
Xanthochymus ovalifolius.—East Indies.

Messrs. J. and C. LEE, Royal Vineyard Nursery, Hammersmith.
Araucaria Rulei and Araucaria sp. nov. [*Prize of* 2*l.*]
Aucuba japonica fœmina vera, in berry. [*Prize of* 1*l.*]
Taxus baccata tabulæformis.
Abies excelsa aurea.
Viburnum plicatum.
Aucuba japonica bicolor mascula.
Aucuba japonica grandis.

J. H. LERMITTE, Esq., Knighton's, Finchley. (W. Birse, gardener.)
Six Dwarf Celosias.

Mr. PETER McARTHUR, Nurseryman, Maida Hill.
Two Plants of Bonapartea juncea filamentosa.—Price 15 guineas.

W. MARSHALL, Esq., Clay Hill, Enfield. (W. Wilson, gardener.)
Ouvirandra fenestralis. [*Commended.*]
A group of 19 Orchids.

CLASS 238

Col. MILES, Burton Hall, Malmesbury. [*Prize of* 1*l.*]

Adiantum farleyense.—A very handsome vigorous-growing stove fern, introduced into this country in 1862, from Barbados, West Indies.

Mrs. JANE S. MILNE, Buckland, Farringdon, Berks. [*Commended.*]

Dried specimens of British Mosses.

Mrs. MARY ANN MITCHELL, 5, Anglesea Terrace, Battersea.

Large Group of Wax Flowers:— [*Highly commended.*]

Large white Magnolia.	Wallflower.	Clianthus.
Large white garden Lily.	Passionflower.	Pansies.
Lilium lancifolium.	Cotton flower.	White Lilac.
A collection of Pelargoniums.	White Narcissus.	Gardenia.
	Bignonia grandiflora.	Blue Salvia.
Ditto of Orchids.	Carnations.	Auriculas.
Ditto of Camellias.	Lily of the valley.	Delphinium Hendersoni.
Ditto of Roses.	Rhododendron.	Dipladenia.
Heliotrope.	Myrtle.	Allamanda.
Mignonette.	Orange blossom.	

Two baskets of mixed wax flowers. The collection of vases for the flowers are ornamented with specimens of natural mosses and lichen.

Mr. JOHN MONRO, Osborne Park Gardens, Barnet.

Dish of Ripe Plums and Apricots.

W. MOORE, Esq., Wierton House, Staplehurst. (W. Divers, gardener.)

Apples:—Gooseberry Pippin, kitchen use; Easter Pippin, kitchen use; Winter Queening, kitchen or table; Golden Knob, table use; Kent Filberts.

Messrs. MURRAY, GROOM, & WADDS, Cliveden, Maidenhead.

Model of the Spring Flower Garden, Cliveden, Maidenhead.

The LADY DOROTHY NEVILL, Dangstein, Petersfield.

Two pots of Ailantus glandulosa, with Silk Worms and specimens of Silk.

C. N. NEWDEGATE, Esq., M.P., Arbury, Nuneaton. (Samuel Evans, gardener).

One box of Nectarines. [*Prize of* 10*s.*]

Mr. JOSEPH NEWTON, Landscape Architect, 30, Eastbourne-terrace, Paddington. Office, 14, Carey Street, Lincoln's Inn Fields. [*Highly commended.*]

A collection of Landscape, Architectural, and Picturesque Views, from works by the exhibitor; also of views taken from the grounds of the Lord Chief Baron Pollock, the grounds of the Saltburn Improvement Company, Yorkshire, the grounds of the Bishop of London, the Horticultural Society's Gardens, Chiswick; and other sources.

Mr. CHARLES NOBLE, Bagshot. [*Commended.*]

Cupressus Lawsoniana erecta.	Osmanthus Aquifolium diversifolius variegatus.
Osmanthus Aquifolium.	Rhododendron Boothii.
Osmanthus Aquifolium latifolius variegatus.	Clematis Fortunei.
Osmanthus Aquifolium aureus variegatus.	Clematis Standishii.
Osmanthus Aquifolium nanus variegatus.	Retinospora obtusa aurea variegata.
	Retinospora, new species.

E. OATES, Esq., Bydorp House, Hanwell. (Richard Marcham, gardener.)

One box of cut Flowers, various.

Three large Scarlet Pelargoniums—Tom Thumb.

Messrs. OSBORN & SON, Fulham.

Phormium tenax foliis variegatis. [*Prize of* 3*l.*]

Yucca filamentosa.	Yucca gloriosa acuminata.	Yucca californica.
Yucca filamentosa foliis variegatis.	Yucca recurvifolia.	Yucca Ellacombii.
	Yucca flaccida.	Yucca angustifolia.
Yucca gloriosa.	Yucca glaucescens.	Yucca aloifolia variegata.
Yucca gloriosa superba.		

Mr. ROBERT PARKER, Exotic Nursery, Tooting, Surrey. [*Commended.*]

Pleopeltis incurvata, a new and rare Javanese Fern.

CLASS 238

Messrs. PAUL & SON, Old Cheshunt Nurseries.

Abies.
alba.
glauca.
canadensis.
Douglasii.
Clanbrasiliana.
Cranstonii.
elegans.
Gregorii.
monstrosa.
mucronata.
pendula.
pyramidalis.
stricta.
variegata.
finedonensis.
Menziesii.
orientalis.
sibirica.
Smithiana or Morinda.
taxifolia.
Albertiana.
Mertensiana.
Araucaria.
imbricata.
Cedrus.
Libani.
Deodara.
Cunninghamia.
sinensis.
Picea.
amabilis.
Amaliæ reginæ.
cephalonica.
Fraseri glauca.
hudsonica.
grandis.
lasiocarpa.
nobilis.
Nordmanniana.
Pichta sibirica.
Pinsapo.
Pinus.
apulcensis.
Ayacahuite.
austriaca.
Beardsleyi.
Benthamiana.
Cembra.
helvetica.
Craigiana.
Devoniana.
Don Pedri.
Endlicheriana.
excelsa.
Fenzlii.
Fischeri.
Hartwegii.
inflexa.
insignis.
Jeffreyi.
Lambertiana.
Gerardiana.
macrocarpa.
monticola.
muricata.
Pallasiana.
Pinaster maritima.
ponderosa.
Pumilio.
pyrenaica.
radiata.
rigida.
robusta.
Russelliana.
Sabiniana.
Strobus.
nivea.
sylvestris.
pumila.
tuberculata.
Sequoia (Wellingtonia).
gigantea.
Arthotaxis selaginoides.
Biota elegantissima.
aurea.
compacta.
orientalis.
stricta.
japonica.
meldensis.
Chamæcyparis.
sphæroidea.
atrovirens
variegata.
kewensis.
thurifera.
Cryptomeria.
japonica.
Lobbii.
nana.
elegans.
Cupressus.
Benthamiana.
Corneyana.
funebris.
Goveniana.
Lambertiana.
Lawsoniana.
variegata.
McNabiana.
Lindleyana variegata.
nutkaënsis (borealis).
thurifera elegans.
torulosa.
sempervirens.
Uhdeana.
Fitzroya.
patagonica.
Glyptostrobus.
heterophyllus.
pendulus.
Juniperus.
Bedfordiana.
chinensis.
fœmina.
communis.
cracovia.
echiniformis.
hibernica.
compressa.
communis pendula.
oblonga.
pendula.
suecica.
excelsa.
fragrans.
horizontalis.
phœnicea.
pseudo-Sabina
recurva.
densa.
Sabina.
foliis variegatis.
sabinioides.
squamata.
thurifera.
virginiana.
cinerascens.
foliis aureis.
glauca.
humilis.
pendula.
stricta.
viridis.
Retinospora.
obtusa.
pisifera aurea.
Taxodium.
distichum.
pendulum.
Thuja.
gigantea.
Lobbiana.
foliis variegatis.
plicata.
sibirica.
minima.
Wareana.
Verveneana.
Thujopsis.
dolabrata.
Cephalotaxus.
pedunculata.
Fortunei.
fœmina.
Podocarpus.
andina.
japonica.
Salisburia.
adiantifolia.
Saxe-Gothæa.
conspicua.
Sciadopitys.
verticillata.
Taxus.
adpressa.
baccata.
cheshuntensis.
Dovastoni.
elegantissima.
argenteis nova.
ericoides.
fructu luteo.
Jacksoni.
nigra.
nana.
nidpathensis.
recurvata.
stricta.
variegata.
canadensis.
fastigiata
foliis aureis.
pyramidalis viaregata.
Torreya.
nucifera.

CLASS 238

M. CH. PFERSDORFF, 73, South-row, Kensal New-town, Paddington, London; and 110, Avenue de St. Ouen Batignolles, Paris.

Collection of Euphorbias:— [*Commended.*]

Euphorbia abyssinica.
Euphorbia canariensis.
Euphorbia caput medusæ.
Euphorbia odorata.
Euphorbia cœrulescens.
Euphorbia Commelini.
Euphorbia erosa.
Euphorbia fimbriata.
Euphorbia glomerata.
Euphorbia grandidens.
Euphorbia mamillaris.
Euphorbia neriifolia.
Euphorbia meloformis.
Euphorbia officinalis.
Euphorbia polygona.
Euphorbia scolopendrioides.

Grafted Cacti, showing the superior growth of slow growing kinds when grafted:—

Opuntia clavaroides.
Opuntia clavaroides cristata.
Opuntia clavaroides odontoides.
Echinocactus Scopa cristata.
Echinopsis cinnabarina.
Echinopsis pectinifera.
Echinopsis pectinifera texana.
Echinocereus multicostatus.
Pilocereus senilis.
Cereus tuberosus.

Messrs. **PIESSE & LUBIN**, 2, New Bond Street.

Christina, daughter of Linnæus, with her Arrosoir.—A statuette so arranged that water falls from the arrosoir suitable for fish-hatching troughs, garden conservatories, and Nymphæa tanks.

Apparatus for obtaining the Perfumes from Flowers.

1. Chassis en Verre, for enflowering Fat.
2. Chassis en Fer, for enflowering Oil.
3. Model Still, for the Distillation of Lavender, Roses, &c.

Odours from flowers: Jasmine, Tuberose, Violet, Rose, Orange, Mignonette, Acacia (Farnesiana), and Jonquil.

Odours from Leaves: Patchouly, Peppermint, Thyme, Geranium, Orange, Verbena, Citronella, and others.

Odours from Wood: Sandal wood, Myall wood, and Cedar wood.

Odours from Roots: Vitivert, and Orris.

Odoriferous Gums: Benzoin and Incense.

Odours from Fruit: Bergamotte, Lemon, and Orange.

Natural Odorous Bodies: Vanilla and Tonquin Bean.

Various Perfumes of Commerce.

F. PRYOR, Esq., Digswell, Welwyn. (William Earley, gardener).

Collection of Apples: Dumelow's Seedling, Norfolk Beefin, Sam Young, Wheeler's Russet, Golden Reinette, Hertfordshire Codlin, Dredge's Fane, Hambledon Deux Ans, Sturmer Pippin, Cockle Pippin.

Pears: Uvedale's St. Germain, Bezi Mai.

Jasmimum simplicifolium, in flower.

The **DUKE of RICHMOND**, Goodwood. (G. Cameron, gardener.) [*Prize of* 5*l.*]

4 Pine Apples.

The Rev. **G. W. ST. JOHN**, Rectory, Woodstock, Oxfordshire. (Robt. Fenn, gr.)

Robert Fenn's Alliance Beehive, adapted for cottagers, on the depriving system, by methods of supering without destroying the bees. Showing from production to exhaustion the consecutive features in domestic economy to be derived from the system, viz., the hive in alliance, with a bar-and-frame Stewarton hive, showing sufficiently narrowed communications which prevent the ascent of the queen and the drone bees from the stock-hive. Method of working the breakfast-glasses, and method of supering flat-topped or large bell-glasses. [*Commended.*]

Honey gathered by the bees from the lime-tree blossom run from the super or virgin combs, from the bars and frames of the Stewarton hive.

Run-honey from sycamore blossoms, ditto, ditto, and a sample of the usual honey commonly sold and produced in the common way from cottage hives.

Fenn's breakfast-glasses, plenished with honey-comb, as worked by the bees.

Virgin wax, and old hive-wax, with furniture-cream made from the former, and dubbing for shooting-boots manufactured from the latter.

Metheglin (the old Anglo-Saxon drink of our forefathers) and honey-beer, brewed with hops and fermented, the same as for malt liquor; mead or honey-wine, and mead-vinegar.

Bee-dress, honey-knife, and super-beehive for shielding the bars from supers, and glasses from the sun and bad weather.

CLASS 238

Collection of Potatos—twelve sorts, being examples of very early kinds having good keeping qualities, and medium and late varieties, all recommended for quality, and suitable for garden cultivation and household use; grown by the ridge and trench system of cultivation, in the garden at the Rectory, Woodstock, Oxfordshire. [*Highly commended.*]

Shutford seedling—early for forcing.
Hogg's Coldstream—early for forcing.
Beehive potato, early—coming in directly after the first earlies (a new seedling.)
Fenn's Onwards—second early (a new seedling).
Daintree's Seedling—second early.
Daintree's New Kidney—second early.
Lapstone Kidney—second early.
Haigh's Kidney—second early.
Fortyfold—second early.
Pebble White—late.
British Queen—late (a seedling from the Fluke), an excellent potato, arriving at perfection on very poor and light soils.
Fluke, late—The original esculent of the name.

A few years study on the manufacture of English Grape, Gooseberry, and Rhubarb family wines, without any addition of spirituous liquors, by Robert Fenn, along with the judge's opinion of the wines, as given at the Royal Horticultural Society's Saturdays Meetings, on the 7th and 14th of April, 1866. [*Commended.*]

A photograph of the kitchen-garden front of the Rectory House, Woodstock, showing the system of training the vines for growing the grapes.

Mr. E. SENDALL, Burningham, Hanworth, Norfolk.

One Design or Picture made with Everlasting Flowers and Oak Galls, framed and glazed, the frame covered with oak galls.

A Group of three, made with Everlasting Flowers and Shells, for the winter decoration of the drawing-room table.

One Picture made with Everlasting Flowers and Dried Ferns; Birds, Moths, Butterflies, and other Insects, Wasp Nest, &c., framed and glazed, the frame covered with oak galls.

One Design or Picture made with Everlasting Flowers and Oak Galls, framed and glazed; the frame covered with oak galls.

Mr. E. SHENTON, Nurseryman, Biggleswade.

Collection of Aucubas.

E. P. SHIRLEY, Esq., Eatington Park, Stratford-on-Avon. (W. Gardiner. gard.)

Dish of Royal George Peaches, from pot plants.

The EARL OF STAIR, Castle Kennedy, Stranraer. (Archibald Fowler, gardener)

Dish of Figs.

Mr. R. M. STARK, 75, Charlotte Street, Edinburgh.

Collection of North American Plants:— [*Commended.*]

Aster amethystinus.
Aster lævis.
Aster Shortii.
Cypripedium acaule.
Cypripedium parviflorum.
Cypripedium pubescens.
Chimaphila umbellata.
Claytonia virginica.
Diplopappus linariæfolius.
Gentiana Andrewsii.
Gentiana crinita.
Goodyera pubescens.
Helianthus doronicoides.
Hydrophyllum canadense.
Hypericum pyramidatum.
Liatris squarrosa.
Linnæa borealis var. americana.
Phlox divaricata.
Platanthera psychodes.
Pyrola chlorantha.
Sanicula marilandica.
Saxifraga virginica.
Thalictrum anemonoides.
Tofieldia glutinosa.
Trillium grandiflorum.
Uvularia amplexicaulis.
Viola canadensis.
Viola cucullata.
Viola palmata.
Viola pubescens eriocarpa.
Viola sagittata.
Asplenium angustifolium.
Botrychium virginicum.
Lastrea marginata.
Lastrea noveboracensis.
Polystichum acrostichoides, 2 varieties.
Woodwardia angustifolia.

Mr. JOHN STANDISH, Royal Nursery, Ascot, Berks, and 52, St. George's-place, Knightsbridge.

100 Plants of Seedling Aucubas. [*Prize of 2l.*]
100 Plants of Seedling Rhododendrons.
50 Large Rhododendrons.

CLASS 238

M. ADOLPH STELZNER, Faubourg de Bruxelles, Ghent.
A sample of a new style of hanging baskets for saloons. Price 4*l.* each, delivered at any Railway Station.

Mrs. JAMES STODDART, 2, Cambridge Terrace, Notting Hill. [*Highly commended.*]
Specimens of Flowers modelled in Rice Paper, suggestive of the Four Seasons:—

"All seasons in their change, all please alike."—*Milton.*

Spring, with her delicately-tinted, fragile flowers, Nature's Infancy.
Summer, when—
"Hearts open like the Season's Rose,
The floweret of a hundred leaves."—*Moore.*
Autumn's hues, gorgeous and brilliant, and
"Winter, solemn and sad."—*Thompson.*

J. W. TAYLOR, Esq., River House, Woodberry Down, Seven Sisters Road, Stoke Newington. (Henry Barnard, gardener.)

Basket Plants.

Saxifraga japonica variegata.	Sedum Sieboldii variegatum.	Anthurium violaceum.
Hoya carnosa variegata.	Pothos argyræa.	Gymnostachyum Verschaffeltii.

Water Plants.

Vallisneria spiralis (male).	Pistia Stratiotes.	Pontederia crassipes.
Vallisneria spiralis (female).	Aponogeton distachyon.	Limnocharis Humboldtii.

M. G. THOYTTS, Esq., Sulhamstead House, Reading. (G. Curd, gardener.)
Dish of Delicata Cherries.

Mrs. M. R. TOWNLEY, Holloway Road, Highbury. [*Highly commended.*]
Group of Wax Flowers.

Mrs. TREADWELL, Golder's Green, Hendon. (James Winter, gardener.)
Six Scented-leaved Plants, viz.—Pelargoniums—Fair Helen, Fair Emily, Shrubland Rose, Oak Leaf, Rollisson's Unique, and Lavandula dentata.

Mrs. TREDWELL, St. John's Lodge, Norwood. (B. Peed, gardener.)
Two Gymnogramma chrysophylla.

Mr. C. TURNER, Royal Nurseries, Slough.
Collection of Auriculas.
Collection of New Pelargoniums. [*Prize of* 2*l.*]

D. VEASEY, Esq., Castle Hill House, Huntingdon. (F. W. Cooper, gardener.)
Araucaria excelsa.

Messrs. JAMES VEITCH & SONS, Chelsea.
Miscellaneous collection of Plants, principally Japanese Novelties. [*Prize of* 5*l.*]

Messrs. W. & B. VERITY, 2, Charles Street West, Hyde Park.
Plant Case, with Ferns. [*Commended.*]

M. AMBROISE VERSCHAFFELT, 50, Rue du Chaume, Ghent.
Maranta splendida. Introduced by the Exhibitor. Brazil, 1866.
Six frames, with drawings (coloured) of the Illustration Horticole.

M. JEAN VERSCHAFFELT, 48, Rue de la Caverne, Ghent.
Twelve Pyramidal Box Trees in tubs.

W. F. WATSON, Esq., Spring Grove, Isleworth. (J. James, gardener.)
Collection of Seedling Calceolarias.

Mr. JOHN WATSON, New Zealand Nurseries, St. Alban's.

Large specimens of Film-Ferns— [*Prize of* 4*l.*]

Todea hymenophylloides.	Hymenophyllum dilatatum.
Hymenophyllum æruginosum.	Hymenophyllum scabrum.
Hymenophyllum polyanthos.	Hymenophyllum flexuosum.
Hymenophyllum demissum (2).	Trichomanes reniforme.
Hymenophyllum cristatum.	

Also a collection of Twelve Film-Ferns, various. [*Prize of* 1*l.*]

A. WATTENBACH, Esq., Champion Hill, Camberwell. (A. Goodwin, gardener.)
Six Standard Coleus Verschaffeltii. [*Prize of* 1*l.*]

CLASS 238

Mr. J. J. WHEELER, 189, Fulham Road.
Flower Labels.

M. J. A WILLINK, Amsterdam.
Hemionitis Blumeana
Hemionitis semicostata.
Lycopodium tetrastichum.
} New Species of Ferns and Lycopods. [*Prize of* 1*l.*]

EDWARD WOOD, Esq., Newbold Revel, Rugby. (T. Coysh, gardener.)
Gloxinias (12 plants). Deutzia gracilis (4 plants).

E. WOOD, Esq., Hanger Hill House, Ealing. (F. Preece, gardener.)
A collection of Gloxinias.

JAMES YATES, Esq., Lauderdale House, Highgate. (William Taylor, gardener.)
Cycas revoluta, male plant, in flower. East Indies.
Fruit of Dion edule.

LIST OF AWARDS.

§ I.—GENERAL COLLECTIONS.

CLASS.

(1.)—6 New Plants, introduced into Europe by the exhibitor.

1st Prize,—M. JOHN LINDEN, Brussels.*
2nd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
3rd Prize,—M. JOHN LINDEN, Brussels.
4th Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.

(2.)—3 New Plants, distinct, shown for the first time in Flower.

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.

(3.)—1 New Plant, in Flower, introduced into Europe by the exhibitor.

1st Prize,—M. JOHN LINDEN, Brussels.
2nd Prize,—Mr. JOHN STANDISH, Ascot and Knightsbridge.
3rd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.

(4.)—1 New Plant, not in Flower, introduced into Europe by the exhibitor.

1st Prize,—M. JOHN LINDEN, Brussels.
2nd Prize,—M. JOHN LINDEN, Brussels.
2nd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
3rd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
3rd Prize,—Mr. JOHN STANDISH, Ascot and Knightsbridge.

(5.)—12 New Plants of any description.

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—M. JOHN LINDEN, Brussels.

(6.)—6 New Plants of any description.

1st Prize,—Mr. WILLIAM BULL, Chelsea.
2nd Prize,—Withheld.
3rd Prize,—Mr. B. S. WILLIAMS, Holloway, London.

(7.)—16 Stove or Greenhouse Plants. (Amateurs.)

1st Prize,—HORATIO L. MICHOLLS, Esq., Summerfield, Bowdon.—T. Baines, gr.
2nd Prize,—Mrs. TREDWELL, St. John's Lodge, Norwood.—B. Peed, gardener.
3rd Prize,—J. PHILPOTT, Esq., Stamford Hill.—J. Wheeler, gardener.
4th Prize,—The EARL PERCY, Albury Park, Guildford.—W. Kemp, gardener.

(8.)—12 Stove or Greenhouse Plants. (Nurserymen.)

1st Prize,—Messrs. J. & C. LEE, Hammersmith.
2nd Prize,—Mrs. E. COLE & SONS, Withington, near Manchester.
3rd Prize,—Mr. O. RHODES, Sydenham.

(9.)—10 Stove or Greenhouse Plants. (Amateurs.)

1st Prize,—J. G. BARCLAY, Esq., Leyton.—D. Donald, gardener.
2nd Prize,—T. CANNING, Esq., Westbury-on-Trym, Bristol.—A. Morse, gr.
3rd Prize,—JOHN J. BLANDY, Esq., Reading.—A. Ingram, gardener.
4th Prize,—The EARL OF LOVELACE, Ripley.—Wm. Kaile, gardener.

(10.)—6 Stove or Greenhouse Plants. (Amateurs.)

1st Prize,—W. R. G. FARMER, Esq., Cheam.—S. M. Carson, gardener.
1st Prize,—J. SICHEL, Esq., Lark Hill, Timperley.—J. Stevenson, gardener.
2nd Prize,—WM. LEAF, Esq., Park Hill, Streatham.—Thomas Page, gardener.
3rd Prize,—J. MCHENRY, Esq., Addison Road, Kensington.—A. Wilkie, gard.

(11.)—6 Stove or Greenhouse Plants. (Nurserymen.)

1st Prize,—Mr. B. S. WILLIAMS, Holloway.

* The full addresses will be found in the List of Exhibitors, page 389.

CLASS 11

2nd Prize,—Messrs. S. GLENDINNING & SONS, Chiswick.
3rd Prize,—Messrs. JACKSON & SON, Kingston.
4th Prize,—Mr. R. BAXINDINE, Guildford, Surrey.

(12.)—6 Stove or Greenhouse Climbing Plants.
No exhibition.

(13.)—The finest Stove or Greenhouse Plant.
1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Mr. B. S. WILLIAMS, Holloway.
3rd Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.

(14.)—12 Fine-Foliaged Stove or Greenhouse Plants. (Amateurs.)
1st Prize,—HORATIO L. MICHOLLS, Esq., Bowdon.—T. Baines, gardener.
2nd Prize,—JAMES YATES, Esq., Highgate.—W. Taylor, gardener.
3rd Prize,—The DUKE OF NORTHUMBERLAND, Isleworth.—G. Fairbairn, gr.
4th Prize,—RIGHT HON. LOUISA, LADY ASHBURTON, Romsey.—Wm. Cross, gr.
4th Prize,—MADAME LEGRELLE D'HANIS, Berchem.—F. Vervoort, gardener.

(15.)—12 Fine-Foliaged Stove or Greenhouse Plants. (Nurserymen.)
1st Prize,—Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith.
2nd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
3rd Prize,—Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway.

(16.)—6 Fine-Foliaged Stove or Greenhouse Plants. (Amateurs.)
1st Prize,—J. SICHEL, Esq., Lark Hill, Timperley.—J. Stevenson, gardener.
2nd Prize,—Miss BURDETT COUTTS, Holly Lodge, Highgate.—C. Hutt, gr.
3rd Prize,—W. H. STONE, Esq., M.P., Leigh Park, Havant.—G. Young, gr.
4th Prize,—J. J. BLANDY, Esq., Highgrove, Reading, Berks. A. Ingram, gr.

(17.)—12 Variegated Tender Plants.
1st Prize,—Messrs. JAMES VEITCH & SONS, Nurserymen, Chelsea.
2nd Prize,—Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway.
3rd Prize,—Withheld.
4th Prize,—MME. CAROLINE LEGRELLE D'HANIS, Anvers.—F. Vervoort, gr.

(18.)—20 Economical and Medicinal Plants.
1st Prize,—M. JOHN LINDEN, Royal Zoological & Horticultural Gdns., Brussels.
2nd Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.
3rd Prize,—Messrs. OSBORN & SONS, Fulham Nursery.

(19.)—20 Hardy Deciduous Shrubs, in Flower.
1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.
2nd Prize,—Mr. WM. PAUL, Waltham Cross.

(20.)—20 Hardy Deciduous Trees and Shrubs, shown for foliage.
1st and 2nd Prizes,—Withheld.
3rd Prize.—Mr. WM. PAUL, Waltham Cross.

(21.)—20 Hardy Evergreen or Deciduous Climbing Plants.
1st Prize,—Mr. WM. PAUL, Waltham Cross.
2nd Prize,—Mr. CHARLES TURNER, Slough.
3rd Prize,—Messrs. JAMES IVERY & SON, Dorking & Reigate.

(22.)—20 Hardy Evergreen Trees and Shrubs.
1st Prize,—Messrs. GEORGE JACKMAN & SON, Woking Nursery, Surrey.
2nd Prize,—Mr. JOHN STANDISH, Ascot and Knightsbridge.
3rd Prize,—Messrs. JOHN and CHARLES LEE, Hammersmith.

(23.)—12 New Hardy Evergreen Trees and Shrubs.
1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Mr. JOHN STANDISH, Ascot and Knightsbridge.
3rd Prize,—Mr. W. BULL, Kings-road, Chelsea.

(24.)—50 Hardy Alpine and Herbaceous Plants.
1st Prize,—Messrs. JAMES BACKHOUSE & SON, Nurseries, York.

(25.)—50 Hardy Variegated Alpine and Herbaceous Plants.
1st Prize,—Mr. JOHN SALTER, Vale Place, Hammersmith.

(26.)—9 Boxes of Annuals, shown for effect.
No entry.

§ II.—COLLECTIONS REPRESENTING FAMILIES.

CLASS

(27.)—50 Exotic Orchids, of any kind.

1st Prize,—ROBERT WARNER, Esq., Broomfield, Chelmsford.

(28.)—20 Exotic Orchids. (Amateurs.)

1st Prize,—A. TURNER, Esq., Leicester—Robt. Bullen, gardener.
2nd Prize,—W. LEAF, Esq., Streatham—Thomas Page, gardener.
3rd Prize,—Mrs. TREDWELL, Norwood—B. Peed, gardener.
4th Prize,—W. W. BULLER, Esq., Exeter—Emanuel Culley, gardener.

(29.)—12 Exotic Orchids. (Nurserymen.)

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Mr. B. S. WILLIAMS, Holloway.
3rd Prize,—Withheld.
4th Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.

(30.)—10 Exotic Orchids. (Amateurs.)

1st Prize,—H. H. GIBBS, Esq., St. Dunstan's, Regent's Park—C. Penny, gr.
2nd Prize,—WM. MARSHALL, Esq., Enfield—Wm. Wilson, gardener.
3rd Prize,—J. SICHEL, Esq., Lark Hill, Timperley.—J. Stevenson, gardener.
4th Prize,—J. PHILPOTT, Esq., Stamford Hill.—J. Wheeler, gardener.

(31.)—6 Exotic Orchids. (Amateurs.)

1st Prize,—J. BRAND, Esq., Bedford Hill, Balham—W. Howard, gardener.
2nd Prize,—The DUKE OF NORTHUMBERLAND, Isleworth—G. Fairbairn, gr.
3rd Prize,—W. H. STONE, Esq., M.P., Leigh Park, Havant—G. Young, gr.
4th Prize,—J. J. BLANDY, Esq., Highgrove, Reading—A. Ingram, gardener.

(32.)—6 Exotic Orchids. (Nurserymen.)

1st Prize,—Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith.
2nd Prize,—Mr. O. RHODES, Nurseryman, Sydenham.
3rd Prize,—Withheld.
4th Prize,—Messrs. THOMAS JACKSON & SON, Kingston, Surrey.

(33.)—1 New Orchid, shown for the first time in Flower.

1st Prize,—M. JOHN LINDEN, Brussels.
2nd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
3rd Prize,—Withheld.
Commended,—Messrs. J. BACKHOUSE & SON, York.

(34.)—1 Exotic Orchid.

1st Prize,—ROBT. BARNETT, Esq., Blackheath Park.—T. Charles, gardener.
2nd Prize,—The DUKE of NORTHUMBERLAND, Isleworth.—G. Fairbairn, gr.
3rd Prize,—A. TURNER, Esq., Leicester.—Robert Bullen, gardener.
4th Prize,—J. W. MILES, Esq., Kingsweston, Bristol.—R. Webb, gardener.
Commended,—J. BATEMAN, Esq., Biddulph Grange.—J. Stanton, gardener.

(35.)—10 Variegated Orchids.

1st Prize,—Mr. B. S. WILLIAMS, Holloway, London, N.
2nd and 3rd Prizes,—Withheld.
4th Prize,—Messrs. S. GLENDINNING & SONS, Chiswick.

(36.)—6 Palms.

1st Prize,—The Duke of NORTHUMBERLAND, Isleworth.—G. Fairbairn, gr.
2nd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
3rd Prize,—M. AMBROISE VERSCHAFFELT, 50, Rue du Chaume, Ghent.

(37.)—3 Palms.

1st Prize,—Mr. B. S. WILLIAMS, Holloway, London.
2nd Prize,—Messrs. THOMAS JACKSON & SON, Kingston, Surrey.
3rd Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.

(38.)—The largest and finest Palm.

1st Prize,—R. BARCLAY, Esq., Highgate.—W. Young, gardener.
2nd Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.
3rd Prize,—Mr. B. S. WILLIAMS, Holloway.

CLASS

(39.)—3 Cycads.

1st Prize,—M. AMBROISE VERSCHAFFELT, 50, Rue du Chaume, Ghent.
2nd Prize,—JAMES YATES, Esq., Highgate.—W. Taylor, gardener.
3rd Prize,—Mr. B. S. WILLIAMS, Holloway, London.

(40.)—3 Pandanads.

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Mr. B. S. WILLIAMS, Holloway, London.
3rd Prize,—Mr. THOMAS JACKSON & SON, Kingston, Surrey.

(41.)—The largest and finest Pandanad.

1st Prize,—R. BARCLAY, Esq., Highgate.—W. Young, gardener.
2nd Prize,—J. G. BARCLAY, Esq., Leyton.—D. Donald, gardener.
3rd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.

(42.)—12 Stove or Greenhouse Ferns. (Amateurs.)

1st Prize,—H. L. MICHOLLS, Esq., Summerfield, Cheshire,—T. Baines, gr.
2nd Prize,—R. HANBURY, Esq., The Poles, Ware, Herts.—I. Hill, gardener.
3rd Prize,—J. W. TAYLOR, Esq., Stoke Newington.—H. Barnard, gardener.
4th Prize,—J. YATES, Esq., Highgate.—W. Taylor, gardener.

(43.)—12 Stove or Greenhouse Ferns. (Nurserymen.)

1st Prize,—Mr. B. S. WILLIAMS, Holloway, London.
2nd Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.

(44.)—6 Stove or Greenhouse Ferns. (Amateurs.)

1st Prize,—W. H. STONE, Esq., M.P., Leigh Park, Havant.—G. Young. gr.
2nd Prize,—The Rt. Hon. LOUISA, LADY ASHBURTON, Romsey.—W. Cross, gr.
3rd Prize,—W. MARSHALL, Esq., Clay Hill, Enfield.—W. Wilson, gardener.
4th Prize,—J. J. BLANDY, Esq., Highgrove, Reading.—A. Ingram, gardener.
Commended.—Mrs. ALSTON, Elmdon Hall.—W. Brown, gardener.

(45.)—6 Stove or Greenhouse Ferns. (Nurserymen.)

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Messrs. THOMAS JACKSON & SON, Kingston, Surrey.

(46.)—6 New Tender Ferns.

1st Prize,—Messrs. JAMES BACKHOUSE & SON, York Nurseries.
2nd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
3rd Prize,—Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway.

(47.)—6 New Hardy Ferns.

1st Prize,—Messrs. JAMES IVERY & SON, Nurserymen, Dorking and Reigate.
2nd Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.
3rd Prize,—Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway.

(48.)—24 Hardy Ferns.

1st Prize,—Messrs. JAMES IVERY & SON, Nurserymen, Dorking and Reigate.
2nd Prize,—Mr. JOHN SALTER, Vale Place, Hammersmith.
3rd Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.

(49.)—12 Hardy Ferns. (Amateurs.)

1st Prize,—WM. MARSHALL, Esq., Enfield.—W. Wilson, gardener.
2nd Prize,—The Earl of LOVELACE, Ripley, Surrey.—Wm. Kaile, gardener.
3rd Prize,—The Earl PERCY, Albury Park, Guildford.—W. Kemp, gardener.
4th Prize,—Withheld.

(50.)—6 Tree Ferns.

1st Prize,—Mr. THOMAS WILLIAMS, Crystal Palace Gardens, Sydenham.
2nd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
3rd Prize,—Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway.

(51.)—3 Tree Ferns.

1st Prize,—Withheld.
2nd Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.
3rd Prize,—Miss BURDETT COUTTS, Highgate.—Chas. Hutt, gardener.

(52.)—The finest Tree Fern.

1st Prize,—Mr. THOMAS WILLIAMS, Crystal Palace Gardens, Sydenham.
2nd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
3rd Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.

CLASS

(53.)—12 Lycopods.

1st Prize,—J. W. TAYLOR, Esq., Stoke Newington.—Hy. Barnard, gardener.
2nd Prize,—The Duke of NORTHUMBERLAND, Isleworth.—G. Fairbairn, gdnr.
3rd Prize,—Mrs. BARCHARD, Putney Heath.—M. Higgs, gardener.

(54.)—6 Lycopods.

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—R. BARCLAY, Esq., Highgate.—W. Young, gardener.
Commended,—W. R. G. FARMER, Esq., Nonsuch Park, Cheam.—S. M. Carson, gr.

(55.)—10 Arads.

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Madame LEGRELLE D'HANIS, Berchem.—F. Vervoort, gardener.
3rd Prize,—Withheld.

(56.)—6 Exotic Araliads.

1st Prize,—Messrs. JAMES VEITCH & SONS. Chelsea.
2nd Prize,—Mr. B. S. WILLIAMS, Victoria and Paradise Nurseries, Holloway.

(57.)—6 Bromeliads.

No entry.

(58.)—12 Marantads.

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Madame LEGRELLE D'HANIS, Berchem.—F. Vervoort, gardener.

(59.)—25 Dwarf Cacti.

1st Prize,—M. CHARLES PFERSDORFF, Kensal New Town, and Paris.
2nd Prize,—Mr. C. H. DUTTON, Bath.
3rd Prize,—Mrs. PATTISON, Wrackleford.—G. Winzer, gardener.

(60.)—6 Tall Cacti.

No exhibition.

(61.)—12 Hardy Taxads.

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Messrs. WATERER & GODFREY, Knaphill, Woking.
3rd Prize,—Messrs. PAUL & SON, Cheshunt.

(62.)—25 Hardy Conifers.

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Messrs. WATERER & GODFREY, Knaphill, Woking.
3rd Prize,—Mr. JOHN STANDISH, Ascot and Knightsbridge.

(63.)—12 Hardy Conifers.

1st Prize,—Messrs. JOHN & CHARLES LEE, Hammersmith.
2nd Prize,—Messrs. GEORGE JACKMAN & SON, Woking, Surrey.
3rd Prize,—Mr. CHARLES TURNER, Slough.

(64.)—12 Greenhouse Conifers.

1st Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.

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§ III.—COLLECTIONS REPRESENTING GENERA.

(65.)—10 Evergreen Berberis.

No entry.

(66.)—3 Aucubas, in Berry.

1st Prize,—Messrs. J. & C. LEE, Hammersmith.
2nd Prize,—Messrs. WATERER & GODFREY, Knaphill, Woking.
3rd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.

(67.)—2 Musas.

Prize withheld.

CLASS

(68.)—12 Caladiums.

1st Prize,—A. WATTENBACH, Esq., Camberwell.—A. Goodwin, gardener.
2nd Prize,—Messrs. ARTHUR HENDERSON & Co., Pine Apple Place.
3rd Prize,—The Duke of NORTHUMBERLAND, Isleworth.—G. Fairbairn, gr.

(69.)—3 Anthuriums.

1st Prize,—Messrs. J. VEITCH & SONS, Chelsea,
2nd Prize,—Mr. B. S. WILLIAMS, Holloway.
3rd Prize,—Messrs. ARTHUR HENDERSON & Co., Pine Apple Place.

(70.)—6 Nepenthes.

1st Prize,—Messrs. J. VEITCH & SONS, Chelsea.

(71.)—The finest Nepenthes.

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—W. W. BULLER, Esq., Exeter.—Emanuel Culley, gardener.
3rd Prize,—Mr. B. S. WILLIAMS, Holloway.

(72.)—9 Sarracenias.

1st Prize,—H. L. MICHOLLS, Esq., Bowdon, Cheshire.—T. Baines, gardener.
2nd Prize,—Mr. B. S. WILLIAMS, Holloway.

(73.)—10 Begonias.

1st Prize,—W. H. STONE, Esq., M.P., Dulwich Hill.—Robert Smee, gardener.
2nd Prize,—Sir F. H. GOLDSMID, Bart. M.P., Regent's Park.—G. Wheeler, gr.
3rd Prize,—J. H. BUCHAN, Esq., Hanwell.—G. Venner, gardener.
4th Prize,—R. BARCLAY, Esq., Highgate.—W. Young, gardener.

(74.)—6 Begonias, in Flower.

1st Prize,—FELIX PRYOR, Esq., Welwyn.—W. Earley, gardener.

(75.)—1 Allamanda.

1st Prize,—Messrs. JAMES VEITCH, & SONS, Chelsea.

(76.)—1 Croton.

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Mrs ALSTON, Birmingham.—William Brown, gardener.

(77.)—1 Clerodendron.

1st Prize,—Mr. ROBERT PARKER, Tooting Surrey.
2nd Prize,—Messrs. ARTHUR HENDERSON & Co., Pine Apple Place.

(78.)—1 Ixora.

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.

(79.)—1 Dipladenia.

No Exhibition.

(80.)—3 Greenhouse Rhododendrons.

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Mr. B. S. WILLIAMS, Holloway.
3rd Prize,—Mr. W. BULL, Chelsea.

(81.)—10 Greenhouse Ericas.

1st Prize,—Mrs. TREDWELL, Norwood.—B. Peed, gardener.
2nd Prize,—Mr. O. RHODES, Sydenham.
3rd Prize,—Messrs. THOMAS JACKSON & SON, Kingston, Surrey.

(82.)—6 Greenhouse Ericas. (Amateurs.)

1st Prize,—J. J. BLANDY, Esq., Reading.—A. Ingram, gardener.
2nd Prize,—J. PHILPOTT, Esq., Stamford Hill.—J. Wheeler, gardener.
3rd Prize,—W. LEAF, Esq., Streatham.—Thomas Page, gardener.
4th Prize,—W. H. STONE, Esq., M.P., Havant.—G. Young, gardener.

(83.)—20 Greenhouse Ericas.

1st Prize,—Messrs. THOMAS JACKSON & SON, Kingston, Surrey.

CLASS

(84.)—1 Greenhouse Erica.
1st Prize,—Mrs. TREDWELL, Norwood.—B. Peed, gardener.
2nd Prize,—THOMAS CANNING, Esq., Bristol.—Abraham, Morse, gardener.
3rd Prize,—Messrs. E. COLE & SONS, Withington, Manchester.

(85.)—10 Greenhouse Yuccas, &c.
1st Prize,—Mr. B. S. WILLIAMS, Holloway.
2nd Prize,—M. JEAN VERSCHAFFELT, 43, Rue de la Caverne, Ghent, Belgium.
3rd Prize,—W. B. KELLOCK, Esq., Stamford Hill, London.
4th Prize,—Mr. W. BULL, King's Road, Chelsea.

(86.)—10 Dracænas, &c.
1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Mr. B. S. WILLIAMS, Holloway.
3rd Prize,—Messrs. THOMAS JACKSON & SON, Kingston, Surrey.
4th Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.

(87.)—6 Liliums.
1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.

(88.)—6 Pots of Lilium auratum.
1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.
2nd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
3rd Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.

(89.)—24 Agaves.
1st Prize,—M. JEAN VERSCHAFFELT, Ghent, Belgium.
2nd Prize,—Mr. B. S. WILLIAMS, Holloway, London.
3rd Prize,—M. CHARLES PFERSDORFF, Kensal New Town, and Paris.

(90.)—10 Agaves.
1st Prize,—Mr. B. S. WILLIAMS, Holloway.
2nd Prize,—M. JEAN VERSCHAFFELT, Ghent, Belgium.
3rd Prize,—W. B. KELLOCK, Esq., Stamford Hill, London.

(91.)—12 Amaryllis.
1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Mr. B. S. WILLIAMS, Holloway, London.
3rd Prize,—Mr. ROBERT PARKER, Tooting, Surrey.

(92.)—6 Amaryllis.
No award.

(93.)—1 Orange Tree.
1st Prize,—Withheld.
2nd Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.
3rd Prize,—Messrs. OSBORN & SONS, Fulham Nursery.

(94.)—12 Orange Trees, etc.
1st and 2nd Prizes,—Withheld.
3rd Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.

(95.)—6 Bougainvillæas.
1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.

(96.)—1 Tuberous Tropæolum.
No entry.

(97.)—12 Cape Pelargoniums.
1st Prize,—Mr. J. J. CHATER, Gonville Nurseries, Cambridge.

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§ IV.—COLLECTIONS REPRESENTING SPECIES AND VARIETIES.

(98.)—3 Standard Hardy Rhododendrons.
1st Prize,—Messrs. WATERER & GODFREY, Knaphill Nursery, Woking.

CLASS

(99.)—1 Standard Hardy Rhododendron.

1st Prize,—Mr. JOHN STANDISH, Ascot and Knightsbridge.

(100.)—30 Hardy Rhododendrons.

1st Prize,—MR. JOHN STANDISH, Ascot and Knightsbridge.
2nd Prize,—Messrs. H. LANE & SON, Nurserymen, Great Berkhamstead.

(101.)—12 Hardy Rhododendrons.

No entry.

(102.)—8 Greenhouse Azaleas. (Amateurs.)

1st Prize,—W. R. G. FARMER, Esq., Cheam.—S. M. Carson, gardener.
2nd Prize,—THOMAS CANNING, Esq., Bristol.—Abraham Morse, gardener.
3rd Prize,—H. H. GIBBS, Esq., Regent's Park.—C. Penny, gardener.
4th Prize,—Mrs. TREDWELL, Norwood.—B. Peed, gardener.

(103.)—8 Greenhouse Azaleas. (Nurserymen.)

1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.
2nd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
3rd Prize,—Mr. O. RHODES, Nurseryman, Sydenham.

(104.)—6 Greenhouse Azaleas. (Amateurs.)

1st Prize,—E. J. COLEMAN, Esq., Slough.—John Chalmers, gardener.
2nd Prize,—J. PHILPOTT, Esq., Stamford Hill.—J. Wheeler, gardener.
3rd Prize,—J. J. BLANDY, Esq., Highgrove, Reading.—A. Ingram, gardener.
4th Prize,—J. SICHEL, Esq., Lark Hill, Timperley.—J. Stevenson, gardener.

(105.)—6 Greenhouse Azaleas. (Nurserymen.)

1st Prize,—Messrs. H. LANE & SON, Nurserymen, Great Berkhamstead.
2nd Prize,—Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith.
3rd Prize,—Messrs. S. GLENDINNING & SONS, Nurserymen, Chiswick.
4th Prize,—Messrs. JAMES IVERY & SON, Dorking and Reigate.

(106.)—3 Greenhouse Azaleas. (Amateurs.)

1st Prize,—The EARL OF LOVELACE, Ripley.—William Kaile, gardener.
2nd Prize,—The EARL PERCY, Albury.—William Kemp, gardener.
3rd Prize,—SIR F. H. GOLDSMID, Bart., M.P., Regent's Park.—G. Wheeler, gr.

(107.)—8 Greenhouse Azaleas. (Nurserymen.)

1st Prize,—Messrs. JOHN DOBSON & SONS, Isleworth.
2nd Prize,—Mr. R. BAXINDINE, Nurseryman, Guildford, Surrey.
3rd Prize,—Mr. W. C. DRUMMOND, Nurseryman, Weston Road, Bath.

(108.)—1 Greenhouse Azalea.

1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.
2nd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
3rd Prize,—W. R. G. FARMER, Esq., Cheam, Surrey.—S. M. Carson, gardener.

(109.)—20 Greenhouse Azaleas.

1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.
2nd Prize,—Messrs. JAMES IVERY & SON, Dorking and Reigate.
3rd Prize,—Messrs. H. LANE & SON, Nurserymen, Great Berkhamstead.
4th Prize,—Messrs. J. & C. LEE, Royal Vineyard Nursery, Hammersmith.

(110.)—10 Roses, in pots.

1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.
2nd Prize,—Mr. WM. PAUL, Paul's Nurseries, Waltham Cross.
3rd Prize,—Messrs. PAUL & SON, Old Cheshunt Nurseries, Cheshunt.
4th Prize,—Messrs. E. P. FRANCIS & Co., Nurseries, Hertford.

(111.)—6 Roses, in pots. (Amateurs.)

1st Prize,—A. G. PULLER, Esq., Youngsbury, Herts.—T. Terry, gardener
2nd Prize,—E. J. COLEMAN, Esq., Slough.—John Chalmers, gardener.

(112.)—6 New Roses, in pots.

1st Prize,—Mr. WM. PAUL, Paul's Nurseries, Waltham Cross.
2nd Prize,—Messrs. PAUL & SON, Old Cheshunt Nurseries, Cheshunt.
3rd Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.

CLASS

(113.)—1 Rose, in pot.

1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.
2nd Prize,—Mr. WM. PAUL, Paul's Nurseries, Waltham Cross.

(114.)—20 Roses, in pots.

1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.
2nd Prize,—Mr. WM. PAUL, Paul's Nurseries, Waltham Cross.
3rd Prize,—Messrs. PAUL & SON, Old Cheshunt Nurseries, Cheshunt.

(115.)—6 Standard Roses, in pots.

1st Prize,—Mr. WM. PAUL, Paul's Nurseries, Waltham Cross.
2nd Prize,—MR. CHARLES TURNER, Royal Nurseries, Slough.
3rd Prize,—F. PRYOR, Esq., Digswell, Welwyn.—Wm. Earley, gardener.

(116.)—25 Roses, cut flowers.

1st Prize,—Messrs. PAUL & SON, Old Cheshunt Nurseries, Cheshunt.
2nd Prize,—Mr. WM. PAUL, Paul's Nurseries, Waltham Cross.
3rd Prize,—Mr. JAS. MITCHELL, Pilt Down Nurseries, Maresfield, Sussex.

(117.)—12 Roses, cut flowers. (Amateurs.)

1st Prize,—E. J. COLEMAN, Esq., Slough.—John Chalmers, gardener.
2nd Prize,—JOHN HOLLINGWORTH, Esq., Maidstone.

(118.)—30 Hollies.

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Messrs. WATERER & GODFREY, Knaphill Nursery, Working.
3rd Prize,—Messrs. JOHN & CHARLES LEE, Hammersmith.

(119.)—1 Pair of Standard Laurustinus.

1st Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.

(120.)—1 Pair of Pyramidal Bay Trees.

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.
3rd Prize,—Messrs. JOHN & CHARLES LEE, Hammersmith.

(121.)—1 Pair of Standard Bay Trees.

1st Prize,—M. JEAN VERSCHAFFELT, Ghent, Belgium.
2nd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
3rd Prize,—Messrs. JOHN & CHARLES LEE, Hammersmith.

(122.)—1 Pair of Standard Portugal Laurels.

1st Prize,—Messrs. JOHN & CHARLES LEE, Hammersmith.

(123.)—1 Pair of Standard Hollies.

1st Prize,—Messrs. GEORGE JACKMAN & SON, Woking, Surrey.
2nd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
3rd Prize,—Messrs. WATERER & GODFREY, Knaphill, Woking.

(124.)—1 Pair of Standard Box Trees.

1st Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
2nd Prize,—Messrs. JOHN & CHARLES LEE, Hammersmith.

(125.)—1 Pair of any Standard Evergreen Tree.

1st Prize,—Mr. WILLIAM BULL, King's Road, Chelsea.
2nd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.
3rd Prize,—Messrs. JOHN & CHARLES LEE, Hammersmith.

(126.)—12 Zonal Pelargoniums.

1st Prize,—Mr. JOHN FRASER, Lea Bridge Road Nurseries.
2nd Prize,—Mrs. LERMITTE, senior, Finchley.—J. Catlin, gardener.
3rd Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.

(127.)—12 Nosegay Pelargoniums.

1st Prize,—Mr. WILLIAM PAUL, Paul's Nurseries, Waltham Cross.

CLASS

(128.)—12 Variegated Pelargoniums.

1st Prize,—Messrs. E. G. HENDERSON & SON, St. John's Wood.
2nd Prize,—Mr. JOHN FRASER, Lea Bridge Road Nurseries.
3rd Prize,—Messrs. SALTMARSH & SON, Moulsham Nursery, Chelmsford.

(129.)—6 Standard Zonal Pelargoniums.

1st Prize,—J. H. LERMITTE, Esq., Knighton's, Finchley—W. Birse, gardener.
2nd Prize,—Mr. WM. PAUL, Paul's Nurseries, Waltham Cross.

(130.)—6 Standard Variegated Pelargoniums.

1st Prize,—Mr. WM. PAUL, Paul's Nurseries, Waltham Cross.

(131.)—12 Show Pelargoniums. (Nurserymen.)

1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.
2nd Prize,—Mr. JOHN FRASER, Lea Bridge Road Nurseries.
3rd Prize,—Messrs. JOHN DOBSON & SONS, Woodlands Nursery, Isleworth.

(132.)—10 Show Pelargoniums. (Amateurs.)

1st Prize,—T. T. DRAKE, Esq., Amersham, Bucks.—T. Bailey, gardener.

(133.)—6 Show Pelargoniums. (Amateurs.)

1st Prize,—F. G. WILKINS, Esq., Leyton.—J. Ward, gardener.
2nd Prize,—A. J. DOXAT, Esq., Putney Heath.—James Shrimpton, gardener.
3rd Prize,—W. BECK, Fsq., Worton Cottage, Isleworth.—J. Wiggins, gardener.
4th Prize,—Mrs. HODGSON, The Elms, Hampstead.—James Weir, gardener.

(134.)—6 Fancy Pelargoniums. (Nurserymen.)

1st Prize,—Mr. JOHN FRASER, Lea Bridge Road Nurseries.
2nd Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.

(135.)—6 Fancy Pelargoniums. (Amateurs.)

1st Prize,—T. T. DRAKE, Esq., Amersham, Bucks.—T. Bailey, gardener.
2nd Prize,—Mrs. HODGSON, The Elms, Hampstead.—James Weir, gardener.
3rd Prize,—J. G. BARCLAY, Esq., Leyton.—D. Donald, gardener.

(136.)—1 Pelargonium.

1st Prize,—T. T. DRAKE, Esq., Amersham, Bucks.—T. Bailey, gardener.
2nd Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.

(137.)—12 Herbaceous Calceolarias.

1st Prize,—W. F. WATSON, Esq., Isleworth.—J. James, gardener.
2nd Prize,—Messrs. JOHN DOBSON & SONS, Woodlands Nursery, Isleworth.
3rd Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.

(138.)—8 Shrubby Calceolarias.

No exhibition.

(139.)—12 Pansies, in pots.

1st Prize,—W. F. WATSON, Esq., Isleworth.—J. James, gardener.
2nd Prize,—Mr. HENRY HOOPER, Vine Nursery, Widcombe Hill, Bath.
3rd Prize,—Mr. JOHN SHACKELL, Old Field Nursery, Bath.

(140.)—12 Fancy Pansies, in pots.

1st Prize,—Mr. HENRY HOOPER, Vine Nursery, Widcombe Hill, Bath.
2nd Prize,—Mr. JOHN SHACKELL, Old Field Nursery, Bath.

141.)—24 Pansies, cut flowers.

1st Prize,—Messrs. DOWNIE, LAIRD, & LAING, Forest Hill, Sydenham.
2nd Prize,—Mr. HENRY HOOPER, Vine Nursery, Widcombe Hill, Bath.
3rd Prize,—Mr. JOHN SHACKELL, Old Field Nursery, Bath.

(142.)—50 Tulips, cut flowers.

1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.
2nd Prize,—Mr. THOMAS WESTBROOK, Abingdon, Berkshire.
3rd Prize,—Mr. JAMES BATTEN, Florist, Brook Street, Clapton.

CLASS

(143.)—12 Mignonettes.

1st Prize,—Mr. GEORGE MACINTOSH, Nurseryman, Hammersmith.

(144.)—3 Tree Mignonettes.

1st Prize,—Mr. CHARLES EWART, The Grove, Alexandra Park, Muswell Hill.
2nd Prize,—C. LEACH, Esq., King's Road, Clapham.—W. Watson, gardener.
3rd Prize,—Mrs. BARCHARD, Putney Heath.—M. Higgs, gardener.

(145.)—3 Standard Heliotropes.

1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.
2nd Prize,—Mr. W. BRAGG, Slough.

(146.)—6 Heliotropes.

1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.

(147.)—6 Fuchsias. (Nurserymen.)

1st Prize,—Mr. H. CANNELL, Fuschia Nursery, Woolwich.
2nd Prize,—Withheld.
3rd Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.

(148.)—6 Fuchsias. (Amateurs.)

1st Prize,—Rev. A. H. BRIDGES, Beddington House, Surrey.—J. August, gr.
2nd Prize,—Rev. C. H. SPURGEON, Nightingale Lane, Clapham.—W. Fay, gr.

(149.)—3 Standard Fuchsias

1st Prize,—Rev. A. H. BRIDGES, Beddington House, Surrey.—J. August, gr.
2nd Prize,—Rev. C. H. SPURGEON, Nightingale Lane, Clapham.—W. Fay, gr.
3rd Prize,—Mrs. BARCHARD, Putney Heath.—M. Higgs, gardener.

(150.)—25 Gladioli.

No entry.

(151.)—6 Tree Carnations.

No exhibition.

(152.)—12 Early Pinks.

1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.
2nd Prize,—T. T. DRAKE, Esq., Shardeloes, Amersham, Bucks.—T. Bailey, gr.

(153.)—6 Herbaceous Pæonies.

No entry.

(154.)—6 Pots of Lily of the Valley.

1st Prize,—Mr. JOHN SALTER, Versailles Nursery, Hammersmith.
2nd Prize,—Messrs. JAMES VEITCH & SONS, Chelsea.

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§ V.—SEEDLINGS.

(155.)—Seedling Florists' Flower, of any kind. (Certificates.)

1st Class Cert.—G. W. HOYLE, Esq., Reading, for Pelargonium, Alfred.
1st Class Cert.—G. W. HOYLE, Esq., for Pelargonium, Favourite.
1st Class Cert.—Mr. C. TURNER, Slough, for Pelargonium (Fancy) Duchess of Buccleuch.
1st Class Cert.—Mr. C. TURNER, for Pelargonium (Fancy) Sylvia.
1st Class Cert.—Mr. C. TURNER, for Alpine Auricula, Vivid.
1st Class Cert.—Mr. C. TURNER, for Alpine Auricula, Bertha.
1st Class Cert.—Mr. W. PAUL, Waltham Cross, for Pelargonium (hyb. nosegay) Rebecca.
1st Class Cert.—Mr. W. PAUL, for Pelargonium (hyb. nosegay) Prince of Orange.
1st Class Cert.—Messrs. IVERY & SON, Dorking, for Azalea, Fascination.
2nd Class Cert.—Mr. BULL, Chelsea, for Azalea, Madame Cannart d'Hamale.

CLASS

(156.)—New Garden Hybrid.

1st Class Cert.—Messrs. J. **VEITCH & SONS**, Chelsea, for Nepenthes maculata.
1st Class Cert.—Mr. **EARLEY**, Digswell, for Begonia phyllomaniaca hybrida.
2nd Class Cert.—Messrs. J. **VEITCH & SONS**, Chelsea, for Caladium albo-maculatum.

(157.)—New Garden Variety.

1st Class Cert.—Messrs. **FISHER, HOLMES, & Co.**, Sheffield, for Taxus hibernica fastigiata.
1st Class Cert.—Messrs. **PAUL & SON**, Cheshunt, for Cratægus Oxyacantha coccinea plena.
1st Class Cert.—Mr. **TICEHURST**, Gardener, Dynevor Castle, for Gymnogramma lanata monstrosa.
1st Class Cert.—Rev. W. H. **GIRDLESTONE**, Ryde, for Athyrium Filix-fœmina Girdlestoni.
1st Class Cert.—Messrs. **IVERY & SON**, for Athyrium Filix-fœmina formosum cristatum.
1st Class Cert.—Messrs. **IVERY & SON**, for Athyrium Filix-fœmina lanceolatum.
1st Class Cert.—Messrs. **IVERY & SON**, for Polystichum angulare attenuato-cristatum.
1st Class Cert.—Messrs. **IVERY & Son**, for Lastrea Filix-mas Ingramii.
1st Class Cert.—Messrs. **IVERY & SON**, for Asplenium Trichomanes Moulei.
1st Class Cert.—Messrs. E. G. **HENDERSON & SON**, St. John's Wood, for Pelargonium (tricolor-leaved) Lady Cullum.
1st Class Cert.—Messrs. E. G. **HENDERSON & SON**, for Pelargonium (tricolor-leaved) Harry George Henderson.
1st Class Cert.—Mr. J. J. **CHATER**, Cambridge, for Pelargonium (tricolor-leaved) Senior Wrangler.
1st Class Cert.—Messrs. F. & A. **SMITH**, Dulwich, for Pelargonium (tricolor-leaved) Jetty Lacy.
1st Class Cert.—Mr. W. **GROOM**, Ipswich, for Pelargonium (tricolor-leaved) Miss Turner.
1st Class Cert.—Messrs. **SALTMARSH & SON**, Chelmsford, for Pelargonium (variegated) Queen of the Fairies.
2nd Class Cert.—Messrs. **JAMES GARAWAY & Co.**, Bristol, for Pelargonium (tricolor-leaved) Princess Lichtenstein.
2nd Class Cert.—Messrs. **IVERY & SON**, Dorking, for Athyrium Filix-fœmina pterophorum.
2nd Class Cert.—Mr. W. **BULL**, for Myosotis Impératrice Elizabeth.

(158.)—Seedling Fruit, of any kind.—(Certificates.)

2nd Class Cert.—Mr. **CHARLES TURNER**, Royal Nurseries, Slough; for Cherry, Frogmore Early.

(159.)—Seedling Vegetable, of any kind. (Certificates.)

No award.

§ VI.—FRUITS.

(160.)—Forced Fruits, 10 dishes.

1st Prize,—Mr. **CHARLES TURNER**, Royal Nurseries, Slough.

(161.)—1 "Queen" Pineapple.

1st Prize,—The Duke of **RICHMOND**, Goodwood, Sussex.—G. Cameron, gr.
2nd Prize,—Rev. J. N. **MICKLETHWAIT**, Norwich.—R. Carr, gardener.
3rd Prize,—Mrs. **BARCHARD**, Putney Heath.—M. Higgs, gardener.

(162.)—1 "Smooth Cayenne" Pineapple.

1st Prize,—The Lady **ROLLE**, Bicton, Budleigh-Salterton.—J. Barnes, gardener.
2nd Prize,—The Duke of **RICHMOND**, Goodwood, Sussex.—G. Cameron, gr.

(163.)—1 "Providence" Pineapple.

1st Prize,—Mr. J. **MEREDITH**, The Vineyard, Garston, near Liverpool.

CLASS
(164.)—" Charlotte Rothschild" Pine Apple.
No entry.

(165.)—1 Pineapple, any other kind.
1st Prize,—W. Leaf, Esq., Park Hill, Streatham.—T. Page, gardener.
2nd Prize,—J. Dixon, Esq., Astle Park, Cheshire.—John Wallis, gardener.
3rd Prize,—Mrs. Cubitt, Denbies, Dorking.—J. Drewett, gardener.

(166.)—Grapes, 5 kinds.
1st Prize,—Lord Bagot, Blithfield, Rugeley.—T. Bannerman, gardener.
2nd Prize,—Henry Akroyd, Esq., Doddington Park.—J. Allport, gardener.
3rd Prize,—Mr. George Osborne, manager, Kay's Nursery, Finchley.

(167.)—Grapes, 6 bunches.
1st Prize,—R. Sneyd, Esq., Keele Hall, Staffordshire.—W. Hill, gardener.
2nd Prize,—Mr. George Osborne, manager, Kay's Nursery, Finchley.
3rd Prize,—The Lord Bagot, Blithfield, Rugeley.—T. Bannerman, gardener.

(168.)—3 Bunches of " Black Hamburgh " Grapes.
1st Prize,—Hy. Akroyd, Esq., Doddington Park, Nantwich.—J. Allport, gr.
2nd Prize,—Mr. Charles Turner, Royal Nurseries, Slough.
3rd Prize,—Sir G. H. Beaumont, Bart., Cole Orton Hall.—M. Henderson, gr

(169.)—3 Bunches of Black Muscat-flavoured Grapes.
1st Prize,—Hy. Akroyd, Esq., Doddington Park, Nantwich.—J. Allport, gr.
2nd Prize,—The Lord Foley, Worksop Manor, Notts.—John Miller, gardener.
3rd Prize,—The Earl of Stair, Castle Kennedy, Stranraer.—A. Fowler, gr.

(170.)—3 Bunches of Black Grapes.
1st Prize,—Ralph Sneyd, Esq., Keele Hall.—W. Hill, gardener.
2nd Prize,—Hy. Akroyd, Esq., Doddington Park, Nantwich.—J. Allport, gr.
3rd Prize,—Wm. J. Loyd, Esq., Langleybury, Watford.—W. Cruickshank, gr.

(171.)—3 Bunches of " Muscat of Alexandria " Grapes.
1st Prize,—Mr. Charles Turner, Royal Nurseries, Slough.
2nd Prize,—H. Fowler, Esq., Woodford, Essex.—S. Chambers, gardener.
3rd Prize,—Mrs. Wood, Twyford Abbey, Acton.—Henry Beasley, gardener.

(172.)—3 Bunches of White Muscat-flavoured Grapes.
1st Prize,—Mr. John Standish, Ascot and Knightsbridge.
2nd Prize,—The Earl of Stair, Castle Kennedy, Stranraer.—A. Fowler, gr.
3rd Prize,—The Viscountess Palmerston, Herts.—R. Ruffett, gardener.

(173.)—3 Bunches of other White Grapes.
1st Prize,—Mr. George Osborne, manager, Kay's Nursery, Finchley.
2nd Prize,—The Earl of Stair, Castle Kennedy, Stranraer.—A. Fowler, gr.
3rd Prize,—The Lord Bagot, Blithfield, Rugeley.—T. Bannerman, gardener.

(174.)—The best bunch of Black Grapes.
1st Prize,—Hy. Akroyd, Esq., Doddington Park, Nantwich.—J. Allport, gr.
2nd Prize,—Mr. George Osborne, manager, Kay's Nursery, Finchley.
3rd Prize,—Mr. D. Clement, Chase Side, East Barnet.

(175.)—The best bunch of White Grapes.
1st Prize,—Mr. Charles Turner, Royal Nurseries, Slough.
2nd Prize,—Mr. George Osborne, manager, Kay's Nursery, Finchley.
3rd Prize,—Mr. John Standish, Ascot, and Knightsbridge.

(176.)—4 Vines in pots.
1st Prize,—Messrs. H. Lane & Son, the Nurseries, Great Berkhamstead.

CLASS

(177.)—2 Vines in pots.

1st Prize,—Lieut.-Col. LOYD, Hawkhurst, Kent.—T. Record, gardener.

(178.)—1 Green-fleshed Melon.

1st Prize,—H. LITTLEDALE, Esq., Liscard Hall, Cheshire.—George Smith, gr.
2nd Prize,—G. S. FOLJAMBE, Esq., Osberton Hall, Worksop.—Ed. Bennett, gr.
3rd Prize,—Mrs. HOPE, Dorking.—J. B. Whiting, gardener.

(179.)—1 Scarlet-fleshed Melon.

1st Prize,—J. MILES, Esq., Whetstone—W. Lane, gardener.
2nd Prize,—JOHN GOTT, Esq., Armley House, near Leeds—A. Batger, gardener.
3rd Prize,—Messrs. R. GADD & SON, Worthing.

(180.)—Peaches, 3 kinds.

No exhibition.

(181.)—6 Peaches.

1st Prize,—Sir G. PHILLIPS, Bart., Shipston-on-Stour—W. Gardner, gardener.
2nd Prize,—Mr. CHARLES TURNER, Slough.

(182.)—Nectarines, 3 kinds.

1st Prize,—C. N. NEWDEGATE, Esq., M.P., Nuneaton—Saml. Evans, gardener.

(183.)—6 Nectarines.

1st Prize,—Mr. CHARLES TURNER, Slough.
2nd Prize,—The Duke of NEWCASTLE, Worksop—J. Tegg, gardener.

(184.)—6 Figs.

1st Prize,—The Duke of NORTHUMBERLAND, Isleworth—G. Fairbairn, gr.
2nd Prize,—The Duke of NEWCASTLE, Worksop—J. Tegg, gardener.
3rd Prize,—The Countess COWPER, Wrest Park, Beds.—S. Snow, gardener.

(185.)—Strawberries, 6 kinds.

1st Prize,—J. H. BARNES, Esq., Rickmansworth—J. Widdowson, gardener.

(186.)—Strawberries, 3 kinds.

1st Prize,—RICHARD POOL KING, Esq., Bristol—M. O'Brien, gardener.

(187.)—25 Strawberries, any kind.

1st Prize,—Mrs. CUBITT, Denbies, Dorking—James Drewett, gardener.
2nd Prize,—RICHARD POOL KING, Esq., Bristol—M. O'Brien, gardener.
3rd Prize,—The Duke of HAMILTON, Easton Park—T. D. Irving, gardener.

(188.)—10 Pots of Strawberries.

1st Prize,—The Duke of NORTHUMBERLAND, Isleworth—G. Fairbairn, gr.

(189.)—30 Black Cherries.

1st Prize,—The Viscountess PALMERSTON. Brockett Hall.—R. Ruffet, gr.
2nd Prize,—Captain GLEGG, Withington Hall, Chelford.—C. Allen, gardener.
3rd Prize,—M. G. THOYTTS, Esq., Sulhamstead House, Reading.—G. Curd, gr.

(190.)—30 White Cherries.

1st and 2nd Prizes,—Withheld.
3rd Prize,—M. G. THOYTTS, Esq., Sulhamstead House, Reading.—G. Curd, gr.

(191.)—30 Red Raspberries.

1st Prize,—Withheld.
2nd Prize,—E. J. G. HOPWOOD, Esq., Manchester.—W. Allen, gardener.

(192.)—30 White Raspberries.

1st Prize,—Withheld.
2nd Prize,—E. J. G. HOPWOOD, Esq., Manchester.—W. Allen, gardener.

CLASS

(193.)—**Oranges, Shaddocks, &c., of foreign growth.**
No entry.

(194.)—**6 Tangierine Orange Trees.**
No entry.

(195.)—**Foreign Fruits.**
No entry.

(196.)—**Bananas, heaviest.**
1st Prize,—P. L. HINDS, Esq., The Lodge, Byfleet, Surrey.—J. Carr, gardener.
2nd Prize,—JOHN GOTT, Esq., Armley House, near Leeds.—A. Batger, gr.

(197.)—**6 Fruit Trees, showing training for walls, &c.**
1st Prize,—MM. JAMIN & DURAND, Bourg-la-Reine, near Paris.

(198.)—**6 Fruit Trees, showing training for open ground.**
1st Prize,—MM. JAMIN & DURAND, Bourg-la-Reine, near Paris.

(199.)—**12 Orchard House Trees, in fruit.**
1st Prize,—Messrs. H. LANE & SON, Great Berkhamstead, Herts.

(200.)—**6 Orchard House Trees, in fruit.**
1st Prize,—Mr. THOMAS H. MORTEN, Woodville House, Amersham, Bucks.

§ VII.—VEGETABLES.

(201.)—**Forced Vegetables, 6 kinds.**
1st Prize,—Rev. J. N. MICKLETHWAIT, Norwich.—R. Carr, gardener.
2nd Prize,—The Earl of DARNLEY, Cobham Hall, Gravesend.—R. Budd, gr.

(202.)—**Vegetables, not forced, 6 kinds.**
1st Prize,—T. T. DRAKE, Esq., Shardeloes, Amersham.—T. Bailey, gardener
2nd Prize,—Mrs. HOPE, The Deepdene, Dorking.—J. B. Whiting, gardener.
3rd Prize,—The Earl of DARNLEY, Cobham Hall, Gravesend.—R. Budd, gr.

(203.)—**Salading, 10 sorts.**
1st Prize,—Mr. JAMES M. MASON, Old Woolwich Road.
2nd Prize,—The Earl of DARNLEY, Cobham Hall, Gravesend.—R. Budd, gr.
3rd Prize,—The Lady Mary C. NISBET HAMILTON, Sleaford.—D. Lumsden, gr.

(204.)—**50 Heads of Asparagus.**
1st Prize,—Mr. GEORGE TIPPETT HASELL, Barton Hill, Bristol.
2nd Prize,—The Countess COWPER, Wrest Park, Beds.—S. Snow, gardener.
3rd Prize,—J. COCKLE, Esq., West Moulsey Lodge.—J. Penfold, gardener.

(205.)—**12 Largest heads of Asparagus.**
1st Prize,—Mr. GEORGE TIPPETT HASELL, Barton Hill, Bristol.
2nd Prize,—Withheld.
3rd Prize, { J. COCKLE, Esq., West Moulsey Lodge.—J. Penfold, gardener.
Mrs. TURNER, Rook's Nest, Godstone.—J. Squibbs, gardener.

(206.)—**Mushrooms, 1 punnet.**
1st Prize,—The Earl of DARNLEY, Gravesend.—R. Budd, gardener.
2nd Prize,—E. J. G. HOPWOOD, Esq., Manchester.—W. Allen, gardener.

CLASS

(207.)—24 Kidney Potatos, forced.

1st Prize,—The Earl FITZWILLIAM, Coollattin Park.—H. W. Cordle, gr.
2nd Prize,—The Lady M. C. NISBET HAMILTON, Sleaford.—D. Lumsden, gr.
3rd Prize,—Mrs. HOPE, The Deepdene, Dorking.—J. B. Whiting, gardener.

(208.)—24 Round Potatos, forced.

1st Prize,—Mr. THOMAS WESTBROOK, Abingdon, Berkshire.
2nd Prize,—The Countess COWPER, Wrest Park, Beds.—S. Snow, gardener.

(209.)—50 French Beans, forced.

1st Prize,—JOHN SIMS OATES, Esq., Floral Villa, Hanwell.
2nd Prize,—E. OATES, Esq., Bydorp House, Hanwell.—R. Marcham, gardener.
3rd Prize,—JOHN GOTT, Esq., Armley House, Leeds.—A. Batger, gardener.

(210.)—Half a Peck of Peas.

1st Prize,—Mr. CHARLES TURNER, Royal Nurseries, Slough.
2nd and 3rd Prizes,—Withheld.

(211.)—24 Early Carrots.

1st Prize,—The Countess COWPER, Wrest Park.—S. Snow, gardener.
2nd Prize,—Mrs. HOPE, The Deepdene, Dorking.—J. B. Whiting, gardener.
3rd Prize,—W. E. HUBBARD, Esq., Horsham.—S. Ford, gardener.

(212.)—24 Early Turnips.

No award.

(213.)—1 Brace Cucumbers.

1st Prize,—The Lord ST. JOHN, Higham Ferrars.—John Rabbitt, gardener.
2nd Prize,—H. LITTLEDALE, Esq., Cheshire.—George Smith, gardener.

(214.)—The handsomest Cucumber.

1st Prize,—The Lord ST. JOHN, Higham Ferrars.—John Rabbitt, gardener.
2nd Prize,—Mr. H. CARR, Jeffries' Arboretum Nurseries, Ipswich.
3rd Prize,—Mr. JOHN JENNINGS, Nurseryman, Shipton-on-Stour.

(215.)—The longest Cucumber.

1st Prize,—J. COCKLE, Esq., West Moulsey Lodge, Surrey.—J. Penfold, gr.
2nd Prize,—Mrs. W. TETLEY, Leeds.—T. Dale, gardener.
3rd Prize,—Mr. JOHN HOUSE, East Gate Nursery, Peterborough.

(216.)—12 Heaviest Rhubarb stalks.

1st Prize,—Mrs. HOPE, The Deepdene, Dorking.—J. B. Whiting, gardener
2nd Prize,—Mr. JOHN CATTELL, Nurseryman, Westerham.
3rd Prize,—R. BARCLAY, Esq., Highgate, N.—W. Young, gardener.

(217.)—3 Heads of Cabbage.

1st Prize,—The Countess COWPER, Wrest Park, Beds.—S. Snow, gardener.
2nd Prize,—F. PRYOR, Esq., Digswell, Welwyn.—W. Earley, gardener.

(218.)—3 Heads of Cauliflower.

1st Prize,—Mr. JOHN CATTELL, Nurseryman, Westerham, Kent.
2nd Prize,—The Countess COWPER, Wrest Park, Beds.—S. Snow, gardener.

(219.)—3 Heads of Broccoli.

1st Prize,—Mr. JOHN CATTELL, Nurseryman, Westerham, Kent.
2nd Prize,—Mrs. HOPE, The Deepdene, Dorking.—J. B. Whiting, gardener.
3rd Prize,—Lieut.-Col. LOYD, Hawkhurst, Kent.—T. Record, gardener.

CLASS

(220.)—Newly Introduced Vegetable.

1st Class Cert.—Mr. Bull, Chelsea, for Raphanus caudatus.
1st Class Cert.—Messrs. Ivery & Son, Dorking, for Dioscorea Batatas.
1st Class Cert.—W. Jones Loyd, Esq., Watford (W. Cruickshank, gardener) for Dioscorea Batatas.
1st Class Cert.—M. Morin, Fontainebleau, for Dioscorea Batatas.

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§ VIII.—BOUQUETS AND OBJECTS OF ORNAMENT IN NATURAL FLOWERS.

(221.)—Dinner-table Decorations, 3 pieces.

1st Prize,—Mrs. Lermitte, Knighton's, Finchley.
2nd Prize,—Messrs. Lucking Brothers, Westbourne Park.
3rd Prize,—T. C. March, Esq., Ambassadors' Court, St. James's Palace.
Highly commended,—Messrs. James Powell & Sons, Glass Works, Whitefriars.

(222.)—Table Plateau, ornamented with Flowers.

1st and 3rd Prizes,—Withheld.
2nd Prize,—Miss F. A. Wint, 15, Bedford Place, Brighton.

(223.)—Drawing-room Flower-stands.

1st Prize,—T. C. March, Esq., Ambassadors' Court, St. James's Palace.
2nd and 3rd Prizes,—Withheld.
Highly commended,—Messrs. James Powell & Sons, Glass Works, Whitefriars.

(224.)—Drawing-room Plant Case.

1st Prize,—Mr. Geo. Macintosh, Nurseryman, Hammersmith.
2nd Prize,—Messrs. Claudet, Houghton & Son, 89, High Holborn.
3rd Prize,—Messrs. Barr & Sugden, King Street, Covent Garden.

(225.)—Window Jardinet.

No award.

(226.)—Window Box, furnished with Plants.

1st Prize,—Messrs. Wm. Cutbush & Son, Nurserymen, Highgate.
2nd Prize,—Withheld.

(227.)—3 Hanging Baskets, furnished with Plants.

1st Prize,—Withheld.
2nd Prize,—Messrs. Wm. Cutbush & Son, Nurserymen, Highgate.

(228.)—1 Wedding Bouquet.

1st Prize,—Messrs. Lucking, Westbourne Park, W.
2nd Prize,—Mr. John Delamere, Nurseryman, Holm Lane, Oxton, Cheshire.

(229.)—3 Bouquets for Balls.

1st Prize,—Mr. Richard S. Yates, Sale, Cheshire.
2nd Prize,—Messrs. Lucking Brothers, Westbourne Park, W.

(230.)—3 Head-dresses or Wreaths.

1st Prize,—Withheld.
2nd Prize,—Mr. Richard S. Yates, Sale, Cheshire.

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§ IX.—IMPLEMENTS. DESIGNS, &c.

CLASS 231

(231.)—Garden Implements. (Certificates.)

1st Class Cert.—Mr. R. READ, 35, Regent Circus, Piccadilly, for Garden Engines, Syringes, &c.
1st Class Cert.—Mr. J. GRAY, Danvers Street, Chelsea, for Oval Tubular Boiler.
2nd Class Cert.—Messrs. JOHN WARNER & SONS, 8, Crescent, Cripplegate, for Garden Engines, &c.
3rd Class Cert.—Messrs. BARNARD, BISHOP & BARNARD, Norwich, for Garden Seats, &c.

(A.)—Model of Tent.

No entry.

(B.)—Transplanting Machine, 8 tons or upwards.

No entry.

(C.)—Transplanting Machine, ½ to 2 tons.

Soc. of Arts' Prize.—Mr. McINDOE, gardener, Bromley Palace.

(D.)—Best Method of ventilating Plant structures.

Soc. of Arts' Prize.—Messrs. SANDERS, FREWER & Co., Bury St. Edmunds.

(E.)—Garden Wheelbarrow.

No award.

(F.)—Sunshade for Garden Seats.

Soc. of Arts' Prize.—Mr. T. L. SCOWAN, Stoke Newington.

(G.)—Guard for protecting trees.

Soc. of Arts' Prize.—Mr. W. EARLEY, gardener, Digswell, Welwyn.

(H.)—Levelling Instrument.

No entry.

(232.)—Garden Ornaments. (Certificates.)

1st Class Cert.—Mr. J. J. THOMAS, 188, Edgeware Road, for Wirework for garden purposes.
1st Class Cert.—Mr. H. LOVEGROVE, Slough, for Summer-Houses, Rustic Seats, &c.
1st Class Cert.—Messrs. F. & G. ROSHER, Queen's Road West, Chelsea, for Artificial Stone Boxes, &c.
2nd Class Cert.—Mr. E. A. PUIG, 21, Grove Terrace, St. John's Wood, for designs of Ornamental Rockwork.

(A.)—Earthenware Boxes for Edgings.

No entry.

(B.)—Ornamental Flower Pots.

No award.

(233.)—Tubs for Orange Trees.

No award.

(234.)—Design for Public Garden.

No award.

(235.)—Design for Private Garden of 20 acres.

1st and 3rd Prizes,—Withheld.
2nd Prize.—Mr. J. W. CHAPMAN, Richmond, Surrey.

CLASS

(236.)—Design for Villa Garden of 5 acres.

1st Prize.—Withheld.
2nd Prize.—Mr. T. J. CAPARN, King's Road Nursery, Newark.

(237.)—Water-colour Drawing of any Plant.

1st Prize.—Mr. F. A. SLOCOMBE, South Kensington Museum, for Rhododendron Nuttallii.
2nd Prize.—Mrs. HENRY HILL, Cork, for Drawings of Vanda suavis, and Oncidium Papilio.
3rd Prize.—Miss AGNES BOYD, Edinburgh, for Columbines.

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§ X.—MISCELLANEOUS SUBJECTS.

(238.)—Miscellaneous Class.

Prize of 5*l.*—Messrs. JAMES VEITCH & SONS, Chelsea, for Miscellaneous Collection of Novelties.
Prize of 5*l.*—The DUKE OF RICHMOND, Goodwood (G. Cameron, gardener), for a collection of 4 Pine Apples.
Prize of 4*l.*—Mr. JOHN LINDEN, Brussels, for a collection of 25 new species of Maranta.
Prize of 4*l.*—Mr. JOHN WATSON, St. Alban's, for group of fine specimens of New Zealand Film Ferns.
Prize of 4*l.*—The COUNTESS COWPER, Wrest Park, Beds. (S. Snow, gardener), for a well-preserved collection of Apples.
Prize of 3*l.*—JAMES BATEMAN, Esq., Biddulph Grange (J. Stanton, gardener), for Dendrobium Falconeri.
Prize of 3*l.*—Mr. W. BULL, Chelsea, for a Miscellaneous Collection of Novelties.
Prize of 3*l.*—Messrs. OSBORN & SONS, Fulham, for Phormium tenax variegatum.
Prize of 3*l.*—J. BRAND, Esq., Balham (W. Howard, gardener), for 3 magnicent plants of Eucharis amazonica.
Prize of 3*l.*—W. E. HUBBARD, Esq., Horsham (S. Ford, gardener), for a well-preserved collection of Apples and Pears.
Prize of 2*l.*—Mr. C. TURNER, Slough, for collection of new Pelargoniums.
Prize of 2*l.*—Messrs. E. G. HENDERSON & SON, St. John's Wood, for collection of new Variegated Bedding and Hardy Plants.
Prize of 2*l.*—Mr. JOHN STANDISH, Ascot and Knightsbridge, for 100 seedling Aucubas.
Prize of 2*l.*—Messrs. J. & C. LEE, Hammersmith, for Araucaria Rulei, and Araucaria sp. nov.
Prize of 2*l.*—Messrs. LANE & SON, Great Berkhamstead, for collection of Rhododendrons.
Prize of 1*l.*—Mr. JOHN LINDEN, Brussels, for collection of Tropical Fruits.
Prize of 1*l.*—Messrs. J. & C. LEE, Hammersmith, for Aucuba japonica, in berry.
Prize of 1*l.*—Col. MILES, Malmesbury, for Adiantum farleyense.
Prize of 1*l.*—A. WATTENBACK, Esq., Camberwell (A. Goodwin, gardener), for 6 standard Coleus Verschaffeltii.
Prize of 1*l.*—M. J. A. WILLINK, Amsterdam, for 3 new Ferns and Lycopods.
Prize of 1*l.*—Mr. JOHN WATSON, for miscellaneous Film Ferns.
Prize of 1*l.*—G. S. FOLJAMBE, Esq., Osberton Hall (E. Bennett, gardener), for a dish of English-grown Vanilla.
Prize of 10*s.*—C. N. NEWDEGATE, Esq., M.P., Arbury (S. Evans, gardener), for a box of Peaches and box of Nectarines.
Highly commended.—Mrs. HOPE, The Deepdene, Dorking (J. B. Whiting, gardener), for collection of Apples.
Highly commended.—Mrs. MARY ANN MITCHELL, Battersea, for Wax Flowers.
Highly commended.—Mr. JOSEPH NEWTON, Eastbourne Terrace, W., for various Plans and Views relating to landscape gardening.
Highly commended.—Mrs. J. STODDART, Notting Hill, for Rice Paper Flowers.
Highly commended.—Mrs. M. R. TOWNLEY, Holloway, for Wax Flowers.
Highly commended,—Rev. G. W. ST. JOHN, Woodstock (R. Fenn, gardener), for a collection of 12 sorts of Potatos.

Commended.—Messrs. W. & B. VERITY, 2, Charles Street West, for Cases filled with Ferns.
Commended.—Mr. W. BULL, Chelsea, for 6 New Petunias.
Commended.—Mr. R. M. STARK, Edinburgh, for collection of North American plants.
Commended.—The Rev. J. W. ST. JOHN, Woodstock (R. Fenn, gardener), for English Wines.
Commended.—The Rev. J. W. ST. JOHN, Woodstock (R. Fenn, gardener), for Fenn's Alliance Beehive.
Commended.—M. C. PFERSDORFF, Kensal New Town, for a collection of 16 species of Euphorbia.
Commended.—W. MARSHALL, Esq., Enfield (W. Wilson, gardener), for Ouvirandra fenestralis.
Commended.—Mr. C. NOBLE, Bagshot, for various Hardy Shrubs.
Commended.—Mr. R. PARKER, Tooting, for Pleopeltis incurvata.
Commended.—Mr. H. KNIGHT, jardinier-en-chef, Chateau de Pontchartrain, for a Hybrid Amaranthus.
Commended.—Messrs. LANE & SON, for miscellaneous collection of Azaleas.
Commended.—Messrs. DOWNIE LAIRD, & LAING, Sydenham, for a stand of cut Fancy Pansy blooms.
Commended.—J. H. BUCHAN, Esq., Hanwell (G. Venner, gardener), for miscellaneous collection of Flowering Plants.
Commended.—Messrs. BACKHOUSE & SON, York, for collection of Trichomanes and Hymenophyllum.
Commended.—Mrs. MILNE, Buckland, Farringdon, for 2 glazed frames filled with Dried Mosses.

LIST OF JURORS.

	Classes.
Mr. JAMES ANDERSON, The Gardens, Meadow Bank, Uddingston .	27— 35
Mr. THOMAS BAILEY, The Gardens, Shardeloes, Amersham . . .	158—170
Mr. G. BAKER, Gardener to A. Bassett, Esq., Stamford Hill, London .	102—109
M. BARILLET, Jardin de Muette, Passy, Paris	14— 18
Mr. JAMES BARNES, The Gardens, Bicton, Budleigh-Salterton . .	61— 66
Mr. WILLIAM BARNES, Camden Nursery, Camberwell	7— 13
Mr. A. F. BARRON, Royal Horticultural Gardens, Chiswick . . .	209—220
Mr. WILLIAM BARRON, Elvaston Nursery, Borrowash	61— 66
Mr. WILLIAM H. BAXTER, Botanic Garden, Oxford	87— 97
M. F. BERGMAN, Ferrières, près de Lagny, France.	221—230
Mr. JOHN BISSET, The Gardens, Croxteth Park, Liverpool . . .	80— 86
Mr. L. BOOTH, Nurseryman, Flottbeck, Hamburg	19— 26
Rev. TH. BRÉHAUT, Richmond House, Guernsey	193—200
Mr. THOMAS BROWN, Exotic Nursery, Lower Tooting	14— 18
Mr. J. BRUCE, The Gardens, Collier's Wood, Lower Tooting . . .	7— 13
Mr. WILBRAHAM BUCKLEY, Messrs. Rollisson's, Lower Tooting . .	238
Mr. W. CARMICHAEL, The Gardens, Sandringham, King's Lynn . .	171—177
Mr. S. M. CARSON, The Gardens, Nonsuch Park, Cheam . . .	80— 86
Mr. H. CHILMAN, The Gardens, Somerley House, Ringwood . . .	147—154
Mr. JOHN CLARK, The Gardens, Studley Royal, near Ripon . . .	87— 97
Mr. GEORGE CLARKE, Nurseryman, Streatham Place, Brixton Hill .	147—154
Mr. PETER CLARKE, Royal Botanic Garden, Glasgow	42— 54
Mr. JOHN COX, The Gardens, Redleaf, Penshurst	171—177
Mr. ALEX. CRAMB, The Gardens, Tortworth Court, Wotton-under-Edge	178—184
Mr. WILLIAM DEAN, Bradford Nursery, Shipley	137—146
Rev. JOSHUA DIX, 13, Stratford Place, Camden Square, London . .	126—130
Mr. WILLIAM DODDS, The Gardens, Ashton Court, Bristol . . .	209—220
Mr. W. EARLEY, The Gardens, Digswell, Welwyn	126—130
Mr. C. EWING, The Gardens, Bodorgan, Anglesea	193—200
Mr. JOHN EWING, Botanic Garden, Sheffield	55— 60
Mr. BRUCE FINDLAY, Botanic Garden, Manchester	14— 18
Mr. DAVID T. FISH, The Gardens, Hardwicke House, Bury St. Edmunds	238
Mr. R. FISH, Putteridgebury, Luton	231—233
Mr. W. FORSYTH, The Gardens, Gunnersbury Park, Ealing . . .	201—208
Mr. ARCHIBALD FOWLER, The Gardens, Castle Kennedy, Stranraer, N.B.	178—184
Mr. J. FRASER, Nurseryman, Lea Bridge Road, Leyton	156—157
Mr. JAMES FREEMAN, The Gardens, Knowsley, Prescot, Liverpool .	178—184
Mr. PHILIP FROST, The Gardens, Dropmore, Maidenhead . . .	61— 66
Mr. GORDON, The Gardens, Crystal Palace, Sydenham	118—125
Mr. GREEN, The Gardens, Hillfield, Reigate	55— 60
Mr. AND. HENDERSON, Wellington Rd. Nursery, St. John's Wood, London	1— 6
Mr. ARCHIBALD HENDERSON, Sion Nursery, Thornton Heath, Croydon	171—177
Mr. ARTHUR HENDERSON, Pine Apple Nursery, Edgware Road, London	156—157
Mr. WILLIAM HILL, The Gardens, Keele Hall, Newcastle under Lyne .	67— 79
Mr. W. HOLMES, Frampton Park Nursery, Hackney, London . .	155
Mr. G. W. HOYLE, Reading, Berks	131—136
Mr. T. INGRAM, Junr., Royal Gardens, Frogmore	156—157

Mr. W. Ingram, The Gardens, Belvoir Castle, Grantham . . . . 118—125
Mr. Thomas Jones, The Gardens, Petworth House, Sussex . . . . 185—192
Mr. D. Judd, The Gardens, Hawkstone Park, Shrewsbury . . . . 185—192
Mr. Edward Kemp, The Park, Birkenhead . . . . 234—237
Mr. John Keynes, Nurseryman, Salisbury . . . . 110—117
Mr. Francis R. Kinghorn, Sheen Nursery, Richmond . . . . 102—109
Mr. J. H. Krelage, Haarlem, Holland . . . . 87— 97
Mr. John Laing, Stanstead Park Nursery, Forest Hill, Sydenham . 98—101
Mr. J. W. Lawrence, The Gardens, Farnham Castle, Surrey . . . 27— 35
Mr. Charles Lidgard, Albion Road, Hammersmith . . . . . 137—146
M. John Linden, Royal Zoological and Horticultural Gardens, Brussels 67— 79
Mr. Alex. McKenzie, Superintendent, Alexandra Park, Muswell Hill 87— 97
Mr. James McNab, Royal Botanic Gardens, Edinburgh, N.B. . . . 36— 41
Mr. R. Marnock, 11, St. John's Ter., North Gate, Regent's Park, London 234—237
Mr. William Masters, Exotic Nursery, Canterbury . . . . . 19— 26
Mr. H. May, The Hope Nurseries, Bedale . . . . 131—136
Mr. Thomas Methven, Nurseryman, Leith Walk, Edinburgh . . . 19— 26
Mr. David Mitchell, The Gardens, Hamilton Palace, N.B. . . . . 14— 18
Dr. Moore, Royal Botanic Garden, Glasnevin, Dublin . . . . . 1— 6
Mr. James Neilson, Rose Hall, Falkirk . . . . 98—101
Mr. Markham Nesfield, 61, York Terrace, Regent's Park, London . 234—237
M. Edward Ortgies, Botanic Garden, Zurich . . . . . . 7— 13
Mr. Thomas Page, The Gardens, Park Hill, Streatham . . . . 42— 54
Mr. Robert Parker, Exotic Nursery, Tooting . . . . 42— 54
Mr. Anthony Parsons, The Gardens, Danesbury, Welwyn . . . 155
Mr. John Peel, The Gardens, Cambridge House, Twickenham . . 238
Mr. W. Perry, Messrs. Rivers' Nursery, Sawbridgeworth . . . . 110—117
Mr. C. Pilcher, Gardener to S. Rucker, Esq., West Hill, Wandsworth 231—233
Prof. Reichenbach, Botanic Gardens, Hamburgh . . . . . . 27— 35
Mr. John Richards, The Gardens, Grimston Park, Tadcaster . . . 80— 86
Mr. T. Rivers, Nurseryman, Sawbridgeworth . . . . . . 193—200
Mr. John Robson, The Gardens, Linton Park, Staplehurst . . . . 221—230
Mr. Alexander Roger, The Gardens, Berry Hill, Maidenhead . . 118—125
Mr. William Rollisson, The Nurseries, Tooting . . . . . . 27— 35
Mr. Richard Roser, 2, Upper Tulse Hill, Brixton Hill, Surrey . . 126—130
Mr. Richard Ruffett, The Gardens, Brockett Hall, Welwyn . . . 201—208
Dr. Sankey, Sandywell Park, Cheltenham 155
M. Sello, Gr. to H.R.H. the Crown Prince of Prussia, Sans Souci, Potsdam 126—130
Mr. John Shaw, 29, Oxford Street, Manchester . . . . . . 19— 26
Mr. J. Sladden, Ash, near Sandwich . . . . 137—146
Mr. Geo. Smith, The Gardens, Vice-Regal Lodge, Phœnix Park, Dublin 131—136
Mr. George Smith, Tollington Nursery, Hornsey Rd., Islington, London 147—154
Mr. John Smith, Royal Botanic Gardens, Kew . . . . 1— 6
Mr. John Smith, The Gardens, Moston House, Burnage Lane, Levenshulme, Manchester . . . . 36— 41
Mr. Zadok Stevens, The Gardens, Trentham, Stoke-upon-Trent . . 110—117
Mr. J. Taplin, The Gardens, Chatsworth, Chesterfield . . . . . 209—220
M. Thibaut, Rue de Charonne, 146, Paris . . . . 55— 60
Mr. R. Thompson, Royal Horticultural Gardens, Chiswick . . . . 185—192
Mr. David Thomson, The Gardens, Archerfield, Drem, N.B. . . . 231—233
Mr. George Thomson, The Gardens, Stansted Park, Emsworth . . 55— 60
Mr. W. Thomson, The Gardens, Dalkeith Park, N.B. . . . . . 102—109
Mr. W. Thomson, City of London Club . . . . 221—230
Mr. G. Tillyard, The Gardens, Brocklesby Park, Ulceby . . . . 158—170
Mr. John Trotter, The Gardens, Badminton, Chippenham . . . . 201—208
Mr. James Vair, The Gardens, Dangstein, Petersfield . . . . 67— 79

LIST OF EXHIBITORS.

Mr. W. ABRAHAM, manager, Donald & Sons, Goldsworth Nursery, Woking.—Class 233, 234, 235.

The ACCLIMATISATION SOCIETY OF GREAT BRITAIN.—Class 238.

H. AKROYD, Esq., Doddington Park, Nantwich, Cheshire (J. Allport, gardener).—Class 166, 168, 169, 170, 174.

THOMAS ALCOCK, Esq., Kingswood Warren, Epsom (W. Beech, gardener).—Class 184, 208, 209, 210, 211, 213, 217, 219.

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The Lord BAGOT, Blithfield, Rugeley (T. Bannerman, gardener).—Class 166, 167, 168, 173, 175, 178.

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M. ALFRED BLEU, 48, Route d'Italie, Paris.—Class 157.

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Miss AGNES BOYD, Edinburgh.—Class 237.

Mr. W. BRAGG, Nurseryman, Slough.—Class 122, 139, 141, 144, 145, 149.

J. BRAND, Esq., Bedford-hill, Balham (W. Howard, gardener).—Class 31, 238.

Rev. A. H. BRIDGES, Beddington, Surrey (J. August, gardener).—Class 93, 141, 143, 148, 149.

Mr. J. BRISTOW.—See G. Orme, Esq.

Mr. E. BROWN, Slough.—Class 234, 235, 236.

Messrs. J. B. BROWN & Co., 18, Cannon-street, and 148, Upper Thames-street, London.—Class 231.

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J. H. BUCHAN, Esq., The Grove, Hanwell (G. Venner, gardener).—Class 54, 73, 238.

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Mr. R. BULLEN.—See A. Turner, Esq.

WENTWORTH W. BULLER, Esq., Strete Ralegh, Exeter (E. Culley, gardener).—Class 28, 34, 71, 238.

Messrs. BURY & POLLARD, Park Iron Works, No. 17, New Park-street, Southwark.—Class 231.

T. P. W. BUTT, Esq., Arle-court, Cheltenham (J. May, gardener).—Class 9, 34, 78, 84, 106.

Mr. G. CAMERON.—See Duke of Richmond.

Mr. H. CANNELL, Fuchsia Nursery, Woolwich.—Class 147, 238.

T. CANNING, Esq., Westbury-on-Trym, near Bristol (A. Morse, gardener).—Class 9, 84, 92, 102, 108, 178, 179, 214.

CHARLES CANNON, Esq. Kidderpore Hall, Hampstead (John Hepper, gardener).—Class 187, 188, 189, 209, 213, 214.

Mr. T. J. CAPARN, King's-road Nursery, Newark-on-Trent.—Class 235, 236.

M. ISODORE CAPEINICK, Arboriculteur, Pêcherie, Ghent.—Class 238.

Mr. J. CARR.—See P. L. Hinds, Esq.
Mr. R. CARR.—See Rev. J. M. Micklethwait.
Mr. H. CARR, Arboretum Nurseries, Ipswich.—Class 213, 214, 215.
Mr. S. M. CARSON.—See W. R. G. Farmer, Esq.
Messrs. J. CARTER & Co., Seedsmen, &c., High Holborn.—Class 157, 224, 227, 238.
R. A. CARTWRIGHT, Esq., Edgcott House, Banbury, Oxon (T. Neale, gardener).—Class 162, 187, 207, 208, 216, 219.
Mr. JOHN CATLIN.—See Mrs. Lermitte, Senr.
Mr. J. CATTELL, Nurseryman, Westerham, Kent.—Class 202, 213, 214, 216, 217, 218, 219.
The Earl of CAWDOR, Stackpole, Pembroke (G. Sclater, gardener).—Class 168, 169, 173, 191.
Mr. J. H. CAWKELL.—See J. G. Riddell, Esq.
Mr. J. CHALMERS.—See E. J. Coleman, Esq.
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Mr. T. CHARLES.—See R. Barnett, Esq.
Mr. J. J. CHATER, Gonville Nurseries, Cambridge.—Class 48, 97, 128, 141, 155, 238.
Mr. W. CHATER, Saffron Walden.—Class 141, 183.
COLES CHILD, Esq., Bromley Palace, Kent (J. McIndoe, gardener).—Class 187, 201, 203, 211, 216, 217, 218.
Mrs. CHILD, The Nurseries, Station-road, Whetstone (G. Thomas, manager).—Class 173, 213.
Miss ELLEN E. CHILD, School of Art, Lincoln.—Class 237.
Mr. G. A. CHRISTMAS, 3, Cromwell-place, Clerkenwell.—Class 224.
Messrs. CLAUDET, HOUGHTON, & SON, 89, High Holborn.—Class 224.
Mr. D. CLEMENT, Chase-side, East Barnet.—Class 167, 168, 174.
J. COCKLE, Esq., West Moulsey Lodge, Surrey (J. Penfold, gardener).—Class 204, 205, 207, 210, 213, 214, 215, 216, 217.
Mrs. E. COLE & SONS, Fog Lane Nurseries, Withington, Manchester.—Class 8, 84, 107, 216, 218, 219, 238.
E. J. COLEMAN, Esq., Stoke Park, Slough (J. Chalmers, gardener).—Class 104, 111, 117, 238.
Messrs. COLLYER & ROBERTS, 54, St. John-street, Clerkenwell.—Class 238.
G. COOPER, Esq., Alpha House, Coburg-road, Old Kent-road (J. Robson, gardener.)—Class 28.
Mr. F. W. COOPER.—See D. Veazey, Esq.
Mr. H. W. CORDLE, gardener, Coollattin Park, Carnew.—(See also) Earl Fitzwilliam.—Class 221.
Miss BURDETT COUTTS, Holly Lodge, Highgate (C. Hutt, gardener).—Class 16, 51.
The Countess COWPER, Wrest Park, Bedfordshire (S. Snow, gardener).—Class 184, 204, 207, 208, 211, 213, 217, 218, 219, 238.
Mr. T. COYSH.—See E. Wood, Esq.
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The LORD CREWE, Crewe Hall, Cheshire (W. Whitaker, gardener).—Class 178, 179, 181.
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Mr. W. CRUICKSHANK.—See W. Jones Loyd, Esq.
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Mr. E. CULLEY.—See Wentworth W. Buller, Esq.
Messrs. CUMMING & EDMONDS, Stamford-bridge, Brompton.—Class 231.

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Mr. G. CURD.—See M. G. Thoytts, Esq.
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Mr. T. DALE.—See Mrs. W. Tetley.
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Mr. G. DAVIES, Stanley Nurseries, Old Swan, Liverpool.—Class 4.
Mr. DAWSON.—See Earl Shaftesbury.
Miss CHRISTINA DEAN, School of Art, Edinburgh.—Class 237.
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Messrs. J. DOBSON & SONS, Woodlands Nursery, Isleworth.—Class 107, 131, 137, 155.
Mr. D. DONALD.—See J. G. Barclay, Esq.
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Mr. H. DOWNING, gardener, Norbury Park, Dorking.—(See also) T. Grissell, Esq.—Class 228, 229.
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T. T. DRAKE, Esq., Shardeloes, Amersham (T. Bailey, gardener).—Class 132, 135, 136, 138, 152, 154, 202, 217, 218, 219.
Mr. R. DRAPER.—See Earl Vane.
J. DREW, Esq., Haringey Park, Crouch End, Hornsey (J. Embery, gardener).—Class 167, 168, 174.
Mr. J. DREWETT.—See Mrs. Cubitt.
Mr. W. C. DRUMMOND, Nurseryman, &c., Bath.—Class 11, 107, 126, 221, 228, 229, 230, 238.
Mr. C. H. DUTTON, 25, Milsom-street, Bath.—Class 59.
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Mrs. W. EARLEY, Digswell, Welwyn.—Class 238.
Mr. W. EARLEY, gardener, Digswell, Welwyn.—(See also) F. Pryor, Esq.—Class 231, 231G.
Mr. J. EMBERY.—See J. Drew, Esq.
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Mr. R. FENN, gardener, Rectory, Woodstock.—See Rev. G. W. St. John.
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Mr. J. FLEMING, gardener to the Dowager Duchess of Sutherland, Cliveden, Maidenhead.—Class 236.

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Mr. S. FORD.—See W. E. Hubbard, Esq.
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Mr. A. FOWLER.—See Earl of Stair.
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Mr. W. FRANKCOMB.—See F. C. Hills, Esq.
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Mr. J. FRASER.—See J. Hope, Esq.
Mr. JOHN GADD, Castle Gardens, Dorking.—Class 178, 179.
Messrs. R. GADD & SON, Salvington Nurseries, Worthing.—Class 155, 168, 178, 179, 210, 213, 214, 238.
Messrs. J. GARAWAY & Co., Durdham Down Nursery, Bristol.—Class 157, 219.
Mr. J. F. GARDINER, Belgrave-road, Leicester.—Class 238.
Mr. W. GARDINER.—See E. P. Shirley, Esq.
Mr. W. GARDNER.—See Sir G. Phillips, Bart.
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H. H. GIBBS, Esq., St. Dunstan's, Regent's Park (C. Penny, gardener).—Class 30, 102.
J. GILLETT, Esq., the Grove, Stanmore (W. Lewis, gardener).—Class 168, 174.
Rev. W. H. GIRDLESTONE, Gwydyr House, Ryde, Isle of Wight.—Class 156.
Captain GLEGG, Withington Hall, Chelford (C. Allen, gardener).—Class 166, 167, 183, 189.
Messrs. S. GLENDINNING & SONS, Chiswick Nurseries.—Class 11, 35, 105, 155.
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Mr. O. GOLDSMITH.—See Sir W. R. Farquhar, Bart.
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Mr. W. GROOM, Ipswich.—Class 156, 157.
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Mr. J. HALLY, Nurseryman, Blackheath.—Class 128, 157.
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The Lady M. C. N. HAMILTON, Bloxholm Hall, Sleaford (D. Lumsden, gardener).—Class 159, 187, 203, 206, 207, 209, 219, 238.

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Mr. JOHN HEPPER.—See Charles Cannon, Esq.
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Mr. M. HIGGS.—See Mrs. Barchard.
Mrs. HENRY HILL, Cork.—Class 237.
Mr. W. HILL.—See R. Sneyd, Esq.
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Mrs. HODGSON, the Elms, Hampstead (J. Weir, gardener).—Class 133, 135, 144, 154, 169, 181, 184, 188, 191, 206, 213, 238.
J. HOLLINGWORTH, Esq., Maidstone.—Class 117, 187, 211.
Rev. R. HOLLIS, Spalding, Lincoln.—Class 155.
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Mrs. HOPE, the Deepdene, Dorking (J. B. Whiting, gardener).—Class 178, 202, 204, 206, 207, 208, 211, 212, 216, 217, 219, 238.
J. HOPE, Esq., Belmont, Murrayfield, Edinburgh (J. Fraser, gardener).—Class 141.
E. J. G. HOPWOOD, Esq., Hopwood Hall, Manchester (W. Allen, gardener).—Class 167, 168 ,170, 173, 175, 181, 189, 190, 191, 206, 238.
Mr. J. HORWOOD.—See G. H. Turnbull, Esq.
Mr. J. HOUSE, Eastgate Nursery, Peterborough.—Class 180, 181, 182, 183, 185, 186, 187, 188, 213, 214, 215, 228, 229.
Mr. W. HOWARD.—See J. Brand, Esq.
Mr. H. HOWLETT, Chelsea.—Class 223, 235.
G. W. HOYLE, Esq., Reading.—Class 155.
W. E. HUBBARD, Esq., St. Leonard's Lodge, Horsham, Sussex (S. Ford, gardener).—Class 187, 202, 207, 208, 211, 216, 217, 238.
R. HUDSON, Esq., Clapham Common (T. Todman, gardener).—Class 104.
M. VAN HULLE, Curator, Horticultural and Botanical Gardens, Ghent, Belgium.—Class 18.
JAMES HUNT, Esq., Sydenham-hill (Walter Reid, gardener).—Class 209, 213, 214.
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Rev. J. N. MICKLETHWAIT, Taverham Hall, Norwich (R. Carr, gardener).—Class 161, 178, 184, 187, 201, 202, 203, 207, 209, 211, 212, 213, 218.

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Colonel MILES, Burton Hall, Malmesbury, Wilts.—Class 238.

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Mr. J. MITCHELL, Pilt Down Nurseries, Maresfield, Sussex.—Class 116.

Mrs. MITCHELL, 5, Anglesea-terrace, Bridge-road, Battersea, S.W.—Class 238.

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Sir H. C. MONTGOMERY, Burnham Grove, Maidenhead (C. Neave, gardener).—Class 213, 214, 215.

W. MOORE, Esq., Wierton House, Staplehurst, Kent (William Divers, gardener).—Class 238.

M. MORIN, Fontainebleau.—Class 220.

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Mr. H. MORGAN.—See Marquis Townshend.

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Mr. C. NEAVE.—See Sir H. C. Montgomery.

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The Duke of NEWCASTLE, Clumber Park, Notts (J. Tegg, gardener).—Class 180 181 183 184, 201, 202, 206, 207, 208, 209, 219.

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J. S. OATES, Esq., Floral Villa, Hanwell.—Class 209, 213, 214.

Mr. M. O'BRIEN.—See R. P. King, Esq.

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Messrs. OSBORN & SONS, Nurserymen, Fulham.—Class 18, 93, 118, 238.

Miss BEATRICE OSBORN, School of Art, Birmingham.—Class 237.

Mr. G. OSBORNE, Manager, Kay's Nursery, Finchley.—Class 166, 167, 168, 170, 173, 174, 175.

Mr. T. PAGE.—See W. Leaf, Esq.

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Mr. R. PARKER, Exotic Nursery, Tooting.—Class 29, 77, 91, 238.

Mrs. PATTISON, Wrackleford, Dorchester (Geo. Winzer, gardener).—Class 59.

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Mr. W. PAUL, Paul's Nurseries, Waltham Cross, N.—Class 19, 20, 21, 61, 63, 110, 112, 113, 114, 115, 116, 118, 125, 127, 129, 130, 155, 156.

Mr. B. PEED.—See Mrs. Tredwell.

Mr. J. PENFOLD.—See J. Cockle, Esq.

Mr. C. PENFORD.—See The Viscount Folkestone.

Mr. C. PENNY.—See H. H. Gibbs, Esq.

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M. C. PFERSDORFF, 73, South Row, Kensal New Town; and 110, Avenue de St. Ouen, Paris.—Class 59, 89, 224, 238.

Sir G. PHILLIPS, Bart., Shipton-on-Stour (W. Gardner, gardener).—Class 181.

J. S. PHILLIPS, Esq., Culham House, Abingdon, Berks (T. Lockie, gardener).—178, 179, 213.

J. PHILPOTT, Esq., Stamford-hill (J. Wheeler, gardener).—Class 7, 16, 30, 82, 104.

Messrs. PIESSE & LUBIN, 2, New Bond-street.—Class 238.

Miss ELIZABETH POLLOCK, School of Art, Edinburgh.—Class 237.

Mr. B. PORTER.—See Hon. A. Z. Ashley.

The Duke of PORTLAND, Welbeck Abbey, Worksop, Notts (W. Tillery, gardener). —Class, 180, 182, 186, 187, 207, 209.

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Mr. F. PREECE, Gardener, Hanger Hill House, Ealing.—(See also) E. Wood, Esq. —Class 228, 229.

F. PRYOR, Esq., Digswell, Welwyn (W. Earley, gardener).—Class, 74, 115, 156. 202, 206, 207, 208, 212, 213, 216, 217, 238.

Mr. E. A. PUIG, Ornamental Rock Worker, 21, Grove-terrace, Grove-road, St. John's Wood, N.W.—Class 232.

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Mr. T. RECORD.—See Lieut.-Col. Loyd.
Mr. WALTER REID.—See James Hunt, Esq.
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The Duke of RICHMOND, Goodwood, Sussex (G. Cameron, gardener).—Class 238.
The Duke of RICHMOND, Gordon Castle, N.B. (J. Webster, gardener).—Class 161, 162.
J. G. RIDDELL, Esq., Hermiston Grange, Worksop, Notts (J. H. Cawkell, gardener).—Class 163.
Mr. W. ROBINS.—See Sir E. Kerrison.
Mr. J. ROBSON.—See F. Cooper, Esq.
Mr. A. ROGER, Gardener, Berry Hill, Maidenhead.—(See also J. Noble, Esq.—Class 229, 231, 231B, 233.
W. ROGERS, Esq., Red-hill (J. Beach, gardener).—Class 205, 215, 216, 219.
The Lady ROKEBY, Portman Square.—Class 222.
The Lady ROLLE, Bicton, Budleigh-Salterton (James Barnes, gardener).—Class 162.
J. A. ROSE, Esq., Fern Side, Wandsworth-common (W. Wisker, gardener).—Class 213, 214, 215.
Messrs. F. & G. ROSHER, Queen's-road West, Chelsea, S.W.—Class 226, 232.
Miss ISABELLA S. ROSS, School of Art, Edinburgh.—Class 237.
Mr. R. RUFFETT.—See Viscountess Palmerston.
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Mr. A. SALTER, William-street, Vale-place, Hammersmith.—Class 222.
Mr. J. SALTER, Versailles Nursery, William-street, Vale-place, Hammersmith.—Class 25, 48, 126, 127, 154.
Messrs. SALTMARSH & SON, Chelmsford.—Class 128, 155, 157.
G. SANDARS, Esq., Chesterford Park, Saffron Walden (Charles Tyler, gardener).—Class 178, 179.
Messrs. SANDERS, FREWER, & Co., Victoria Works, Bury St. Edmunds.—Class 231D.
Miss SAVAGE, Tetbury Lodge, Cheltenham (J. Cypher, gardener).—Class 10, 75, 106.
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Mr. T. L. SCOWAN, Patent Canopy-maker, Allen-road, Stoke Newington.—Class 231F.
Mr. A. SENDALL, Burningham, Hanworth, Norfolk.—Class 238.
Mr. J. SHACKELL, Old Field Nursery, Bath.—Class 139, 140, 141, 204, 206.
The Earl of SHAFTESBURY, St. Giles, Cranbourne, Dorset (J. Dawson, gardener).—Class 181.
Mr. E. SHENTON, Nurseryman, Biggleswade.—Class 238.
Mr. J. SHEPPARD, Gardener, Woolverstone Park, Warwick.—Class 232B.
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Mr. THOMAS SHORTT, Fulham.—Class 4.
Mr. J. SHRIMPTON.—See A. J. Doxat, Esq.
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Mr. R. SMEE.—See W. H. Stone, Esq., M.P.

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Mr. G. SMITH.—See H. Littledale, Esq.
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Messrs. PETER SMITH & Co., Hamburgh.—Class 157.
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Mr. S. SNOW.—See Countess Cowper.
Rev. C. H. SPURGEON, Nightingale-lane, Clapham (W. Fay, gardener).—Class 148, 149.
Miss CATHERINE SPRAGGE, South Kensington Museum.—Class 237.
Mr. J. SQUIBBS.—See Mrs. Turner.
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Mrs. J. STODDART, No. 2, Cambridge-terrace, Notting-hill.—Class 238.
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W. H. STONE, Esq., M.P., Leigh Park, Havant, Hants (G. Young, gardener).—Class 16, 31, 44, 82.
Mr. W. STUTTLE, Ironfounder, Shrewsbury.—Class 233.
Mr. C. TANSLEY.—See A. Moss, Esq.
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Mr. ALLEN HENRY CLARKE, 39, King-st., Covent Garden, W.C.	5	5	0	—	
Mr. JOSHUA CLARKE, F.L.S., Saffron Walden	5	5	0	—	
Mr. R. G. CLARKE, F.R.B.S., 3, St. Alban's-road, N.W.	5	5	0	—	

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Mrs. JOHN CLUTTON, F.R.H.S., Sussex-square, W.	10	10	0	..	—	
Mr. J. COATES, Gr. Tedworth, Marlborough	1	1	0	..	—	
Mrs. E. COLE and SONS, Withington, near Manchester	5	5	0	..	—	
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Mr. A. De Mornay, Howberry, Wallingford	5	5	0	—	
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Rev. W. ELLIS, Rose Hill, Hoddesdon	5	5	0	..	—	
Mr. J. JOEL ELLIS, F.R.H.S., Brompton Hall, S.W.	—			..	50	0
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The Earl GRANVILLE, K.G., F.R.H.S.	10	10	0	..	50	0
Dr. J. E. GRAY, British Museum, W.C.	26	5	0	..	—	
Mr. J. GRAY, Summerhill, Bath	5	5	0	..	—	
Mr. JAMES GRAY, F.R.H.S., Chelsea, S.W.	10	10	0	..	50	0
Mr. M. GRAY, Gr. Upleatham, Redcar, Yorkshire	1	1	0	..	—	
Mr. R. GRAVES, Ashby-de-la-Land, Sleaford	1	1	0	..	—	
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Mr. T. GRISSELL, F.R.H.S., Norbury Park, Dorking	10	10	0	..	—	
The Earl GROSVENOR, M.P., V.P.R.H.S., 28, Prince's-gate, W.	10	10	0	..	50	0
Mr. HENRY GUEDALLA, F.R.H.S., Devonshire-terrace, W.	10	10	0	..	50	0
Mrs. GUITTON, F.R.B.S., 6, Manchester-square, W.	5	5	0	..	—	
Mr. J. GULSON, Coventry	1	1	0	..	—	
Mr. W. E. GUMBLETON, F.R.H.S., Queenstown, Ireland	10	10	0	..	—	
Mr. GAYLAND HADWEN, Fairfield, Manchester	5	5	0	..	—	
Mr. G. HAINES, Wilton House, Eaton-square, S.W.	1	1	0	..	—	
Mr. ALFRED HAINES, F.R.H.S., Kensal-green, W.	5	5	0	..	—	
Mr. J. HALL, Gr. Sandbeck Park, Rotherham	1	1	0	..	—	
Major W. HALL, F.R.H.S., Syndale Park, near Faversham	10	10	0	..	—	
Mr. J. HALLY, Lee Park, Blackheath	2	2	0	..	—	
The Rt. Hon. R. C. NISBET HAMILTON, Bloxholm Hall	10	10	0	..	—	
Sir R. N. C. HAMILTON, Bart., K.C.B., F.R.H.S., 129, Park-street	5	5	0	..	—	
Mr. JOS. HAMILTON, Wellington-place, Carlisle	1	1	0	..	—	
Mr. C. A. HANBURY, Belmont, East Barnet, N.	5	5	0	..	—	
Mr. OSGOOD HANBURY, jun., Brentwood	1	1	0	..	—	
Mr. ROBERT HANBURY, F.R.H.S., Poles, Ware, Herts	10	10	0	..	—	
Mr. R. C. HANBURY, M.P., F.R.H.S., 10, Upper Grosvenor-st., W.	5	5	0	..	—	
Mr. J. HANDLEY, Gr. Fawsley Park, Daventry	1	1	0	..	—	
Lieut.-Col. HANMER, K.H., F.R.B.S., Leighton Buzzard	5	5	0	..	25	0
Mr. W. HANT, Sleaford	1	1	0	..	—	
Mr. J. HARDIE, Gr. Gazeereh Palace, Cairo, Egypt	5	5	0	..	—	
Mr. J. HARDING, Tattenhall Lodge, Leamington	5	5	0	..	—	
Mr. J. HARDING, 35, Devonshire-place, Portland-place, W.	1	1	0	..	—	
Miss HARDING, 35, Devonshire-place, Portland-place, W.	1	1	0	..	—	
Mr. ROBERT HARDWICKE, F.L.S., 192, Piccadilly, W.	1	1	0	..	—	
Mrs. HARDWICKE, 192, Piccadilly, W.	1	1	0	..	—	
Mr. G. W. HARDY, J.P., Warrington	1	1	0	..	—	
Mrs. LUCY C. HARRINGTON, F.R.H.S., 64, Porchester-terrace, W.	5	5	0	..	—	

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Mr. F. HARRISON, Gr. Osmaston Hall, Derby	1	1	0	—
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Mr. E. HEDLEY, The Grove, Burton-road, Derby	2	2	0	—
Captain HEMMING, 36, Queen's-gate-terrace, W.	2	2	0	—
Mr. R. HENDERSON, 18, Lynedoch-crescent, Glasgow	5	5	0	—
Mr. ARCHIBALD HENDERSON, Thornton-heath, S.	2	2	0	—
Mr. ARTHUR HENDERSON, F.R.H.S., Edgware-road, W.	10	10	0	50 0
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Mr. MONTGOMERY HENDERSON, Gr. Coleorton Hall	5	5	0	—
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Messrs. E. G. HENDERSON & SON, St. John's-wood, N.W.	10	10	0	50 0
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Mr. W. HERBERT, F.R.H.S., Clytha, Monmouthshire	5	5	0	—
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Mr. GEORGE HERIOT, F.R.B.S., 19, Birchin-lane, E.C.	10	10	0	—
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Lieut.-Col. W. B. HIGGINS, F.R.H.S., Pict's Hill, Bedfordshire	10	10	0	—
The Viscount HILL, F.R.H.S., Hawkstone, Salop	10	10	0	—
Mr. C. HILL, F.S.A., F.R.H.S., 25, Hyde-park-square, W.	10	10	0	—
Mr. CHAS. HILL, F.R.B.S., Gloucester-gate, Regent's-park, N.W.	10	10	0	—
Mr. I. HILL, Gr. Poles, Ware	2	2	0	—
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Mr. S. MUSGRAVE HILTON, Bramling, Wingham	5	5	0	—
Mrs. T. HINCKS, F.R.H.S., Tettenhall Wood, Wolverhampton	5	5	0	—
Mrs. P. L. HINDS, F.R.B.S., 61, Portland-place, W.	2	2	0	—
Mr. J. J. P. HOARE, Bitterne, Southampton	1	1	0	—
Mr. JAMES HODGES, F.R.H.S., Perry Hill, Bagshot	1	1	0	10 0
Mrs. A. HODGSON, Eastwood Lodge, Leamington	1	1	0	—
Miss HODGSON, Eastwood Lodge, Leamington	1	1	0	—
Dr. ROBERT HOGG, F.L.S., 99, St. George's-road, S.W.	10	10	0	50 0
Mr. J. HOLAH, Gr. Chawton Park, Alton, Hants.	1	1	0	—
Rev. S. REYNOLDS HOLE, F.R.H.S, Caunton Manor, Newark	5	5	0	—
Mr. J. HOLLINGWORTH, Maidstone	5	5	0	—
Mr. E. HOLMES, Handsworth, Sheffield	5	5	0	—
Mr. JAMES HOLMES, F.R.H.S., 4, New Ormond-street, W.C.	10	10	0	—
Mr. WILLIAM HOLMES, F.R.H.S., Hackney. N.E.	5	5	0	—
The Earl of HOME, F.R.B.S., 6, Grosvenor-square, W.	10	10	0	—
Mr. JAMES HOPE, Gr. Weston, Shiffnal	1	1	0	—

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Mrs. E. HORNER, Halstead	1	1	0	—	
Rev. JOHN S. H. A. HORNER, F.R.H.S., Frome	10	10	0	—	
Mr. T. B. HORSFALL, M.P., F.R.H.S., Bellamour Hall	10	10	0	—	
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Mr. H. HOULDSWORTH, Coltness, Motherwell, N.B.	5	5	0	—	
Mr. W. HOWELL, Durdham Down Nursery, Bristol	1	1	0	—	
Mr. G. W. HOYLE, Reading	1	1	0	—	
Mr. JAMES HOZIER, Maudslie Castle, Carluke, N.B.	5	5	0	—	
Mr. P. HUBBERSTY, Wirksworth, Derby	1	1	0	—	
Mrs. P. HUBBERSTY, Wirksworth, Derby	1	1	0	—	
Miss HUBBERSTY, Wirksworth, Derby	1	1	0	—	
Mr. W. HUDSON, Gr. Lockington Hall, Derby	1	1	0	—	
Mr. WALTER HUGHES, Southwood, Highgate, N.	10	10	0	—	
Mr. R. D. HUGHES, 52, Lincoln's Inn-fields, W.C.	5	5	0	—	
Mrs. J. HULBERT, F.R.H.S., 8, Sussex-terrace, Hyde-park, W.	2	2	0	—	
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Mr. J. HUTCHINSON, Gr. Elvetham Park, Winchfield	1	1	0	—	
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The Right Hon. Sir W. HUTT, K.C.B., M.P., Gateshead	10	10	0	—	
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Mr. THOMAS INGRAM, Frogmore, Windsor	5	5	0	—	
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Mr. J. IRELAND, Edward-street, Broughton-lane, Manchester	1	1	0	—	
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Mr. JAMES IVERY, F.R.H.S., Dorking	10	10	0	—	
Mr. WILLIAM IVERY, Peckham, S.E.	5	5	0	—	
Mr. J. IVISON, Avenue Gardens, Regent's-park, N.W.	1	1	0	—	
Mr. J. B. IZON, Wallsgrave-on-Sowe, Coventry	1	1	0	—	
J. C. R., per Mr. W. Miller, Coventry	1	1	0	—	
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Mr. J. L. JACKSON, 6, Earl's-terrace, Kensington, W.	1	1	0	—	
Mrs. J. L. JACKSON, 6, Earl's-terrace, Kensington, W.	1	1	0	—	
Mr. W. JACKSON, Gr. Kedleston Hall, Derby	1	1	0	—	
Messrs. THOS. JACKSON & SON, Kingston	10	10	0	—	
Mr. LEONARD JACQUES, F.R.H.S., Easby Abbey, Richmond	5	5	0	—	
Sir WALTER C. JAMES, Bart., F.R.H.S., Betteshanger	—			10	10
Mr. D. JAMES, Gr. Carton, Maynooth	2	2	0	—	
Mr. A. JAMIESON, Gr. Hooton Hall, Sutton, Chester	1	1	0	—	
Sir R. JARVIS, F.R.H.S., Ventnor, Isle of Wight	2	2	0	—	
Mr. C. JAY, 10, The Grove, Boltons, West Brompton, S.W.	10	10	0	—	
Mr. W. B. JEFFRIES, Arboretum Nurseries, Ipswich	5	5	0	—	
Mr. CHARLES JELLICOE, F.R.G.S., 23, Chester-terrace, N.W.	5	5	0	—	
Mr. JOSEPH JESSOP, Chiswick, W.	5	5	0	20	0
Mr. G. W. JOHNSON, F.R.H.S., 10, Stanley-crescent, W.	10	10	0	50	0
Mr. H. JOHNSON, F.R.H.S., 39, Crutched Friars, E.C.	10	10	0	—	
Mr. GEORGE JONES, Gr. Mottisfont Abbey, Romsey	1	1	0	—	
Mrs. INWOOD JONES, F.R.H.S., 1, Cadogan-place, S.W.	5	5	0	10	0
Mr. T. JONES, Gr. Petworth House, Sussex	5	5	0	—	
Mr. T. JONES, Gr. Platt Cottage, Rusholme, Manchester	1	1	0	—	

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Mr. Thomas Jones, Whalley Range, Manchester	5	5	0	—	
Mr. J. J. Jones, Rossett, Chester	1	1	0	—	
Mr. Henry Joyce, Gr. Buckhurst-park, Tunbridge Wells	1	1	0	—	
Mr. Daniel Judd, Gr. Hawkstone, Shrewsbury	1	1	0	—	
Mr. Duncan J. Kay, High Leighs, Hoddesdon	10	10	0	—	
Mr. W. B. Kellock, Stamford-hill, N.	5	5	0	—	
Mr. John Kelk, M.P., F.R.H.S., Stanmore, N.W.	10	10	0	—	
Rev. C. Kemble, F.R.H.S., Vellore, Bath	10	10	0	—	
Mr. W. Kemp, Gr. Albury Park, Surrey	1	1	0	—	
Mr. W. Kemp, Gr. Heybridge, near Maldon	1	1	0	—	
Mr. E. Kemp, The Park, Birkenhead	10	10	0	—	
Mr. J. Kennard, Swan-place, Old Kent-road, S.E.	1	1	0	—	
Mr. H. B. Kent, F.R.H.S, 5, Gloucester-road, W.	1	1	0	—	
Mr. W. Kershaw, Suffolk Lodge, Brixton-road, S.	5	5	0	—	
Mr. John Keynes, F.R.H.S., Salisbury	10	10	0	—	
Mr. C. Keyser, The Warren House, Stanmore, N.W.	5	5	0	—	
Mr. James Kidston, Newton House, Glasgow	5	5	0	—	
Mr. Frederick Kinahan, Elmwood, Belfast	1	1	0	—	
Mrs. Charlotte King, F.R.H.S., 89, Eaton-square, S.W.	1	1	0	—	
Mr. F. R. Kinghorn, Richmond, S.W.	5	5	0	—	
Mr. T. E. Kitchener, Rugby	1	1	0	—	
Mr. John Knight, Private Gardens, Hampton Court	2	2	0	—	
Mr. H. Knight, Jardinier-en-Chef, Château de Pont Chaltrait	2	2	0	—	
Mr. G. Knowles, Bradford	1	1	0	—	
Mr. H. Kopke, F.R.H.S., Clifton House, Herne-hill, S.	10	10	0	—	
Mr. Henry Lainson, F.R.H.S., Heath House, Reigate	5	5	0	—	
Mr. John Lamont, Edinburgh	2	2	0	—	
Mr. B. Lancaster, F.R.H.S., 1, Princes-gardens, W.	5	5	0	—	
Mr. John Lancaster, West End, Southampton	5	5	0	—	
Messrs. H. Lane & Son, Great Berkhamstead	10	10	0	—	
Mr. W. H. Gore Langton, F.R.H.S., 2, Prince's-gate, S.W.	10	10	0	—	
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Mr. J. Sutherland Law, F.R.H.S., Oriental Club, W.	5	5	0	—	
Messrs. Peter Lawson & Sons, Edinburgh and London	21	0	0	50	0
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Mr. J. W. Lay, F.R.H.S., 8, Savage-gardens, E.C.	5	5	0	—	
Mr. C. Layton, Stoke, Coventry	1	1	0	—	
Mr. C. Leach, F.R.H.S., Clapham-park, S.	10	10	0	—	
Mr. W. Leask, F.R.H.S., 48, Queen's-gate, W.	5	5	0	—	
Mr. J. S. Leather, 19, Carlton-house-terrace, S.W.	5	5	0	—	
Mr. Le Breton, 21, Sussex-place, Regent's-park, N.W.	1	1	0	—	
Mrs. Le Breton, 21, Sussex-place, Regent's-park, N.W.	1	1	0	—	
Mr. A. Lee, Gr. Kimberley Hall, Wymondham.	2	2	0	—	
Mr. John Lee, F.R.H.S., Hammersmith, W.	10	10	0	50	0
Mr. Charles Lee, F.R.H.S., Hammersmith, W.	10	10	0	50	0
Mr. W. Lee, Gr. Baldersby Park, Thirsk	1	1	0	—	
The Lady Caroline Legge, F.R.H.S., Forest Lodge, Bromley	1	1	0	—	
Mr. H. Leith, Palmerscross, Elgin, N.B.	1	1	0	—	
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Mr. J. H. Lermitte, F.R.H.S., Knightons, Finchley, N.	10	10	0	—	
Mr. A. J. Lewis, Mornay Lodge, Kensington, W.	5	5	0	—	
The Lord Lindsay, Haigh Hall, Wigan	10	10	0	—	
Mr. T. M. Lindsay, Gr. West Shandon, Dumbarton	2	2	0	—	
Mr. A. Lindsay, Gr. Ditton Park, Slough	0	10	6	—	

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Mr. W. Loader, Gr. Blaize Castle, Henbury	1	1	0	..	—	
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Mr. James Lodge, Aubrey House, Reading	1	1	0	..	—	
Mr. F. Longdon, Quorndon, Derby	1	1	0	..	—	
Mr. G. Lovejoy, Reading	1	1	0	..	—	
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Mr. E. J. Lowe, F.L.S., Highfield, Nottingham	5	5	0	..	—	
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Mr. P. Loye, Mannamead, Plymouth	3	3	0	..	—	
Mr. W. J. Lucking, F.R.H.S., Willesden, N.W.	10	10	0	..	50	0
Mr. J. T. Ludlam, F.R.H.S., New-road, Hammersmith, W.	—			..	5	0
Mr. D. Lumsden, Gr. Bloxholm Hall, Sleaford	2	2	0	..	5	0
Mr. Thomas Lunt, Gr. Ardgowan, Greenock	1	1	0	..	—	
The Lord Lurgan, Lurgan, Belfast	5	5	0	..	—	
Mr. Wm. Lynn, Gr. Hedsor, Maidenhead	1	1	0	..	—	
Mr. J. Lyon, Gr. Coleby, Lincoln	1	1	0	..	—	
Mr. J. Mann, F.R.H.S., Brentwood	5	5	0	..	—	
Mr. P. McArthur, F.R.H.S., Maida-hill, W.	2	2	0	..	—	
Mr. J. Robinson M'Clean, F.R.H.S., 2, Park-st., Westminster	10	10	0	..	20	0
Mr. C. McDonald, Gr. Woodstock Park, Innistiogue	2	2	0	..	—	
Mr. D. McDonald, Gr. Easton Hall, Grantham	1	1	0	..	—	
Mr. Duncan McEwen, 24, London-road, Brighton	2	2	0	..	—	
Mr. F. McGedy, Montague Villa, Surbiton, S.W.	2	2	0	..	—	
Mrs. MacGuffie, 95, Gloucester-terrace, Hyde Park	5	5	0	..	—	
Mr. Charles McGarel, F.R.H.S., 2, Belgrave-square, S.W.	5	5	0	..	30	0
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Mr. J. B. Mackay, Totteridge Green, N.	5	5	0	..	—	
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Mr. J. Mackintosh, F.R.H.S., The Lodge, Totteridge	10	10	0	..	—	
Mr. K. Stewart Mackenzie of Seaforth	5	0	0	..	—	
Mr. A. McKenzie, Alexandra-park, N.	10	10	0	..	—	
Mr. W. McKenzie, 34, Dawson-street, Dublin	—			..	5	0
Mr. J. Maclean, Gr. Donnington Park, Derby	1	1	0	..	—	
Mr. D. McLellan, Superintendent of Public Parks, Glasgow	1	1	0	..	—	
Mr. E. M'Morland, F.R.H.S., 32, St. Paul's Churchyard, E.C.	10	10	0	..	—	
Mr. Robert McMorland, 32, St. Paul's Churchyard, E.C.	10	10	0	..	—	
Mr. J. McLean, Gr. Elvedon Hall, Thetford	2	2	0	..	—	
Mr. N. Macleod, Dalvey, near Forres, N.B.	5	5	0	..	—	
The Lady Macarthur, F.R.H.S., 27, Princes-gardens, W.	5	5	0	..	—	
Mr. W. Macfarlane, Saracen Foundry, Glasgow	1	1	0	..	—	
Mr. J. H. Machu, F.R.H.S., Oakfield Lodge, Tulse Hill, S.	10	10	0	..	—	
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Mr. Malcolm, Gr. Cholmondeley Castle, Nantwich	1	1	0	..	—	
Mr. W. Manning, Gr. Tingrith House, Woburn	5	5	0	..	—	
The Earl Manvers, F.R.H.S., 6, Tilney-street, Park-lane, W.	10	10	0	..	—	
Mr. T. C. March, St. James's Palace, S.W.	2	2	0	..	—	
Mrs. C. Markham, 21, Eccleston-square, S.W.	1	1	0	..	—	
The Duke of Marlborough, F.R.H.S., 10, St. James'-sq., S.W.	10	10	0	..	—	
Mr. R. Marnock, St. John's-terrace, N.W.	10	10	0	..	50	0

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Mr. J. MARSON, Northfield, Warrington	8	8	0	—	
Miss M. A. MARTIN, Milton House, Eaton-square, S.W.	1	1	0	—	
Mr. E. M. MARTIN, 20, Queen's-gate W.	2	2	0	—	
Dr. MAXWELL T. MASTERS, F.L.S., Spring Grove, W.	10	10	0	50	0
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Mrs. MATHESON, of Ardross, F.R.H.S., 38, South-street, W.	5	5	0	—	
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Mr. H. MATTERSON, Ford-street, Coventry	1	1	0	—	
Mr. M. MATTHIESON, Gr. Burghley Park, Stamford	1	1	0	—	
Mr. A. MAULT, Stoke Green, Coventry	1	1	0	—	
Mr. D. MAURIGY, F.R.H.S., 1, Regent-street, S.W.	10	10	0	—	
Mr. J. P. MAXWELL, Gr. Exton Park, Oakham	1	1	0	—	
Mr. H. MAY, Hope Nursery, Bedale	1	1	0	—	
Mr. T. MAY, Orford House, Warrington	1	1	0	—	
Mr. J. MAYNARD, F.R.H.S., 52, Westbourne-terrace, W.	5	5	0	—	
Mr. P. MAZE, F.R.B.S., 12, Portland-place, W.	10	10	0	—	
Mr. W. MELVILLE, Gr. Dalmeny Park, Cramond, N.B.	1	1	0	—	
Mr. S. MENDEL, F.R.H.S., Manley Hall, Manchester	10	10	0	50	0
Mr. W. MERCER, F.R.H.S., Grove House, Staplehurst	5	5	0	—	
Mr. J. MEREDITH, The Vineyard, Garston, Liverpool	10	10	0	—	
Mr. J. F. MESTON, 7, Fortess-terrace West, N.W.	5	5	0	—	
Mr. O. F. MEYRICK, 16, Clifford-street, W.	10	10	0	—	
Mr. H. L. MICHOLLS, F.R.H.S., Bowdon, Manchester	10	10	0	50	0
Adm. Sir G. N. BROKE MIDDLETON, Bart., F.R.H.S., Shrubland	10	10	0	—	
Mr. J. MIERS, F.R.S., 84, Addison-road, Kensington, W.	5	5	0	—	
Mr. T. MILAN, Baxtergate, Doncaster	1	1	0	—	
Mr. J. MILBURN, Albion Foundry, Hollingworth, Hadfield	1	1	0	—	
Mr. E. ST. JOHN MILDMAY, F.R.H.S., 2, Wilton-crescent, S.W.	5	5	0	—	
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Mr. JOHN MILLER, Manor Gardens, Worksop	1	1	0	—	
Mr. W. MILLER, Gr. Combe Abbey, Coventry	2	2	0	—	
Mr. J. MILLIGAN, 15, Northumberland-street, W.C.	3	3	0	—	
Mr. CHARLES MILLS, Hillingdon, Uxbridge	10	10	0	—	
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Mr. JOHN MONRO, Osborn Park Nursery, Barnet, N.	2	2	0	—	
Mrs. MONTGOMERY, Pole Hill Lodge, Uxbridge	2	2	0	—	
Miss MONTGOMERY, Pole Hill Lodge, Uxbridge	2	2	0	—	
Mr. W. MOON, Coventry	1	1	0	—	
Dr. DAVID MOORE, F.L.S., Glasnevin, Dublin	5	5	0	—	
Mr. THOMAS MOORE, F.L.S., Chelsea, S.W.	10	10	0	50	0
Mr. H. MOORE, Doncaster	2	2	0	—	
Mr. W. MOORE, Gr. Alton Towers, Cheadle, Staffordshire	2	2	0	—	
Mr. THOS. MOORHOUSE, Gr. Shrewbridge Hall, Nantwich	1	1	0	—	
Sir C. MORDAUNT, Bart, M.P., Walton, Warwick	5	5	0	—	
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Mr. R. NELSON, Gr. Stourton Hall, Horncastle	1	1	0	..	—	
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Mr. H. O. NETHERCOTE, F.R.H.S., Moulton Grange, Northampt.	5	5	0	..	—	
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Mr. R. S. NEWALL, 121, Langham Hotel, W.	3	3	0	..	—	
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Mr. G. NEWARK, Coventry	1	1	0	..	—	
Rev. W. W. NEWBOLD, 2, Heathfield-terrace, Turnham-green, W.	1	1	0	..	—	
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Mr. W. NEWTON, Newark-on-Trent	1	1	0	..	—	
Mrs. W. NEWTON, Newark-on-Trent	1	1	0	..	—	
Mr. R. NISBET, Gr. Aswarby Park, Folkingham	1	1	0	..	—	
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Mr. J. NOCKOLES, Sleaford	1	1	0	..	—	
Rev. C. F. NORMAN, F.R.H.S., 35, Prince's-gardens, W. . .	5	5	0	..	—	
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Major R. N. NORTH, 20, King-street, St. James's, S.W. . .	2	2	0	..	—	
Mr. JOHN NUNN, F.R.H.S., 23, Euston-square, N.W. . . .	5	5	0	..	10	10
Mr. C. NUTT, Coventry	1	1	0	..	—	
Messrs. NUTTING & SONS, 60, Barbican, City, E.C. . . .	10	10	0	..	—	
Mr. J. S. OATES, Floral Villa, Hanwell	1	1	0	..	—	
Mr. RICHARD OLIVERSON, F.R.H.S., 37, Gloucester-square, W. .	10	10	0	..	—	
Mr. E. H. B. ORD, 18, Abbey-place, St. John's-wood, N.W. .	2	2	0	..	—	
Mr. H. ORMSON, F.R.H.S., Chelsea, S.W.	10	10	0	..	50	0
Mr. GEO. OSBORNE, Kay's Nursery, Finchley, N..	1	1	0	..	—	

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Mr. Thomas Osborn, F.R.H.S., Fulham, S.W.	10	10	0		
Mr. Osman, Gr. Stanmore Hall, N.W.	1	1	0	—	
Mr. William Owen, Sleaford	1	1	0	—	
The Bishop of Oxford, F.R.S., F.R.H.S.	—			5	0
Mr. E. H. Palmer, F.R.H.S., Canon Hill, Maidenhead	10	10	0	—	
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Mr. W. J. Palmer, Reading	10	10	0	—	
Sir H. W. Parker, Stawell House, Richmond, S.W.	1	1	0	—	
The Lady Parker, Stawell House, Richmond, S.W.	1	1	0	—	
Mr. R. Parker, Tooting, S.	5	5	0	—	
Mr. A. Parsons, Gr. Danesbury, Welwyn	5	5	0	—	
Dr. C. H. Parsons, Shilton, near Coventry	1	1	0	—	
Mr. John Parsons, Ranelagh Gardens, Leamington	1	1	0	—	
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Mr. William Paul, F.R H.S., Waltham Cross, N.	10	10	0	50	0
Messrs. Paul & Son, Cheshunt, N,	10	10	0	—	
Mr. Thomas Peake, F.R.H.S., Stoke-upon-Trent	10	10	0	50	0
Rev. Beauchamp W. Pearce, Ascot	1	1	0	—	
Mr. H. Pease, Pierremont, Darlington	5	5	0	—	
Mr. Joseph Pease, F.R.H.S., Darlington	10	10	0	—	
Mr. John Peel, Gr. Cambridge House, Twickenham	1	1	0	—	
Mr. J. Pender, Crumsall House, Manchester	10	10	0	—	
Mr. Charles Penford, Gr. Longford Castle, Salisbury	1	1	0	—	
Mr. T. Perkin, Gr. Warren House, Stanmore, N.W.	1	1	0	—	
Messrs. H. Perkins & Sons, Park Nursery, Coventry	1	1	0	—	
Mr. J. Perkins, Market-square, Northampton	5	5	0	—	
Mr. I. Perry, Shrublands, Chelmsford	2	2	0	—	
Mr. C. J. Perry, Castle Bromwich, Birmingham	2	2	0	—	
Mr. Peter J. Perry, Banbury, Oxon	3	3	0	—	
Mr. J. R. Petch, Gr. Endcliffe Hall, Sheffield	3	3	0	—	
Mr. Mark Philips, F.R.H.S., Snitterfield, Stratford-on-Avon	5	5	0	—	
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Mr. A. B. Philp, The Limes, Crouch Hill, N.	10	10	0	—	
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Mr. J. S. Pidgeon, 13, Pembridge-villas, W.	10	10	0	—	
Dr. G. W. Septimus Piesse, F.R.H.S., Chiswick, W.	10	10	0	—	
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Mr. E. P. Pillinger, Nursery, Chepstow	1	1	0	—	
Mr. W. M. Pillinger, Nursery, Chepstow	1	1	0	—	
Dr. Playne, Maidenhead	1	1	0	—	
The Lord Chief Baron Pollock, F.R.S., F.R.H.S., Hatton, W.	5	5	0	—	
Miss A. Porter, F.R.H.S., Burlingham, near Pershore	10	10	0	—	
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Mr. J. Pottle, Gr. Bealing's Grove, Woodbridge, Suffolk	1	1	0	1	1
The Viscount Powerscourt, Enniskerry, Ireland	10	10	0	—	
Mr. B. M. Power, F.R.H.S., 19, Chesham-street, S.W.	5	5	0	—	
The Hon. L. W. H. Powys, Bewsey Hall, Warrington	5	5	0	—	
Mr. T. H. A. Poynder, F.R.H.S., 21, Upper Brook street, W.	10	10	0	—	
Mrs. T. H. A. Poynder, F.R.H.S., 21, Upper Brook-street, W	5	5	0	—	
Mr. Robert H. Poynter, Castle Green, Taunton	1	1	0	10	10

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Mr. W. F. PRIDMORE, Stivichall, Coventry	1	1	0	..	—	
Dr. R. C. A. PRIOR, F.L.S., Halse House, Taunton	5	5	0	..	—	
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Rev. W. F. RADCLYFFE, Blandford, Dorset	5	5	0	..	—	
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Captain F. RAMSDEN, R.A., Hexthorpe, Doncaster	1	1	0	..	—	
Mrs. F. RAMSDEN, Hexthorpe, Doncaster	1	1	0	..	—	
Mr. F. RAMSDEN, 32, Half Moon-street, W.	1	1	0	..	—	
Mr. A. RANDALL, Foley House, Maidstone	10	10	0	..	—	
Mr. C. RATCLIFF, F.R.H.S., Wyddrington, Edgbaston	10	10	0	..	50	0
Mr. W. RATLIFF, Coventry	1	1	0	..	—	
Mr. Under-Sheriff RAWLINS, 29, Coleman-street, E.C.	10	10	0	..	—	
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Mr. T. ROBY, Gr. Middleton Park, Bicester	1	1	0	..	2	2
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Mr. J. RYLANDS, J.P., Oxford House, Warrington	1	1	0	—	
Mr. P. RYLANDS, J.P., Bewsey House, Warrington	1	1	0	—	
Mr. T. G. RYLANDS, F.L.S., F.G.S., Heath House, Warrington	1	1	0	—	
Mr. E. SAGE, Gr. Gopsall Hall, Atherstone	1	1	0	—	
Mr. GEORGE SAGE, Gr. Ashridge Park, Berkhamstead	1	1	0	—	
Mr. EDWARD SALT, Saltaire, Leeds	10	10	0	—	
Mr. TITUS SALT, Saltaire, Leeds	5	5	0	—	
Mr. JOHN SALTER, F.R.H.S., Hammersmith, W.	10	10	0	—	
Messrs. SALTMARSH & SON, Chelmsford	5	5	0	—	
Mr. T. G. SAMBROOKE, F.R.H.S., 32, Eaton-place, S.W.	10	10	0	—	
Mr. G. G. SANDEMAN, 15, Hyde-park-gardens, W.	10	10	0	—	
Mr. G. SANDARS, F.R.H.S., 27, Sussex-square, W.	10	10	0	—	
Mr. A. SANDERS, Gr. Theobald's Park, Herts	5	5	0	—	
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Mr. A. SAUL, Gr. Castle-hill, South Molton	1	1	0	—	
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Mr. G. C. SCHWABE, Broughton, Liverpool	10	10	0	50	0
Mr. A. SCOTT, Northgate Nursery, Chichester	2	2	0	—	
Lieut.-Col. H. Y. D. SCOTT, R.E., Secretary R.H.S., Ealing, W.	2	2	0	—	
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Dr. BERTHOLD SEEMANN, F.L.S., Windsor-road, N.	5	5	0	—	
Mr. ALEX. SHANK, F.R.H.S., 43, Wilton-crescent, S.W.	5	5	0	—	
Mr. R. SHARPE, Bristol Arms, Sleaford	1	1	0	—	
Mr. JOHN SHAW, F.R.H.S., Nurseryman, Manchester	5	5	0	50	0
Dr. SHEFFIELD, Doncaster		—		3	3
The Lady COTTON SHEPPARD, F.R.H.S., Crakemarsh Hall	10	10	0	—	
Mr. J. SHEPPARD, Bedford	1	1	0	—	
Mrs. SHILLINGFORD, F.R.H.S., Clapham-park, S.	5	5	0	—	
Mr. JULIUS SICHEL, Timperley, Manchester	10	10	0	—	
Mr. S. W. SILVER, F.R.H.S., Norwood Lodge, S.	10	10	0	50	0
Mr. W. B. SIMONDS, M.P., 18, Sussex-place, N.W.	10	10	0	—	
Miss SIMMONS, 21, Sussex-place, Regent's-park, N.W.	1	1	0	—	
Mr. E. SIMPSON, Gr. Wrottesley, Wolverhampton	1	1	0	—	
Mr. T. B. SIMPSON, Boltons, West Brompton, S.W.	10	10	0	—	
Mr. R. J. SISSON, jun., Carlton Club, S.W.	2	2	0	—	
Mr. J. SKENE, Gr. Garswood, Newton-le-Willows	1	1	0	—	

	Donations. £	s.	d.		Guaranteed. £	s.
Mr. C. B. SKINNER, F.R.H.S., Came House, Dorchester	10	10	0	..	50	0
Mr. G. URE SKINNER, F.R.H.S., Great Malvern	10	10	0	..	50	0
Mr. W. H. SKYNNER, F.R.H.S., 7, Cavendish-pl., Cavendish-sq., W.	5	5	0	..	—	
Mrs. ST. BARBE SLADEN, F.R.H.S., 39D, Onslow-square, S.W.	5	5	0	..	—	
Mr. S. SMALLEY, Gr. Norton Hall, Daventry	1	1	0	..	—	
Messrs. G. SMALL & SON, Ilkeston, Derbyshire	2	2	0	..	—	
Mr. CHARLES SMITH, Buchanan-street, Glasgow	3	3	0	..	—	
Messrs. F. & A. SMITH, Dulwich, S.	5	5	0	..	—	
Capt. H. SMITH, The Park, Nottingham	5	5	0	..	—	
Mr. GEORGE SMITH, Hornsey-road, N.	5	5	0	..	—	
Mr. G. SMITH, Gr. Vice-Regal Lodge, Phœnix Park, Dublin	1	1	0	..	—	
Mrs. G. SMITH, 2, Adelaide-terrace, Exmouth	1	1	0	..	—	
Mr. JAMES SMITH, Gr. High Elms, Farnborough, Kent	1	1	0	..	—	
Mr. JOHN SMITH, Holland House, Hornsey, N.	10	10	0	..	—	
Mr. J. SMITH, F.R.H.S., Tudor House, Camberwell, S.	2	2	0	..	—	
Mr. J. L. SMITH, 5, Sidney-street, Brompton, S.W.	1	1	0	..	—	
Mr. J. S. SMITH, F.R.H.S., Sidney Lodge, Wimbledon, S.W.	5	5	0	..	—	
Mr. RICHARD SMITH, F.R.H.S., Worcester	10	10	0	..	—	
Mr. W. B. SMITH, F.R.H.S., 28, King-street, Cheapside, E.C.	5	5	0	..	—	
Mr. S. SMITH, Gr. Portnal Park, Staines	1	1	0	..	—	
Mr. ALEX. SMOLLETT, Cameron House, Dumbarton, N.B.	1	1	0	..	—	
Mr. HY. SNOOK, Belmont Castle, Havant, Hants	5	5	0	..	—	
Mr. S. SNOW, Gr. Wrest Park, Silsoe	10	10	0	..	—	
Mr. J. D. SNOWDON, Sprotborough, Doncaster	1	1	0	..	—	
Mr. H. SODEN, Quadrant, Coventry	1	1	0	..	—	
Mr. T. SODEN, Quadrant, Coventry	1	1	0	..	—	
Mrs. SOMES, F.R.H.S., 17, Queen's-gate-terrace, W.	1	1	0	..	—	
Mr. W. M. SPARROW, Wolverhampton	4	4	0	..	—	
Mr. EDWD. SPARY, F.R.H.S., Queen's Graperies, Brighton	5	5	0	..	—	
Mr. THOS. SPEED, Gr. Berry Hill, Mansfield	1	1	0	..	—	
Mr. W. SPEED, Gr. Penrhyn Castle, Bangor	1	1	0	..	—	
Mr. D. SPENCER, Coventry	1	1	0	..	—	
Mr. H. SPENCER, Coventry	1	1	0	..	—	
Mr. W. SPENCER, Coventry	1	1	0	..	—	
Mr. A. SPERLING, Lattenbury Hill, St. Ive's	2	2	0	..	—	
Mr. HENRY SPICER, 68, Upper Thames-street, E.C.	10	10	0	..	50	0
Mr. JAMES SPICER, Harts, Woodford, N.E.	10	10	0	..	—	
Mr. W. R. SPICER, 68, Upper Thames-street, E.C.	10	10	0	..	50	0
Mr. C. E. STAHL, F.R.H.S., Lansdowne-ter., W. Brompton, S.W.	10	10	0	..	—	
Rev. T. STANIFORTH, F.R.H.S., Storrs Hall, Windermere	5	5	0	..	—	
Mr. J. STANTON, Gr. Biddulph Grange, Congleton	1	1	0	..	—	
Mr. JOHN STANDISH, F.R.H.S., Ascot	10	10	0	..	50	0
Mr. S. STAFFORD, Hyde, near Manchester	2	2	0	..	—	
Messrs. A. STANSFIELD & SONS, Todmorden, Lancashire	5	5	0	..	10	10
Mr. CHARLES STEAD, Saltaire, Leeds	10	10	0	..	—	
Mr. WILLIAM STEAD, Bradford	2	2	0	..	—	
Mr. J. C. STEVENS, 38, King-street, W.C.	10	10	0	..	—	
Mr. S. STEVENS, F.L.S., 24, Bloomsbury-street, W.C.	5	5	0	..	—	
Mr. Z. STEVENS, Gr. Trentham		—		..	10	10
Mr. J. STEVENSON, Gr. Cobham Park, Surrey	1	1	0	..	—	
Mrs. J. STEVENSON, Cobham Park, Surrey	1	1	0	..	—	
Mr. HENRY STEWARD, York	2	2	0	..	—	
Rev. G. W. ST. JOHN, Rectory, Woodstock, Oxon	2	2	0	..	—	
Mr. W. H. STONE, M.P., Dulwich Hill, S.		—		..	25	0
Mr. C. W. STRICKLAND, F.R.H.S., Whitby	5	5	0	..	—	

	Donations. £	s.	d.	Guaranteed. £	s.
Messrs. STUART & MEIN, Kelso	5	5	0	—	
Mr. E. STUDD, Hollaton Hall, Leicestershire	5	5	0	—	
Messrs. SUTTON & SONS, Reading	10	10	0	50	0
Rev. C. L. SWAINSON, Crick Rectory, Rugby	1	1	0	—	
Mr. G. TABER, Rivenhall, Witham	5	5	0	—	
The Hon. Mrs. J. C. TALBOT, F.R.H.S., New Falconhurst	5	5	0	—	
Mr. J. R. TANTON, Nurseryman, Epsom	10	10	0	—	
Mr. JAMES TAPLIN, Gr. Chatsworth, Chesterfield	3	3	0	2	0
Lady TAYLOR, F.R.H.S., 3, Clarendon-pl., Hyde-park-grdns., W.	2	2	0	—	
Mr. J. E. TAYLOR, Platt Cottage, Rusholme, Manchester	10	10	0	—	
Mr. J. W. TAYLOR, F.R.H.S., River House, Woodberry Down, N.	5	5	0	—	
Mr. R. P. TAYLOR, 4, Adelaide-place, London Bridge, E.C.	2	2	0	—	
Mr. S. TAYLOR, Gr. Brodsworth Hall, Doncaster	1	1	0	—	
Mr. THOMAS TAYLOR, F.R.H.S., 16, Brompton Crescent, S.W.	1	1	0	5	0
Mr. A. TAYLOR, Gr. Temple Newsame, Leeds	2	2	0	—	
Dr. TAYLOR, 9, Friar-gate, Derby	1	1	0	—	
Mrs. TAYLOR, 9, Friar-gate, Derby	1	1	0	—	
Mr. W. TAYLOR, Gr. Lauderdale House, Highgate, N.	1	1	0	—	
Mr. J. TEGG, Gr. Clumber, Notts.	1	1	0	—	
Mr. C. TELFORD, F.R.H.S., Widmore Lodge, Bromley	10	10	0	50	0
Mr. W. TERRELL, South Mead, Westbury-on-Trym	1	1	0	—	
Mrs. W. TERRELL, South Mead, Westbury-on-Trym	1	1	0	—	
Mr. W. TERRY, F.R.H.S., Peterboro' House, Fulham, S.W.	5	5	0	—	
Mr. F. W. TETLEY, Foxhill, Weetwood, Leeds	5	5	0	—	
Mr. J. L. THACKERAY, Nottingham	5	5	0	—	
Mr. SHAW THEWLIS, Mayor of Warrington	1	1	0	—	
Mr. JOSEPH THOMPSON, F.R.H.S., Beech Grove, Bowden	10	10	0	—	
Mr. J. THOMPSON, Gr. Preston Towers, Northumberland	0	10	0	—	
Messrs. J. THOMPSON & SON, Doncaster	1	1	0	—	
Mr. MATTHEW W. THOMPSON, Bradford	10	10	0	—	
Mr. W. THOMPSON, Tavern-street, Ipswich	1	1	0	—	
Dr. WYVILLE THOMPSON, Sydenham, Belfast	3	3	0	—	
Mr. D. THOMSON, Gr. Archerfield, Drem, N.B.	2	2	0	—	
Mr. G. THOMSON, Gr. Stansted Park, Emsworth	10	10	0	—	
Mr. W. THOMSON, Gr. Dalkeith Park, N.B.	5	5	0	—	
Major THORNICROFT, Alexandra Hotel, S.W.	2	2	0	—	
Mr. E. THORNTON, F.R.H.S., 11, Princes-street, Hanover-square, W.	3	3	0	—	
Mr. JAMES THROWER, Gr. High Cannons, Barnet, N.	2	2	0	—	
Mr. J. TICEHURST, Gr. Dynevor Castle, Carmarthen	1	1	0	—	
Col. Rt. Hon. W. F. TIGHE, F.R.H.S., Woodstock, Innistiogue	5	5	0	—	
Mr. W. TILLERY, F.R.H.S., Gr. Welbeck	2	2	0	—	
Mr. G. TILLYARD, F.R.H.S., Gr. Brocklesby Park, Ulceby	2	2	0	3	3
Mr. JOHN A. TINNÉ F.R.H.S., Aigburth, Liverpool	5	5	0	—	
Mr. WILLIAM TITE, M.P., 42, Lowndes-square, S.W.	10	10	0	—	
Mr. DAVID TOD, Partick, Glasgow	3	3	0	—	
Mr. G. TOLL, Gr. Pendelbury, Manchester	1	1	0	—	
Mr. J. TOMKINSON, High-street, Coventry	1	1	0	—	
Mr. W. TOMLINE, F.R.H.S., 5, Whitehall-yard, S.W.	5	5	0	—	
Mr. T. W. TOMLINSON, Leamington	10	10	0	—	
Mr. ANDREW TOWARD, C.M. R.H.S., Gr. Osborne House	5	5	0	—	
Mr. C. TOWNELEY, F.R.H.S., Towneley, Burnley	10	10	0	—	
Mr. M. TREHERNE, M.P., 10, Stratford-place, W.	5	5	0	—	
Mr. JOHN TROTTER, Gr. Badminton, Chippenham	1	1	0	—	
Mr. N. TROUGHTON, Coventry	1	1	0	—	
Mr. FRANCIS WYATT TRUSCOTT, 5, Park Crescent, N.W.	10	10	0	—	

	Donations.			Guaranteed.	
	£	s.	d.	£	s.
Mr. Robert Turnbull, Gr. Blenheim Palace, Oxon	5	5	0	—	
Mr. A. Turner, Bowbridge, Leicester	10	10	0	50	0
Mr. Charles Turner, F.R.H.S., Slough	10	10	0	—	
Mr. J. B. Twist, Stoke House, Coventry	1	1	0	—	
Sir James Tyler, F.R.H.S., Pine House, Holloway, N.	10	10	0	50	0
Capt. George Tyrrell, R.N., F.R.H.S., Fordhook, Ealing, W.	5	5	0	—	
Mr. G. Tranter, Gr. Westbrook, Hemel Hempstead	1	1	0	—	
Mr. J. Unite, 18, St. Alban's-place, Edgeware-road, W.	25	0	0	—	
Mr. W. Valentine, White Abbey, Belfast	10	10	0	—	
The Earl Vane, F.R.H.S., Holdernesse House, Park-lane, W.	10	10	0	—	
Mr. Veitch, F.R.H.S., Chelsea, S.W.	10	10	0	50	0
Mr. John G. Veitch, F.R.H.S., Chelsea, S.W.	10	10	0		
Mr. Harry J. Veitch, F.R.H.S., Chelsea, S.W.	10	10	0	50	0
Mr. R. T. Veitch, 54, High-street, Exeter	5	5	0	—	
Mrs. Verelst, F.R.H.S., 59, Gloucester-place, W.	5	5	0	—	
Mr. R. H. Vertegans, Edgbaston, Birmingham	10	10	0	—	
Dr. E. H. Vinen, F.L.S., 6, Chepstow-villas West, Bayswater	2	2	0	—	
Mrs. Vivian, 11, Upper Grosvenor-street, W.	3	3	0	—	
Messrs. Waite, Burnell, & Co., 181, High Holborn, W.C.	10	10	0	—	
Mr. E. C. Walker, Lead Works, Chester	3	3	0	—	
Capt. W. H. Walker, F.R.H.S., 103, Gloucester-terrace, W.	10	10	0	—	
Mr. Walker, Doncaster	0	10	6	—	
Mr. John Wallis, Gr. Astle Park, Congleton	1	1	0	—	
Mr. J. Walters, 1, Normanton-terrace, Derby	1	1	0	—	
Mr. C. Walton, Nurseryman, Lymington	1	1	0	—	
Mr. C. Walton, F.R.H.S., Manor House, East Acton, W.	1	1	0	—	
Capt. Waring, Waringstown, Belfast	2	2	0	—	
Mr. Robert Warner, F.R.H.S., Broomfield, Chelmsford	10	10	0	50	0
Mr. Charles N. Warre, F.R.H.S., Hendon Hall, N.W.	5	5	0	—	
Mr. Frank Warwick, Nurseryman, Sleaford	1	1	0	—	
Messrs. Waterer & Godfrey, Knaphill, Woking	10	10	0	—	
Mr. H. Watkinson, Market-place, Manchester	2	2	0	—	
Sir J. Watts, F.R.H.S., Abney Hall, Cheadle	5	5	0	—	
Mr. W. Watts, 9, Motcomb-street, S.W.	2	2	0	—	
Mr. W. F. Watson, Isleworth, W.	2	2	0	—	
Mr. W. J. Watson, Fenham, Newcastle-on-Tyne	1	1	0	—	
Mr. John Weatherston, Presteign, Radnorshire	1	1	0	—	
Mr. Thomas Weaver, 5, St. Swithin's-street, Winchester	1	1	0	—	
Mrs. S. Webb, F.R.H.S., 11, Grafton-street, Bond-street	5	5	0	25	0
Mr. W. F. Webb, Newstead Abbey, Nottingham	5	5	0	—	
Mr. Fred. W. Webb, Claughton Village, Birkenhead	2	2	0	—	
Mr. R. Webb, Gr. Kingsweston House, Bristol	1	1	0	—	
Mrs. M. Webber & Co., Covent Garden, W.C.	5	5	0	—	
Mr. John Webster, Gr. Gordon Castle, N.B.	5	5	0	—	
Mr. J. Kemp Welch, F.R.H.S., Cavendish-road, Clapham, S.	10	10	0	—	
Mr. H. C. Wells, Broomfield Lodge, Chelmsford	10	10	0	—	
Mr. C. T. Wells, 24, Bouverie-street, E.C.	2	2	0	—	
Mr. H. Westcar, F.R.H.S., Burwood Cottage, Esher	3	3	0	—	
Mr. G. Westland, Gr. Kingston Hall, Derby	1	1	0	—	
Mr. George Weston, Sleaford	1	1	0	—	
Mrs. Sam. Wheeler, F.R.H.S., Barrow Hills, Chertsey	5	5	0	—	
Sir Thomas Whichcote, Bart., Aswarby Park, Folkingham	10	10	0	—	
Mr. W. Whitaker, Gr. Crewe Hall, Crewe	1	1	0	—	
Mr. G. F. White, F.R.H.S., West-hill, Wandsworth, S.W.	10	10	0	—	
Mr. James White, Arrtown, Dumbarton, N B	2	2	0	—	

	Donations. £	s.	d.	Guaranteed. £	s.
Mr. John White, Arddarroch, Dumbarton	5	0	0	—	
Mr. Lynch White, Upper Ground-street, S.	5	5	0	—	
Mr. J. B. Whiting, C.M.R.H.S., Gr. The Deepdene, Dorking	1	1	0	2	0
Mr. James S. Whittem, Wallgrave, Coventry	1	1	0	—	
Mr. J. Widdowson, Gr. Chorleywood, Rickmansworth	1	1	0	—	
Dr. Robert Wight, F.R.S., Grazely Lodge, Reading	5	5	0	—	
Mr. J. Wighton, Cossey Park, Norwich	1	0	0	—	
Mrs. Wilbraham, Pare Hall, Lawton	1	1	0	—	
Mr. T. F. Wilding, F.R.H.S., 2, Chesterfield-street, W.C.	10	10	0	50	0
Mr. W. Wilkie, Whitefields, Phœnix Park, Dublin	2	0	0	—	
Miss Wilkinson, The Priory, Conisbrough, Rotherham	1	1	0	—	
Mr. Samuel Wilkinson, Sleaford	1	1	0	—	
Mr. B. S. Williams, F.R.H.S., Holloway, N.	10	10	0	50	0
Mr. F. M. Williams, M.P., Goonvrea, Perranarworthal	10	10	0	—	
Rev. James Williams, F.R.H.S., Tring Park, Herts	10	10	0	—	
Mr. J. Williams, J.P., Loughton, N.E.	5	5	0	—	
Sir. W. Williams, Bart., Tregullow, Cornwall	2	2	0	—	
Mr. Jos. Williamson, Gr. Whitehaven Castle	1	1	0	—	
Mr. John Wills, Gr. Huntroyde Park, Burnley	5	5	0	10	10
Mr. G. F. Wilson, F.R.H.S., East-hill, Wandsworth, S.W.	10	10	0	—	
Mr. H. Wilson, F.R.H.S., Stowlangtoft	10	10	0	—	
Mr. J. Holbert Wilson, F.R.H.S., 19, Onslow-square, S.W.	5	5	0	—	
Mr. John Wilson, Gr. The Castle, Arundel	1	1	0	—	
Sir T. Maryon Wilson, Bart., F.R.H.S., Charlton House, S.E	5	5	0	—	
The Bishop of Winchester, F.R.H.S., Farnham Castle	10	10	0	50	0
Mr. E. H. Lyon Winder, Vaenor Park, Berriew	5	5	0	—	
Mr. Geo. Winzer, Gr. Wrackleford House, Dorchester	1	1	0	—	
Mr. H. C. Wise, M.P., F.R.H.S., Woodcote, Warwick	5	5	0	—	
Mr. T. V. Wollaston, F.L.S., Teignmouth	3	3	0	—	
Mr. R. C. Woolloton, 246, High-street, Boro', S.E.	5	5	0	—	
Mr. G. Wood, Athelhampton	1	1	0	—	
Mr. E. Wood, Newbold Revel, Rugby Mrs. Wood, F.R.H.S., Newbold Revel, Rugby	10	10	0	50	0
Mr. Thomas Woodford, Gr. Eastwell Park, Ashford	1	1	0	—	
Mr. J. G. Woodhouse, Brontë House, Everton, Liverpool	5	5	0	—	
Messrs. J. Wrench & Sons, 39, King William-street, E.C.	5	5	0	—	
Mr. John Wright, Nurseryman, Pontefract	1	1	0	—	
Mr. W. Wright, Market-street, Retford	3	3	0	—	
Mrs. Wyatt, 7, Lower Gore, Kensington, W.	1	1	0	—	
Mr. Wyatt, 7, Lower Gore, Kensington, W.	1	1	0	—	
Mr. Jas. Yates, F.R.S., F.L.S., Highgate, N.	2	2	0	—	
Mr. R. S. Yates, F.R.H.S., Manchester	5	5	0	—	
Mr. Maurice Young, Milford Nursery, Godalming	10	10	0	—	
Mr. Wm. Young, Gr. West Hill House, Highgate, N.	1	1	0	—	
Mr. G. Young, Gr. Audley End, Saffron Walden	1	1	0	—	

MUSIC.

The services of the following Military Bands were retained on the opening day, and also on the three succeeding days. The programme of the music performed by each of the bands, on each of these days, is subjoined :—

The ROYAL ARTILLERY (*by permission of Maj.-Gen. Warde, C.B.*); Conductor, MR. J. SMYTH.
The SCOTS FUSILIER GUARDS (*by permission of Colonel de Bathe*); Conductor, MR. CHARLES GODFREY.
The FIRST LIFE GUARDS (*by permission of Colonel the Hon. Dudley de Ros*); Conductor, Mr. J. WATERSON.

MAY 22nd.

PART I.—TWO O'CLOCK.

1. GRAND EXHIBITION MARCH (*Auber*)	Royal Artillery.
2. OVERTURE—"Maritana" (*Wallace*)	
3. WALTZ—"Atmospheric" (*Gung'l*)	
4. OPERATIC SELECTION—"L'Africaine" (*Meyerbeer*) . .	
5. POLKA—"Les Fauvettes" (*Bosquet*)	

PART II.—THREE O'CLOCK.

6. GRAND OVERTURE—"Oberon" (*Weber*)	Royal Artillery.
7. WALTZ—"La Murska" (*Charles Godfrey*) . . . (Solo for Cornet, by Mr. W. HARDY.)	Scots Fusiliers.
8. GRAND FANTASIA—"Don Giovanni" (*Mozart*) . .	1st Life Guards.
9. QUADRILLE—"Herold" (*Strauss*)	Royal Artillery.
10. SELECTION — "Faust" (*Gounod*): concluding with the "Soldier's Chorus." . . . . (Euphonium, Mr. HUDSON—Trombone, Mr. WILSON—Clarionet, Mr. GOUGH—Cornet, Mr. HARDY.)	Scots Fusiliers.
11. WALZER—"Nachfalter" (*Strauss*)	1st Life Guards.
12. OPERATIC SELECTION—"Lucia di Lammermoor" (*Donizetti*) .	Royal Artillery.
13. OVERTURE—"La Gazza Ladra" (*Rossini*)	Scots Fusiliers.
14. SELECTION—"La Belle Hélène" (*Offenbach*) . . .	1st Life Guards.
15. POLKA—"Campbell" (*Charles Godfrey*) . . . . (Cornet Obligato, Mr. HARDY.)	Scots Fusiliers.
16. DRAMATIC OVERTURE—"Lucie Manette" (*Waterson*) . (Written on DICKENS' Story, "A Tale of Two Cities.")	1st Life Guards.
17. SELECTION—"Orphée aux Enfers" (*Offenbach*) . . .	Scots Fusiliers.
18. GALOP—"Bicester Hunt" (*Minnie*)	1st Life Guards.

"GOD SAVE THE QUEEN."

MAY 23rd.

PART I.—TWO O'CLOCK.

1. GRAND MARCH—"Mock Doctor" (*Gounod*)	Scots Fusiliers.
2. OVERTURE—"Der Freischütz" (*Weber*)	
3. WALTZ—"Florence" (*Charles Godfrey*) (Cornet Obligato, Mr. HARDY.)	
4. FANTASIA—"Reminiscences of Meyerbeer" (Solos for Cornet, Clarionet, and Euphonium by Messrs. HARDY, GOUGH, and HUDSON.)	
5. QUADRILLE—"La Belle Hélène" (*Offenbach*)	

PART II.—THREE O'CLOCK.

6. MARCH—"Prince of Wales" (*Costa*)	Scots Fusiliers.
7. OVERTURE—"Masaniello" (*Auber*)	Royal Artillery.
8. WALTZ—"Wiener Kinder" (*Strauss*)	Scots Fusiliers.
9. OPERATIC SELECTION—"Martha" (*Flotow*)	Royal Artillery.
10. OVERTURE—"Il Barbière" (*Rossini*)	Scots Fusiliers.
11. WALTZ—"Eugénie" (*Smyth*)	Royal Artillery.
12. GRAND SELECTION—"L'Africaine" (*Meyerbeer*) (Solos for the principal Instruments.)	Scots Fusiliers.
13. OPERATIC FANTASIA—"Oberon" (*Weber*)	Royal Artillery.
14. OVERTURE—"Zanetta" (*Auber*)	1st Life Guards.
15. OPERATIC SELECTION—"Un Ballo in Maschera" (*Verdi*)	Royal Artillery.
16. NEW WALTZ—"Annie" (*Waterson*)	1st Life Guards.
17. QUADRILLE—"Concordia" (*Faust*)	Royal Artillery.
18. GRAND FANTASIA—"Der Freischütz" (*Weber*)	1st Life Guards.
19. GALOP—"Vive la France" (*Smyth*) (Expressly composed for, and performed by, the Royal Artillery Band at the French Naval Fêtes.)	Royal Artillery.

PART III.—SIX O'CLOCK.

20. OVERTURE—"Don Giovanni" (*Mozart*)	1st Life Guards
21. BALLET MUSIC—"La Nonne Sanglante" (*Gounod*)	
22. GRAND SELECTION—"I Lombardi" (*Verdi*)	
23. GALOP MILITAIRE (*Fahrbach*)	

"GOD SAVE THE QUEEN."

MAY 24th.

PART I.—TWO O'CLOCK.

1. GRAND PAGEANT MARCH—"La Reine de Saba" (*Gounod*)	1st Life Guards.
2. NEW OVERTURE—"Fest" (*Waterson*)	
3. WALTZ—"Julien-Tanze" (*Gung'l*)	
4. DRAMATIC FANTASIA—"Les Huguenots" (*Meyerbeer*)	
5. GALOP—"The Troopers" (*Waterson*)	

PART II.—THREE O'CLOCK.

6. MELANGE—"Lieder Ohne Wörte" (*Mendelssohn*)	Royal Artillery.
7. WALTZ—"Grafenberger" (*Gung'l*)	Royal Artillery.
8. FANTASIA—"Reminiscences of Bellini" (Solos for Cornet, Euphonium, and Clarionet by Messrs. HARDY, HUDSON, and GOUGH.)	Scots Fusiliers.
9. QUADRILLE—"Scotch" (*Waddell*)	1st Life Guards.
10. OPERATIC SELECTION—"Masaniello" (*Auber*)	Royal Artillery.
11. WALTZ—"La Murska" (*Charles Godfrey*) (Cornet Obligato.)	Scots Fusiliers.
12. GRAND FANTASIA—"Faust" (*Gounod*)	1st Life Guards.
13. GRAND OVERTURE—"Semiramide" (*Rossini*)	Royal Artillery.
14. SELECTION—"La Gazza Ladra" (*Rossini*) (Trombone, Mr. WILSON.)	Scots Fusiliers.
15. WALTZ—"Narragansett" (*Gung'l*)	1st Life Guards.
16. FANFARE MILITAIRE (*Ascher*)	Scots Fusiliers.
17. GRAND FANTASIA—"Les Diamants de la Couronne" (*Auber*)	1st Life Guards.
18. GALOP—"Fire Battle" (*Nelson*)	Scots Fusiliers.

"GOD SAVE THE QUEEN."

MAY 25th.

PART I.—TWO O'CLOCK.

1. OVERTURE—"I Martiri" (*Donizetti*)	Royal Artillery.
2. WALTZ—"Eugénie" (*Smyth*)	Royal Artillery.
3. GRAND POTPOURI—"International" (on Melodies of All Nations) (*Conradi*)	Royal Artillery.
4. Birthday Serenade of Princess Sidonia, Duchess of Saxony (*Eisoldt*)	Royal Artillery.
5. GALOP—"Vive la France" (*Smyth*)	Royal Artillery.

PART II.—THREE O'CLOCK.

6. OVERTURE—"Crown Diamonds" (*Auber*)	Royal Artillery.
7. WALTZ—"Dawn of Love" (*Charles Godfrey*)	Scots Fusiliers.
8. OPERATIC SELECTION—"Lurline" (*Wallace*)	1st Life Guards.
9. QUADRILLE—"The Lakes of Killarney" (*Smyth*)	Royal Artillery.
10. FANTASIA—"Reminiscences of Meyerbeer." (Solos for Cornet, Euphonium, and Clarionet by Messrs. HARDY, HUDSON, and GOUGH.)	Scots Fusiliers.
11. CAPRICE-MAZURKA—"Danse des Paysans Russes" (*Ascher*)	1st Life Guards.
12. OPERATIC SELECTION—"La Juive" (*Halévy*)	Royal Artillery.
13. OVERTURE—"Guy Mannering" (*Sir H. R. Bishop*)	Scots Fusiliers.
14. GRAND FANTASIA—"La Sonnambula" (*Bellini*)	1st Life Guards.
15. WALTZ—"Florence" (*Charles Godfrey*)	Scots Fusiliers.
16. BALLET MUSIC—"Danse Bohèmienne" (*Gounod*) (Opera, "La Nonne Sanglante.")	1st Life Guards.
17. SELECTION—"Fra Diavolo" (*Auber*) (Solos for Clarionet by Master LODGE, and Althorn by Mr. GOUGH.)	Scots Fusiliers.
18. GALOP DE CONCERT—"Boute-en-Train" (*Ketterer*)	1st Life Guards.

"GOD SAVE THE QUEEN."

The music at the Banquet in the Guildhall of the City of London, on the evening of May 22nd, was performed by the Band of the GRENADIER GUARDS, under the direction of Mr. Dan. Godfrey, and consisted of the following selection :—

FEST MARSCH—"Tannhaüser"	*Wagner.*
WALTZ—"Mabel"	*D. Godfrey.*
SELECTION—"Reminiscences of Auber" . . . . (Solos for Clarionet, Euphonium, and Cornet, by Messrs. SPENCER, LAWFORD, and MCGRATH.)	*Auber.*
QUADRILLE—"The Royal Alfred" (On Nautical Melodies) . .	*D. Godfrey.*
FANTASIA—"Il Trovatore" . . . . (Petite Clarinette —Mr. RUSTON. Cornet—Mr. MCGRATH.)	*Verdi.*
NEW WALTZ—"Adèle" (First time of performance) . . .	*D. Godfrey.*
SELECTION—"Reminiscences of Meyerbeer"	*Meyerbeer.*
SOLO—Cornet à Pistons . . . . (Performed by Mr. MCGRATH.)	*Bonisseau.*
FANTASIA—"Orphée aux Enfers"	*Offenbach.*
WALTZ—"Hilda"	*D. Godfrey.*

The music at the Conversazione at the South Kensington Museum, on the evening of May 23rd, was performed by the Band of the FIRST LIFE GUARDS, under the direction of Mr. J. Waterson, and consisted of the following selection :—

CONCERT OVERTURE	*Kalliwoda.*
OPERATIC SELECTION.—"Semiramide" . . . . (Solos for Corni, E flat Clarionet, Cornet, Euphonium, and B flat Clarionet, by Messrs. RANGE and DAVIS, PARK, LAWSON, COUSINS, and STYLES.)	*Rossini.*
WALZER—"Soldaten Leider"	*Gung'l.*
SCENA AND ARIA—"Jeanne Hachette" . . . . (Solo for Cornet, by Master LAWSON.)	*Concone.*
DANSE DES MATELOTS . , ...	*Metzger.*
QUADRILLE—"Scotch" . . . . (Variations for B flat Clarionet, Bassoons, and Flute, by Messrs. STYLES, WOTTON and EARNSHAW, and EDWARDS.)	*Waddell.*
GRAND FANTASIA—"La Sonnambula" . . . . (Solos for B flat Clarionet, Cornet, Trumpet, Trombone, Picolo, E flat Clarionet, and Bassoon, by Messrs. STYLES, LAWSON, BANNISTER, DONAGHER, EDWARDS, PARK, and WOTTON.)	*Bellini.*
WALTZ—"Annie"	*Waterson.*
BALLET MUSIC—"La Nonne Sanglante"	*Gounod.*
SOLO, OBOE—"Nel Cor Piu" (Mr. FOWLER.)	*Waterson.*
GALOP MILITAIRE	*Mayer.*

"GOD SAVE THE QUEEN."

INTERNATIONAL HORTICULTURAL EXHIBITION AND BOTANICAL CONGRESS.

Dr. Financial Statement up to November 3rd, 1866. *Cr.*

1866.	£	s.	d.	£	s.	d.
To Subscriptions paid				5,604	0	0
„ Payments on Entry, first four days	3,974	4	0			
„ „ „ last five days	4,375	6	0			
				8,349	10	0
„ Sale of Admission Tickets by Agents	1,313	8	0			
„ Sale of Tickets at Office and elsewhere	106	10	3			
„ Sale of Gardeners' Tickets	191	9	0			
				1,611	7	3
„ Sale of Catalogues	225	6	6			
„ Advertisements in ditto	76	11	0			
				301	17	6
„ Percentages, subscriptions twice paid, and sundry small items				151	9	10
				£16,018	4	7

1866.	£	s.	d.	£	s.	d.
By Unite for Tent and Fittings	2,956	3	0			
„ ditto 20 per cent. on net proceeds of last five days	700	0	0			
„ ditto for Band Stand	10	16	0			
				3,666	19	0
„ Building Committee Payments				989	17	4
„ Prizes awarded				2,007	9	0
„ Extra Expenses allowed to certain Exhibitors for last five days				219	16	0
„ Advertising				998	0	0
„ Rent of Offices				58	15	0
„ Stationery, Postages, &c.				230	0	0
„ Police				74	13	0
„ Printing Circulars, Cards, &c.				983	9	6
„ Law Expenses				39	19	2
„ Banquet Expenses (incl. Music)				970	12	6
„ Congress and Conversazione Expenses (excl. Music)				54	19	0
„ Music in R. H. Gardens and at Conversazione				304	16	8
„ Local Committee's Expenses				38	9	8
„ Royal Horticultural Society				300	0	0
„ Working Expenses, Salaries, Gratuities, &c.				1,641	14	9
„ Gardeners' Royal Benevolent Institution				1,000	0	0
„ Coutts & Co., at interest				2,000	0	0
„ „ open Account				438	14	0
				£16,018	4	7

(Signed) DANIEL COOPER, Treasurer.

3rd November, 1866.