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JOURNAL

OF THE

ROYAL HORTICULTURAL SOCIETY

EDITED BY THE

REV. W. WILKS, M.A.

SECRETARY

AND

MR. JOHN WEATHERS

ASSISTANT-SECRETARY

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JOURNAL

OF THE

ROYAL HORTICULTURAL SOCIETY.

VOL. XIX. 1895.

PART I.

EXAMINATION IN HORTICULTURE, 1895.

ON May 1, 1895, the Society held the Fourth Annual Examination in the Principles and Practice of Horticulture in various centres in the United Kingdom, and 169 candidates presented themselves for examination.

It may be mentioned that the candidates came from widely different parts of the country, a centre being established wherever a magistrate, or clergyman, or schoolmaster, or other responsible person accustomed to examinations, would consent to superintend one on the Society's behalf, and in accordance with the rules laid down for its conduct. No limits as to the age, or position, or previous training of the candidates were imposed, and the Examination was open to both sexes.

EXAMINERS' REPORT.

To the Council of the Royal Horticultural Society.

Gentlemen,—We beg leave to report that we have examined the papers of the candidates who offered themselves for Examination in Horticulture in May 1895. There were 169 candidates in all, varying greatly, as usual, in age, occupation, and in the means of instruction at their disposal.

Three hundred marks were allotted as a maximum, and all candidates who obtained 200 marks and upwards were placed in the first class; those who received between 150 and 200 marks were placed in the second class; and those to whom 100 marks and upwards were adjudged were ranked in the third class. The remainder, who obtained fewer than 100 marks, were not classed.

In this way 12 candidates were adjudged worthy to be placed in the first class, 37 in the second, and 73 in the third class. The highest number of marks obtained was 260, by Miss A. U. Gulvin, of the Horticultural College, Swanley.

Considering the opportunities at the disposal of the candidates, the results may be considered satisfactory. The effect of continuous systematic training is well exemplified in the class lists. On the other hand, many young gardeners and mechanics, who cultivate small gardens and allotments, but who have not had the opportunity of regular tuition and systematic study, have taken a lower place than they otherwise would have done, because they have failed to grasp the significance of the questions.

We have the honour to be, Gentlemen, your obedient servants,

MAXWELL T. MASTERS,
JAS. DOUGLAS.

June 15, 1895.

The names and addresses of the successful candidates, together with the number of marks assigned to each, are given in the following Class List, to which is appended the questions set by the Examiners:—

CLASS LIST.

Maximum number of marks obtainable, 300.

<i>First Class.</i>	<small>No. of Marks gained.</small>
1.*Miss A. U. Gulvin, Horticultural College, Swanley .	260
2. Mr. Geo. Butcher, gardener, 188 Wellfield Road, Streatham	240

* Wins the Society's Silver Gilt Medal.

3. Miss F. M. G. Micklethwait, Horticultural College, Swanley	220
4. Mr. C. Brown, Horticultural College, Swanley, Kent .	215
4. Miss Alice Hutchings, Horticultural College, Swanley	215
4. Mr. J. Warner, School House, West Street, Dorking .	215
4. Miss Madeline Agar, Horticultural College, Swanley .	215
8. Mr. G. H. Cave, 16 Gloucester Road, Kew, Surrey .	210
8. Mr. W. Bell, Knighton Road, Leicester	210
10. Mr. Edward Dumper, The Gardens, High Ashurst, Dorking	205
11. Mr. J. K. F. Jack, Horticultural College, Swanley .	200
11. Mr. H. W. Gunston, Fressingfield, near Harleston, Norfolk	200

Second Class.

1. Mr. John Ettle, The Gardens, Glais House, Swansea .	190
2. Mr. G. Potter, Woking Village, Surrey	180
3. Mr. R. G. Lawson, Shirley Road, South Knighton, Leicester	175
3. Mr. G. Cornford, Limpsfield, Surrey	175
3. Mr. G. Neaves, Meerbrook, Leek	175
3. Mr. H. Ames, Headley, Epsom	175
7. Mr. J. Rathbone, Tongham, Farnham, Surrey . .	170
7. Miss Ethel Brooks, Horticultural College, Swanley .	170
7. Mr. J. Palmer, Blaxhall, Wickham Market	170
7. Mr. W. A. Brown, 30 Palmerston Road, Ipswich .	170
11. Mr. W. J. Bales, Bellevue House, Wickham Market .	165
12. Mr. C. Atkyns, Watling Street, Brownhills, South Staffs	160
12. Mr. D. W. Luck, Horticultural College, Swanley . .	160
12. Mr. P. A. H. Radcliffe, Birstal, near Leeds . . .	160
12. Mr. W. Pascoe, Sydney Lodge, Hamble, near Southampton	160
12. Mr. J. S. Mallinson, Horticultural College, Swanley .	160
17. Mr. J. Hillson, The Gardens, Castle Howard, York .	155
17. Mr. J. G. Wilson, Nunnery Gardens, Douglas, Isle of Man	155
17. Mr. J. J. Sykes, Windycote, Longsdon S. O., Staffs .	155
17. Mr. R. H. Wedd, Horticultural College, Swanley .	155
21. Mr. A. Sowman, The Grange, Woodbridge, Suffolk .	150

	No. of Marks gained.
21. Mr. R. G. Waterman, Church Road, Woolton, Liverpool	150
21. Mr. R. D. Ewens, West Horsley Place, near Leatherhead	150
21. Mr. E. Skelton, 9 Dunstable Villas, Richmond, Surrey	150
21. Mr. W. Pickford, 14 Rose Bank Street, Leek . . .	150
21. Mr. G. D. Selden, The Brokes, Reigate Hill, Reigate .	150
21. Miss Lizzie Phillips, 18 Stockwell Street, Leek . . .	150
21. Mr. W. C. Pleasants, Metfield, Harleston, Norfolk . .	150
21. Mr. W. Galloway, Castle Howard Gardens, York . . .	150
21. Mr. T. D. Turner, Low Town, Bridgenorth	150
21. Miss Elsie A. Benians, Swanley	150
21. Miss Lydia Wardle, 54 St. Edward Street, Leek . . .	150
21. Mr. W. H. Patterson (Chelmsford), 8 Albion Grove, Winchester Road, Colchester	150
21. Mr. G. Underwood, Swanley	150
21. Mr. W. Dyke, 1 High Street, Turnford	150
21. Miss Julia A. Dowson, Westbury Road, Brentwood . .	150
21. Miss Ellen A. Pash, Primrose Hill, Chelmsford . . .	150

Third Class.

1. Mr. W. H. Stevens, Ingestre Gardens, Stafford . . .	145
2. Mr. John Duff, 54 Chestnut Road, Bushey Mead, Merton	140
2. Mr. R. Jupp, Rose Villa, Limpsfield, Surrey . . .	140
2. Mr. Edmund Smith, 4 Edgend, Brierfield, near Burnley	140
5. Miss Louise Udall, Horticultural College, Swanley . .	135
5. Mr. C. George, Horticultural College, Swanley, Kent .	135
5. Mr. A. F. Turner, Horticultural College, Swanley . .	135
8. Mr. G. E. Bradbury, Black Shaw Moor, near Leek . .	130
8. Mr. H. J. Cape, 2 Cawdry Buildings, Leek, Staffs . .	130
8. Mr. W. Wicking, 1 Queen's Road, Clarendon Park, Leicester	130
8. Mr. William Pye, Madeley, Staffordshire	130
8. Miss Evelyn Windemer, Horticultural College, Swanley	130
8. Mr. A. J. Ward, 3 Beaufort Villas, Kew Gardens . . .	130
8. Miss Emelyn Atkins, Horticultural College, Swanley .	130

15. Mr. C. E. W. Garner, The Horticultural College, Kent	125
15. Mr. J. G. Bachelor, 33 Holmesdale Road, Reigate .	125
15. Miss J. S. Dixon, Wickham Mills, Witham, Essex .	125
15. Mr. A. Girt, Epsom	125
15. Mr. C. Berry, Goldrood Gardens, Ipswich	125
15. Mr. H. Taphouse, Swanley Horticultural College .	125
15. Mr. M. Tucker, Horticultural College, Swanley . .	125
15. Mr. R. Bellarby, Askham Grange Gardens, Askham Richard, York	125
23. Mr. T. Bonner, The Garden, Vierrepoint, Farnham .	120
23. Mr. William Burgess, Mitchells Farm, Lingfield .	120
23. Mr. W. P. Selby, 7 Turnford Cottages, Turnford, near Broxbourne, Herts	120
23. Mr. George Sherman, Alderton, Woodbridge, Suffolk .	120
23. Mr. L. L. Dunmall, Heath House Gardens, Headley, Epsom	120
23. Mr. C. Cundy, 9 King Street, Sudbury, Suffolk . .	120
23. Mr. P. J. Gray, Newnham Paddox Gardens, Lutter- worth	120
30. Mr. J. T. Newman, Madeley Manor, near Newcastle- under-Lyme, Staffs	115
30. Mr. R. Kerr, The Gardens, Headley Grove, Epsom .	115
30. Mr. C. E. Thomas, Aughton, near Liverpool	115
30. Miss Eleanor Morland, Horticultural College, Swanley	115
30. Mr. A. Baker, Farnham	115
30. Miss M. Maud Prior, Horticultural College, Swanley .	115
36. Mr. C. D. Carter, Great Seabrights Farm, Gallewood, near Chelmsford, Essex	110
36. Mr. T. Whit, Barkby Hall, Leicester	110
36. Mr. W. H. Walker, 5 George Street, Sutton, Surrey .	110
36. Mr. C. Eades, Fairfield, Leatherhead	110
36. Miss Marion Stuart, Horticultural College, Swanley, Kent	110
36. Mr. W. Timbers, Ham	110
36. Mr. G. B. Savage, Woking	110
36. Mr. H. Pearman, Horticultural College, Swanley .	110
36. Mr. R. Moss, Whiston-Froghall, Stoke-on-Trent . .	110
36. Mr. C. Lawrence, Horticultural College, Swanley .	110
36. Mr. W. Reader, Farnham	110

	No. of Marks gained.
36. Mr. H. Corlett, Woolton Wood Gardens, Woolton, Liverpool	110
48. Mr. H. O. Weddell, Haycroft Cottage, Southboro', Surbiton, Surrey	105
48. Mr. A. G. Ewens, West Horsley, near Leatherhead	105
48. Mr. H. Miles, Park Villas, Ash, near Aldershot	105
48. Mr. J. Gilbert, Merrow, near Guildford	105
48. Mr. A. Ashley Broad, Madeley, Staffordshire	105
48. Mr. C. Wingrove, The Lodge, Firfield, Addlestone	105
48. Miss Mary Drewett, Shalford	105
48. Mr. J. Guy, Turnford Nurseries, Turnford	105
48. Mr. Isaacs Godbeer, 9 Turnford Villas, Turnford	105
48. Miss E. Clarke, Horticultural College, Swanley	105
48. Mr. J. Barkham, Myrtle Cottage, Haven Street, near Ryde	105
48. Miss L. A. Dunington, Horticultural College, Swanley	105
60. Mr. J. T. Bridges, Deighton Lane, Henley, Batley, Yorks.	100
60. Mr. H. Cooke, Manor House, Frensham, Farnham, Surrey	100
60. Mr. H. A. Featherstone, Pebble Combe, Headley, Epsom	100
60. Mr. E. J. Bedford, Leatherhead	100
60. Mr. G. A. Jones, Greenford Place, Sudbury, Harrow	100
60. Mr. J. Little, Turnford	100
60. Miss Annie Geoghegan, Horticultural College, Swanley	100
60. Mr. A. E. Normingson, Turnford	100
60. Mr. J. R. Clapson, Horticultural College, Swanley	100
60. Mr. S. J. Tomlinson, Market Place, Chelmsford	100
60. Miss Marion Tomlinson, Market Place, Chelmsford	100
60. Mr. F. J. Ashdown, Godalming	100
60. Mr. W. E. Case, 35 St. John's Road, Waterloo-with- Seaforth, near Liverpool	100
60. Miss Hannah M. Dixon, Wickham Mills, Witham	100

ROYAL HORTICULTURAL SOCIETY'S EXAMINATION
IN HORTICULTURE.

QUESTIONS.

Eight questions only to be answered: four from Division A, including No. 5, which must be answered by every Candidate, and four from Division B.

DIVISION A.

ELEMENTARY PRINCIPLES.

1.—(a) What substances do plants absorb by means of their roots? Explain the process of absorption by the root.

(b) What elements do plants obtain from the air, and by what agency do they obtain them?

2.—Explain the effect on flowering plants of an adequate, a deficient, or of an excessive, amount of heat.

3.—How are "cuttings" made? Describe the changes that occur during the process of "striking."

4.—What are the objects sought to be obtained in digging the soil?

5.—Write as full and orderly a description as you can of any plant in common cultivation, through all stages of its growth, from the germination of the embryo to the formation of the seed.

6.—What organs of the plant are represented respectively by an onion, a cabbage, a potato, beet, turnip, and a pea-pod?

7.—Describe the mode of growth of the common mushroom.

8.—What is meant by "green-fly"? What is the best application to rid plants growing out of doors of this pest?

DIVISION B.

HORTICULTURAL PRACTICE.

9.—Name six of the best species of hothouse flowering plants and give some of the general details of culture. Name some of the insect pests that infest such plants, and state the best method to be adopted for their destruction.

10.—Give general details for growing Peas, and the method

of culture, time of sowing, &c., to give a supply for as long a period as possible. What is the use of the nodules on the roots?

11.—What is an Alpine plant, as the name is generally understood in gardens? Describe the cultural requirements of such plants, and the best way to propagate them.

12.—What is the original parentage of Cauliflower and Broccoli? Give the method of culture, and the best varieties to obtain a succession all the year round.

13.—Give some details of the culture of Grape vines under glass. Describe the diseases to which they are subject, and the insect pests which attack them, and their cure.

14.—What kinds of fruit trees and bushes are best adapted for culture in small gardens? Briefly describe the best method of culture, and arrangement of the trees and bushes.

15.—In a walled garden what kind of fruit trees would you recommend to be planted on the four aspects—south, north, east, and west? What distance apart should the trees be? Suggest the best width of the borders and height of the walls.

16.—(a) What do you consider the best class of soil for fruit trees, and how ought it to be prepared for them?

(b) Is there any method of culture likely to prevent canker in Apple trees or gumming in Apricots, Cherries, and Plums?

NOTES ON THE WINTER OF 1895 IN THE ISLE OF WIGHT.

By Mr. SAMUEL HEATON, F.R.H.S.

THE past winter in the island has been unusually severe, and great damage has been done to many rare trees and shrubs. The fall of snow has not been so great as in 1881, when it fell in some places to a depth of from 6 to 9 feet; but the frosts have been more intense and the winds strong and sharp, whether blowing from the east, north-east, or north-west, from which quarters they principally came.

The following comments are made by Mr. J. Dover,

F.R.Met.S., of Totland Bay, Isle of Wight: On January 11, 1895, the thermometer fell to 19° Fahr.: this is, with one exception, the lowest temperature recorded during the past nine years, and that was on January 5, 1894, when the thermometer fell to 14° Fahr. Snow fell on five days, and fog was present on two days. Rain fell on fifteen days in January, which was under the average (16·4 days), though the rainfall (3·42 inches) was above the average (2·19 inches). The month of February was more remarkable. Mr. Dover says: "The temperature has not been up to the average warmth of a February day on any single day of the month." On February 6 the temperature never rose above 24° Fahr.; and on the night of February 9 the thermometer fell to 16°·2. During January and February there were twenty-seven frosty nights consecutively; no records of a similar occurrence can be found. There were two foggy days, four wet days, which was considerably under the average (13), and the rainfall (·10 inch) was below the average (1·52 inch) for the month of February.

The following are particulars I have been able to obtain from other parts of the island. Steephill Castle, Ventnor, which is situated from 100 to 130 feet above the sea level, with a southern slope towards the sea, had many of its trees and shrubs more or less injured during the past winter. The lowest temperature recorded by Mr. R. Scott, the gardener, was 18° Fahr. some time during the month of February. The only plant killed was a *Colletia horrida*, but *Podocarpus chilensis*, Sweet Bays, Laurestinus, *Benthamia fragifera*, *Erica arborea*, Myrtles, *Garrya elliptica*, *Phormium tenax*, and *Ceanothus* in variety were all very severely injured; Portugal and Common Laurels and *Pinus insignis* were slightly injured; while the Camellias, *Quercus glabra*, and Pittosporums were uninjured. The soil is a good loam, though rather shallow in places. The large forest trees and overhanging cliffs afford more or less protection to the smaller plants on the estate.

At Newport, which is in the centre of the island and lies low, much injury was done to vegetation, though no trees and shrubs were killed quite outright. Mr. A. E. Cave, F.R.H.S., of Newport Nursery, reports that on February 6, 1895, there were seven degrees of frost at mid-day, and the minimum on the night of February 9 was 23° Fahr. of frost, and on February 13 twenty

degrees of frost. Teas and Noisette Roses were in many places killed; while Junipers, Retinosporas, Thuias, Aucubas, Box, Holly, Elæagnus, Osmanthus, Andromeda, and Rhododendrons were uninjured. *Aralia Sieboldii*, Sweet Bays, *Benthamia fragifera*, Cotoneaster, Desfontainea, Euonymus, Hydrangea, *Griselinia macrophylla*, Portugal and Common Laurels, Laurestinus, Phillyrea, Skimmia, Kalmia, Cedar of Lebanon, and *Cupressus Lawsoniana* were slightly injured; whilst *Cupressus macrocarpa*, *Pinus insignis*, Arbutus, *Berberis aquifolia* and *Darwinii*, *Choisya ternata*, Evergreen Oak, Wellingtonia, Pyracantha, Ceanothus, Veronica, Myrtles, and double Furze were severely injured. The soil is a black loam, resting on a gravelly and a clayey subsoil.

Mr. Munson, of Brading, reports the following particulars: The garden is fully open, at an elevation of over 100 feet above sea level, and consists of clay loam and limestone on a clay subsoil.

The minimum temperature registered in February 1895 was 9° Fahr., or twenty-three degrees of frost. Plants killed were *Veronica Andersonii* and *Choisya ternata*; those severely injured were *Eugenia apiculata*, *Veronica Traversii*, and *Buddleia globosa*; those slightly injured Laurestinus, Portugal and Common Laurels, Common Bays, and *Spiræa Thunbergii*; those uninjured were *Osmanthus ilicifolius*, *Olearia Haastii*, Irish Yews, *Griselinia macrophylla*, Aucubas, and Arbutus.

Mr. F. Cleverley, Northwood Park Gardens, West Cowes, states that they had twenty-three degrees of frost, which did much damage. The garden is at a high elevation; the soil sandy loam, and subsoil gravel. Veronicas, herbs such as Sage, Thyme, and Parsley, Lettuce, Wallflowers, Violets, Violas, and Chrysanthemums were killed outright; whilst *Ceanothus thyrsiflora*, *Benthamia fragifera*, *Garrya elliptica*, Roses, Strawberries, and *Quercus Ilex* were severely injured; Common and Portugal Laurels, Bays, Aucubas, Laurestinus, and Euonymus were slightly injured; whilst the Hollies and Yuccas did not suffer in the least.

Mr. W. Tribbick, F.R.H.S., Brooke House Gardens, reports his garden to be low, slightly undulating, facing south, close to the sea, exposed to the west and north-west winds. The soil is a clay loam. Though he registered twenty-five degrees of frost no plants were actually killed. Those most severely injured were the Portugal

and Common Laurels, *Choisya ternata*, *Escallonia macrantha*, *Garrya elliptica*, *Cupressus macrocarpa*, and *Ligustrum marginatum aureum*; those slightly injured were Bays, *Euonymus*, *Laurestinus*, *Elæagnus*, *Hypericum*, *Pinus insignis*, and *Salisburia adiantifolia*; those uninjured *Olearia Haastii*, *Genista Andreana*, *Griselinia littoralis*, *Kalmias*, *Andromedas*, *Veronica Traversii*, *Diplopappus chrysophyllus*, *Skimmias*, *Cryptomeria elegans* and *japonica*, *Taxus baccata*, *aurea*, and *elegantissima*, *Retinospora squarrosa*, *filifera*, and *plumosa*, *Juniperus neoboracensis*, *Cupressus erecta viridis*, *Thuiopsis dolabrata*, *Cedrus atlantica*, *Deodara*, and *Libani*, *Abies nobilis robustus*, *Pinsapo*, and *Nordmanniana*.

SEEDLING NARCISSI.

A CONSPICUOUS feature of the meeting of April 23 was the Rev. G. H. Engleheart's exhibit of hybrid and seedling Narcissi. The lateness of the spring, which brought early, mid-season, and late kinds into almost simultaneous bloom, made it possible to stage an unusual range of form and colour.

A remarkable series of hybrids of *N. triandrus* was grouped separately in pots. These flowers are the offspring of the *major* or Glénan variety of *triandrus* and other Narcissi, and invariably possess great refinement of colour and shape. Perhaps the most beautiful is "Snowdrop" (*N. triandrus* × *N. albicans*), with large, Fuchsia-like, pendulous flowers of uniform ivory-white, the scape sometimes two-flowered. Similar white seedlings were the produce of *N. cernuus* and *N. moschatus* of the Pyrenees crossed with *triandrus*. Emperor × *triandrus* yielded a drooping flower of an exquisite tone of pale sulphur, approaching Emperor in size, while *Horsfieldi* gave a flower of the same delicate colouring, but more "bicolor." Perhaps the outcome of *N. poeticus* × *N. triandrus* was as attractive as any other—clustered white blossoms with creamy cups on slender stems, the whole plant being very graceful. Other crosses of *triandrus* were shown.

The most striking flower of the whole collection was the new bicolor trumpet Daffodil "Ellen Willmott," which is

considered to be the finest Ajax yet raised. The corona is of deep gold, and expanded to a width of nearly $2\frac{1}{2}$ inches at the mouth; the perianth-segments are of great substance and broadly overlapping; the perianth is flat and firm, and the whole flower is of solid texture. A large gathering was shown of Ajax Golden Bell, a seedling from Emperor, but of richer colour and very distinct character from its broad, drooping, and deeply toothed corona. "Sir Evan" is a fine Ajax in the way of Glory of Leyden, and other yellow Ajax kinds were noticeable by reason of their proportions and depth of colour. A large representative gathering was included of white or pale trumpets, chiefly the result of intercrossing the old white sorts, *albicans*, *cernuus*, &c., with other forms of Ajax. These seedlings were much admired on account of their varied and delicate tints—almost pure white, cream, straw, sulphur, apricot, &c.

All the classes or groups of cross-bred Narcissi now in cultivation were reproduced in Mr. Engleheart's stand, varieties of *N. incomparabilis*, *Barrii*, *Burbidgei*, *Nelsoni*, &c., being shown in some quantity. The *Leedsii* section was represented by many seedlings between white trumpets and *N. poeticus*, many being wholly white or ivory-white in perianth and crown, while others were remarkable from the citron or apricot-colouring of the crown, derived from *poeticus poetarum*. Examples were shown of *Tazetta* × *poeticus*, the flowers being three or four on a scape, and intermediate in size, some having highly coloured cups. This last cross is of interest as showing beyond doubt the parentage of *N. biflorus* and such garden forms as *orientalis*, *Bazelman major* and *minor*. Some very substantial and "finished" flowers in the way of *Nelsoni* and *Backhousei* were exhibited. A number of "incomparabilis" seedlings (*Ajax* × *poeticus*) were grouped together in order to show the advance made in the depth of the red colouring. Very prominent among these were "Torch," in which the perianth is full yellow and gracefully twisted, the crown long and of rich orange-red, and "Dorothy Yorke," with broad white petals and a widely open cup of very perfect shape and vivid, glowing colour.

A Silver Banksian Medal was awarded to Mr. Engleheart's exhibit, and his flower "Ellen Willmott" gained the Silver Gilt Flora medal for the premier Narcissus of 1895.

TOMATO DISEASE IN GUERNSEY.

By Mr. A. COLLENETTE, F.C.S.

[Read March 12, 1895.]

GUERNSEY, as everyone knows, is a very small island, being only seven miles in its greatest length and five miles at its broadest, and, roughly speaking, is of a triangular shape. It contains about 36,000 inhabitants, and there is one large town having 16,000 inhabitants, and yet notwithstanding there are no fewer than 1,500 persons who grow crops for exportation, sending away hundreds of thousands of packages yearly, and returning a gross income of more than half a million of money. The chief crops placed in order of importance are: *Indoor crops*—Tomatos, Grapes, French Beans, Melons, and flowers. *Outdoor crops*—Early Potatos, Broccoli, and flowers. And of these various crops there can be no doubt that the Tomatos are by far the most important item, and even at the present low prices are able to yield a fair profit to the grower.

Tomatos are grown (with or without heat, according to the time of year) in glass houses, usually about 120 feet long and 30 feet wide: these are erected cheaply, over all sorts of land, and with more thought for convenience than aspect. The result is that a great many houses are working under somewhat unfavourable conditions as regards drainage of soil and aspect. Nevertheless, such is the indomitable energy and pluck of the average Guernseyman that many succeed under conditions which would seem to mean absolute failure to outsiders. Many persons come to Guernsey with an idea that the soil is one of the chief causes of success, but they are not with us long before they find out that Guernsey soil is not more productive, in itself, than that of other places, and is, indeed, inferior to that of Jersey, being hard rubbly stone (metamorphic gneiss, diorite, and syenite), covered over with a yellow brick clay so stiff as to make drainage a difficult matter, or with a deposit of sand (in the lower parishes) containing very little plant-food. I have seen many places with better average soil than ours not considered worth working in England. Guernsey has, however, an unfailing source of plant-food (potash) in the seaweed of its

coasts, which are carted up and laid on the soil and borders, considerably improving the soil by its decomposition, mechanically as well as manurially.

The success of the Guernsey Tomato-grower cannot, therefore, be placed to the credit of his natural advantages. In one thing only can he be said to have an advantage over an English grower, and that is his climate. The winter in Guernsey is mild as a rule; it has an average for the winter months of $43^{\circ}\cdot5$ F., and an excessively small daily range of temperature—only about 10° F.—which is exceeded even in Jersey, and, of course, the range of temperature is very much greater in England. Here lies the chief advantage of Guernsey; the cold snaps, however bad they may be, are less bad here than elsewhere, and crops recover more rapidly than in England. But these advantages are not without their accompanying drawbacks, one of which—indeed the most serious—is the extreme suitability of the climate to the growth of the lower forms of life, which, attacking the chief crops as parasites, cause an enormous loss to the growers. I have known men with only moderate areas under cultivation suffer losses amounting in a single season to more than £300; indeed, it may be said that an average house containing Tomatos will, if attacked by disease, suffer a loss of from £100 to £200 in a season; and, unfortunately, in cultivating a crop like the Tomato the grower, under present conditions, is not only cultivating the crop but the disease.

There are two enemies at present devastating Tomatos—one a fungoid disease, the other an insect pest—and to these two I shall devote the most of my remarks.

Besides these two there are, of course, all the ordinary moulds and rusts which are more or less destructive, but which may also be more or less successfully combated. Among those of lesser importance I may just name two of the chief, "Common yellow blight" (*Cladosporium fulvum*). This disease is to be found in almost every glass house, but if the gardener is alive to its importance he can generally keep it within safe bounds, and, as a rule, in Guernsey it does not very much interfere with the success of a crop. The chief treatment given is rapid changes of the heat and humidity of the house, giving the house attacked an occasional thorough drying-off. Where this

is not successful the removal of the diseased plants will succeed in stopping the evil.

The second of the diseases of lesser importance which I mention in passing is one to which the Guernsey grower has given the name of "black stripe," because it shows itself as a black stripe upon the stem of the Tomato plant. It is a "brand." The exact species has not so far been determined.* It is of recent introduction, and has probably taken to the Tomato as a host since its culture in glass houses. The removal of the diseased plants is in this case the only successful means of dealing with this disease.

I come now to *the* disease, the disease of chief importance to which I alluded above : it is also caused by a parasite, which I am sorry to say that I am not able to identify, nor am I aware that any experts have worked at it at all. It may exist elsewhere ; but, if so, I have not yet seen any scientific description of it. It must be thoroughly understood that in rendering the following account of my own work upon it I am not posing as a fungologist. I certainly have made myself acquainted with a few of our local plant diseases, with a desire to help the growers, but being in full employment, and, in fact, a very busy man, I have been unable to devote the necessary time to exhaustively study either the diseases I meet with in particular or the fungi in general. Under these circumstances it must be understood that I am more than usually open to correction, and, indeed, if I am found to be wrong in any (or all) of my conclusions, I would still be pleased to find that this paper had been the means of opening up the subject to experts, and thus have had some influence in obtaining a clearer insight into these obscure pests.

This disease, which I look upon as the most fatal of all parasitical pests, is termed by our growers the "sleeping disease," and the great difficulty with it is that when first it is recognised it is too late to adopt any means of cure. In fact the first outward appearance shows that the death sentence has already been passed. In a few cases the plants have been so benefited as to appear cured, but I think I can safely say that these are most rare.

* Since the above was written the disease has been described under the name of *Macrosporium tomati* (*Journal of Horticulture*, May 30, 1895, p. 481).

The first thing noticed by the grower when his crop is attacked is that the leaves lose their bright appearance, assuming a dull and faded tint. The leaf branch then becomes limp and droops, the leaves also drooping, but apparently no further change takes place, that is to say, no leaf disease is to be noticed; the leaf does not become spotted at first. The next point, as regards external appearance, is a complete stoppage of growth: the young leaves and branches bend over, just as they would do if frozen, and cease altogether to grow. When this stage is reached the leaves are found to have left off forming chlorophyll and to have yellow patches, not due to fungoid growth, but to the absorption of the existing chlorophyll. From this time the plant gradually "goes off," having ceased to perform any of its functions. The fruit-spurs bearing green fruits are usually allowed to remain on the dying plant until the Tomatos are ripe, and then the whole plant is removed, and it is no uncommon thing to see a house allowed to die down with only one, two, or three fruit trusses to each plant.

Now those fruits which outwardly appear good and ripe are in many cases put aside for seed, the remainder being sent away for consumption, all, to the eye of the grower, appearing unaffected by the sleeping disease, and no doubt the grower congratulates himself on the saving of at least a portion of his crop. Certainly the Tomatos are not unfit for sale, but it remains to be proved whether it is wise to keep them for seed.

I early noticed that in planting seedlings a certain proportion of the strongest taken from the seed-boxes (where a number always remained as too weakly) reached a moderate height, in many cases bearing only three or four bunches of fruit, and then became attacked. I therefore commenced a series of observations, and noted first that the smallest seedlings died just in the same way as the larger plants; and on cutting sections of the stems and studying them under the microscope I was not long in finding out that as soon as the leaf begins to droop, whatever the age of the plant, the plant ceases to be supplied with the upward flow of sap, because already a serious and fatal condition of things has arisen in the stem.

A series of microscopic sections made from diseased plants has proved that the following state of the root and stem occurs: The root first suffers the loss of its smaller fibres, which rot away;

then the growing points of the larger root leaders become soft and brown, and higher up the cortex of the root becomes discoloured; and when this has come to pass the terminal leaves of the branches at once begin to droop. The stem sections show that at first, at a very early stage of the disease, a small portion of the cambium layer (or its equivalent in the Tomato) has become broken down and tinted brown; later on a second spot, probably on the side opposite the first, appears, and these gradually grow until the whole circle of the cambium layer * becomes brown and rotten; and it is not until this ring of disease is nearly completed that the plant "sleeps"; and thus the outward manifestation of the disease comes too late to be of any use as a warning or indication of the danger, and a whole houseful of plants is often killed before it is known that the disease exists. The rotting of the cambium layer (including the inner cortex) is due to the presence of the mycelium of a fungus, which rapidly extends upwards, usually killing the plant when it has reached a height of from 12 to 18 inches up the stem.

I wish now to draw attention to the fact that the growers in almost all cases ripen their fruit as far as possible upon the dying plants, and hence it is only reasonable to suppose that the Tomatos themselves, and probably also their seeds, contain the germs of the disease. After searching in vain for the fungus of this disease in the soil of a house freshly attacked, and after many ineffectual attempts at cures, I at last determined to test this question of the condition of the fruit. Sections of Tomatos from the diseased houses were made for me by Mr. Sinel, of Jersey, and these were sufficient to satisfy me that the disease may be perpetuated through the seed. I cannot, indeed, say that I have actually proved my point to the satisfaction of others, but I have opened up the question, and my hope is that it will now be taken up by experts, and my theory either confirmed or refuted.† The fruit chosen for my sections undoubtedly showed the presence of minute transparent hyphæ; no spore-like bodies have been found on the hyphæ, but Mr. Sinel, working with an

* The term "cambium layer" is incorrect, but is useful in describing the position of the first appearances. The fungus does not attack the xylem directly, but commences its attack in the formative layer on the outside of the xylem proper.

† The presence of hyphæ in the seeds has since been confirmed by Mr. G. Masee, of Kew.

oil immersion $\frac{1}{12}$ objective, reports spore-like bodies, separate, which gave him the impression of "bacteroids." This I have not been able to confirm, as I have not examined the slides with a higher power than $\frac{1}{8}$ inch, and I therefore may have missed them. I have, however, found a state of things which appears to me to be the result of the ravages of a rapidly growing mycelium. In many parts of the slides I see portions of minute hyphæ, but I cannot as yet say that anything like a distinct branching or matted mycelium is present. The pulp is in many places broken down and the oil-cells lying loosely about (known by their refracting power). The cells have left remnants where attacked, to which the oil-cells still cling by the adhesion of the protoplasmic walls. Mucilaginous globules also lie about in disorder. Within the ovules are in some cases bodies suspiciously like resting-spores, but I cannot say positively that they are such.

My theory, then, is that the "sleeping" disease is really primarily propagated by the seed, and the first thing to be done is to refuse to save or use the seed derived from the diseased plants. Cases have come to my knowledge where the plants have, by means of special soil and new seed-boxes, been protected from the supposed infected soil, and yet have died, as seedlings, from the disease. No doubt at all exists in my mind that ultimately the disease is present in the soil, and I have always recommended the use of pots in an infected house; but it seems also certain that primarily the disease is absent from the soil, seeing that it makes its appearance in the protected seedling. But when once a house is thoroughly infected, Tomatos can only be successfully grown in pots. The best method of treating an infected house, as far as my experiments have gone, is—

1. To grow plants in pots, and to let the natural soil of the house have a fallow season.
2. Give heat and water to the soil, in order to germinate any resting-spores.
3. To keep the soil loose, to assist the germination.
4. Apply lime thoroughly at least once during the fallow season.
5. Also apply 10 to 20 lb. of green copperas per perch during the fallow season.

6. Avoid organic manures for as long a period as is convenient.

Every plan fails, however, if seed from infected plants is used.

The other important disease I wish to mention is the "Eel-worm," which is committing awful havoc in Guernsey, practically destroying whole crops, and producing in some cases real financial difficulty, the failure of the crop being so very certain.

This disease is due to the presence of a small worm which penetrates the loosely fibred root of the Tomato, and, by encysting itself and its eggs, produces root-galls. This disease is well known, indeed too well known, to need any elaborate description. The Nematoids attack Lettuce, Melons, Geraniums, Begonias, and many other plants frequently found in Guernsey hothouses, and are therefore very difficult to eradicate.

A cure found very successful in America is to thoroughly freeze the soil. No doubt this plan would be practicable in England, but in Guernsey there is but little chance of a sufficiently severe frost to do any good, besides which such a succession of crops is kept up by heating the houses that if by chance such a frost should come it would not be allowed to act.

The remedies recommended are the application of lime, sulphate of iron, salt, and heavy dressings of seaweed, but they are but partially successful.

Tomato plants are also attacked and injured in a minor degree by a large number of grubs. In fact the houses are often happy hunting-grounds for minute forms of life. Many of these can be killed by a sudden change of temperature, and hence a good drenching with very cold water is often successful in mastering the evil; but I am persuaded that eventually the best way of fighting fungoid diseases will be the selection of disease-resisting plants and varieties, and saving seed exclusively from these.

[Since the above paper drew attention to this "sleeping disease" the following note has appeared in the *Gardeners' Chronicle* for June 8, which we have the editor's kind permission to reprint:—]

THE "SLEEPING DISEASE" OF TOMATOS.

During the past two or three seasons a Tomato disease, far more destructive than any of the many diseases previously known as attacking the Tomato, has been noted in widely separated localities in Britain, although the headquarters of the disease appear to be in Guernsey and the Isle of Wight. As a rule, the plants are attacked while quite young, but the outward evidence of the disease does not usually manifest itself until the plant is full grown, or even not before the fruit is set. The first indication that a plant is diseased is shown by the drooping of the leaves, which increases day by day, often accompanied by discoloration. If at this stage the root of the plant is split, the woody portion is seen to be of a dingy yellowish-brown colour, which becomes more marked after the root has been cut open for half a day. The above characters are the sure signs of the presence of the disease, and all such plants should be removed and burnt at once, as they have reached the condition of being able to communicate the disease to adjacent healthy plants. The disease is caused by a minute fungus (*Fusarium Lycopersici*, Sacc.) whose life history is as follows. Certain resting-spores of the fungus, present in the soil in which the young Tomato roots are growing, germinate and give origin to very delicate hyphæ or threads of mycelium: these hyphæ, on coming in contact with the young Tomato rootlets, attack the outermost layers of living cells, and soon find their way into the vessels of the root, which they gradually fill with a web of hyphæ which spreads to the adjoining elements of the vascular bundles, causing the discoloration already alluded to. By degrees the hyphæ of the fungus gradually grow up the stem, following the course of the vascular system, ultimately passing into the leaves and the fruit. The progress of the fungus up the stem of the Tomato can be readily determined by the discoloration of the vascular system caused by the parasite. When a plant has been attacked for about three weeks, the lower portion of the stem is usually more or less covered with a very delicate white bloom: this appearance is due to the presence of numerous fruiting branches of the fungus which have pushed through the decaying tissues of the stem for the purpose of producing their conidia or reproductive bodies at the surface, where they are readily dispersed

when mature by wind or rain, or artificially during the process of syringing or watering the plants. In structure the fruiting branches described above agree with a genus of fungi called *Diplocladium* (fig. 1), and will, in future, be called the *Diplocladium* stage of the Tomato fungus, which produces three forms of fruit at least. The *Diplocladium* stage usually lasts for about a week, at the end of which period the Tomato stem has become very much decayed, especially near the root, and is then usually

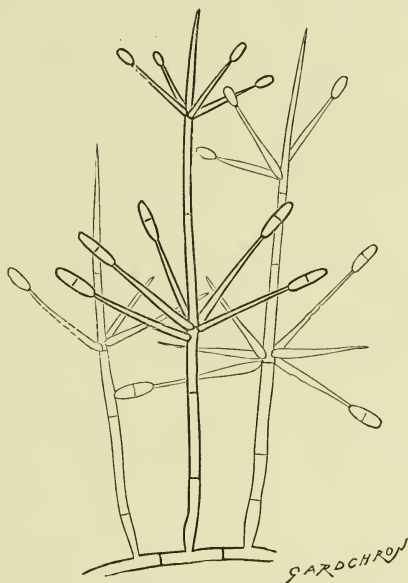


FIG. 1.—TOMATO FUNGUS—DIPLOCLADIUM STAGE : SUPERFICIAL.

studded with more or less effused, subglutinous patches, which are at first whitish in colour, becoming pale dingy orange at maturity. If a portion of this gelatinous mass be examined under the microscope, it is seen to consist of myriads of crescent-shaped spores, as shown in fig. 2: these represent the conidia of the second or *Fusarium* stage of the fungus.

Finally, the mycelium that has produced the *Diplocladium* and *Fusarium* stages of the fungus in succession at last bears numerous resting-spores (fig. 3), which tide the fungus over the winter, and until young Tomatos are again present, when

the cycle of development of the fungus is renewed. The resting-

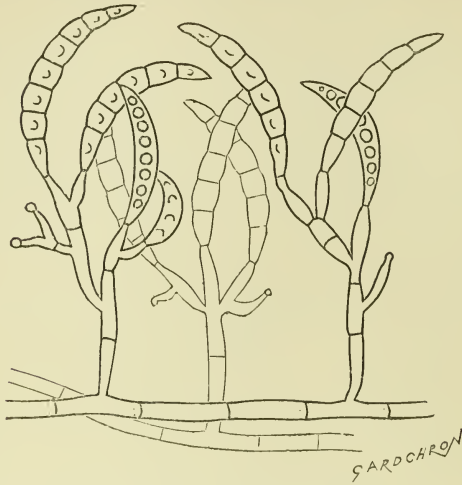


FIG. 2.—TOMATO FUNGUS—FUSARIUM STAGE : SUPERFICIAL

spores, or chlamydospores, are produced on the hyphæ running in the tissues of the decaying stem, and not on its surface, as

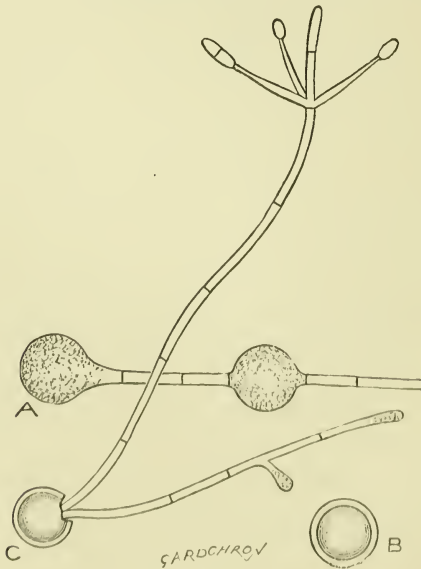


FIG. 3.—RESTING-SPORES : IN THE ROOTS AND IN THE SOIL.

was the case with the two previous stages. Fig. 3, A, shows the formation of chlamydospores on the hyphæ; B, a mature free chlamydospore; C, the same germinating, and producing the first or *Diplocladium* form of fruit. The resting-spores, as before stated, are present in the soil, and attack the roots of young Tomatos; hence the importance of removing all diseased plants before the resting-spores are formed, as these pass into the soil when the Tomato roots, where they are principally formed, decay. It is not sufficient to simply pull up the diseased plants, but all the rootlets should be removed, as these are the parts first attacked by the fungus, and consequently contain the most matured hyphæ, and, being surrounded by soil, the usual conidial stages are not produced; consequently the resting-spores are developed in greater quantities than in the above-ground parts of the plant.

It is somewhat remarkable, and contrary to the general rule, that the conidia of the rapidly maturing summer phases of the fungus—*Diplocladium* and *Fusarium*—whose function is to effect the spread of the fungus, should be unable to attack the living tissues of the Tomato, but such is the case; the conidia of both forms germinate only as saprophytes, growing readily on rich humus, manure, &c., the conidia of the *Diplocladium* on germination producing the *Fusarium*, the hyphæ finally forming resting-spores in the soil, the *Fusarium* conidia giving origin to its like and resting-spores on the hyphæ. Thus both stages, after extending their area during the summer months, agree in producing resting-spores in the soil, which renew the cycle of development by germinating and attacking young Tomatos during the spring following their formation.

Fusarium Lycopersici was first described by Saccardo in 1882, from Italian specimens, growing on decaying Tomatos, but was not at that time connected with a disease.

SUMMARY.

From what has been said, it will have been gathered that the germinating resting-spore is the only condition of the fungus capable of attacking the Tomato; hence the characteristics of the disease—drooping of the leaves in succession from the base of the plant upwards, and the discoloration of the wood in the root—should be thoroughly grasped, and plants promptly removed

and burnt, on presenting the first symptoms of the disease. By this means the formation of resting-spores in the soil would be prevented. On the removal of a diseased plant from a bed the soil should be thoroughly mixed with quicklime, which destroys any mycelium or resting-spores left in the earth.

Spraying with a fungicide is of no avail, as the roots are first attacked, and the parasite is internal.

As much lime as the plants will allow should be mixed with the soil in which Tomatos are grown, more especially if the plants are grown during successive seasons in the same beds. If the plants in a house are badly attacked, all the soil should be removed, and the walls &c. sterilised by applying a wash of lime.

Finally, the infected soil removed from a bed should not be thrown out at random, but should be sterilised by mixing with quicklime, otherwise the resting-spores present might find some other suitable host-plant, and thus furnish a new and unexpected centre for the diffusion of the disease. All the figures are magnified 450 times.—G. MASSEE.

LIFTING LARGE TREES.

By Mr. T. H. CRASP, F.R.H.S.

[Read March 26, 1895.]

LANDSCAPE gardeners very commonly recommend close planting to ensure *immediate* effect, and this is, of course, very necessary where the proprietor's wishes have to be studied in that direction. Unfortunately, however, the thinning which is subsequently indispensable is often neglected until it is too late to avert the evil, and in the course of years the result is crowded plantations and many fine trees spoiled or partly hidden by others of much less consequence. The only possible remedy after a long period of inattention is to undertake what appears so formidable to many people, namely, lifting and transplanting on a large scale.

Again, pleasure grounds or parks may have to be extended or altered, new mansions or buildings are erected, or carriage

drives formed, and in all cases plantations are required; and to avoid a meagre and poor appearance for some years it frequently becomes necessary to obtain both trees and shrubs of as large a size as can be safely transplanted, and very often such trees may be found on the same estate in positions where they are really deteriorating, and whence they would be better in every way for transference to more open quarters. But the lifting and transplanting large trees is so commonly regarded as such a serious, expensive, and risky work that the owners of estates too frequently let their plantations become practically weakened rather than resort to a measure that appears fraught with the danger of losing some valued old specimens. Perhaps the extreme course is adopted of cutting away trees that are crowding the finer specimens, but in many cases this is a costly and wasteful method which should only be entertained when other modes are impracticable or unadvisable.

It would be difficult to understand why there should be so much reluctance to undertake the removal of large trees were it not for the fact that in the hands of inexperienced persons such work has proved to be very expensive, and attended by a large proportion of failures which always become more widely known and are longer remembered than the better results attainable with due care. Certainly it is possible now to point out many estates where, under efficient superintendence, enormous improvements have been effected by the transplanting of large trees—cases amply sufficient to show what is really required for success, and to induce gentlemen to venture upon an experiment that should not be attended with more risk and loss than many other operations in gardening and estate work. When it is considered how much may be gained by such work, and what pleasure is reaped from watching the progress of handsome trees in suitable positions, as compared with the painful impression caused by observing the crippled giants of old crowded plantations, it is surprising that still more is not done in this way. I have recently had occasion to inspect one of the finest old parks in South Wales, where trees fifty to 100 years old are in many places crowded to such an extent that the struggle for existence has resulted in disfigured or disproportioned specimens where otherwise magnificent examples of arboreal beauty might have been ensured. The present proprietor is fully conscious of the

defects, and is anxious to correct the mistakes of his predecessors, though equally desirous of preserving his highly prized trees, and he is considering a carefully devised scheme to effect both purposes by an extensive removal of those that require more space.

Where new gardens or parks are being formed, one great difficulty always is to provide a sufficient number of large trees and shrubs to avoid the bare, unfurnished appearance which for several years is so disappointing while the young shrubs or trees are assuming the size requisite to display their true characteristics. Modern millionaires who admire our old well-timbered parks and handsome avenues, and who wish to see something of the same kind in the estates they form, are beginning to realise that it is possible to greatly lessen the too conspicuous newness of their demesnes by the introduction of larger trees than are usually planted. Nor is the work only within the reach of the wealthy, for the expense can be reduced within much more reasonable limits than was at one time thought possible, while greater safety can at the same time be assured.

It is often asked, What large growing trees can be lifted for removal with a fair prospect of success? The question is not easily answered in a few words. Not because the number of such is small, but because, in my experience, there are few which cannot be safely subjected to this treatment. I have lifted many kinds of Conifers and deciduous trees in different parts of the country, and under varying conditions of soil and climate, and the results have been so uniform that I can speak with confidence on the matter. Such Conifers as *Thuja Lobbi*, *Abies Albertiana*, *Picea nobilis*, *Picea cephalonica*, *Cupressus Lawsoniana*, *Taxodium sempervirens*, *Cedrus Deodara*, and *Cedrus Libani*, of heights ranging from 20 feet to 50 feet and proportionate diameter, have been lifted, and in some cases conveyed a distance of several miles, without any real injury. Magnificent Retinosporas, 12 feet to 15 feet in height, Portugal Laurels of great age, fine Hollies, Horse-chestnuts, and Copper Beech, with large Laburnums and Scarlet Thorns, and many others have also been lifted with equal success. With only one kind have I had any really serious trouble, and that is *Abies Pinsapo*, which, from some cause that I have not been able to ascertain, has proved very refractory and uncertain; and I should hesitate to advise the removal of very large specimens, except in a case of great urgency. The trees

occasionally do well, but at other times they fail quite unaccountably.

With regard to the age of trees operated upon, there seems to be very little more difference in the result than with those of varying size; for while I have lifted very many at the age of twenty years and upwards, some few have been moved with equal success that were probably not less than 100 years old.

I consider early autumn—say any time in September—the best month for lifting both Conifers and deciduous trees. In the case of the latter it is by no means necessary to wait until the leaves have fallen, or have even changed colour, for I have moved large examples in full leaf in early September when the weather has not been too hot and dry. In fact, such trees seem to recover more quickly, as the foliage no doubt assists in reviving the checked root-action, and there is time to recover before the soil becomes cold with the winter frosts.

In briefly describing my method of operation it is needful first of all to carefully prepare, map out, and prepare the plan of the work and its details, not only selecting all the trees to be dealt with, and the site to which each is to be transferred, but also making all arrangements for the promptitude of the removal and the replanting, so that when the work is once commenced there may be no hitch whatsoever, or occasion for any delay. The next important point is to decide upon the size of the ball of earth to be removed with the roots, and much doubt, or at least difference of opinion, seems to exist on this point; for when a tree has attained a considerable size it is often thought that the "ball" must be of such enormous dimensions that removal would be a practical impossibility. Now I have found that, in proportion to the height, vigour, or habit of the tree, the ball of earth may vary from 4 feet to 8 feet square, the latter size being large enough for the majority of trees (even for very well-grown specimens) that are likely to be removed. Having marked out the size of the "ball," I next have a trench formed round the tree at the distance decided upon, 5 feet wide and 4 feet deep, not ruthlessly cutting off all roots, but preserving them from injury as far as possible, as they can be spread out in their fresh position when the soil is being again filled in round the ball. Three feet below the surface we carefully bore through the ball from one side, and pass a stout, strong plank

through, each end of it resting firmly on brick pillars built up to the requisite height. This is continued until the whole of the ball and tree is supported entirely by the planks, which are, however, rendered firm by ramming soil under them as the work proceeds. A slope is prepared from this level on the side the tree is to be moved out, and after the roots are well matted round, a low, broad-wheeled trolley is backed up to the tree and underneath it as far as possible, the ball being lowered on to it by means of jacks. It is then pulled out of the hole with a windlass, as I have found that horses are apt to jerk and snap the chain or damage the tree or its roots. When the trolley is out of the hole and on the level, horses may be employed to move it any distance on good roads or over firm ground, provided that due care be exercised in securing the tree by stays of stout rope and chains over the ball. The site for the tree is prepared in the same way, allowing sufficient space to draw the trolley in and lower the tree into its position, disturbing the ball of earth as little as possible, the roots beyond the ball being spread out equally in soil carefully introduced, and made thoroughly firm. A good and ample supply of water then becomes necessary, and to ensure its penetrating the whole of the soil it is frequently necessary to bore a few holes through the old ball with iron rods, some judgment and care being essential in this part of the work to avoid damaging the roots. But I have found that more failures in moving large trees result from allowing the ball to remain or become dry after the moving, as the water naturally drains into the softer soil of the trench outside, much in the same way as it so often is with lately repotted plants. An occasional spraying over the foliage in the case of evergreens and trees in full leaf is most beneficial, and slight applications of manure also greatly assist some trees. With attention to these matters I have rarely found any serious difficulty, nor have the after-results been otherwise than highly encouraging and satisfactory.

When moving trees of more moderate size that can be lifted and conveyed to their place entirely by hand power, I have employed a collar formed of four elm boards, 3 feet long and 9 inches wide, $1\frac{1}{2}$ inch thick, each hollowed slightly on one side. They are then secured by bolts at the corners, one side being left unfastened until secured round the ball of the tree. By

means of corner loops and a strong pole on two sides four men can lift and carry a fairly heavy tree for a moderate distance, or it can be lowered on to a hand trolley.

These few hints may serve to indicate the general methods adopted, but, as in everything else connected with horticulture, one of the greatest lessons we all have to learn is to adapt our knowledge to any particular circumstances that may arise. I should therefore modify my practice under different conditions, though in the main it would be unaltered, because it has proved so successful.

DISCUSSION.

Mr. J. CHEAL said that when plantations became overcrowded it was difficult to determine what to do with the trees in them—to know which should be cut down and which should be allowed to remain. Mr. Crasp had not touched upon the preparation of a tree prior to its removal bodily. His own practice was to have a trench dug round the tree about a year before the removal, and put some fresh soil in to induce the formation of new roots. When transplanted these would be of great benefit to the tree. Amongst the Coniferæ Mr. Crasp omitted *Araucaria imbricata* as being a tree suitable for removal, but he quite agreed that *Abies Pinsapo* was a difficult subject to transplant. As a rule, it would be found advisable when lifting trees to trim the roots cleanly with a sharp knife instead of tearing them. When freshly transplanted the trees should be firmly fixed so as to prevent them being shaken about by the wind, and plenty of water should be given when necessary until the roots took a firm hold in their new quarters.

Mr. R. COOKE referred to the Yew tree in Buckland Churchyard, near Dover, as an example of a very old and large tree which had been successfully moved a few years ago from one spot to another without being injured. The tree, which he believed was mentioned in the Domesday Book, was well watered after transplantation, and was now in the best of health.

THE GENUS *CAMPANULA* FROM A GARDENER'S POINT OF VIEW.

By Mr. J. WOOD, F.R.H.S.

[Read April 9, 1895.]

It is from the gardener's more than from the botanist's point of view that I propose to speak of the Bellwort family.

The genus *Campanula* has a world-wide representation, wild species being found in every continent, but chiefly in the Old World, though possibly this is because of its flora being more fully investigated.

Gardens are said to take their complexions from the moods and minds of their owners, but, so far as one can judge, flower-lovers of all minds and moods otherwise have endorsed and accepted the Bellflowers as beautiful and desirable friends. One might seem by such words as these to flatter either the flowers or the gardener, or both, but it is not so, for though as a type of flower the *Campanula* is known all the world over, comparatively little is known by many, even by numerous experienced gardeners, of the exceedingly rich store there is in this genus, as represented by the multitude of types and varieties, their extensive range of colour tints, their numerous forms and constant succession of flowering when brought under cultivation.

It is not so much my intention to deal with the tender species, or even with the annuals and biennials, as to confine myself mainly, if not altogether, to the hardy perennials. When I speak of hardy I mean the capacity of the plant to withstand the rigors of even a severe winter like 1894-95 in any part of Great Britain, though one is aware that plants in captivity are largely influenced as regards hardiness by local conditions, such as rich, heavy, or light soils, wind-swept aspects, fairly elevated positions, or the warmer and closer and damper air of our river valleys. These things have all much to do with the hardiness and health of our garden plants, influencing them so much that a man must go to school afresh at every change of locality where he may do his gardening, even with the care of plants he has known and grown all his life.

To leave out of our present thoughts such beautiful biennials

and annuals as *C. Medium*, *alpina*, *Wanneri*, *thyrsoidea*, *sibirica*, *attica*, and *Loreyi* may seem unfair in more than one sense; but besides the fact that one cannot in a short paper deal quite exhaustively with any one class, those I have named may also well be left out for the present, because I wish to speak of Campanulas placed under such conditions in a garden as to grow after the way of nature—spreading and mingling one with another year after year, and so becoming a united and beautiful whole.

The various species of hardy Campanulas are pre-eminently adapted for special positions in the wild or in the rock garden. As a suggestion in passing, some are better for being used in big groups by woodland paths, others in the copse, and yet others never look more beautiful than when springing up from the moist ditch bank, or brightening the hedgerows with their tall spikes at midsummer. But I wonder if anyone has ever tried a garden of Bellflowers—Bellflowers to the exclusion of all other herbaceous plants, and with only a backing of trees or suitable evergreen shrubs to break up that plainness of surface which inevitably comes about for several months of the year in all herbaceous borders. I do not see why, with such an enormous number of species (and of varied forms) as belong to this genus, we should not try a Bellflower garden as well as a Lily garden, a Rose garden, Ferneries, or Pæony breaks. It would have the merit of novelty and permanency, and its beauty and interest would be assured by the intrinsic merit and adaptability of the individual species throughout. As a matter of fact, I have tried it on a small scale, both in my own and in other people's gardens, and, believe me, it is remarkable how the blues and whites, and the many shades of purple, mingled with the evergreen shrubs just referred to, and, dying back into the deeper shade of a wood or plantation, attract and please by their somewhat sombre effect, as distinct from the more ordinary garden effects produced by the stronger glare and more numerous colours dotted here and there. The effects are at once rich and restful to the eye, for it is not all colours that mingle well with the purples, more especially with the red-purples.

Let us, for a moment at least, imagine a Campanula garden, and in so doing we may usefully find hints and suggestions of a practical kind. And before we begin our word-picture let us reflect on what a Campanula garden essentially implies—namely,

an ideal site. This should be fixed where there is suitable environment, because of its special character. I mean this in the sense that if we are to gather together in one place a special collection of flowers of one family, it will be worth while to do so with surroundings which may be expected to be conducive not only to the best scenic effects, but also to the best accommodation of the plants culturally. If we grow *Campanulas* in mixed borders, or mix them with other Alpines on our rockeries, as a matter of course the borders and rockeries are not, and need not, be specially selected so as to give the *Campanulas* all or even a maximum of the advantages; but it could, and should, be otherwise with a *Campanula* garden, and my point is that they merit and warrant this special style of culture where the opportunity presents itself.

Doubtless many of the species (such as the Alpines) are better for the rarefied atmosphere of the higher altitudes, but generally speaking this section of *Campanulas* flourishes in almost any position where they are not absolutely or too partially shaded. It is well known that *Campanulas* flourish in the vicinity of dwarf shrubs and trees; if these do not obstruct the direct skylight they conduce to a more balmy condition of the atmosphere by reason of the amount of moisture evaporated from the abundance of leaf surface. I believe these are generally accepted facts, and, given an ideal position for a supposed *Campanula* garden, let us feebly attempt to imagine the picture.

Coming round a bend where a slope rises from a small stream, the slope facing to the east, and by another bend facing to the south: the slopes furnished with dwarf shrubs a little distance up, presenting sometimes rounded, at other times forked points, tapering in dwarfness to within a few inches of the ground. A little beyond, the groups of shrubs become larger as well as the stature of the individuals higher, and beyond, again, are forest trees, common to our parks and woodlands. Turning round and glancing at the irregular strip or stony bank between the walk on which you stand and the stream, your eye is caught at once by large patches, rambling between the boulders, of the delicate *C. hederacea*. *C. isophylla* (both the white and blue forms) is far happier in these moist stony positions than you are wont to see it in drier places.

Relieving the stones are the glorious spikes of the big-

belled *macrantha*; and *cæspitosa*, with its free habit and pleasing leaves, as well as its abundance of flowers, has possession of a broad piece of the bank, and has rapidly encircled many of the big boulders. There are Ferns, both large and small, but these *Campanulas* by the waterside run around them; forbidden by the darkness or the shadow of the spreading fronds, they have simply accommodated themselves by turning in other directions, and they seem grateful that they may ramble elsewhere.

By the edges of the walk on both sides, and delightfully creeping into the gravel, are large masses of *C. pusilla* in various shades of colour, but, of course, including the white form. *Allioni*, a pigmy plant with giant flowers and bells erect, occupies a similar place. The pretty *garganica*, with its racemes of starry flowers—procumbent—and with each flower suggesting a white star in a blue foil, forms itself into charmingly rounded tufts, the centre cushions of delicate green being surrounded with a ring of starry inflorescence. In no case do these humble Bellworts occur in line, but, on the contrary, break up the essentially line-character of the walk. Unless you watch your feet, you may tread on pretty tufts of *mollis* and *muralis*. *Pulla* you may easily overlook, as its herbage is so thin and scarcely conspicuous when not in flower; then, however, you cannot miss it, for its comparatively large black-purple bells almost invite you to kneel down and closely examine and admire them.

Here and there near the walk are more of these humble beauties, such as *Waldsteiniana*, with its hair-like stems, almost leading you to suppose that its sheeny bells are without supports. In the slight gutter on the walk side, and evidently loving the gravel, is the rare grey-foliaged *Raineri*, with erect cup-like flowers of a delicate heliotrope hue. In the warmer soil, by reason of its mixture with the gravel, is *Portenschlageana*, which in fatter soil might not delight you with its perennial appearance. There you see a deep green and shining mass of overlapping and somewhat rosetted cushions of foliage, with dumpy and stout, but very short flower-stems. That is surely the typical *nitida*, and by its side, of a paler green, and evidently not so robust, is its *white* form. In passing let me say this is one of the most exquisite of the dwarf Bellworts, and all too rare. Seldom are its flowers borne above 4 or 5 inches high: they

are of ivory whiteness and stout substance, quite 2 inches across, and looking skywards. *Cenisia* and *excisa* are rare gems, flourishing only where the rooting medium and the conditions of moisture exactly suit them. *Zoysii* has a place in this open, sunny, and withal moist position, and suggests an inquiry whether it has not really got into wrong company in the Campanula garden, so unlike the Bellflowers are its contracted tubes with mitre-shaped limb—but, oh! how exquisite. Only 2 or 3 inches high at most, the flowers are in abundance, surmounting delicate tufts of spoon-shaped tiny leaves, compared with which the flowers of $\frac{3}{4}$ inch long are large. The seeming white lines which really form the edges of the corolla, and which appear to cross symmetrically over the mouth of the tube, constitute the feature to most excite our curiosity in connection with this gem.

We linger among the Alpine species, and directly we find *valdensis*. This seems to come somewhat near to *pusilla*, but it is more refined. Its flowers are so shell-like that they rattle in your hand, or when you draw your hand over them. *Fragilis* is a delicate beauty, as implied by its name, and *abietina*, with a dense-growing matted habit, has three rather distinct features—pale green herbage, glistening sky-blue flowers, and an abrupt ascending flower-spike.

A little further back from the edge of the walk are species and varieties of somewhat stronger growth and higher stature. The lovely group of *carpatica* first attracts our notice. This comprises the three or four shades of *turbinata*, two or more shades of the distinct *pelviformis*, the two (reputed) varieties of "C. F. Wilson," and the, so to speak, "false" *Raineri*—not *Raineri vera*. More or less near to *turbinata* are various other forms of *carpatica*, as *alba* and *pallida*, and where these plants have been allowed to seed themselves the natural hybrids of this type are delightfully confusing. There is also the *aggregata* group, 1 to 2 feet or more high, *glomerata* and *dahurica* being conspicuous.

There have been planted here also, according to the more ancient nomenclature, *Campanula grandiflora* and its varieties (known nowadays as Platycodons). These are distinct to a degree, as the change of name made by botanists would seem to imply; but so lovely is this group of some four forms, in-

cluding the dwarf and indispensable *Platyodon Mariesii*, that the planter has been justified in making a slight botanical deviation in the Campanula garden.

There is the pleasing *C. Hendersoni*, a sort of pigmy *pyramidalis*, an almost ceaseless bloomer, and one of the best Bellworts—a hybrid itself, it somehow seems to be variable.

How grandly that pair of *Hostii* show up!—the pure white and the deep blue side by side in big patches. This species literally produces sheaves of flowers. With the knife, in sickle-fashion, you may reap a handful of spikes 15 or 18 inches high, which fill a good-sized vase, and you may repeat the operation for many days consecutively.

Now we get a glance of a more homely group—the commonest of our native species—the Harebell, or the Bluebell of Scotland. How grandly this does in cultivation! And our interest is the more stimulated in connection with this from the fact that it has evolved many beautiful forms, more or less recognised now under botanical names, such as *linifolia* and *alba*, *soldanellæflora*, *major*, and a double-flowered kind. *Rhomboidea* and *Rapunculus* strike us by their profusion of flowers of deep blue. *Persicifolia* covers a large space, for not only do the root-stems wander quickly, but it varies greatly. There are five forms at least of white varieties—one, known as *coronata*, having a curiously puffed and puckered calyx. The type itself is by no means bad, but some of the varieties in both white and blue are great advances from the gardener's point of view, notably the one known by the long name of *C. persicifolia alba grandiflora*, and you may see amongst chance seedlings several shades of blue to match this for size and shape of flowers. *Nobilis* is not so gay-looking a subject, but it strikes one by its peculiar arrangement of the flowers. *Grandis* and *gemmaifera* are useful for their sheets of colour, and the white variety of the former is very telling.

As you cast your eye still further back, you see the giants of the genus, with, in front of them, yet a few more of intermediate stature. These comprise *americana*, with, by its side, the distinct and very uncommon *bononiensis*. We halt a moment whilst viewing this—it is so remarkable. It has long slender stems of 4 feet, arching outwards, and all the flowers for nearly the whole length are open at one time. They furnish the stem in a one-

sided fashion like a Foxglove, and the flowers rather resemble the shape of the Foxgloves, but are much smaller. It is a telling plant as we see, especially viewed at a short distance.

What is that lovely 5-foot strong-stemmed and diffusely branched kind, with myriads of flowers of medium size? The milk-white or pale blue flowers at once truly suggest it as *lactiflora*. *Latifolia* among the shrubs and nearing the trees, common as it is, is pleasing. *C. van Houttei* and *Bourgatti* are a capital match. They have extravagantly large flowers, exceeding the common Canterbury Bells, with the rims of the bells deeply cut, and did they not by the weight of their big flowers bend themselves too lowly, they would perhaps be more conspicuous. A wealth of beauty they undoubtedly possess, but it is not displayed to advantage. Still it were wise, I think, that these were placed here, as they constitute a somewhat distinct type. *Sarmatica* and even the common *urticifolia* contribute their quota to the Campanula garden, as seen yonder in the deeper shade. But I fear we shall have to leave the imaginary garden without noticing many other worthy denizens. For whoever can go into a garden where there are such vast variety and so much individual beauty that could take note of all in a single visit?

Some of the names just mentioned may have but slender botanical authority, especially in reference to the varieties of the types. Still they have the sanction of the usage of gardeners, and so may be more or less justified apart from the stricter botanical point of view. Speaking of names in relation to the facility of identifying the plants, the genus *Campanula* doubtless has long puzzled, and still continues to puzzle, the gardener. When a man has had experience in growing a large number of species in one garden, and has noted the result of self-sown seed, he has no longer any wonder that many forms prove puzzling. The mere fact of a large genus; the way in which some forms overlap each other; the difference in the habit of a given species as grown in captivity compared with its habit in a wild state; the large number of synonymous names, and the too frequent employment of obsolete nomenclature—all these things go to mystify our conclusions as to the identity of our material. I fancy I am not far wrong in saying that, generally speaking, gardeners do not realise how vast the variety of Campanulas is,

and as a consequence of this the genus is not yet fully appreciated by them. And the indubitable fact that to the average gardening mind the nomenclature of the *Campanulas* (at least as they are distributed in commerce) seems all in a muddle is hardly calculated to promote a larger employment of these decorative flowers. And yet it is precisely as a gardener that I would like to urge my humble opinion, that with a little pains the *types* may be fairly well recognised. As for the varieties, we cannot, even if we would, hope to master them in the sense of finality, for, besides natural hybrids, we get numerous garden varieties, especially where several types are growing close together as in collection. But when once one has reached the point of sufficient experience to be able to pick out the varieties, and group them around their respective types, then the haze of doubt in a great measure disperses, though even still, when you come to individuals, you may sometimes be long in doubt, and require more than one light by which to find your way out of the difficulty.

As one thinks about these flowers the subject seems to open up wider and wider; in fact, we have all in the *Campanulas* that can interest alike the botanist and the gardener: there is scope for the exercise of all those thoughts and arts which render gardening so pleasurable, but time forbids me saying much more on the present occasion, although I have not yet touched on culture and propagation. Suffice to say that, though generally the *Campanulas* have a robust habit, and are propagated by the very simplest and easiest means, there are some which are almost the reverse, and have special requirements and peculiarities. Whenever we investigate these plants it is always better to do so in relation to environment, for it goes without saying how many and how varied are the conditions of different gardens, and it is often among these varying local circumstances that we find the real causes which alone account for the different results attained. Generally, too, the *Campanulas* flourish, and increase in size in all their parts, under cultivation as compared with wildlings, and no doubt many of the Alpines experience their greatest troubles from a too kind and generous treatment. I dare say that some *Campanulas* are practically impossible in some gardens, but such exceptions would be very few indeed could we but trace out and avoid the excessive artificialism of some gardeners' cultural methods.

This shifts the responsibility of non-success in great measure from the plant to the planter ; and, to make my meaning clear, I will glance at one example. Take *C. Raineri*, a very dwarf Alpine with thickly pubescent herbage and somewhat thick underground stems. Its roots, to my mind, seem to have peculiar requirements both in regard to air and moisture, and their requirements may be met by keeping them near the surface, as on a moist stone ledge with a covering of well-consolidated soil, not more than 2 or 3 inches thick. With a deeper root-run I have found the roots to be rank in summer and to rot off in winter. On the stony ledge they seem to grow longer and faster, and to be much more wiry. We have, in fact, to humour a plant whose roots have very finely balanced requirements in the way of a freer atmosphere and moisture, whereas in regard to quality of soil it shows a corresponding amount of indifference.

In the cultivation of Campanulas, whether in the style of a Campanula garden or otherwise, it would perhaps always be advisable to prevent the escape of seed, even if we sowed the seed otherwise, because when the seed is self-sown the unaccountable ways in which it comes up and develops will upset all our ideas of classification, and, worse still, the strongest and perhaps coarsest forms will obviously prevail, and in a very short time such self-sown seedlings will doubtless upset the best-arranged planting of carefully named varieties. So insidious do those seedlings seem to be that it almost appears as if they were actually conspiring to cheat you, especially when they implant themselves in the heart of a choice kind, or correctly named group, and in a comparatively short time might easily be taken by a casual observer to be the rightful owners of the positions and the names.

In speaking of propagation I shall take the term in its more precise meaning, as the increase of a desirable variety by means of small parts taken from a common stock. I should hardly consider this analogous to "propagation with a spade," cutting off a slice of the matted roots of, say, such free growers as *pusilla*, *carpatica*, or *turbinata*. The increase of these implies no care or skill to speak of, for they carry a full complement of all the parts essential to free growth, without artful or helpful means. I think it is rather important for the propagator to keep these

distinctions in mind, because of the widely varying root habits of the sections, and even of the individuals. For instance, the taproots of *C. Hendersonii* being furnished with fine fibre, you may propagate it readily if the season of the year encourages growth by reason of its warmth and long light days; but you may not pull this plant asunder in the dormant season with impunity. Just the same may be said of *pelviformis* in the *carpatica* group, and there are others; but I prefer those better-known and common forms as examples of my meaning, as then, if my words have any value, they will have a more extensive application and may easily be proved.

There is another feature about the roots of many *Campanulas* that may have been observed by those who handle them in numbers; some of the fastest growers are remarkable for the way in which their roots become almost invisible or unfindable in winter. Instances of these are to be found in the *carpatica* group—*e.g.* “G. F. Wilson” and one or two nearly related hybrids. Likely enough they inherit this from one of their supposed parents—*pulla*—because *pulla* is as remarkable as any for this habit; and may we not take it that, whenever a plant so closely reefs or contracts its physical parts, we may only deal with it for propagation purposes when the roots are in a growing state? Anyhow, it is a fact that we succeed with their propagation vastly better when in a sprouting or verdant condition, as opposed to the dormant state.

DISCUSSION.

Mr. H. SELFE-LEONARD said he grew several kinds of *Campanulas*, and found little difficulty in regard to the treatment of most of them. He could hardly tell whether Mr. Wood treated *C. alpina* as an annual or a biennial, and *C. pelviformis*—which he regarded as the best form of *C. carpatica* or *turbinata*—he had no difficulty in protecting. *C. nitida* he found difficult to flower, while *C. Raineri* he considered the most charming of all. *C. Zoysii* was more easily grown with him than appeared to be the case with most other cultivators. In reply to Mr. Burroughes, who said he had lost *C. Zoysii* and *C. cenisia*, Mr. Leonard remarked that *C. Zoysii* would thrive in a chalky situation, and that it stood the winter of 1894–95 with the protection of a piece of glass only. As to dividing the clumps by means of the knife or

the spade, Mr. Leonard stated that the weapon employed would depend to some extent on the species. For example, *C. persicifolia* would stand division by the spade, but many other *Campanulas* would not, and, personally, he preferred using the knife for all.

Dr. MAXWELL MASTERS referred to the trial of *Campanulas* that was being made at Chiswick with a view to arriving at some definite results regarding habits and nomenclature. He alluded to a plant known as *C. pseudo-Raineri*, and demurred to applying the word "pseudo" to any plant, which was either one thing or the other. If the plant in question was not *C. Raineri*, then why not give it a distinctive name of its own, instead of mixing it up with *C. Raineri*? He had in his herbarium specimens of *C. Raineri* and the form known as "G. F. Wilson," but he really could not distinguish one from the other in a dried state. No doubt many variations were brought about by hybridists. He had no objection whatever to intercrossing, provided the hybridist would only record his operations carefully, and indicate the parentage of the various hybrids produced by him. Dr. Masters then referred to *C. isophylla*, which was a familiar plant at Mentone, but he thought very few had seen it—as he had—beautifully grown as a window-plant in some of the poor dwellings in Whitechapel.

PRIMULA CONFERENCE.

HELD IN THE DRILL HALL, JAMES STREET, VICTORIA
STREET, WESTMINSTER, APRIL 23, 1895.

THE Chairman, Professor MICHAEL FOSTER, F.R.S., in opening the proceedings, remarked that the Conference had been arranged with a view to increasing the amount of pleasure to be obtained from the culture of the various species of *Primula*. There were three ways of obtaining this result: (1) By procuring new plants from remote regions; (2) by practising the most successful methods of culture; and (3) by assisting Nature in the matter of hybridisation.

Professor Foster expressed his love for the whole *Primula* family, from the common Primrose to the most "civilised"

Auricula, and hoped that cultivators who grew only one or a few species would not treat with contempt some smaller kinds, which, perhaps, were not so attractive to them individually.

In calling upon Mr. J. G. Baker, of Kew, to deliver his lecture on "New Primulas," the Chairman happily remarked that Mr. Baker was everywhere recognised as the Gardener's Botanist, and as such was always most ready to impart the information which was so frequently sought from him.

ON THE BOTANICAL WORK WHICH HAS BEEN DONE
IN THE GENUS PRIMULA SINCE THE LAST
CONFERENCE.*

By Mr. J. G. BAKER, F.R.S., F.L.S.,

Keeper of the Herbarium of the Royal Gardens, Kew.

WHEN Bentham and Hooker published the third volume of their "Genera Plantarum" in 1876 they estimated the number of known species of *Primula* at 70 to 80. At the present time we are acquainted with 150, so that within the last twenty years the number of species has been doubled.

The external characters on which groups have usually been founded are taken from the leaves, which in some cases are folded towards the inside when young, and sometimes towards the back; the bracts, which in some cases are conspicuously gibbous at the base; the comparative length of the calyx and corolla-tube, and the absence or presence of folds at the throat of the corolla-tube. In 1886 Van Tieghem and Douliot published in the *Bulletin of the Botanical Society of France* a physiological classification of the genus, founded upon the structure of the stem, two main groups and seven sections; but as there are abundance of external characters to be found, this is not likely to be used either for purposes of horticulture or systematic botany.

The last *Primula* Conference was held in June 1886, and since that two separate books have been written which are entirely devoted to the genus. In 1888 Dr. Pax, one of the most able and industrious members of the new generation of

* Copies of the REPORT of the PRIMULA CONFERENCE, held at South Kensington in 1886, may still be obtained. (See *Advertisements*.)

systematic botanists in Germany, published in the tenth volume of Engler's "Jahrbuch" a complete monograph of the genus, which was afterwards brought out as a separate work. By this date the greater proportion of new species discovered by the French missionaries in Western China had been described. He includes 135 species, which he classifies under twenty groups, two of which (*Floribundæ* and *Auriculæ*) have the edges of young leaves involute, and all the others the edges of the young leaves revolute. He gives a key under each group showing the characters of the species, and traces out carefully their synonymy and geographical distribution, giving also an account of the hybrids and an historical review of the genus, and a full account of the range of character shown by the different organs. This work leaves little to be desired as a monograph, except that I think the number of groups might be reduced with advantage; but, unfortunately, it is only accessible in German. I will return to the groups later on in my paper.

Another work, also in German, is E. Widmer's "Monograph of the European Primulas and their Hybrids," published at Munich in 1891. The author was a pupil of the celebrated Professor Naegeli, who contributes an introduction. This work deals with the European Primulas with characteristic German exhaustiveness, 154 pages being devoted to general remarks, and the description of 22 species, their varieties and hybrids. It is especially valuable, from the cultivator's point of view, for the full account which it gives of the hybrids of the *Auricula* group.

The following are the principal papers and local floras which contain an account of the new species which have been discovered during the last twenty years. Dr. Franchet's first paper on the new species collected by the Abbé Delavay in Western China was published in 1885 in the 32nd volume of the *Bulletin of the Botanical Society of France*. In this 16 new species were described. In his second paper, published in the same journal a year later, 12 new species are added. In April 1888 he published in the *Bulletin of the Philomathique Society of Paris* a conspectus of the 11 Japanese Primulas. In the *Journal de Botanique* for 1891, in a paper written in concert with M. Bureau, he described five new species discovered by Prince Henri d'Orléans and his companions in their travels in Western China and Tibet. In the third part of the third

volume of the "Flora of British India," published in 1882, Sir J. D. Hooker described and classified the 43 Himalayan species. In 1891, in the 26th volume of the *Journal of the Linnean Society*, my colleague, Mr. W. Botting Hemsley, F.R.S., gave an enumeration and an account of the distribution of 43 Chinese species, and in the 29th volume of the same journal he described three new species discovered by Mr. Pratt on the confines of China and Tibet. A few additional species have been recently described and figured by Professor Oliver in Hooker's "Icones Plantarum," and by the Japanese botanists in the *Japanese Journal of Botany*. We have now in the Kew Herbarium specimens of 54 distinct species from China and Japan. The total number of species now known is about 150, of which, in round numbers, one-third are Himalayan, one-third Chinese and Japanese, and the other third spread through Europe, Northern Asia, and America. The European species all belong to three out of the twenty groups recognised by Dr. Pax, and in the appended table I have shown how the Himalayan, Chinese, and Japanese species are distributed through these twenty groups.

P.S.—In Part II. of the *Bulletin of the Museum of Natural History of Paris*, just received, three new Chinese species are described: *P. chartacea*, allied to *P. obconica*; *P. sinuata*, allied to *P. Wattii*; and *P. breviscapa*, allied to *P. sonchifolia*.

Name of Group	Type Species	Total	China	Japan	Himalayas
1. Sinenses . . .	<i>P. sinensis</i> , L.	15	7	1	9
2. Fallaces . . .	<i>P. yesonana</i> Miq.	4	—	3	—
3. Monocarpicæ . .	<i>P. malacoides</i> , Franch.	2	2	—	—
4. Floribundæ . . .	<i>P. verticillata</i> , Forsk.	3	—	—	—
5. Petiolares . . .	<i>P. petiolaris</i> , Wallich	3	1	—	2
6. Bullatæ	<i>P. bullata</i> , Franch.	4	4	—	—
7. Vernales	<i>P. veris</i> , L.	3	—	—	—
8. Soldanelloides .	<i>P. pusilla</i> , Wallich	8	3	—	5
9. Auriculatæ . . .	<i>P. auriculata</i> , Lam.	8	1	—	2
10. Capitatæ	<i>P. capitata</i> , Hook.	7	3	—	5
11. Farinosæ	<i>P. farinosa</i> , L.	11	3	1	3
12. Minutissimæ . .	<i>P. minutissima</i> , Jacq.	3	—	—	3
13. Tenellæ	<i>P. tenella</i> , King	6	2	—	4
14. Nivales	<i>P. nivalis</i> , Pall.	13	6	—	4
15. Barbatae	<i>P. vinciflora</i> , Franch.	3	1	—	2
16. Macrocarpeæ . .	<i>P. macrocarpa</i> , Max.	7	1	5	—
17. Calianthæ	<i>P. obtusifolia</i> , Royle	11	5	—	5
18. Cordifoliæ . . .	<i>P. reticulata</i> , Wallich	6	—	—	5
19. Proliferæ	<i>P. japonica</i> , Gray	9	7	1	1
20. Auriculæ	<i>P. Auricula</i> , L.	21	—	—	—
		147	46	11	50

THE CULTURE AND CLASSIFICATION OF PRIMULAS.

By Mr. H. SELFE-LEONARD, F.R.H.S.

[Read April 23, 1895.]

MAY I be allowed to say a word in explanation and excuse of my appearance on the programme, and that the honour was unsought, indeed disclaimed by me, and was, I take it, the result rather of the paucity of Alpine Primula growers than of any other cause?

And may I also add, as regards the announcement of my subject, that it was not that of my own choosing as the title of a formal paper, though it certainly indicates the directions in which I am glad to offer a few observations, and desire to promote discussion, in this Conference?

I am almost appalled to find myself, for such purpose, alone in the same curriole, or rather carriage, with eminent botanical authorities like our Chairman and Mr. Baker, and with such a prince among cultivators as Mr. Douglas.

And yet, on second thoughts, I can catch at the encouraging certainty that, if that same carriage held the four of us, and we were now nearing the summit of some Alpine pass, say Stelvio or Albula, or Furka, and were in sight of mountain Primulas and Ranunculi, we should, I believe, be a very easy and untimid company, however recent our acquaintance; and the last thing either Mr. Douglas or I would think about would be, whether we were wise enough for the company of those two encyclopædias of botanical learning we carried with us.

And I am further consoled by the reflection (confirmed by perusal of the proceedings at the last Primula Conference—the first, I think, of its kind) that there is left something to be done which can, perhaps, be as well done by a mere practical and cultural enthusiast who has little or no botanical learning; and that is, the subject of European hardy Alpine Primulas, considered from a gardener's standpoint, and of their culture, whether under glass along with florists' Auriculas, or in the open garden.

Considering the charm and character of their beauty, the suitability of our climate to the great majority of the species

and their comparative ease of culture, the small extent to which choice collections are found is remarkable. The more so for the reason that their more civilised sisters, the florists' Auriculas, although all too seldom seen at their best, even in good gardens, are yet, by comparison, seen frequently; that wherever these can be grown, so can the wild species, with, on the whole, greater ease; and that while all choice florists' Auriculas need glass protection to do them any justice, with the majority of the *Primula* species this is not the case.

I attribute this fact, myself, first to comparative ignorance of their beauty. The group has never "boomed," so to speak, sufficiently to give it that publicity which should secure for it a permanent place among plant-lovers. Then, again, while the larger number of species are of easy culture, some are not so. A very few are not so even with winter shelter, and so the whole class has been discredited by the failure of a few.

Finally, the nomenclature of the genus has been in so chaotic a state that it has repelled many from the subject. A word or two first on this question of nomenclature.

The Report of the last *Primula* Conference, published by the R.H.S., and the perusal of which I may recommend to all, contains an elaborate synonymic list of the known species and forms of the genus put together by Mr. Dewar, lately of Kew Gardens.

The number of names in this list with a botanist's name attached to each is over 600, including hybrids and natural varieties named by botanists, but not including garden varieties named by nurserymen.

Of this number no less than 365 or thereabouts (nearer two-thirds than one-half) are marked as mere synonyms or second names, thus reducing to about 300 the number of species, hybrids, and well-marked varieties known to the compiler, and authorised by one botanist or another. The typical species alone are, of course, far fewer, for the hybrids and varieties are many; and these are sometimes, by-the-bye, the more beautiful plants.

After all allowance made, I think all competent botanists allow that the confusion is extreme. They are fellow-sufferers with us gardeners in this matter, and such only. For let me say, in passing, that, while botanical nomenclature is in its

present state, no worse use of time can, in my view, be possibly made, either by gardener or botanist, than to occupy it in seeking to fasten on his brother plant-lover responsibility for the confusion.

To the extent of this confusion the figures I have just given scarcely do justice. For it might be said that out-of-the-way and little known kinds were responsible for it all, and that in regard to others such confusion did not exist. The fact is otherwise. Take, for instance, *Primula integrifolia* of Linnæus, a well-known plant and a well-known name. Yet this name has been used by no less than five botanists as that for as many other and quite distinct species. I could multiply instances indefinitely, but it is needless.

It is, I believe, a canon law in botanical nomenclature that the name rightly belongs to that plant to which it was *first* applied, and this rule may largely correct the mischief for those botanists—surely few, if any—who are learned enough in all plant history to apply it. But, for the bulk of us at least, the confusion remains. For this reason, and for others, I would strongly enforce on new students of the genus what was said by Mr. Baker at the last Conference, that it “is much the best plan to begin by learning thoroughly the clearly distinguishable species, and afterwards to work out the subordinate types.” I should venture to add that the nomenclature of some one leading botanist, an authority in the class, should alone be followed. Probably, as regards the genus *Primula*, this would be Kerner or Pax.

And to those who are disposed to commence the *cultivation* of these plants I should venture myself to give a piece of advice somewhat analogous to that given by Mr. Baker in regard to the *study* of them, namely, to commence with some of the most typical and distinct, and, I may add, with those most easy to grow, and to grow, at first at least, a fair number of each rather than single plants of many sorts. I shall presently enumerate kinds I can personally recommend.

I have only to remind you, before leaving the subject of nomenclature, that in the Report of the last Conference, already referred to, will be found, in addition to the longer synonymous list of Mr. Dewar, a short synopsis, prepared by Mr. Baker, of most of the principal typical species; and another and larger one

on similar lines, but extending to hybrids, by Herr Stein, of Breslau.

From nomenclature I pass to more practical matter.

When noting the reasons which make against the popularity of the group as garden-flowers, might I not have added the unnatural manner and "setting" in which hitherto they have been generally shown?

I will own to a doubt which I think I have never yet been bold enough to breathe in Auricula committee (where I am already heretic enough on some matters), that even our best florists' Auriculas, and especially our choice Alpines and Fancies, would look none the worse if we mended our ways in our mode of staging and exhibiting them.

Granted, at least for argument's sake, that skill in the production of fine specimens or of new varieties be the *chief*, or even the *sole*, thing for the judges to consider in their awards. I am not, therefore, completely convinced that the show should consist so largely of rectangular batches of pots, and that anything like setting or natural arrangement of the plants, or the provision of natural "carpetters" for them, should be almost or generally "tabooed" in every Auricula class.

I am on delicate ground I know, but the subject wants ventilation, and that is why I raise it. I am bold enough to think that even our best named Auriculas would, to nine persons out of ten, look better if they rose from a bed of, say, moss or Saxifrages. Even an exhibit of noble silver-leaved "Show" Auriculas springing from a white silk carpet of *Antennaria* would please most of us more than when severely marshalled in rows—each pot "nakedly and shamelessly" exposed.

Be the case as regards florists' Auriculas as it may, I argue with confidence that when we come to more natural flowers, like Primroses and *Primula* species, excuse for such modes of staging as at present obtain is, to say the least, very difficult. Surely, without affecting close imitation of nature, where such is impossible, we can *suggest* nature, and can often by simple means make an exhibit more pretty and natural as a whole; something approaching to a plant-picture, rather than so many "plants in pots." And the same plan of natural arrangement may well be carried also into the Alpine house, even to the frame. On the rockery it already largely obtains.

I should like, too, to put it to the Conference whether, on every ground, the different classes of *Primula* should not be better classified than at present for exhibition and other practical purposes. I am not, of course, speaking of mere botanical grouping.

We seem to have at least three groups which should be, I think, more or less kept apart.

First, the greenhouse species, nearly all from Asia, such as *obconica*, *sinensis*, *mollis*, *erosa*, and *floribunda*, with *P. verticillata*, which alone is from Africa.

Secondly, the *large-habited* and coarser, harder species, invaluable for the open garden, and generally of easy culture, but not generally suited for close association with the third group. This third group will comprise the smaller and choicer high mountain sorts.

The second and coarser group comprises some noble garden plants, such as *P. denticulata* in its many fine varieties; *P. japonica* in perhaps as many (a fine plant, by the way, for massing under trees). *P. capitata* in this group is a plant which should be again brought to the front for its splendid flowers of the richest purple. In addition to the type, which (with me at least) blooms in the majority of months in the year, there is a superb large-flowered variety, which seemingly only blooms in the late autumn. The bog-loving *P. sikkimensis*, the invaluable *P. rosea*, and the rarely seen *P. Stuarti purpurea*, and probably *P. Poissoni* from the Yunan, must be included in it.

Whether the many other choice *Primulas* which have from time to time reached us from Asia should (if my notion of grouping for exhibition and for culture were followed) be distributed among the three classes suggested, or whether perhaps a fourth group be not needed to include them, I am not competent to judge, for I have had little experience with their culture. They have, I am glad to see, to be treated of by others. The culture of many or most of them seems hitherto to have been but little understood, and it would seem either that they are naturally biennials—at least in this climate—or that their culture is difficult. Many once imported are no longer to be found. Such gems as *P. Reidii* and *obtusifolia* seem nearly lost, and *P. petiolaris* and *amethystina* wholly so. We have, I fancy, yet to learn almost everything about the culture of these choicer Asiatic

species. Nothing that I know of would be a more welcome service to hardy horticulture than a fresh collection and distribution of reliable seeds of the group in question.

The reasons for some such grouping as I have suggested are evident enough. The greenhouse species, the subject of the first class, however beautiful and interesting in themselves, associate ill with the robust and hardy border kinds, while noble exhibits might be made of these latter in more natural and congruous company.

And both classes are still more out of place side by side with the small and choice high Alpine sorts. These latter have a style of beauty altogether their own, which is overshadowed and obscured by the company of the grosser and more obtrusive species.

I am aware that at present Primulas are so little grown and shown that all that are at present sent to our shows can be accommodated all too easily in a single class. But I am not sure that the paucity of exhibitors may not be explained by the lack of classification which I have regretted. More would be grown, and so more be shown, with increased method in classification and in culture.

The rest of what I would say to-day relates solely, or nearly so, to my third group, viz. Alpine species of Primulas.

Nearly all of these have their habitat in Europe; and all, too, may with enough of correctness be termed "alpine," for in the few cases like those of the Bird's-eye Primrose, and of *P. mistassinica* (from extreme North America), which are found at low levels, either the plants are found as we move southwards, on mountains only, or their climatic conditions are alpine in character. You know, doubtless, that *P. farinosa*, the Bird's-eye Primrose, is the one species of this group found in England. It abounds in Teesdale. Scotland has alone the rarer but allied *P. scotica*.

As regards the culture of these Primulas less needs saying than looking at the paucity of growers of them might be supposed.

Outside a few which are really difficult to suit, such as *P. glutinosa*, "the blue speik" of the Tyrol, some, like *P. minima*, being fairly easy to grow, but less so to bloom—outside such, I say, the general culture is simple, if indeed so serious a term as *culture* need be used at all.

Broadly speaking, it is that of the *Auricula*, and thus need not be repeated. The only points of difference are that we do not allow them to go so completely to rest in mid-winter, and that the continuous care and studied culture which are generally needed to produce *high quality* in the *Auricula* are not needed for the *Alpine Primula*.

It is to the needs of the hardier *Alpine Auricula*, rather than to those of the choicer *Show Auricula*, that I should liken those of these *Primulas*.

And the benefits which they derive from glass protection from late autumn to early spring are about equal, I think, both in extent and character, to those derived by *Alpine Auriculas* from the same, viz. finer quality in the flowers, protection from the mischief of excessive wet, and, I must add, preservation generally from oblivion and neglect. I am sceptical how far any of the species care for shelter from cold; many value shelter from summer heat.

The better opinion, I think, is that the matter of soil is not of the first importance. Avoid nostrums, of course. A good loam, with a little sand, but inclining to heavy rather than light—exactly such, indeed, as you would take for *Auriculas*—is the type of soil which suits most of them best. I think of none which prefer peat.

Complete drainage is, of course, essential; abundant moisture (not stagnant) in the growing season, and a fairly dry autumn and winter are desirable, unless the death-rate is to “mount.” Full exposure in summer and free air practically at all times are important. The cooler sides of the rockery—east and north—suit them best, and at least partial shade from a really hot sun they prefer, but it must not be secured by overhanging trees. If kept under glass at all, between April and September inclusive (as they should be only if necessary to protect the *bloom*), shade will be then essential. The cooler climates of Northern Europe are far better suited to them than those of more southern parts. I notice how much better many of them are grown in the open in the cool air of Scotland and of the North of England than in the South.

Some time back cultivators were much exercised on the subject of the benefit of chalk or calcareous soil for those kinds which in nature are only found upon such soil. The outcome of

experience in that regard leads, in my view, to the conclusion, not only that we need not, but that we should not, trouble our heads about it. This for a reason which it will be well to give. A chalk soil is in no way *essential* to the culture of any *Primula*; it is positively inimical to not a few, and even poisonous to some. And so, just as the tyro in horticulture is well advised to leave liquid manure alone, because, useful though it be in experienced, it is a dangerous tool in inexperienced hands, so the most of us, who have not enough knowledge of these plants to distinguish the calcareous from the non-calcareous species, will do well to leave *chalk* wholly alone, lest we give to some for food what may be in fact poison to them.

The better opinion seems to be that the action of a chalk soil on the plants is only mechanical, and consists in its power of holding moisture. Thus those many plants which require much water will only be found in nature on soils which give it them. They may, so to speak, wander on to drier soils "on occasion," but perennially they will not exist there. Nature seems, unlike many of us, only to grow what and where she can grow well and easily.

But if we do not mind the trouble of otherwise supplying the required moisture, experience conclusively proves that those Alpine *Primulas* which in nature are only found on calcareous soils can be easily grown in our gardens without a particle of chalk or lime in the soil.

On the other hand, and be the reason what it may, those *Primulas* which in nature are only found on granitic or other *non-calcareous* soils generally resent being planted on chalk. Even the common *P. viscosa* will not live with me on my chalk, and has to be isolated from it in pots. In any other soil, however ordinary, it grows with ease.

Since writing I have been interested to see that Herr Kerner, who is a grower of these plants as well as a botanical specialist in regard to them, confirms pretty exactly the opinions I have just expressed.

And now, in conclusion, I think I may perhaps usefully do, in regard to Alpine *Primulas*, what I recollect our Secretary, Mr. Wilks, once doing in regard to Daffodils, viz. commend a short selection of the best dozen or so—a "Baker's" dozen, I think, he appropriately chose for us.

Such first selection may well be about the same, whether for the rockery, or the frame, or alpine house, and whether for a representative set of single plants, or for a showy collection with a dozen or twenty plants of each sort in a mass.

I would emphasise the fact that many, perhaps most of the best, happen to be the commonest, as well in nature as in commerce, and also to be the easiest to grow. Indeed, it is natural, of course, that plentifulness and ease of culture should be found together.

First (not necessarily in order of value), I name the well-known golden-yellow *P. Auricula*, which has the additional interest that it is certainly one of the original parents of our florists' Auriculas. I believe it is rarely, if ever, found in nature off calcareous soil, but in the garden it grows with the greatest ease in ordinary loam. It has been much improved by cultivation, and the strains vary greatly in beauty and value.

Next, that loveliest of white Alpine Primulas, *P. viscosa nivalis*, not to be confounded with the rarely seen *P. nivalis* of the Himalayas.

It and the *viscosa* group generally are unhappy on chalk, and I mostly grow them in pots. But elsewhere it is of fairly easy culture, and grows, I know, in Scotland "like a weed."

Thirdly, I will name *P. rosea* in its best varieties, *grandiflora* and *splendens*, Asiatic though it be, for inclusion with even the choicest European Alpines. Its colour is so unique, and its habit so neat, that it must be accorded a place among the best.

Fourthly, if you want a large and robust Alpine species with crimson flowers to match with *P. viscosa nivalis*, take *P. viscosa major* (known to some, I think, as *Peyritschii*).

So great is the number of fine forms and hybrids of this well-known *viscosa* that the next five of my items must be taken from their ranks, viz. *P. ciliata* (of gardens), with a good blue-purple flower; *P. ciliata purpurata*, a brilliant red or crimson-purple; *P. Balfouri*, a beautiful Scotch hybrid of a rare tone of colour; *P. Lindsayana*, a scarce and fine hybrid from the same northern garden, I think; and *P. ciliata coccinea*, of a rare red shade, which has not been happily translated *coccinea*. These two latter plants are very scarce. There are, however, a number of fine hybrid forms of *viscosa*, and some of them commercially offered under the name *intermedia*, which

will be thought to run the foregoing very close, and to need inclusion in any selection of the best.

Passing from that group we come to a most recommendable plant in either *P. spectabilis*, *P. Clusiana*, or *P. Wulfeniana*. One is humbly thankful that, at last, these three kinds, formerly regarded as botanically distinct, are now generally classed under *spectabilis* or its varieties. They are from the S. Austrian or N. Italian Alps, and the colour rose-purple, sometimes very rich. Wulfen's Primrose is the smaller form, *P. Clusiana*, the largest. They seem of easy culture.

P. calycina, alias *glaucescens*, from the same regions, and rather in the same way, as another easily grown, smooth-leaved species, may well be added next.

Last, though far from least, let me name for completion of this collection No. 1, that perhaps most satisfactory of all, for either open-air rockery or frame, the charming *Primula marginata* of the Maritime Alps; not, of course, to be confounded with the quite different *P. Auricula marginata*, which comes from far more northerly habitats.

It abounds on the Sea Alps, and this time last year I collected some plants on the Gramont behind Mentone. As a show plant, or rather as a *Primula* show plant, it has one weak point in common with *P. viscosa nivalis*, *P. villosa*, and *P. rosea*, viz. that in the South at least these all bloom so early that it is often difficult to retard them until the middle of April. But for this very reason these four kinds are invaluable to lovers of the earlier Alpines.

Of this *P. marginata* there are several varieties besides the type. One, often called, not quite happily, *cærulea*, has a purple-blue flower, the blue predominating in the bud, but later degenerating. There is a larger-flowered form called *grandiflora*, and still finer seedlings raised by Dr. Stuart and my friend Mr. Boyd. Foliage and habit vary greatly in the several varieties. This particular species, in as many of its best varieties as are to be had, must, in my judgment, be placed among the best and most easily grown Alpine plants in cultivation.

So much for my first "Baker's" dozen. They are a homogeneous and even "set," differing sufficiently in character to be varied, but agreeing enough to be a thoroughly "congruous" exhibit.

It would be almost, if not quite, as easy to name a second dozen at all points desirable. Say, *P. farinosa* for delicacy and interest ; its pretty little white variety, too seldom seen ; *P. Forsteri*, an excellent hybrid of *minima*, which generally blooms twice a year ; the fine new and scarce hybrid *P. Sendtneri*, a rich-coloured hybrid between *P. pedemontana* and *Auricula* ; the white or whitish form of this last-named species, as well as the cross between *P. Auricula* and *P. viscosa nivalis*, which has yielded a charming sulphur-coloured flower ; *P. integrifolia* of Linnæus, for its distinctness ; *P. frondosa*, from the Balkans, for its rarity ; *P. salisburgensis* and *P. Huteri*, small hybrids of *minima* and *glutinosa*, which perhaps give us our nearest approaches to blue in Alpine Primulas ; *P. longiflora*, like a giant *farinosa*, and *P. Balbisi*, for its dark yellow blooms. There, I think, is a second "Baker's" dozen to be commended to those for whom a first is not enough.

Nature thus far has been the chief hybridiser with this genus. Personally, I trust that by the many hybrids presently, no doubt, to be raised by man, the natural beauty and character of the original species will not be so obscured or overshadowed that our successors two hundred years hence will be in like doubt to that in which we find ourselves to-day as to what species were two hundred years ago the progenitors of our garden Auriculas.

I have found it difficult to find much to say which I could hope would be acceptable or useful to very many here.

To botanists, as such, it was obvious that I could say nothing *new* ; and to orthodox florists, little which they will think *true* ; and the feeling of both, as regards my botany and my art, may perhaps resemble that of the friends of Artemus Ward for his picture of the moon in his showman's diorama. "My art friends," said Mr. Ward, with admiring self-complacency, as the intentionally wretched daub of a disc struggled up the picture, "say they never in their lives saw anything like that moon before, and," he added drily, "*they hope they never will again!*"

But if the feelings of botanists and florists are such, my notes may yet perhaps be found useful to those—for whom, indeed, alone they are intended—coming fresh to the subject of Alpine Primulas and their culture. And I have more confidently the hope that I have been able at least to raise questions—albeit, perhaps, old ones—worthy the attention of this Conference.

THE AURICULA.

By Mr. JAMES DOUGLAS, F.R.H.S.

It is very difficult to say anything new about the Auricula, or in any way to add to the information placed before the Society at the Conference held on April 20 and 21, 1886. The full report of the Primula Conference of that year is given in Vol. VII., Part 2, of the Society's *Journal*.* The introductory paper by the late Mr. Shirley Hibberd is a very able one on the "Origin of the Florist's Auricula." But it will be remembered that in that paper Mr. Hibberd stated that the Alpine Auricula (*Primula pubescens*) and the Show Auricula (*Primula Auricula*) would not cross. This has been shown to be an error. The two distinct specific forms can be crossed, as I have since proved. There is nothing gained, however, by crossing the two classes of Auriculas, the resulting plant being far inferior in beauty to those of either the Show or Alpine sections.

As a garden flower the Auricula has been grown and esteemed in England since the later years of the sixteenth century, but not until the present century has the plant been divided into sections. Up to the end of the eighteenth century the Show Auricula produced parti-coloured flowers without any well-defined edge or ground colour: they were splashed through with stripes of green and yellow from edge to centre, but in the early years of the present century the florists gradually obtained a well-defined edge, white or grey, while self-edged flowers were then always predominant.

The history of the Auricula is interesting, but it has been told more than once, and never better than by Mr. Hibberd in the paper alluded to. At the present time the flowers have taken on well-defined edges of green, grey, white, and self colour.

1. The green-edged Auricula has a well-defined margin of green on the upper surface of the comparatively flat corolla; inside of this margin of green it has a band of black, blackish maroon, or rarely of reddish colour. The centre is white, caused by a very dense coating of white powder (*farina*), whilst the eye of the flower is yellow, or ought to be yellow, and the stigma should

* See *Advertisement* in this issue.

not protrude from the eye, or, indeed, be visible amongst the anthers. None of the green-edged varieties have powdered leaves.

2. The grey-edged Auricula has farina coated over the edge sufficiently thinly to show the colour underneath, and it therefore has a greyish appearance.

3. The white-edged varieties have the coating of white powder so thickly laid on that the margin is white.

4. The selfs, or self-edged varieties, have the same pure white rounded centre, but they have an unshaded edge of blackish maroon, purplish blue, or red; in fact, of any colour that can be obtained provided it is unshaded.

There are also considerable variety and beauty in the foliage of the Auricula. Some varieties have foliage so thickly coated with farina as to appear quite white, and in many the freshly developed foliage is exceedingly beautiful. In Scotland this whiteness of the foliage has gained for the plant the local name of "The Dusty Miller," and a very appropriate name it is.

There are other forms of the Garden Auricula exhibited to day which should not be passed by without notice. In Class S of the Auricula Society's schedule prizes are offered for "Fancy Auriculas." These are of unequal merit; some of them are very beautiful, others are more notable for their oddity than for their beauty. Any variety produced by ordinary generation from the Garden Auricula, outside the four classes named above, may be described as a "fancy" Auricula. The characteristic of the greater number of them is a yellow tube and white centre, with a margin of green or grey, but no ground colour. There are also the yellow and primrose selfs, which are sometimes included amongst the "fancies," though they ought not to be so, as they come in naturally amongst the selfs, and very beautiful they are, especially a very fine one named Buttercup, raised by the Rev. F. D. Horner.

Before passing from the Garden Auriculas I may draw attention to a panful of the true *Primula Auricula* of the Alps. The plant was collected by the President of the Auricula Society, Sir John T. D. Llewelyn, Bart., M.P., who kindly gave it to me. It was only a small plant when I received it some fifteen years ago, and it has been under garden cultivation in rich soil ever since; but, although it has increased a hundredfold, there has not

been the least alteration in the size or form of the flowers. The same plant was exhibited at the Auricula and Primula Conference in 1886. There is also a peculiar form of the wild Auricula exhibited in a box of Primulas and Auriculas arranged for effect in Class W. The flowers are striped with red on a yellow ground and it is curious to notice that one truss has produced flowers of the normal form and colour, pure yellow. Varieties of the Auricula proper have also been produced from seed with double flowers. I exhibited one at the last Conference held by the Society, but it was considered to be the ugliest flower in the entire exhibition, and I did not continue to cultivate it.

I may be permitted at this point to draw more particular attention to the cause of the production of those Fancy Auriculas to which I have already briefly alluded. They are, of course, seminal variations from the edged flowers. Now a young Auricula-grower wishing to obtain plants from seed is tempted to purchase a packet saved from edged flowers of the green, grey, or white edged varieties, and he naturally expects the same class of flowers to be produced, but he will be woefully disappointed; half of them may be selfs so rough in character that they are hurried off to the rubbish heap as quickly as possible, others may be of the fancy type, and a few may be like the parents. These fancy varieties are, I believe, nothing more nor less than reversioners or semi-reversioners to the wild type, as they in many instances more nearly resemble the wild flower of the Alps than they do the garden Auricula. Even if the greatest care is taken to fertilise the flowers, and only the very best sorts are used for seed and pollen bearers, the cultivator may consider himself lucky if he obtains one really good Show Auricula in every hundred seedlings he raises. I am showing some green, grey, and white edged seedlings to-day of only moderate merit, but they are all from the very best crosses. The green-edged seedlings, for example, have been obtained by fertilising the flowers of the variety Francis D. Horner with the pollen of Abbé Liszt, and amongst these seedlings were numerous dark selfs with such badly formed flowers that I was glad to get them at once out of sight and buried in the rubbish heap. One naturally asks, Why this marked tendency to produce purple selfs, and selfs of such inferior quality? My idea is that these inferior selfs are also reversioners. But here we must

introduce another Alpine species or variety, *Primula venusta*. This is probably a variety of *P. Auricula*, but it has deep purple flowers, and from it we have the dark purple and maroon selfs; and these poor varieties are quite likely reversions to it, as the fancy varieties are to the yellow type. By selecting the very worst seedlings, and crossing and recrossing them, it would not take long, I think, to get back to the source whence our best varieties have been derived.

I come now to the Alpine Auricula, which botanists suppose to be derived from *Primula pubescens*. It was introduced to cultivation by Clusius some 200 years ago; but the whole matter was so exhaustively treated by Mr. J. G. Baker at the previous Conference (see page 213 of "Report on Primula Conference"*) that it would be presumption on my part to go further into the matter to-day. I will confine myself to the statement that it is easy to raise seedlings of good quality from the Alpine Auricula, there being really very few bad ones amongst them, and nothing like the variation that is to be found amongst the edged classes. I have already pointed out that there is no difficulty in obtaining crosses between the edged varieties and the Alpines, but such crosses as garden plants are of no value whatever.

The cultivation of the Auricula has been fully described by competent authorities, and we do not find much fresh information on this point in recent years. The Auricula, as well as all similar Alpines, may be propagated either by seed, offsets, or division of the plants. The seed should be sown in pots or seed-pans as soon as it is ripe, and the pans set in a shady place, as the seed is usually ripe about midsummer and the seedlings suffer from excessive heat. A few plants will appear in about three weeks from the time of sowing, but the greater portion of the seed will remain dormant until spring, when it will vegetate freely. The plants are pricked out as soon as the first leaf, after the seed leaves, is formed, and when large enough are repotted singly. They flower strongly the second year after sowing. It requires an entire season to grow an Auricula plant to its full size from seed or from an offset. Offsets are the side-growths, which are removed from the parent plant as soon as roots are formed from their base. They are planted in very small pots. They should be put into close hand-lights, with the air almost excluded at first, and shaded from bright sunshine.

* *Journal of the R.H.S.*, Vol. VII., Part 2, 1886.

Repotting of the flowering plants should be attended to in May; and they ought to go into their summer quarters, on the north side of a building or fence, before they are repotted. Ordinary garden-frames are the best places for them.

DISCUSSION.

Mr. MILNE-REDHEAD referred to a *Primula*, which he showed, supposed to be the result of intercrossing between *P. integrifolia* and *P. viscosa*. He had been looking for it in the neighbourhood of Luttron for some time (ten years since, Mrs. Milne-Redhead having picked up a flower by the wayside), and at last found the plant growing near the Pont du Diable. *P. viscosa* grew in the vicinity, but he never saw *P. integrifolia* there. He sent some of the plants to the Royal Gardens, Kew, but at that time no clear idea could be given as to its identity. Now it was generally regarded as a hybrid between the two species mentioned. *Primula scotica*, as grown at Kew, seemed to have much longer flower-stalks than his plants (which came from the same habitat in Orkney), and the segments of the corolla much more divided. He believed it to be a biennial, as it disappeared in a mysterious way, and rarely lived until the third year. *Primula farinosa*, which grew in boggy places, he said, would sow its seeds in limestone or gravel walks. It was certainly a perennial.

Prof. MICHAEL FOSTER, in bringing the Conference to a close, said that he hoped everyone had been interested in the possibilities opened up by the papers and discussion. There were possibilities of many things arising from the smaller species, and some of the finest forms yet had been derived from them. In regard to the nomenclature, something had been done, but there was still more, and he hoped the Society would one day issue an authentic list of *Primulas*. He thought Mr. Baker was right in calling the attention of collectors to the fact that they should give every information regarding the altitude at which plants were found, as it would be helpful to cultivators, but he (Prof. Foster) would like a little more than this. He had himself received many species with the altitudes at which they were found, but one very important item was generally lacking, namely, some information as to the kind of soil in which the plants grew. If this were also mentioned, he thought that growers would stand a far better chance of succeeding with new species.

THE PLANTS AND GARDENS OF THE CANARY ISLANDS.

By Dr. MORRIS, C.M.G., M.A., F.L.S., Assistant-Director of the Royal Gardens, Kew.

[Read May 14, 1895.]

THE Canary Islands consist of a group of seven islands lying off the coast of North-west Africa in lat. 28° N. They are in the same latitude as Florida, Egypt, and Southern Persia. The total area is about 2,800 square miles, and the population is 300,000, mostly of Spanish descent. The eastern islands, Lanzarote and Fuerteventura, are 60 miles from Cape Juby, on the Africa coast. The most western islands, Palma and Hierro, are 300 miles away. The distance from the mainland of Africa, with the Sahara in the background, "modifies not only the climate, the aspect, the flora, and the produce of the islands, but also the customs and habits of the people."* The eastern islands, Lanzarote (380 square miles) and Fuerteventura (797 square miles), are comparatively flat, and have large tracts of land covered either with yellow sand or with lava-ashes. The latter island (highest elevation 2,770 feet) has less verdure, there are no forests, very few trees, and springs of water are so limited that cultivation is dependent on the precarious rain supply. In very dry seasons many of the inhabitants have to move with their cattle for a time to the western islands. In the northern part of Lanzarote (highest elevation 2,244 feet) there are springs of water used for irrigation. In other parts crops are entirely dependent on the winter rains. In Grand Canary (634 square miles) the mountains in the interior rise to an elevation of 6,400 feet. Large tracts of land round the coast are barren owing to want of water. In some parts cereal crops are raised during the winter months by means of irrigation. The water from the mountains is carefully stored in tanks, and in the neighbourhood of these large crops of Bananas, Tomatos, and Potatos are raised. Inland, where there is a heavier rainfall and less necessity for irrigation, there are flourishing plantations of Sugar-cane, Grapes, Sweet-potatos, and Cereals. The island of Teneriffe (919 square miles) is divided along its whole length by a central ridge of high

* "Health Resorts of the Canary Islands." By J. Cleasby Taylor, M.D. London, 1893.

mountains culminating in the celebrated Peak of Teneriffe, with an altitude of 12,180 feet. The north-western side of the island, with the Orotava Valley, is very fertile. The rainfall is slightly heavier than in the other islands, and there is less need for irrigation. The eastern side is drier and comparatively barren.

Gomera (172 square miles) is almost circular in outline, with the coast extremely precipitous. The highest elevation is 4,400 feet. There is an abundance of verdure, and the mountains are often covered with splendid woods. The island of La Palma (318 square miles) is remarkable for

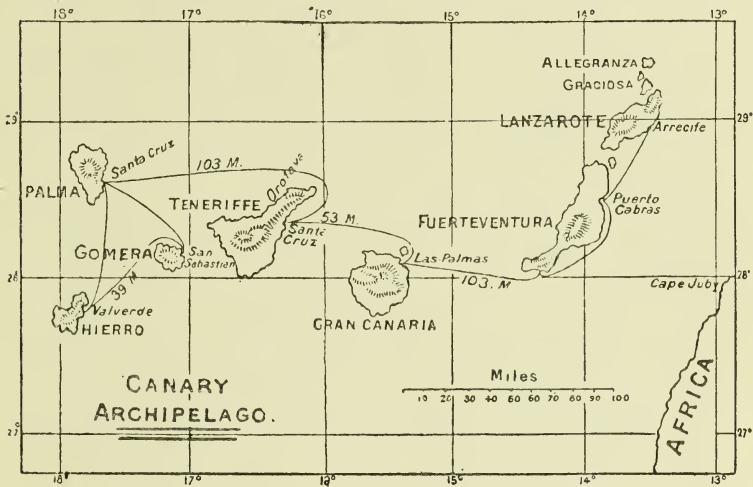


FIG. 4

its enormous crater, which occupies a great part of its surface. The highest point is 7,730 feet. There is considerable verdure, and the soil is fertile. Hierro (122 square miles) consists of a tableland in the interior, with cliffs rising suddenly from the sea. The highest elevation is 4,400 feet. There are no springs, and the people depend entirely on rain-water stored in tanks. The amount of vegetation in the several islands increases with their distance from the African mainland. It also depends on the proximity and height of the mountain ranges. The mean temperature during the winter months (December to February) at Las Palmas in Grand Canary, is 63° Fahr.; at

Orotava, in Teneriffe, it is $60^{\circ}3$ Fahr. The mean temperature on the Riviera at Mentone for the same months is 50° Fahr. The climate is therefore warm and mild, the air is usually dry, and there is abundant sunshine. The rainfall varies from 9 to 18 inches per annum. Of late years the Canary Islands have become more widely known, and they are fast becoming places of winter resort for invalids. They are within five days of Plymouth, six of London, seven of Liverpool, five of Genoa, four of Barcelona, and two of Cadiz. In addition, they are ports of call for passenger steamships bound for Montevideo, Valparaiso, the Cape, Australia, and New Zealand, while there is intercourse with the West Indies by way of Porto Rico and Cuba.

The islands anciently bore the name of the Fortunate Islands. They were known to Pliny. Juba, King of Mauritania, despatched ships to visit them, and reported to Augustus Cæsar that they were clothed with fire. He sent to Rome a present of two huge dogs obtained from the islands—hence probably the name Canary. After this they were forgotten. The Portuguese rediscovered them in the fourteenth century, and successive expeditions were fitted out until 1496, when Spain finally conquered them. All the original inhabitants had disappeared by the end of the seventeenth century. The islands now form a province of Spain, and the language is entirely Spanish. These islands have always been more or less noted for their produce. The Sugar-cane was cultivated as early as the fifteenth century by the aid of negro labour. Later the Vine was brought from Madeira, and Canary wine became in great request. The Vine-mildew, however, nearly destroyed the vineyards, but they are now being again revived. In 1826 the cochineal culture was introduced. This became for many years a most prosperous industry, but the discovery of aniline dyes has latterly driven cochineal out of the market. More recently Las Palmas and Santa Cruz have become important coaling stations, and the cultivation of Bananas, Tomatos, Potatos, and Oranges for the English market has almost taken the place of the cochineal, and given new life to the islands.*

* A very practical and comprehensive guide to the Canary Islands (with nine maps), by Samler Brown, is published by Sampson Low, London, 1894. The descriptive parts are carefully compiled and thoroughly reliable.

From the geological point of view the Canaries are singularly interesting. They are almost entirely of volcanic formation, and are really the peaks of submerged mountains—a continuation of the Atlas chain running westward into the Atlantic. The last eruptions took place in 1796 and 1798. Cones of ash and scorïæ—veritable cinder-heaps—mounds of volcanic mud of various colours, and rugged masses of lava extending for miles across the country bear abundant evidence of the origin of the islands. To get at the volcanic dust for soil it is often necessary, for instance in Teneriffe, to blast the solid lava and pile it up in heaps. This gives some parts of the country the appearance of an extensive stone quarry. In Grand Canary, where volcanic mud is more widely distributed, the cultivated areas are more easily reclaimed. The soil, where existing, is very rich and fruitful. The area suitable for cultivation is, however, comparatively small. Only about one-seventh of Teneriffe is capable of bearing crops, and the proportion in the other islands is equally limited. The land is usually very steep and stony. In fact, along the coast the aspect is singularly barren and desolate. It is only in the interior valleys, under the influence of irrigation, that crops can be successfully cultivated. Green slopes with grass (*monte verde*) are met with in the cloud region at an elevation of 2,500 to 4,000 feet. This is the region of the evergreen trees and shrubs. In Teneriffe above this there is a sub-alpine region with a dry climate, where only a few plants flourish. Humboldt visited Teneriffe at the end of the last century. His review of the vegetation is given in his "Personal Narrative" (chap. ii., Bohn's ed., 1852). The first zone he termed that of the Vine, extending from the seashore to about 1,000 feet elevation. It is that which was most inhabited, and the only part carefully cultivated. The native plants found were tree-like Euphorbias, Dragon trees, House-leeks, and shrubby Sow-thistles. The cultivated plants were Date-palms, Bananas, Sugar-cane, European fruit-trees, the Vine, and Corn. The second zone, in addition to the grassy slopes, comprised the Laurels of several species, a native Olive, Hollies an Arbutus, the Canary Ivy, numerous Ferns, Buttercups, and the native Foxgloves. The cultivated plants were chiefly Sweet Chestnuts and fodder plants.

The third zone with the Candleberry Myrtle (*Myrica*), the

beautiful Tree Heath, a Juniper, and the native Pine formed moderately large forests up to 6,000 feet. The fourth and last zone was the region of the singular Retama bush, found only on the plateau at the foot of the peak, and of a few herbaceous plants and grasses found only on the Peak itself.

The Canary Islands have furnished facts of the most interesting character in regard to the distribution and migration of plants from the time of Humboldt to the present day. Webb and Berthelot published in 1839 their great work, "Histoire Naturelle des Iles Canaries," which was long regarded as exhaustive. Other workers have, however, explored the islands more thoroughly, bringing forth many new facts.

More recently Mr. W. Botting Hemsley, F.R.S., has reviewed the vegetation of the Canary Islands in an able paper in *Science Progress*, ii. pp. 379-398. He bases his conclusions chiefly on the writings of Dr. Christ, who has thoroughly studied the Canary flora. Dr. Christ distinguishes three regions or zones in the islands—namely, the coast, cloud, and uppermost regions. The coast region includes the barrancos, or ravines, and the cultivated areas, ranging from the seashore up to about 2,000 feet. It is in this region that most of the introduced plants are found. The most abundant of the latter are the Cochineal Cactus (*Opuntia coccinellifera*) and the Spiny Cactus (*O. Dillenii*). They were purposely introduced in connection with the cochineal industry, and now that cochineal cultivation has been almost abandoned the plants remain as a scourge. The cloud region is the zone above cultivation. It is almost constantly enveloped in clouds, engendering a green and leafy vegetation. Under the shade of trees grow many Ferns, the giant Buttercups the Geraniums, the Canary Foxglove, and clumps of the white downy-leaved *Sideritis*. Above this, in Teneriffe only, is the singular Alpine region already described.

There is very little truly herbaceous vegetation in any of the Canaries. The plants met with are mainly the weeds of cultivation. Of native bulbous plants specially noteworthy there are *Pancreatium canariense* and two species of *Romulca*. These practically exhaust the list.

INDIGENOUS VEGETATION.

The deep ravines, known locally as "barrancos,"* that intersect the islands, often running many miles inland, are important features in the landscape. They may be volcanic fissures or formed by the wearing action of water. For a few weeks in winter they have a little water in them, or may even be rushing, roaring torrents. After that they are quite dry, and in some cases can be used as roads. When deep enough to afford shelter from the sun they are cool and agreeable places for afternoon rambles. To the botanist they are amongst the most interesting parts of the country. They give an asylum to numerous members of the native flora that would otherwise be ousted by cultivation. In the beds and along the sides of some of them there may be met with plants brought down by the winter floods from the highest mountains. For instance, in the Barranco San Filipe, near Puerto Orotava, plants from the Cañadas at 8,000 feet brought down by the great flood of 1877 were pointed out to me by Dr. George Perez as still existing there in 1893.

Of plants truly wild in the Canaries there are enumerated about 800 species. Of these, 414, according to Dr. Christ, are peculiar to them and the neighbouring islands of Madeira and the Azores, while 392 are also found on the adjoining parts of Africa, and a few extending to the South of Europe. The Canary plants possess characters which distinguish them in many respects from the introduced plants. Those that inhabit the rocky coast have usually thick, fleshy leaves, a glaucous colour, and long tap-roots that reach immense depths into the cracks and crevices, where they obtain moisture. In these respects their vegetative characteristics enable them to hold their own against all intruders. Grisebach was of opinion that the endemic flora of the Canaries was dying out. This, happily, is not true. The native flora evidently survives in spite of the spread of cultivation, and were it not for the wholesale cutting down of forests of Pine in the higher lands it is probable that the vegetation would be as extensive as it ever was. The Canary plants are slow in growth, and they lay up a large store of nutriment in

* The word "barranco" literally means a mountain torrent. It is now generally applied to any ravine, gully, or deep glen.

their stems and leaves. They flower, in many cases, at long intervals ; but, as in the case of the Echioms and Sempervivums, the flower-panicles when produced are usually very large and many-flowered. The study of the adaptation of these plants to their environment is one of the most interesting problems connected with them.

Many Canary plants are met with under cultivation in this country. There are over one hundred species at present under cultivation at Kew. Although some of them come from considerable elevation—one or two being found on the Peak of Teneriffe at an elevation of from 8,000 to 10,000 feet—hardly one is truly hardy in the neighbourhood of London. During the late severe weather many were killed even in cold frames. The only species that stood the last winter in the open air were two interesting Umbelliferæ—viz. *Ferula Linkii* and *Fœniculum Webbiai*. These were saved, as the stems die down after flowering, and the root-stocks were protected by mulching. *Ranunculus cortusæfolius* is unquestionably the handsomest of all Buttercups ; the flowers are 2 inches across, with a glossy yellow colour. It grows in damp woods at about 1,000 feet. *Cheiranthus mutabilis*, with variable flowers, is another attractive plant. Five species of Canary Laurineæ flourish at Kew in the temperate house. These are *Laurus canariensis*, *Apollonias canariensis*, *Phœbe Barbusana*, *Persea indica*, and *Ocotea fætens*. A Violet from the summit of the Peak, with glaucous leaves (*Viola cheiranthifolia*), is a singular species. There are eight species of Hypericums in the islands, some of them very handsome. *Hypericum canariense* and *H. floribundum* are at Kew. A native Mallow (*Lavatera acerifolia*) has white flowers with a purple centre. *Visnea Mocanera* is a handsome evergreen tree which bears its original Guanche name. A Catchfly from the Peak (*Silene nocteolens*) was killed at Kew during the recent severe weather. The Canary Euphorbias have at least two leafless species, *E. canariensis* and *E. aphylla*. The others have tufts of leaves at the ends of the branches and succulent milky stems. *E. atropurpurea* has branches of a deep red colour, which present a contrast to the pale glaucous hue of the foliage. Although generally regarded as poisonous, the inner core of the stems of *E. canariensis*, freed from the milk and rind, is, according to Berthelot, eaten by the natives. Amongst Crassulaceæ numerous representa-

tives belong to the genus *Sempervivum* alone. There are fifty species, many of them most striking and showy. Fourteen of these are grown at Kew. Of the closely allied but peculiar genus *Monanthes* there are two species at Kew, *M. agriostaphys* and *M. polyphylla*. This genus was supposed to be confined to the Canary Islands, but Sir Joseph Hooker and Mr. John Ball found *M. murale* growing a few years ago on the Greater Atlas.

A peculiar species of Rosaceæ (*Bencomia caudata*) closely resembles in habit *Poterium Sanguisorba*. Of the Leguminosæ there are several plants familiar to us in English green-houses. Amongst these are *Cytisus canariensis*, with yellow flowers, *C. prolifer*, with whitish flowers, and the beautiful *Lotus Berthelotii* (L. peliorhynchus), with red and yellow flowers and glaucous green linear leaves. Amongst shrubby Convolvulaceæ the Canary Rosewood or "Guadil" (*Convolvulus floridus*) is a lovely plant, with glaucous leaves and masses of pure white flowers. The almost leafless *Ceropegia dichotoma* is a singular Asclepiad that is apparently somewhat rare in the islands. It has long been an inhabitant of the succulent house at Kew.

Jasminum odoratissimum, introduced to English gardens in 1656, is shrubby in habit and fairly hardy. The Canary Arbutus-tree (*Arbutus canariensis*) is found of large size in woods, the flowers are greenish white, and the berries are made into sweetmeats. Perhaps one of the most striking Canary plants is *Canarina campanulata*, a climber with a tuberous root and dark red flowers. There is another Campanula which I have not so far seen (*Laurentia canariensis*). There are a dozen species of the boragineous genus *Echium* found in the islands. *E. simplex*, "the Pride of Teneriffe," has a single dense spike of flowers about 8 feet high; others are shrubby and some herbaceous. All have bright-coloured flowers, purple, with shades of red, white, or rosy.

The Canary Foxglove is *Isoplexis canariensis*. This grows in woods under the shade of the Laurel and Arbutus trees. It is now in flower at Kew. The closely allied *I. isabelliana* I saw once only in Barranco del Rio in Teneriffe. It does not appear to be in cultivation in this country. A peculiar genus of Labiateæ with white woolly leaves (*Sideritis*) is represented at Kew by a single species, *S. canariensis*. This

grows high up on the hills amongst Hypericums and the Tree Heaths.

The Canary Thrifts (*Statice*) are mostly confined to the rocky coasts. They are sometimes shrubby, and attaining, as in *S. arborea*, a height of 6 feet. A plant of this species exhibited before the Royal Horticultural Society in 1842 was so handsome a specimen, and covered with such wealth of flowers, that it was awarded a gold medal. The *Botanical Magazine*, t. 3776, recorded this as "an unusual mark of distinction." There are at least half a dozen species yet to be introduced to this country.

The Canary Laurestine (*Viburnum rigidum*), growing in its native woods up to 6 feet high, is familiar in this country. It has large heads of white flowers with red stigmas. The Canary Ivy (strangely enough also called in this country Irish Ivy), *Hedera Helix* var. *canariensis*, I saw truly wild in the Barranco de la Virgen in Grand Canary. It grew on rocks in large quantity. The leaves were not so large as usually seen under cultivation.

There are two sections of Cinerarias or ornamental Groundsels found in the islands—the shrubby and the herbaceous. *Cineraria Heritieri* and *C. populifolia* with white tomentose leaves are shrubby; while *C. cruenta*, with green leaves, purple underneath, is an annual. These are regularly grown at Kew. The latter is a most graceful plant, and it has recently attracted a good deal of attention as the parent of the cultivated Cinerarias of gardens. The Colt's-foot Cineraria (*C. tussilaginis*) is apparently not in cultivation. It is also herbaceous. Belonging to the same natural order are the Sow-thistles (*Sonchus*), of which sixteen species are found in the Canaries. Many are distinctly arboreous, with stems 4 to 5 feet high. From their size and peculiarity of form they constitute striking features in the landscape. *Sonchus radicans* has deeply lyrate leaves and large bright yellow flowers. *S. leptcephalus*, with finely cut leaves, is just coming into flower at Kew. *Senecio Kleinia* has the habit of a miniature Dragon tree.

Several species of *Chrysanthemum* cultivated in this country and on the Continent, under the name of Marguerites, or Paris Daisies, have been derived from the Canary Islands. One of the most familiar of these is the white-flowered *C. frutescens*, of which there are some yellow-flowered varieties, such as *flavidum* and *chrysaster*, also known as "Etoile d'Or." A species with

finely cut glaucous leaves is *C. fœniculaceum*. This is the same as *C. anethifolium*. The latter is the name to be adopted for it.

C. grandifolium, an attractive plant with numerous synonyms, is also cultivated. *C. pinnatifidum*, although usually associated with the Canary plants mentioned above, and very near *C. grandiflorum*, is a native of Madeira. *C. coronopifolium*, from Grand Canary, has not been grown so largely as it deserves. All these plants are of shrubby habit, but require protection in winter. They are grown almost exclusively for decorating window-boxes. They are, however, amongst the brightest ornaments of the green-house (No. 4) at Kew in early summer.

Amongst the Docks (*Rumex*) is a shrubby species with glaucous leaves (*R. Lunaria*), common along the coast. There is also a shrubby Plantain (*Plantago arborescens*). All these shrubby and even tree-like forms of familiar English Groundsels, Sow-thistles, Docks, and Plantains awaken attention, and afford striking instances of the diversity of plant life brought about by environment. There is a native Willow (*Salix canariensis*) yielding osiers for basket and chair making. The native Date-palm of the Canaries deserves more than a passing notice. It was introduced into cultivation as *Phoenix tenuis*, and its origin not given. It has a globular head, the fronds are bright green, and the pinnæ are flat and closely set together as in *Cycas revoluta*. *Phoenix canariensis* I regard as a very handsome Palm. The stems are 3 feet in diameter, and the whole plant has a majestic and striking appearance. It is largely cultivated in the Riviera gardens, and is admirably suited to sub-tropical countries. The character of the plant may very well be seen in painting No. 514 in the North Gallery at Kew, and in *Gardeners' Chronicle*, 1894 (1), p. 405.

Pancratium canariense has glaucous leaves, with a peduncle up to 3 feet high. There are about twenty flowers to the umbel. This should be grown in our greenhouses as a winter-flowering plant. A large climbing liliaceous plant from the Canaries long grown in this country is *Semele* (*Ruscus*) *androgyna*. It clambers over rocks and trees to a height of 30 or 40 feet.

The Dragon tree, or more properly the Dragon's-blood tree, of the Canaries would take a whole paper to itself. It is one "of the most celebrated in the annals of natural history." Within a few years there stood at Villa Orotava a gigantic

specimen of it that was about 75 feet high and 78 feet in circumference. It had scarcely increased in size since it was first described by the navigators in the early part of the fifteenth century. This interesting tree was destroyed in 1867. Portions of it are preserved in the Museum III. at Kew, and a living branch is growing in one of the conservatories. This latter is probably the only living portion now existing of the renowned Dragon tree of Orotava.

Strange to say, Dragon trees very similar to those in the Canaries are found in Socotra, Abyssinia, Somaliland, and other parts of the continent of Africa. They all belong to a peculiar old type of vegetation. As pointed out by Professor Bayley Balfour, "they, amongst others, are the remains of an old African flora which once peopled the greater part of the continent at a time when the climate was very much colder than at present. As the ice in the Ice-age gradually receded northward and the climate got warmer these plants were driven upwards to higher regions, and also northwards and southwards. The result was that at the present day, on the high peaks of South Africa, in the Canary Islands, and in other places mentioned, the remains were found of the old flora which by climatic changes had been gradually driven out and replaced by more tropical plants." Two species of Wood-rush (*Luzula*) are ornamental and grown in English gardens. *Luzula canariensis* has broad strap-shaped leaves of a bright green colour. *L. Forsteri* grows in damp woods in the mountains. The Canary grass (*Phalaris canariensis*), of which the seed is much used as food for cage birds, is found in the South of Europe as well as in the Canaries. It is now widely cultivated both here and in Germany and in Southern California.

The two members of the Coniferæ found in the mountains of the Canaries are *Pinus canariensis* and *Juniperus Cedrus*. The *Pinus* is known locally as the Téa. It is a handsome tree, growing to a great size. The timber is very dense and heavy. It has been extensively used in the roofs of churches, and is most lasting. The coffins of the Guanches, who embalmed their dead, were also made from it. The *Juniper* is more bushy in habit, and is now almost extinct in the islands.

FERNs.

In spite of the dry climate and the porous, gritty soil, there are thirty species of Ferns found in the islands. Of these, six are endemic. The common Maidenhair (*Adiantum Capillus-veneris*) grows freely on damp rocks. The Kidney Fern (*A. reniforme*) grows in dry situations, almost at sea-level. The common Bracken (*Pteris aquilina*) covers large tracts in the mountains, while *P. arguta* is found near streams and woods, where also are found the Chain Fern (*Woodwardia radicans*), several species of Asplenium, the Tunbridge Filmy Fern (*Hymenophyllum tunbridgense*), and the Killarney Bristle Fern (*Trichomanes radicans*). The Canary Hare's-foot Fern, so familiar in our greenhouses (*Davallia canariensis*) grows on heaps of lava in most arid situations. The thick, fleshy rhizomes evidently enable it to withstand many months absolutely without rain.

Ceterach officinarum var. *aureum* grows in large rosettes in barrancos in the mountains. Its fronds are often a foot long and about 3 to 4 inches wide. *Cheilanthes pulchella* and *Nothochlæna lanuginosa* grow on dry walls. *Polypodium vulgare* occupies exactly the same positions as in this country, on stumps of trees and on walls amongst moss. An Adder's-tongue Fern (*Ophioglossum lusitanicum*), flourishing in winter, is scarcely 3 inches long.

TENERIFFE.

Visitors to Teneriffe arrive at the port of Santa Cruz, on the north-eastern coast of the island. This is usually hot and dusty. The immediate neighbourhood has a most barren aspect, but the botanist soon finds that amongst the crevices of the rocks and in some green and fertile spots in the inland valleys there are many interesting plants. Even on the rugged cliffs eastward of the town the uncouth *Euphorbia canariensis* and the singular and graceful *Plocama pendula*, thoroughly local types, are abundant and give a distinct character to the scenery. *Euphorbia piscatoria* resembles a closely allied plant in the Mediterranean region, while *Senecio Kleinia* is of an African type. These plants are found nearly everywhere along the rocky and rugged parts of the coast.

As remarked by Bunbury, "when the *Plocama* and the *Kleinia* grow in close contact with the clumps of *Euphorbia*

canariensis the effect is singular, the light, weeping form and lovely green colour of the *Plocama* being strongly contrasted with the grey hue and gouty branches of the *Kleinia* and with the stiff columns of the *Euphorbia*."

From Santa Cruz to Orotava, the chief place of resort in Teneriffe, is a distance of twenty-five miles across a steep ridge dividing the eastern and western sides of the island. The road is excellent. On either side are planted Eucalyptus trees, Wattle trees (*Acacia*), Pepper trees (*Schinus molle*), and the "Bella Sombra" (*Phytolacca dioica*). The walls are covered with the Spiny Cactus (*Opuntia Dillenii*), interspersed with

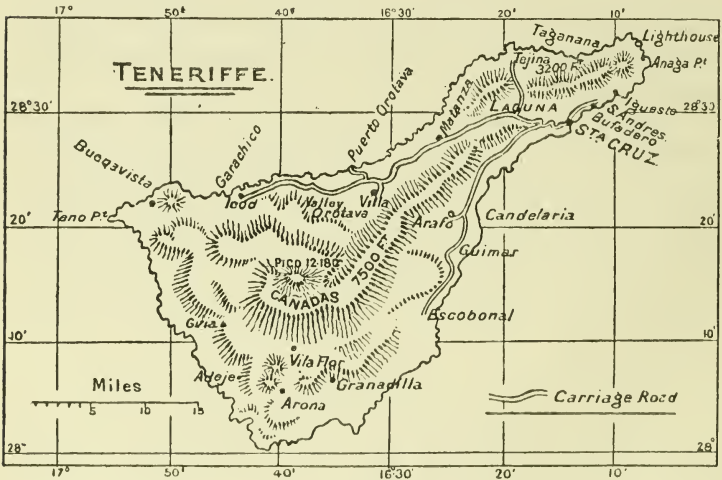


FIG. 5.

bright-coloured Geraniums and American Aloe (*Agave americana*). The crevices are dotted with tufts of the Hare's-foot Fern (*Davallia canariensis*). In the fields are graceful plants of the Canary Date (*Phoenix canariensis*) with deep green fronds. This is sometimes growing side by side with the common Date (*P. dactylifera*). The latter is easily recognised by its glaucous green fronds and narrower pinnae, giving it a less luxuriant habit. The road reaches the ancient town of Laguna at an elevation of 1,840 feet. Here the country is less arid in appearance, and there are grassy slopes with leafy trees and shrubs. The "Plaza" has many interesting plants. In the

neighbourhood is a fine Dragon tree of great age. To the north-east are the woods of Las Mercedes and the lovely forest of La Mina. To the south-west are the Laurel woods and Fern glades of Agua Garcia.

Beyond Laguna the visitor is launched at once into the heart of the picturesque—a land of gardens and rich vegetation. The roadsides are lined with tree Fuchsias, Myrtles, Acacias, Palms, and Agaves. In early spring the Peach and Almond trees brighten the landscape, while large bushes of Heliotrope and Roses scent the air. Before the valley of Orotava is reached there are magnificent views speckled with gold and shade; on either side are fields of corn, vineyards, and Olive trees, backed above by the sombre Pine woods. If clear, the snow-capped Peak shows above the long sloping ridge of Tigaiga. Many thousands, in voyaging north and south, have had a distant view of the Peak from the sea. It looks then even grander than it does from the island itself.

Humboldt was enchanted with the Orotava Valley. If seen under favourable circumstances, “the delightful climate, the softness of the air, the sky, strewn with milky-tinted clouds, the happy mixture of verdure and rocks, all soothe the eye and go to the heart.”* To approach this fair spot in rain or mist is to lose a most pleasurable sight. The valley is a network of gardens and trees with encircling hills, sloping from the vast shoulders of the Peak down to the sea. Villa Orotava is a picturesque town at an elevation of 1,100 feet. Below it, near the sea, is Puerto Orotava, once an important shipping port for Canary wine.

OROTAVA TO GUIMAR.

To obtain a good idea of the successive zones of vegetation in Teneriffe, nothing is better than a trip across the island over the “Cumbres,” or, preferably, over the “Cañadas,” the elevated platform on which stands the Peak. The highest point attained would be about 7,000 to 8,000 feet. In March 1893 a small party started at daybreak from Puerto Orotava, and passed the Villa (1,100 feet) on the way to Agua Manza, Pedro Gill,

* “Orotava as a Health Resort.” By George Victor Perez, M.B. (Lond.). London, 1893.

Arafo, and Guimar. This route traverses the main ridge of mountains to the north-east of the Peak, and affords magnificent views of the island in nearly every direction. The journey usually takes six to seven hours. It is better, however, to start early, and devote a day to it. A strong mule can be ridden the whole distance. A guide, although not absolutely necessary, is advisable in case of the sudden formation of cloud and fog. Immediately above the Villa the vegetation begins to assume a more luxuriant aspect. The air is perceptibly cooler, and there is usually a heavy morning dew. Only a few of the plants noticed can be enumerated here. The small red *Fuchsia coccinea* grew in the hedgerows, and the yellow Dyer's Rocket (*Reseda luteola*) showed its stiff upright flower-spikes. The white Willow stood in the fields, while the pink Spurge-Laurel (*Daphne Gnidium*) from the south-west of Europe was found established in a congenial climate. Large bushes of the common Broom (*Cytisus Scoparius*) were in full bloom. Mixed with these were the Canary St. John's Worts, *Hypericum canariense* and *H. floribundum*. These do not flower until the autumn. In crevices of the walls were *Asplenium Adiantum-nigrum* and *Nothochlæna Maranta*, with the common Polypody (*Polypodium vulgare*) on the wall itself. About a thousand feet above the Villa is the region of the sweet Chestnut trees. They were, as yet, leafless. Many were of large size. The chestnuts are carefully gathered in autumn, and what are not consumed in the island are exported to Spain. The poorer peasants thatch their huts with branches of the Chestnut trees. Young plants of the annual *Cineraria cruenta*, having the leaves purple beneath, were coming up thickly along the roadside. These flower in early summer, and brighten up the whole country. The handsome *Pteris arguta*, with the fronds deeply notched, grew in moist places, as also northern forms of tall Epilobiums. The first native tree of large size met with was the Canary Holly (*Ilex canariensis*), called by the natives "Acébino." Then came grassy slopes.

In these higher regions, under the shadow of the "umbrella" cloud from the Peak, the "monte verde," or green sward, zone is a delightful one. In the west of the island hundreds of acres are met with in this zone covered with English gorse (*Ulex europæus*). When in flower during February and March these vast stretches afford one of the most glorious sights possible to

be seen. The abundance of sweet Violets in the woods and of Watercress in the streams completes the northern character of the scene. Yet a few miles away are the barren hot rocks of the coast, and not far above are the ashes and cinders of the Peak with their capping of last winter's snow. At 3,890 feet Agua Manza is reached. It is at the head of a deep ravine with a good stream of water which supplies the Villa. This is one of the show-places of Teneriffe, and is easily reached from the Orotava valley. The Pear trees were in blossom, and the native Elder bushes (*Sambucus palmensis*) were fully in bud. The flowers of the latter are used for making tea. An experimental garden started by Mr. Wildpret some years ago had the following plants: *Robinia Pseudacacia*, the common Lilac, the Monterey Pine (*Pinus insignis*), the Spanish Silver Fir (*Abies Pinsapo*), and *A. Nordmanniana*. Besides these *Araucaria imbricata* thrived in this cool climate, but nowhere else in the island. *Cydonia japonica* was in flower. The Walnut grew to a large size. The water in the irrigation gutters had a temperature of 54° Fahr. Close by were growing the English Forget-me-not, white Clover, and the common Dock. Going into the deep gorge there were met with large bushes of *Cytisus canariensis*, covered with sulphur-yellow flowers, also the Escobon (*C. prolifer*). The Chain Fern (*Woodwardia radicans*) grew in great luxuriance in most shady places. *Asplenium umbrosum* was on the banks of streams, with a near neighbour in *Epilobium tetragonum*. *Psoralea bituminosa*, a weed from the Mediterranean region, was common everywhere. It appears to be of no value. Many other species, such as the Indian Turnip of the United States, are food plants. *Cistus vaginatus*, with flowers of a rich-rose colour, was a particularly showy plant. This was introduced to Europe in 1779, twenty years before Humboldt visited Teneriffe. A very bright coloured-root parasite (*Cytinus*) was noticed on this species. A Rubiaceous shrub with white flowers, *Phyllis Nobla*, formed an attractive plant. *Lathyrus Aphaca*, a common weed in northern climates, is grown in Teneriffe as a fodder plant. Numerous white masses on the hillside above looked in the distance like a flock of sheep. These proved to be clumps of the white-leaved *Sideritis* rounded off by the constant grazing of goats. *Echium Auberianum* was the last of the genus passed in our ascent. It is therefore

rightly placed by Christ as a high mountain plant of Teneriffe. The other species apparently occupy warmer districts. Numerous mules brought down fire-wood from the heights above. The logs were small, and appeared to be Tree-heath and the Retama (*Cytisus fragrans*). The latter is the chief inhabitant of the region of the Cañadas at about 8,000 feet. The plants were apparently badly infested with a coccus (*Mytilaspis pomorum*). Lunch was taken under the shade of an enormous Chestnut tree with a trunk 30 feet in circumference. The real climbing began after this. The road became a narrow mule path, almost overgrown with dense thickets of the Tree-heath (*Erica arborea*), the "Brezo" of the natives. The heaths were shrubby, and none attained large size. In some parts of the island specimen trees are 25 to 30 feet high, with a trunk about a foot in diameter. All the large trees on this Cumbre had evidently been cut down long ago for firewood and for making charcoal. "Brezo," the guide said, "makes excellent charcoal." Once or twice we were enveloped in mist, and everything loomed large and spectral. In bright intervals we could see a vast expanse of "Brezo" in flower, forming a whitish belt stretching for miles to right and left of us. Above could be seen bushes of native Broom, some Pines, and brown winter patches of the common Bracken. Higher still were the bare rocks crowning the summit of Pedro Gill. The region of Leguminosæ was the last of the belts of vegetation through which we passed. The plants were *Adenocarpus viscosus* (or *anagyris*), having small leaves crowded thickly along the branches, with yellow flowers. Above these the rocks and soil were covered with bright patches of moss glistening with the moisture condensed from the mist. At the top of the pass, 6,800 feet, the view was magnificent. There were only transient glimpses of the Peak and the Cañadas, but on either side of the ridge it was possible to look down into the Orotava valley on the west, and see the "pinars" (pine trees) over Arafo on the east. More rain falls on the western slopes, hence they are cooler and moister. On the other hand, the eastern slopes are hotter and drier. Owing to this circumstance, the plants on the latter grow at a higher elevation. We met the species of *Adenocarpus* almost immediately we crossed the ridge, and the other zones, such as pine, tree-heaths, laurels, and grassy slopes,

came in quick succession down to the hot dry regions of the coast.

Just below Pedro Gill we passed over stretches of black ash and cinders, making the travelling very laborious. Then came the remarkable gorge known as the Valle, described as "one of the most stupendous efforts of eruptive force to be seen in the world." The surface was traversed by a network of dykes, standing vertically like walls, owing to the weathering of the adjacent strata. In sheltered hollows were large bushes of *Cytisus prolifer*, covered with silky-white flowers. Below the Pine trees were splendid views of the plains around Arafo and Guimar, with the glittering sea beyond. A singular-looking mass extended in a sinuous line from the foot of the hills almost down to the beach. A bird's-eye view of it gave the appearance of a huge black glacier. It was a lava stream, "the volcano of 1705." The greyish, hoary hue noticed, on nearer approach, was caused by the abundant growth of a lichen—one of the first pioneers of vegetable life. A few robust plants, such as *Plocoma pendula*, *Sonchus leptcephalus*, and *Euphorbia canariensis*, had established themselves in crevices; but during the 190 years that had elapsed since the molten stream had left the fiery caldron of the Peak the progress of vegetation upon it had been singularly slight. At Arafo a visit was paid to the garden of Señor Don Duggi, where Mango, Avocado Pear, and Loquat trees were very flourishing. There were also large areas covered with Sage, Onions, Tomatos, and Potatos, all for the English market. Guimar was reached at nightfall. It is a quiet little town at 985 feet elevation. The air is dry and balmy. There is a comfortable English hotel with a pleasant garden. In the neighbourhood are two remarkable gorges, Barranco Badajos and Barranco del Rio. The latter was visited. It affords one of the best botanical collecting grounds in the island. Nearly one hundred species of Canary plants were found, many of them seen nowhere else. The wet rocks were clothed with masses of the Maidenhair Fern. There were also the Canary Jasmine, the native Olive, the Canary Foxglove (*Isoplexis*), a native Nettle (*Bæhmeria*), numerous Ferns, with the interesting *Ceterach aureum*, a *Gnaphalium*, large trees of *Arbutus canariensis*, the very showy *Ranunculus cortusæ-folius*, the "Mocan" of the Guanches (*Visnea Mocanera*), the

Candleberry Myrtle (*Myrica Faya*), many Epilobiums, the Rock Rose (*Helianthemum*), and large patches of *Selaginella denticulata*. Just outside the barranco was the common Henbane, and everywhere in fields, although getting almost too dark to see it, was the English Pimpernel (*Anagallis arvensis*); the flowers were blue not red. An English robin-redbreast, a blackbird, and some gold-finches had also come all the way to the Canaries for their winter vacation. They could not spend theirs in a lovelier or a more romantic spot.

The return journey was taken along the coast, past Candelaria, up the slopes to Igueste, then through very rocky defiles to the crest of the ridge at 5,350 feet. On the other side were groves of Pine trees fast falling under the axe of the charcoal-burners. Then came delightful stretches of grassy slopes with flocks of sheep, followed by belts of Tree-heaths and Hypericums, and finally the cultivated fields around the village of Victoria and the well-kept grounds of the English hotel above Puerto Orotava.

BOTANIC GARDEN, OROTAVA.

The Botanic Garden in Teneriffe is situated on the old road between Villa Orotava and the Puerto. The area is about four acres, well supplied with water. It slopes to the south-west at an elevation of about 500 feet above the sea, and is surrounded by whitewashed walls, giving it, at a distance, the appearance of a cemetery. Once, however, the visitor is within the garden he is enchanted by the shade and coolness of his surroundings and the beautiful plants that have been gathered together from all parts of the world. This garden owes its existence to the Marquis de Nava, who in 1795 (exactly one hundred years ago) undertook, at an enormous expense, to level the hill of Durasno and lay it out for receiving "the treasures of other climes."

"The Marquis thought that the Canary Islands, from the mildness of their climate and geographical position, were the most suitable place for naturalising the productions of the East and West Indies."

His ultimate object was to inure them gradually to the colder temperature of the South of Europe. Amongst the special plants thus sought to be introduced to the Old World were the valuable Cinchona trees of South America. In 1799

Humboldt found "the Australian Protea, the Guava, the Jambos, the Cherimoyer of Peru, the Sensitive Plant, and the Heliconia" growing at Durasno in the open air. In his ascent of the Peak he was accompanied "by the English gardener at Durasno," showing that probably the new Botanic Garden was then under the charge of an Englishman. The influence of the garden in the introduction of new plants into the Canaries is perceptible everywhere. For a hundred years this garden has introduced and distributed throughout the archipelago some of the most cherished and beautiful objects of cultivation found in any part of the world. It has also supplied species of Eucalyptus and Acacia for planting along the roadsides, and sub-tropical fruit trees suitable for the climate. For the last thirty years the garden has been under the enthusiastic and devoted charge of Hermann Wildpret, who has maintained it in admirable condition. The amount allowed by the Spanish Government for the up-keep of the gardens has always been strictly limited, and the salary of the Curator was nominal. In spite of these drawbacks, Mr. Wildpret has been successful in introducing from time to time most of the new plants brought into notice by travellers, and in the splendid climate of Teneriffe they flourish with such luxuriance as to excite the wonder of all who behold them. This garden is within easy reach of the English colony at Orotava, and accessible also from the English hotel. It forms one of the most attractive places of resort in the island, and on this account alone, apart from its utility as the centre for the distribution of plants, it deserves to be maintained in a high state of efficiency.*

The chief features in the Gardens are the fine trees of Araucarias, the majestic Palms, and the numerous umbrageous species of Fig trees. There are also many striking specimens of the Coniferæ. On the walls are masses of *Bougainvillæa*, many beautiful species of *Passiflora*, *Bignonia*, *Combretum*, *Ipomœa*, *Aristolochia*, *Cobæa scandens*, *Ephedra altissima*, and *Solandra grandiflora*.

The large Fig on the lower terrace called the Imperial Fig is *Ficus Roxburghii*. It is an Indian species, producing large

* Owing to lack of funds, I regret to hear that Mr. Wildpret has been compelled to resign the post he has held for so many years at this garden. He is now engaged in business as a nurseryman in Puerto Orotava.

clusters of fruit at the base and along the stem. Each fruit is about 2 inches in diameter, but not eatable. This is figured in the *Gardeners' Chronicle*, 1889 (2), p. 598. Close by is a fine specimen of *Ficus nitida*, twenty-eight years old, occupying a central position, and covering a large area with its wide-spreading branches. This species is used generally in gardens and squares as a shade tree. It is locally known as the "Indian Laurel." Here are also the Cocoa-nut Palm, the Traveller's tree (*Ravenala madagascariensis*), a tall young Dragon tree with a simple stem, the Papaw tree, the Calabash tree, and the Oil Palm of the West Coast of Africa (*Elæis guineensis*). As might be expected from the climate, there are numerous Australian plants in a flourishing condition. There are about thirty species of *Eucalyptus*, at least the same number of species of *Acacia*, and many characteristic species of *Banksia*, *Grevillea*, *Hakea*, *Casuarina*, *Tristania*, and *Leptospermum*. Cape plants are also very prominent. *Strelitzia augusta* attains a height of 15 feet. *S. Nicolai* with blue petals, closely allied to the last, is a superb plant; so is *S. Reginae*, with orange and purple flowers. Other Cape plants represented are *Greyia Sutherlandi*, many Kaffir-booms or *Erythrina*, *Phoenix spinosa* (sometimes labelled *P. leonensis*), *Schotia speciosa*, Cape Aloes, the sweet-scented *Diosma ericoides*, known to the Spaniards as "Breso de olor," the Hottentot Fig (*Mesembryanthemum edule*), used for edging beds, the familiar white Arum, *Richardia africana*, *Melanthus major*, *Plumbago capensis*, now widely naturalised along roadsides, species of *Ixia*, *Gladiolus*, *Watsonia*, *Pelargonium*, *Freesia*, *Sparaxis*, and *Montbretia*.

Amongst the plants of Tropical America represented at Orotava are the Cabbage Palm (*Oreodoxa oleracea*), the Royal Palm (*O. regia*), the Trumpet tree (*Cecropia peltata*), the Jamaica Juniper (*Juniperus bermudiana*), the edible Sweet-cups and Granadilla (*Passiflora* spp.), *Euphorbia* (*Poinsettia*) *pulcherrima*, the Tree Tomato (*Cyphomandra betacea*), sometimes labelled *Solanum Wallisii*, the West Indian Cedar (*Cedrela odorata*), various species of *Anona* yielding the fruits known as Sweet-sop, Sour-sop, and Cherimoyer, numerous species of *Agave*, *Furcraea gigantea*, the Peach Palm (*Guilielma speciosa*), *Cocos flexuosa*, and the Mexican *Dioon edule*.

The striking plants and those specially worthy of attention

are, as already indicated, the ornamental, large-fruited species of *Ficus*, such as *F. Roxburghii*, *F. hirta*, and *F. glomerata*. Next come the noble specimens of Palms, such as the native *Phoenix canariensis*, the majestic *Washingtonia filifera*, and the stout-stemmed Coquito Palm of Chili (*Jubæa spectabilis*). The Norfolk Island Pine (*Araucaria excelsa*) is one of the finest in the islands; the Moreton Bay Pine (*A. Cunninghamii*) is to be seen in fruit, while the Queensland Bunya-bunya (*A. Bidwillii*) is a very handsome specimen. The giant Abyssinian Plantain (*Musa Ensete*) attains a height of 30 feet. A very interesting tree is the indigenous Laurel (*Laurus canariensis*), a venerable tree planted more than fifty years ago by S. Bertholet, one of the authors of "Histoire Naturelle des Iles Canaries." It may be mentioned that very few copies of this noble work exist in the islands. One is in the library at Laguna, and another is in a private library at Realejo. A fine specimen of the singular Screw-pine (*Pandanus utilis*) stands in the middle of one of the circular beds. Of *Canarina campanulata* there are two varieties: one is of a dark red colour, found only on rocks near Tacoronte, below Laguna.

The charm of the garden lies, however, in the diversity of the plants represented in it. Along with such northern forms as the common Oak, Ash, Bramble, the Tulip tree, *Ailanthus glandulosa*, the Ginkgo tree, the White Poplar, and the Stone Pine, there flourish in the open air such strictly tropical plants as *Ipomœa Horsfalliæ*, *Clerodendron Thomsonæ*, *Brownea Ariza*, *Plumeria alba*, *Coccoloba uvifera*, the Sugar-cane, the Banana, the Oil Palm of Africa, and the Cocoa-nut Palm. The climate is singularly equable—the lowest temperature even in winter is said to fall very rarely below 50° Fahr. Plants thus testify to the mildness of the climate almost as accurately as the most careful observations.

No catalogue of the Orotava Garden has been issued for many years, and possibly no account of it has ever appeared in English. With the view of assisting in the former direction, I have prepared a list of the most striking plants noticed there in 1893. This is given in Appendix II. In many cases the names attached to the plants are not those generally in use in current literature. I have recorded these names only so far as to enable visitors to identify them with the names now adopted.

TENERIFFE GARDENS.

Many of the private gardens in Teneriffe are nearly as interesting as the Botanic Garden. The beautiful garden of the Marquesa de la Quinta at Villa Orotava, arranged in terraces, contains many fine Canary Laurels, the beautiful *Lotus Berthelotii*, and numerous climbing plants and Roses, which festoon the walls and arbours. One large tree of the native Laurel is surrounded by six stout stems that have grown up from suckers near the base. The same singular habit of growth was observed in this species elsewhere. The garden of the Marquesa de Sauzel, also at the Villa, is not so well kept now as formerly. It is, however, of great historical interest, as containing the spot where once stood the great Dragon tree of Orotava. There is a very old engraving of this garden in the Kew Museum II., showing the Dragon tree and its surroundings, including also a fine specimen of the Canary Date, which still stands there. Close by is a venerable and majestic Chestnut tree (*Castanea vesca*) in the garden of the Marques de la Candia. In the Machado Garden, although in the middle of the town, there were growing Coffee trees bearing good crops of fruit, Camphor, Cinnamon, Alligator Pear, Bamboos, Rose-apple, Myrtles, *Pandanus utilis*, a fine Wistaria, double white Daisies, *Alpinia nutans*, *Magnolia grandiflora* (with a stem 3 feet in diameter), *M. purpurea*, yellow Cluster Roses, and Royal Palm.

The large-leaved Wigandia (*Wigandia macrophylla*) from South America is one of the finest plants in Canary Gardens. In sheltered situations it attains a large size. One plant below the Grand Hotel at Orotava was an immense bush, 22 feet high and 40 feet through. This was covered with masses of lilac-blue flowers. Another plant, somewhat similar in habit, but belonging to quite another family, is *Ferdinandia eminens*, now called *Podachnium paniculatum*. This plant is one of the *Compositæ*, and forms large bushes 15 feet high, covered with white flowers, very similar in appearance to the Ox-eye Daisy of our meadows. *Solanbra grandiflora*, an extensive climber from the mountains of Jamaica, is grown on walls and arbours. The large tubular flower of this plant, of a greenish-yellow colour, is 9 to 10 inches long. It is flowered regularly at Kew under the roof of House No. 5.

The most promising Palm for cultivation in Canary Gardens, after the native *Phoenix canariensis*, is undoubtedly the very handsome fan-leaved *Washingtonia filifera*. This is described as "one of the glories of the Riviera." It is a native of California, and was not introduced into the Old World until about 1875. Although a comparatively new Palm, it is already widely planted in sub-tropical countries. At Villa Valetta, on the Riviera, Mr. Watson mentions that "on a sloping lawn in front of the house is a grove of about sixty of this magnificent Palm—a marvellous sight." The plant in the Botanic Garden at Orotava is about 20 feet high and very healthy. The plants elsewhere are smaller, but they promise to flourish as well in the Canaries as anywhere.

Amongst *Bromeliaceæ* the ornamental *Billbergia zebrina* and *B. marmorata* are grown in pots, and flourish with little or no attention. The bluish-red and green flowers are very strikingly in contrast with the bronzed marking of the leaves. As showing that architecture in the Canaries takes note of its surroundings, the base of the columns in the church at Orotava is chiselled with Banana leaves and fruit. "They are so good," says Edwards, "that an *Acanthus* would make but a poor figure by the side of them." *Cassia occidentalis* with its bright yellow flowers is a garden plant. The seeds when roasted and ground make a tolerable coffee. In fact, they supply the "Negro Coffee" of the West Indies. They do not appear to be so used in the Canaries, but the leaves of *Sida rhombifolia* at Agaete are regarded as an excellent substitute for tea.

A very undesirable weed from the Argentine is spreading in the islands. This is the Tree-tobacco (*Nicotiana glauca*). It is a slender, weedy-looking plant with greyish-green leaves and yellow tubular flowers. It is a troublesome pest in New South Wales and Victoria, where it is regarded as poisonous to cattle and horses. At the Cape Professor MacOwan states: "We are too late for the smallest hope of eradicating this troublesome 'by-woner' from abroad, which plays the mischief with our ostriches." The plant is rather common in waste places about Orotava, and also in the neighbourhood of Las Palmas. It has no doubt been introduced from Buenos Ayres with seed-wheat. In this way many other South American weeds have reached the Canaries. The Tree-tobacco should certainly be destroyed before it has spread further.

Near the Puerto is a very carefully cultivated garden belonging to Mrs. Boreham. This is not far from the English Church and the Grand Hotel. The extensive grounds of the latter are laid out with great taste. On the lawn are bright patches of colour made up of the white-leaved *Cineraria maritima* with *Coleus* and *Iresine*. These plants grow into large well-trimmed bushes. The Canary Date-palm is used with good effect, and many species of *Ficus* afford shade and shelter for visitors, who in the balmy winter climate of the Orotava valley practically live out of doors. Every effort is made here, under the fostering and intelligent care of Señor Don Domingo and Dr. George Perez, to grow the native trees and shrubs. Many of these are already making an excellent show. Later on it is hoped that the very fine garden in course of being formed by Colonel Wethered close by will have a special portion set apart for the cultivation of all the rarer Canary species. At the Sitio del Pardo, below the Grand Hotel, to the north, is the garden of the late Mr. Charles Smith, who took the deepest interest in Canary plants. Miss North made this charming spot her headquarters while in the islands. Many of her pictures represent plants that are now tended by Mrs. Smith with loving care. I cannot do better than quote Miss North's own description of this garden and its surroundings (*Recollections*, vol. i. pp. 196, 197) :—

“There were Myrtle trees 10 or 12 feet high, Bougainvilleas running up Cypress trees (Mrs. S. used to complain of their untidiness), great white Longifolium Lilies growing as high as myself. The ground was white with fallen Orange and Lemon petals; and the huge white Cherokee Roses covered a great arbour and tool-house with their magnificent flowers. I never smelt Roses so sweet as those in that garden. Over all peeped the snowy point of the Peak, at sunrise and sunset most gorgeous, but even more dazzling in the moonlight. From the garden I could stroll up some wild hills of lava, where Mr. S. had allowed the natural vegetation of the island to have all its own way. Magnificent Aloes, Cactus, Euphorbias, Arums, Cinerarias, Sedums, Heaths, and other peculiar plants were to be seen in their fullest beauty. Eucalyptus trees had been planted on the top, and were doing well with their bark hanging in rags and tatters about them. I scarcely ever went out without finding some new wonder to paint, lived a life of the

most perfect peace and happiness, and got strength every day with my kind friends."

The following plants from Canary gardens are represented in Miss North's pictures in the North Gallery at Kew. They are twenty-nine in all (Nos. 502-528):—

Pomegranate (*Punica Granatum*); Spiny Cactus (*Opuntia Dillenii*); Canary Campanula (*Canarina campanulata*); Blue Iochroma (*Iochroma violacea*); Dragon tree (*Dracæna Draco*); Common or Barbadoes Aloe (*Aloe vera*); Tunera (*Euphorbia canariensis*); House-leek (*Sempervivum holochrysum*); American Aloe (*Agave americana*); group of succulent plants belonging to the genera Kleinia, Aloe, Euphorbia, Opuntia, &c.; Date-palm (*Phoenix dactylifera*); Canary Date-palm (*P. canariensis*); Abyssinian Plantain (*Musa Ensete*); Pride of Teneriffe (*Echium simplex*); Canary Arum (*Dracunculus canariensis*); Wild Cineraria (*Cineraria cruenta*); Orange flowers and fruits (*Citrus aurantium*); Cherokee Rose (*Rosa lævigata*); Cochineal Cactus (*Nopalea coccinellifera*); Basket Reed (*Arundo Donax*); Tree Heath (*Erica arborea*); Canary Pine or Téa (*Pinus canariensis*); Aloe and Cochineal Cactus in flower (*Aloe vera* and *Opuntia coccinellifera*).

In spite of the heat and arid nature of the locality, there are several very pretty gardens in the suburbs of Santa Cruz. Don Pedro de Foronda y Mandillo was good enough to show me a garden belonging to a relative that contained the largest number of purely tropical plants seen anywhere in the islands. There were Mango trees, Cocoa-nut Palms, Alligator Pears, Cherimoyer, Mammee-apple, Mammee-sapote, Tamarind, Clove, Guava, Camphor, Papaw, Coffee, Mahoe, Sarsaparilla, Oil-palm, Cassava, Bananas, Jack-fruit, Baobab, Rose-apple, Star-apple, Bamboos, Calabash trees, West India Cedar, and the Arrowroot plant.

In Mrs. Douglas's garden at Salamanca was a very large Argan tree (*Argania Sideroxylon*) of Morocco. The seeds yield a valuable oil. There were also Coffee bushes in bearing, and latterly Mrs. Douglas has introduced a Tea plant from Kew.

In the Public Garden at Santa Cruz the plants cultivated were evidently there for shade and not for ornament. There were several very fine trees of *Ficus nitida*, with small, glossy, evergreen leaves, affording protection against the strongest sun.

The Plane trees (*Platanus orientalis*) were almost leafless in the winter. *Pinus canariensis*, although a mountain plant, grew fairly well even at the seashore. The other trees noticed were *Casuarina equisetifolia*, *Albizzia Lebbek*, *Araucaria excelsa*, and *Schinus molle*. Amongst the few ornamental plants were *Datura suaveolens*, *Strelitzia augusta*, with a stem 15 feet high, *Plumeria acutifolia*, *Yucca aloifolia*, the Pomegranate (*Punica Granatum*), *Hibiscus rosa-sinensis*, *Fuchsia arborescens*, and *Furcraea gigantea*.

GRAND CANARY.

The capital of Grand Canary is Las Palmas, an important town of 20,000 inhabitants. Visitors are landed at Puerto de la

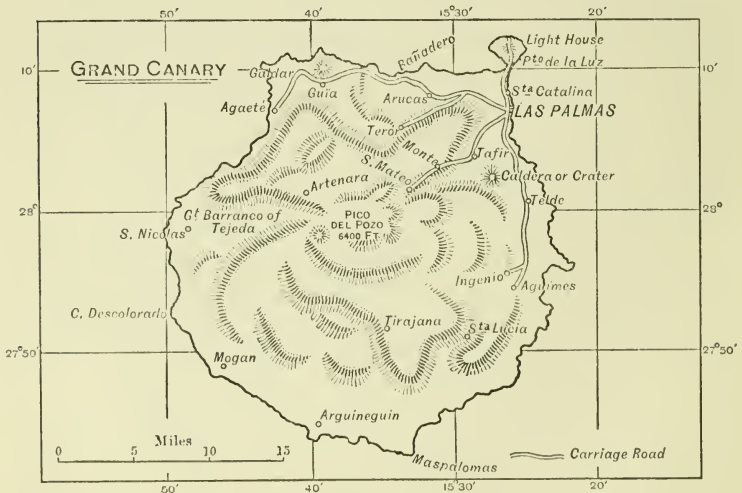


FIG 6.

Luz—with an excellent harbour—about three miles from the capital. The form of the island is circular, with the highlands in the centre, gradually falling away to the sea. The slopes are cut up into many deep ravines, longer than those in Teneriffe. The Caldera de Bandama, near Monte, the crater of an extinct volcano, is an immense basin-like depression, about a mile wide and a thousand feet deep. The bottom is cultivated, and contains some interesting plants. The Gran Barranco de Tejada,

a vast succession of precipitous ravines on the western side, affords the grandest scenery in the island. The Barranco de Tirajana, opening towards the south-east, and starting from the shoulders of the Pico Pozos, the highest point in Grand Canary, presents some bold and rugged scenery. The only prominent vegetation in this part are the Pine trees (Pinars) which crown the distant ridges.

The immediate neighbourhood of Las Palmas and the port is the least interesting part of Grand Canary. The native vegetation is very scanty, and requires to be carefully sought for. On the Isleta, beyond the port, there are scattered amongst the lava heaps and ashes many plants that repay a visit. From Las Palmas the land rises in a succession of terraces, and each ledge brings the visitor nearer to the heart of the country, where streams and verdure afford a more refreshing aspect than the bare rocks and barren slopes of the coast region. There are good carriage roads to the west as far as Guia and Galdar, 25 miles, and in course of being carried on to Agaete, 31 miles distant. To the south there is an equally good road through Telde to Aguimes, 18 miles. To the interior the road to Galdar branches off beyond Tamaracite to Teror, 13 miles; a delightful little town under the Peak of Osorios, at an elevation of 1,750 feet. From Teror numerous fertile valleys are reached full of interesting plants, as well as the high mountains in the centre of the island. In a south-westerly direction a road leaves Las Palmas for Tafira, 1,080 feet; Monte, 1,320 feet; within easy reach of Sta. Brigida, 1,580 feet; and terminating at San Mateo, 2,680 feet. The latter place is 13 miles from Las Palmas. It is in the heart of the mountains. Both the western and southern parts of the island can be explored from this centre. As in Teneriffe, the coast region is chiefly characterised by species of Euphorbia, the most striking being the columnar form of the "Cardon" (*E. canariensis*), and its almost inseparable companions the miniature Dragon-tree (*Senecio Kleinia*) and the graceful *Plocama pendula*. The more precipitous rocks are sprinkled with the rosettes of many species of *Sempervivum*. In winter the yellow masses of flowers of *S. holochrysum* are very conspicuous. Between Las Palmas and the port is an expanse of sand blown over from the coast of Africa. In this grow large bushes, almost trees, of *Tamarix gallica*. There are

also numerous plants of the Colocynth (*Citrullus Colocynthis*). The fruits, like small melons, are plentifully distributed in winter over the surface of the sand. The pulp in the interior of these fruits is very bitter, and is the well-known medicine colocynth. It forms an important article of export from Jaffa and other places in the Levant.

Among the special plants of Grand Canary not known in the other islands *Hypericum coadunatum*, with bright yellow flowers and broad, clasping leaves, is found sparingly on the banks of streams. *Sempervivum cæspitosum*, a somewhat small tufted species with yellow flowers, is found in rocky woods on the Pozo de la Plata. The peculiar *Monanthes purpurascens* (of which there is no specimen in the Kew Herbarium) is said to grow in the valley of Tenteniguada, below Los Saucillos. *M. tilophilum* is found in Barranco de los Tilos. *Cytisus congestus*, with short, densely packed leaves and abundant white flowers, is found on the Cumbres. *C. rosmarinifolius* is a singular species with stiff leaves like Rosemary. It is said to be found at El Risco Blanco in Barranco de Tirajana. *Lotus spartioides* is a low, spreading plant with yellow flowers growing at "La Calderita de la Cumbre." *Ipomœa Preauxii* is given as a Canary plant growing in the lowlands. This is not in the Kew Herbarium. *Ceropegia fusca* is described by Bolle as growing in Barranco Seco, near Las Palmas, and also at Arucas. Of this too there is no specimen in the Kew Herbarium. The round, fleshy-leaved *C. dichotoma*, found on rocks and cliffs at Buenavista in Teneriffe, is well known, and is growing at Kew. A very delicate Canary Campanula (*Laurentia canariensis*), scarcely three inches high, grows at a spring in Barranco de la Virgen. This is of no interest as a garden plant. The other Campanula (*Canarina campanulata*) is well known as a very attractive plant.

A very interesting species, confined to Grand Canary, is *Echium callithyrsum*, from the Cumbre de Tenteniguada. It is cultivated in this country. It has often been flowered at Kew, and there are specimens in the herbarium from Mr. Harper-Crewe's garden in 1884. *E. onosmæfolium*, once at Kew, is a smaller plant from the Pozo de la Plata. *Sideritis* (*Leucophaë*) *discolor*, with white felted leaves, is common near Los Tilos. *Prenanthes pendula*, closely allied to the Sow-thistles, with a striking habit, is found in sheltered places on rocks in the moun-

tains. It has broad, sinuous leaves and a large head of delicate yellow flowers. If not already in cultivation it certainly deserves to be introduced. It is a typical Canary plant.

GARDENS IN GRAND CANARY.

As in Teneriffe, the best cultivated gardens in the lowlands will probably be those attached to the new hotels established under English management. Although only lately started, the garden and grounds of the Hôtel Métropole, between the Puerto and Las Palmas, promise to be very successful. The parts facing the sea will always suffer occasionally from wind and spray, but even here many plants, such as *Araucaria excelsa*, species of *Ficus* and *Coniferæ*, do well. In the more sheltered parts, with good soil and careful cultivation, a most luxuriant garden could be established. Irrigation is essential everywhere in the lowlands, so the supply of water must be continuous and plentiful.

The grounds of the Catalina Hotel are well planned and tastefully laid out. The soil is, however, very poor, and the locality is exposed to strong sea breezes. A few plants have done well. In order to make a really good garden it would be necessary to supply an abundance of manure and well trench the whole area. Close by is a small garden belonging to Señor Don Wood. Here are beautifully shaded walks under Date-palms and Olives, lined with beds of Iris. There is a very good specimen of the Royal Palm (*Oreodoxa regia*) and a handsome *Livistona*. There are two Dragon-trees, about fifty years old, planted by the proprietor himself. A decorative *Aloe* in flower was probably *A. succotrina*. The New Zealand Flax (*Phormium tenax*) grows freely; also the false Ipecacuanha (*Asclepias curassavica*), a Cassia, and the Mahoe tree of the West Indies (*Hibiscus elatus*). A venerable Pomegranate tree was 12 feet high, and with a trunk 36 inches in circumference.

Almost adjoining this garden is that of Señor Don Cayetano de Lugo, a descendant of one of the early Governors of the islands. This is a small grove rather than a garden. Here at sea-level, in a perfectly sheltered situation, there is a collection of tropical plants, almost identical with what would be found in any one of the West Indian islands. There were Cocoa-nut Palms, Mango (fruiting regularly every year), Mahogany, Sweet-

sop, Sour sop, Silk Cotton, Mammee Sapote, Papaw, Granadilla (*Passiflora quadrangularis*), in fruit. Indiarubber (*Ficus elastica*), Camphor, West India Cedar, Mahoe, Wine-palm (*Caryota*), Frangipani (*Plumeria*), a fine tree of *Podocarpus*, or Cape Yew, *Strelitzia regia*, and the Blimbing (*Averrhoa Bilimbi*). Two interesting native trees were flourishing in this garden, the Barbusano (*Phæbe Barbusana*) and the Vinatico (*Persea indica*). The proprietor had spent many years in Brazil, and had brought with him and established in this tranquil and lovely spot many plants he had met with in his travels. The garden is freely open to visitors, for whose accommodation seats are provided under the shade of trees.

In the town of Las Palmas there are several public squares planted with trees. Many graceful Palms are grown, mingled with the Oriental Plane, the Indian Laurel (*Ficus nitida*), and a few native trees. The private gardens are small, but many are cultivated with great care. For instance, in Mr. Nelson's garden there were Bamboos, a Dragon tree, a Red-fruited Banana, *Wigandia macrophylla*, Purple Guava, Arrowroot, the Sweet-cup (*Passiflora edulis*), a fine plant of *Calosanthes indica*, and quite large trees, with stems about eight inches in diameter, of the Castor-oil plant. In the adjoining garden there were *Cecropia palmata*, the handsome *Sanchezia nobilis*, *Jacaranda ovalifolia*, a good tree of the variegated *Ficus Parcelli*, *Schotia latifolia*, a *Rondeletia* (probably *R. odorata*), and several Palms. Amongst them were species of *Oreodoxa*, *Cocos*, *Areca*, with a tall plant of *Trachycarpus Martianus*. The finest Tree-fern in the island was growing in the courtyard (*patio*) of this house.

Visitors to Telde (elevation 390 feet) are permitted to enter a pretty garden outside the town belonging to Señor Don Juan Leon y Castillo (brother of the ambassador at Paris), who, with true Spanish hospitality, has further provided seats and arbours for them. In this garden were some plants not noticed elsewhere. The chief attraction were the large masses of *Bougainvillæa*, forming conspicuous objects for miles round. There were at least four shades of colour. A fine Calabash tree (*Crescentia Cujete*) looked as much at home as if it were growing in the lowlands of Jamaica. So did a large Tamarind tree loaded with rusty-brown pods. An Argan tree, a Cotton plant, *Grevillea robusta*, *Pandanus utilis*, a Jamaica Walnut (*Aleurites moluc-*

cana), a Sea-side Grape (*Coccoloba uvifera*), a Purple Guava (*Psidium Cattleianum*), and many Palms, especially the Canary Date Palm, were in excellent health. *Aracauria excelsa* flourished here even better than at Las Palmas. The orange-flowered *Bignonia venusta* was a glorious plant.

The nearest mountain scenery in Grand Canary is reached by a pleasant drive from Las Palmas to Tafira and Monte. The latter is only six miles distant, and forms an excellent centre for excursions. At Tafira (elevation 1,081 feet) is the lovely garden of Mr. James Miller. It is on a gentle slope facing south, and well sheltered from winds. It is the most carefully cultivated garden in the island. Its chief features are the fine collections of Palms and Roses. Amongst the former were species of *Washingtonia*, *Cocos*, *Phoenix*, *Livistona*, *Corypha*, *Caryota*, *Trachycarpus*, *Thrinax*, *Kentia*, *Chamædorea*, *Sabal*, *Elæis*, and *Jubæa*. Many of these were young as yet, but they looked very promising. The Roses comprised more than a hundred named varieties. Among the general collection were some rare species of *Ficus*, including a tree of *F. Parcelli*. The Bougainvillæas were large and very striking. The Allamandas were gorgeous. A large plant of Heliotrope covered a wall nearly 20 feet high. This was supported by a trellis. Even at this elevation there were flourishing trees of the tropical *Coccoloba uvifera* and *Calotropis procera*. *Pandanus utilis* formed a large plant. Mr. Miller is very successful with his rock-gardens. These were covered with a superb collection of Ferns, Aroids, and succulents. The plants were watered by spraying from pipes hidden above. A very fine English Oak flourished near the entrance, and specimen plants of Camellia and Tree-ferns were grown with great care. *Thunbergia grandiflora* and *Bignonia venusta* were most luxuriant.

Beyond Monte there is an attractive garden belonging to Count Filipe Maseu. The plants were well grown, and formed a most interesting collection. I was unable to make a note of the species represented in it.

In the remote little town of Agaete, 30 miles due west of Las Palmas, there is a charming little garden, established no doubt during the prosperous days of the cochineal industry, belonging to Señor Don Antonio de Armas. This is well worth visiting. Mrs. Stone says: "Oranges, Mangos, and Guavas

were dropping off the trees, and we trod upon them as we walked; while Bananas, Aguacates (Alligator Pears), and all kinds of fruit were growing in abundance. . . . The garden was in fact a wilderness of luxuriant vegetation—coffee shrubs, Pomegranates, Daturas with white bell-flowers in full bloom, Peach trees, large Eucalyptus trees, and hosts of others." In addition to these I noticed a fine English Oak, the Cherimoyer, handsome clumps of Pampas Grass, the Pride of India (*Melia Azedarach*), the Mammee tree, the gorgeous *Lagerstræmia Flos-reginæ* of Ceylon, *Clerodendron fragrans*, *Hedychium coronarium*, and the Cassie tree (*Acacia Farnesiana*).

Amongst bulbous plants in Canary Gardens the large *Crinum augustum* is found in many places. The native *Pancreatium canariense* is seldom cultivated locally. It makes, however, an attractive greenhouse plant in this country, but should be flowered in late autumn or early winter. *Amaryllis Belladonna* is a weed in some old gardens. Strong plants of *Furcræa gigantea* are grown in dry situations, and in one locality, according to Worsley, this or a closely allied species forms regular copses between Monte and Teror. The leaves yield a valuable fibre. As they have no spines and prickles they are easier to handle than those of the common Aloe. *Agave americana* is extensively planted everywhere as a fence plant. In the mountains it attains an immense size. The pulpy portion of the leaves is fed to cattle. The leaves themselves are used as thatch. The variegated forms are not common. The green or normal form of this Agave, with the Tamarisk and double-red Geraniums, are amongst the most familiar roadside plants in the Canaries. White Geraniums are not much seen. The climate encourages colour in everything.

Species of *Yucca*, or Adam's Needles, both with green and variegated leaves, are grown. *Y. aloifolia* is used for fences. A Garlick-looking plant (*Nothoscordum*) is a weed in gardens. It is, however, not nearly so great a pest as *Cyperus rotundus*, the most troublesome and persistent weed of all warm countries. The chief garden Lily is *Lilium longifolium*. *Antholiza æthiopica* and *Gladiolus segetum* (probably escapes from cultivation) are widely dispersed. The latter is a weed of cornfields. Species of *Iris* are used as edging for beds. The Florentine *Iris* is practically wild in the mountains. The common Taro,

Eddoe or Coco of tropical countries (*Colocasia antiquorum*), with large sagittate leaves, is most abundant in damp situations. The roots are eaten, and after boiling are also given to pigs.

Another Aroid sometimes seen is *Amorphophallus Rivieri* (A. Konjac). Like all members of the genus the flowers give forth a most disagreeable odour. *Dracunculus canariensis* is not cultivated. It is, however, abundant near gardens, and deserves to be more widely known in this country. *Arundo Donax* is agriculturally of great importance. Large patches of it are grown in damp situations for the sake of the stems. These are used for making Banana baskets, for wattles for houses, light fences, and trellis for supporting Vines and Tomatos. The leaves are used for fodder. Variegated forms are often grown in gardens. Both the single and double forms of *Oxalis cernua* are found along roadsides. They also form a dense growth in pastures. The plant is a native of the Cape of Good Hope. It must have spread with great rapidity, for it is apparently a recent introduction to the Canaries. The double form is propagated by means of tubers.

FIELD AND GARDEN PRODUCE.

The old industries of the Canaries were sugar, wine, and cochineal. From these islands were taken the first Sugar-canes that reached the New World in the beginning of the sixteenth century. According to Ovideo, Bananas were also taken from the Canaries by Father Thomas, of Berlangas, into San Domingo in 1516, whence they were introduced to the other islands and to the mainland. In return the Canaries received, from the New World, Tomatos, Potatos, Maize, Sweet Potatos, Cherimoyer, Guavas, Cochineal insect, and Cactus, Papaw, Chayota, Passion-fruits, Pine-apple, Cape Gooseberry, and many others. The cultivation in the Canaries, both in extent and character, is almost entirely garden cultivation. The ploughing is done with primitive wooden ploughs by oxen. The fields are all small: there are no large estates or farms. Land everywhere is very valuable; in fact, houses and land are considered the only safe investments. First-class land may sell for £150 to £200 per acre. Including water rights the price may be even higher. The rest of such land may be £15 to £25 per acre, with £10 to £15 added for water. Even the best land

is valueless without water. Hence, large tanks in which to store the winter's rains are indispensable. They constitute the basis of the whole prosperity of the country. Three and four crops a year are raised by means of irrigation, and a net return (after paying nearly £40 for rent and water) of £30 per acre is not unusual. The people are thrifty and laborious, or these results could never be obtained.

When the ruin brought upon the cochineal industry by the discovery of aniline dyes had been fully realised it was fortunate that, owing to increased facilities for shipment, the attention of the people was directed to new industries, which from the first were "started and fostered by Englishmen, and maintained entirely by the English demand." The Canary ports are free. They have of late years become great Atlantic coaling stations, and a "half-way house between the Old and New Worlds." It is owing to the growth of rapid communications between the islands and the great centres of population in other countries that the trade in fruit and vegetables has been so largely developed. Most of the fruit and vegetables, at present, are shipped to England, but some are shipped to Spain and Portugal, and in a lesser degree to France and Germany. Potatos and Onions are largely shipped to the West Indies, and there is besides a constant demand for supplies by the numerous passenger ships calling at the islands. It may be added that the rediscovery of the Canary Islands in a commercial sense has taken place during the last ten years. It is due in a large degree to the enterprise and energy of one man, Mr. Alfred L. Jones, of the firm of Messrs. Elder, Dempster & Co., of Liverpool. His name has been the dominant factor in persuading the people to start new industries.

Mr. Samler Brown (*Guide*, 1894, p. 235) makes the following remarks on the value of the exports of fruits &c. for 1892 :— "Almonds, £7,361; Bananas, 63,601 tons, valued at £60,697 (59,508 tons to England); Vegetables, 96,842 tons, valued at £130,652 (59,124 tons to England and 27,970 tons to the West Indies). There is nothing to show which are Tomatos, Potatos, and Onions. Dried Vegetables, 13,804 tons, valued at £19,380 (319 tons to England and 11,735 tons to the West Indies). The exports return does not state which is Grand Canary and which Teneriffe, but it may be taken for granted that most Bananas come from Grand Canary, and most Tomatos and Potatos from

Teneriffe." In all about 118,632 tons of fresh fruit left the islands for England in one year. The value of the other exports in 1892 was: Cochineal, £50,877; Wine, £20,785; Spirits, £5,761. Tobacco was exported in 1890 to the value of £30,064. None appears to have been exported since, owing to fiscal charges.

Bananas are being largely grown in the islands of Grand Canary and Teneriffe. They flourish only on land that is irrigated and in warm localities near the sea coast. The sort almost exclusively cultivated is the Chinese Banana (*Musa chinensis*). This is a shorter and stouter plant than the tropical Bananas, but produces very large bunches of fruit. There are often 150 to 250 "fingers" to a bunch. The suckers are planted at 8 to 10 feet apart. The first crop is obtained in eighteen months after planting. After the fruit is gathered the stem is cut down, and suckers that have arisen at the base bear the succeeding crops. Banana growing is entirely in the hands of the Canarians. No Europeans seem to succeed so well owing to the complicated nature of the tenure of land and the difficulties with water and labour. The export of Bananas from the Canaries is assuming very large proportions. The exports in 1893 from Grand Canary alone were 217,095 bunches. Nearly all the Bananas consumed in this country come either from the Canaries or Madeira. The trade is apparently capable of considerable extension, and, so far, there does not appear to be any competition from other countries. A few Bananas of other sorts are grown in gardens. A fine red Banana is grown sparingly at Las Palmas, and the "Apple Banana" or "Manzano," with a tall stem, is found in the country districts.

Oranges in Grand Canary are of excellent flavour. They recall the best sorts of St. Michael Oranges, now almost extinct. Strange to say, the trees are little cared for, and consequently are badly affected with disease. The Orange trees near Telde, in Grand Canary, and at Granadilla, in Teneriffe, are the best in the islands. They evidently require warm, sheltered situations. The land should be well drained, have a sweet subsoil, and receive liberal supplies of manure. There is a good opening for two or three men with experience in Florida to take up Orange-growing in Grand Canary. The small quantity of Canary Oranges that reach this country early in the season are readily taken up, and fetch good prices. The drawbacks appear to be that there

are so few of them, and that they reach this country so irregularly. The disease affecting the trees could easily be dealt with by careful cultivation and the use of insecticides. The Canary people have, however, no idea how to treat them, and Orange-growing in the future, if the business is to become established, will have to be done by skilful men from other countries. Besides Oranges there are grown a few Lemons, some Citrons, Shaddocks, and Limes. None of these can ever attain to the importance of Oranges. The Bergamot Orange yields a valuable essence from the rind of the fruit. For this purpose the fruits are gathered green. Very good Mandarin Oranges are grown in Grand Canary. These are easily recognised by the peculiar odour, similar to that of the leaves. The skin is very easily detached.

Tomatos.—The industry in Tomatos in the Canaries is of recent date. The first cases were exported in 1887. It has, however, increased by leaps and bounds, and is now considered in good years to be the most profitable of any. The exports from Grand Canary in 1893 were 54,641 cases. In the half-year from January to June 1894 the exports were 85,000 cases. It is probable that the total exports from Grand Canary and Teneriffe will now amount to about 150,000 cases yearly. The sort chiefly cultivated is the "Perfection." The seed is imported every year from England and distributed amongst the growers, locally called contractors, who undertake to sell the produce to the shippers at a certain rate per cwt. The fruit is large and of good flavour. The earliest crop ripens in November and December; the second, which is the best, in January to March. The fruit is gathered when green, carefully selected into different qualities, and then packed in paper with sawdust or peat-dust in wooden cases holding, on an average, about 40 lb. The actual cost of growing, packing, and shipping Canary Tomatos is estimated at 2*d.* per pound delivered in London. The fruit is much liked in this country, and as it comes over when English-grown Tomatos are not obtainable the channels of trade are kept open all the year round.

The disease in Tomatos in the Canaries is a serious drawback to cultivation. In some seasons the whole crop is lost. It is caused in part, at least, by *Phytophthora infestans*, the Potato disease. There is a remedy for it, but systematic action is necessary, and the superintendence of Europeans who thoroughly

understand the nature of the disease and the treatment required. The Bordeaux mixture, consisting of copper sulphate and fresh lime, is undoubtedly a specific if applied at the right time and repeated two or three times before the plants are in flower. The Strawsons' Co., Ltd., supply a knapsack machine for applying the mixture. This will dress one acre per day. If Tomato-growing is to be maintained as a leading industry in the Canaries, the treatment of the disease must receive serious and early attention.

Potatos.—In the lowlands Potatos are planted in irrigable soils, and the first crops come in early in January. The seed Potatos, generally "Magnum Bonum," are received in October and November. The whole Potato is planted, and the manure used is chiefly artificial. The return in good years is six- to eight-fold. The Potato disease is prevalent, and the Bordeaux mixture as recommended for Tomatos should be regularly tried. The Canary Potatos received in this country are excellent, and sell readily up to the end of May. In 1893 there were exported 15,101 cases. In the first half of 1894 the exports were 32,600 cases. The total exports for Grand Canary and Teneriffe would be about 50,000 cases yearly. A very hardy and prolific Potato, of small size, grown for local consumption is known as the "*palmera*." It is said to yield fourteen- to thirty-fold (*Samler Brown*). It is almost proof against the disease, and it may be regarded as an acclimatised sort—a survival of former importations thoroughly adapted to in the islands.

Grapes and Wine.—Vines are grown on slopes above the zone devoted to the cultivation of Bananas and Tomatos. The land is not irrigated, and the fruit is chiefly made into wine. "The grapes grown are the *Tentillo* and the *Negra Molle*, both black; the Moscatel, black and white; the *Verdelho*, *Pedro Jimenez*, *Forastero*, and *Vija-riega*, all white." There is a revival of Grape-growing for wine purposes, and it is possible that Red Canary and other wines will come into popular demand in this country in the place of cheap clarets. The vine mildew is kept in check by means of sulphur. The White Lupin is grown in the winter, and dug in as a green dressing in the spring. The phylloxera is said not to be present in the Canaries (*Samler Brown*).

Cochineal.—Although this industry is greatly reduced of late years, the exports are still of the annual value of about £50,000.

In commerce, Cochineal appears in the form of reddish or black shrivelled grain, covered with a white powder. This grain is the dried body of the Cochineal insect (*Coccus Cacti*), and yields a beautiful crimson colour. The insect is carefully fed or raised on the flat, blade-like branches of the Cochineal Cactus (*Nopalea coccinellifera* and other species). The abundance of these plants everywhere in the Canaries indicates the great extent of the Cochineal industry in former days. The insects are transferred to the plants on white rags, which are pinned to the branches by means of spines from the Spiny Cactus (*Opuntia Dillenii*). A Cochineal plantation, with the plants covered with white rags, looks as if it "were yielding crops of white paper bun-bags." When the insects are fully grown they are brushed off into trays, and carefully cured by being dried in the sun. Considerable intelligence and skill are necessary in the successful treatment of the insects, as well as in the proper cultivation of the plants.

Cereals.—A good deal of Wheat is grown in Lanzarote and Fuerteventura, and moderate quantities in the other islands. The bread from native Wheat, made into flour in the "Gofio" mills, is more palatable than any other. Good bread is a feature even in remote parts of the Canary Islands. Barley, Oats, Rye are also grown, but for the most part they are cut in the green state for fodder purposes. Nearly all the cattle and horses and pigs are stall-fed. Sheep only are pastured on the grassy slopes in the mountains, while destructive goats are allowed to roam everywhere on land not actually under cultivation.

Maize (*Zea Mays*).—The Maize crops in the Canaries are amongst the most valuable of all the agricultural produce. Two crops are raised on first-class land. Beans are often planted with Maize, and the returns are often very considerable. The rent of land is, however, very high, and there is also a considerable sum to be paid for water for irrigation.

Sweet Potato (*Ipomœa Batatis*).—Although not much in evidence, Sweet Potatoes are grown to a large extent. The land yields two and three crops annually. The leaves are given to cattle.

Sugar-cane (*Saccharum officinarum*).—The cultivation of the Sugar-cane is one of the oldest industries in the islands. Large areas are planted in Grand Canary, and under the measure

of protection afforded by the Spanish Government there are several sugar works in operation, turning out a very good quality of sugar. The Cane cultivated is the Otaheite, similar to that so largely grown in the West Indies. Where irrigated the Canes are very healthy and remarkably rich in sugar. The Canaries would serve as an excellent centre from which to obtain a fresh supply of healthy Canes for the West Indies and other places affected with disease.

Date (*Phoenix dactylifera*).—The Date Palm is widely cultivated in dry districts in Northern Africa, Arabia, and Persia. It flourishes in the lowlands in the Canaries, but the fruit is seldom of the best quality. The choice sorts are propagated entirely by suckers from old trees. As the species is dioecious, that is, has the male and female flowers on different trees, it is necessary to take the suckers from female trees only. One or two male trees are sufficient in a moderately large grove. Sometimes the female flowers are fertilised artificially by dusting amongst them the pollen taken from male trees. If carefully cultivated and supplied with water, plants six or seven years old will begin to bear fruit. The best suckers, especially of the celebrated “Deglet nour” Date, if not already in the islands, could be obtained from Biskra through the Botanic Garden at Algiers. The finest fresh Dates I ever tasted were grown in an old garden at Jamestown, St. Helena. They were large, deliciously flavoured, pulpy fruits, with no kernel or stone. Suckers might be obtained also from this source. Date Palms will grow in extremely dry climates, but they require irrigation, or find water deep down in the soil. The roots travel immense distances in search of moisture. It is a mistake to suppose that absolute dry porous soils without moisture will support Date Palms. The native Date of the Canaries (*P. canariensis*) does not produce eatable fruit.

Pomegranate (*Punica Granatum*).—There are several varieties of this plant. Many dwarf sorts, bearing double red or white flowers, are very ornamental. The tree-like plants met with in Canary gardens bear globular fruits as large as an orange with a hard shell filled with seeds. The latter are covered with a pink juicy coating. The best sorts of fruits with abundant sweet juice are cool and refreshing in hot countries. The rind is sometimes employed for tanning, and it gives the yellow colour to Morocco leather.

Pine-apple (*Ananas sativa*).—This delicious tropical fruit will not thrive to perfection in the open air in the Canaries. Small stunted fruits only are produced. The chief supply of Pine-apples received in this country comes from the Azores, where they are grown under glass. They are packed with the husk of Maize in flat boxes, with a division across the middle, holding six Pines. There is no doubt that Pines under glass would do extremely well in the Canaries. The glass would afford shelter and warmth. No artificial heat would be necessary. The great point in growing Pine-apples is to secure a suitable soil. One of the most successful cultivators of Pine-apples in this country gave the following advice on this point: "From old pasture or meadow ground strip off the turf, and dig to the depth of six or eight inches according to the goodness of the soil; draw the whole together to some convenient place, and mix it with one-half of good rotten dung; frequently turn over *for twelve months*, and it will be fit for use. This is the only compost which I use for young and old plants." This turfy loam could be obtained in considerable quantity from the grassy slopes above Teror in Grand Canary, and many places in Teneriffe. Pine-apple plants cannot stand fresh manure. They rot at once. To make Pine-growing a success, large well-favoured fruit only should be grown, and it should be shipped early in the year from February to the end of May.

Common Fig (*Ficus Carica*) is practically wild in the islands. It loses its leaves in the winter, and during that period its bare leaden-coloured branches are widely dispersed over the country. There is hardly any tree so abundant. It grows in the most rocky and unpromising situations. It is seldom, if ever, cultivated. The peasants practically live on Figs during the crop season, and at Hierro, where the best sorts are found, Figs are dried and exported to the other islands. They are, however, small and rather tough. Fresh Figs will not bear transit by steamer; but it might easily be possible to improve their size and flavour, and ship them dried in the same way as Smyrna Figs. A thousand tons of Figs are received in the United Kingdom every year from Turkey and the Mediterranean regions.

Cherimoyer (*Anona cherimolia*).—This is sometimes known in the Canaries and Madeira as the "Custard Apple." It is not, however, the true Custard Apple, but a much superior fruit,

obtained originally from Peru. The tree is about 15 to 20 feet high, somewhat resembling a small Apple tree. The fruit is the size of a double fist, heart-shaped, with a yellowish tinge of green. Inside the pulp is snowy-white, with black almost flat seeds. The Sour-sop (*A. muricata*), the Custard Apple (*A. reticulata*), and the Sweet-sop, or Sugar-apple (*A. squamosa*), are closely allied to the Cherimoyer, but usually require a warmer climate. None of the latter is so good as the Cherimoyer.

Alligator Pear (*Persea gratissima*).—This is grown largely in Madeira, and the fruit is often seen in the London market. The tree flourishes both in Grand Canary and Teneriffe. The fruit is a large pear-shaped body, either green or purple, with a large globular seed in the centre. The pulp is soft and creamy. It is used in the West Indies as a salad and as a substitute for butter. This fruit if carefully packed might prove valuable for export purposes on a small scale.

Peach (*Prunus Persica*).—The Peach is not carefully cultivated. The trees are, however, widely distributed. In early spring the blossom is very pretty. The fruit is inferior and seldom suitable for dessert. Some superior sorts have lately been introduced by Colonel Wethered and others into the Orotava Valley.

Almond (*Prunus amygdalus*).—Widely distributed everywhere. Almonds are largely exported in good season. The exports in 1892 were of the value of £7,361.

Melons (*Cucumis melo*).—The best varieties of Melons require great care. They thrive better in newly broken land. This applies generally to Melons, Vegetable Marrows, Cucumbers, and all cucurbits. Water Melons reach England in immense quantities from Malta; hence there is not much prospect for this fruit from the Canaries. Good, well-flavoured sweet Melons would do better.

Guava (*Psidium Guayava*).—The apple and pear-shaped Guavas, of a yellowish-green colour, are common. They are not of good flavour, and are not much liked as a dessert fruit. They, however, make good jelly. The small purple Guavas (*P. Cattleianum*) are a superior fruit when well cultivated.

Prickly Pear (*Opuntia spp.*).—This hardly deserves to be mentioned as a fruit. The inferior sorts produced on wild plants are only eaten by the poorer people and by animals. The choice

sorts, similar to those received in this country from Malta, are unknown in the Canaries.

Walnut (*Juglans regia*).—This tree is fairly common. It deserves to be still more largely planted. The fruit is cured and shipped to a small extent.

Loquat (*Eriobotrya japonica*).—The Japanese Medlar, or Loquat, known locally as “Nespero,” is one of the regular fruits of the country. They are usually of good quality, but many self-sown seedlings produce poor fruits. The best varieties with only one seed should be carefully cultivated. The Loquat makes excellent jelly.

Papaw (*Carica Papaya*).—The Papaw tree, with its usually single stem surmounted by a crown of large palmate leaves, is not uncommon in the lowlands. The fruit is like a Melon in flavour, but, except in the very best sorts, is apt to be insipid. The juice has the singular property of rendering flesh tender. From the milk is prepared vegetable pepsine.

Olive (*Olea europæa*).—Many large Olive trees are scattered over the country. They appear to be semi-wild sorts, of little value commercially. If it were proposed to cultivate Olives of the best sorts it would be necessary to introduce grafted trees, and select those yielding large fruits known as Spanish Olives.

Chayota (*Sechium edule*).—This is a pear-shaped fruit with a single seed borne by a large climber with the habit of a Vegetable Marrow. In fact, the fruit closely resembles a Vegetable Marrow in flavour, and is used in the tropics as a substitute for it. It is a native of South America. There are two well-marked varieties, green and cream-coloured. The Chayota, Chocho, or Christophine, is sometimes imported into this country from Madeira. It sells well during the winter months, and only requires to be more widely known to be in still greater demand.

Amongst the **Passion-fruits** the most common is the Sweet-cup (*Passiflora edulis*). This is sometimes, but erroneously, called Granadilla. The fruit is the size of a small apple, purple outside. The plant grows very readily everywhere. The true Granadilla (*P. quadrangularis*) is borne by a very vigorous climber with a square stem and large oblong leaves. The fruit is green, as large as a Vegetable Marrow, and filled with a jelly in which are numerous seeds. A plant of this was noticed grow-

ing in Señor Don Cayetano de Lugo's garden, near the Catalina Hotel, Grand Canary. The Water Lemon (*P. laurifolia*) is one of the best of the Passion-fruits, and might be suitable for export. Like the others, it is borne on a twining stem, and requires the support of a trellis or wall.

Okro, or Gombo (*Hibiscus esculentus*).—This annual shrub produces the horn-like fruits which are largely eaten in the tropics for the sake of the mucilage they contain. They are useful also for making soup and pickles. The seeds yield oil and the stems a good fibre.

Roselle (*Hibiscus Sabdariffa*).—The fleshy involucre of the fruit have a sharply acid flavour and a rich red colour. They are used for making summer drinks, for preserves and jellies. The plant grows in almost any soil.

Brinjal, or Egg-plant (*Solanum Melongena*), allied to the Tomato.—The fruit is long, oval, or pear-shaped; white, striped, or purple. It is an excellent vegetable, and might be produced for export.

Tree Tomato (*Cyphomandra betacea*).—Although not a Tomato, it belongs to the same family, and has somewhat the texture of a Tomato. The plant is a native of Peru. It is a large shrub with leaves sometimes a foot long. The flowers are very fragrant, and succeeded by an egg-shaped fruit of a reddish-yellow colour. It has a fresh, piquant flavour, and is agreeable either fresh or cooked. It makes excellent jam and jelly. It is occasionally imported into this country from Madeira under the erroneous name of "Granadilla." It deserves to be more widely grown, both for local use as well as for shipment.

Cape Gooseberry (*Physalis peruviana*).—This is hardy enough to occupy almost any waste land without cultivation. The fruit is enclosed in a leafy bladder, and is most agreeable either fresh or made into jam. At the Cape it is very abundant, and makes "admirable preserve." In Natal it is a valuable fruit; "the jam made from it is hardly ever known to ferment."

Capers (*Capparis spinosa*).—A spiny shrub with the habit of a bramble, and bearing large white flowers. The flower buds, and sometimes the unripe fruits, pickled in vinegar, yield the capers of commerce. The chief supply comes from Sicily. The plant is occasionally grown in the Canaries.

Carambola (*Averrhoa Carambola*) and the Bilimbi, or Tree

Sorrel (*A. Bilimbi*), yield acid fruits suitable for preserves. The first of these is grown in the neighbourhood of Las Palmas.

Pod Peppers (*Capsicum frutescens*).—These pods are borne on somewhat low bushes about 2 to 3 feet in height. The fresh fruits are hot and pungent, and are used as seasoning and to supply some of the Cayenne Pepper of commerce. Some varieties are less pungent and almost sweet. Pod Peppers in the fresh state might be tried as one of the exports of the islands. **Bird Peppers** (*C. annum*) would grow freely in dry, stony places. The pods picked when ripe, sun-dried, and packed in mat bags would fetch from 70s. to 140s. per cwt.

Igname, Taro, or Eddoe (*Colocasia antiquorum*).—This plant is common in damp situations. The leaves and the tuberous stems are extensively used as food in tropical countries. In the Canaries they are not specially cultivated, and probably they have deteriorated and become semi-wild.

Apples are grown in the mountains, and in some years the crops are considerable. Canary-grown apples are to be found in the public market at Las Palmas. They are chiefly French sorts with a transparent skin, hard, and rather insipid. The Pears are still less palatable. There are numerous Plums and some Cherry trees to be seen. The fruit of these is probably reserved for private use. The Strawberry is cultivated, but not largely. This delicious fruit might be produced in excellent quality during the early spring months.

Besides the fruits above mentioned it might be added that a large number of tropical and sub-tropical fruits are grown in gardens in very small quantities. They are interesting to visitors. They also show the capabilities of the islands. There are to be met with: Tamarind, Jujube, Barbados Cherry, Baobab, Cape Gooseberry, Cashew-nut, Cocoa-nut, Star-apple, Date, Hog-plum, Jack-fruit, Kumquat, Litchi, Mango, Mulberry, Persimmon or Date Plum, Pine-apple, Pomegranate, Rose-apple, and Sapodilla Plum.

Carob-tree (*Ceratonia Siliqua*).—This is grown in hedge-rows, very much like the Elm in England. It is a comparatively low tree, with two or three pairs of oval leaflets of a leathery texture. The small reddish flowers hang in clusters. The pods are 6 to 10 inches long, with many seeds embedded in pulp. The tree has many names. It is the Algaroba of the

Spaniards and Kharoub of the Arabs, whence comes our English name Carob-pods or Caroub-beans. These pods contain a quantity of agreeably flavoured mucilage and saccharine matter. They are employed for feeding horses, mules, and pigs. Occasionally they are seen in this country. The Carob-tree is valuable for dry countries, but as the species is diœcious, both the male and female plants should be grown, or no pods would be produced. The timber is of a pretty pink colour.

Tagasaste (*Cytisus prolifer*, var. *palmensis*).—This is a valuable fodder plant, first brought into notice by the late Dr. Victor Perez, of Orotava. It is a native of the island of Palma. The ordinary plant of Teneriffe is the “Escobon.” The variety is a large bush, often attaining a height of 12 to 15 feet, and covered with trifoliate leaves. In many instances Tagasaste is the only plant that will thrive in loose volcanic ash and cinders. It yields large quantities of green fodder, makes excellent hay, and its abundant sweet flowers render it a valuable bee-plant. Both in the Canary Islands and in other countries with a sub-tropical climate Tagasaste should prove of great value. It requires no irrigation, and when overgrown and cut down it yields excellent firewood. Dr. George V. Perez, M.B. (Lond.), the accomplished son of the advocate of Tagasaste, and now the leading medical authority at Puerto Orotava, takes a deep interest in this plant. He has lately republished his father’s writings on the subject. (See Appendix III.)

Canary Rosewoods.—These were at one time in great request. The root was known as rose-root or *lignum rhodium*. The plants yielding them are shrubby species of Convolvulacæ. One, the “Guadil” (*Convolvulus floridus*), is a most attractive plant. When in flower it appears as if covered with newly fallen snow. It is one of the few native plants which awaken the enthusiasm of the local residents. It is grown at Kew from seed received from Dr. George V. Perez. The other plant, more correctly known as Rosewood, is *Convolvulus scoparius*, called “Leña Noel.” This has become very rare owing to the excessive digging of the roots many years ago. Piesse states: “When Rosewood is distilled a sweet-smelling oil is procured, resembling to some slight degree the fragrance of the Rose; hence the name. One hundredweight of wood yields about three ounces of oil. Ground Rosewood is valuable as a basis in the manufacture of sachet powders.”

APPENDICES.

APPENDIX I.

LIST OF CANARY PLANTS UNDER CULTIVATION AT THE ROYAL GARDENS, KEW,
MAY 1895.

- Ranunculus cortusæfolius, Willd.
 Cheiranthus (Dichroanthus) mutabilis, L'Herit.
 Laurus canariensis, Webb & Berth.
 Phœbe Barbusana, Webb & Berth.
 Apollonias canariensis, Nees.
 Ocotea (Oreodaphne) fœtens, Berth. & Hook. f.
 Persea indica, Spring.
 Cistus osbeckiæfolius, Webb
 Hypericum canariense, Linn.
 „ floribundum, Dryand.
 Lavatera acerifolia, Cav.
 Visnea Mocanera, Linn. f.
 Geranium anemone-folium, L'Herit.
 Silene nutans, Linn.
 „ nocteolens, Webb & Berth
 Euphorbia aphylla, Brouss.
 „ canariensis, Linn.
 „ piscatoria, Ait.
 „ mauritanica, Linn.
 „ mellifera, Ait.
 „ balsamifera, Ait.
 „ Regis-Jubæ, Webb & Berth.
 „ hæmatodes, Boiss.
 Ferula Linkii, Webb & Berth.
 Fœniculum tortuosum, Benth. & Hook. f.
 Bowlesia (Drusa) oppositifolia, Buch.
 Sempervivum tabulæforme, Haw.
 „ glaucum, Tenore
 „ glutinosum, Ait.
 „ balsamiferum, Webb & Berth.
 „ marginatum
 „ barbatum, C. Smith (lineolare, Haw.)
 „ youngianum, Webb & Berth.
 „ ciliatum, Willd.
 „ Haworthii, Hort. Angl.
 „ orbicum, C. Smith
 „ Paivæ, Bolle
 „ cuneatum, Webb & Berth.
 „ holochrysum, Webb & Berth.
- Monanthes agriostaphys [Webb & Berth.]
 „ polyphylla, Haw.
 „ atlantica, Ball (muralis, Hook. f.)
 Bencomia caudata, Webb & Berth.
 Adenocarpus foliolosus, DC.
 Cytisus fragrans, Lam. (Spartium supranubium, Linn. f.)
 Cytisus filipes, Webb & Berth.
 „ canariensis, Steud.
 Lotus Berthelotii, Masf. (L. peliorhynchus, Hook. f.)
 Convolvulus floridus, Linn.
 Ceropogia dichotoma, Haw.
 Jasminum odoratissimum, Linn.
 Arbutus canariensis, Duham.
 Canarina campanulata, Linn.
 Tournefortia (Messersmidia) fruticosa, Ker-Gawl.
 Echium callithyrsum, Webb
 „ Auberianum, Webb & Berth. (E. bourgeanum, Webb)
 „ bifrons, DC.
 „ strictum, Linn. f.
 Isoplexis (Callianassa) canariensis, Steud.
 Lavandula pinnata, Linn. f.
 Salvia canariensis, Linn.
 Sideritis (Leucophaë) canariensis, Linn.
 Statice Bourgæi, Webb
 „ puberula, Webb
 „ fruticans, Webb (S. arborescens, Brouss.)
 „ Halfordi, Hort. x
 Viburnum rigidum, Vent. (V. rugosum, Pers.)
 Chrysanthemum frutescens, Linn.
 „ „ var. flavidum
 „ „ „ chrysaster
 „ anethifolium, Brouss. (C. fœniculaceum, Steud.)
 „ Broussonetii, Balb.
 „ grandiflorum, Willd.
 „ pinnatifidum, Linn.
 Gonospermum fruticosum, Less.
 Senecio Heritieri, DC. (Cineraria lanata, Lam.)

Senecio cruentus, DC. (<i>Cineraria cruenta</i> , Mass.)	Dracæna draco, Linn.
Senecio populifolius, DC. (<i>Cineraria populifolia</i> , L'Hérit.)	Aloe vera, Linn. (<i>A. vulgaris</i> , Lam.)
Senecio maderensis, DC. (<i>Cineraria aurita</i> , L'Hérit.)	Luzula Forsteri, DC.
Senecio Kleinia, Less. (<i>S. nervii-folius</i> , Baill.)	„ canariensis, Poir.
Sonchus radicans, Ait.	Pinus canariensis, C. Smith
„ gummifer, Link.	Juniperus Cedrus, Webb & Benth.
„ leptocephalus, Cass.	Adiantum reniforme, Linn.
„ laciniatus, T. Moore	Cheilanthes pulchella, Bory.
„ tenerimus, Linn. (<i>S. pectinatus</i> , DC.)	Dicksonia Culecita, L'Hérit.
Myrica Faya, Dryand.	Asplenium Ceterach, Linn.
Dracunculus canariensis, Kunth.	„ „ var. aureum
Pancratium canariense, Ker-Gawth.	Asplenium canariense, Willd.
Semele (<i>Ruscus</i>) androgyna, Kunt.	„ Newmani, Bolle
	„ umbrosum, J. Smith
	(<i>Athyrium umbrosum</i> , Presl.)
	Nephrodium Filix-Mas, Desv.
	„ „ var. canariense
	Ophioglossum lusitanicum, Linn.

APPENDIX II.

A SELECT LIST OF THE NATIVE AND INTRODUCED PLANTS OBSERVED IN THE BOTANIC GARDEN NEAR OROTAVA, TENERIFFE, IN MARCH, 1893.

Abrus precatorius, Linn.	. Wild Liquorice .	. Tropics
Abutilon indicum, Sweet	. . . . .	. Old World Tropics
„ megapotamicum, St. Hil. & Naud.	. . . . .	. Trop. America
Acacia albicans, Kunth.	. = Pithecolobium albicans	
„ arabica, Willd.	. Gum Arabic Tree	. Africa, Trop. Asia
„ armata, R. Br.	. Kangaroo Thorn	. Australia
„ celastrifolia, Benth.	. = A. myrtifolia	
„ cultriformis, A. Cunn.	. . . . .	. Australia
„ dealbata, Link.	. Silver Wattle	. Australia
„ decurrens, Willd.	. Black Wattle	. Australia
„ Farnesiana, Willd.	. Cassie	. Tropical Regions
„ Julibrissin, Willd.	. = Albizzia Julibrissin	
„ Lebbek, Willd.	. = Albizzia Lebbek	
„ leptophylla, DC.	. = Acacia Farnesiana	
„ linearis, Sims	. . . . .	. Australia
„ longissima, Wendl.	. = A. linearis	
„ lophantha, Willd.	. = Albizzia lophantha	
„ myrtifolia, Willd.	. . . . .	. Australia
„ speciosa, Willd.	. = Albizzia Lebbek	
„ spectabilis, A. Cunn.	. . . . .	. Australia
„ trinervia, Desv.	. . . . .	. Nat. country unknown
„ verticillata, Willd.	. Prickly Wattle	. Australia
Achras Sapota, Linn.	. Sapodilla Plum.	. South America
Adamia versicolor, Fortune	. = Dichroa febrifuga	
Adenocarpus anagyris, Spreng.	. . . . .	. Canary Is.
„ frankenioides, Choisy	. = A. anagyris	
Adiantum Capillus-veneris, Linn.	“Culantrillo,” Maiden-hair	Trop. & Temp. Zones
„ reniforme, Linn.	“Yerva tastonera,” Kidney Fern	Madeira and Teneriffe
Agathis australis, Steud.	. Kauri Pine .	. New Zealand

- Agathis loranthifolia, *Salisb.* Malaya
 Agati grandiflora, *Desv.* = *Sesbania grandiflora*
 Agave americana, *Linn.* American Aloe . . . Trop. America
 " " var. *variegata*
 Ailanthus glandulosa, *Desf.* Tree of Heaven . . . China
 Albizzia Julibrissin, *Durazz.* Asia, Trop. Africa
 " Lebbek, *Benth.* "Bois Noir," Woman's Old World Tropics
 Tongue
 " lophantha, *Benth.* Australia
 Aleurites triloba, *Forst.* Jamaica Walnut . . . Trop. Asia, Pacific Is.
 Aloe vera, *Linn.* Common Aloe . . . Mediterranean Region
 Aloysia citriodora, *Orteg.* = *Lippia citriodora*
 Alpinia nutans, *Rosc.* Wild Ginger . . . India
 Amaryllis Belladonna, *Linn.* South Africa
 Amorphophallus Rivieri, *Dur.* Cochinchina & Japan
 Angophora lanceolata, *Cav.* Rusty Gum . . . Australia
 Anona cherimolia, *Mill.* Cherimoyer . . . Trop. America
 " microcarpa, *Ruiz. & Pav.* Peru
 " squamosa, *Linn.* Sweet-sop . . . West Indies
 Anthocercis elliptica "Transparens"
 " picta = *Myoporum crystallinum*
 Antholyza aethiopica, *Linn.* Anteliza . . . South Africa
 Antigonon leptopus, *Hook. & Arn.* South America
 Apollonia canariensis, *Nees.* Canary Is.
 Aralia Guilfoylei, *Cogn. & March* Pacific Islands.
 " papyrifera, *Hook.* = *Fatsia papyrifera*
 " reticulata, *Willd.* = *Oreopanax reticulatum*
 " Schefflera, *Spreng.* = *Schefflera digitata*
 Araucaria Bidwillii, *Hook.* Bunya-Bunya . . . Australia
 " brasiliiana, *Rich.* Brazil
 " brasiliensis, *Loud.* = *A. brasiliiana*
 " Cookii, *R. Br.* New Caledonia
 " Cunninghamsi, *Sweet* Moreton Bay Pine . . . Australia
 " excelsa, *R. Br.* Norfolk Island Pine . . . Australia, Norfolk Is.
 Arbutus canariensis, *Duham.* "Madrono" . . . Canary Is.
 Area lutescens, *Bory* = *Chrysalidocarpus lutescens*
 Argania Sideroxyylon, *Roem.* Argan Tree . . . Morocco
 & *Schult.*
 Arisarum vulgare, *Targ. Toz.* Mediterranean Region
 Aristolochia brasiliensis, *Mart. & Zucc.* Brazil
 " ornithocephala, = *A. brasiliensis*
Hook.
 Arum italicum, *Mill.* Italian Arum . . . Europe
 " " v. *canariense, Engl.*
 Arundinaria japonica, *Sieb. & Zucc.* Japan
 " Simoni, *A. & C. Riviere.* China
 Arundo Donax, *Linn.* Orient & Mediter.
 Region
 " " v. *variegata*
 Aselepias curassavica, *Linn.* Wild Ipecacuanha . . . South America
 " linifolia, *Lag.* Mexico
 Asparagus scaber, *Brign.* Asparagus . . . Mediterr. & Caucas
 Region
 " scoparius, *Lowe* Morocco & Madeira Is.
 Asphodelus fistulosus, *Linn.* Asphodel . . . Orient and Mediter.
 Region
 " ramosus, *Linn.* South Europe
 Aspidium aculeatum, *Sw.* Cosmopolitan

- Asplenium Adiantum-nigrum*, Black Spleenwort . N. & S. Temp. Zones
Linn.
 „ *axillare, Ait.* . . = *A. umbrosum*
 „ *canariense, Willd.* = *A. præmorsum*
 „ *Ceterach, Linn.* . Golden Ceterach . Europe & Temp. Asia
 „ v. *aureum*
 „ *Filix-Fœmina, Bernh.* Lady Fern Cosmopolitan
 „ *Hemionitis, Linn.* S. Europe & N. Africa
 „ v. *productum*
 „ *lanceolatum, Huds.* Europe
 „ *marinum, Linn.* . . Sea Spleenwort Europe
 „ *monanthemum, Linn.* Temperate Regions
 „ *præmorsum, Sw.* Trop & Sub-Trop.
 „ Regions
 „ *Trichomanes, Linn.* Common Spleenwort. Temperate Regions
 „ v. *anceps*
 „ *Newmani, Bolle* Canary Is.
 „ *umbrosum, J. Smith* Madeira
Bactris Gasipaës, H. B. K. New Granada
Bambusa arundinacea, Willd. Bamboo East Indies
 „ *gracilis, Hort.* Unknown
 „ *Metake, Siebold* . = *Arundinaria japonica*
 „ *nigra, Lodd.* . = *Phyllostachys nigra*
 „ *Simoni, Carr* . = *Arundinaria Simoni*
Banksia integrifolia, Linn. . Honeysuckle Australia
Bauhinia purpurea, Linn. India, Burmah, China
Benthamia fragifera, Lindl. . = *Cornus capitata*
Berberidopsis corallina, Hook. Chili
Berberis vulgaris, Linn. . Barberry Europe, Temp. Asia
Bignonia atro-sanguinea, Hort. = *B. capreolata*
 „ *capreolata, Linn.* North America
 „ *Chamberlaynii, Sims.* Brazil
 „ *jasminoides, Thunb.* Brazil
 „ *Lindleyi, DC.* Argentina
 „ *magnifica, Bull* New Granada
 „ *Manglesii, Hort.*
 „ *mirabilis* . . . = *B. magnifica*
 „ *ochroleuca, Hort.*
 „ *speciosa, R. Grah.* Brazil
 „ *stans, Linn.* . = *Tecoma stans*
 „ *variabilis, Jacq.* Venezuela
 „ *velutina, DC.* Brazil
 „ *venusta, Ker-Gawl* Brazil
Billbergia zebrina, Lindl. Brazil
Bougainvillea glabra, Choisy Bougainvillea Brazil
 „ *spectabilis, Willd.* Brazil
 „ var. *lateritia*
Brachychiton acerifolium, F. = *Sterculia acerifolia*
 „ *Muell.*
 „ *Gregorii, F. Muell.* = *S. diversifolia*
 „ *populneum, R. Br.* = *S. diversifolia*
Brassaiopsis speciosa, Decne. Himalayan Aralia Himalayan Region
 „ & *Planch.*
Bromelia sp. Trop. America
Brownea Ariza, Benth. . . Brownea New Granada
Bryophyllum calycinum, Salisb. Plant of Life Mexico
Bursaria spinosa, Cav. . . Box Thorn Australia

<i>Bystropogon punctatus</i> , <i>L'Hérit.</i>	. . . . .	Madeira Is.
<i>Cæsalpinia Gilliesii</i> , <i>Wall.</i>	. . . . .	South America
„ <i>pulcherrima</i> , <i>Sw.</i>	. . . . .	Tropics
„ <i>tinctoria</i> , <i>Domb.</i>	. . . . .	New Granada
<i>Calla æthiopica</i>	. . . . . = <i>Richardia africana</i>	
<i>Callistemon speciosus</i> , <i>DC.</i>	Bottle Brush Tree	Australia
<i>Callitris cupressioides</i> , <i>Schrad.</i>	. . . . .	South Africa
„ <i>quadrivalvis</i> , <i>Vent.</i>	Arar Tree	North Africa
<i>Campanula Vidalii</i> , <i>H. C. Wats.</i>	. . . . .	Azores Is.
<i>Canarina campanulata</i> , <i>Linn.</i>	“Bicararo”	Canary Is.
<i>Capparis spinosa</i> , <i>Linn.</i>	Caper Plant	India, Orient, Medit. Region
<i>Carapa guianensis</i> , <i>Aub.</i>	Crab-oil Tree	Trop. Africa, Guiana
<i>Carica Papaya</i> , <i>Linn.</i>	Papaw Tree	Trop. America
<i>Carlina salicifolia</i> , <i>Cav.</i>	“Cardo de los Montes”	Madeira
<i>Caryota urens</i> , <i>Linn.</i>	Wine Palm	Trop. Asia
<i>Cassia arborea</i> , <i>Macfad.</i>	. . . . . = <i>C. siamea</i>	
„ <i>bacillaris</i> , <i>Linn.</i>	. . . . .	Trop. America
„ <i>bicapsularis</i> , <i>Linn.</i>	. . . . .	Trop. America
„ <i>brasiliensis</i> , <i>Lam.</i>	. . . . . = <i>C. grandis</i>	
„ <i>fistula</i> , <i>Linn.</i>	. . . . . “Amaltas” or Indian Laburnum	Trop. Asia
„ <i>grandis</i> , <i>Linn.</i>	. . . . .	Panama
„ <i>mimosoides</i> , <i>Linn.</i>	. . . . .	Tropics
„ <i>occidentalis</i> , <i>Linn.</i>	Negro Coffee	Tropics
„ <i>polyantha</i> , <i>Moc. & Sess.</i>	. . . . .	Mexico
„ <i>siamea</i> , <i>Lam.</i>	. . . . .	India, Malaya
<i>Castanospermum australe</i> , <i>A. Cunn. & Fras.</i>	Moreton Bay Chestnut	Australia
<i>Casuarina equisetifolia</i> , <i>Linn.</i>	“Filao.” Beefwood	Malaya, Pacific Is.
„ <i>glauca</i> , <i>Sieber.</i>	Bull-oak	Australia
„ <i>pyramidalis</i>	. . . . . = <i>C. stricta</i>	
„ <i>quadrivalvis</i> , <i>Labill.</i>	“She-oak”	
„ <i>stricta</i> , <i>Dryand.</i>	Coast She-oak	Australia
<i>Catlia cassinoides</i> , <i>Webb & Berth.</i>	= <i>Gymnosporia cassinoides</i>	
<i>Cecropia palmata</i> , <i>Willd.</i>	Snake Tree	Brazil
<i>Cedrela odorata</i> , <i>Linn.</i>	West Indian Cedar	South America
<i>Cedronella canariensis</i> , <i>Webb & Berth.</i>	“Algaritofe,” “Neta”	Canary Is.
<i>Cedrus atlantica</i> , <i>Manetti</i>	. . . . . = <i>C. Libani</i>	
„ <i>Libani</i> , <i>Barrel</i>	. . . . . Cedar of Lebanon	Asia Minor, Syria, Algeria, Himal. Reg.
<i>Cercis Siliquastrum</i> , <i>Linn.</i>	Judas Tree	Europe, Orient
<i>Ceropegia dichotoma</i> , <i>Haw.</i>	“Cardoncillo”	India, Canary Is.
<i>Cestrum aurantiacum</i> , <i>Linull.</i>	. . . . .	Guatemala
„ <i>elegans</i> , <i>Schlecht.</i>	. . . . .	Mexico
„ <i>nocturnum</i> , <i>Linn.</i>	. . . . .	South America
<i>Ceterach officinarum</i>	. . . . . = <i>Asplenium Ceterach</i>	
„ „ <i>v. aureum</i>	= „ „	var. aureum
<i>Chamærops cærulescens</i> , <i>Hort.</i>	= <i>Sabal cærulescens</i>	
„ <i>Fortunei</i> , <i>Hook.</i>	= <i>Trachycarpus</i>	
„ <i>macrocarpa</i> , <i>Linden</i>	. . . . .	Unknown
<i>Cheilanthes fragrans</i> , <i>Sw.</i>	Scented Fern	Europe &c.
„ <i>maderensis</i> , <i>Lowe</i>	= <i>C. fragrans</i>	
„ <i>pulchella</i> , <i>Jory.</i>	Dip fern	Madeira & Canary Is.
<i>Cheiranthus mutabilis</i> , <i>L'Hérit.</i>	Changeable Wallflower	Madeira & Canary Is.
<i>Chrysalidocarpus lutescens</i> , <i>H. Wendl.</i>	. . . . .	Madagascar

Chrysanthemum frutescens,	Marguerite	.	.	Canary Is.
	<i>Linn.</i>			
"	anethifolium, <i>Brouss.</i>	.	.	Canary Is.
"	Broussonetii, <i>Ball</i>	.	.	Canary Is.
"	grandiflorum, <i>Willd.</i>	.	.	Canary Is.
"	pinnatifidum, <i>Linn.</i>	.	.	Madeira
Cineraria cruenta, <i>Mass.</i>	= Senecio cruentus			
Cinnamomum camphora, <i>T.</i>	Camphor	.	.	China, Japan
	<i>Nees et Eberm.</i>			
"	zeylanicum, <i>Nees</i>	Cinnamon	.	India, Malaya
Cistus vaginatus [<i>Dryand.</i>]	"Jarra"	.	.	Teneriffe
Citharexylum quadrangulare,	Fiddle Wood	.	.	West Indies
	<i>Jacq.</i>			
Citrus aurantium, <i>Linn.</i>	Orange	.	.	Trop. Asia
"	medica, <i>Linn.</i>	Citron	.	Trop. Asia
"	nobilis, <i>Lour.</i>	Mandarin Orange	.	Trop. Asia
Clematis Jackmani ×, <i>Van Houtte</i>	.	.	.	Japan
Clerodendron fragrans, <i>Vent.</i>	.	.	.	China, Sumatra, Java
"	fragrantissimum = C. fragrans			
"	speciosum ×, <i>Teijm. & Binn.</i>			
"	Thomsonæ, <i>Balf.</i>	.	.	Trop. Africa
Clethra arborea, <i>Soland</i>	.	.	.	Madeira
Clianthus Dampieri, <i>A. Cunn.</i>	Parrot Flower	.	.	Australia
Cobæa penduliflora, <i>Hook.</i>	.	.	.	Venezuela
"	scandens, <i>Cav.</i>	.	.	Mexico
Cocos australis, <i>Mart.</i>	.	.	.	Paraguay
"	flexuosa, <i>Mart.</i>	.	.	Brazil
"	nucifera, <i>Linn.</i>	Cocoa-nut Palm	.	Tropics
Coffea arabica, <i>Linn.</i>	Common Coffee	.	.	Arabia, Trop. Africa
"	Liberica, <i>Hiern.</i>	Liberian Coffee	.	Trop. Africa
Colocasia antiquorum, <i>Schott</i>	Taro "Igne" "	.	.	Trop. Asia
Colvillea racemosa, <i>Boj.</i>	.	.	.	Madagascar
Combretum Loefflingii, <i>Eichl.</i>	.	.	.	Trop. America
"	micropetalum, <i>DC.</i>	= C. Loefflingii		
"	pincianum, <i>Hook.</i>	.	.	Trop Africa
Convolvulus canariensis,	"Correhuelo de los Montes"	Canary Is.		
	<i>Linn.</i>	Canary Convolvulus		
"	floridus, <i>Linn.</i>	"Guadil"	.	Teneriffe
Cordyline indivisa, <i>Steud.</i>	Cabbage Tree	.	.	New Zealand
"	robustum, <i>Hort.</i>			
Cornus capitata, <i>Wall.</i>	"Bamora"	.	.	Himalaya Region
Coronilla glauca, <i>Linn.</i>	.	.	.	Mediterr. Region
"	viminalis, <i>Salisb.</i>	.	.	North Africa
Corypha australis, <i>R. Br.</i>	= Livistona australis			
"	Gebanga, <i>Blume</i>	.	.	Malaya
Coullteria tinctoria, <i>H. B. K.</i>	= Cæsalpinia tinctoria			
Coussapoa dealbata, <i>André</i>	.	.	.	Brazil
Cratægus Azarolus, <i>Linn.</i>	Azarole	.	.	Asia Minor, Persia
Crescentia Cujete, <i>Linn.</i>	Calabash Tree	.	.	Trop. America
Cryptolepis longiflora, <i>Regel</i>	.	.	.	Unknown
Cryptostegia madagascariensis, <i>Boj.</i>	.	.	.	Madagascar
Cuphea eminens, <i>Planch. & Lind.</i>	= C. micropetala			
"	micropetala, <i>H. B. K.</i>	.	.	Mexico
Cupressus Benthami, <i>Endl.</i>	.	.	.	Mexico
"	elegans	= C. Lindleyi		
"	excelsa, <i>Scott</i>	= C. Benthami		
"	Goveniana, <i>Gord.</i>	.	.	California
"	horizontalis, <i>Mill.</i>	= C. sempervirens		

Cupressus	Lindleyi, <i>Klotzsch</i>	Mexico
"	McNabiana, <i>Andr.-Murr.</i>	California
"	pisifera, <i>Koch</i>	Japan
"	pyramidalis, <i>Targ.</i> = <i>C. sempervirens</i>	
"	sempervirens, <i>Linn.</i>	Europe, Orient
"	torulosa, <i>D. Don.</i>	Himalaya Region
"	<i>Tournefortii, Tenore</i> = <i>C. torulosa</i>	
Cycas	revoluta, <i>Thunb.</i>	Sago Palm Japan
Cyperus	alternifolius, <i>Linn.</i>	Madagascar
"	Papyrus, <i>Linn.</i>	Papyrus or Paper Sicily, Syria, Trop. Africa
	Reed	
Cyphomandra	betacea, <i>Scudtn.</i> Tree Tomato	South America
Cystopteris	fragilis, <i>Bernh.</i>	Bladder Fern Cosmopolitan
Cytisus	canariensis, <i>Steud.</i>	Canary Is.
"	filipes, <i>Webb & Berth.</i>	Canary Is.
"	fragrans, <i>Lam.</i>	"Retama" Teneriffe
"	proliferus, <i>Linn. f.</i>	"Escobon" Canary Is.
"	" v. palmensis "Tagasaste"	
Danmara	alba, <i>Lam.</i>	= <i>Agathis loranthifolia</i>
"	australis, <i>Lamb.</i>	= <i>A. australis</i>
Dasyliion	glaucophyllum, <i>Hook.</i>	Mexico
"	glaucum, <i>Carr</i>	= <i>D. glaucophyllum</i>
Datura	arborea, <i>Linn.</i>	White Datura South America
"	" v. fl. pl.	Double White Datura
"	coccinea	= <i>D. sanguinea</i>
"	sanguinea, <i>Ruiz & Pav.</i>	South America
"	Wallisii, <i>Hort.</i>	
Davallia	canariensis, <i>Sm.</i>	Hare's-foot Fern Europe & Canary Is.
Delphinium	staphisagria, <i>Linn.</i> "Albarras"	Mediterr. Region
Dichroa	febrifuga, <i>Lour.</i>	Malaya, China, Himal.
Dicksonia	Culcita, <i>L'Herit.</i>	Madeira, Azores, and Spain
Diervilla	florida, <i>Sieb. & Zucc.</i>	China
Digitalis	canariensis, <i>Linn.</i>	= <i>Isoplexis canariensis</i>
Dion	edule, <i>Lindl.</i>	Mexico
Diosma	ericoides, <i>Linn.</i>	"Braza de olor" South Africa
Diospyros	Kaki, <i>Linn.</i>	Date Plum Japan
Dolichos	acinaciformis, <i>Blanco</i>	Philippine Is.
"	" v. purpureus	
"	Jacquini, <i>DC.</i>	West Indies
"	lignosus, <i>Jacq.</i>	= <i>D. Jacquini</i>
Dracena	Draco, <i>Linn.</i>	Dragon's Blood Tree Canary Is.
"	indivisa, <i>Forst.</i>	= <i>Cordyline indivisa</i>
"	marginata, <i>Lam.</i>	Madagascar
Dracunculus	canariensis, "Tacarontilla" "Tara-Kunth gontia"	Canary Is.
Duranta	elegans	
"	Ellisia, <i>Jacq.</i>	= <i>D. Plumieri</i>
"	Plumieri, <i>Jacq.</i>	Trop. America
Dypsis	madagascariensis, <i>Hort.</i>	Madagascar
Echium	aculeatum, <i>Poir.</i>	Canary Is.
"	Auberianum, <i>Webb & Berth.</i>	Canary Is.
"	callithyrsum, <i>Webb</i>	Canary Is.
"	candicans, <i>Linn. f.</i>	Madeira
"	fastuosum, <i>Jacq. f.</i>	Canary Is.
"	gigantum, <i>Linn. f.</i>	Teneriffe
"	lineatum, <i>Jacq. f.</i>	Canary Is.
"	simplex, <i>DC.</i>	"Arrebol" Pride of Teneriffe

<i>Echium strictum</i> , <i>Linn. f.</i>	“Taginaste”	. . .	Canary Is.
“ <i>virescens</i> , <i>DC.</i>	= <i>E. candicans</i>		
<i>Elæis guineensis</i> , <i>Jacq.</i>	Oil Palm	. . .	Trop. Africa
<i>Embothrium coccineum</i> , <i>Forst.</i>	Burning Bush	. . .	Magellan Region
<i>Ephedra altissima</i> , <i>Desf.</i>		. . .	North Africa
<i>Epiphyllum grandiflorum</i>	= <i>E. truncatum</i>		
“ <i>truncatum</i> , <i>Haw.</i>		. . .	Brazil
<i>Equisetum ramosissimum</i> , <i>Desf.</i>	Horse Tail	. . .	Trop. and Temp. Regions
<i>Erica arborea</i> , <i>Linn.</i>	Tree-heath “Brezo”	. . .	Medit. and Caucas Regions
<i>Eriobotrya japonica</i> , <i>Lindl.</i>	Japanese Medlar or Loquat “Nespero”	. . .	China and Japan
<i>Eryngium bromeliæfolium</i> , <i>Delar.</i>		. . .	Mexico
<i>Erythrina bogotensis</i> , <i>Hort.</i>		. . .	New Granada
“ <i>caffra</i> , <i>Thunb.</i>	Kaffirboom	. . .	South Africa
“ <i>corallodendron</i> , <i>Linn.</i>		. . .	N. America, W. Indies
“ <i>Crista-galli</i> , <i>Linn.</i>		. . .	Brazil
“ <i>Humeana</i> , <i>Spreng.</i>		. . .	South Africa
“ <i>Humei</i> , <i>E. Mey.</i>	= <i>E. Humeana</i>		
“ <i>insignis</i> , <i>Tod.</i>		. . .	Unknown
“ <i>laurifolia</i> , <i>Jacq.</i>	= <i>E. Crista-galli</i>		
“ <i>Vespertilio</i> , <i>Benth.</i>		. . .	Australia
<i>Escallonia floribunda</i> , <i>H.B.K.</i>		. . .	New Granada
<i>Eucalyptus amygdalina</i> , <i>Labill.</i>	Peppermint Tree	. . .	Australia
“ <i>colossea</i> , <i>F. Muell.</i>	= <i>E. diversicolor</i>		
“ <i>diversicolor</i> , <i>F. Muell.</i>	Karri Gum Tree	. . .	Australia
“ <i>Globulus</i> , <i>Labill.</i>	Blue Gum	. . .	Australia
“ <i>Gunnii</i> , <i>Hook. f.</i>	Cider Gum	. . .	Australia
“ <i>hæmastoma</i> , <i>Sm.</i>	Spotted Gum	. . .	Australia
“ <i>Lehmanni</i> , <i>Preiss.</i>	Yate	. . .	Australia
“ <i>leucoxylon</i> , <i>F. Muell.</i>	Iron Bark	. . .	Australia
“ <i>resinifera</i> , <i>Sm.</i>	Red Gum	. . .	Australia
“ <i>salicifolia</i> , <i>Cav.</i>		. . .	Australia
“ <i>Stuartiana</i> , <i>F. Muell.</i>	Turpentine Tree	. . .	Australia
“ <i>viminalis</i> , <i>Labill.</i>	Swamp Gum	. . .	Australia
<i>Eugenia australis</i> , <i>Wendl.</i>	= <i>E. myrtifolia</i>		
“ <i>Jambos</i> , <i>Linn.</i>		. . .	Trop. Asia
“ <i>myrtifolia</i> , <i>Sims</i>		. . .	Australia
“ <i>Pimenta</i> , <i>DC.</i>	= <i>Pimenta officinalis</i>		
“ <i>rubicunda</i> , <i>Wight</i>		. . .	India
“ <i>rubricaulis</i> , <i>Duthie</i>		. . .	Burmah, Malaya
“ <i>uniflora</i> , <i>Linn.</i>	Brazil Cherry	. . .	Tropical America
<i>Eulalia japonica</i> , <i>Trin.</i>	= <i>Miscanthus sinensis</i>		
<i>Eupatorium aromaticum</i> , <i>Linn.</i>		. . .	North America
“ <i>conyzoides</i> , <i>Vahl.</i>		. . .	North and Trop. America
“ <i>floribundum</i> , <i>H. B. K.</i>	= <i>E. conyzoides</i>		
“ <i>ianthinum</i> , <i>Hemsl.</i>		. . .	Mexico
“ <i>macrophyllum</i> , <i>Linn.</i>		. . .	Trop. America
<i>Euphorbia aphylla</i> , <i>Brouss.</i>	“Tabayba selvaje,” “Tolda”		Teneriffe
“ <i>atropurpurea</i> , <i>Brouss.</i>	“Tabayba majorera”		Teneriffe
“ <i>balsamifera</i> , <i>Ait.</i>	“Tabayba dulce”	. . .	Canary Is.

Euphorbia canariensis, <i>Linn.</i>	“ Cardon ”	Canary Is.
“ mauritanica, <i>Linn.</i>		South Africa
“ piscatoria, <i>Ait.</i>	“ Figueiro de Inferno ”	Canary Is.
“ pulcherrima, <i>Willd.</i>	“ Flor de Pascua,” or Easter Flower	Mexico
“ Regis-Jubæ, <i>Webb</i> & <i>Berth.</i>	“ Higuierilla,” “ Tabayba selvaje ”	Teneriffe
Fabricia lævigata, <i>Gaertn.</i>	= <i>Leptospermum lævigatum</i>	
Fatsia papyrifera, <i>Benth.</i> & <i>Hook. f.</i>	Rice-paper Tree	China
Ferdinanda eminens, <i>Lag.</i>	= <i>Podachænum paniculatum</i>	
Ficus benghalensis, <i>Linn.</i>	Banyan	India, Trop. Africa
“ Canoni, <i>N. E. Br.</i>		Society Is.
“ Chauvieri, <i>Hort.</i>		Trop. America
“ Cooperi, <i>Hort.</i>		
“ dealbata, <i>Hort.</i>	= <i>Conssapoa dealbata</i>	
“ elastica, <i>Roxb.</i>	Indiarubber Tree	Trop. Asia
“ foveolata, <i>Wall.</i>		Burmah, China, Himalaya.
“ glomerata, <i>Roxb.</i>		India, Burmah
“ hirta, <i>Vahl.</i>		Trop. Asia, Malaya
“ imperialis	= <i>F. Roxburghii</i>	
“ nitida, <i>Blume</i>		Java
“ Porteana, <i>Regel</i>		Mexico
“ religiosa, <i>Linn.</i>	Peepul.	India
“ Roxburghii, <i>Wall.</i>		Burmah, Himalaya.
“ suringari, <i>Carr</i>		Amboina Is.
“ vesca, <i>F. Muell.</i>	= <i>F. glomerata</i>	
“ Wrightii, <i>Benth.</i>	= <i>F. foveolata</i>	
Fragaria indica, <i>Andr.</i>		India, Malaya, China
Fraxinus australis, <i>Mont.</i>	= <i>F. oxyphylla</i>	
“ oxyphylla, <i>Bieb.</i>		Tauria
Freesia refracta, <i>Klatt</i>		South Africa
Fuchsia boliviana, <i>Carr</i>		Bolivia
“ coccinea, <i>Soland.</i>		Brazil ?
“ corymbiflora, <i>Ruiz & Pav.</i>		Peru
“ v. alba		
Furcraea gigantea, <i>Vent.</i>	Mauritius Hemp	Trop. America
Genista canariensis, <i>Linn.</i>	= <i>Cytisus canariensis</i>	
“ ephedroides, <i>DC.</i>		I. of Sardinia
“ florida, <i>Linn.</i>		W. Mediterr. Region
“ monosperma, <i>Lam.</i>		W. Mediterr. Region
Geranium anemonifolium, <i>L'Hérit.</i>	Geranium	Fortune Is.
“ canariense, <i>Reut.</i>		Teneriffe
Ginkgo biloba, <i>Linn.</i>	Ginkgo	Japan
Gladiolus segetum, <i>Ker-Gawl.</i>	“ Ajillo ”	Mediterr. Region
Gleditschia triacanthus, <i>Linn.</i>	Honey Locust	North America
Globularia salicina, <i>Lam.</i>	“ Lentisco ” “ Mosquera ”	Canary Is.
Gomphocarpus fruticosus, <i>R. Br.</i>		Mediterr. Region
Gossypium arboreum, <i>Linn.</i>	Tree Cotton	Tropics
Grevillea asplenifolia, <i>R. Br.</i>		Australia
“ Hilliana, <i>F. Muell.</i>	White Ziel	
“ longifolia, <i>R. Br.</i>	= <i>G. asplenifolia</i>	
“ robusta, <i>A. Cunn.</i>	Silky-oak	Australia
Grewia orientalis, <i>Linn.</i>		Trop. Asia, Trop. Australia
Greyia Sutherlandii, <i>Hook. & Harv.</i>		South Africa

- Guilielma speciosa*, *Mart.* . = *Bactris Gasipaës*
Gymnogramme leptophylla, *Desv.* Cosmopolitan
Gymnosporia cassinoides, "Peralillo" Canary Is.
Masf.
Gynerium argenteum, *Nees.* . Pampas Grass Brazil
" " v. *variegata*
Habrothamnus aurantiacus, = *Cestrum aurantiacum*
Seem.
" *elegans*, = *Cestrum elegans*
Brongn.
" *Hügeli*, *Regel.* = *Cestrum elegans*
Hakea ferruginea, *Sweet.* Australia
" *repanda*, *R. Br.* = *H. ferruginea*
Hardenbergia Comptoniana, *Benth.* Australia
" *digitata*, *Lindl.* = *H. Comptoniana*
Hedera Helix, *Linn.* Ivy Europe, N. Africa,
and Temp. Asia
" " v. *canariensis* "Yedra" Canary Is.
Hedychium coronarium, *Koen.* India
" *Gardnerianum*, *Griff.* India
Helianthemum canariense, *Pers.* N.W. Africa, Canary Is.
Heliotropium peruvianum, *Linn.* Peru
Hernandia Sonora, *Linn.* India
Hibiscus elatus, *Sw.* Mahoe W. Indies
" *metallicus*, *Hort.*
" *rosa-sinensis*, *Linn.* . Shoe Flower Old World Tropics
Hovenia dulcis, *Thunb.* China, Japan, Himal.
Humea elegans, *Sm.* Australia
Hymenophyllum tun- Filmy Fern Cosmopolitan
bridgense, *Sm.*
" *unilaterale*, = *H. tunbridgense*
Bory
Hymenosporum flavum, *F.* Wollum-Wollum Australia
Muell.
Hypericum floribundum, *Dryand.* Canary Is.
" *grandifolium*, *Choisy* Canary Is.
Hypocalymma robustum, *Schau.* Australia
Ilex canariensis, *Poir.* "Acebino," Canary Canary Is.
Holly
" *platyphylla*, *Webb & Berth.* "Naranjero salvage" Canary Is.
Illicium anisatum, *Linn.* . Star Anise Japan
Indigofera tinctoria, *Linn.* . Indigo Cultivated in Tropics
Ioichroma coccinea, *Schied.* Mexico
" *tubulosa*, *Benth.* New Granada
Ipomœa biloba, *Forsk.* Tropics
" *Bona-nox*, *Linn.* Trop. America
" *brasiliensis*, = *I. biloba*
G. F. W. Mey.
" *kryseides*, *Ker-Gawl.* Trop. Asia and Trop.
Australia
" *Horsfalliæ*, *Hook.* India
" *Leari*, *Paxl.* Trop. America
" *purpurea*, *Roth.* . Whish-whish Trop. America
" *Quamoclit*, *Linn.* Tropics
" *versicolor*, *Meissn.* Trop. America
Isoplexis canariensis, *Steud.* . Canary Foxglove Canary Is.
Jacaranda mimosæfolia, *D. Don* = *J. ovalifolia*
" *ovalifolia*, *R. Br.* South America

Jacobinia pauciflora, <i>Benth. & Hook. f.</i>	. . .	Brazil	
Jambosa Korthalsii, <i>Blume</i>	. . .	Malaya	
„ vulgaris, <i>DC.</i>	. . . = Eugenia Jambos		
Jasminum grandiflorum, <i>Linn.</i>	. . .	Himalayan Region	
Jatropha Curcas, <i>Linn.</i>	. . .	Tropics	
Jubaea spectabilis, <i>H. B. K.</i>	Coquito Palm	Chili	
Juniperus bermudiana, <i>Lindl.</i>	Bermuda Cedar	Trop. America	
„ Cedrus, <i>Webb & Berth.</i>	Cedro, Juniper	Canary Is.	
„ virginiana, <i>Linn.</i>	Pencil Cedar	North America	
Kleinia neriifolia, <i>Haw.</i>	. . . = Senecio Kleinia		
Lagunaria Patersonii, <i>G. Don</i>	. . .	Australia	
Lantana Camara, <i>Linn.</i>	. . .	Trop. America	
„ Sellowiana, <i>Link & Otto</i>	. . .	South America	
Lapageria alba, <i>Decne</i>	. . . = L. rosea		
„ rosea, <i>Ruiz & Pav.</i>	. . .	Chili	
Latania Commersonii, <i>J. F. Gmel.</i>	. . .	Mascarene Is.	
„ rubra, <i>Jacq.</i>	. . . = L. Commersonii		
Laurus canariensis, <i>Webb & Berth.</i>	Laurel	Canary Is.	
„ regia	. . . = Umbellularia californica		
Lavandula abrotanoides, <i>Lam.</i>	“Romanillo”	Canary Is.	
Lavatera acerifolia, <i>Cav.</i>	. . .	Canary Is.	
Lawsonia alba, <i>Lam.</i>	Henna	Orient	
„ inermis, <i>Linn.</i>	. . . = L. alba		
Leptospermum australe, <i>Salisb.</i>	= L. pubescens		
„ lævigatum, <i>F. Muell.</i>	Australian Tea Tree	Australia	
„ pubescens, <i>Lam.</i>	. . .	Australia	
„ robustum, <i>Endl.</i>	= Hypocalymma robustum		
„ scoparium, <i>Forst.</i>	. . .	Australia, Zealand	New
Leucophaë canariensis, <i>Webb & Berth.</i>	= Sideritis canariensis		
Libonia floribunda, <i>C. Koch</i>	. . . = Jacobinia pauciflora		
Lippia citriodora, <i>H. B. K.</i>	. . .	South America	
Liquidambar styraciflua, <i>Linn.</i>	. . .	North America	
Liriodendron tulipifera, <i>Linn.</i>	Tulip Tree	N. America, China	
Livistona australis, <i>Mart.</i>	. . .	Australia	
„ chinensis, <i>R. Br.</i>	. . .	China	
Lobelia laxiflora, <i>H. B. K.</i>	. . .	Mexico	
Lomaria Spicant, <i>Desv.</i>	Hard Fern	N. Temp. Zone	
Lonicera japonica, <i>Thunb.</i>	Honeysuckle	Himalayan Region	
„ sinensis, <i>Wats.</i>	. . . = L. japonica		
Lophospermum scandens, <i>D. Don</i>	. . .	Mexico	
Lotus Bertholetii, <i>Masf.</i>	“Pico di Paloma”	Canary Is.	
„ peliorhynchus, <i>Hook. f.</i>	= L. Bertholetii		
Luzula canariensis, <i>Poir.</i>	. . .	Canary Is.	
Magnolia acuminata, <i>Linn.</i>	Magnolia	North America	
„ grandiflora, <i>Linn.</i>	Large Magnolia	North America	
Malva acerifolia, <i>Alef.</i>	. . . = Lavatera acerifolia		
Mammea americana, <i>Linn.</i>	South American Apricot	Trop. America	
Manettia bicolor, <i>Paxl.</i>	. . . = M. luteo-rubra		
„ luteo-rubra, <i>Benth.</i>	. . .	Brazil	
Marsilea diffusa, <i>Lepricur</i>	. . .	N. and Trop. Africa, Mascar. Is.	

Maurandia Barclaiana, <i>Lindl.</i>	Mexico
Melaleuca hypericifolia, <i>Smith</i>	Australia
Melia Azedarach, <i>Linn.</i>	Pride of India, Persian Lilac . . Himalayan Region
Melianthus major, <i>Linn.</i>	Honey-flower . . . South Africa
Mesembryanthemum speciosum, <i>Haw.</i> . . . .	. . . . . South Africa
Metrosideros speciosa, <i>Sims</i>	= Callistemon speciosus
,, splendens, <i>DC.</i>	= Angophora lanceolata
Micromeria teneriffæ, <i>Benth.</i> . . . .	. . . . . Teneriffe
Mina lobata, <i>Cerv.</i>	= Ipomœa versicolor
Miscanthus sinensis, <i>Anderss.</i> . . . .	. . . . . China, Japan
Mitraria coccinea, <i>Cav.</i> . . . .	. . . . . Chiloe Is.
Monanthes agriostaphys [<i>Webb & Berth.</i>] . . . . .	. . . . . Canary Is.
,, atlantica, <i>Ball</i> . . . . .	. . . . . Morocco
,, muralis, <i>Hook. f.</i>	= M. atlantica
,, polyphylla, <i>Haw.</i> . . . .	. . . . . Madeira Is.
Montbretia crocosmiæflora × (M. Pottsii × Crocosma aurea)	
Muehlenbeckia platyclada, <i>Meissn.</i> . . . .	. . . . . Solomon Is.
Murraya exotica, <i>Linn.</i> . . . .	. . . . . Polynesia, Trop. Asia, Trop. Australia
Musa Cavendishii, <i>Lambert</i>	= M. chinensis
,, chinensis, <i>Sweet</i>	Chinese Banana . . China
,, Ensete, <i>J. F. Gmel.</i>	Abyssinian Ensete. . Trop. Africa
,, Martini, <i>André</i> . . . . .	. . . . . Trop. Africa
,, rosacea, <i>Jacq.</i> . . . .	. . . . . Trop. Asia
,, rosea, <i>Hort. Calcutt.</i> . . . .	. . . . . Unknown
,, sapientum, <i>Linn.</i>	The Banana . . . Trop. Asia
,, ,, paradisica, <i>R. Br.</i>	The Plantain . . . " "
,, zebrina, <i>Van Houtte</i>	= M. sapientum
Myoporum crystallinum, <i>Hort.</i> . . . .	. . . . . New Zealand (?)
Myrica Faya, <i>Dryand.</i>	" Faya " . . . Canary and Azores Is.
Myrtus communis, <i>Linn.</i>	Common Myrtle . . Orient, South Europe
;; Ugni, <i>Molina</i> . . . . .	. . . . . Chili
Narcissus canariensis, <i>Burbridge</i> = N. Tazetta	
,, Tazetta, <i>Linn.</i> . . . .	. . . . . Mediterr. Region
Nephrodium Filix-Mas, <i>Desv.</i>	Male Fern . . . Temp. Regions
,, ,, v. canariense . . . . .	. . . . . Canary Is.
,, ,, v. elongatum . . . . .	. . . . . Canary Is.
,, molle, <i>Desv.</i> . . . .	. . . . . Cosntopolitan
,, spinulosum, <i>Desv.</i> . . . .	. . . . . N. Temp. Zone
,, ,, v. maderense . . . . .	. . . . . Canary Is.
Nerium Oleander, <i>Linn.</i>	Oleander . . . Orient, Mediterr. Reg.
Nicandra physaloides, <i>Gaertn.</i> . . . .	. . . . . Peru
Nicotiana affinis, <i>Hort.</i>	= N. alata
,, alata, <i>Link & Otto</i> . . . . .	. . . . . Brazil
,, colossæ	= N. tomentosa
,, glauca, <i>R. Gralh.</i> . . . .	. . . . . Tree Tobacco . . Argentine
,, Tabacum, <i>Linn.</i> . . . .	. . . . . Common Tobacco . . South America
,, tomentosa, <i>Ruiz & Pav.</i> . . . .	. . . . . Peru
,, wigandioides, <i>C. Koch & Fint.</i> . . . .	. . . . . New Granada
Nopalea coccinellifera, <i>Salm.Dyck</i>	Cochineal Cactus . Mexico
Notelæa excelsa, <i>Webb & Berth.</i>	" Palo Blanco " . . Canary Is.
Nothochlæna lanuginosa, <i>Desv.</i> . . . .	. . . . . S. Europe &c.
,, Marantæ, <i>R. Br.</i>	Cloak Fern . . . S. Europe &c.
Ocotea fætens, <i>Benth. & Hook. f.</i>	" Til " Canary Is.
Odontospermum sericeum, <i>Sch. Bip.</i> . . . .	. . . . . Canary Is.
Olea fragrans, <i>Thunb.</i>	= Osmanthus fragrans
Ophioglossum lusitanicum, <i>Linn.</i>	Adder's Tongue . . Mediterr. Reg. and Guinea Coast

<i>Opuntia cochinelifera</i> , <i>Mill.</i>	. = <i>Nopalea coccinellifera</i>	
„ <i>Dillenii</i> , <i>Haw.</i>	. Spiny Cactus	. South America
<i>Oreodaphne fœtens</i> , <i>Nees</i>	. = <i>Ocotea fœtens</i>	
<i>Oreodoxa oleracea</i> , <i>Mart.</i>	. Cabbage Palm	. West Indies
„ <i>regia</i> , <i>H. B. K.</i>	. Royal Palm	. Cuba, Panama
<i>Oreopanax reticulatum</i> , <i>Decne. & Planch.</i>		. South America
<i>Osmanthus fragrans</i> , <i>Lour.</i>		. China, Japan, Himal.
<i>Oxalis cernua</i> , <i>Thunb.</i>	. Yellow Oxalis	. South Africa
„ „ <i>v. fl. pl.</i>		
<i>Pancratium canariense</i> , <i>Ker- Gawl.</i>		. Canary Is.
<i>Pandanus utilis</i> , <i>Bory</i>		. Madagascar
<i>Parkinsonia aculeata</i> , <i>Linn.</i>		. Trop. America
<i>Passiflora cardinalis</i> , <i>Hort.</i>		. Unknown
„ <i>edulis</i> , <i>Sims</i>	. Passion-fruit	. Brazil
„ <i>maliformis</i> , <i>Linn.</i>	. Sweet-cup	. West Indies
<i>Pavetta borbonica</i> , <i>Hort.</i>		. I. of Bourbon
„ <i>caffra</i> , <i>Linn. f.</i>		. South Africa
<i>Pavonia hastata</i> , <i>Cav.</i>		. Brazil
<i>Pereskia aculeata</i> , <i>Mill.</i>		. West Indies
<i>Persea gratissima</i> , <i>Gaertn.</i>	. Avocado Pear	. Trop. America
„ <i>indica</i> , <i>Spreng.</i>	. “Vinatico”	. Canary Is.
<i>Petrophytes agriostaphis</i> , <i>Webb & Berth.</i>	. = <i>Monanthes agriostaphis</i>	
<i>Phaseolus Caracalla</i> , <i>Linn.</i>		. Tropics
<i>Phœbe Barbusana</i> , <i>Webb & Berth.</i>	. “Barbusano”	. Canary Is.
<i>Phoenix canariensis</i> , <i>Chabaud</i>	. Canary Date Palm	. Canary Is.
„ <i>dactylifera</i> , <i>Linn.</i>	. Date Palm	. N. Africa, Arabia
„ <i>Jubæ</i> , <i>Webb.</i>	. = <i>P. canariensis</i>	
„ <i>leonensis</i> , <i>Lodd.</i>	. = <i>P. reclinata</i>	
„ <i>reclinata</i> , <i>Jacq.</i>		. Trop. and South Australia
„ <i>spinosa</i> , <i>Schum. & Thon.</i>	. = <i>P. reclinata</i>	
„ <i>tenuis</i> , <i>Hort.</i>	. = <i>P. canariensis</i>	
<i>Phormium tenax</i> , <i>Forst.</i>	. New Zealand Flax	. New Zealand
„ „ <i>v. Colensoi</i>		. „
<i>Phyllis Nobla</i> , <i>Linn.</i>	. “Capitana”	. Canary Is.
<i>Phyllostachys nigra</i> , <i>Munro</i>		. China and Japan
<i>Physalis peruviana</i> , <i>Linn.</i>	. Cape Gooseberry	. Tropics
<i>Phytolacca dioica</i> , <i>Linn.</i>	. “Belle Sombra”	. South America
<i>Picconia excelsa</i> , <i>A. DC.</i>	. = <i>Notelea excelsa</i>	
<i>Pimenta officinalis</i> , <i>Lindl.</i>	. Pimento or Allspice	. West Indies
<i>Pinus halepensis</i> , <i>Mill.</i>	. Aleppo Pine	. Mediterr. Region
„ <i>insignis</i> , <i>Dougl.</i>	. Monterey Pine	. California
„ <i>pinca</i> , <i>Linn.</i>	. Stone Pine	. Mediterr. Region
<i>Pithecolobium albicans</i> , <i>Benth.</i>		. Mexico
<i>Pittosporum coriaceum</i> , <i>Dryand.</i>		. Madeira
„ <i>crassifolium</i> , <i>Soland.</i>		. New Zealand
„ <i>Mayi</i> , <i>Hort.</i>		. Unknown
„ <i>tenuifolium</i> , <i>Gaertn.</i>		. New Zealand
„ <i>Tobira</i> , <i>Dryand.</i>		. Japan, China
„ <i>undulatum</i> , <i>Vent.</i>		. Australia
<i>Platanus occidentalis</i> , <i>Linn.</i>	. American Plane	. N. America
„ <i>orientalis</i> , <i>Linn.</i>	. Eastern Plane	. S. Europe, Orient
<i>Plumeria alba</i> , <i>Linn.</i>	. Frangipani	. W. Indies
„ <i>rubra</i> , <i>Linn.</i>		. Trop. America
<i>Podachœnium paniculatum</i> , <i>Benth.</i>	. Tree Daisy	. Mexico

Poinciana Gilliesii, <i>Hook.</i>	. = Cæsalpinia Gilliesii	
„ pulcherrima, <i>Linn.</i>	= Cæsalpinia pulcherrima	
„ regia, <i>Boj.</i>	Flamboyante	Madagascar
Polygala virgata, var. speciosa, <i>Thunb.</i>		South Africa
Polypodium vulgare, <i>Linn.</i>	Common Polypod	N. Temp. Zone
Populus alba, <i>Linn.</i>	White Poplar	Europe, N. Asia
Prosopis juliflora, <i>DC.</i>	Cashaw	Trop. America
„ siliquastrum, <i>DC.</i>	= P. juliflora	
Psidium Cattleianum, <i>Sabine</i>	Purple Guava	Brazil
„ Guajava, <i>Linn.</i>	“ Cabazina ” Guava	Trop. America
„ pomiferum, <i>Linn.</i>	= P. Guajava	
Psoralea angustifolia, <i>L'Herit.</i>		S. Africa
„ bituminosa, <i>Linn.</i>	“ Teder ”	Arabia, Medit. Reg.
Pteris aquilina, <i>Linn.</i>	{ “ Helecho,”	Cosmopolitan
„ arguta, <i>Ait.</i>	{ Common Bracken }	
„ longifolia <i>Linn.</i>		
		S. Europe and Azores
		Trop. and sub-Trop. Regions
Ptychosperma elegans, <i>Blume</i>		Australia
Punica granatum, <i>Linn.</i>	Pomegranate	S. Europe, Mauritius
„ „ v. fl. pl.		
„ „ v. Legrellia		
„ „ v. nana.		
Quercus glabra, <i>Thunb.</i>		Japan
„ macrocarpa, <i>Michx.</i>	Burr Oak	N. America
„ tomentosa, <i>Willd.</i>		Mexico
Raphiolepis indica, <i>Lindl.</i>		China
„ ovata, <i>Briot</i>		Japan
Ravenala madagascariensis, <i>J.</i>	Traveller's Tree	Madagascar
	<i>F. Gmel.</i>	
Retinospora squarrosa	= Cupressus pisifera	
Rhamnus crenulata, <i>Ait.</i>	“ Tena negra ”	Teneriffe
„ glandulosa, <i>Ait.</i>	“ Sanguino ”	Canary Is.
Rhodocistus Berthelotianus,	= Cistus vaginatus	
	<i>Spach.</i>	
Rhodomyrtus tomentosa, <i>Wight.</i>		India, Malaya
Rhus rufa, <i>Teijsm. & Binn.</i>		Java
Rhynchospermum jasminoides,	= Trachelospermum jasminoides	
	<i>Lindl.</i>	
Richardia africana, <i>Kunth</i>	White Arum	S. Africa
Rivina humilis, <i>Linn.</i>		Trop. America
Robinia Decaisneana, <i>Verlot</i>	= R. Pseud-acacia	
„ Pseud-acacia, <i>Linn.</i>	False Acacia	N. America
Rogiera cordata, <i>Planch.</i>	= Rondeletia cordata	
Romulea Bulbocodium, <i>Sebast. & Mauri</i>		Mediterr. Region
Rondeletia cordata, <i>Benth.</i>		Guatemala
Rosa indica, <i>Linn.</i>		China
„ lævigata, <i>Michx.</i>	Cherokee Rose	N. America
„ multiflora, <i>Thunb.</i>		China, Japan
„ polyantha, <i>Siebb & Zucc.</i>	= R. multiflora	
„ semperflorens, <i>Curt.</i>		China
Ruscus androgynus, <i>Linn.</i>	= Semele androgyna	
Sabal Blackburniana, <i>Glazebrook</i>		W. Indies
„ cœrulescens, <i>Hort.</i>		New Granada
„ mexicana, <i>Mart.</i>		Mexico
„ Palmetto, <i>Lodd.</i>	Palmetto	N. America
„ princeps, <i>Hort. Versch.</i>		Unknown

<i>Sabal umbraculifera</i> , <i>Hort.</i>	. = <i>S. mexicana</i>	
<i>Saccharum officinarum</i> , <i>Linn.</i>	Sugar-cane	. Cultivated in Tropics
<i>Salix babylonica</i> , <i>Linn.</i>		. N. Asia, Caucasus
„ <i>canariensis</i> , <i>Sm.</i>	Canary Willow,	Morocco, Canary Is.
	“Sauce”	
<i>Salvia canariensis</i> , <i>Linn.</i>	“Salvia”	. Canary Is.
„ <i>cardinalis</i> , <i>H. B. K.</i>	. = <i>S. fulgens</i>	
„ <i>fulgens</i> , <i>Cav.</i>		. Mexico
<i>Sambucus palmensis</i> , <i>Link.</i>	{ “Sauco,”	. Canary Is.
	{ Canary Elder }	
<i>Sapindus indicus</i> , <i>Poir.</i>		. India
„ <i>saponaria</i> , <i>Linn.</i>	Soap-berry	. N. and S. America
<i>Schefflera digitata</i> , <i>Forst.</i>		. New Zealand
<i>Sechinus molle</i> , <i>Linn.</i>	Pepper Tree	. Trop. America
<i>Schotia latifolia</i> , <i>Jacq.</i>		. S. Africa
<i>Scutellaria Ventenati</i> , <i>Hook.</i>		. New Granada
<i>Seaforthia elegans</i> , <i>R. Br.</i>	. = <i>Ptychosperma elegans</i>	
<i>Sechium edule</i> , <i>Sw.</i>	“Chayota”	. W. Indies
<i>Selaginella denticulata</i> , <i>Link.</i>		. Europe
<i>Semcle androgyna</i> , <i>Kunth.</i>		. Canary Is.
<i>Sempervivum barbatum</i> , <i>C. Sm.</i>		. Canary Is.
„ <i>canariense</i> , <i>Linn.</i>		. Canary Is.
„ <i>ciliatum</i> , <i>Willd.</i>		. Canary Is.
„ <i>cuneatum</i> , <i>Webb & Berth.</i>		. Canary Is.
„ <i>dodrantale</i> , <i>Willd.</i>		. Canary Is.
„ <i>glutinosum</i> , <i>Ait.</i>		. Madeira
„ <i>holochrysum</i> , <i>Webb & Berth.</i>		. Canary Is.
„ <i>lincolare</i> , <i>Haw.</i>	. = <i>S. barbatum</i>	
„ <i>Paivæ</i> , <i>Lowe</i>		. Canary Is.
„ <i>tabuleforme</i> , <i>Haw.</i>		. Madeira
„ <i>urbicum</i> , <i>C. Smith</i>		. Canary Is.
<i>Senecio eruentus</i> , <i>DC.</i>		. Canary Is.
„ <i>Ghiesbreghtii</i> , <i>Hort.</i>	. = <i>S. grandifolius</i>	
„ <i>grandifolius</i> , <i>Less.</i>		. Mexico
„ <i>Heritieri</i> , <i>DC.</i>		. Canary Is.
„ <i>Kleinia</i> , <i>Less.</i>	“Berode”	. Canary Is.
„ <i>populifolius</i> , <i>DC.</i>		. Canary Is.
<i>Sesbania grandiflora</i> , <i>Poir.</i>		. India, Malaya, Australia
<i>Sida canariensis</i> , <i>Willd.</i>	. = <i>S. rhombifolia</i>	
„ <i>rhombifolia</i> , <i>Linn.</i>	“Te,” or “Te de Canarias”	Tropics
<i>Sideritis canariensis</i> , <i>Linn.</i>		. Canary Is.
<i>Silene nocteolens</i> , <i>Webb & Berth.</i>		. Canary Is.
<i>Siphocampylus bicolor</i> , <i>G. Don</i>	. = <i>Lobelia laxiflora</i>	
<i>Smilax mauritanica</i> , <i>Poir.</i>	“Cerrajuda”	. Mauritius
<i>Solandra grandiflora</i> , <i>Sw.</i>		. Trop. America
<i>Solanum Capsicastrum</i> , <i>Link.</i>		. Brazil
„ <i>cyananthum</i> , <i>Dun.</i>		. Brazil
„ <i>jasminifolium</i> , <i>Sendtn. & Mart.</i>		. Brazil
„ <i>jasminoides</i> , <i>Paxt.</i>		. Brazil
„ <i>Wallisii</i>	. = <i>Cyphomandra betacea</i>	
<i>Sonchus congestus</i> , <i>Willd.</i>	“Cerrajon”	. Canary Is.
„ <i>gummifer</i> , <i>Link.</i>		. Canary Is.
„ <i>Jaquini</i> , <i>DC.</i>	. = <i>S. congestus</i>	
„ <i>pinnatus</i> , <i>Ait.</i>		. Madeira
„ <i>leptocephalus</i> , <i>Cass.</i>	“Balillo”	. Canary Is.
„ <i>maeranthus</i> , <i>Poir.</i>	. = <i>S. congestus</i>	

<i>Sophora japonica</i> , <i>Linn.</i> . . . . .		. Japan, China
<i>Spartium supranubium</i> , <i>Linn. f.</i> = <i>Cytisus fragrans</i>		
<i>Spiræa cantoniensis</i> , <i>Lour.</i> . . . . .		. China
„ <i>reevesiana</i> , <i>Lindl.</i>	= <i>S. cantoniensis</i>	
<i>Statice arborea</i> , <i>Brouss.</i>	= <i>S. fruticans</i>	
„ <i>arborescens</i> , <i>Brouss.</i>	= <i>S. fruticans</i>	
„ <i>Bourgæi</i> , <i>Webb.</i> . . . . .		. Canary Is.
„ <i>frutescens</i> , <i>Hort.</i>	= <i>S. fruticans</i>	
„ <i>fruticans</i> , <i>Webb.</i> . . . . .		. Canary Is.
„ <i>macrophylla</i> , <i>Brouss.</i> . . . . .		. Canary Is.
„ <i>pectinata</i> , <i>Ait.</i>	“ <i>Siempreviva</i> ”	. Canary Is.
„ <i>puberula</i> , <i>Webb.</i> . . . . .		. Canary Is.
<i>Stephanotis Thouarsii</i> , <i>Brogn.</i> . . . . .		. Madagascar
<i>Sterculia acerifolia</i> , <i>A. Cunn.</i> . . . . .		. Australia
„ <i>diversifolia</i> , <i>G. Don.</i> . . . . .		. Australia
<i>Stiffitia chrysantha</i> , <i>Mikan.</i> . . . . .		. Brazil
<i>Strelitzia augusta</i> , <i>Thunb.</i> . . . . .		. S. Africa
„ <i>Reginæ</i> , <i>Banks.</i> . . . . .		. S. Africa
<i>Sutherlandia frutescens</i> , <i>R. Br.</i> . . . . .		. S. Africa
<i>Swietenia Mahagoni</i> , <i>Jacq.</i>	Mahogany	. S. America
<i>Tacsonia exoniensis</i> × <i>Hort. Veitch.</i> . . . . .		. S. America
„ <i>Van Volkemii</i> , <i>Hook.</i> . . . . .		. New Granada
<i>Tamarix anglica</i> , <i>Webb.</i>	= <i>T. gallica</i>	
„ <i>gallica</i> , <i>Linn.</i> . . . . .		. Europe, Asia, Africa
<i>Taxodium distichum</i> , <i>Rich.</i>	Swamp Cypress	. N. America
<i>Taxus baccata</i> , <i>Linn.</i>	Common Yew	. N. Temp. Zones
„ <i>v. pendula</i>		
<i>Tecoma stans</i> , <i>Juss.</i> . . . . .		. N. and S. America
<i>Terminalia elegans</i> , <i>Linden.</i> . . . . .		. Madagascar
<i>Teucrium heterophyllum</i> , <i>L'Hérit.</i>	{ “ <i>Jocama</i> ,” “ <i>Sal-</i> <i>via de India</i> ” }	. Canary Is.
<i>Thuja gigantea</i> , <i>Nutt.</i> . . . . .		. N.W. America
„ <i>orientalis</i> , <i>Linn.</i>	Chinese Arbor Vitæ	. China, Japan
<i>Thunbergia alata</i> , <i>Boj.</i> . . . . .		. Cultivated in Trop. Africa and India
„ <i>fragrans</i> , <i>Roxb.</i> . . . . .		. India, Malaya, Australia
„ <i>grandiflora</i> , <i>Roxb.</i> . . . . .		. East Indies
<i>Trachelospermum jasminoides</i> , <i>Linn.</i> . . . . .		. China
<i>Trachycarpus excelsus</i> , <i>H. Wendl.</i> . . . . .		. Japan
„ <i>Martianus</i> , <i>H. Wendl.</i> . . . . .		. Himalayan Region
<i>Tradescantia discolor</i> , <i>L'Hérit.</i> Oyster Plant . . . . .		. Trop. America
<i>Trichomanes radicans</i> , <i>Sw.</i>	Bristle Fern	. Trop. and sub-Trop. Regions
<i>Tristania conferta</i> , <i>R. Br.</i> . . . . .		. Australia
<i>Tropæolum Lobbianum</i> , <i>Hort. Veitch.</i> . . . . .		. New Granada
„ <i>Moritzianum</i> , <i>Klotzsch.</i> . . . . .		. Venezuela
<i>Umbellularia californica</i> , <i>Nutt.</i> . . . . .		. N.W. America
<i>Veronica speciosa</i> , <i>R. Cunn.</i> . . . . .		. New Zealand
<i>Viburnum rigidum</i> , <i>Vent.</i>	“ <i>Follao</i> ”	. Canary Is.
„ <i>rugosum</i> , <i>Pers.</i>	= <i>V. rigidum</i>	
<i>Vitis heterophylla</i> , <i>Thunb.</i> . . . . .		. China, Japan
<i>Washingtonia filifera</i> , <i>H. Wendl.</i> . . . . .		. California
<i>Weigelia amabilis</i> , <i>Hort.</i>	= <i>Diervilla florida</i>	
„ <i>rosea</i> , <i>Lindl.</i>	= <i>Diervilla florida</i>	
<i>Wigandia macrophylla</i> . . . . .		. Caracas
<i>Wistaria frutescens</i> , <i>Poir.</i>	= <i>W. speciosa</i>	

Wistaria speciosa, <i>Nutt.</i>	N. America
Woodwardia radicans, <i>Sm.</i> . Chain Fern	N. Temp. Zone
Yucca aloifolia, <i>Linn.</i>	N. America, W. Indies
" " v. gloriosa	
" " v. tricolor	
" " v. variegata	
" baccata, <i>Torr.</i>	N.W. America, Mexico
" filifera, <i>Hort.</i>	= Y. baccata
" gloriosa, <i>Linn.</i>	Adam's Needle N. America

APPENDIX III.

LIST OF WORKS TREATING OF THE PLANTS OF THE CANARY ISLANDS.

1. VON HUMBOLDT. Personal Narrative of Travels. (Bohn's Ed. 1852.) Vol. i. pp. 29-125. [Contains many references to the native and introduced plants of the islands existing in 1799.]
2. BARKER WEBB and S. BERTHELOT. Histoire Naturelle des Iles Canaries. Paris, 1839-1846. (With numerous plates and illustrations.)
3. Remarks on the Botany of Madeira and Teneriffe. By Sir CHARLES J. F. BUNBURY, F.R.S. *Journ. Linn. Soc.* Bot. vol. i. 1856.
4. A. GRISEBACH. Die Vegetation der Erde, ii. p. 512.
5. C. BOLLE. Zeitschrift für Erdkunde. Berlin, 1861.
6. PEREZ et SAGOT. De la Végétation aux Iles Canaries. *Journal de l'Agriculture des Pays Chauds.* Paris, 1865-1866.
7. VIERA y CLAVIJO. Un Diccionario de Historia Natural de las Canarias. Las Palmas. 1868-1869.
8. F. SAUER. Catalogus Plantarum in Canariensibus Insulis sponte et sub sponte crescentium. 1880.
9. H. CHRIST. Euphorbia Berthelotii, Bolle. Engler's *Jahrbücher*, xiii. pp. 10-14. (Contains a special account of the Canary species of Euphorbia.)
10. H. CHRIST. Vegetation and Flora der Canarischen Inseln. Engler's *Jahrbücher*, vi. pp. 458-526. 1885.
11. H. CHRIST. Spicilegium Canariense. Engler's *Jahrbücher*, ix. pp. 86-172. 1887-1888.
12. I. BAYLEY BALFOUR. *Trans. Roy. Soc. Edinburgh.* Vol. xxxi. 1888. [Contains striking comparisons between the flora of Socotra and the Canary Islands.]
13. C. BOLLE. Florula Insularum olim Purpurariarum nunc Lanzarote et Fuerteventura &c. Engler's *Jahrbücher*, xiv. pp. 230-256. 1891-1892.
14. PEREZ et SAGOT. "Le Tagasaste," fourrage important, publié sous la direction de Georges V. Perez. Paris, 1892.
15. C. BOLLE. Botanische Rückblicke auf die Inseln Lanzarote und Fuerteventura. Engler's *Jahrbücher*, xvi. pp. 224-261. 1892-1893.
16. D. MORRIS. Tagasaste. (*Cytisus prolifer*, L., var. *palmensis*, Chr.) A valuable Canary fodder-plant. *Kew Bulletin*, 1893, pp. 115-117.
17. D. MORRIS. Canary Rosewoods. *Convolvulus floridus*, L., and *C. scoparius*, L. *Kew Bulletin*, 1893, pp. 133-136.
18. R. P. MURRAY. A new *Vicia* from Teneriffe. *Journal of Botany.* Vol. xxxiii. p. 9. 1895.
19. A. WORSLEY. Notes on the Distribution of the Amaryllidæ and other Plants in Grand Canary &c. London: W. Wesley & Son. 1895.
20. W. B. HEMSLEY. Insular Floras. (Atlantic islands.) *Science Progress.* Vol. ii. pp. 379-398. 1895.

THE CULTURE OF ROSES UNDER GLASS.

By Mr. FRANK CANT, F.R.H.S.

[Read June 11, 1895.]

VARIOUS treatises have been published on the cultivation of Roses under glass, some of them emanating from very experienced Rose-growers, such as Mr. William Paul, Mr. Duncan Gilmour, and others, the latest being the chapter on the subject in the Rev. Foster Melliar's "Book of the Rose." I refrain from expatiating on this particular chapter. My reason for doing so will be understood from the reference to my name in the preface on page vi. in "The Book of the Rose." But in passing I must say, and I hope Mr. Foster Melliar will take it to imply no empty flattery, that "The Book of the Rose" is the most scientific, complete, and perfect ever published on that subject, and I strongly advise those who have not read it to lose no time in possessing a copy. Having said so much, it may be thought that a lecture on the subject in this hall is scarcely needed; but amateurs complain that none of the existing treatises fully supply their needs, that rather too much knowledge on their part is taken for granted, and that more detailed information is needed on what may seem to be somewhat rudimentary points, such as the construction of a Rose-house and the different requirements of Roses grown in pots and of those planted in the ground. It must be remembered that the culture of Roses under glass is not at present very extensively carried on by amateurs, but is mainly confined to nurserymen, who, growing their Roses for sale or exhibition, necessarily cultivate them for the most part in pots, which, as they can be transferred into the open air after blooming, and remain there during the summer months, do not require quite the same construction of house as is needed for Roses planted in the ground. The first point, therefore, to which I wish to draw attention is the structure of the house, which should be equally suitable for growing Roses permanently planted in the ground and for those in pots. There may doubtless be varieties of makeshifts, such as a lean-to, which should face east or west, due south being the least desirable, or a pit roofed over, and good Roses may be grown in either of such

structures, provided that, if the Roses are to be planted in the ground, the lights or sashes forming the roof are movable and can be taken off at a time hereafter stated ; but there can be no doubt that the structure best adapted for the purpose is a span-roofed house, and I will endeavour to describe the construction of one of this kind of a moderate size, which may be enlarged or diminished at the will of the builder.

In the first place it may be regarded as an axiom that the two ends of the house should face respectively north and south, so as to reap the advantage of morning and afternoon sun, and at the same time diminish the excess of heat in the middle of the day when the sun bears the greatest power.

As an illustration, I will presume that it is desired to build a house for Roses, 24 feet in length by 14 feet in width, inside measurement. This is by no means a large house, and should not be very costly. In the centre may be formed a bed 7 feet wide, with a path round it $1\frac{1}{2}$ foot wide, which will leave room for a border between the path and the walls 2 feet wide. By this arrangement the centre bed may be planted with Standard and Half-standard Teas, whilst the borders may be filled with dwarf Hybrid Perpetuals to give colour which is not obtainable amongst the Teas.

In each corner may be planted one good climbing Rose, such as Maréchal Niel, W. A. Richardson, Climbing Niphetos, L'Idéal, Solfaterre, or any others desired to train thinly under the roof ; but it must be thoroughly understood that the four climbers must not be allowed to grow so densely as to obscure the light from those growing beneath them : this can be easily guarded against by careful and judicious pruning and training.

In addition to the climbers planted in the corners, there may be two more planted close to the uprights in the centre of the house, which form supports to the ridge hereafter described. The height from the ground to the ridge should be 9 or 10 feet, and from the ground to the eaves 3 feet 6 inches, including 2 feet of $4\frac{1}{2}$ -inch or 9-inch brickwork and 1 foot 6 inches of side-lights, which should be made to open the entire length of the house for ventilation. Of course top ventilation is indispensable, and it is desirable that the ventilators on the roof should be continuous the whole length and on both sides. This is better than having ventilating lights at intervals ; but more particularly does this

apply to a cool house—that is, one in which Roses are not intended to be forced. The depth of the top ventilators should be about 2 feet.

The sills require to be 4 inches wide by 3 inches thick, bevelled to 2 inches on the inside. The object of this is to prevent water remaining on the sill to rot it. The ridge should be 9 inches deep by $1\frac{1}{2}$ inch thick, supported by two iron standards up the centre of the house, with bevelled coping over it grooved on the under side. There may be a door at each end. If only one be required it should be at the south end. If there be two doors it is a matter of the greatest importance that both should not be allowed to remain open at the same time.

The woodwork should all be painted two coats, with the best paint, before the house is put together, and one coat after the completion of the structure. The glass used for the roof should be that known as best 21-oz. English, free from blisters, which can be obtained in sheets of any size; but perhaps the best for the purpose is 15 inches long by 12 inches wide, and no putty should be used on the top of the glass. If larger sheets of glass are used there will be considerable risk of breakages from hail-storms and gales of wind.

As one of the most important adjuncts to the successful cultivation of Roses planted in the ground under glass is ventilation, it is necessary that I should here describe the construction of the roof. In a house of the dimensions suggested there should be on each side six sashes or lights—temporary fixtures, that is—securely fastened, but portable. Above these will be the six top ventilators on both sides, hung from the ridge on shifting butts, rendering these also portable. Either ventilating gear may be employed for the purpose of opening and closing them, or the ordinary iron “set open,” as the will of the builder may dictate. It will thus be seen that the whole of the glass roof can be removed if desired (excepting the principal rafters which support the lights or sashes, of which there should be five on either side, nailed to the sill and the ridge), and when Roses are planted in the ground it is most important that the roof should be removed about the middle of June, when indoor Roses are superseded by those from the open ground, in order that the plants may rest and ripen ready for the next season’s work. But it must be understood that before the glass roof is taken clean

away both side and top ventilators should remain open night and day for at least a fortnight to prepare the plants for the exposure, and advantage should be taken of a dull, still warm morning for this change, as strong sun or wind is hurtful to the foliage of Roses exposed for the first few days.

Thus it will be seen that in a house such as I have endeavoured to describe there will be ample means of ventilation, which will go a long way towards warding off the various pests which, whether under glass or in the open air, but especially under glass, the Rose-grower has to encounter. But while sufficient ventilation is most essential, there can be no question that it may be overdone in the spring and winter months. There is more danger from this in the spring. At this season Roses should not be exposed to a keen wind or to sharp currents of air. Mr. Foster Melliar's remarks on this point are deserving of special attention. As he says in his "Book of the Rose," page 175: "It is far better to give no air at all than to open the ventilators to an icy wind. Still Roses must have air, and there will be few days when it cannot be admitted on the lee side for an hour, or even less."

It may be thought that I have commenced my lecture from the wrong end, by explaining the time for the removal of the lights or sashes before having mentioned the introduction of the Rose plants into the house; but my pen ran away with me, and I will now return to the subject of equal importance to the structure—viz. the Roses.

As no staging will be required in the house I have described, there will, as I have before said, be a centre bed, and a border all round, in which may be planted about eighty Rose trees; but if plants in pots are used, one-third more will be required. If the Roses are to be planted in the ground, this operation should be carried out not later than the first week in November, giving them a good watering with tepid water after planting, and a slight syringing every morning. Do not admit much or any ventilation for a fortnight, except during bright sunshine, when a thick shading is necessary to prevent the sun from shrivelling the young wood. This precaution will not be necessary at this season of the year after the plants have become established. At the expiration of a fortnight or three weeks the top ventilators may remain open night and day except during

frost, and if the temperature inside the house does not fall below 32°, nor rise above 40° until the end of January, so much the better. By the middle of January these fresh-planted Roses may be pruned, but in after years it will be advisable to prune them a fortnight earlier. Having said thus much about Roses planted in the ground, I will now refer to those intended to be grown in pots. It is quite hopeless to take plants from the open ground and pot them, and expect them to do well the first season under glass. They resent such treatment more than any other plant I know, and more especially does this apply to the H.P.'s. It is most important, therefore, to have plants prepared for their new life, and these must have been grown in pots at least one year to have become established, and if they are not already in the possession of the amateur, he must purchase them. They are not very expensive, seeing the number of years they will flourish if properly treated. As Roses in pots should be carefully overhauled, and repotted into larger pots if the roots are overcrowded, or top-dressed, as each plant may require in September, it is about this time that plants should be purchased, and those supplied by any well-known Rose-grower should not require repotting; but still it is safest to examine their roots and ascertain if they are pot-bound or otherwise. This will save much disappointment at the time of blooming, and I am a staunch believer in the old axiom, "If anything is worth doing at all, it is worth doing well." If you are satisfied that the roots are in perfect health, and have plenty of room, the plants may be removed to some shady spot, the north side of a brick wall for preference, and there stood upon pieces of slate, or ashes an inch thick, to prevent worms from finding their way into the soil through the drainage holes at the bottom of the pots. They must be watched as carefully now as if they were under glass, never allowing the ball of earth to become sufficiently dry as to leave a crack between the ball of earth and the pot. At the same time water must not be given too liberally, as this is the resting season for Roses in pots. They may remain under this treatment until November, when they should be put into cold frames, or be protected in some way from severe frosts. Four or five degrees will not hurt them. About the end of December the Roses in pots may be put into the house I have described, and may be pruned a fortnight later. The soil

most suitable for growing Roses in pots, or planted in the ground, is good turfy fibrous loam, cut about 3 inches thick from a rich old pasture, and laid in a heap with sandwiches of cow-droppings; if allowed to lie six months before using, so much the better for the Roses. When used, it should be chopped fine, and a little coarse sand added. The rougher portions of the soil should be put over the crocks at the bottom of the pot, and the new soil made firm round the existing ball of earth (if the plant is being repotted) by ramming with a piece of wood made for the purpose. A good soaking with clear water must be given after repotting. The roots of Roses repotted in September into larger pots, if examined now, will be found full of activity—at least they should be. Like Roses planted out, those in pots are now in their flowering quarters, and if, as before stated, it is not intended that they shall bloom before April, the temperature of the house must be kept as low as possible for some time, giving plenty of top ventilation, and using no fire heat, or only sufficient to keep out frost and damp.

I omitted to say in my description of the house that there should be one 4-inch circulating hot-water pipe round the centre bed, or between the path and the border, which will provide sufficient heat to keep out frost, and assist in arresting the progress of mildew. As before stated, a fortnight after the plants are admitted into the house they will be ready to prune; an operation not very difficult to perform, unless it is desired to grow specimen plants producing from 100 to 150 blooms. This will require more skill and patience than most amateurs possess. The plants which I have described should have from three to five shoots, which must be shortened so as to leave only two or three eyes at the base of each shoot, taking care that the uppermost eye points outwards. The same kind of pruning applies to those planted in the ground for at least the *first* year.

As January wanes, the careful observer will discover activity above the pots, the sign of life (as in March outside) becoming more apparent each day; the small buds bursting from the base and developing into tiny leaves, and later on smaller flower-buds, remind us that as the temperature rises during the months of March and April it should also be increased gradually in the house until it reaches 60° by sun-heat, and should not be allowed

to fall below 45° at night. Each morning, from the time of pruning, the plants, pots, walls, and paths should be well syringed except in dull, cold weather, when it is desirable to withhold the syringe for a time, and later on, as brighter weather succeeds the dull, cloudy sky of mid-winter, it will be found necessary to syringe every morning about nine o'clock and every evening about three to four o'clock. But I am advancing too rapidly for the Roses, and will mention this again at the proper place.

It must not be forgotten that in growing Roses under glass the conditions attending their culture should as nearly as possible correspond with the conditions of the months in which Roses grow and bloom in the open—that is April, May, and June—and thus it will be understood that it is necessary to transform January, February, and March into April, May, and June by artificial means; and when it is known the Rose is so amenable to treatment under glass, and so thoroughly enjoys perfect immunity from cold or strong winds, it is a matter of surprise that the culture of this beautiful flower under glass is not more general and extensive. The Rose is a most interesting subject under glass, free from thunder-storms, May frosts, hurricanes, and every evil visitation of British climatic eccentricity, which causes so much anxiety and grief to the lover of Roses who is not in the happy possession of a glass-house. Then, again, it is under glass that artificial hybridisation can be most successfully carried on and the work made more interesting by being the work of one's own brush, and where no chance hybridisation can take place unless bees are admitted.

Watering is, perhaps, the next most important subject to occupy our attention. Where the Roses are planted out, they will not require so much attention as those in pots; in fact, they will be better if water be withheld from them (except that applied through the syringe) until they have made two or three inches of young growth. And on no account should newly planted Roses be treated to liquid manure. It is mistaken kindness on the part of the operator. Not so with established plants in pots. Each pot must be examined every day, and the best way to ascertain whether water is required or not is to tap each pot with a small knob stick. If it sounds hollow and empty it indicates want of water, but if the sound be dead and heavy it

may be passed by. Judicious watering is, perhaps, the greatest secret of success. Over-watering will produce mildew, and insufficient water will be mischievous in other ways. There can be no rule laid down as to how often plants in pots require to be watered. When asked the question, I invariably reply, "When they want it." As the spring advances and drying winds and bright sunshine take the place of duller and cooler weather, increased vigilance is necessary in the matter of watering, and during the brighter days in March, April, and May it is necessary to syringe freely the whole of the Roses, whether planted in the ground or in pots, also the back walls and paths night and morning, and again in the middle of the day, in order to maintain a moist atmosphere; for if the atmosphere be allowed to become dry, red-spider will soon make its appearance, and a dangerous and troublesome pest it is. The necessity for a moist atmosphere will be better understood when it is remembered that Roses in the open derive much benefit from the heavy dews which invariably follow hot days and charge the foliage with moisture. It is this purpose that the syringe under glass is intended to serve, so in using the syringe the spray should be made as light and fine as possible.

As the young growth progresses, it will be discovered that all the pests with which the Rose-grower has to battle outside are hideously conspicuous under glass, excepting red-rust or orange fungus. This, I am happy to say, I have never seen in any Rose-house.

The worst pest of all, perhaps, is mildew, more frequently caused by injudicious watering and careless ventilation. If great attention be paid to the two primary causes, it may be avoided, and prevention is better than cure; but once apparent (and it is quickly seen by the curling of the young tender foliage, accompanied by a spot or two of white-like dust on the under side of the leaf) it must be immediately dealt with.

If the house has a hot-water pipe in it, as before recommended, the water in the pipe should be made to nearly boil, and then the pipes must be painted with a mixture of sulphur and milk, which will effectually destroy all spores for the time.

Where hot-water pipes are not available, the affected foliage, and that surrounding it, must be dusted with flowers of sulphur after syringing.

The aphid is, perhaps, more troublesome than mildew, and although some have recommended the safe and effectual remedy of catch 'em and kill 'em, I imagine that it would be an irksome task in a Rose-house. This pest may be kept in check by the free use of the pump syringe, but it is necessary sometimes, during a spell of cold weather which we frequently experience during March and April, when the syringe may not be used so freely, to resort to fumigating as a mode of exterminating them. (Oh! how I wish they might be exterminated.) For this purpose I have found McDougall's fumigating sheets very effectual, harmless, and requiring little or no attention beyond lighting; but it is desirable to procure them as they are wanted, as I find they do not improve by keeping. The old system of fumigating with tobacco paper or rag answers very well for a nurseryman, but it is objectionable and troublesome for an amateur, and be he ever such a smoker he will not enjoy the fumes from tobacco rag, nor watch them with so much interest, as those proceeding from his own pipe. Whatever material be used for fumigating, it should always be done after sunset, the house and plants being dried for the purpose. Therefore the plants should not be syringed after nine o'clock on the day it is intended to fumigate them.

A dull, still night should be selected for the purpose, if possible. The following morning a free use of the pump syringe will effectually remove the few aphid which may have escaped death; for however carefully you may fumigate or syringe, he is indeed a bold man who will assert that he has killed them *all*. There are many effectual and safe insecticides which may be used to destroy aphid by spraying or syringing; but where these are used a deposit is generally found on the foliage, which is not, in my opinion, conducive to perfect health or appearance. It has been asserted by authorities on the subject of growing Roses under glass that Teas and Hybrid Perpetuals cannot be successfully grown together in the same house. I am happy to say I have not found this the case. Where it so, I should at once dismiss all the H.P.'s and grow only Teas, but with me they are happy tenants under the same roof. That Teas like more sun than H.P.'s I freely admit, and by putting the latter round the outer borders, as before described, the H.P.'s may be slightly shaded by thin tiffany outside, sufficiently wide only to shade the border of

H.P.'s, whilst the Teas in the centre bed enjoy the full benefit of the sun; but even these require a little shade during the very bright days of April and May if fine flowers are aimed at. Those who grow Roses in the open well know how much better the colour is sustained, the petals firmer, and the bloom more substantial after two or three dull days early in July, compared to those obtainable after a spell of very bright sunshine; therefore, to make the Rose structure as complete as possible, it is advisable to fix roller blinds, which may be drawn when the sun is too bright, and removed during cloudy weather, for although Roses object to too much sun, they require plenty of light and air. For this reason the blinds or shading should not be thick or heavy, and the colour should be green.

Where no shade is used the temperature, which should not exceed 75° or 80°, will rapidly rise much above that during bright sunshine, to the injury of the plants. I omitted to remark that Roses under glass, whether planted in the ground or in pots, require to have the shoots thinned as soon as the flower-buds are formed, and plants in 7-inch or 8-inch pots may be allowed to carry six to nine flowering shoots. All the other growth must be removed. These flowering shoots in their turn must be examined later on, and all buds removed excepting the crown or centre bud on each shoot. This may be done so soon as the buds are large enough to indicate whether the crown or centre bud promises to be a perfect bloom.

The foregoing also applies to Roses planted out, except that more shoots may be left according to the age of the plants, and knowledge on this point will accumulate, as on many others, from experience. Roses grown in a cool house, such as I have endeavoured to describe, will not carry a second crop of blooms before there are plenty of Roses in the open; but when more heat is used early in January to produce the first crop of Teas early in April, a second crop of blooms from the same plants may be obtained in May and early June, just before the advent of outdoor Roses, when they are most acceptable. It is only the Teas that I consider worth encouraging for a second crop of flowers; the H.P.'s come much too thin and scant. So far I have made no reference to feeding Roses under glass, and, like animals, they will not become fat—*e.g.* produce fat blooms—unless they are fed. During the early stages of their intro-

duction into the house liquid manure must be withheld and not until the flower-buds are formed should liberal supplies be given. When obtainable, liquid from the cow-yard is most desirable; but it must be well diluted, according to the circumstances under which it is collected. If from a cesspit, one-fourth liquid to three-fourths water will be a safe stimulant, and may be applied twice a week to pot Roses; but for those planted out it is best to use water and liquid alternately, as required. Liquid from a stable cesspit is dangerous, unless very much diluted, and, when cow manure is not obtainable, I prefer to use soot water. A bushel of soot put into a bag and suspended in a barrel of water (which may be emptied and refilled with water four times) makes an excellent and harmless manure.

There are many fertilisers which may be used in the solid form by mixing with the soil when potting, or placing on the surface of the pots to gradually dissolve, but I prefer to also use liquid manure for pot Roses. Vapour troughs placed on the hot-water pipes, and filled with strong ammoniacal liquid manures, will generate gases beneficial to the plants.

Having carried out all the details before named, and watched with intense satisfaction and pleasure the development of many a perfect specimen of the queen of flowers, you may perhaps grasp the opportunity of experimenting in hybridising by conveying the pollen of one good Rose to that of some other variety on a camel-hair brush, at the same time marking in some way the label, so that an authentic record may be kept of the parentage of any first-class seedling which may originate from such an experiment. In this way the same parent may again be used crossed by another variety. The seed-pods, which must be allowed to ripen on the plant, will be fit to gather when just changing from a golden to a duller colour. They should then be stored away in some airy place beyond the reach of mice until October, when the seeds from each pod should be sown in a 5-inch pot covered with sand and buried in some snug border an inch deeper than the pots, and fine wire netting should be placed over them to prevent the removal of the precious seeds by birds or mice. Some may germinate the following spring, but more will do so the next; the experimenter need not be disheartened at this. If he be successful in raising a white Alfred Colomb or a yellow Marie Baumann he will be amply

rewarded by the pleasure he will give to the Rose-growing community. This is thrown out as a suggestion, and I only hope it may bear fruit.

Having taken a review of the Rose under glass from September to the time of blooming, it will be well to continue a little further. As I have before said, those planted in the ground must gradually be hardened by the admission of plenty of air day and night. So is it equally necessary for those in pots to receive the same treatment, which will prepare them for their exodus. Although no longer subjects of interest *inside*, they must not be neglected. They should be plunged in ashes up to the rims of the pots, taking care that the bottom of the pot stands on a piece of slate or on ashes at least an inch thick, to prevent worms from working their way into the hole at the base of the pot. If time can be spared to repot them into pots one size larger before plunging them in ashes, it will be an advantage; but this is not of vital importance just at this time. It will answer almost as well if done in September. The surface of the pots after they are plunged may be covered with old hot-bed material, which will minimise the necessity for frequent waterings, twice weekly being generally sufficient for plants in this condition. During July and August growth will be emitted from the extreme points of the shoots, which shows healthy root-action, but flower-buds must be promptly removed until September, when the plants should receive the attention described in an earlier part of this lecture. The same treatment applies to Roses planted in the ground from which the roof of the glass-house has been removed, including the covering of the ground with old hot-bed material.

I will now conclude my lecture by giving the names of what I consider to be the best 24 Hybrid Perpetuals and Hybrid Teas and the best 18 Teas and Noisettes for general cultivation, together with the names of a few smaller buttonhole or decorative Roses.

THE BEST 24 HYBRID PERPETUALS.

Ulrich Brunner.

Crown Prince.

S. M. Rodocanachi.

La France.

Gustave Piganeau.

Mdme. Lacharme.

Mrs. John Laing.

Général Jacqueminot.

Mdme. G. Luizet.

Caroline Testout.

Baroness de Rothschild.

Camille Bernardin.

Marie Baumann.	Duke of Teck.
Duke of Edinburgh.	Capt. Christy.
Danmark.	Victor Hugo.
Duke of Wellington.	Fisher Holmes.
Prince Camille de Rohan.	H. Schultheis.
Marchioness of Londonderry.	Pride of Waltham.

THE BEST 18 TEAS.

The Bride.	Catherine Mermet.
Cleopatra.	Souv. d'Elise.
Niphetos, or Comtesse de Nadaillac.	Ethel Brownlow.
Mdme. Hoste.	Mdme. de Watteville.
Mdme. Lambard.	Anna Olivier.
S. A. Prince.	Souv. d'un Ami.
Medea.	Edith Gifford.
Rubens.	Ernest Metz.
Maréchal Niel.	Amazone.

And as decorative or buttonhole Roses, Mdme. Falcot, Mdme. Chedane Guinoisseau, Camoens, Mdme. Charles, Crimson Rambler, Claire Jacquier, Perle d'Or, Laureatte Messimy, and many others.

 FLORAL DEMONSTRATION.

By Rev. GEORGE HENSLOW, M.A. &c.

[June 25, 1895.]

MR. W. T. THISSELTON-DYER, Director of the Royal Gardens, Kew, being unable to deliver his lecture this day, as arranged, the Rev. George Henslow very kindly undertook to give a conversational discourse on a few of the more interesting plants exhibited in the Drill Hall.

He began by calling attention to a pretty specimen of the Highland Primrose, *Primula scotica*, from Mr. George F. Wilson, Weybridge. This species is a native of pastures in Orkney, Caithness, and Sutherland. The late Charles Darwin devoted

a great deal of attention to Primroses, and endeavoured to find some explanation of what are called the "pin-eyed" and "thrum-eyed" forms—otherwise, flowers possessing either long styles and short stamens, or short styles and long stamens. By numerous experiments he arrived at the conclusion that short-styled flowers, if fertilised with pollen from long-styled forms, *i.e.* forms with short stamens, or *vice versa*, produced the most numerous offspring. These he called "legitimate" unions, while the term "illegitimate" union was applied to flowers in which the *long* styles received pollen from *short* stamens, or short styles from long stamens.

Primula scotica is an exception to the Primulas in general owing to the fact that it is neither "pin-eyed" nor "thrum-eyed," and succeeds in fertilising itself easily.

A similar condition often arises under cultivation with dimorphic Primulas, when the stamens and style become of the same length, as may be seen sometimes in Auriculas and the Chinese Primrose.

Some of Messrs. John Laing & Son's new single and double Begonias were next called attention to. Professor Henslow pointed out that between 1864 and 1867 three species of Begonia—*B. boliviensis* (scarlet), *B. Veitchii* (rose-red), *B. Pearcei* (yellow)—were introduced to cultivation, but they were totally different in aspect from the progeny which had been produced by crossing and intercrossing these species.

Prof. Henslow alluded to the great assistance which a white-flowering plant rendered to the florist, for as soon as such had appeared it is shown that the further generations showed much variation in colour when this is used as one of the parents. Thus, if an orange-coloured flower be crossed with white, a dissociation of the red and yellow might follow, pure red and pure yellow-coloured flowers resulting. This phenomenon had occurred with Abutilons and E. I. Rhododendrons, as well as with Begonias. A point he wished to emphasise was the difficulty that would be experienced in tracing the present-day hybrids of many plants to their original forms where authentic information was missing. In this connection the lecturer referred to the controversy which was being carried on in the columns of *Nature* in regard to the florists' Cineraria. Mr. Dyer maintained that *Cineraria cruenta* was the sole source whence the florists' Cinerarias

were derived, while Mr. Bateson was of opinion that *C. lanata* had something to do with the original parentage. There was no doubt that most plants soon begin to vary, even without crossing, under cultivation, and numerous varieties can be established when the process of selecting seed from certain flowers is adopted. He suggested that both opinions might possibly be right, for an analogous case would seem to be presented by the Pansy. This was a favourite garden flower in 1725; but in about the second or third decade of this century it is believed to have been crossed with *Viola altaica*, *V. grandiflora*, &c. At the present day it would be quite impossible to detect and distinguish the true uncrossed descendants of *V. tricolor* from those of hybrid origin. So, possibly, may it be with Cinerarias.

Professor Henslow next drew attention to some Cactaceous plants exhibited by Mr. Cannell and Mr. Ludford, such as *Pilocereus senilis*, *Echinocactus cornigera*, Mamillarias, and compared their forms with some fleshy-stemmed species of Euphorbia. He pointed out the great resemblance in general appearance between these plants, although they belonged to entirely different families. The reason for this resemblance was that the plants which were natives of arid deserts adapted themselves to their surroundings by assuming the same vegetative structures. Thus in the deserts near Cairo all plants have a bluish appearance, caused by hairiness, or else they are thick and fleshy-stemmed. The cuticle is hard and thick, and prevents the transpiration of water from the cells.

Brodiaea volubilis, a Liliaceous plant from Messrs. Wallace & Co.'s (Colchester) collection, was the next plant called attention to by the lecturer. He pointed out that its peculiarity lay in the fact that the long flower-stems had a climbing habit, twisting round artificial supports by aid of the motion called "circumnutation." This again was simply an adaptation to circumstances. Plants which grew in dense shady forests often produced long stems by which they pulled themselves up to the light. Many such plants have a climbing habit, when allied species growing in the open assume a short and more or less shrubby habit, as in some species of *Convolvulus* growing in deserts which are stunted woody little shrubs.

Calochortus (Cyclobothra) pulchra and *C. venustus*, from the same firm. The *Cyclobothra* section of this genus differs con-

siderably in shape from the Calochortus, or Mariposa Lily proper. The petals have a curious swelling on one side and a corresponding depression on the other, in which honey is secreted, and protected by a tuft of hairs. Professor Kerner is of opinion that these hairs afford a hindrance in keeping certain small insects, such as ants, away from the nectary, which they would rob of its honey without being of any service to the flower by pollinating it. Prof. Henslow thought it would be more probable that the hairs were an outgrowth due to the irritation set up by the appropriate insect-visitor, but that having thus developed them, the hairs might well prove to be a hindrance to other insects.

A new yellow-flowered Hibiscus from Caracas, and shown by Messrs. Geo. Jackman & Son, of Woking, attracted attention. Prof. Henslow pointed out that some species of Hibiscus were trees and shrubs, and some herbs. *H. rosa-sinensis*, with its beautiful crimson-coloured flowers, was sometimes known as the "Rose of Sharon," but there was no reason whatever to believe that it had anything to do with the Scriptural plant mentioned in the Song of Solomon. Judging from the Hebrew word, it would seem to be a bulbous plant, possibly *Colchicum autumnale*.

Alstrœmerias were mentioned as having the leaves upside down. In ordinary leaves the under surface were covered with minute breathing pores or stomata, and there were none, or comparatively few, on the upper surface. In the Alstrœmeria, however, where the upper surface becomes the lower, stomata are abundant, showing again how a plant will adapt its structure to altered circumstances. The common "Ramsons," *Allium ursinum*, has similarly twisted leaves, with the upper and lower surfaces changed in structure.

Astrantia major—an Umbelliferous plant—differs from the plants of its order in having simple (instead of compound) umbels, and the attraction to insects resides chiefly in the conspicuous bracts. This plant is only found wild in two places in England, namely, Stokesay Wood in Shropshire, and at Malvern, by the old Roman quarries in the limestone rocks. It is supposed to have been accidentally introduced from Southern Europe by the Romans.

Eryngium Oliverianum—another Umbelliferous plant—was an example of the compound umbels being reduced to massive heads with spiny steel-blue bracts. Species of *Eryngium*,

including our British wild ones, are very valuable plants to bee-keepers, as great quantities of honey are secreted by the flowers.

A dwarf Sweet Pea named "Cupid," from Mr. Burpee, of Philadelphia, U.S.A., was remarked upon by the lecturer as evidence of what could be done by selection. It would be difficult to explain *why* dwarfs arise at all; but gardeners know very well that dwarfing may be obtained by sowing the seeds early or late, and then pricking the seedlings out several times so as to check their growth. By the selection of the smallest seeds also year after year a dwarfing habit may be obtained. Crossing with pollen taken from the shortest stamens in Rhododendrons has been proved to give rise to dwarf plants.

The lecturer recommended that a series of experiments of this nature, conducted on a definite basis, might lead to very valuable results, or at all events teach us a little more than we know at present about the physiological processes of dwarfing.

A specimen of *Hydrangea hortensis*—which belongs to the natural order Saxifrageæ—was referred to simply to point out that it was the calyx only which was expanded and formed the popular "flower"—the corolla, andræceum, and gynæceum being closed up and aborted in the centre.

In the Guelder Rose or Snowball-tree (*Viburnum Opulus*), which belongs to Caprifoliaceæ, it was the corolla, and not the calyx, which was expanded, while the other organs were undeveloped.

Prof. Henslow next touched upon the regularity and irregularity of flowers, and said that botanists had come to the conclusion that all irregular flowers had been derived from regular ones as simply the result of interference on the part of insects. A regular flower was always situated in a terminal position, or else so that the nectary could be reached from any point of the compass, but in irregular flowers there was usually only one way of entering, as the flowers were almost invariably situated close to the stem.

As examples of irregular flowers being changed into regular, *Sinningia (Gloxinia) speciosa* was mentioned. It was introduced in 1815, and had irregular drooping flowers with four stamens.

Sinningia (Gloxinia) caulescens was afterwards introduced, and hybrids were soon raised between them. In 1846 Mr. Fyfe, of Messrs. Dobbie & Co., of Rothsay, N.B., succeeded in raising a

new form, called *Gloxinia* \times *Fyfeana*. It was remarkable in having the flowers erect and regularly shaped, and possessing *five* stamens, instead of the usual four. Hence this was a reversion to the ancestral and regular form of *Gloxinia*, not now known to exist in nature.

The terminal flowers of Delphinium, Foxglove (*Digitalis*), and Horse Chestnut were mentioned as further examples of accidental returns to regularity in the midst of irregularity. In the Toad Flax (*Linaria*) the irregular personate corollas with four stamens were frequently changed into a regular flower with five stamens. In the irregular forms there is one spur, but in the regular one there are five fully developed, thus forming what is termed a *peloria*.

Both these forms of *Linaria* were exhibited. A difference must be noticed in cases of true *peloria* from a true reversion to regularity, for in the former case the regularity is acquired by *every* petal assuming the same form as that of the *one* which usually only deviates from the rest; so that the irregularity spreads, so to say, all round until all five petals are alike and the corolla becomes regular. In a true reversion the irregularity is lost by the non-development of the peculiarity. Thus in Columbines every petal has a spur; consequently the flower is regular, but it resembles the *pelorian* state of *Linaria*. It often happens, however, that all the spurs are suppressed, and the Columbine then has five leaf-like petals, and so exhibits a true reversion.

The "doubling" of flowers was also referred to as a remarkable process in flowers. In many cases, *e.g.* the Rose, Carnation, Pink, Pæony, Buttercup, &c., the doubling was caused at the expense of the stamens and carpels, which are replaced by petals these latter being then greatly multiplied; but in others, *e.g.* *Campanula*, it was caused by multiplication of the corolla alone, with or without a metamorphosis of the green calyx into a coloured one. The "Cup and Saucer" *Campanula* on the table was referred to as illustrating the point.

EXTRACTS FROM THE PROCEEDINGS
OF THE
ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETING.

JANUARY 15, 1895.

Mr. JOSEPH CHEAL in the Chair.

Fellows elected (23).—Miss A. M. Breton, C. J. Bungay, Jan Brodie of Brodie, Philip Le Cornu, D. Doncaster, Mrs. Eley, H. Fenn, S. Wyndham Fitzherbert, John Gascoine, Mrs. Gibbon, Stanley J. Goddard, Capt. J. Kennedy Douglass, Arthur Lloyd, Richard Lowe, W. H. Marshall, W. A. Michael, G. W. Miller, Chas. E. C. Prichard, Rev. W. B. Ramsay, Sir Edwin Saunders, W. R. Virgoe, C. Walker, and John Welford.

Society affiliated (1).—Bishops Stortford Horticultural Society.

ANNUAL GENERAL MEETING.

FEBRUARY 12, 1895.

Sir TREVOR LAWRENCE, Bart. (President of the Society), in the Chair, and about 80 Fellows present.

The Minutes of the last Annual General Meeting on February 13, 1894, were read and signed.

The following elections took place :—

Fellows (37).—Hiatt C. Baker, T. Bevan, Rev. A. T. Boscawen, Leonard G. Browne, Stratten Boulnois, G. Burt, Wm. Busby, Cecil E. Cant, Mrs. H. Carter, E. Clementi-Smith, C. G.

Cresswell, Hon. Chas. Ellis, W. Gibson, R. C. Carr Gregg, S. R. Hay, W. T. Hender, Mrs. Hope, John Hughes, Capt. Julian, Forbes Laurie, H. E. Milner, Lady Mountstepher, Mrs. Oliver, Stephen Osborn, C. Wray Palliser, Chas. J. Poston, Jas. Preece, H. Ramsbotham, Gustav Reuthe, Hy. Rose, Jno. Sandars, Rev. M. J. Sutton, Walter B. Tubbs, John Gould Veitch, H. Wartmann, Chas. G. Watkins, Chas. Mills, M.R.C.S.

Societies affiliated (3).—Haslemere Cottage Gardeners' Horticultural Society; Leighton Buzzard Horticultural Society; Reigate Borough Cottage Gardeners' Horticultural Society.

Messrs. J. Cheal and H. Turner were appointed Scrutineers of the ballot.

Mr. McLachlan proposed, and Mr. Harry Veitch seconded, a hearty vote of thanks to the Members of the Council who were retiring under the operation of the Bye-laws, viz.: The Right Hon. Lord Annesley, the Hon. Walter Rothschild, and Chas. J. Lucas, Esq.

To fill the vacancies thus caused on the Council, the following gentlemen were proposed for election, viz.: Sydney Courtauld, Esq., Thomas Statter, Esq., and Henry Williams, Esq.

The following gentlemen were proposed for re-election as officers, viz.: *President*—Sir Trevor Lawrence, Bart.; *Treasurer*—Philip Crowley, Esq., F.L.S.; *Secretary*—The Rev. W. Wilks, M.A.; *Auditors*—Messrs. Harry Turner, A. H. Pearson, and James H. Veitch.

After a careful examination of the ballot papers, the Scrutineers reported the above-named gentlemen to be all duly elected.

The CHAIRMAN, in moving the adoption of the Report with the Financial Statement and Balance-sheet, referred briefly to several of the matters contained therein, and said that the Council were again in the position of having to ask exhibitors to allow their plants to remain three days at the show held in the Temple Gardens. The third day on the last occasion brought a very considerable amount of money to the Society. This show had become more and more popular. At the first show, held in 1887, the amount taken was £278, and in 1894 the sum was £1,023.

Reference was made to the show of British fruits, held in September, 1894, at the Crystal Palace. It had been a success, and, at the invitation of the Crystal Palace Company, the exhi-

bition would be repeated this year. An appeal was made for funds towards the special prize list.

The Chiswick Conference on hardy trees and shrubs had been a failure in regard to the number of the members attending, and the weather prevented, in large degree, an inspection of the exhibits that were staged, but considerable good would result from the papers that were read.

The growth of the Society was illustrated by quoting the number of new members enrolled between 1889 and 1894, which, after deducting the number of resignations and deaths during the same period, gave a net gain of 1,530. Reference was made to the desire of the Council to maintain the *Journal* in the highest position possible. The examinations conducted under the auspices of the Society during the last year were alluded to and declared satisfactory on the whole. Fewer candidates presented themselves, but a higher standard of efficiency was displayed than in the preceding year.

In regard to Chiswick, the President declared that the Council had no intention of turning their back upon the Gardens there; indeed, they were very anxious that Chiswick should be kept up as well as possible, and the very most made of it. The Society had expended during the last year upon the Gardens there, after deducting the amount received for sales from the Gardens, a sum of £1,500, and the cost of the Gardens to the Society since 1890 had been £7,445. He thought there was no evidence of starving in such figures.

In regard to the desirability of publishing a Catalogue of the Lindley Library, which was proposed at the last annual meeting, the President stated that £80 had been subscribed, and the work had commenced, but the sum obtained being far below the required amount, further donations were solicited.

The Council hoped that by the steps they were taking to draw up a code of suggested rules and regulations for judging at fruit and flower shows, they would help considerably in meeting the difficulties that frequently arise at such exhibitions.

In concluding, the President remarked that everyone, however remotely connected with the Society, had sympathised with the Rev. W. Wilks in his illness, and they rejoiced to see him with them that day, and hoped that he would be restored to his usual good health. The Treasurer (Mr. P. Crowley), the Assistant-

Secretary (Mr. J. Weathers), and Mr. A. F. Barron were mentioned as deserving of the Society's thanks for the earnest manner in which they had attended to the interests of the Society on all occasions.

Mr. PARKER, in seconding the adoption of the Report, thanked the Council for the effort they had made to draw up a code of rules for judges. He thought that the Council should increase the advantages that were available to members of the Society who resided at a distance from headquarters, and were unable to attend the meetings, or to visit Chiswick. He welcomed the concession that had been made to those living more than 35 miles distant, in regard to the distribution of plants, and urged that a similar concession in regard to seeds might be made. He regretted that the distribution of cuttings had fallen out of the list of advantages held out to members living at a distance. In reference to the *Journal*, he welcomed the promise of the President that it would be well kept up, and urged that it should be issued more regularly and frequently.

Mr. RANGER JOHNSON criticised the amount paid for printing as being more than the Society could afford. Some other members expressed dissent from the proposal to curtail the *Journal*.

Mr. P. C. M. VEITCH, Exeter, suggested that the work done at Chiswick by the Visiting Committees should be embodied in the reports of the Committee's work at the Drill Hall. The members were not sufficiently alive to the value of the work done at Chiswick, and were ignorant in many instances as to what was done there.

Mr. W. MARSHALL (Chairman of the Floral Committee) thought that Mr. Veitch's suggestion was a good one. He regretted that there was to be no show at Chiswick this year.* The Gardens were looking well, a large amount of money had been spent in restoring the houses, and he thought that, although the shows there were financial failures, it would be well to continue them.

The PRESIDENT, before putting the Report to the vote, remarked that in regard to the distribution of seeds the Council

* There will be a special show of British-grown Vegetables at Chiswick Gardens on September 10, 1895.

were careful not to compete with the trade in this matter. The Council regretted that the shows at Chiswick had to be abandoned, but, unfortunately, members would not attend there.

The Report was then passed unanimously, and a vote of thanks to the Chairman concluded the meeting.

REPORT OF THE COUNCIL FOR THE YEAR 1894-95.

The year 1894 has again been one of steady work and progress for our Society.

Nineteen Fruit and Floral Meetings have been held in the Drill Hall, James Street, Victoria Street, Westminster, besides the more extended shows at the Temple Gardens on May 23, 24, and 25; at Chiswick Gardens on September 25; and at the Crystal Palace on September 29, and October 1 and 2; and lectures have been delivered at fourteen of the meetings, exclusive of those given at the conferences. The number of awards has been as follows:—On the recommendation of the Floral Committee, 71 First Class Certificates against 64 in 1893, 225 Awards of Merit against 201, and 3 Botanical Certificates against 6. On the recommendation of the Orchid Committee, 68 First Class Certificates against 39 last year, 134 Awards of Merit against 86, 21 Botanical Certificates against 25. On the recommendation of the Fruit and Vegetable Committee, 15 First Class Certificates against 16, and 12 Awards of Merit against 23 last year.

The Society's great show held (by the continued kindness of the Treasurer and Benchers) in the Inner Temple Gardens, and graciously opened by H.R.H. the Duke of York, was a greater success than ever, and it is a matter of satisfaction to the Council to find that this meeting is now universally acknowledged to be the leading horticultural exhibition of this country. The best thanks of the Society are due to all who kindly brought their plants for exhibition, or otherwise contributed to the success of this show.

The great show of British-grown Fruit, held by the Society, at the Crystal Palace on September 29 and October 1 and 2, was

of national importance, and as an object-lesson in British fruit culture it stands out unrivalled. It is needless to enter into further details, as full particulars will be found in Vol. XVIII. of the *Journal*, issued at the same time as this Report.

To one point, however, connected with the Fruit Show the Council desire to draw the special attention of the Fellows and of the general public interested in fruit cultivation. The Society may well be proud of this show, but it must not be forgotten that the holding of the show was due to a very small number of gentlemen, who subscribed the £100 asked by the Council towards the prize-money before they would consent to embark on the scheme. This year (1895) the Council have made arrangements with the Directors of the Crystal Palace to again hold a similar show; and they will be glad to receive offers of special prizes from any who are interested in British fruit culture. Donations towards this fund should be sent at once to the Secretary, the Rev. W. Wilks.

The Council have decided to devote the meeting of October 15, 1895, entirely to an exhibition of Vegetables. A special schedule of the show will be issued in April, together with one for the Crystal Palace Fruit Show.

The Conference on Trees, held at Chiswick on September 25, abounded in interesting material and in papers of the greatest use to landowners interested in woods and plantations; but, unfortunately, the weather was such as to make it exceedingly difficult to examine the multitude of specimens so kindly sent by contributors, to whom the best thanks of the Society are specially due.

The Society's general work of scientific experiments and investigation, and of the practical trial of various plants, has been going on steadily at Chiswick, under the superintendence of Mr. Barron. Trials have been made of 40 varieties of Cauliflowers, 86 of Peas, 116 of Strawberries, 55 of new varieties of Potatos, and 67 of Tomatos. In the floral department 400 varieties of Carnations and Picotees, 70 of Pinks, 78 of Cannas, 60 of Sweet Peas, as well as many Clematis, Campanulas, and Mignonette, have been tried.

The following table will show the Society's progress in regard to numerical strength during the past year:—

DEATHS IN 1894.				FELLOWS ELECTED 1894.					
		£	s.	d.		£	s.	d.	
Life Fellows ...	8	0	0	0	4 Guineas	5	21	0	0
4 Guineas	3	12	12	0	2 „	90	189	0	0
2 „	16	33	12	0	1 „	231	242	11	0
1 „	14	14	14	0	Associates	3	1	11	6
					Affiliated Societies	10	11	11	0
	41	£60	18	0					
						339	£465	13	6
					Deduct loss	214	4	0	
RESIGNATIONS.				Net increase in income					
		£	s.	d.		£	s.	d.	
2 Guineas	24	50	8	0		251	9	6	
1 „	98	102	18	0					
	122	£153	6	0	New Fellows &c.	339			
					Deduct resignations and deaths	163			
Total loss	163	£214	4	0	Numerical increase	176			

The *Journal* of the Society has been continued so as to enable Fellows at a distance to enter more fully into and reap the benefits of the study and work of those actively engaged at headquarters. Vols. XVI., Parts 2 and 3, and Parts 1 and 2 of Vol. XVII. were issued during the year, and Vol. XVIII., containing the Reports of the Conferences on Trees at Chiswick, and on British Fruits at the Crystal Palace, is now ready for issue. The Council would like to remind Fellows of two very valuable volumes published in 1893, of which a few copies are left, viz. : (i) "A Monograph on Bulbous Irises," by Professor Michael Foster, Joint Secretary of the Royal Society; and (ii) "A Complete List of Certificates to Plants, Flowers, Ferns, Orchids, Fruits, Vegetables, &c.," granted by the Society from the year 1859 to January 1893.

An examination in the principles and practice of Horticulture was held on May 1, concurrently in different parts of the United Kingdom, a centre being established wherever a magistrate, a clergyman, or schoolmaster, or other responsible person accustomed to examinations would consent to superintend one on the Society's behalf, and in accordance with the rules laid down for its conduct. No limit as to the age, position, or previous training of the candidates was imposed, and the examination was open to both sexes. One hundred and twenty-six candidates presented themselves for examination, and were divided into three classes. Eleven of the candidates gained 200 marks and more out of a possible 300 in the first

class; 37 gained between 150 and 200 marks in the second class; 40 gained between 100 and 150 marks in the third class; and 33, having failed to obtain 100 marks, were not classed. The names and addresses of the successful candidates, together with the number of marks assigned to each, will be found in the Society's *Journal*, Vol. XVII., 1894, page 67.

In connection with this examination, it is satisfactory to record that Mr. W. N. Sands and Mr. G. F. Tinley were appointed to the two Scholarships, value £39 a year, and tenable for two years, kindly given to the Society by Baron Schröder, Sir Trevor Lawrence, Bart., and the Worshipful Company of Gardeners.

It is proposed to hold a similar examination in May 1895, and candidates intending to sit for it should apply to the Secretary, 117 Victoria Street, Westminster, during March.

In round numbers, £1,900 has been expended at Chiswick this year on the general work and repairs and keeping up of the Gardens. The receipts from the Gardens by sale of surplus produce amount to £400, making the net cost of the Gardens £1,500.

The Council, acting in conjunction with the Lindley Trustees, have devoted considerable attention to the Library. All serial publications have been kept up to date, a large number of valuable volumes have been bound, and the following new books, amongst others, added to the Library, viz.: "The Natural History of Plants," "The Forester" (6th Edition), "The Diseases of Trees," "The Genus *Masdevallia*," "Flowers of the Engadine," "The Gardens of the Sun," "Les Orchidées Exotiques," "Schneider's Book of Choice Ferns," "European Ferns," "Index Kewensis" (Part 3), &c.

At the last annual meeting of the Society a wish was expressed that a Catalogue of the Library should be published. A fund to meet the expense was accordingly opened, and a sum of £80 has been received up to the present. The Catalogue is already partly advanced, although this sum will not be sufficient, but it is hoped that many Fellows, seeing that the matter is actually in hand, will now come forward with donations, however small they may be.

The hearty thanks of the Society are due to the Chiswick Board and to all the members of the Standing Committees—viz. the Scientific, the Fruit and Vegetable, the Floral, the

Orchid, and the Narcissus Committees, for the kind and patient attention which they have severally given to their departments.

The Council are of opinion that the special work for which the Narcissus Committee was originally appointed has, thanks to their labours, been so far accomplished that it will not be necessary to call together a separate Committee this year, but that this work may now be carried on by the Floral Committee, to which one or two Narcissus experts have been added.

The best thanks of the Society are due to all those who, either at home or abroad, have so kindly and liberally presented books to the Library or plants or seeds to the Gardens. A list of the donors has been prepared, and will be found in the Society's *Journal*, Vol. XVII., Parts 3 and 4, 1895. The Council also wish to express, in their own name and in that of all Fellow of the Society, their great indebtedness to all who have so kindly contributed, either by the exhibition of plants, fruits, flowers, or vegetables, or by the reading of papers, to the success of the fortnightly meetings in the Drill Hall.

The papers read at these meetings, which have been or will shortly be published in the *Journal*,* are as follows:—

- Mar. 13. "The Deciduous Trees and Shrubs of Japan," Mr. James H. Veitch.
- „ 27. "Rare Trees and Shrubs in the Arnold Arboretum, U.S.A.," Mons. Maurice de Vilmorin.
- April 10. "Hybrid Narcissi," the Rev. G. H. Engleheart, M.A.
- „ 24. "Botanical Exploration in Borneo," Mr. F. W. Burbidge, M.A.
- June 12. "Flowering Trees and Shrubs," Mr. George Nicholson, A.L.S.
- July 10. "Cactaceæ," Mr. John W. Singer.
- „ 24. "Filmy Ferns," Mr. J. Backhouse.
- Aug. 14. "Fruit Culture in France," Mons. Chas. Baltet.
- „ 28. "Gardeners and their Employers," Mr. Malcolm Dunn.
- Sept. 11. "Lord Bute's Vineyards," Mr. A. Pettigrew.
- „ 25. "The Larch Canker," Mr. J. B. Carruthers, F.L.S.
- „ 25. "The Utilisation of Land unsuitable for Agriculture by planting with Forest Trees," Mr. J. Simpson.

* Several back numbers of the *Journal* can still be purchased at reduced prices. For list see "Arrangements, 1895," p. 15.

- Sept. 25. "Forest Trees for Commercial Purposes," Mr. E. J. Baillie.
- „ 25. "The Management of Plantations," Mr. A. C. Forbes.
- „ 29. "Fruit-growing in Small Gardens," the Rev. W. Wilks, M.A.
- Oct. 1. "Fruit-growing on a large Scale," Mr. C. D. Wise, F.S.I.
- „ 2. "Packing, Grading, and Marketing Fruit," Mr. George Monro.
- „ 9. "How to Popularise Orchid-growing," Mr. E. H. Woodall.
- „ 23. "The Origin of Common Vegetables, and their Value as Food," the Rev. Professor G. Henslow, M.A.
- Nov. 13. "Chrysanthemums," Mr. C. E. Shea.
- „ 27. "The Principles of Judging at Shows," Mr. James Douglas.

The Council have the sad duty of recording the death of forty-one Fellows during the year, and amongst them they regret to find the names of Professor Cheshire, Lady Eastlake, Rev. F. H. Gall, W. H. Gower, George Hardy, Sir Thomas Hepburn, Bart., R. Holland, Colonel Hussey, William Ingram, John Malcolm, Edward Moon, Henry Sibray, Mrs. Lyne Stephens, Sir James Tyler, Lady Charles Wellesley, W. H. Williams, Lady Henry Grosvenor, &c.

A scheme for the affiliation of Local Horticultural Societies was put forward in 1890, and sixty-five Local Societies have availed themselves of it. The Council express the hope that Fellows will promote the affiliation of Local Horticultural and Cottage Garden Societies in their own immediate neighbourhood.

A Special General Meeting of the Society was held on July 24, 1894, when the following addition to the bye-laws was adopted:—"Bye-law 11A.—Any Fellow wishing to commute his annual subscription may do so by making one payment of forty guineas in lieu of a £4. 4s. annual subscription; of twenty-five guineas in lieu of a £2. 2s. annual subscription; or of fifteen guineas in lieu of a £1. 1s. annual subscription: such commutation entitling the Fellow for life to all the privileges of the corresponding annual subscription."

The Council, wishing to recognise in any way in their power

the fact that Fellows residing at a distance from London are at some disadvantage in not being able so easily and regularly to attend the Society's meetings, have decided that in future all Fellows residing outside of a radius of thirty-five miles from London shall, in the annual distribution of plants, receive twice the number allotted to those who live within the said radius. The Council are conscious that this may create a slight feeling of grievance with those who live only just within the boundary fixed, but this is inevitable whatever the radius may be, and they hope that Fellows, seeing the reasonableness of the principle involved, will gladly see it adopted, although they themselves may not benefit from it.

In order to meet a suggestion made by the Fruit Committee, the Council have decided to limit the number of dishes or baskets of fruit shown in any collection to 100 dishes or baskets of distinct varieties.

At the request of many Secretaries of Local Societies and of some of the most prominent judges at shows, the Council have consented to appoint a committee to draw up a code of suggested Rules and Regulations for judging of Fruit and Flower Shows, in order to secure, if possible, some sort of uniformity underlying the principles on which judging is conducted at shows all over the kingdom. The Committee have already begun their work, and will be glad to receive any suggestions or information concerning cases of difficulty or doubt which have actually occurred within the experience of any.

The Council would like to draw the attention of all Fellows of the Society to the more extended use which the Scientific Committee might be to them if they availed themselves more freely of their privileges in submitting instances of diseases of or injuries of plants, caused by insects or otherwise. The Scientific Committee are composed of gentlemen qualified to give the very best advice on all such subjects, either in respect to the prevention or cure of disease. The Committee are also glad to receive specimens of malformation or other subjects of horticultural or botanical interest.

Subjoined is the usual Revenue and Expenditure Account with the Balance-sheet for the year ending December 31, 1894.

ANNUAL REVENUE AND EXPENDITURE ACCOUNT

To ESTABLISHMENT EXPENSES—	£	s.	d.	£	s.	d.
Salaries and Wages	647	12	0			
Rent of Office	173	3	0			
Printing and Stationery	162	2	5			
Journal	315	12	6			
Postage	72	19	0			
Coal and Gas	4	13	1			
Donation to Auricula and Primula Society ...	10	0	0			
" " Carnation and Picotee Society ...	10	0	0			
Miscellaneous	166	4	4			
Lindley Library	47	1	0			
	-----			1,609	7	4
„ SHOWS and MEETINGS—						
Rent of Drill Hall and Cleaning	102	13	0			
Temple Show	556	2	7			
Crystal Palace Fruit Show	281	8	0			
Advertising	18	11	9			
Prizes and Medals	384	9	2			
Printing &c.	39	19	0			
Labour	79	17	11			
Repairs to Tents &c.	30	18	0			
Superintendent of Flower Shows	50	0	0			
	-----			1,543	19	5
„ CHISWICK GARDENS—						
Rent, Rates, Taxes, and Insurance	304	6	1			
Superintendent's Salary	225	0	0			
Labour	734	5	9			
Implements, Manure, Soil, Packing, &c.	137	5	0			
Coal and Coke	197	6	7			
Repairs, Ordinary	80	8	8			
„ Special	198	6	0			
Water and Gas... ..	10	8	4			
Miscellaneous	37	13	3			
	-----			1,924	19	8
„ BALANCE TO GENERAL REVENUE ACCOUNT				472	9	2

				£5,550	15	7

BALANCE SHEET, 31st DECEMBER, 1894.

Cr.

	£	s.	d.	£	s.	d.
To SUNDRY CREDITORS	51	1	3			
" SUBSCRIPTIONS, 1895, paid in advance	82	18	11			
" CHISWICK SCHOLARSHIPS	34	0	0		20	0
" LIFE COMPOSITIONS	68	5	0		34	7
" GENERAL REVENUE ACCOUNT—						
Balance, 1st January, 1894 ...	2,585	8	11			
Less Bad Debts	6	11	9			
	<u>2,578</u>	<u>17</u>	<u>2</u>			
" Balance for the year 1894, as per Revenue and Expenditure Account	472	9	2		326	12
				3,051	6	4
				<u>£3,287</u>	<u>11</u>	<u>6</u>
By SUNDRY DEBTORS—						
Annual Subscriptions outstanding, estimated at					20	0
Garden Produce					34	7
Rates and Taxes (Chiswick) paid in advance					34	18
					<u>89</u>	<u>5</u>
" INVESTMENTS—						
2 $\frac{3}{4}$ % Consols, £2,122. 8s. 9d. cost	1,892	11	3			
held by the Society subject to the provisions of the will of the late J. Davis, Esq.)						
2 $\frac{3}{4}$ % Consols, £1,000 ... cost	975	1	6			
					<u>2,867</u>	<u>12</u>
" CASH AT LONDON AND COUNTY BANK—						
On Current Account					326	12
" CASH IN HAND—						
Head Office					3	15
Chiswick					0	5
					<u>330</u>	<u>12</u>
					<u>£3,287</u>	<u>12</u>
					<u>6</u>	

We have examined the above Accounts, and find the same correct.

(Signed)

HARRY TURNER, }
HENRY WILLIAMS, } Auditors.

HARPER BROS., Chartered Accountants.

January 7,

GENERAL MEETING.

MARCH 12, 1895.

Mr. JAS. DOUGLAS in the Chair.

Fellows elected (28).—G. H. Adcock, Lord Barnard, W. D. Bason, A. K. Basu, W. O. Campbell, W. Colchester, J. Omer Cooper, H. Croom-Johnson, G. H. Dean, Dr. W. Firbank, Dr. John Falconer, Ar. Gibson, D. M. Grimsdale, H. W. Grigg, Mrs. Gutch, J. W. Harker, Rev. P. D. Hawker, Mrs. Johnstone, Miss M. J. King, J. T. Marsden, Francis G. Powell, E. R. Ramsbotham, G. H. Richards, F. W. Sharp, Mrs. E. Thackwell, W. G. Watson, H. W. Wilson, A. C. Wrinch.

Societies affiliated (4).—Cheshunt, Wormley, and District Horticultural Society; Hampton Hill and Hampton Horticultural Society; Pinner Horticultural Society; Woolwich, Plumstead and District Horticultural Society.

The Assistant Secretary read a paper by Mr. A. Collenette on "The Diseases of Tomatos." (See page 13.)

GENERAL MEETING.

MARCH 26, 1895.

Mr. JOSEPH CHEAL in the Chair.

Fellows elected (8).—Mrs. J. Blake, H. J. Chalwin, W. T. Crossweller, Mrs. Walpole Eyre, Jas. H. Morgan, Septimus Pye, Miss Radcliffe, R. Trengrouse.

Society affiliated (1).—Cardiff Horticultural Society.

A paper on "Lifting Large Trees and Shrubs," by Mr. T. Crasp, was read by the Assistant Secretary. (See page 24.)

GENERAL MEETING.

APRIL 9, 1895.

Mr. H. SELFE-LEONARD in the Chair.

Fellows elected (11).—Chas. Burgin, F. W. Burt, W. Drover, Lady Du Cane, E. Godfrey, W. C. Hayles, J. MacPhail, W. Noakes, W. C. Pleasants, Rev. J. Simmance, W. S. Tighe.

A paper on "Campanulas from a Garden Point of View," by Mr. J. Wood, was read by the Assistant Secretary. (See page 30.)

GENERAL MEETING.

APRIL 23, 1895.

Professor M. FOSTER, F.R.S., in the Chair.

Fellows elected (13).—L. Bentall, Miss A. Blenkiron, Mrs. A. B. Bryans, H. W. Bryans, W. Atlee Burpee, John E. Barnes, H. Ford Hillier, Miss J. Lindley, C. W. B. Moore, Thomas Reidpath, Alf. Tate, Lieut.-Colonel W. N. Turnor, Spencer Whitehead.

Associate (1).—D. Kemp.

Society affiliated (1).—Waterhouses and Esh Horticultural Society.

A Conference on Primulas and Auriculas was held. The following papers were read: "New Primulas," by Mr. J. G. Baker; "The Auricula," by Mr. James Douglas; "Culture and Classification of Primulas," by Mr. H. Selfe-Leonard. (See page 40.)

GENERAL MEETING.

MAY 14, 1895.

Dr. MAXWELL T. MASTERS, F.R.S., in the Chair.

Fellows elected (31).—Hon Percy Allsopp, Jas. Backhouse, C. J. Backhouse, John H. Billing, G. Brace Colt, A. Bray, Major G. A. Chapman, A. F. Charrington, R. H. Clarke, Mrs. G. T. Doveton, Sam. G. Gadd, Herbert Green, E. C. Griesbach, N. P. Hodgson, Rev. James Holmes, Mrs. E. J. Husey, Joseph Leete, Guy Lushington, Keith Maitland, Colonel Ed. Maltby, K. I. Marks, F. V. Marment, S. Marshall, J. McBean, F. Page, Mrs. Selwyn Payne, E. A. Rehder, J. R. Roberts, Mrs. L. Snowden, E. G. Sumner, Mrs. Trinmis.

Associate (1).—E. H. Harry.

Society affiliated (1).—Devon and Exeter Gardeners' Mutual Improvement Association.

Dr. Morris gave a lecture (illustrated by magic-lantern views) on "The Plants and Gardens of the Canary Islands." (See page 60.)

THE TEMPLE SHOW, 1895.

MAY 21, 22, and 23.

By the kind permission of the Treasurer and Masters of the Bench, the Society held for the eighth time its Great Flower Show in the gardens of the Inner Temple on Tuesday, Wednesday, and Thursday, May 21, 22, and 23, 1895.

Her Royal Highness the Princess of Wales had graciously consented to visit the show, but at the last moment was prevented from doing so owing to ill-health, which necessitated her moving from London to Sandringham.

The weather was somewhat threatening on the first day, but despite this fact there was a very large and fashionable gathering—much larger than on any previous occasion. The Temple Gardens, which on ordinary occasions lie in quiet repose on the side of the Thames, were during the show transformed into a brilliant scene of human vivacity and floral splendour.

The exhibits, which were from all parts of the country, and quite up to the usual standard of excellence, occupied five large tents. It would be impossible to describe in detail all the fruit and floral triumphs of the show, and we can only refer our readers to the respective reports of the Fruit, Floral, and Orchid Committees for the more noteworthy exhibits. (*See* pages xxix-c.)

During the day musical selections were performed by the following highly efficient bands, viz.: First day, the Royal Horse Guards (Blues), under the direction of Mr. Chas. Godfrey, R.A.Mus.; second day, the Second Life Guards, under the direction of Mr. Leonard Barker; and the third day, the First Life Guards, under the direction of Mr. Joel Englefield.

 GENERAL MEETING.

JUNE 11, 1895.

Sir TREVOR LAWRENCE, Bart., in the Chair.

Fellows elected (41).—Walter P. Abbott, R. Arkwright, W. Atkinson, A. W. Boodle, Cecil Boyle, T. Bradshaw, J. H. Brazendale, W. E. Budgett, Lady Calthorpe, R. Carlyon Coode, J.P., Mrs. Cunliffe, H. Deverill, C. E. Easton, Francis Fox, Miss

Gregory, T. Morgan Harvey, Jas. John Joicey, Ed. Jones, Rev. G. Laycock, Thomas C. Line, H. W. Mathias, Lady Ann Murray, G. Nobbs, C. W. Dyson Perrins, G. J. Pritchard, Jas. Pulham, Francis Ransom, Jno. Wm. Reid, Alf. G. Renshaw, Jno. Rider, Duchess of Roxburgh, Chas. E. Rudd, Mrs. H. F. Shattock, H. F. Shattock, Miss Willoughby Smith, Mrs. Spratt, E. Stevens, Miss Vasey, Jno. Waldram, Chas. H. Ward, Mrs. Wickham.

Associate (1).—J. R. Chard.

The President (Sir Trevor Lawrence, Bart.) presented Veitch Memorial Medals to James Bateman, Esq., of Worthing, author of the "Orchidaceæ of Mexico and Guatemala," &c., and to F. W. Moore, Esq., Curator of the Botanic Gardens, Glasnevin. A third medal was ready for presentation to M. Victor Lemoine, of Nancy. He was, however, unable to be present, and Mr. Harry Veitch undertook to convey to him the medal on behalf of the Trustees.

Mr. Frank Cant gave a lecture on "Rose Culture under Glass." (See page 123.)

GENERAL MEETING.

JUNE 25, 1895.

R. McLACHLAN, Esq., F.R.S., in the Chair.

Fellows elected (10).—Rev. W. Bentley, G. Bullen, Mrs. W. Burnside, F. Macmillan, A. Parris, Lady Reay, Mrs. Richmond, A. J. Sanderson, Major C. H. Santi, Rev. Robert Usher.

Professor Geo. Henslow gave a conversational lecture on some of the most interesting plants exhibited. (See page 135.)

SCIENTIFIC COMMITTEE.

JANUARY 15, 1895.

A. MICHAEL, Esq., in the Chair, and three members present.

Primula obconica and *P. sinensis* causing *Eczema*.—Further observations were made upon this subject brought before the last meeting. The fact that the Chinese Primrose occasionally

produces the same effect as *P. obconica* has been ascertained by Messrs. Sutton, of Reading, Messrs. James, of Farnham Royal, and others; but the ill effects appear to be only observed in the case of very few of the persons who handle the plants. It was the variety known as *P. s. alba plena*, in which the irritant property had been noticed. As a contrary case, it was observed that with regard to the very poisonous Neilgherry Nettle, none at Kew could touch it except one person, to whom it was innocuous. Mr. Michael added that very similar differences occur when hairy caterpillars are handled.

Fertilisation of the Chrysanthemum.—An interesting communication was received from Mr. H. Briscoe-Ironside, of Burgess Hill, on this subject. It had been thought by some writers, following Darwin a little too implicitly perhaps, that “the anthers of the *Chrysanthemum* . . . as of all members of the *Compositæ* . . . are proterandrous . . . and naturally adapted for cross-fertilisation” (Burbidge). Mr. Ironside, quoting this passage, observes that as far as his own observations in Italy went, the *Chrysanthemum* is quite, if not more, readily self-fertilised than naturally crossed. He finds, too, that the seed resulting from the self-fertilisation of the disk-florets give very poor results from a horticultural point of view, and he thinks it to be “most probable that this is the seed which is advertised and sold, and which, as we learn, gives such poor results.” It has now been generally recognised that the *Compositæ* depend quite as much on self-fertilisation in nature as on intercrossing, and, although the florets are seemingly adapted to the latter process, the former is quite as likely to take place, many inconspicuously flowering species, as Wormwood and Groundsel, being in all probability never visited by insects at all. With reference to the “inferiority” of the flowers resulting from self-fertilisation, this is the rule; hence arises the importance of intercrossing for floral improvements. But the difficulties involved in trying to avoid self-fertilisation in the *Compositæ* are very great, in consequence of the minuteness and proximity to each other of the florets. Mr. Ironside proceeds to quote the following observation of Mr. Burbidge: “The *Chrysanthemum* had, ages ago, become naturally adapted for cross-fertilisation, and to that fact, no doubt, is due its variability in nature and in our own gardens;” and he thereupon asks: “Why does history refer con-

spicuously to the varieties raised by their comparatively few raisers? Surely if cross-fertilisation were natural, the raising of new varieties would seem a common event not worth chronicling." This question might be asked of all other plants as well. The reply is, that Mr. Burbidge here refers to one cause of variability, intercrossing, and omits the commoner one, a change of environment, which may give rise to it as well. With regard to the former, there is always the antagonistic process of self-fertilisation to overcome. This fixes, or tends to fix, characters, while the other tends to alter them. Self-fertilisation, however, is the rule in nature, notwithstanding the numerous contrivances for intercrossing. Mr. Ironside adds the further question: "Do our English authorities, when describing the seeding or fertilisation of flowers not indigenous to the soil of Great Britain, give their opinions of experiences based on their having seen them in their native state, or otherwise?" Perhaps some author will reply to this question.

SCIENTIFIC COMMITTEE, MARCH 12, 1895.

Dr. M. T. MASTERS in the Chair, and seven members present.

Dendrobium Wardianum.—A plant was exhibited by Mr. Hugh Low, lately received from Burmah, remarkable for having four flowers, two on one stem and two on a second stem, each pair of flowers being quite distinct, but arising from the same point, and all four flowers with two lips. Dr. Masters undertook to examine and report upon them.

Libocedrus decurrens.—Dr. Masters exhibited specimens received from Mr. Meehan, of Germantown, Philadelphia, in which the terminal portions of the shoots had been attacked by some grub (*Cecidomyia*). The consequence was that the leaves, instead of being minute, with mucronate tips and adherent to the axis, were broad at the base, free and lanceolate, thus bringing about what would seem to be a reversion to a more ancestral state of the foliage.

Pholidota sp. (?) *diseased*.—Dr. Masters showed some Orchid leaves with rows of circular spots, having a central hole due to some fungus. The specimen was interesting from an

historical point of view, because a similar one was figured by Gerarde ("Herball," page 1,168), in 1597, under the name of *Viscum indicum* L'Obelli. Being an epiphyte, this and a *Tillandsia*, called *V. peruvianum* L'Obelli, were supposed to be parasites, like the Mistletoe. Gerarde describes the leaf of this Orchid as having "certaine round eies, such as are in the haft of a knife."

Chinese Primrose × *The Lady*.—Some umbels of flowers were received from Mr. Cannell, stated to be a cross, originally effected by Mr. C. Green, of Reigate, between the original wild form of *Primula sinensis*, from N.W. China, and a garden form of the same plant. The wild form has never been known to be crossed. It is figured in the *Gardeners' Chronicle*, March 16, 1895, p. 327.

Photos from New Jersey.—Dr. Masters exhibited a series of photographs illustrative of *Nelumbiums*, *Nymphæas*, &c., growing in the open in ornamental waters, from Mr. S. C. Nash, of Clifton, N.J.

Pinus cubensis with Androgynous Catkins.—Dr. Millichamp, of Blufton, South Carolina, forwarded some catkins of one particular tree, which apparently produces this phenomenon every year.

Larch Canker.—Mr. Rogers sent a very characteristic specimen of this disease caused by *Peziza Wilckommi*. It appears to be due to the attack of this fungus after some injury, and then spreads throughout the tree. When this occurs no remedy can be applied, and the tree must be cut down. If, however, it be perceived early enough the infected part can be cut out, and coal tar or carbolic acid be applied to the wound; the fungus may then be killed and the canker arrested.

Orchid Leaves decayed.—Some *Cypripedium* leaves were sent by Mr. O. O. Wrigley for examination. No fungus was apparent on a superficial examination. They were forwarded to Kew for further investigation.

Trachymene, fasciated.—Baron Ferd. von Mueller sent a specimen of this plant with this common deformity, from near Coolgardie, W. Australia.

SCIENTIFIC COMMITTEE, MARCH 26, 1895.

Dr. M. T. MASTERS in the Chair, and five members present.

Orchid Leaves decayed.—The report from Kew upon the specimens brought to the last meeting was as follows: "Fungi and bacteria are absent from all the specimens, and the disease is entirely physiological, being caused by the substance of the leaf at particular points becoming saturated with water. This causes the formation of numerous oil globules, followed by degeneration of the chlorophyll corpuscles and cell contents." This disease is caused by the activity of the roots being in excess of that of the leaves. Less moisture at the roots, and a circulating with a not too damp atmosphere, is the remedy.

Dendrobium with Two Lips.—Dr. Masters had examined a flower of the plant exhibited at the last meeting, and found that the extra lip was accompanied with a bifurcation of the single central cord belonging to a normal labellum, so that it was not due to a fusion of two organs, but to multiplication by chorisism of one.

Ferns injured by Mice.—Mr. McLachlan described the injuries done to Ferns during the hard frost by mice. Mr. Morris attributed it to a want of water, as he had experienced a similar trouble on board ship when a consignment of Cinchonas and other plants were sent from Jamaica to New Orleans, and was much injured by rats and mice. By placing pans of water among them, however, no further injury occurred.

Aspidistra attacked by Fungi.—Dr. Masters exhibited a leaf much decayed in parts, with peculiar black marks upon it. It was referred to Kew for examination.

Odontoglossum cirrhosum.—A specimen was sent by Mr. Smee, remarkable for the flowers being associated with leafy bracts.

Hyacinth malformed.—A peculiar specimen was sent by Sir Charles Strickland, Bart. The stem was exceedingly slender, the flowers remote, small, double, and campanulate; probably an accidental variation from impoverishment.

Galls on Leptospermum.—Dr. Masters showed a specimen of these received from Baron von Mueller from Australia. Mr. McLachlan undertook to examine them.

Schinus molle.—A photograph of a remarkably fine tree, apparently some 25 feet in height, growing in Grahamstown, was shown by Dr. Masters.

Bulbophyllum grandiflorum.—This remarkable Orchid was exhibited by Sir Trevor Lawrence. It is probably by far the largest flowering species of this genus. Its peculiarity, however, consists in having only rudimentary petals, and three large green sepals, the posterior one being spotted with white.

SCIENTIFIC COMMITTEE, APRIL 23, 1895.

Professor MICHAEL FOSTER, F.R.S., in the Chair, and six members present.

Fasciated Lily.—From Baron Sir Ferdinand von Mueller came a photograph of a fasciated specimen of *Lilium auratum*, which bore 208 more or less developed flowers.

Superposed Bulb in Leucojum.—Dr. Lowe, Wimbledon, sent a specimen of *Leucojum* with one bulb superposed on another. The older of the two bulbs had produced a cylindrical stem or rootstock about an inch in length, which bore at its extremity the new bulb, so that the two bulbs resembled beads strung on a necklace.

Cuscuta on Pelargonium.—Dr. Masters exhibited a plant of *Pelargonium* densely covered with a mass of long fine threads, which had been taken for aerial roots, but which were clearly the thread-like stems of a species of Dodder, probably introduced with the peat made use of in potting.

Androgynous Willow.—The same gentleman showed specimens of Willow catkins, the lower portions of which bore female flowers, the upper male flowers. Between the two were several flowers in which one stamen was perfect, whilst its neighbour in the same flower was half anther, half carpel. In some cases three catkins, one terminal, two lateral, merged from the same node. The catkins and the branches in the vicinity in some, but not in all cases, were marked by irregular swellings. These, when cut open, were each found to contain the larva probably of some beetle. It is thus a matter for speculation whether the irritation set up by the puncture of the insect had anything to do with the morphological changes observed.

Saintpaulia ionantha.—Dr. Masters showed flowers received from Mr. Ernst Benary, of Erfurt, showing a considerable range of variation in size and in colour. With reference to this matter, the proposal to refer this East African genus to the Chinese *Petroxosmea* was mentioned, and the opinion of Mr. C. B. Clarke, the monographer of the order, was cited to the effect that until the ripe fruit of *Saintpaulia* was examined, and the numerous new forms of this order lately introduced carefully investigated, it was considered better to retain for the present the genus *Saintpaulia*—though, in all probability, it would eventually have to be merged into some other genus.

Cattleya Lawrenceana.—Sir Trevor Lawrence, Bart., sent a raceme of this species bearing six flowers, all of which presented the same peculiarity. The two lateral petals were joined at their inner edges, and adherent also to the back of the column.

Lindley Library.—Mr. Arthur Sutton obligingly presented to the Lindley Library a fine copy of L. Plukenet's "Opera Omnia," six volumes in two. Plukenet's volumes have an historical interest, as they serve to fix the date of introduction of many garden plants. Plukenet was botanist to Mary, Queen of William III., was Superintendent of the Gardens at Hampton Court, and at one time had a botanic garden of his own not far from the present site of the offices of the Royal Horticultural Society in Victoria Street, Westminster.

SCIENTIFIC COMMITTEE, MAY 14, 1895.

Dr. M. T. MASTERS, F.R.S., in the Chair, and five members present.

Wellingtonia with Tuberos Growth.—Mr. Bunyard sent a specimen of a young plant which had produced a large globular woody growth at the base. It was perforated by some beetle, but this was apparently of subsequent occurrence, and had nothing to do with the cause. A very similar structure had formerly been sent in a *Taxodium*. It was forwarded to Mr. Blandford for further examination.

Fungi in Soil.—A sample of soil was received from Mr. Hooper, Cambridge, Waikato, New Zealand, with a communication stating that the roots of fruit trees which penetrated the

places where the fungus appeared to reside became infected, the fungus penetrating the tree from base to summit, and ultimately killing it. It was referred to Kew for investigation.

Nemophila Seedlings.—Dr. Masters called attention to a peculiarity in the cotyledons and some of the leaves of this plant—in that the epidermis appears to become detached in places from the underlying tissue, and gives the appearance of white spots as the chlorophyll becomes invisible.

Cattleya malformed.—He also exhibited a flower reduced to its lowest terms in having two sepals only, an anther with two (instead of eight) pollen masses, and no pistil, the “inferior ovary” being represented by a stalk only.

Rhododendron hirsutum.—Sir Edward Loder sent a specimen apparently dying, with the observation that others appear to be in the same condition. Mr. Michael remarked that he had observed how this species is confined to limestone districts, while *R. ferrugineum* is indifferent, and grows both on limestone and granite in the Alps of Switzerland. It is possible, therefore, that the plants require lime, if it be deficient in the garden in question.

Black Currant “jaundiced.”—Mr. Fish sent specimens having a very yellow-green foliage, with a communication of which the following is an abstract:—After referring to several assumed causes—*e.g.* “sudden changes from heat to cold, drought to drowning, &c.”—he says this case differs from most in the following particulars: “The jaundice is limited to Black Currants of two or three years of age. The cuttings last year were free from the disease. The field is well drained, and of excellent quality for fruit trees and bushes. I hear at Meldreth that this new disease is more or less prevalent over very wide areas in Cambridge-shire.” The best remedy to be tried was thought to be a solution of sulphate of iron, and, if this failed, only to grow those kinds which appear to resist the complaint—*e.g.* Black Champion, Lee’s Prolific, and the Cut-leaved Black Currant.

Colours of Flowers.—Some discussion arose as to the question of the influence of mineral salts in the soil upon the colours of flowers, Dr. Russell observing that many interesting and profitable results would undoubtedly follow from experiments in this direction. The change from blue to red in Hydrangeas when they are removed from maritime to inland places was spoken of,

the general experience being that blue specimens grew mostly by the seaside, and were not altogether attributable to iron in the soil. Dr. Russell suggested the use of a dilute solution of ferro-chloride to test the conversion of the red to a blue colour.

Influence of Salt.—A further discussion arose on the effect of salt. That on maritime plants is well known, being a cause of succulency in many of them; but the injury due to its presence in the case of S.W. winds has been felt at great distances inland, as at Bagshot, upwards of fifty miles away. Dr. Masters described the remarkable result on a Japanese Maple in Mr. Waterer's grounds, in that while one-half of the tree, on the leeward side, grew vigorously and never flowered, the other half, exposed to the wind, was greatly checked, and, as a consequence, blossomed every year subsequently, and so enabled seed to be procured from it.

Tulip, abnormal.—Mr. M. Mills, of The Gardens, Coombe House, Croydon, sent a Tulip of abnormal size and growth, consisting of three peduncles fused together, with leaves 15 inches by 5 inches, the whole being nearly 3 feet in height.

Primroses, blue-tinted.—Mr. Wilson exhibited a fine bowlful of the best of the blue-tinted Primroses, showing a great improvement upon the original forms when first raised.

Photo of Fig.—Dr. Masters showed a photograph of a Fig, possibly *F. Tsiela, Roxb.*, with its roots forming a perfect network over the stem of a Mango. It was taken in a grove near Lanowlee, Western Ghauts, by Mr. G. Marshall Woodrow, College of Science, Poona.

Rosa multiflora.—Dr. Masters showed a photograph, sent by M. de Vilmorin, of a dwarf variety of this Rose, the growth of which was so precocious that, although the seed was only sown on January 15, the plant was in blossom on April 11 of this year.

Tendrils on Vines.—Dr. Masters showed the results of some observations on the occurrence of tendrils on shoots of Vines. The tendrils of a Vine are potentially inflorescences; in other words, they are abortive bunches. Their position is therefore a matter of something more than botanical interest. Although essentially terminal, they become lateral in course of growth, each one being eventually placed opposite to a leaf. It is, therefore, a matter of practical interest to ascertain whether they occur

opposite to any particular leaf or leaves on the shoot, or whether their position is indeterminate. Again, it is desirable to know if there is any variation in this respect in particular varieties. With this view a considerable number of young Vine shoots from the gardens at Chiswick and elsewhere were casually examined, and in seventeen special cases, which seemed to be more or less characteristic, the number of leaves on the shoot, counting from the base upwards, was ascertained, as well as the relative position of the tendril in each case. Each of the seventeen shoots noted bore seven leaves. In no case did every leaf have a tendril opposite to it, but the arrangement may be expressed in the following manner:—

Occurrence of tendril opposite leaf	Leaves in numerical order
Twice opposite	1st
Four times opposite	2nd
Five times „	3rd
Six times „	4th
Five times „	5th
Six times „	6th
Six times „	7th

The number of cases examined is, of course, far too small to justify any inference being drawn other than this, that the position of the tendril with reference to any particular leaf in the shoot is variable. It is desirable to submit many more examples to examination to ascertain how far the position of the tendrils opposite particular leaves may be the result of differences in the amount of vigour of growth as dependent on favourable or unfavourable circumstances, and how far, if at all, it is characteristic of particular varieties.

SCIENTIFIC COMMITTEE, JUNE 11, 1895.

Dr. M. T. MASTERS in the Chair, and six members present.

Injury by Salt.—With reference to this subject, discussed at the last meeting, Mr. Dod observed that it was reported from Lancashire that, while evergreens had been uninjured during the severe frost, yet they succumbed to a storm which conveyed much salt from the sea.

Asparagus, fasciated.—Mr. Arthur Sutton sent a remarkably

fine specimen of this not uncommon phenomenon in *Asparagus*. Mr. Dod observed that it was probably the result of over-nourishment, as he had fertilised *Primula rosea* with superphosphates, and fasciation resulted from it.

Beetles and Orchids.—Some specimens of cockroaches were received, said to be very destructive to Orchids and Ferns. Mr. McLachlan named them as *Blatta lapponica* and *germanica*. They were doubtless imported with the plants. Any method usually adopted for destroying cockroaches should be applied.

Dried Orchid Flowers.—Mr. Chapman, gardener to Mr. Measures, sent some remarkably well-prepared specimens of dried and varnished Orchid-blossoms retaining their colours.

“Barbarossa” Grape.—Dr. Masters exhibited specimens of Grapes which had burst, and apparently showing another in the interior. This has been the usual interpretation; but an examination of the monstrosity in the young state proved that the interior “Grape” was really a seed, but coated with a succulent membrane, something like the seed of a Gooseberry. Dr. Masters observed that Robert Brown had noticed the same phenomenon to occur in *Leontice*, *Berberis*, and *Crinum*.

Double Daisies.—Some fine specimens of double white Daisies on very long peduncles were received from MM. Lambert, Trèves. It was suggested that they may have been derived from *Bellis sylvestris*, which has very similar scapes, and not from *B. perennis*.

Ustilago primulina disappearing.—Mr. Dod remarked that plants formerly badly infested with this disease gradually recovered, and were now quite free from it. He observed that the remedy so often given, of total destruction by burning of plants infected by certain fungi, might be sometimes too drastic a measure. Dr. Masters corroborated this observation, as he had heard of a similar recovery in Lilies.

Infected Soil from New Zealand.—With reference to this matter the report from Kew is as follows:—“The root fungus sent to Kew for investigation from Cambridge, New Zealand, is known as *Dematophora necatrix*, *Hartig*, the cause of the much-dreaded ‘root disease’ in vineyards and orchards, and is widely distributed throughout France, Italy, Austria, and South-west Germany. The fungus also attacks young Maples, Oaks, Beeches, Pines, Spruces, and Laburnums; Beans and Beet are also

attacked. The fungus can live in the soil as a saprophyte, and there forms at least two forms of reproductive bodies, which are dispersed by wind, birds, or small animals. When the mycelium comes in contact with the rootlets of a living tree it becomes parasitic, and spreads rapidly in the living tissues.

“All diseased plants should be burned, and the soil where infected plants have grown should be thoroughly mixed with quicklime, if available; if not, the soil should be burnt, so as to destroy all remnants of roots which contain the mycelium. Diseased patches of ground should be isolated by digging a trench about 1 foot deep, and left open. Wood ashes or manure containing potash, *but no acid*, dug into the soil among the roots is a preventive.

“The disease has probably been imported with trees from Europe. If the roots of imported trees are made very moist, and kept in a warm place for three days, the fungus, if present, will show itself under the form of snow-white strands and tufts of mycelium.”

A vote of thanks was unanimously accorded to Mr. Massee for his important investigation.

FRUIT COMMITTEE.

JANUARY 15, 1895.

P. CROWLEY, Esq., in the Chair, and eighteen members present.

Awards Recommended:—

Silver Knightian Medal.

To Messrs. J. Cheal & Sons, Lowfield Crawley, for a collection of seventy varieties of Apples and Pears of good appearance and quality, the most noteworthy varieties being Golden Noble, King of the Pippins, Royal Russet, and Dutch Mignonne.

Silver Banksian Medal.

To Messrs. J. Laing & Sons, Forest Hill, for a collection of forty dishes of Apples, the most noteworthy varieties being

Lane's Prince Albert, Bismarck, Striped Beefing, Bramley's Seedling, Sandringham, Lord Derby.

Other Exhibits.

Sir G. E. Meyrick, Bart., Bodorgan, Anglesea (gr. Mr. Gray), sent a dish of Tomatos.

Mr. W. Gradwell, Manor Road, Tottenham, sent some good sticks of Rhubarb, named Tottenham Early, which was recommended to be tried at Chiswick.

FRUIT COMMITTEE, FEBRUARY 12, 1895.

P. CROWLEY, Esq., in the Chair, and seventeen members present.

Awards Recommended:—

Silver Gilt Knightian Medal.

To Messrs. T. Rivers & Son, Sawbridgeworth, for a collection of Oranges and Lemons, grown at Sawbridgeworth. The fruits were of good quality and were extremely interesting.

Silver Banksian Medal.

To Major Thornhill, Stanton Hall, Bakewell, Derby (gr. Mr. Harvey), for large and fine examples of Seville Oranges, grown in pots, showing superior cultivation.

Other Exhibits.

Messrs. J. Peed & Sons, Norwood Road, S.E., sent a collection of Apples.

Mr. A. J. Nichols, Nuneham Park Gardens, sent good examples of an Onion named Nichols's Favourite.

FRUIT COMMITTEE, MARCH 12, 1895.

P. CROWLEY, Esq., in the Chair, and nineteen members present.

Award Recommended:—

First Class Certificate.

To Strawberry, Stevens's Wonder (votes, unanimous), from Mr. J. R. Stevens, Clayton, Hassocks. Twelve plants in pots were shown, all laden with ripe fruit. Plants very dwarf. Fruit of

medium size, conical, of a pale rose colour. Flesh pale, somewhat soft, moderately rich. Said to have been selected several years ago. (Fig. 7.)

Other Exhibits.

Earl Percy, Syon House, Brentford (gr. Mr. Wythes), sent some ripe fruit of Fig, St. John's Day ; a very early variety.

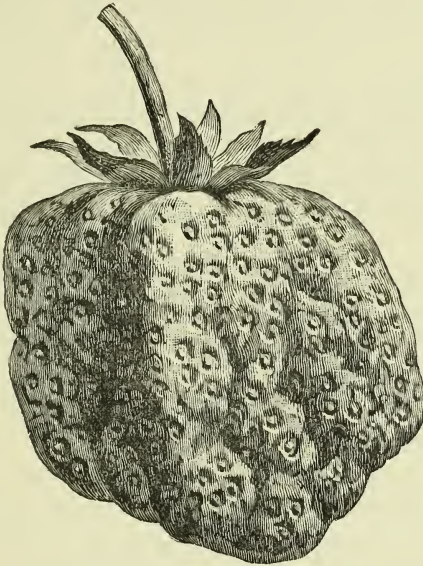


FIG. 7.—STRAWBERRY, STEVENS'S WONDER. (*Journal of Horticulture.*)

Death of Mr. George Taber, member of the Committee.—The following resolution, proposed by Mr. Dean and seconded by Mr. Saltmarsh, was carried unanimously :—

“ The members of the Fruit Committee, having learned with deep regret of the death of their esteemed and valuable colleague, Mr. George Taber, desire to give to that expression of regret the fullest publicity, and also request that the purport of this resolution may be embodied in the minutes of the Committee's proceedings.”

FRUIT COMMITTEE, MARCH 26, 1895.

P. CROWLEY, Esq., in the Chair, and seventeen members present.

Award Recommended:—

Cultural Commendation.

To Earl Percy, Syon House (gr. Mr. Wythes), for a bundle of Asparagus.

Other Exhibits.

Lord Wolverton, Iwerne Minster House, Blandford (gr. Mr. Patrick Davidson), sent a dish of good Tomatos.

H. Balderson, Esq., Hemel Hempstead, sent Onions, Ailsa Craig and Rousham Park, to show their keeping qualities.

FRUIT COMMITTEE, APRIL 9, 1895.

T. F. RIVERS, Esq., in the Chair, and eighteen members present.

Award Recommended:—

Silver Knightian Medal.

To Earl Percy, Syon House, Brentford (gr. Mr. Wythes), for a very comprehensive and complete collection of Vegetables fit for use, almost every kind being represented, the examples of Asparagus, Seakale, Leeks, Potatos, and Broccoli being exceptionally good.

Other Exhibits.

Earl Percy also exhibited Spinach Victoria, a large, fleshy-leaved, deep green variety, which it was requested should be tried at Chiswick.

Some fine examples of Strawberry, La Grosse Sucrée, also came from Syon.

Sir E. Loder, Bart., Leonardslee, Horsham, sent some good sound handsome Apples, named Burfield.

FRUIT COMMITTEE, APRIL 23, 1895.

T. F. RIVERS, Esq., in the Chair, and fourteen members present.

Awards Recommended :—*First Class Certificate.*

To Tomato, All the Year Round (votes, unanimous), from A. Pears, Esq., Spring Grove, Isleworth (gr. Mr. Farr). Fruits small, somewhat oblong in shape, resembling Chiswick Red, borne freely in great clusters. A good winter bearing variety.

Award of Merit.

To Sutton's Hearting Curled Kale (votes, unanimous), from Messrs. Sutton & Sons, Reading. Hearts full, close, of a deep green colour.

To Radish, Sutton's Earliest Frame (votes, unanimous), from Messrs. Sutton & Sons. Bulbs of a clear scarlet, solid, with a very small top; very early; an excellent sort.

Cultural Commendation.

To Earl Percy, Syon House (gr. Mr. Geo. Wythes), for Grape, Foster's Seedling (votes, unanimous).

To Earl Percy, for Potato, Sharpe's Victor (votes, unanimous). A good forcing variety.

To Earl Percy, for Seakale (votes, unanimous), grown in the open ground.

To A. Henderson, Esq., Buscot Park (gr. Mr. Meades), for Melon, The Countess (votes, unanimous),

To the Horticultural College, Swanley, for Strawberry, Sir Joseph Paxton, and Strawberry, Royal Sovereign (votes, unanimous). Royal Sovereign was recommended as a forcing variety.

Other Exhibits.

Messrs. Sutton also exhibited an extremely interesting and well-grown collection of nine varieties of Radishes, having small tops, which are suitable for forcing, and thirteen varieties, having larger tops, suitable for general cultivation. The whole exhibit was very highly commended.

Sir E. Loder, Bart., Leonardslee, Horsham, again exhibited

the Apple named Burfield, which it was proposed should be submitted in a cooked state when in condition.

Mr. B. S. Williams & Son, Upper Holloway, sent a seedling Bean which it was requested should be tried at Chiswick.

FRUIT COMMITTEE, MAY 14, 1895.

T. F. RIVERS, Esq., in the Chair, and nineteen members present.

Award Recommended:—

First Class Certificate.

To Strawberry, Leader (votes, unanimous), from Messrs. Laxton Brothers, Bedford. Fruit of large size, pale crimson; flesh firm, pale, of rich, sprightly flavour; excellent quality.

Cultural Commendation.

To Earl Percy, Syon House, for Peach, Amsden June (votes, unanimous). One of the very earliest Peaches.

Other Exhibits.

J. R. Morgan, Esq., Dover House, Roehampton (gr. Mr. McLeod), sent a fine bundle of Asparagus.

Mr. S. Mortimer, Swiss Nursery, Farnham, sent examples of Cucumber Marvel, a short, smooth, pale green variety, resembling the old Syon House.

Messrs. J. Veitch & Sons, Chelsea, sent Cucumber Allan's Favourite, a large, handsome variety, which received an Award of Merit in July, 1890.

Mr. J. Vert, Audley End, Saffron Walden, sent Cucumber Vert's Improved Favourite.

The Committee recommended that, if practicable, a trial of Cucumbers should be made at Chiswick next year.

From the Earl of Shrewsbury, Ingestre Hall, Stafford (gr. Mr. Gilman), came a new hybrid Melon of promise.

The Horticultural Travelling Structures Company, White Street, London, exhibited models and photos of movable houses &c. The Committee recommended that workable models of the structures be erected at Chiswick.

THE TEMPLE GARDENS.

FRUIT COMMITTEE, MAY 21, 1895.

Mr. GEORGE BUNYARD in the Chair, and twenty-nine members present.

Awards Recommended:—*Cultural Commendation.*

To Messrs. Sutton & Sons, Reading, for Tomato, Sutton's Best of All (votes, unanimous).

To Messrs. Sutton & Sons, for Tomato, Princess of Wales (votes, unanimous).

To Messrs. Sutton & Sons, for Seedling Pea Infant (votes, unanimous).

To Messrs. Sutton & Sons, for Climbing Bean, Tender and True (votes, unanimous).

Other Exhibits.

Thomas Statter, Esq., Stand Hall, Manchester, sent bunches of Black Hambro' and Foster's Seedling Grapes.

Messrs. Cutbush & Son, Highgate, sent examples of the new Grape, Lady Hutt, which was Certificated in December, 1890.

Mr. J. Friend, Godstone, sent six bunches of Black Hambro' and Foster's Seedling Grapes.

Mr. E. Trollope, Combe Bank, Reading, sent a bundle of Asparagus.

The Earl of Shrewsbury (gr. Mr. Gilman) sent Melon, Early May.

A. Pears, Esq., Isleworth, sent Beauty of Patshull Melon.

Special Awards:—*Gold Medal.*

To Messrs. T. Rivers & Son, Sawbridgeworth, for Nectarines in pots.

Silver Cup.

To Messrs. G. Bunyard & Co., The Old Nurseries, Maidstone, for Kentish Apples.

Silver Gilt Knightian Medal.

To the Right Hon. Earl Percy, Syon House, Brentford (gr. George Wythes), for Figs, Peaches, Grapes, Melons, vegetables.

To Mrs. Wingfield, Amptill House, Beds (gr. W. J. Empson), for Vegetables.

Silver Knightian Medal.

To L. J. Baker, Esq., Ottershaw Park, Chertsey, for Grapes.

To the Earl of Radnor, Longford Castle, Salisbury (gr. Mr. H. W. Ward), for Cucumbers &c.

Silver Floral Medal.

To Sir J. W. Pease, Bart., M.P., Hutton Hall, Guisborough (gr. J. McIndoe), for Melons, Nectarines, Peaches, Tomatos.

Silver Gilt Banksian Medal.

To C. H. Berners, Esq., Woolverston Park, Ipswich (gr. W. Messenger), for Black Grapes.

FRUIT COMMITTEE, JUNE 11, 1895.

T. F. RIVERS, Esq., in the Chair, and twelve members present.

Awards Recommended:—*Silver Knightian Medal.*

To Mr. S. Mortimer, Swiss Nursery, Farnham, Surrey, for a very beautiful collection of Tomatos and Cucumbers.

Bronze Medal.

To Earl Percy, Syon House, Brentford (gr. Mr. Wythes), for an extensive and excellent collection of vegetables, including the White Milan Turnip, Veitch's Early Longpod Bean, Carter's Cardinal Turnip, &c.

To A. J. Howard, Esq., Worton Hall, Isleworth (gr. Mr. Pentney), for a large and excellent collection of vegetables of good appearance and quality.

To Messrs. Laxton Brothers, Bedford, for a collection of their new seedling Strawberries Royal Sovereign, Leader, and Monarch, beautiful in appearance and of superior quality.

Award of Merit.

To Spinach Longstander (or Lente à monter of Vilmorin), (votes, unanimous), from Messrs. Carter & Co. A very fine variety, grown at Chiswick. The leaves large, pale green. Very late in running to seed.

To Tomato Corbett's Excelsior (votes, unanimous), from the Marquis of Normanby, Mulgrave Castle, Whitby (gr. Mr. Corbett), a variety tried at Chiswick in 1894, where it received × × ×.

Fruit of medium size, round, very solid, deep red, borne in great profusion.

To Melon *The Lady* (votes, unanimous), from Mr. Thomas, The Royal Gardens, Windsor. Fruit of medium size; skin pale; flesh pale, melting, juicy, and of excellent flavour.

Cultural Commendation.

To Messrs. Rothschild, Gunnersbury (gr. Mr. Hudson), for some excellent fruit of Lord Napier Nectarine (votes, unanimous).

To Lord Radnor, Longford Castle (gr. Mr. Ward), for good examples of Peas *Lightning*, *Telegraph*, and *William the First* (votes, unanimous).

To Thomas H. Staples, Esq., Margaret Street, Regent Street, for a bundle of very good *Asparagus* (votes, unanimous).

Other Exhibits.

From the Society's Gardens came good examples of *Royal Sovereign Strawberry*.

Mr. Collis, Bollo Lane, Chiswick, again submitted *Strawberry Collis's May Queen*.

Mr. Thomas, The Royal Gardens, Windsor, sent *Melon Pine-apple*, a variety of medium size.

Mr. J. Spencer, Goodrich Court, Hereford, sent *Melon Goodrich Seedling*, which proved over-ripe.

W. H. Evans, Esq., Forde Abbey, Chard, sent a dish of *Chelsea Gem Peas*.

Miss Alexander, Chislehurst (gr. Mr. Fickens), sent a beautiful-looking dish of *Potato Queen of the Earlies*, which was referred to Chiswick for trial.

Messrs. Malden Brothers, Cardington, Beds, sent a *Kale* of the *Buda* section, which was referred to Chiswick.

FRUIT COMMITTEE, JUNE 25, 1895.

Dr. HOGG in the Chair, and eleven members present.

Awards Recommended:—

Silver Banksian Medal.

To Lord Llangattock, The Hendre, Monmouth (gr. Mr. Coomber), for twelve *Queen Pine-apples*.

To Messrs. Fellowes & Ryder, Orpington, Kent, for twelve Duke of York Tomatos in pots, bearing fine large fruit.

First Class Certificate.

To Strawberry Monarch (votes, unanimous), from Laxton Bros., Bedford. Fruit large, cockscombed, fine clear colour; the flesh firm and of excellent quality. A great cropper and decided acquisition.

Award of Merit.

To Melon Bishop's Favourite (votes, unanimous), from R. Burrell, Esq., Westley Hall, Bury St. Edmunds (gr. Mr. Bishop).

To Pea Carter's Daisy (votes, unanimous), from Earl Percy, Syon House. A dwarf free-bearing variety of good quality.

Cultural Commendation.

To the Marquis of Salisbury, Hatfield (gr. Mr. Norman), for twelve large Hatfield Scarlet Melons (votes, unanimous).

To the Marquis of Exeter, Burghley, Stamford (gr. Mr. R. Gilbert), for a magnificent dish of Strawberry Royal Sovereign (votes, unanimous).

To G. F. Wilson, Esq., Weybridge Heath, for very fine examples of Strawberry Latest of All (votes, unanimous).

To A. H. Smee, Esq., The Grange, Carshalton (gr. Mr. Cummins), for examples of Scarlet Runner Ne Plus Ultra, grown in pots for an early supply (votes, unanimous).

To Lord Radnor, Longford Castle (gr. Mr. Ward), for nice examples of Peas Daisy, Telephone, and Early Favourite (votes, unanimous).

Other Exhibits.

Ten Melons were exhibited for Certificates, viz. :—

1. Eclipse, from Mr. Mortimer, Farnham, Surrey, a variety which received an Award of Merit in 1894.

2. The Earl's Favourite, from the Earl of Radnor (gr. Mr. Ward).

3. New Seedling, from Baron Howard, Glossop Hall, Derby (gr. Mr. Ashton).

4. The Duchess, from Mr. Thomas, The Royal Gardens, Windsor. Received an Award of Merit in 1894.

5. Lord Llangattock, from Lord Llangattock, The Hendre, Monmouth (gr. Mr. Coomber).

6. Wightwick Manor Favourite, from Mr. G. A. Bishop, Wightwick Manor, Wolverhampton.

7. Red Rice Perfection, from H. A. Simmonds, Esq., Red Rice, Andover (gr. Mr. Brooks).

8. Johnson's Seedling, from H. Gilliatt, Esq., Driffield House, Stoke Poges (gr. Mr. E. Johnson).

9. Hatfield Scarlet, from the Marquis of Salisbury, Hatfield House (gr. Mr. Norman).

10. Champion, from Earl Percy, Syon House (gr. Mr. Wythes).

Messrs. T. Rivers & Son, Sawbridgeworth, sent very fine Early Rivers Nectarine of excellent quality.

Messrs. Laxton Bros. exhibited a collection of their new seedling Strawberries.

Mr. Collis again submitted examples of Collis's May Queen Strawberry.

The Marquis of Normanby, Mulgrave Castle, Whitby, again submitted Tomato Corbett's Excelsior, which received an Award of Merit at the previous meeting.

Mr. Thomas, The Royal Gardens, Windsor, exhibited a very handsome Cucumber named Frogmore Gem.

Earl Percy (gr. Mr. Wythes) sent a Cauliflower named Veitch's Early Forcing, closely resembling the Dwarf Erfurt; also Peas Symmetry, Stratagem, &c.

Messrs. Carter & Co., High Holborn, submitted examples of Longstander Spinach, and of a variety named The Carter. These seemed to closely resemble each other. It was recommended that a trial of Spinach be made at Chiswick next year.

Mr. Alexander again submitted examples of Potatos Queen of the Earlies and Laxton's Early for comparison, the former proving much the earlier and quite distinct.

Messrs. J. Veitch & Sons, Chelsea, sent a large collection of Peas and Cabbages.

FLORAL COMMITTEE.

JANUARY 15, 1895.

W. MARSHALL, Esq., in the Chair, and twenty-one members present.

Awards Recommended:—

Silver Flora Medal.

To Messrs. Sutton & Sons, Reading, for an extensive and exceptionally well-flowered group of Primulas and Cyclamen in great variety.

First Class Certificate.

To *Lachenalia quadricolor maculata* (votes, 14 for), from F. W. Moore, Esq., Botanic Garden, Glasnevin. A very distinct variety with large flowers; colour, orange and greenish yellow, purple-crimson at tips. Figured in the *Botanical Magazine* in 1808, t. 1097.

To *Rhododendron ponticum foliis purpureis* (votes, unanimous), from Messrs. W. Paul & Son, Waltham Cross. A dwarf-growing variety of bushy habit, with rich, bronzy purple foliage. Distinct and handsome.

Award of Merit.

To *Chrysanthemum L. Canning* (votes, unanimous), from Mr. Owen Thomas, Royal Gardens, Frogmore. A very fine decorative variety; flowers pure white, borne in great profusion.

To *Rose Mrs. Pierpont Morgan* (votes, 15 for), from Mr. J. N. May, New Jersey, U.S.A. A sport from Madame Cusin. Flowers pretty rose-pink. The specimens exhibited had been cut twenty days.

To *Primula sinensis Giant Rosy Queen* (votes, 10 for, 4 against), from Messrs. Sutton & Sons, Reading. A distinct variety, of compact habit and large, soft, rose-coloured flowers.

To *Cyclamen*, strain of (votes, unanimous), from Messrs. Sutton & Sons. A very fine strain with large, well-formed, and richly coloured flowers.

To *Chrysanthemum Jeanette Sheaham* (as a late-flowering, decorative variety), from Mr. D. Sheaham, Wimbledon. A sport from Princess Blanche. Flowers sulphur-yellow, deeper centre. A very distinct variety.

Other Exhibits.

F. W. Moore, Esq., Glasnevin, sent specimens of *Hippeastrums* and *Dermatobotrys Saundersii*. The latter is figured in the *Botanical Magazine*, t. 7369.

Mr. H. Howell, Hammersmith, exhibited *Pteris tremula* Howellii.

From Messrs. Collins Bros. & Gabriel, 39 Waterloo Road, S.E., came a yellow-flowered Carnation named Jane Collins.

FLORAL COMMITTEE, FEBRUARY 12, 1895.

W. MARSHALL, Esq., in the Chair, and twenty-four members present.

Award Recommended:—*Award of Merit.*

To *Anthurium*, Perfection (votes, 14 for), from Sir Trevor Lawrence, Bart., Burford Lodge, Dorking (gr. Mr. Bain). Spathe large, colour bright scarlet.

Other Exhibits.

Sir Trevor Lawrence, Bart., also exhibited very well-flowered examples of *Thyrsacanthus rutilans*.

Sir David Evans, Ewell Grove (gr. Mr. J. Eninton), sent a single-flowered *Primula* named David Evans.

From the Rev. T. H. Marsh, Cawston Rectory, Norwich, came specimens of *Lachenalia* Cawston Gem, being the result of a cross between *L. Nelsoni* and *L. quadricolor superba*.

Mr. J. E. Burton, Cambridge House, Twickenham, staged a small group of a *Primula* named Bouquet.

Messrs. J. Veitch & Sons, Chelsea, sent a beautiful collection of *Rhododendrons*.

FLORAL COMMITTEE, MARCH 12, 1895.

W. MARSHALL, Esq., in the Chair, and twenty-nine members present.

Awards Recommended:—*Silver Gilt Flora Medal.*

To Messrs. W. Paul & Son, Waltham Cross, for an extensive

group of Camellias, noteworthy varieties being Madame Ambrose Verschaffelt, Princess Charlotte, Marchioness of Exeter, and Reine des Fleurs. Also a quantity of the new winter-blooming and bedding China Rose named Duke of York, and a few plants of the pretty Clematis indivisa lobata, covered with its beautiful snow-white flowers.

Silver Banksian Medal.

To Messrs. J. Veitch & Sons, Chelsea, for a magnificent group of Iris reticulata Krelagei. The flowers large and of good colour.

To Messrs. J. Peed & Sons, Norwood Road, S.E., for a group of flowering and foliage plants, including Ericas, Staphylleas, Primulas, Begonias, Tulips, and Ferns.

To Messrs. Barr & Son, Covent Garden, for a group of hardy cut flowers, composed chiefly of Narcissi, Iris, a few pots of Galanthus Elwesi, and some well-flowered Spiræas.

Award of Merit.

To Violet, Princess Beatrice (votes, 19 for, 3 against), from Mr. G. Nobb, Royal Gardens, Osborne. A magnificent variety, with large sweetly scented flowers, carried well above the foliage; colour very bright.

To Ghent Azalea, John Weathers (votes, unanimous), from Earl Cowper, Panshanger, Hertford (gr. Mr. Fitt). A very handsome and free-blooming variety, with sweetly scented flowers; colour salmon-rose, the upper petals being of a rich yellow flushed with rose.

To Eucharis Stevensii (votes, 10 for, 7 against), from the Duke of Sutherland, Trentham (gr. Mr. P. Blair). Flowers of medium size, pure white, borne in great profusion.

To Hippeastrum, Mrs. Montefiore (votes, unanimous), from Messrs. J. Veitch & Sons, Chelsea. Flowers large, white, streaked with crimson and scarlet, greenish yellow centre.

To Hippeastrum Prince Edward (votes, 21 for), from Messrs. J. Veitch & Sons. Flowers of medium size, colour intense crimson, very fine.

Cultural Commendation.

To Lady Bowmann, Joldwinds, Dorking (gr. Mr. Cornish), for a very fine example of Shortia galacifolia, carrying upwards of fifty flowers.

Other Exhibits.

F. W. Moore, Esq., Botanic Garden, Glasnevin, sent specimens of *Aristolochia Westlandi*, *Strelitzia reginæ*, and *Rhododendron barbatum*.

Leopold de Rothschild, Esq., Ascott, Leighton Buzzard (gr. Mr. Jennings), sent a bunch of Violet *Victoria*. This beautiful variety received a First Class Certificate in 1887.

F. M. Burton, Esq., Highfield, Gainsborough, exhibited a half-hardy Cape bulb named *Melanthium junceum*. Figured in the *Bot. Mag.* 1803, t. 558.

Earl Cowper, Panshanger, Hertford, staged a vase of very fine blooms of *Richardia æthiopica* arranged with their own foliage.

From H. Briscoe-Ironside, Esq., Burgess Hill, Sussex, came a yellow-flowered *Chrysanthemum* named *Stresa*, which the Committee asked to see again.

From Messrs. Paul & Son, Cheshunt, came a dwarf *Canna* named *Dr. Masters*, having deep yellow flowers beautifully feathered with crimson. The Committee also asked to see this again.

Mr. Bolas, Wirksworth, sent a small group of cut *Narcissi*, arranged with *Ivy* and *Mahonia* foliage, suitable for table decoration.

Messrs. J. Veitch & Sons, Chelsea, staged a very choice collection of *Hippeastrums*.

FLORAL COMMITTEE, MARCH 26, 1895.

J. FRASER, Esq., in the Chair, and sixteen members present.

Awards Recommended:—*Silver Gilt Flora Medal.*

To Messrs. W. Paul & Son, Waltham Cross, for an extensive group of well-grown *Camellias*, the following varieties being particularly noteworthy: *Princess Charlotte*, pure white; *C. H. Hovey*, red; *L'Avenir*, pink; and a new variety, named *The Duchess*.

Silver Flora Medal.

To Mr. T. S. Ware, Tottenham, for a beautiful group of hardy flowers, containing excellent examples of *Saxifrages*, *Scillas*, *Narcissus*, *Irises*, *Fritillarias*, and *Hepaticas*.

To Messrs. J. James & Son, Farnham Royal, for an exceedingly well-grown group of Cinerarias, the plants of dwarf habit with deep green, healthy foliage, with flowers of large size and good form, representing many shades of colour.

Silver Banksian Medal.

To Earl Cowper, Panshanger, Hertford (gr. Mr. Fitt), for a group of *Beaumontia grandiflora*. Also specimens of *Azaleas* and *Clerodendron splendens*.

To Earl Percy, Syon House, Brentford (gr. Mr. Wythes), for a group of plants consisting of *Hyacinths*, *Tulips*, *Acacias*, *Anthuriums*, *Ferns*, and *Palms*.

To Messrs. J. Peed & Sons, Norwood Road, S.E., for a group of *Caladiums* in variety.

To Messrs. Barr & Son, Covent Garden, for a group of hardy flowers, amongst which were *Narcissus*, *Anemone fulgens*, *Chionodoxas*, *Snowdrops*, and *Iris reticulata*.

To Messrs. B. S. Williams & Son, Upper Holloway, for a well-flowered group of *Clivias* in variety. Also a few fine specimens of *Boronias*, *Camellias*, and small *Orange trees* in pots, carrying a quantity of large, handsome fruits.

Bronze Banksian Medal.

To Mr. H. B. May, Upper Edmonton, for a small group of *Clematis*.

Award of Merit.

To *Streptocarpus* × *gratus* (votes, 6 for, 2 against), from Messrs. J. Veitch & Sons, Chelsea. A very free-flowering variety, bearing rich rosy purple flowers.

To *Hippeastrum Gorgeous* (votes, unanimous), from Messrs. J. Veitch & Sons. A magnificent variety, with medium-sized, well-formed, deep crimson flowers.

To *Mignonette Bush Hill White* (votes, 9 for, 3 against), from Messrs. Hugh Low & Co., Clapton. A distinct and fragrant variety. Flowers white, borne on slender spikes.

To *Clivia Model* (votes, 7 for), from Messrs. B. S. Williams & Son. A strong grower bearing very fine trusses of rich orange-coloured flowers.

Other Exhibits.

Lord Foley, Ruxley Lodge, Esher (gr. Mr. Miller), sent a beautiful tray of *Neapolitan Violets*.

FLORAL COMMITTEE, APRIL 9, 1895.

J. FRASER, Esq., in the Chair, and twenty-one members present.

Awards Recommended :—

Silver Gilt Flora Medal.

To Mr. F. Cant, Colchester, for an exquisite collection of cut Roses, varieties of exceptional merit being Madame Hoste, Bridesmaid, Ernest Metz, Madame de Watteville, Niphetos, and Anna Olivier.

Silver Flora Medal.

To Sir Trevor Lawrence, Bart., Burford Lodge, Dorking (gr. Mr. Bain), for an interesting and exceptionally well-flowered collection of named and seedling Anthuriums, the varieties named Rothschildianum maximum, Marie Thérèse, Burfordense, and Lawrenceanum being particularly noteworthy.

To J. T. Bennett-Poë, Esq., Holmwood, Cheshunt, for a well-flowered group of Streptosolen Jamesoni, together with some nicely flowered specimens of Cœlogyne cristata and Arums.

To Mr. G. Mount, Canterbury, for a group of cut Roses, amongst which were very fine examples of Catherine Mermet, The Bride, Souvenir d'un Ami, and Maréchal Niel.

To Messrs. J. Laing & Sons, Forest Hill, for a very bright group of plants, composed of Palms, Dracænas, Crotons, Clivias, Orchids, Begonias, Boronias, Caladiums, and Anthuriums.

To Mr. T. S. Ware, Tottenham, for a very attractive group of hardy flowers, amongst which were excellent specimens of Saxifraga Boydii, Hepaticas, Narcissi, Chionodoxas, Trilliums, and Primulas in variety.

Silver Banksian Medal.

To Earl Cowper, Panshanger (gr. Mr. Fitt), for a grand display of Beaumontia grandiflora, together with Glonera jasminiflora, Habrothamnus scabra, and a large flower-spike of Cordyline australis.

To Messrs. Paul & Son, Cheshunt, for a collection of plants, amongst them being Cannas, Hippeastrums, Saxifrages, Hepaticas, Primulas, and Daphnes.

To Messrs. J. Peed & Sons, Norwood Road, S.E., for a group of small Dracænas suitable for table decoration, conspicuous

varieties being Lord Wolseley, *Terminalis alba*, Madame F. Bergmann, and Superba.

To Messrs. B. S. Williams & Son, Upper Holloway, for a very choice collection of *Clivias* and *Hippeastrums* in great variety.

To Messrs. Barr & Son, Covent Garden, for a group of hardy flowers, consisting of a very fine collection of Daffodils, Primulas, Hellebores, Scillas, *Chionodoxas*, and *Fritillarias*.

Bronze Banksian Medal.

To Mrs. Crawford, Reigate, for a group of Swanley White and Marie Louise Violets.

First Class Certificate.

To *Tacca cristata* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford Lodge, Dorking. Flowers borne in umbels, in dense clusters, having numerous thread-like, pale-purple bracts hanging loosely amongst them. Leaves oblong, deep green, with long purple petioles. A curious Malayan plant. (*Bot. Mag.* t. 4589.)

Award of Merit.

To *Anthurium compactum* (votes, unanimous), from Sir Trevor Lawrence, Bart. Spathe of medium size, creamy white, spotted crimson and scarlet.

To *Hippeastrum Chimera* (votes, unanimous), from Messrs. J. Veitch & Sons, Chelsea. Flowers well formed, white, marked with crimson.

To *Hippeastrum Doris* (votes, 7 for, 5 against), from Messrs. J. Veitch and Sons. Flowers rich crimson. Very handsome.

To *Saxifraga Boydii alba* (votes, unanimous), from Messrs. Paul & Son, Cheshunt. A very pretty variety, with pure white flowers borne very freely on scapes about 2 inches high. A valuable plant for the rockery.

To *Clivia* Rt. Hon. J. Chamberlain (votes, 5 for, 4 against), from Messrs. J. Laing & Sons. A free-flowering variety, bearing very large trusses of orange-scarlet flowers. The throat of a rich yellow.

Other Exhibits.

F. Carr-Gomm, Esq., Farnham Chase, Slough, sent very fine specimens of *Richardia africana*.

“St. Brigid,” Salerno, Killiney, Dublin, exhibited seedling Daffodils.

The Rev. G. H. Engleheart, Andover, also exhibited seedling Daffodils.

F. W. Moore, Esq., Botanic Garden, Glasnevin, sent specimens of *Daphne Blagayana* and *Macleania insignis*.

FLORAL COMMITTEE, APRIL 23, 1895.

W. MARSHALL, Esq., in the Chair, and twenty-six members present.

Awards Recommended :—

Silver Gilt Flora Medal.

To Mr. W. Rumsey, Waltham Cross, for an extensive group of Roses in exceptionally fine condition. Particularly good were The Bride, La France, Niphetos, General Jacqueminot, and Maréchal Niel.

Silver Flora Medal.

To Messrs. Paul & Son, Cheshunt, for a group of dwarf Cannas and Roses.

To Messrs. Barr & Son, Covent Garden, for a very large group of hardy flowers, chiefly Narcissi, Tulips, Muscarias, and Fritillarias.

To Mr. H. B. May, Upper Edmonton, for a group of small Palms, Dracænas, Ferns, &c.

To Mr. Mount, Canterbury, for a large group of Roses.

To Mr. T. S. Ware, Tottenham, for a group of Daffodils, Irises, Gladioli, and Freesias.

To the Guildford Hardy Plant Company, Millmead, Guildford, for an extremely interesting group of Primulas, Alpines, and other miscellaneous hardy flowers.

To Mr. F. Cant, Colchester, for a splendid collection of Roses, varieties of exceptional merit being Madame de Watteville, Ethel Brownlow, Maggie Dickson, Mrs. J. Laing, and Niphetos.

Silver Banksian Medal.

To Rev. G. H. Engleheart, Appleshaw, Andover, for a very

choice group of Daffodils, comprising several unnamed seedlings and many new varieties of great excellence. See page 11.

To J. C. Tasker, Esq., Middleton Hall, Brentwood, Essex, for a group of pot Roses, edged with *Azalea mollis* and *Adiantums*.

To Mr. J. Walker, High Street, Thame, for a group of Roses.

Bronze Flora Medal.

To Messrs. B. S. Williams & Son, Upper Holloway, for a group of *Hippeastrums*, with *Leschenaultia biloba major*.

To Messrs. G. Jackman & Son, Woking, for a group of hardy plants—*Narcissi*, *Primulas*, *Fritillarias*, and *Roses*.

Bronze Banksian Medal.

To Sir Trevor Lawrence, Bart., Burford Lodge, Dorking (gr. Mr. W. Bain), for a charming basket of *Polyanthus*, *Primulas*, and *Daffodils*.

To Messrs. de Rothschild, Gunnersbury Park, Acton (gr. Mr. Reynolds), for a very fine group of *Primula obconica*.

Award of Merit.

To *Bougainvillæa speciosa superba* (votes, 15 for), from J. Wilson Noble, Esq., Park Place, Henley-on-Thames (gr. Mr. G. Stanton). Similar to the type, but of a deeper shade of colour.

To *Polyanthus Hermand* (votes, 14 for), from G. F. Wilson, Esq., Weybridge. Flowers large, colour deep violet blue.

To *Pteris cretica Wimsetti* (votes, 13 for), from Mr. H. B. May, Edmonton. A very handsome crested form, of tall habit, very distinct.

To *Tropæolum Coolgardie* (votes, 9 for, 2 against), from Mr. H. B. May. A very free-flowering variety; colour bright yellow.

To H. P. Rose Marchioness of Londonderry (votes, 17 for), from Messrs. Paul & Son, Cheshunt. A very large and handsome variety, of good form; colour creamy white.

To Tea Rose *Bridesmaid* (votes, 9 for, 3 against), from Messrs. Paul & Son. Flowers of good substance; colour soft salmon-pink, sweetly scented.

Cultural Commendation.

To the Dowager Lady Bowmann, Joldwinds, Dorking (gr. Mr. Cornish), for very fine specimens of *Epigæa repens*, the New

England "Ground Laurel" or "Mayflower," with white flowers tinged with red.



FIG. 8. — ALDBOROUGH ANEMONE (*A. FULGENS*). (*Journal of Horticulture*.)

Other Exhibits.

The Director, Royal Gardens, Kew, sent a very interesting collection of Primulas; also *Amherstia nobilis* and a very fine specimen of *Cineraria cruenta*.

Lord Suffield, Gunton Park, Norwich (gr. Mr. Allan), sent Aldborough Anemones (Fig. 9) and Hose-in-Hose Polyanthus.

From T. McMeekin, Esq., Falkland Park, South Norwood (gr. Mr. Wright), came two Rhododendrons named Chrissie and Moonlight.

Miss Mason, Morton Hall, Notts, sent a very pretty exhibit of hardy flowers.

The Rev. W. Wilks, M.A., Shirley Vicarage, Croydon, staged a very fine *Narcissus* named Cressida.

Mrs. Robb, Golden Gate, Liphook, sent specimens of *Salix lanata*, Primulas, and Tulips.

Mr. J. Douglas, Great Bookham, Surrey, sent a double crimson Primrose.

From Messrs. W. Paul & Son, Waltham Cross, came a group of Evergreens which had passed uninjured through the late severe winter.

Mrs. Ramsden exhibited *Pieris (Andromeda) formosa*, which received an Award of Merit in May 1894 when exhibited from the Glasnevin Botanic Gardens.

Prizes.

Class 3. -Collection of Daffodils (*Polyanthus* excluded), open. First Prize (Silver Cup, presented to the Society by Mr. Barr), to Rev. S. Eugene Bourne, Dunston Vicarage, Lincoln. Second Prize (Barr small Silver Medal), to J. T. Bennett-Poë, Esq., Holmwood, Cheshunt. Third Prize (Barr Bronze Medal), to M. Cammell, Esq., Billingshurst, Sussex. Fourth Prize (Barr small Bronze Medal), to W. J. Grant, Esq., Bassaleg, Newport.

FLORAL COMMITTEE, MAY 14, 1895.

W. MARSHALL, Esq., in the Chair, and twenty-two members present.

Awards Recommended:—

Silver Flora Medal.

To Mr. T. S. Ware, Tottenham, for an extensive display of

hardy flowers, amongst which were Gladioli, Tree Pæonies, Tulips, Irises, Saxifrages, Cyripediums, and Spiræas.

To Messrs. J. Veitch & Sons, Chelsea, for a very large group of Tulips, particularly noteworthy varieties being Fulgens, deep crimson ; Bouton d'Or, golden yellow ; Graaf Buren, Lutea major, Queen of the Reds, and Picotee.

Silver Gilt Banksian Medal.

To Mr. G. Mount, Canterbury, for a group of cut Roses in great variety, and in grand condition, conspicuous varieties being General Jacqueminot, Mrs. J. Laing, La France, Fisher Holmes, and Niphetos.

To Messrs. J. Laing & Sons, Forest Hill, for a very large group of well-grown Gloxinias, arranged with Ferns, Palms, and dwarf Caladiums.

To Messrs. Barr & Son, Covent Garden, for a very large group of Tulips in immense variety ; also Narcissi, Irises, Phloxes, Aubrietias, Pæonies, and Primulas.

Silver Banksian Medal.

To Messrs. J. Peed & Sons, Norwood Road, S.E., for a group of Palms, Dracænas, Begonias, Caladiums, Anthuriums, &c.

Bronze Banksian Medal.

To Messrs. Paul & Son, Cheshunt, for a group of plants, amongst them being Lilacs, Hippeastrums, Rhododendrons, a small collection of dwarf Cannas, and some pretty Alpines.

To Messrs. J. Cheal & Sons, Crawley, for a group of hardy shrubs—Acer, Philadelphus, Pyrus, Spiræa, and Cerasus.

Award of Merit.

To *Sambucus racemosus plumosus fol. aureus* (votes, 6 for, 4 against), from Messrs. K. Wezelenburg & Son, Hazerswoude, near Leiden, Holland. Foliage soft yellow, and very deeply cut.

To *Tulipa elegans alba* (votes, 14 for, 1 against), from Messrs. Barr & Son. White edged with pink.

To Lilac *La Tour d'Auvergne* (votes, 10 for, 3 against), from Messrs. Paul & Son. A sweet-scented, semi-double flowered variety, bearing very fine trusses of rich reddish lilac-coloured flowers.

Other Exhibits.

J. P. Morgan, Esq., Dover House, Roehampton (gr. Mr. McLeod), sent a very large and well-flowered plant of *Medinilla magnifica*.

G. F. Wilson, Esq., F.R.S., Weybridge, exhibited specimens of *Rheum Moorcroftianum*, a very rare, pretty, and dwarf Rhubarb under 2 feet high.

Messrs. de Rothschild, Gunnersbury House, Acton (gr. Mr. Hudson), sent specimens of *Cercis siliquastrum* and the new Rose Turner's Crimson Rambler.

R. Maitland, Esq., Comrie Castle, Dunfermline (gr. Mr. McIvor), staged a group of *Auriculas* and *Polyanthus*.

Messrs. Koll & Sonntag, Hilden, Dusseldorf, sent *Trollius caucasicus* Golden Gate and *Lychnis flos-cuculi alba fl. pl.*

Messrs. W. Paul & Son, Waltham Cross, sent Rose Empress Alexander of Russia. The Committee asked to see it later in the season.

Messrs. Saltmarsh & Son, Chelmsford, exhibited *Syringa vulgaris ruberrima*.

The Horticultural Travelling Structures Co., Ltd., White Street, London, exhibited photographs and models of their new travelling structures.

Prizes.

Class 3.—Collection of Daffodils (*Polyanthus* excluded). Open. First Prize (Barr Small Silver Medal), to K. Maitland, Esq., Comrie Castle, Dunfermline. Second Prize (Barr Bronze Medal), to C. J. Backhouse, Esq., St. John's, Wolsingham, Darlington.

Class 4.—The Barr Silver Gilt Medal for the best English-raised Seedling Daffodil shown during the season of 1895 was won by the Rev. G. H. Engleheart, Appleshaw, Andover, with Daffodil Ellen Willmott.

Class 5.—Collection of English Amateur Tulips. Amateurs. First Prize (Barr Silver Medal), to J. T. Bennett-Poë, Esq., Holmwood, Cheshunt.

TEMPLE SHOW.

FLORAL COMMITTEE, MAY 21, 1895.

W. MARSHALL, Esq., in the Chair, and twenty-one members present.

Awards Recommended:—*First Class Certificate.*

To *Incarvillea Delavayii* (votes, unanimous), from Sir Trevor



FIG. 9.—*INCARVILLEA DELAVAYII*. (*Journal of Horticulture*.)

Lawrence, Bart., Burford Lodge, Dorking. A pretty and distinct hardy perennial from China. Flowers bright pink; throat yellow streaked with pink. (Fig. 9.)

To *Dracæna Godseffiana* (votes, 12 for), from Messrs. F. Sander & Co., St. Albans. Plant of a peculiar Bamboo-like growth, of a slender branching and bushy habit, with bright green leaves, blotched and spotted with creamy white.

Award of Merit.

To *Caladium Henry Irving* (votes, unanimous), from Messrs. J. Veitch & Sons, Chelsea. Leaves of medium size, creamy white, with a deep bordering of bright green; veins very prominent; distinct and handsome.

To *Caladium Lord Derby* (votes, 9 for, 3 against), from Messrs. J. Veitch & Sons. Leaves bright pink, with prominent green veins.

To *Caladium Rose Laing* (votes, 11 for), from Messrs. J. Peed & Son, Norwood Road, S.E. Leaves very large, creamy white, suffused with pink, edged with pale green.

To *Begonia Samuel Pope* (votes, 10 for), from Mr. T. S. Ware, Tottenham. Flowers large, pale white, suffused with pink and beautifully margined with rose.

To *Begonia White Camellia* (votes, unanimous), from Mr. T. S. Ware. Flowers white, tinged with green in the centre.

To *Pelargonium Duchess of York* (votes, 13 for), from Mr. J. Prewett, Hammersmith. A very dwarf and showy variety of the tricolor section.

To *Phyllocactus Excellent* (votes, unanimous), from Messrs. J. Veitch & Sons. Flowers very rich orange-scarlet margined with rosy pink.

To *Begonia Lady Annesley* (votes, unanimous), from Messrs. F. Sander & Co. A pretty ornamental foliaged *Begonia*; leaves of a beautiful silvery grey, blotched with deep crimson in the centre, and margined with deep bronzy green.

To *Begonia Rex Sander's Masterpiece* (votes, unanimous), from Messrs. F. Sander & Co. A handsome variety, of dwarf habit; foliage rich brownish crimson, margined with green.

To *Clematis Duchess of York* (votes, 9 for, 3 against), from Messrs. G. Jackman & Son, Woking. Flowers small; colour delicate pink.

To *Sibthorpia europæa aurea* (votes, 13 for, 1 against), from Messrs. J. Backhouse & Son, York. A very pretty golden-yellow form.

To Gloxinia Prince of Wales (votes, 12 for), from Messrs. H. Cannell & Sons, Swanley. Flowers rich crimson-scarlet; throat deep velvety crimson.

To Tree Pæony Lord Iveagh (votes, 12 for), from Messrs. Kelway & Son, Langport. Flowers very large, semi-double; colour rich rosy red.

Special Awards.

Silver Cups (in order of merit).

To Messrs. J. Veitch & Sons, King's Road, Chelsea, for Streptocarpus, Phyllocacti, Gloxinias, trees and shrubs, Caladiums, new and rare Ferns, cut flowers, &c.

To Messrs. Paul & Son, Cheshunt, for pot Roses, Cannas, Alpine plants, &c.

To Messrs. C. Turner & Son, Slough, for Roses, Pelargoniums, Azaleas.

To Messrs. Sutton & Sons, Reading, for Saintpaulia ionantha, Gloxinias, Begonias, Lilies, Tomatos, Cucumbers, &c.

To Messrs. J. Backhouse & Son, York, for filmy Ferns, Alpine and Herbaceous plants.

To Messrs. Richard Smith & Co., St. John's, Worcester, for specimen Clematis.

To Mr. William Icton, Putney Park Lane, Roehampton, S.W., for Palms, Caladiums.

To Messrs. Wills & Segar, Onslow Crescent, South Kensington, for decorative Palms.

To Pantia Ralli, Esq., Ashstead Park, Epsom (gr. G. Hunt), for Caladiums.

To Messrs. J. James & Son, Woodside, Farnham Royal, Slough, for Calceolarias.

To Messrs. H. Low & Co., Clapton Nursery, London, E., and Bush Hill Park, Enfield, for Orchids, Caladiums, and choice stove plants, Ericas and greenhouse plants.

To Messrs. Perkins & Sons, Coventry, for bouquets, wreaths, floral designs.

Silver Gilt Floral Medal.

To Messrs. W. Balchin & Sons, Hassocks Nurseries, Sussex, for Leschenaultias, Ericas, Palms, Boronias, Coprosmas.

To Messrs. P. Barr & Son, Covent Garden, London, for cut flowers.

Silver Gilt Flora Medal.

To J. T. Bennett-Poë, Esq., Homewood, Cheshunt, for *Streptosolen Jamesoni*.

To Messrs. W. & J. Birkenhead, Sale, Manchester, for Stove, Greenhouse, Hardy, Exotic, and British Ferns.

To Messrs. H. Cannell & Sons, Swanley, Kent, for Begonias, Gloxinias.

To Messrs. James Carter & Co., 237 High Holborn, for cut flowers.

To Messrs. W. Fromow & Sons, Chiswick, for Japanese Maples.

To Messrs. Geo. Jackman & Son, Woking, for pot Roses.

To Messrs. J. Kalway & Son, Langport, Somerset, for Pæonies, Irises, Hardy Flowers, &c.

To Messrs. William Paul & Son, Waltham Cross, for Roses, cut Rhododendrons, Lilacs.

To Messrs. John Peed & Sons, Roupell Park Nurseries, Norwood Road, S.E., for Caladiums.

To Leopold de Rothschild, Esq., Ascott, Leighton Buzzard (gr. J. Jennings), for Carnations.

To Mr. T. S. Ware, Hale Farm Nurseries, Tottenham, for Begonias, Hardy Herbaceous Plants, and cut flowers.

To Messrs. John Waterer & Son, Bagshot, Surrey, for Acers and Rhododendrons.

Silver Flora Medal.

To Mr. L. H. Calcutt, Fairholt Road, Stoke Newington, N., for table decorations.

To Messrs. Chard & Co., for cut flowers.

To Messrs. W. Cutbush & Son, Highgate Nurseries, London, N. for Azaleas and cut flowers.

To Messrs. Dobbie & Co., Rothesay, N.B., for Violas.

To Mr. H. J. Jones, Ryecroft, Lewisham, for Pelargoniums.

To Mr. B. Ladhams, Shirley, Southampton, for cut flowers.

To Mr. H. B. May, Dyson's Lane Nurseries, Upper Edmon-
ton, for Ferns.

To Mr. G. Mount, Canterbury, for cut Roses.

To Mr. W. Rumsey, Joynings Nurseries, Waltham Cross, for pot Roses.

To the Hon. W. F. D. Smith, M.P., Greenlands, Henley-on-Thames (gr. H. Perkins), for *Hippeastrums* (*Amaryllis*).

Silver Banksian Medal.

To Mr. John R. Box, Derby Road, Croydon, for cut flowers.

To Messrs. J. Cheal & Sons, Crawley, Sussex, for cut flowers.

To the Horticultural College, Swanley (Principal F. G. Powell), for table decorations.

To Mr. M. Pritchard, Riverslea Nursery, Christchurch, Hants, for cut flowers.

To Messrs. Phelps & Co., Queen Street, Cardiff, for bridal bouquets.

To Mr. S. Pye, Catterall, Garstang, Lancashire, for Pansies and Violas.

To Messrs. Wallace & Co., Colchester, for Calochorti, Irises, &c.

Other Exhibits.

Mrs. Wingfield, Ampthill House, Ampthill (gr. Mr. Empson), sent *Dracæna australis variegata* and *D. Doucetti*.

From J. T. Bennett-Poë, Esq., Holmwood, Cheshunt, came a double-flowered *Polyanthus* named Cloth of Gold and *Nerium Oleander* Blush Beauty.

J. B. Karlake, Esq., White Knights, Reading, sent *Adiantum Karlakei*.

The Executors of the late Dr. Wood, The Priory, Roehampton (gr. Mr. Campbell), sent some very well-flowered examples of *Clerodendron Priori*.

Mr. W. J. Godfrey, Exmouth, exhibited *Pelargonium* Glory of the West.

Messrs. Collins Bros. & Gabriel, 39 Waterloo Road, S.E., sent a yellow-flowered *Carnation* named Jane Collins.

Mr. W. Joy, Hill Lane, Southampton, exhibited *Pelargonium* Ada Joy.

 FLORAL COMMITTEE, JUNE 11, 1895.

W. MARSHALL, Esq., in the Chair, and twenty-four members present.

Awards Recommended:—*Silver Floral Medal.*

To Messrs. Kelway & Son, Langport, Somerset, for a very

large group of single and double Pæonies, Pyrethrums, and Delphiniums in great variety.

To Mr. Mount, Canterbury, for an excellent collection of cut Roses, varieties of exceptional merit being A. K. Williams, Captain Hayward, Anna Olivier, and Mdme. Gabriel Luizet.

To Mr. Prince, Oxford, for an equally fine display of cut Roses, amongst which were excellent specimens of Princess of Wales, Maréchal Niel, Clara Watson, and The Bride.

To Messrs. Barr & Son, Covent Garden, for a group of Irises, Hemerocallis, single Chrysanthemums, Poppies, and a large collection of Pæonies.

To Messrs. J. Veitch & Sons, Chelsea, for a group of Streptocarpus and a very fine assortment of Pæonies, Phloxes, Campanulas, Helianthus, and two excellent spikes of Eremurus robustus.

Silver Gilt Banksian Medal.

To Mr. T. S. Ware, Tottenham, for a very fine group of Liliiums, Spiræas, Ramondia pyrenaica, Inulas, Campanulas, and Carnations.

Silver Banksian Medal.

To J. T. Bennett-Poë, Esq., Holmwood, Cheshunt, for a large and exceptionally well-flowered plant of *Carpenteria californica*.

To Messrs. Wallace & Co., Colchester, for a collection of Calochorti, Liliiums, and some very fine Irises.

To Messrs. Paul & Son, Cheshunt, for a group of Roses and a very large collection of hardy flowers, Phloxes, Inulas, Spiræas, Irises, &c.

To Messrs. H. Cannell & Sons, Swanley, for an extensive group of Gloxinias and some very fine Cannas.

To Messrs. J. Laing & Son, Forest Hill, for a large group of Campanulas, Irises, Gaillardias, Pæonies, and Delphiniums.

To Messrs. G. Cooling & Son, Bath, for a group of old-fashioned Garden Roses, hybrid Sweet Briars, Austrian Briars, Polyantha, &c., and some very fine Teas.

Bronze Banksian Medal.

To Mr. M. Prichard, Christchurch, for a very showy group of Irises, Aquilegias, *Scabiosa caucasica*, Pæonies, Delphiniums, and *Dictamnus albus*.

First Class Certificate.

To *Blandfordia aurea* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford Lodge, Dorking (gr. Mr. Bain). A very graceful plant with pretty bell-shaped flowers borne on long scapes, and of a rich orange colour, lighter-coloured tube.

To *Bentinckia nicobariensis* (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. A very fine Palm from Tropical Asia; fronds large and of a bright green colour.

To *Cyrtanthus obliquus* (votes, 13 for), from Messrs. F. Sander & Co. A distinct and rare Cape plant, bearing stout scapes with numerous funnel-shaped flowers; colour orange-scarlet running to greenish yellow, margined with pale green. (*Bot. Mag.* 1808, t. 1133.)

Award of Merit.

To *Carnation Corunna* (votes, 10 for, 3 against), from Mr. J. Douglas, Great Bookham. Flowers large; colour deep yellow.

To *Begonia B. R. Davis* (votes, 8 for, 1 against), from Mr. B. R. Davis, Hendford Hill, Yeovil. Flowers double, very large; colour deep crimson.

To *Begonia Mont Blanc* (votes, unanimous), from Mr. Davis, Yeovil. A beautiful variety with large double, pure white flowers.

To *Begonia Lucerne* (votes, 12 for), from Mr. Davis, Yeovil. Flowers double; colour soft salmon, bright rose centre.

To *Delphinium Beauty of Langport* (votes, unanimous), from Messrs. Kelway & Son, Langport. Flowers semi-double, white, pale yellow centre.

To *Pæony Lady Beresford* (votes, 7 for), from Messrs. Kelway & Son. Flowers blush white; large and handsome.

To *Pæony Duke of Devonshire* (votes, 8 for), from Messrs. Kelway & Son. Large rose-coloured flowers shaded with purple.

To *Streptocarpus Distinction* (votes, 11 for), from Messrs. J. Laing & Sons. Flowers deep blue, streaked and blotched with deep violet-blue.

To *Pæony Solfaterre* (votes, 7 for, 4 against), from Messrs. Barr & Son. Flowers creamy white, sweetly scented.

To *Calochortus Lyoni* (votes, unanimous), from Messrs. Wallace & Co., Colchester. Flowers white blotched with brown at the base of each petal. A very rare variety.

To *Iris asiatica* (votes, 13 for, 1 against), from Messrs.

Wallace & Co. A very strong-growing variety, with large flowers. Standards deep blue; falls blue, shaded with violet.

To H.P. Rose Lawrence Allen (votes, 8 for, 3 against), from Messrs. G. Cooling & Sons, Bath. Flowers large; colour bright pink.

To Rosa rugosa Blanche de Coubert (votes, 12 for), from Messrs. Paul & Son, Cheshunt. Flowers semi-double, white. A very free-flowering variety.

Cultural Commendation.

To Mr. B. Campbell, The Willows, Windsor, for a very well-flowered plant of Bougainvillea glabra, Campbell's Brilliant (votes, unanimous).

Other Exhibits.

Martin R. Smith, Esq., The Warren, Hayes, Kent (gr. Mr. Blick), sent Carnation Lady Grimston.

From the Duke of Marlborough, Woodstock (gr. Mr. Whillans), came a large-flowered Carnation named Blenheim Beauty.

M. Louis de Smet, Ledeborg, Ghent, sent a few small plants of a variegated Abutilon named Sawitzi. The Committee expressed a wish to see larger plants.

Mr. A. Waterer, Woking, exhibited a choice collection of new Rhododendrons.

Messrs. Hugh Low & Co., Clapton, submitted Caladium Beige Flor Boucador. The Committee asked to see this again.

From Messrs. W. Paul & Son, Waltham Cross, came some very fine Roses.

Mr. Bones, Cheshunt, sent a very nice group of Carnation Yellow Queen.

From Mr. F. Cant, Colchester, came a small group of single and double Roses.

FLORAL COMMITTEE, JUNE 25, 1895.

W. MARSHALL, Esq., in the Chair, and seventeen members present.

Awards Recommended:—

Silver Gilt Flora Medal.

To Messrs. J. Veitch & Sons, Chelsea, for a very large group

of Roses and hardy flowers, Campanulas, Delphiniums, Phloxes, Spiræas, Aquilegias, and *Malva moschata alba*, &c.

Silver Flora Medal.

To Mr. T. S. Ware, Tottenham, for Phloxes, Calochorti, Delphiniums, Liliums, Inulas, and Campanulas.

To Messrs. H. Cannell & Sons, Swanley, for a large group of interesting and curious Cacti and succulent plants, including Mamillarias, Opuntias, Agaves, Echeverias, Euphorbias, and Pilocereus.

To Mr. M. Prichard, Christchurch, for a collection of hardy flowers, containing Campanulas, Liliums, *Scabiosa caucasica*, Poppies, and Tritomas.

Silver Banksian Medal.

To Messrs. Dobbie & Co., Rothesay, for a large stand of Violas and Sweet Peas.

To Messrs. Wallace & Co., Colchester, for a collection of Calochorti, Liliums, Irises, and Brodiaëas.

To Messrs. G. Jackman & Son, Woking, for a group of Roses, Gaillardias, Phloxes, *Coreopsis*, Carnations, and a very fine collection of *Iris Kämpferi*.

To Messrs. W. Cutbush & Son, Highgate, for a very large display of Malmaison Carnations.

To Messrs. Barr & Son, Covent Garden, or a group of hardy flowers, consisting of Pæonies, Irises, Gaillardias, Phloxes, Liliums, Erigerons, and Pinks.

Bronze Banksian Medal.

To Messrs. Paul & Son, Cheshunt, for a group of single and double Roses in great variety, together with a collection of Inulas and a few very fine Pæonies.

To Messrs. J. Cheal & Sons, Crawley, for a group of Violas, Irises, Liliums, Delphiniums, Poppies, and Spiræas.

First Class Certificate.

To *Echinocactus aureus* (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. A distinct Cactus, covered with clear yellow spines which measure from 1 to 2 inches long.

To *Philadelphus Boule d'Argent* (votes, unanimous), from Messrs. T. Cripps & Son, Tunbridge Wells. A dwarf and free-blooming shrub, bearing small semi-double white flowers.

Award of Merit.

To Carnation George Cruikshank (votes, 9 for, 2 against), from Martin R. Smith, Esq., The Warren, Hayes, Kent (gr. Mr. Blick). Flowers large; colour salmon suffused and striped with red.

To Carnation Cowslip (votes, 14 for), from M. R. Smith, Esq. (gr. Mr. Blick). Yellow ground, edged and striped with bright rose.

To Carnation Lady Ridley (votes, unanimous), from M. R. Smith, Esq. (gr. Mr. Blick). A very fine pure white-flowered variety.

To Carnation Zoë (votes, 10 for), from M. R. Smith, Esq. (gr. Mr. Blick). Flowers large, bluish pink, spotted red.

To Sweet Pea Cupid (votes, unanimous), from Mr. Burpee, Philadelphia. A dwarf variety growing only a few inches high, bearing pure white flowers in great profusion.

To Begonia Prince Adolphus of Teck (votes, 7 for, 3 against), from Messrs. J. Laing & Sons, Forest Hill. Flowers intense crimson.

To Begonia J. T. Bennett-Poë (votes, 6 for, 2 against), from Messrs. J. Laing & Sons. Flowers bright scarlet.

To Viola A. J. Rowberry (votes, unanimous), from Mr. G. McLeod, Chingford. A beautiful yellow rayless variety; colour rich.

To *Potentilla californica* (votes, 14 for, 1 against), from Mr. M. Prichard, Christchurch. A well-known and free-flowering plant, bearing large double flowers; colour yellow tipped with red.

To *Calochortus venustus Pictus* (votes, 7 for), from Messrs. Wallace & Co., Colchester. A new variety with large white flowers blotched with crimson.

To *Lilium Dalhausoni* (votes, 8 for), from Mr. T. S. Ware, Tottenham. Flowers of medium size; colour reddish brown, slightly marked with yellow.

To *Pæony Madame de Galban* (votes, unanimous), from Messrs. Paul & Son. Flowers soft pink, lighter centre. A very fine late-flowering variety.

Other Exhibits.

Lord Penzance, Eshing Park, Godalming, sent a very interesting collection of seedling Roses.

G. A. Farini, Esq., Forest Hill, staged a small group of cut Begonias.

C. F. Thompson, Esq., Penhill, Llandaff, Cardiff, sent a collection of cut Delphiniums.

From G. F. Wilson, Esq., Weybridge, came *Primula scotica*.

Mr. Prewett, Hammersmith, staged two Gloxinias named Mrs. John Holland and Delicata. The Committee asked to see the last named again.

From Mr. W. Taylor, Hampton, came Rose Robin Lyth.

Messrs. T. Cripps & Son, Tunbridge Wells, exhibited *Hydrangea Souv. de Claire* and *Daphniphyllum glaucescens variegata*.

Messrs. W. Cutbush & Son, Highgate, sent Carnation La Villette. The Committee asked to see this again.

Mr. R. Dean, Ealing, sent examples of Dyson's Giant Ten-week Stock.

Prizes.

Class 3.—Herbaceous Pæonies, three single and nine double varieties, three blooms of each. Amateurs. Prize, Kelway Silver Gilt Medal, to J. Brutton, Esq., Yeovil (gr. Mr. A. Crossman).

Class 4.—Six single and six double or semi-double Delphiniums, distinct, one spike of each. Amateurs. Prize, Kelway Silver Medal, to J. Brutton, Esq. (gr. Mr. A. Crossman).

Class 6.—Twelve bunches of Hardy Herbaceous Perennials distinct, bulbs admissible. Amateurs. First Prize, £2, to Mr. G. Sage, Ham House Gardens, Richmond, Surrey.

Class 7.—Eight bunches of Hardy Herbaceous Perennials, distinct, bulbs admissible. Amateurs. First Prize, £1. 10s., to Mr. C. Herrin, Dropmore Gardens, Maidenhead. Second Prize, £1, to Miss Debenham, St. Albans.

Class 8.—Collection of Cactaceous Plants. Amateurs. Prize, Silver Flora Medal, to W. C. G. Ludford, Esq., Fern Lea, Four Oaks, Sutton Coldfield, Birmingham.

ORCHID COMMITTEE.

JANUARY 15, 1895.

HARRY J. VEITCH, Esq., in the Chair, and sixteen members present.

[NOTE.—A *Bronze Banksian Medal* to D. B. Crawshay, Esq., Rosefield, Sevenoaks, for a group of *Odontoglossums*, accidentally omitted in the record of April 24, 1894, *Journal*, Vol. XVII., p. cviii.]



Fig. 10. — *LELLIA ANCEPS CRAWSHAYANA*.

Awards Recommended :—*First Class Certificate.*

To *Lælia anceps* Crawshayana (votes, unanimous), from De Barri Crawshay, Esq., Rosefield, Sevenoaks (gr. Mr. S. Cooke). This is perhaps the largest form of *Lælia anceps* which has yet appeared, and is also very richly coloured. The petals were each over 3 inches in length and $1\frac{3}{4}$ inch broad. (Fig. 10.)

Award of Merit.

To *Cypripedium* × Henry Graves, Junr. (*C. Lawrenceanum* ♀ × *C. Marshallianum* ♂) (votes, 8 for, 3 against), from H. Graves, Esq., Orange, New Jersey, U.S.A. A singular hybrid with ovate-acute dorsal sepal, the whole flower in colour being pale apricot-yellow, tinged and dotted with dark rose.

To *Cypripedium* × Madame Jules Hye (*C. Spicerianum* superbum ♀ × *C. tonsum* ♂) (votes, unanimous), from M. Jules Hye-Leysen, Coupure, Ghent, Belgium. In form this striking hybrid much resembles *C. tonsum*, and the ground colour of the flower is of a similar greenish yellow shade. The dorsal sepal is white, with purple band up the centre and purple flush extending upwards from the base. The rest of the flower is yellowish, with purple veining.

To *Cypripedium* × J. H. Berry (*C. × Harrisianum* superbum ♀ × *C. concolor* ♂) (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. A very large and finely shaped flower, of the same general colouring as *C. × Harrisianum* superbum.

To *Cypripedium* × Mrs. Fred Hardy (*C. superbiens* ♀ × *C. bellatulum* ♂) (votes, unanimous), from Messrs. F. Sander & Co. A distinct and handsome hybrid with pure white, waxlike flowers, the inner halves of the petals and upper sepal being pale emerald-green. The petals bore a few dotted lines of dark purple colour, and the lip a slight veining of rose. (Fig. 11.)

To *Cypripedium* × *nitens* superbum (*C. villosum* ♀ × *C. insigne* Maulei ♂) (votes, unanimous), from Walter Cobb, Esq., Dulcote, Tunbridge Wells (gr. Mr. J. Howes). A fine form of the *C. × Sallierii* class, and with much white and some rich purple spots in the upper sepal.

To *Cypripedium* × Madame Georges Truffaut (*C. ciliolare* ♀ × *C. Stonei* ♂) (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. This bore a general resemblance to *C. × Morgania*,

but the petals were curled slightly, and a rosy bronze hue spread over the whole flower.



Fig. 11.—CYPRIPEDIUM, MRS. FRED HARDY. (*Gardeners' Chronicle*.)

To *Cypripedium* × *Minosa superba* (*C. Spicerianum* ♀ × *C. × Arthurianum* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Sons, King's Road, Chelsea. A distinct improvement on *C.*

× *Arthurianum*. In the upper half of the dorsal sepal there is a good display of white.

To *Cypripedium* × *Norma* (*C. Spicerianum* ♀ × *C. × Niobe* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Sons, Chelsea. In this the form of *C. × Niobe* and its wavy petals appear, but the colouring is nearer to that of *C. Spicerianum*.

To *Odontoglossum nebulosum candidulum* (votes, unanimous), from Fred Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. T. Stafford). The unspotted white form.

Botanical Certificate.

To *Maxillaria ochroleuca* (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. A well-known old species with numerous cream-white flowers.

To *Dendrobium bursigerum album* (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. A close ally of *D. secundum*, but with white flowers.

To *Dendrobium Wattianum* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. White). Flowers white with orange throat. Resembling *D. longicornu*.

To *Dendrobium dicuphum* (votes, unanimous), from Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White). The flowers of this pretty species are of the *D. bigibbum* class, but white with rose lip.

To *Cypripedium* (*Selenipedium*) *Boissierianum* (votes, unanimous), from Thos. Statter, Esq., Stand Hall, Whitefield, Manchester (gr. Mr. R. Johnson).

Cultural Commendation.

To the Right. Hon. Lord Rothschild, Tring Park, Tring (gr. Mr. E. Hill), for a noble example of *Phalænopsis* × *F. L. Ames* (*P. amabilis* ♀ × *P. intermedia* ♂).

To Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White), for a fine specimen of the little *Epidendrum polybulbon*, with over forty flowers.

Other Exhibits.

Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White), staged a number of hybrid *Dendrobiums*, principally crosses between *D. Findlayanum* and *D. × Ainsworthii*; *Masdevallia* × *Courtauldiana*; *Cypripedium* × *Sallierii Hyeantum*, with six flowers; cut spikes of *Phalænopsis* &c.

Messrs. Linden, Parc Léopold, Brussels, sent a fine collection of cut spikes of *Cattleya maxima* varieties.

De B. Crawshay, Esq., Rosefield, Sevenoaks (gr. Mr. S. Cooke), sent the handsome *Lælia anceps*, Rosefield var., and *Odontoglossum Andersonianum pulvereum*, yellow with numerous red spots.

Messrs. Jas. Veitch & Sons showed *Cypripedium* × *Æson* (*C. insigne* ♀ × *C. Druryi* ♂).

E. Ashworth, Esq., Harefield Hall, Wilmslow, Cheshire (gr. Mr. H. Holbrook), showed *Lælia anceps alba*, *L. a. Amesiana*, *L. a. Schröderii*, and other varieties; *Lælio-Cattleya* × *exoniensis*, *L. autumnalis*, *Zygopetalum Mackaii major*, &c.

Fred Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. T. Stafford), exhibited *Lælio-Cattleya* × *Pallas superba*; *Cypripedium* × *Swinburnei magnificum*, and other *Cypripediums*, *Lælia anceps Dawsonii*, &c.

Walter Cobb, Esq., Dulcote, Tunbridge Wells (gr. Mr. J. Howes), showed *Cypripedium Boxallii*, Cobb's var. A fine form, in which the upper sepal is nearly black.

Thos. Statter, Esq., Stand Hall, Whitefield, Manchester (gr. Mr. R. Johnson), staged several hybrid *Cypripediums*.

A. H. Smee, Esq., The Grange, Wallington (gr. Mr. Cummins), sent *Lælia autumnalis gigantea*.

C. L. N. Ingram, Esq., Elstead House, Godalming (gr. Mr. T. W. Bond), showed *Lælia Percivaliana alba*.

S. G. Lutwyche, Esq., Beckenham (gr. Mr. Paterson), sent varieties of *Cypripedium insigne*.

Mr. J. Prewett, Hammersmith, showed *Cymbidium Traceyanum*.

J. Forster Alcock, Esq., Northchurch, Berkhamstead, sent *Cypripedium tonsum*.

ORCHID COMMITTEE, FEBRUARY 12, 1895.

HARRY J. VEITCH, Esq., in the Chair, and eleven members present.

Awards Recommended:—

Silver Banksian Medal.

To Baron Schröder, The Dell, Staines (gr. Mr. H. Ballantine), (votes, unanimous), for a fine collection of cut Orchids of rare kinds, including the new *Calanthe* × *Baron Schröder* and several

forms of *C. Regnierii* ; *Phaio-Calanthe* × *Sedenii*, *P.-C.* × *Arnoldiana*, *Cypripedium insigne* *Sanderiana*, *C. Charlesworthii*, *C.* × *Calypso*, *C.* × *Lathamianum*, *C.* × *Sallierii*, *C.* × *Harrisianum* *superbum*, *Arachnanthe Cathcartii*, *Catasetum barbatum*, &c.

To Mr. H. J. Chapman, gardener to R. I. Measures, Esq.,



FIG. 12.—*PHALÆNOPSIS YOUNGIANA*. (*Journal of Horticulture*.)

Camberwell (votes, unanimous), for a collection of fifty-five dried specimens of Orchids, mounted in picture form.

Bronze Banksian Medal.

To Mons. Seavy, 164 Camberwell New Road, London, S.E., (votes, unanimous), for an excellent collection of photographs of Orchids.

First Class Certificate.

To *Phalaenopsis* × *intermedia* *Portei* (votes, unanimous), from

the Right Hon. Lord Rothschild, Tring Park, Tring (gr. Mr. E. Hill).

To *Phalænopsis* × *Youngiana* (votes, unanimous), from Baron Schröder, The Dell, Staines (gr. Mr. H. Ballantine). This is supposed to be a natural hybrid. The flowers resemble *P. grandiflora*, but are suffused with rose-pink, the lip and lower halves of the lateral sepals being spotted with crimson. (Fig. 12.)

To *Cymbidium* × *eburneo-Lowianum superbum* (votes, unani-

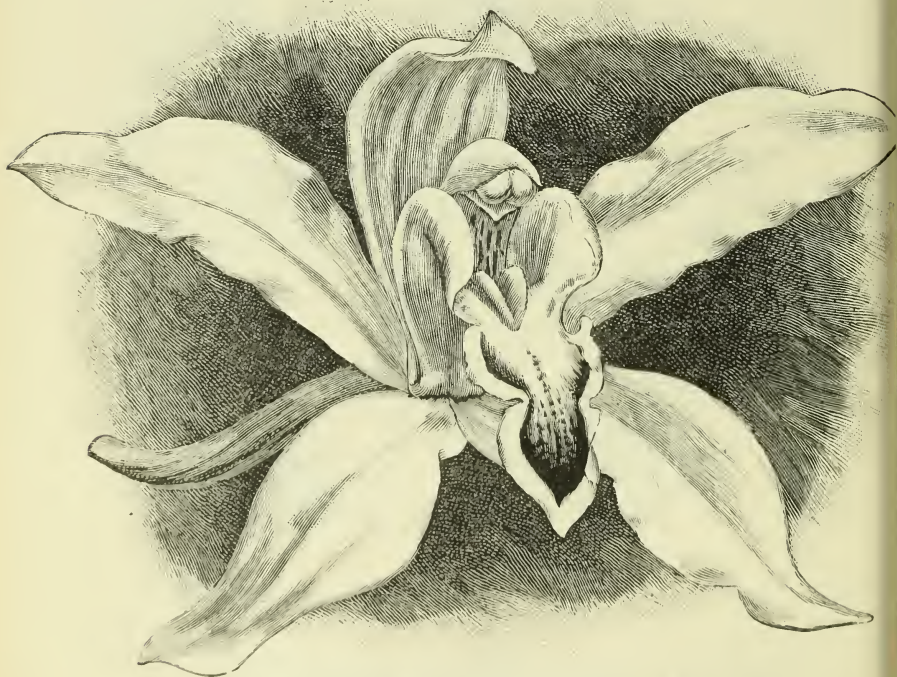


FIG. 13.—*CYMBIDIUM EBURNEO-LOWIANUM*. (*Journal of Horticulture*.)

mous), from Messrs. Jas. Veitch & Sons, King's Road, Chelsea. The flowers of this form are larger than the original, and inside the margin of the lip is a band of purple colour. (Fig. 13.)

Award of Merit.

To *Calanthe* × *masuco-tricarinata* (votes, unanimous), from

Messrs. Jas. Veitch & Sons, Chelsea. The cross was effected between the species indicated in the name, and a great improvement on *C. tricarinata* made. The flowers are cream-white tinged with rose.

Cultural Commendation.

To *Phalænopsis* × *intertexta* *Portei* (votes, unanimous), from the Right Hon. Lord Rothschild, Tring Park, Tring (gr. Mr. E. Hill). A grand example, with six branches to the spike, bearing together over fifty flowers.

To *Odontoglossum coronarium* (votes, unanimous), from Baron Schröder, The Dell, Staines (gr. Mr. H. Ballantine).

To *Odontoglossum coronarium* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White).

Other Exhibits.

The Right Hon. Lord Rothschild (gr. Mr. E. Hill) showed *Lælia superbiens*.

Sir Frederick Wigan, Clare Lawn, East Sheen (gr. Mr. W. H. Young), sent fine specimens of *Stauropsis* (*Vanda*) *gigantea*, *Cypripedium* × *Wiganianum*, *C. Rothschildianum*, *C.* × *Lathamianum*, and the true *Lælia præstans*.

Fred Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. T. Stafford), showed a collection of cut flowers of *Cattleya Trianæ*, *Phalænopsis*, *Dendrobiums*, &c.

Walter Cobb, Esq., Dulcote, Tunbridge Wells (gr. Mr. J. Howes), sent *Odontoglossum crispum* "La Gascoyne," a fine spotted form.

Messrs. F. Sander & Co., St. Albans, staged a number of rare Orchids, among which were *Cypripedium* × *Fordianum* (*C. Stonei* ♀ × *C. callosum* ♂), *Dendrobium luteolum superbum*, *Odontoglossum Coradinei albanense*, *Phaius* × *Marthæ*, *P.* × *amabilis*, &c.

Messrs. W. L. Lewis & Co., Southgate, N., showed *Cattleya Trianæ Ashtonii*.

F. M. Burton, Esq., Highfields, Gainsborough, sent three hybrid *Cypripediums*.

W. Thompson, Esq., Stone, Staffordshire (gr. Mr. W. Stevens), showed cut blooms of *Cattleyas*, *Odontoglossums*, &c.

E. Marshall, Esq., Claremont House, Abbey Road, Grimsby, (gr. Mr. Jas. Johnson), sent six forms of *Cattleya Trianæ*, which, like Mr. Thompson's, were frozen in transit.

Walter C. Walker, Esq., Percy Lodge, Winchmore Hill, (gr. Mr. Geo. Cragg), showed the curious little *Lanium Berkleyii*, the fine *Lælia harpophylla Claudii*, *Cypripedium* × *grande*, *C. Rothschildianum*, &c.

ORCHID COMMITTEE, MARCH 12, 1895.

HARRY J. VEITCH, Esq., in the Chair, and sixteen members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. F. Sander & Co., St. Albans, for an effective group of Orchids, in which were many rare species.

Silver Banksian Medal.

To Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White), for a group of Orchids including *Eulophiella Elisabethæ*, *Ornithidium Lawrenceanum*, *Epiphronitis* × *Veitchii*, *Masdevallia melanoxantha* (Fig. 14), *M.* × *Shuttrayana*, &c.; also a selection of the Burford hybrid *Calanthes*.

To *Sophronitis grandiflora*, from Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White). A magnificent single specimen, with about sixty fine flowers.

To E. Ashworth, Esq., Harefield Hall, Wilmslow, Cheshire (gr. Mr. Holbrook), for a small group of excellently grown *Dendrobiums*.

To Messrs. Jas. Veitch & Sons, King's Road, Chelsea, for a group of new and rare hybrid Orchids.

To Messrs. B. S. Williams & Son, Upper Holloway, N., for a group of Orchids, in which the prominent feature was some fine plants of *Cœlogyne cristata alba*.

To Messrs. Hugh Low & Co., Clapton, for a group of Orchids.

First Class Certificate.

To *Dendrobium* × *Apollo grandiflorum* (*D. nobile pulcherrimum* ♀ × *D. splendidissimum grandiflorum* ♂) (votes, unanimous) from Mr. James Cypher, Queen's Road, Cheltenham.

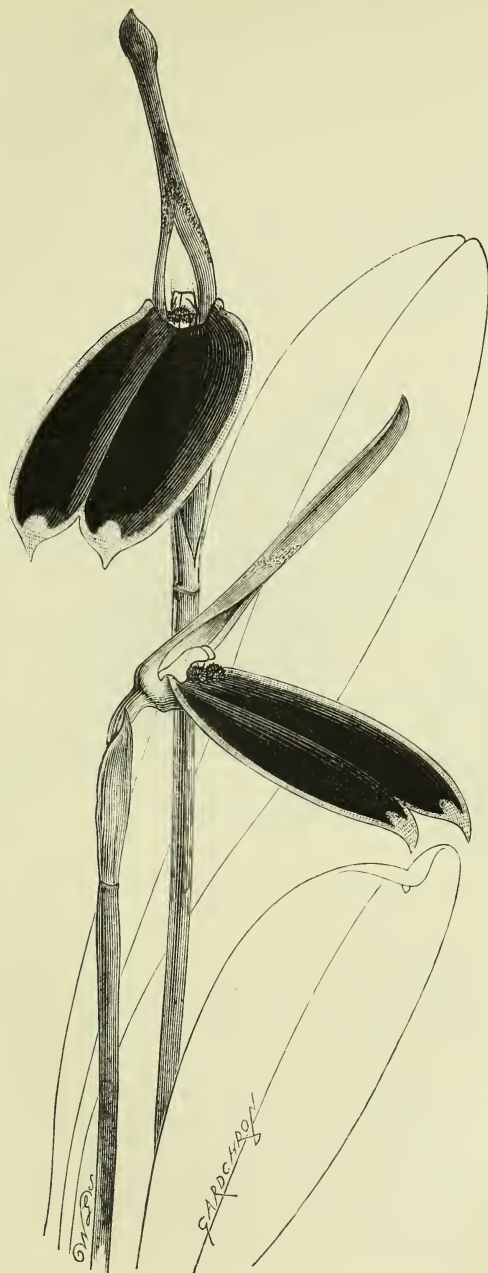


FIG. 14.—MASDEVALLIA MELANOXANTHA. (*Gardeners' Chronicle*.)

A grand hybrid, and a great advance on all others of the *D. × Ainsworthii* class. (Fig. 15.)

To *Sophronitis grandiflora* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White).

Award of Merit.

To *Dendrobium × euosmum virginale* (*D. × endocharis* ♀ × *D. nobile intermedium* ♂) (votes, unanimous) from Messrs. J. Veitch & Sons, Chelsea. Flowers white with purple base to the lip.



FIG. 15.—*DENDROBIUM APOLLO GRANDIFLORUM.* (*Journal of Horticulture.*)

To *Laelio-Cattleya × Myra* (*C. Trianae* ♀ × *L. flava* ♂) (votes, unanimous) from Messrs. J. Veitch & Sons. An extraordinary and pretty hybrid, with flowers equal in size to those of *L. xanthina*. Colour cream-white, with sulphur tinge on the lip.

To *Phaio-Calanthe × irrorata rosea* (*Phaius grandifolius* ♀ × *Calanthe vestita gigantea* ♂) (votes, unanimous) from Messrs. J. Veitch & Sons. A bright rose-pink form. The original type was exhibited in 1868; the variety *purpurea* in 1884, both having nearly white segments to their flowers. (Fig. 16.)

To *Cypripedium × Fowlerianum* (*C. × Harrisianum*

superbum ♀ × *C. bellatulum* ♂) (votes, unanimous) from Messrs. F. Sander & Co., St. Albans. A fine hybrid, with the dark colours of *C. × Harrisianum* superbum on a flower of fine form.

To *Cattleya Percivaliana* magnifica (votes, 8 for, 4 against), from Fred Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. T. Stafford).

To *Dendrobium × Cassiope Ashworthii* (*D. nobile albiflorum* ♀ × *D. moniliforme* ♂) (votes, unanimous), from E. Ashworth, Esq., Harefield Hall, Wilmslow, Cheshire (gr. Mr.



FIG. 16.—*PHAIOS-CALANTHE IRRORATA ROSEA*. (*Journal of Horticulture*.)

Holbrook). A large and pretty form, with a darker purple base to the lip than the original.

Botanical Certificate.

To *Dendrobium undulatum* (votes, unanimous), from J. Forster Alcock, Esq., Northchurch, Berkhamstead.

To *Cœlogyne sparsa* (votes, unanimous), from C. J. Lucas, Esq., Warnham Court, Horsham (gr. Mr. Duncan).

Cultural Commendation.

To Hamar Bass, Esq., Byrkley, Burton-on-Trent (gr. Mr. J. Hamilton), for *Eulophiella Elisabethæ* (votes, unanimous).

To Sir Frederick Wigan for *Platyclinis glumacea* (votes, unanimous).

Other Exhibits.

Mr. McArthur, Maida Vale, W., sent a selection of Orchids.

C. J. Lucas, Esq., Warnham Court, Horsham (gr. Mr. Duncan), sent cut blooms.

Baron Schröder showed the finely spotted *Odontoglossum crispum nobilium* and other *Odontoglossums*.

Earl Cowper, Panshanger, Herts (gr. Mr. J. Fitt), showed *Cypripedium* × *Sallierii* var.

D. M. Grimsdale, Esq., Uxbridge, sent *Odontoglossum crispum guttatum* and *O. Pescatorei*.

J. Gurney Fowler, Esq., Glebelands, South Woodford (gr. Mr. J. Davis), showed three fine varieties of *Cattleya labiata Trianae*.

Fred Hardy Esq., Tyntesfield, Ashton-on Mersey (gr. Mr. T. Stafford), showed several natural hybrid *Odontoglossums* &c.

Thos. Statter, Esq., Stand Hall, Whitefield, Manchester (gr. Mr. R. Johnson), exhibited *Cypripedium* × *Phœbe* (*C. philippinense* ♀ × *C. bellatulum* ♂), *C.* × *selligerum atrorubens*, and *Dendrobium nobile nobilium*.

Sir Frederick Wigan, Clare Lawn, East Sheen (gr. Mr. W. H. Young), sent a noble specimen of *Platyclinis glumacea*, *Cypripedium* × *Godseffianum*, and *C.* × *Carnusianum superbum*.

A. J. Hollington, Esq., Forty Hill, Enfield (gr. Mr. Ayling), showed *Cypripedium* × *Ruth Ayling* (*C. niveum* ♀ × *C. Argus* ♂), which resembled a small *C.* × *Gravesiæ*.

De B. Crawshay, Esq., Rosefield, Sevenoaks (gr. Mr. S. Cooke), showed *Odontoglossum mulus atratum*.

Chas. L. N. Ingram, Esq., Elstead House, Godalming (gr. Mr. T. W. Bond), staged *Cypripedium* × *refulgens* (*C. Curtisii* ♀ × *C. hirsutissimum* ♂) and *C.* × *Crossianum aureum*.

F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin, sent *Epidendrum* × *O'Brienianum* and *E. ardens*.

Thos. Craven, Esq., Ashlea, Ashton-on-Mersey (gr. Mr. Higson), staged a splendid example of *Dendrobium Wardianum album* with over sixty flowers, the growths of the plant being also of remarkable length.

W. C. Clark, Esq., Orleans House, Sefton Park, Liverpool (gr. Mr. T. Jones), sent a flower of a *Cypripedium* supposed to be *C.* × *Lecanum superbum* × *C. Stonci*.

ORCHID COMMITTEE, MARCH 26, 1895.

HARRY J. VEITCH, Esq., in the Chair, and fourteen members present.

Awards Recommended:—*Silver Flora Medal.*

To Messrs. Jas. Veitch & Sons, King's Road, Chelsea, S.W., for a group of rare Orchids, principally new hybrids, and among which were five strong plants of *Cymbidium* × *eburneo-Lowianum* in flower, *Masdevallia* × *Asmodia* (*M. Chelsoni* ♀ × *M. Reichenbachiana* ♂), *Dendrobium* × *Cybele nobilium*, and *D. Murrhinaicum*, Reich. f. (*D. nobile* ♀ × *D. Wardianum* ♂).

To Messrs. F. Sander & Co., St. Albans, for a fine group of Orchids, containing *Cypripedium Lawrenceanum* Hyeanam, *Lycaste Lawrenceana*, *Eulophiella Elisabethæ*, a number of fine forms of *Dendrobium nobile*, *D. × Rolfæ*, *Microstylis tabulæformis*, &c.

Silver Banksian Medal.

To E. Ashworth, Esq., Harefield Hall, Wilmslow, Cheshire (gr. Mr. H. Holbrook), for a noble specimen of *Dendrobium nobile nobilium* bearing 389 flowers, the tallest pseudo-bulbs being 3 feet 9 inches in height.

To Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White), for an interesting group of Orchids, the central figure being the extraordinary *Bulbophyllum grandiflorum*, with a very large flower, in which the sepals were the prominent feature, the lip and petals being very small. The large upper sepal was arched forward; in colour cinnamon-brown, the venation being the darkest, and in places the spaces between them showed white blotches. The lower sepals were smaller than the upper, but similar in colour, except that they showed no white blotches. They were not spreading, but approached each other on the lower edge. Its nearest ally appears to be *B. Leysianum*, Burbridge, illustrated in the "Journal of the Royal Horticultural Society," August 1894. In the group also were *Dendrobium canaliculatum*, *Eulophiella Elisabethæ*, *Odontoglossum crinitum sapphiratum*, *Dendrobium cruentum*, *Vanda cærulescens*, &c.

To Messrs. B. S. Williams & Son, Upper Holloway, N.,

for an extensive group of Orchids, in which were a very large specimen of *Cymbidium eburneum* and several good *Vanda tricolor*.

To Baron Schröder, The Dell, Egham (gr. Mr. H. Ballantine), for a collection of rare Orchids cut blooms, of which *Cattleya* × *Schröderæ*, *Epidendrum* × *dellense*, and *Lælia* × *vitellina* were raised in his own gardens.

To Messrs. W. L. Lewis & Co., Chase Side, Southgate, N., for a representative group of the Orchids of the season, in flower.

To Mr. Jas. Cypher, Queen's Road, Cheltenham, for a fine group of excellently well-grown varieties of *Dendrobium nobile*,

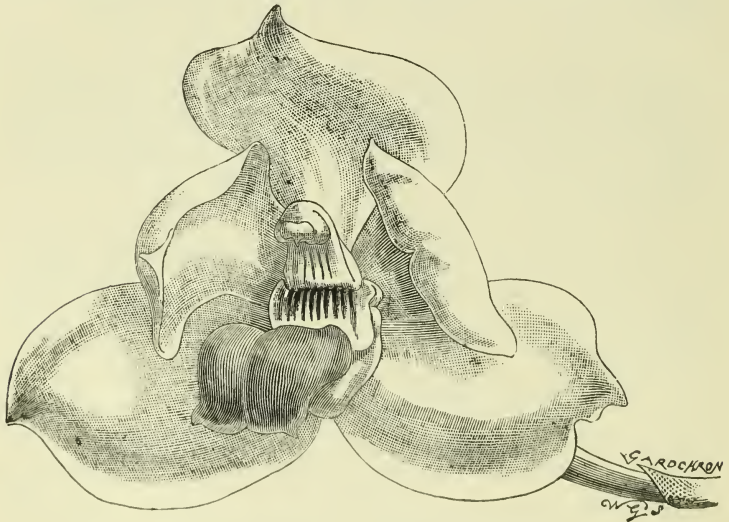


FIG. 17.—*ZYGOPETALUM (BOLLEA) SCHRÖDERIANUM*. (*Gardeners' Chronicle*.)

together with the fine hybrid *D. × rubens grandiflorum* and other hybrids.

To Messrs. Hugh Low & Co., Clapton, for a group of Orchids composed chiefly of various forms of *Miltonia Roezlii*.

First Class Certificate.

To *Zygopetalum (Bollea) Schröderianum* (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. A fine new pure white species, with a pale pink tint on the lip, and with flowers about 4 inches across. A large specimen with nine fine fragrant flowers, was shown. (Fig. 17.)

Award of Merit.

To *Dendrobium* × *Cordelia* (*D. aureum* ♀ × *D. × euosmum leucopterum* ♂) (votes, unanimous), from Messrs. J. Veitch & Sons, Chelsea. This is a hybrid of the third generation, and as *D. aureum* has been used in its progenitors, it is in form very close to that species. In colour cream-white, with russet-purple disc to the lip.

To *Odontoglossum luteo-purpureum amplissimum* (votes, unanimous), from H. Weetman, Esq., The Hawthorns, Little Haywood, Staffs (gr. Mr. Bernard Dun). A large and heavily marked flower.

To *Cypripedium* × *Olenus* (*C. bellatulum* ♀ × *C. ciliolare* ♂) (votes, unanimous), from R. I. Measures, Esq., Cambridge Lodge, Camberwell (gr. Mr. H. J. Chapman). Flowers suffused with rose, the petals dotted and the upper sepal striped with purple. (Fig. 18.)

To *Dendrobium* × *splendidissimum illustre* (*D. × Ainsworthii* *Leechianum* ♀ × *D. nobile nobilius* ♂) (votes, unanimous), from W. R. Lee, Esq., Beech Lawn, Audenshaw, Manchester (gr. Mr. Billington). A fine rose-tinted form of the *splendidissimum* type of *D. × Ainsworthii*.

To *Cattleya Trianae* var. (votes, unanimous), from W. C. Parkes, Esq., Llanberis, Lower Tooting.

To *Dendrobium Donnesiae* (votes, unanimous), from J. Bradshaw, Esq., The Grange, Southgate (gr. Mr. Wiffen). A singular form of the nigro-hirsute section, which is supposed to be a natural hybrid between *D. formosum* and *D. infundibulum*. Flowers as large as *D. formosum*, and similar in colour; in form like *D. infundibulum*; in growth only a few inches high, the pseudo-bulbs thick from the base.

To *Dendrobium* × *Schneiderianum* (*D. Findlayanum* ♀ × *D. aureum* ♂) (votes, unanimous), from E. Ashworth, Esq., Harefield Hall, Wilmslow, Cheshire (gr. Mr. H. Holbrook).

Botanical Certificate.

To *Bulbophyllum grandiflorum* (Blume's "*Rumphia*," iv. p. 42) (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). [The plant figured as *B. grandiflorum* in the "*Lindenia*," iii. p. 27 (1887), is *B. longisepalum*, Rolfe.]

To *Schomburgkia undulata* (votes, unanimous), from Sir Trevor Lawrence, Bart.

To *Odontoglossum crinitum sapphiratum* (votes, unanimous), from Sir Trevor Lawrence, Bart.



FIG. 18.—*CYPRIPEDIUM* × *OLENUS*. (*Gardeners' Chronicle*.)

To *Batemannia peruviana* (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. A true *Batemannia*; in form

resembling *B. Colleyii*, but with broader, chocolate-barred sepals. (Fig. 19.)

Other Exhibits.

E. Ashworth, Esq., Harefield Hall, Wilmslow, Cheshire (gr. Mr. H. Holbrook), showed some fine *Dendrobiums* &c.

C. T. Cayler, Esq., Ivy Mount, Leigham Court Road, Streatham (gr. Mr. H. Paulton), showed two fine specimens of *Phaius grandifolius*.

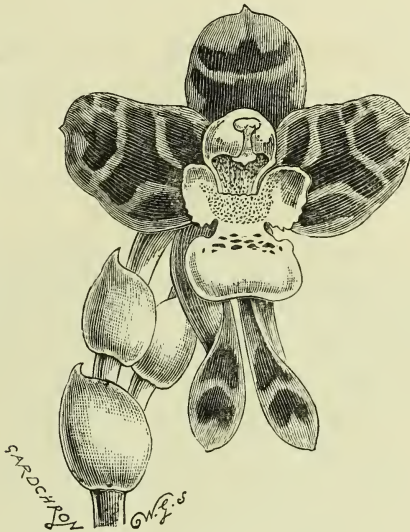


FIG. 19.—*BATEMANNIA PERUVIANA*. (*Gardeners' Chronicle*.)

De B. Crawshay, Esq., Rosefield, Sevenoaks (gr. Mr. S. Cooke), sent *Odontoglossum Ruckerianum* "Juno."

Walter C. Walker, Esq., Winchmore Hill (gr. Mr. G. Cragg), sent *Cymbidium eburneum*.

W. Vanner, Esq., Camden Wood, Chislehurst (gr. Mr. W. H. Robbins), showed *Cypripedium* × *Vanneræ* (? *C.* × *selligerum majus* × *C. Curtisii*), which somewhat resembled *C.* × *Youngianum*.

H. W. Weetman, Esq., The Hawthorns, Little Haywood, sent *Dendrobiums* and *Odontoglossums*.

The Rev. E. Handley, Royal Crescent, Bath (gr. Mr. S. Kerslake), sent fine forms of *Cattleya Trianæ*.

T. Swinburne, Esq., Corndean Hall, Winchcombe, sent *Cypripedium* × *Lady Hutt* (*C.* × *Fitchianum* ♀ × *C. insigne* ♂), a distinct hybrid, with almost entirely yellow flower.

Lord Burton, Rangemore, Burton-on-Trent (gr. Mr. W. Bennett), showed *Cypripedium* × *bellatulo-venustum*, which in many respects resembled *C.* × *Marshallianum*.

ORCHID COMMITTEE, APRIL 9, 1895.

HARRY J. VEITCH, Esq., in the Chair, and sixteen members present.

Awards Recommended :—

Silver Flora Medal.

To Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White), for a noble specimen of *Cattleya Lawrenceana* with fifty-eight very richly coloured flowers, the greatest number on a single spike being eleven.

Silver Banksian Medal.

To Messrs. Jas. Veitch & Sons, King's Road, Chelsea, for a group of rare Orchids, amongst them being *Lælia* × *Latona* (*L. cinnabarina* ♀ × *L. purpurata* ♂), *Dendrobium* × *Alcippe* (*D. lituiflorum* ♀ × *D. Wardianum* ♂), *Cypripedium* × *Winnianum* (*C. villosum* ♀ × *C. Druryi* ♂), *C.* × *macrochilum*, *C.* × *obscurum*, *Cymbidium* × *eburneo-Lowianum*, &c.

To Messrs. F. Sander & Co., St. Albans, for a fine group of Orchids, in which were the new white *Zygopetalum* (*Bollea*) *Schröderianum*, *Eulophiella Elisabethæ*, *Spathoglottis plicata*, *S. aurea*, *Dendrobium amboinense*, *Cyrtopodium Woodfordii*, &c.

To H. T. Pitt, Esq., Rosslyn, Stamford Hill (gr. Mr. Aldous), for a group of showy Orchids, among which were some fine plants of *Angræcum sesquipedale* and *A. modestum*.

To Messrs. W. L. Lewis & Co., Chase Side, Southgate, for a well-arranged group of Orchids.

First Class Certificate.

To *Odontoglossum triumphans* "Lionel Crawshay" (votes,

unanimous), from De B. Crawshay, Esq., Rosefield, Sevenoaks (gr. Mr. S. Cooke). A grand variety with very large and finely marked flowers, which received an Award of Merit in May 1894. (Fig. 20.)

Award of Merit.

To *Lælia flava*, var. *aurantiaca* (votes, unanimous), from the Right Hon. Lord Rothschild, Tring Park, Tring (gr. Mr. E. Hill). A fine variety with brilliant orange-coloured flowers, thus differing from the type, which is chrome-yellow.



FIG. 20.—*ODONTOGLOSSUM TRIUMPHANS* "LIONEL CRAWSHAY."
(*Gardeners' Magazine.*)

To *Odontoglossum crispum* "Catherine" (votes, unanimous), from Fred Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. T. Stafford). A spotted form of the *O. c. guttatum* class.

Botanical Certificate.

To *Bulbophyllum nigripetalum* (votes, unanimous), from Messrs. W. L. Lewis & Co., Chase Side, Southgate, N.

To *Masdevallia ludibunda* (votes, unanimous), from F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin.

Cultural Commendation.

To Geo. C. Raphael, Esq., Castle Hill, Englefield Green (votes, unanimous) (gr. Mr. Adams), for a fine specimen of *Eulophiella Elisabethæ*, with about forty flowers on a spike.

Other Exhibits.

Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White), showed *Miltonia* × *Bleui nobilior*, *Odontoglossum aspersum violaceum*, *Masdevallia leontoglossa*, *Epidendrum* × *Endresio-Wallisii*, and *Eulophiella Elisabethæ*.

The Right. Hon. Lord Rothschild (gr. Mr. E. Hill), sent *Cattleya guttata Prinzii*, *Lælia crispilabia*, *Dendrobium tetragonum*, and *Catasetum scurra*.

Baron Schröder, The Dell, Egham (gr. Mr. H. Ballantine), showed cut blooms of *Cattleya Lawrenceana*, *C. L. Vinckeii*, *C. L. unicolor*, *Odontoglossum Andersonianum* var., and a plant of *Dendrobium* × *Cybele* (*D. Findlayanum* ♀ × *D. nobile* ♂).

Thos. Statter, Esq., Stand Hall, Whitefield, Manchester (gr. Mr. R. Johnson), staged *Lælio-Cattleya* × *Pallas* (*L. crispa* × *C. Dowiana*), *Cattleya Mendelii*, *C. Schröderæ*, *Cypripedium* × *selligerum atrorubens*, and *C. × annamense* (*C. × Ashburtoniæ expansum* ♀ × *C. × Numa* ♂).

A. H. Smee, Esq., The Grange, Carshalton (gr. Mr. Cummins), showed *Cymbidium Lowianum concolor*, which is also known in gardens as *C. L. viride* and *C. L. Mandaianum*.

Major-Gen. E. S. Berkeley, Spetchley, Bitterne Park, Southampton, showed *Dendrobium Rolfeæ roseum*.

Messrs. W. & G. Drover, Fareham, showed two varieties of *Cattleya Trianæ*.

F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin, sent *Phaius assamicus*, *Cymbidium Devonianum*, *Cœlogyne lactea*, and *Cattleya Schröderæ*.

ORCHID COMMITTEE, APRIL 23, 1895.

HARRY J. VEITCH, Esq., in the Chair, and fifteen members present.

G. Shirland Ball, Esq., of Manchester, a visitor, was invited to assist on the Committee.

Awards Recommended:—*Silver Flora Medal.*

To Messrs. Jas. Veitch & Sons, King's Road, Chelsea, for a fine group of rare Orchids, among which were many large specimens.

To Messrs. F. Sander & Co., St. Albans, for a large group of rare and showy Orchids.

To H. T. Pitt, Esq., Rosslyn, Stamford Hill (gr. Mr. Aldous), for a group containing a great many species. The most interesting plant was the original home-raised *Odontoglossum* × *excellens* (*O. Pescatorei* ♀ × *O. triumphans* ♂) of Messrs. Veitch, and which far surpasses the imported specimens.

Silver Banksian Medal.

To Messrs. Heath & Son, Cheltenham, for a group of fine plants of *Cattleya Schröderæ*.

To Messrs. W. L. Lewis & Co., Chase Side, Southgate, for a good group of showy and well-grown Orchids.

To R. I. Measures, Esq., Cambridge Lodge, Camberwell (gr. Mr. H. J. Chapman), for a group of cut blooms, consisting principally of eighteen forms of *Vanda tricolor* and its variety *suavis*.

To Messrs. Hugh Low & Co., Clapton, for a group of Orchids

To Messrs. B. S. Williams & Son, Upper Holloway, N., for a group of Orchids.

To Geo. Marshall, Esq., Claremont House, Grimsby (gr. Mr. Johnson), for *Odontoglossums*, *Dendrobiums*, &c.

First Class Certificate.

To *Lælio-Cattleya* × *Epicasta* (*L. pumila* ♀ × *C. Warszewiczii* ♂) (votes, unanimous), from Messrs. James Veitch & Sons, Chelsea. The plant, which received an Award of Merit in September 1893, had a flower equal in size to a small *C. labiata*, the prevailing colour being bright purplish lilac.

To *Cattleya citrina* (votes, 9 for, 5 against), from H. Grinling, Esq., Harrow Weald (gr. Mr. Rapley).

Award of Merit.

To *Dendrobium fimbriatum* (votes, 8 for, 4 against), from Geo. Marshall, Esq., Claremont House, Grimsby (gr. Mr. Johnson).

To *Dendrobium Hildebrandii* (votes, unanimous), from Baron Schröder, The Dell, Egham (gr. Mr. H. Ballantine). A fine specimen was exhibited, the flowers resembling those of a small primrose-yellow *D. tortile*.

To *Lycaste trifoliata*, *Lehm.* (votes, 9 for), from Messrs. W. L. Lewis & Co., Chase Side, Southgate, N. An ally of *L. lanipes*, with ivory-white flowers, tinged with green on the sepals. The petals reflex naturally. The name was suggested by the plant generally bearing three leaves at the apex of the pseudobulb.

To *Cypripedium* × *Goweri magnificum* (*C. Lawrenceanum* ♀ × *C. Curtisii* ♂) (votes, unanimous), from F. Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. Stafford). In general appearance resembling *C. Lawrenceanum*, but with the more profuse dark spotting of *C. Curtisii*.

Botanical Certificate.

To *Habenaria Bonatea* (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. Figured in the *Gardeners' Chronicle*, June 15, 1895, p. 743.

To *Polystachya Ottoniana* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). The plant exhibited was a dense tuft covered with a great number of spikes of white flowers.

To *Masdevallia fragrans* (votes, unanimous), from Sir Trevor Lawrence, Bart. A species of the *M. Peristeria* section, with pale greenish yellow flowers streaked with purple.

To *Lycaste gigantea* (votes, unanimous) from Walter C. Walker, Esq., Percy Lodge, Winchmore Hill (gr. Mr. Geo. Cragg).

To *Cirrhopetalum Cumingii* (votes, unanimous), from the Right Hon. Lord Rothschild, Tring Park, Tring (gr. Mr. E. Hill).

Cultural Commendation.

To Major Joicey, Sunningdale Park, Sunningdale, Berks

(gr. Mr. Fred J. Thorne), for a grand plant of *Cypripedium Rothschildianum* (votes, unanimous).

To Major Joicey for a specimen of *Dendrobium atro-violaceum* with fine spikes, bearing together twenty-four flowers. The plant was a very small one when obtained out of Messrs. Veitch's original importation (votes, unanimous).

To Messrs. F. Sander & Co., St. Albans, for *Dendrobium veratrifolium*, *Lindl.*, with six erect spikes of many white flowers with purple lip (votes, unanimous).

To Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White), for a pair of fine plants of *Masdevallia Arminii* covered with pretty purple flowers (votes, unanimous).

Other Exhibits.

Walter C. Walker, Esq., Winchmore Hill (gr. Mr. Geo. Cragg), exhibited varieties of *Cattleya Mendelii* &c.

The Right Hon. Lord Rothschild showed *Bulbophyllum Sillemianum*, a showy species with yellow flowers.

Baron Schröder showed *Lælio-Cattleya* × *Digbyana-Mossiae* and other cut blooms.

Norman C. Cookson, Esq., Oakwood, Wylam-on-Tyne (gr. Mr. Murray), sent *Odontoglossum triumphans*, Oakwood variety.

The Prince di Venosa, Rome (gr. Mr. Raggionieri), sent *Cypripedium* × *lucidum* (*C. Lowii* ♀ × *C. villosum* ♂).

Fred Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. T. Stafford), showed *Odontoglossum Andersonianum* "Mrs. Fred Hardy," *O. nebulosum candidulum*, &c.

Thos. Statter, Esq., Stand Hall, Whitefield, Manchester (gr. Mr. R. Johnson), sent *Cattleya* × *Prince of Wales*.

De B. Crawshay, Esq., Rosefield, Sevenoaks (gr. Mr. S. Cooke), showed *Odontoglossum mulus*, Rosefield variety.

W. M. Appleton, Esq., Tyn-y-Coed, Weston-super-Mare, showed *Cattleya Schilleriana*, *Epidendrum atro-purpureum album*, *Odontoglossums*, &c.

Thos. McMeekin, Esq., Falkland Park, South Norwood (gr. Mr. Alex. Wright), sent a fine form of *Odontoglossum Andersonianum*, and cut spikes of other *Odontoglossums*.

ORCHID COMMITTEE, MAY 14, 1895.

HARRY J. VEITCH, Esq., in the Chair, and seventeen members present.

Awards Recommended :—*Silver Flora Medal.*

To Messrs. James Veitch & Sons, King's Road, Chelsea, for an excellent group of Orchids, both species and hybrids.

Silver Banksian Medal.

To W. Thompson, Esq., Walton Grange, Stone, Staffordshire (gr. Mr. W. Stevens), for a small group of fine varieties of *Odontoglossum*.

First Class Certificate.

To *Cypripedium* × “Gertrude Hollington” (*C. ciliolare* ♀ × *C. bellatulum* var. ♂) (votes, unanimous), from Messrs. Hugh Low & Co., Clapton. The plant, which is the result of the reverse cross to *C. × Olenus*, has the usual form and marking of varieties of its class, but in size and richness of colour surpasses them.

To *Cypripedium Godefroyæ*, var. *leucochilum* (votes, unanimous), from R. I. Measures, Esq., Cambridge Lodge, Camberwell (gr. Mr. H. J. Chapman). An excellent form of the variety was shown, the flowers resembling those of *C. bellatulum*, but with a cream-white, unspotted labellum.

Award of Merit.

To *Epidendrum* × *O'Brienianum roseum* (votes, 7 for, 2 against), from Messrs. James Veitch & Sons, King's Road, Chelsea. The variety is a colour variation, obtained from uncrossed seeds of the red *E. × O'Brienianum*, the colour of the variety reverting to that of *E. evectum* (one of the parents of the type), while the form has remained unchanged.

To *Cattleya Mendelii leucoglossa* (votes, 9 for), from Thos. Statter, Esq., Stand Hall, Whitefield, Manchester (gr. Mr. R. Johnson). Flowers pale lilac, with white labellum.

To *Cattleya Mendelii* “Princess of Wales” (votes, unanimous), from De B. Crawshay, Esq., Rosefield, Sevenoaks (gr. Mr. S. Cooke). A very handsome form with a brilliant and highly coloured labellum.

To *Odontoglossum crispum* "The Bride" (votes, 9 for, 5 against), from W. Thompson, Esq., Walton Grange, Stone, Staffordshire (gr. Mr. W. Stevens). A very fine white variety.

Botanical Certificate.

To *Dendrobium taurinum* (votes, unanimous), from Messrs. Jas. Veitch & Sons, King's Road, Chelsea.

To *Dendrobium strongylanthum* (votes, unanimous), from Messrs. Hugh Low & Co. A small species with racemes of twisted bronzy flowers.

To *Cirrhopetalum grandiflorum* (votes, unanimous), from Mrs. Langton, Hillfield, Reigate (gr. Mr. J. Pearce).

Cultural Commendation.

To H. Weetman, Esq., The Hawthorns, Little Haywood, for *Phaius Wallichii* variety (votes, unanimous).

Other Exhibits.

Sir Charles W. Strickland, Bart., Hildenley, Malton, Yorks., sent three plants of *Cypripedium concolor* × *C. bellatulum*, which closely resembled *C. Godefroyæ*.

T. W. Swinburne, Esq., Corndean Hall, near Cheltenham (gr. Mr. W. J. Rendell), showed *Cypripedium* × *Corndeanii* (supposed parentage *C. Lawrenceanum* × *C. × Sedenii*), which, while closely resembling *C. Lawrenceanum*, exhibited no trace of *C. × Sedenii*.

A. Warburton, Esq., Vine House, Haslingden, showed a very fine spike of *Oncidium lamelligerum*.

J. Gurney Fowler, Esq., The Glebelands, South Woodford (gr. Mr. J. Davis), sent varieties of *Cattleya Mendelii*.

Mr. F. Horsman, Colchester, showed an *Odontoglossum*, said to be intermediate between *O. cordatum* and *O. maculatum*.

The Earl of Radnor, Longford Castle, Salisbury (gr. Mr. H. W. Ward), sent a prettily spotted *Odontoglossum crispum*.

De B. Crawshay, Esq., showed *Odontoglossum crispum* "Florrie" and *O. Hallii*.

W. Cobb, Esq., Tunbridge Wells, sent a fine form of *Cattleya Mossiæ*.

Mr. E. J. Wickenden, Heathfield, New Southgate, showed *Cattleya Loddigesii*.

A. H. Smee, Esq., The Grange, Wallington (gr. Mr.

Cummins), sent a plant of *Odontoglossum cirrhosum*, which has flowered from the same flower-spikes two years in succession.

Mr. Charles Terry, Tatton Park Gardens, Knutsford, showed *Cattleya Mossiæ* and *Oncidium varicosum*.

Thomas Statter, Esq., showed *Cattleya intermedia* under the erroneous name of *C. Claesiana*.

H. Grinling, Esq., Harrow Weald House, Stanmore (gr. Mr. Rapley), showed *Cypripedium caudatum Wallisii* and *C. philippinense*.

TEMPLE SHOW, MAY 21, 22, 23, 1895.

ORCHID COMMITTEE.

HARRY J. VEITCH, Esq., in the Chair, and nineteen members present.

Awards Recommended :—

Silver Flora Medal.

To Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White), for a grand specimen of *Epidendrum Stamfordianum* with thirteen fine branched spikes of flowers.

To Sir Trevor Lawrence, Bart., for a strong specimen of the rare *Cypripedium Stonei platytænium*.

First Class Certificate.

To *Cypripedium Stonei platytænium* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White).

To *Cattleya Mendelii dellensis* (votes, unanimous), from Baron Schröder, The Dell, Egham (gr. Mr. H. Ballantine). A very handsome form, with broad carmine-crimson front to the labellum.

To *Miltonia* × *Bleui virginalis* (votes, 10 for, 3 against), from Mons. Jules Hye-Leysen, Coupure, Ghent. A large white form of great merit.

Award of Merit.

To *Masdevallia* × *Shuttryana* (*M. Shuttleworthii* ♀ × *M. Harryana* ♂) (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). A pretty hybrid

with yellow flowers tinged and veined with orange-red, and with bright yellow tails.

To *Masdevallia Harryana miniata* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford Lodge, Dorking. A fine variety with rich dark scarlet flowers.

To *Cattleya Mossiæ* "Lady Wigan" (votes, unanimous), from Sir Frederick Wigan, Clare Lawn, East Sheen (gr. Mr. W. H. Young). Flowers white with yellow base to the lip and light purple veins on the front lobe.

To *Cattleya Mendelii grandis* (votes, unanimous), from Messrs. Hugh Low & Co., Clapton. A large blush-white flower; front of the lip purplish crimson, the base shaded yellow.

To *Cattleya Lawrenceana atrorubens* (votes, unanimous), from Mons. Jules Hye-Leysen, Coupure, Ghent. This is the darkest and brightest form which has yet appeared.

To *Odontoglossum Pescatorei* "La Perfection" (votes, 9 for, 4 against), from M. Vuylsteke, Loochristi, Ghent. A pretty variety with rose-tinted flowers blotched with purple.

To *Lælia purpurata Bella* (votes, 10 for, 6 against), from Messrs. W. L. Lewis & Co., Chase Side, Southgate, N. Flowers white with bright rose tinge and veining on the lip.

To *Odontoglossum Wilckeanum Lowii* (votes, 10 for, 2 against), from Messrs. Low & Co., Clapton. The flowers resembled the ordinary form except that the pale yellow petals were unspotted.

To *Cattleya Mendelii* "Prince of Wales" (votes, 9 for, 5 against), from Messrs. F. Sander & Co., St. Albans. A grand variety, with very richly coloured lip.

Botanical Certificate.

To *Brassia Keiliana tristis* (votes, unanimous), from Messrs. B. S. Williams & Son, Upper Holloway, N.

To *Vanda concolor* (votes, unanimous), from Messrs. B. S. Williams & Son.

Cultural Commendation.

To Messrs. Jules Hye-Leysen, Ghent, for *Lælio-Cattleya* × *Hippolyta*, with eight flowers on a spike (votes, unanimous).

To J. Gurney Fowler, Esq., Glebelands, South Woodford (gr. Mr. J. Davis), for a large specimen of *Epidendrum Wallisii* (votes, unanimous).

Special Awards:—

Silver Cup (in order of merit).

To Messrs. F. Sander & Co., St. Albans, for a group of Orchids and new plants.

To Baron Schröder, The Dell, Egham, for a group of Orchids.

To Sir Trevor Lawrence, Bart., Burford Lodge, Dorking, for a group of Orchids.

To Sir Frederick Wigan, Clare Lawn, East Sheen (gr. W. H. Young), for a group of Orchids.

Silver Gilt Flora Medal.

To Messrs. Charlesworth & Co., Heaton, Bradford, for a group of Orchids.

To Mr. James Cypher, Queen's Road, Cheltenham, for a group of Orchids.

To J. Gurney Fowler, Esq., Glebelands, S. Woodford, for a group of Orchids.

To Messrs. W. L. Lewis & Co., Chase Side, Southgate, N., for a group of Orchids.

To Messrs. B. S. Williams & Son, Upper Holloway, for a group of Orchids.

Silver Gilt Knightian Medal.

To Welbore S. Ellis, Esq., Hazelbourne, Dorking, for a group of Orchids.

Silver Flora Medal.

To the Right Hon. Earl Percy, Syon House, Brentford (gr. Geo. Wythes), for a group of Orchids.

To Malcolm S. Cooke, Esq., Kingston Hill (gr. Mr. Buckell), for a group of Orchids.

Other Exhibits.

M. Jules Hye-Leysen showed *Cypripedium Lawrenceanum* Hyeanum and *Miltonia vexillaria gigantea*.

Mons. Vuylsteke, Ghent, showed *Odontoglossums*.

Fred Hardy, Esq., Tyntesfield, Ashton-on-Mersey, sent *Sobralia macrantha alba*.

J. Charlton-Parr, Esq., Grappenhall Heyes (gr. Mr. R. Elphinstone), showed *Cypripedium præstans*.

Norman C. Cookson, Esq., Oakwood, Wylam-on-Tyne (gr. Mr. Murray), showed *Lælio-Cattleya* × *eximia*.

W. P. Berkenshaw, Esq., West Hill, Hesel, Hull, sent *Cypripedium Rothschildianum superbum*.

H. Shaw, Esq., Stamford House, Ashton-under-Lyne (gr. Mr. J. Cliff), sent *Cypripedium Victoria Marie* and *Odontoglossums*.

M. Wells, Esq., Broomfield House, Sale (gr. Mr. R. Hinds), showed *Cattleyas* and *Lælias*.

ORCHID COMMITTEE, JUNE 11, 1895.

HARRY J. VEITCH, Esq., in the Chair, and seventeen members present.

Awards Recommended :—

Silver Gilt Flora Medal.

To Messrs. Jas. Veitch & Sons, King's Road, Chelsea, for a very fine group of rare Orchids.

To Messrs. F. Sander & Co., St. Albans, for an extensive group of rare and beautiful Orchids.

Silver Flora Medal.

To Mr. Chapman, of Camberwell, for a very fine collection of dried flowers of Orchids, in which the colours were well fixed.

To J. Gurney Fowler, Esq., Glebelands, South Woodford (gr. Mr. J. Davis), for a group of well-grown showy Orchids.

To Messrs. Hugh Low & Co., Clapton, for an extensive group of Orchids, chiefly varieties of *Cattleya Mossiæ*.

Silver Banksian Medal.

To De B. Crawshay, Esq., Rosefield, Sevenoaks, for a group of *Odontoglossums* &c.

To H. T. Pitt, Esq., Rosslyn, Sevenoaks (gr. Mr. Aldous), for a group of Orchids.

To Hamar Bass, Esq., Byrkley, Burton-on-Trent (gr. Mr. Jas. Hamilton), for four splendid examples of *Cattleya Warszewiczii Sanderæ*.

To Messrs. B. S. Williams & Son, Upper Holloway, N., for a group of Orchids, in which were *Pescatorea Lehmannii grandiflora*, *P. Roezii*, and *P. R. alba*.

To Welbore S. Ellis, Esq., Hazelwood, Dorking (gr. Mr. Masterton), for a group of *Odontoglossums* &c.

To Messrs. Charlesworth & Co., Heaton, Bradford, for a group of *Lælia tenebrosa* &c.

To Messrs. W. L. Lewis & Co., Southgate, N., for a group of Orchids.

To W. M. Appleton, Esq., Tyn-y-Coed, Weston-super-Mare, for a group of *Cypripediums* &c.

To Mr. Onzo Fukuba, of Messrs. Veitch & Sons, Chelsea, for a collection of dried flowers of Orchids.

First Class Certificate.

To *Cypripedium bellatulum album* (votes, unanimous), from Sir Frederick Wigan, Clare Lawn, East Sheen (gr. Mr. W. H. Young). A pure white unspotted form of great beauty.

To *Cattleya superba alba* (votes, unanimous), from Thos. Statter, Esq., Stand Hall, Whitefield, Manchester (gr. Mr. R. Johnson). A pure white form.

To *Cirrhopetalum robustum* (votes, unanimous), from Messrs. Jas. Veitch & Sons, King's Road, Chelsea, S.W. A large-growing species from New Guinea, with stout scape bearing several large yellow flowers tinged with red, and with dark red labellum.

To *Cattleya Warszewiczii Sanderæ*, from Hamar Bass, Esq., Byrkley, Burton-on-Trent (gr. Mr. J. Hamilton) (votes, unanimous).

Award of Merit.

To *Lælia grandis*, Wigan's var. (votes, unanimous), from Sir Frederick Wigan, Clare Lawn, East Sheen (gr. Mr. W. H. Young). A very bright and good form of typical *L. grandis*.

To *Lælia purpurata* "Richmond Gem" (votes, unanimous), from Sir Frederick Wigan (gr. Mr. W. H. Young). A large white variety, with dark purplish maroon lip.

To *Renanthera Imschootiana* (votes, 10 for, 6 against), from E. H. Woodall, Esq., St. Nicholas House, Scarborough (gr. Mr. Hughes). A pretty species, the plant only a few inches in height, sending forth a fine inflorescence of dark red flowers, equal in size to those of *R. coccinea*.

To *Cypripedium* × *Eleanor* (*C. selligerum majus* ♀ × *C. superbians* ♂) (votes, 6 for, 5 against), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). A very fine specimen was exhibited.

To *Cypripedium* × *Frau Ida Brandt* (*C.* × *Io grande* ♀ ×

C. × Youngianum ♂) (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. A very large flower, with broad petals, resembling *C. × Morgania*.

Botanical Certificate.

To *Masdevallia campyloglossa* (votes, 9 for), from R. I. Measures, Esq., Cambridge Lodge, Camberwell (gr. Mr. H. J. Chapman).

To *Masdevallia muscosa* (votes, unanimous), from R. I. Measures, Esq.

To *Masdevallia Wageneriana* (votes, unanimous), from R. I. Measures, Esq.

To *Masdevallia gemmata* (votes, unanimous), from R. I. Measures, Esq.

To *Masdevallia demissa* (votes, 8 for, 1 against), from R. I. Measures, Esq.

To *Scuticaria Hadwenii* (votes, unanimous), from W. C. Walker, Esq., Percy Lodge, Winchmore Hill (gr. Mr. Geo. Cragg).

To *Oncidium insculptum* (votes, unanimous), from W. C. Walker, Esq.

To *Bifrenaria vitellina* (votes, unanimous), from Messrs. W. L. Lewis & Co., Chase Side, Southgate, N.

To *Sarcanthus Williamsii* (votes, unanimous), from Messrs. W. L. Lewis & Co.

To *Disa longicornu* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White).

To *Habenaria dilatata* (votes, unanimous), from Mr. Ware, Tottenham.

Cultural Commendation.

To J. T. Bennett-Poë, Esq., Holmwood, Dorking (gr. Mr. Downes), for *Cypripedium caudatum Wallisii* with thirteen flowers (votes, unanimous).

Other Exhibits.

Baron Schröder, The Dell, Egham (gr. Mr. H. Ballantine), showed *Lalio-Cattleya × eximia*, *L.-C. × Canhamii*, and *Sobralia macrantha Kienastiana*.

Sir Trevor Lawrence, Bart., showed fine plants of *Luisia Amesiana*, *Masdevallia gargantua*, *M. × Stella*, *M. × Gairiana*,

M. × torta, *Pleurothallis macroblepharis*, *Bulbophyllum Lobbii*, &c.

W. R. Lee, Esq., Beech Lawn, Audenshaw, Manchester (gr. Mr. Billington), sent *Lælio-Cattleya × Aphrodite* (*C. Mendelii × L. purpurata*).

A. Campbell, Esq., Kennishead, Glasgow (gr. Mr. Reid), sent *Odontoglossum Pescatorei* var.

Reginald R. Young, Esq., Liverpool (gr. Mr. Poyntz), sent *Cypripedium × superbiens* and *C. × Dayanum-superbiens*.



FIG. 21.—*PHAIUS × COOKSONÆ*. (*Journal of Horticulture*.)

Mr. A. A. Peeters, Brussels, showed *Cattleya × Parthenia*.

F. A. Gledstanes, Esq., Gunnersbury, showed *Cattleya Mossiæ*.

Prize:—

Class 1.—For the best seedling Orchid, not exhibited previous to January 1, 1895. Six hybrids were brought to compete for this prize, which was awarded to *Phaius × Cooksonæ* (*P. Humblotii* ♀ × *P. grandifolius* ♂), exhibited by Norman C. Cookson, Oakwood, Wylam-on-Tyne (gr. Mr. Wm. Murray).

The variety bore a resemblance to *P. × Owenianus* and others of its class. Sepals and petals nankeen-yellow; lip bright yellow at the base, with brown-purple markings, the well-defined front lobe rose colour. (Fig. 21.) In competition with it Miss Harris, The Grange, Lamberhurst, showed *Lælio-Cattleya × Harrisii* (? *L.-C. × Schilleriana × C. Mossiæ*), a fine hybrid with a three-flowered inflorescence equal to *L. purpurata* in size and somewhat similar in form. Sepals and petals blush-white; lip chrome-yellow at the base, carmine-crimson in front. Messrs. F. Sander & Co. entered *Cypripedium × Frau Ida Brandt* (*C. × Io grande* ♀ × *C. Youngianum* ♂); *C. × A. de Laresse* (*C. Curtisii* ♀ × *C. Rothschildianum* ♂); *Sobralia × Veitchii grandiflora*, and *Thunia × Veitchiana magnifica*.

ORCHID COMMITTEE, JUNE 25, 1895.

SYDNEY COURTAULD, Esq., in the Chair, and thirteen members present.

Awards Recommended:—

Silver Flora Medal.

To Messrs. Jas. Veitch & Sons, Royal Exotic Nursery, King's Road, Chelsea, for a group of rare Orchids, among which were *Epiphronitis × Veitchii*, *Lælio-Cattleya × Canhamii alba*, *Disa × Veitchii*, and many other rare hybrid Orchids.

To Fred Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. T. Stafford), for a select group of Orchids, including some hybrid *Lælio-Cattleyas*, two white forms of *Sobralia macrantha*, &c.

Silver Banksian Medal.

To J. Gurney Fowler, Esq., Glebelands, South Woodford (gr. Mr. J. Davis), for a group of Orchids, in the centre of which was a specimen of the yellow-petalled *Lælia tenebrosa*, Walton Grange var.

To H. T. Pitt, Esq., Rosslyn, Stamford Hill (gr. Mr. Aldous), for a group of Orchids, in which the fine varieties of *Lælia tenebrosa* were prominent.

To Messrs. Hugh Low & Co., Clapton, for a group of Orchids, including two fine and dissimilar forms of *Cypripedium × Gertrude Hollington* (*C. ciliolare* ♀ × *C. bellatulum* ♂).

First Class Certificate.

To *Dendrobium × illustre* (*D. chrysotoxum* ♀ × *D. Dalhousieanum* ♂) (votes, unanimous), from Messrs. J. Veitch & Sons, King's

Road, Chelsea, S.W. A very fine hybrid, with the leafy stem of *D. Dalhousieanum*, but short and thickened at the base. The plant bore a two-flowered inflorescence, but the spike gave evidence that more might be expected. The flowers bore a remarkable resemblance to those of *D. albo-sanguineum*, but were thicker in texture and of a clear straw-yellow colour, the disc of the downy lip being marked with purple. (Fig. 22.)

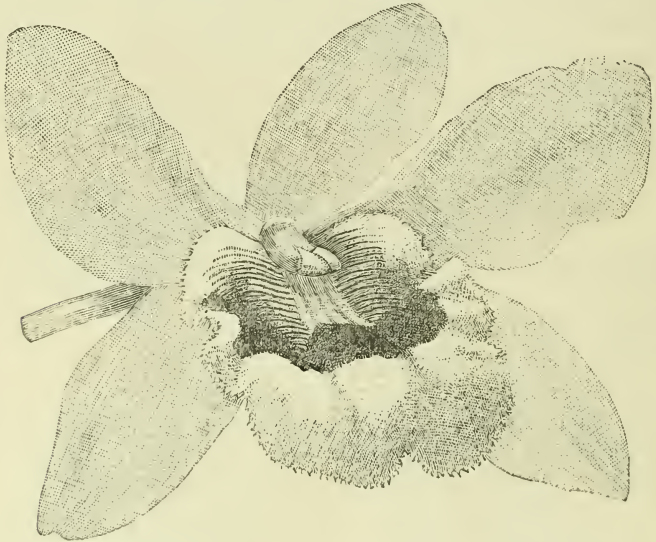


FIG. 22.—*DENDROBIUM* × *ILLUSTRE*. (*Journal of Horticulture*.)

To *Lælio-Cattleya* × *C. G. Roebling* (*L. purpurata alba* × *C. Gaskelliana*) (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. Its large flowers approached nearest to *L.-C.* × *Canhamii*. Sepals and petals blush-white; lip yellow at the base, with a few thin purple lines; front lobe amethyst-purple with a white margin.

Award of Merit.

To *Cattleya* × *Warszewiczii* var. (votes, unanimous), from the Right Hon. Lord Rothschild, Tring Park, Tring (gr. Mr. E. Hill). A very handsome form, in which the lip is entirely of a bright crimson-purple, the yellow blotches usually seen in the species at each side of the lip being absent.

To *Lælia tenebrosa* Pittiana (votes, unanimous), from H. T. Pitt, Esq., Rosslyn, Stamford Hill (gr. Mr. Aldous). The variety



FIG. 23.—CYMBIDIUM × KIMBALLIANUM. (*Gardeners' Chronicle.*)

has yellow sepals and petals veined with purple, and blush-white lip with dark rose-crimson veins.

To *Lælia tenebrosa*, Charlesworth's var. (votes, unanimous), from Fred Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. T. Stafford). Sepals and petals dark reddish brown; lip bright rose-crimson veined with purple.

To *Orchis latifolia*, Glasnevin var. (votes, unanimous), from F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin. A major form of the type, and better in every respect.

Botanical Certificate.

To *Dendrobium inversum*, hort. (votes, unanimous), from J. Bradshaw, Esq., The Grange, Southgate, N. (gr. Mr. Whiffen). The little plant, which was about two inches in height, was imported from Burmah. It bore a two-flowered inflorescence. The flowers were similar in size and colour to those of *Lælia cinnabarina*, the base of the lip turned upwards.

To *Pleurothallis immersa* (votes, unanimous), from R. I. Measures, Esq., Camberwell (gr. Mr. H. J. Chapman).

To *Orchis latifolia*, from F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin.

Other Exhibits.

Thos. Statter, Esq., Stand Hall, Whitefield, Manchester (gr. Mr. R. Johnson), exhibited a small collection of *Lælio-Cattleyas* &c.

Messrs. F. Sander & Co., St. Albans, staged an effective group of rare Orchids, including *Cypripedium* × *Kimballianum* (fig. 23), which is supposed to be a hybrid between *C. Rothschildianum* and *C. Dayanum*.

De B. Crawshay, Esq., Rosefield, Sevenoaks (gr. Mr. S. Cooke), showed the pretty white *Lælia purpurata* "Venus," and the spotted *Odontoglossum crispum* *Crawshayanum*.

Messrs. Charlesworth & Co., Heaton, Bradford, showed *Cattleya Mendelii*, Charlesworth's var., a light form resembling *C. M. Morgania*, but with more ample fringed lip.

A. J. Hollington, Esq., Forty Hill, Enfield (gr. Mr. Ayling), showed *Cypripedium* × *Millmanii* (*C. Lawrenceanum* ♀ × *C. philippinense* ♂).

F. M. Burton, Esq., Highfield, Gainsborough, sent the same cross as *Cypripedium* × *Burtonii*.

J. Forster Alcock, Esq., Northchurch, Berkhamstead, sent *Gongora cassidea*.

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ROYAL HORTICULTURAL SOCIETY.

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PART II.

FRUIT CULTURE IN FRANCE.

[Read August 14, 1894.]

By M. CHARLES BALTET, F.R.H.S., President of the
Pomological Congress of France.

It is now some years since Mr. Gladstone, at Hawarden, recommended farmers to devote a portion of their land to the cultivation of fruit, if they wished to live happily and to be able to pay their rent. "Of Apples, Pears, Cherries, Plums, and Strawberries," he said, "you never produce enough." And, as a matter of fact, has not the extensive cultivation of fruit-trees enriched many nations of the old and new worlds? What numerous industries have sprung from the prosperity of fruit culture! Has it not sustained the agriculturist in his farming experiments? And the pleasure and profit it returns, have they not induced our country youths to remain under the paternal roof, and cultivate the family acres, instead of roaming the world in search of phantoms or sinking down into the misery of our already overcrowded cities?

France, with its varied climate and endowed with such numerous means of transport by land and sea, has entered heart and soul into fruit cultivation both as an agricultural and as a commercial pursuit. In the following paper I have but just indicated, as it were, the landmarks and principal points, hoping

possibly to treat them more fully at some future time. The concluding portion I have devoted to the enumeration of the principal varieties recommended to fruit growers, whether to the amateur for home consumption or to the farmer for commercial purposes.

Through its middle-class manufacturing and agricultural population the United Kingdom has always encouraged our efforts by itself marching constantly in the forefront of fruit-tree culture, by its illustrious pomologists, by its eminent gardeners, and by the example and influence of the indefatigable and renowned Royal Horticultural Society of Great Britain.

PART I.

FRUIT CULTURE FROM A BUSINESS POINT OF VIEW.

THE APRICOT (*ARMENIACA*).

The Apricot is a good fruit both for the table and for trade; its cultivation does not necessitate any special requirements. It has remained wild in its native country to the present day, and it is to France that we owe all the cultural improvements which it has at present received.

From a commercial point of view there may be said to be three great centres for the trade production of Apricots, namely:

1. *Lions*, on the banks of the Rhône, in the south of the department of that name, and in the Isère towards Vienne.
2. *Clermont*, in Limagne d'Auvergne, where Apricot jam is extensively made.
3. *Avignon*, the centre of a district including the departments of Gard, Bouches-du-Rhône, and Vaucluse.

One might add to these the *Paris*, *Bordeaux*, and *Bourgogne* varieties.

I have myself visited these different centres of production, and find them very interesting as well as renowned in the fruit market.

The first consignments to the Paris market arrive in June, and come from Spain and Algiers; these are quickly followed by others from Provence, Vaucluse, Gard, and Pyrénées-Orientales. These again are succeeded by those from Bordelais, Agenais, Anjou, Lyonnais, Bourgogne, Auvergne, and Touraine.

Paris Apricots.—Under this name in the market is understood

such fruit as is received from and cultivated in the departments of the Seine and Seine-et-Oise. The preservers in Paris receive a large part of their consignments from Triel (Seine-et-Oise), where the farmers cultivate the *Pêche*, *Alberge*, *Blanc*, and *Royal* Apricots. The common kind is often sent to them in a green state for preserving, during which process the fruit will clear itself.

The cultivation of Apricots on the banks of the Seine shows in places very considerable differences in the variety cultivated and in the method adopted. Thus the fruit-growers at Triel select the varieties *Blanc* or Common, *Alberge*, and *Pêche*; they grow tall standards, much trimmed and pruned, with the branches well thinned out. The grower himself picks the fruit, packs it, and takes it in the evening to the Paris market. A little further off at Bennecourt, including the villages Gloton and Tripleval, the fruit is sold on the spot. Here, until quite recently, the high banks, sloping steeply, were stone quarries supplying the macadam for the streets of Paris; but now plantations of Apricot, Cherry, and Black Currant, with fields of Asparagus and Peas and other early vegetables, cover them with their shade and useful productions, extending as far as La Roche-Guyon opposite the Bonnières station on the Normandy railway. The *Royal* variety of Apricot predominates on these slopes; it is more robust and productive than the others. Its fine early fruit fetches the large sum of 200 francs per 100 kilos.* Their old gold colour and their size (known as "four to the pound") make them a greatly appreciated luxury. From eight to ten thousand trees are said to grow in the district of Bennecourt, the greater part of them being grafted on the Almond, on account of the nature of the soil. The tree is grown as a bush or half-standard, with a trained head, and in this way it throws itself more into the production of fruit than of wood growth. The crop is at its best towards the middle of July, and is considered of sufficient im-

* For the convenience of the English reader, the following approximate equivalents of the weights and measures mentioned by Monsieur Baltet are given:—

An *Are* = 4 square perches.
 A *Centiare* = 1 square yard.
 A *Hectare* = $2\frac{1}{2}$ acres, nearly.
 A *Hectolitre* = 22 gallons, or $2\frac{3}{4}$ bushels.

A *Kilo*. = $2\frac{1}{4}$ lbs.
 A *Litre* = $1\frac{3}{4}$ pints.
 A *Metre* = $3\frac{1}{4}$ feet.
 A *Poinçon* = about 25 gallons.
 A *Quintal* = 100 lbs.

portance to be marked on the almanac amongst the fairs and markets of the month. At this season at least a score of merchants arrive and publicly announce the prices at which they are prepared to buy. They receive, weigh, pack, and despatch the fruit to Paris, or to the shipping ports for the North of Europe. In 1881 the price reached 140 francs for the 100 kilos., and left Bennecourt and the surrounding villages nearly 140,000 francs richer. Twenty-four hours' longer ripening will often make a difference of as much as 20 francs per 100 kilos. to the value of the fruit.

The Lyons Apricots are found plentifully enough in plantations on the slopes, hillsides, and fields in the Lyonnais district. In the neighbourhood of Lyons we find the varieties *Hâtif du Clos*, *d'Oullins*, *de Jouy*, *Défarges*, and *Précoce de Monplaisir*, all good for export. The *Apricot de Hollande* is grown here under the name of *d'Ampuis*. In the Gironde department it is known as the *Amande-douce* Apricot. The *Commun* Apricot, grown amongst the vines in Bessenay, is well known to preservers. The Lyons market also receives consignments from the Saône-et-Loire and Isère departments. The gardens of Vienne (Isère) provide more than 100,000 kilos. of the *Luizet* Apricot for export every year.

The Saumur Apricots are sufficiently plentiful to cause a fall in the Paris market. They are grown in great quantities in the Saumurois department, and in the valley of the Loire from Tours to Angers. The country here is rich in vineyards, and the department Maine-et-Loire alone exports yearly 20,000 kilos. of Apricots.

Clermont Apricots.—The Puy-de-Dôme Apricot plantations have for many years past had a great reputation on account of the celebrity of the *pâtes d'Abricot* made at Clermont.

The plantations of Auvergne, in the neighbourhood of Clermont, Riom, Châtelguyon, Saint-Hippolyte, and Marsac, are composed almost entirely of the *Commun* Apricot. The fertile valley of the Veyre is rich in Apricot and Apple trees; the special quality of the fruit grown here is due to the volcanic soil, and the fruit growers are always sure of a good market for their produce, as the local confectioners use it for making the well-known *pâtes de Clermont*. Since 1879 six manufactories have utilised the produce for *pâtes d'Abricot*, exported annually

to England, Russia, Turkey, and the United States to the value of 3,000,000 francs.

The Avignon Apricot owes its chief market value to its being an early fruit and a crop which can be depended upon. In 1881, after the disasters caused by the severe winter, the Apricots from the South were of enormous value. The first consignments from Tarascon were sold at the extraordinary price of 200 francs per 100 kilos., but they afterwards fell to 100 francs, 80, 60, 40, and even 30 francs. The lowest average value in any one season has been 45 francs. One of the clever working proprietors of the province sold the produce of 1 hectare of Apricots for 1,950 francs, gathered at the expense of the buyer.

The Apricot *Rouge-hâtif*, arriving first, is generally sold retail at 100 francs per 100 kilos. The *Amande-douce* Apricot is mostly bought up by the confectioners. With regard to the *Pêche* variety, which we rank among the best, its late ripening diminishes its trade value. In the Vaucluse department this variety, being much exposed to the frosts, is not much cultivated. The cost of the gathering, packing, and carriage of Apricots, either to market or to the railway station, is reckoned at 3 francs per 100 kilos., without the basket. In the provincial district of Sénas, which prospers by its early fruit, an orchard composed of 30 Apricot trees produced more than 2,000 francs' worth in one gathering. At Boulbon the fruit nets 100,000 francs; at Barbentane the immense bush Apricot trees produce 300 kilos. of fruit each. The inhabitants of Barbentane, Boulbon, and Châteaurenard in six weeks send off fifty waggon-loads of Apricots, Cherries, Potatos, and Peas. The gardens here are sheltered from the high winds by fences made of reeds, or by hedges of Pear trees; whilst the orchards are protected by avenues of Plane trees, or more often by rows of Cypress.

Trente, in the South, is very favourable to the cultivation of Apricots; the variety grown there is called the Apricot *du Midi*.

In the orchards in the department of Var, Apricot trees are planted at intervals of 8 mètres. On the 15th June the sale commences with the *Royal* variety, a good fine-flavoured fruit for eating fresh; then comes the *Blanc Commun* variety, with a strong greeny-white skin, which makes it more suitable for preserving; then the *Pêche-précoce*, the *Boucaraude*, and the

Pêche or *de Nancy* varieties, which all ripen from the 10th to 20th July.

The Pyrénées-Orientales department grows the *Rouge-hâtif* variety. Corsica has a preference for the *Gros* and *Muscatello* kinds, both of which are strong and fruitful. Algeria is now beginning to supply a little of this fruit, and the growers there ought to think more seriously about it.

Bordeaux Apricots.—The South-west produces a certain quantity of this fruit, which is consigned chiefly to the Bordeaux market, which draws its supplies mainly from Aiguillon, Tonneins, Port-Sainte-Marie, and Nicole. The last village is in the department of Lot-et-Garonne, and has Apricot orchards in the middle of other plantations on steep slopes with a south aspect. The sale amounts to 100,000 francs annually. The common varieties predominate here, and especially the one with a bitter kernel. The fruit is sent to Bordeaux in large baskets, both round and oval, and even in punnets when it has a long journey to make.

The Bourgogne Apricot.—This variety is almost entirely peculiar to the Côte-d'Or department, not far from the P. L. M. railway. The varieties *Précoce*, *de Morey*, and *Royal* are grown in Bourgogne for export and for the market, and particularly for the marmalade trade. The hillsides of Morey, Gevrey, Chambolle, Beaune, Couchey, Brochon, Fixin, and Chenove are one mass of Apricots, Peaches, and early Cherries. The Apricots fetch from 80 to 100 francs per 100 kilos.

THE ALMOND (*AMYGDALUS*).

The Almond is much cultivated by nurserymen as a stock for Peach-grafting ; but in this paper it is only as a fruit-bearing tree that I shall consider it.

If the Almond tree were as robust to resist the evil effects of soil, and still more of climate, as its fruit, or rather its nut, is to stand knocking about, Almond-growing would be an industry to be recommended everywhere ; but as it is not so, the Almond is seldom cultivated for commercial purposes outside its own particular district, viz. from the Drôme to the Aude, inclusive of Provence, except in Corsica and Algeria, where it prefers mountainous districts, sheltered from the north winds. The Almond tree flowering before the foliage is developed, the

least cold coming after a mild winter, or even the chilly April dews, may prove disastrous to the growth of the fruit.

For trade purposes the fruit of the sweet Almond is divided into three classes:—

1. *Amandes dures* (hard Almonds), which can only be broken with a hammer.

2. *Amandes demi-dures* (semi-hard) or *à la Dame*, which one can crack with the teeth.

3. *Amandes fines* or *Princesse*, which can be crushed in the hand.

The province of Languedoc produces an Almond "*à la Dame*" of an elongated shape, which is considered very good by the trade. The Hérault department is more exposed to the frosts, and it is reckoned that 1 hectare of Almond trees will produce 1,000 kilos. of hard-shelled Almonds, or 400 kilos. only if they are of the thin-shelled sort.

In the South-east (or Provence), as far as the valleys of the Buech and Veynes in the Hautes-Alpes, Almonds are more plentiful. In the Lower Alps, the Almond plantations produce a much more regular crop, owing to the way in which they are sheltered from the north-east wind. The late-flowering varieties are also the most grown in these districts. The Pailherols plantations (Lower Alps), consisting of 50 hectares of Almond trees planted in rows 1 kilomètre long, give an annual yield of the value of 20,000 francs. A certain proprietor at Château-Arnoux in this department grows the *Princesse* variety at the rate of 300 kilos. per hectare, and sells at 2 francs 10 centimes the kilo. Against this the hard-shelled Almond produces 1,000 kilos. per hectare, and is sold at 45 centimes the kilo. The soil is a mixture of clay and silica. It is kept well tilled, and the pruning of the trees is carefully attended to. The railway from Cavailon to Miramas runs through a still more important orchard, 6 kilomètres long, at the mouth of the Rhône. This orchard, although exposed to a variable temperature, produces Almonds to the value of 100,000 francs, but this maximum is only attained every fifth or sixth year. One very bad year yielded only 1,200 francs, the average being 20,000 francs—that is to say, about 400 francs the hectare. The hard-shelled variety is the most grown.

The district of Aix, in the Bouches-du-Rhône department,

grows 6,000 hectares of Almond plantations; that of Arles 600, but only 100 hectares are grown in that of Marseilles. The town of Aix is the centre of the Almond trade for the neighbouring departments, and is in the hands of about twenty different firms, and brings in about 3,000,000 francs a year. Marignane, Saint-Chamas, and Toulon are equally well known in the Almond market.

A tree of the hard-shelled variety will bear about 20 litres of Almonds. The tree is at its best when from fifteen to twenty years old. One hectolitre of Almonds in the shell weigh on an average 55 kilos.

The plantations of *bitter* varieties are hardy and productive, but never in any very great demand. They are planted along the roadside and round the outside of other plantations, and in places exposed to pilfering tramps, &c.

THE CHERRY (CERASUS).

It may be said that everyone likes Cherries in one way or another, either in their natural state or as Cherry syrup or jam, or used in tarts or other confectionery. Cherry trees are to be seen almost everywhere—as often in the plains as on the mountains; tall trees as well as bush ones; growing in plantations or as an addition to an orchard, or even dotted amongst the vineyards.

The Cherry is suitable for commercial cultivation, and can be grown as a tall tree or a half-standard. It can be grown by itself or be used in conjunction with other things. When grafted on the Mahaleb it can be grown on poor and uncultivated soil. The comparatively early maturity of its fruit enables it to be profitably cultivated even in places where an early drought forestalls the autumn putting a stop to all leaf growth. In the market Cherries are quickly bought up by the consumers and manufacturers, and also for household use. They are always in great demand.

The planter for profit ought, above all, to cultivate the hardy and prolific varieties, namely:—

1. Standard varieties: The *Anglaise hâtive*, *Belle de Choisy*, *Montmorency*, *Franche*, *Belle de Chatenay*, *Reine Hortense*, and *Lemercier*. Of the black sorts, *du Nord* and *Griotte noire*.

Of the Bigarreau sorts, *Noir*, *Rouge*, and *Rose*. Of the white-hearted sorts, *Précoce*, *d'Annonay*, *Pourpre hâtive*, and *de l'Ohio*.

2. Dwarf trees : The *Anglaise hâtive*, *Impératrice*, *Lemercier*, *Belle de Chatenay*, and *Grosse Transparente* varieties. The *du Nord*, black. The *Beauté de l'Ohio* and *Pourpre hâtive*, white-hearted varieties. The *Napoléon Bigarreau*.

A.—Cherry Orchards from a Commercial Point of View.

The following are some of the principal centres for the production of Cherries suitable for trade, direct consumption, and preserving.

The Bourgogne Cherry Orchards.—The growers in the Lower Bourgogne have realised the advantage to be gained from cultivating Cherries profusely on their hillsides, more especially as they favour the most profitable varieties, namely, the Parisian *Royale hâtive* variety, the English *May Duke*, and the *Anglaise hâtive*. From the nature of the tree and its fruit, the *Anglaise hâtive* takes the lead in plantations for profit. The orchards of Saint-Bris, which produce from 100,000 to 120,000 francs' worth annually, are composed of the *Anglaise* variety. Such a good result has not failed to encourage competition. At the present time the slopes and hillsides on each side of the old road from Auxerre to Avallon are covered with Cherry plantations crowning the bare tops of the pebbly and calcareous hills, or enriching the steep slopes where it is impossible for the vine to flourish. The markets now receive supplies from Augy, Champs, Quenne, &c., whereas formerly Saint-Bris was the only consigning centre. The trees are arranged quincuncially, at a distance of three or four mètres, grafted low down on the *Sainte-Lucie* variety, and grown as bushes. From the natural disposition of the *Anglaise* variety, the foliage is dense and the growth moderate, but its productive powers are very great. The bush is seldom more than 2 mètres high, and the fruit can be gathered without the aid of a ladder, a small stick being all that is necessary.

The chief expenses incurred in cultivation of this kind may be briefly stated thus : For example, a piece of land, value about 1,000 francs per hectare, planted in rows with 800 of the *Sainte-Lucie* (*Cerasus Mahaleb*) variety, upon which are grafted

in a year or two the *Anglaise hâtive*. It is forked over twice a year, and that is all. The approximate expense per hectare for such an orchard is as follows :—

Rent of land	50	francs.
Two forkings over, at 30 francs . . .	60	„
Care of the trees, pruning, clipping, and ridding of caterpillars	25	„
Gathering of the fruit	200	„
	<hr/>	
Total	335	„
	<hr/>	
Produce : 4 kilos. per foot, at 25 centimes the kilo.	800	„
By deducting expenses	335	„
	<hr/>	
Net profit per hectare	465	„
	<hr/>	

Some proprietors obtain much more; but it must be observed that as their wives and children do the gathering, the expenses under this head are much reduced, the proprietors in this case only having to consider the cost of cultivation. During a good year the commune of Saint-Bris alone sells 100,000 francs' worth of Cherries. There are there about 400 hectares of Cherry trees, of all ages, of which half are at their best for bearing. Here and there amongst the *Anglaise hâtive* is cultivated the large black Cherry or *Griotte*, which is sold to the distillers of Paris.

The Cherry orchards in Champagne, the marshes or stony wastes of the Marne, Aube, and Haute-Marne, are beginning to be covered with the *Anglaise* species of bush Cherry trees grafted on the Mahaleb.

In the neighbourhood of Vitry-le-François a variety of Bigarreau is cultivated under the name of "Gounne." It is a firm-fleshed variety with coloured juice, suitable for dry preserves, jams, and even for Cherry brandy.

The *Franche* variety (early or late) has a sourish taste, and is now as common in Champagne as it used to be in the Montmorency valley. The vineyards of the Aube are full of them. In the neighbourhood of Troyes they are consumed on the spot, preserved in brandy, or made into jam. The trees well resisted the severe winter of 1879–1880.

A good sub-variety of the short-stemmed *Montmorency* is cultivated at Mareuil (Marne), under the name of *Belle de Sauvigny*, in sufficiently large quantities to enable five or six waggon-loads to be sent daily during the season by rail from Port-à-Binson to Paris. A similar variety is cultivated in the Ardennes between Tourteron and La Chesne, several villages selling each at least 100,000 francs' worth. When the fruit is ripe it is packed in little baskets and forwarded by train from Vouziers to London.

Le Chesnois, a small place in this district, produces Cherries and Plums to the value of 120,000 francs a year, which are sent from June to August to the station at Saulces-Monclin. The hamlet of Prin, in the commune of Serzy-Maupas (Marne), produces a good Cherry which is earlier than the *Anglaise* variety, and is consigned to the Reims market.

The Picardy Cherries.—The culture of the "Guigne" (Heart-Cherry) owes its origin to the village of Gland in the Aisne department, after which place the *de Gland* variety is named. It is now cultivated in twenty-five communes in the Marne valley, particularly between Chézy and Dormans, near Château-Thierry. Its early, sweet red fruit is amongst the first to arrive in the Paris market. The farmers use the unsold fruit for making Cherry brandy;* 12 litres of fruit will make 1 litre of brandy. Each tree occupies about 50 centiares—or rather used to, for the severe winter 1879-1880 killed nearly 100,000 trees in the valley, all twenty to fifty years old.

The beautiful valleys of Fourdrain, St.-Erme, Outre, and Ramecourt are celebrated in the London market for the production of good Cherries. Here also the 32 degrees of frost experienced did much harm. The *Montmorency* variety, however, seems to have resisted it well. The same may be said of the White-heart and Bigarreau varieties, so abundant in Royaucourt and Mons-en-Laonnois, since the black kinds proved so unreliable.

Cherries are much cultivated in the neighbourhood of Noyon (Oise). The fruit is collected from small growers and ultimately consigned to the English market. The roads committee undertake the planting of the trees and the gathering of the fruit, from the proceeds of which they are enabled to keep the roads

* Not the Cherry brandy made by placing the raw fruit in brandy—but brandy made from the distillation of the fruit of the Cherry, known as Kirsch-wasser.—ED.

and banks in the communes of Aisne, Oise, and Somme in good repair.

Cherry Plantations in the South.—Owing to its comparatively warm winter and early summer, the South of France is able to keep the North supplied with early fruit. Bordeaux does a large trade in Cherries. The *St. George* variety, which is cultivated about Roussillon, ripens in April, especially when grown in the neighbourhood of Céret.

Both Bigarreau and other Cherries are grown in the Languedoc district, but not in such large quantities as in Provence, which is so favoured both by sun and moisture. Here I have seen extensive orchards of short-stemmed trees, which thus escape the cold north-east wind, and are enabled to send large supplies of early fruit to the towns in the North. The Bigarreau is largely cultivated in the Gard district, also round about Moissac (Tarn-et-Garonne) and in the commune of Rouffiac (Haute-Garonne).

In the neighbourhoods of Tarascon, Avignon, Saint-Remy, Solliès-Pont, La Ferlède, La Crau, Le Luc, and Vidauban the "Guigne" (Heart-Cherry) is preferred for export—namely, the *de Bâle* (early) and *du Luc* varieties, which are at their best from the 20th of April to the 5th of May. Next come in order of ripening the *de Mai* Bigarreau, a local variety, also the *Holland* and *à Courte Queue* and the *Montmorency* Cherry. At the present time a great many *Oullins* (early) and *Jaboulay* "Bigarreau" varieties are cultivated, the latter ripening from the 1st to the 10th of May.

The Guignes (Heart-Cherry) are less hardy than the Bigarreus, and do not bear the great heat in the Provence department as well as the latter. I have known plantations of 350 trees to produce 1,000 kilos. of Cherries of the early *de Bâle* variety, planted at a distance of $2\frac{1}{2}$ mètres, the fruit being sold for 700 francs.

Another Vaucluse orchard, composed principally of the *Jaboulay* variety, is manured every other year with silkworm chrysalises!—the trees being planted 7 mètres apart.

During the first fortnight in June, Solliès, in the Var department, forwards daily five or six waggon-loads of Cherries. The orchards are getting much more extensive. At Grans, in the same district, the early *Guigne de Bâle* is packed up in small boxes purchased at Solliès-Pont, ready made and ornamented

with fancy paper, for 15 centimes ($1\frac{1}{2}d.$) each, and each little box containing 1 kilo. of Cherries, when sent to Paris, fetches from 4 to 5 francs in the early season.

Various Cherry Districts.—For a considerable distance round Paris farmers cultivate Cherries for trade purposes. The smaller villages make quite an honest penny in this way. Thus, Villiers-Saint-Frédéric (Seine-et-Oise), with a population of 300, sends every season 30,000 francs' worth of Cherries to Paris. The capital also receives consignments of both Cherries and Bigarreaus from Montmorency, Dammartin, Meaux, La Celle-en-Brie, Esbly, Quincy, and even from Vernon and Gaillon.

Lyons and Mâcon have in their neighbourhood important plantations of "Bigarreau" and "Guigne" Cherries for local consumption. Trévoux sends consignments of *Bigarreau rouge* and *Guigne noire luisante* both to Paris and London. Couzon, in the Lyons district, sends every year more than 100,000 kilos. of Cherries to Paris.

Cherry trees can be cultivated along the seacoast, as shown by the vast plantations at Carhaix (Finistère) and Balzac (Charente).

Ten thousand kilos. of Cherries are exported annually from the rich Maine-et-Loire department. In the centre of France I have seen extensive plantations at Olivet, and on the outskirts of Orléans, with large trees of the *Guigne blanche* variety, often grafted on to the *Anglaise*; also of the *Olivet* Cherry, a common variety in the Montmorency district.

B.—Cherries used in the Manufacture of Brandy (*Kirsch-wasser*).

The Brandy (*Kirsch*) Cherry is cultivated on fallow lands, and in plantations along the roads, as anyone may see in the Haute-Savoie, the Jura, the Doubs, and the Haute-Saône districts, where its commercial value is constantly on the increase.

The varieties preferred for distilling are neither early nor late, but a mid-season variety called locally *Rouge amère*, *Rouge Grand'queue*, *Journée*, *Frontelle*, *Tinette* (red varieties), *Noire basset*, *Baissard*, *Haut Château*, and *Noisette* (black varieties), and several others, which are used only for the manufacture of *Kirsch*.

The Guigniers *Tinette* ("Rouge des Vosges") and *Baissard*

or *Baisseuse* ("Noire des Vosges") are extremely plentiful in the Vosges district. The last-named variety is so called on account of the way its branches droop. A combination of the two fruits produces a first-class Kirsch. At Bains (Vosges) an orchard of 27 ares, containing 24 trees, all forty years old, produced, in 1891, 800 francs' worth of Kirsch.

It is estimated that a wild Cherry tree, twenty to thirty years old, will produce 30 to 60 kilos. of fruit, valued at 25 to 40 francs per 100 kilos., but the price drops to 25 francs during years of great abundance.

Gathering the fruit costs 2 francs 25 cents. to 3 francs 25 cents. per 100 kilos., according to the fertility of the trees. The picking, though done at intervals, does not last for more than about ten to twelve days.

The Franche-Comte alone produces annually 12,000 hectolitres of Kirsch or Cherry.

It takes $17\frac{1}{2}$ lbs. of Cherries to make one litre of Kirsch according to the usual receipt.

THE QUINCE (CYDONIA).

Packed in an ordinary basket, with grass or a sheet of rough paper, Quinces can be sent direct from the orchard to the shop, to undergo the economical, medicinal, or culinary treatment for which they are destined.

Although the Quince is not a fruit for direct consumption, they are sent to market for supplying small establishments and households for occasional use in the kitchen, or for preserving, &c.

The Quince tree, being of a straggling growth, is often planted by the waterside. However, when well trimmed and grown with a tall stem, it may be cultivated in lines in a garden, or dotted about at intervals among the trees of an orchard, or even in the hedge-rows.

Its thick downy foliage, large flowers, and fruits which hang so long on the branches, have a very decorative effect, like that of the Lemon tree at Mentone.

In the Hérault district I have seen numerous plantations of the *de Portugal* variety of Quince. The proprietors cultivate them for their own personal use, and sell what is over to the

preservers. The average price is 20 to 25 francs per 50 kilos. In 1881 they were worth 50 francs, but in 1882 they fell to 15 francs. It is by no means rare for one tree to bear as many as 200 fruits. Sometimes the branches are literally covered, but this is, as a rule, detrimental to the trees.

In the Maritime Alps the *Angers* and *Portugal* varieties grow to a height of 6 mètres. The fruit is preserved one month after it is gathered.

In the Centre of France as many of the *Ordinaire* as of the *Angers* variety are grown, and are sent to the manufacturers, especially to the well-known Orléans Quince marmalade makers. The trade in "Cotignac," or Quince marmalade, has encouraged the cultivation of Quinces in the neighbourhood of Orléans, though it might be more exact to say that the manufacture of Cotignac has been favoured by the abundance of fruit at St. Vincent and at other places round about Orléans. A Quince tree produces up to 2 poinçons (or 230 litres) of fruit, for which there is a sure sale to the local confectioners.

THE FIG (*FICUS CARICA*).

The Fig tree is a native of the Mediterranean district and of the seashores of the British Channel which are under the influence of the Gulf Stream. It is, however, also found near Paris in exceptional situations; but it must there pass the winter underground, which necessitates a special method of cultivation.

Under the influence of the Paris climate, the Argenteuil plantations have no rival. The climate, the nature and configuration of the soil, the intelligence of the population, even the near vicinity of the capital, all contribute to the high reputation of the oasis in this spot so blessed by the gods of the fruit growers and market gardeners. Fig trees have been cultivated here for at least two centuries, on an area of about 50 hectares, the average crop being about 400,000 fruits.

The principal variety is the *Blanquette*, a white early fruit; then, secondly, comes the *Dauphine*, a violet-coloured fruit, larger, and not so early. Everywhere the Fig tree is the object of special care, both in the planting and nipping off the small buds, and in "offsetting" the shoots, and in the careful placing of the stem and branches under the ground for the winter months.

The earlier the fruit the more money it fetches, and for this reason the cultivators hasten the ripening of the earlier Figs by inserting a drop of good olive oil into the eye of each. This must be done at the exact moment when the fruit is ready for it. The full light shade of the skin indicates the initial period of maturity. This operation should, according to ancient authorities, take place in the evening during a south or an east wind, whereas the fruit should be gathered at dawn, between five and six o'clock, after the dew has fallen.

The art of arranging the fruit with leaves in boxes or wicker baskets is only properly accomplished by the Argenteuil ladies.

The Figs sent to market are gathered before they are quite ripe, and packed in flat oval baskets with the edges a little turned up, the bottom being lined with vine leaves. The Figs are arranged in the basket so that all the eyes are towards the outside, one layer above the other, with alternate layers of leaves, in such a way that a pyramid is formed, the whole then being covered over with a newspaper firmly pinned on.

It is then despatched to Paris, and exhibited in all its glory, with the skin just beginning to crack and split; but it need fear no rivals among the provincial or Bordeaux productions. The sale is certain, and the three hundred growers in this fertile spot are enabled to increase their property with the proceeds.

In Provence quite a different method is adopted. The trees are left out of doors during the winter, and the branches are allowed to droop without any attention being paid to them, in accordance with the provincial proverb, "Fillo et figuiéro li faon pas veiré la jarretiéro" (One ought not to see the garter on a young girl or a Fig tree). Owing to the hot climate, two crops can be gathered at an interval of forty or fifty days from the double-cropping varieties, and with the other kinds a crop can be gathered from the current year's wood-growth towards the end of the season in the same year that the fruit is formed. The process of drying Figs in the sun is much facilitated by the temperature. There is a large trade done in Figs for this purpose. A plantation twenty-five years old having an area of one hectare will yield 800 francs' worth of dry Figs after deducting expenses and waste.

Among the double-crop varieties suitable for drying is the

Célestine, commonly called “la grise,” which ripens with the first ears of corn; also the *Buissonne* or “Muissonne” variety, the *Blanche* or “Versailles,” and the *d’Or* or *Dorée* Fig. The other varieties which ripen in the middle of August are the *Blanquette*, called the “Marseillaise,” the *Bourjassotte*, the *Bellone*, the *Datte*, and the *Aubigne*, which follow one another during two or three months.

We also find the Fig tree on the coasts of Brittany favoured by the warm currents of the Gulf Stream, the advantage of which is shown by the giant trees at Roscoff and Quimper, nearly three centuries old, some of which are 12 mètres high and 18 mètres in diameter.

THE RASPBERRY (*RUBUS VITIS IDÆUS*).

Although the Raspberry is not a suitable fruit for distant carriage, it is nevertheless extensively grown, and a large trade is done in the fresh fruit, as well as in crushed and distilled.

The commercial value of Raspberries is on the increase, on account of the numerous ways in which they are utilised—namely, for household use and for the manufacture of jam, for distillation, and for making a dessert wine.

Raspberry Plantations in the Neighbourhood of Paris.—Paris consumes annually 5,000,000 kilos. of Raspberries, grown in the neighbourhood. The market gardeners and fruit and vegetable growers always devote some portion of their land to Raspberry growing. On some swampy piece of ground, or the north side of an orchard, or on open fields, Raspberries may be seen cultivated in squares or beds or in lines. They can be seen thus at Vincennes, Nogent, Argenteuil, Bougival, Marly, Bagnolet, Verrières, Igny, &c. Cultivators prefer the red oblong *Gambon*, the early *Pilate*, and the flesh-coloured *Souchet* varieties; also a sort with thick wood and few thorns and suckers.

Raspberries in Burgundy.—At Plombières, near Dijon, the fields of Black Currant bushes are rapidly changing into Raspberry plantations, because the Black Currant is not used for a dessert fruit, nor has its wine (*cassis*) much commercial value as a public-house drink. Raspberries are more used also for making light wines, and are grown profitably in certain districts where Black Currants would not find the conditions necessary for the

production of good fruit. The Burgundy Raspberry is sent to London to syrup manufactories in small casks or hogsheads.

My friend Mr. Weber, head gardener at the Dijon Botanical Gardens, estimates the total value of the Raspberries produced at Dijon and in the neighbouring "communes"—Plombières-les-Dijon, Talant, Fontaine, and Daix, situated to the north-west of the town—to be 500,000 francs.

The Lorraine Raspberries.—The growing success of the fruit distillery at Lunéville has encouraged the cultivation of Raspberries on vast tracts of land in Lorraine. At the present time the *Hornet* variety, with its bright-coloured juice, is cultivated on many hectares of the fertile valley between Thionville and Metz.

The juice of Raspberries is very largely used in making syrups and sweets, and also enters into the composition of many wines and liqueurs.

CURRANTS (RIBES).

Currants are a fruit suitable for commercial cultivation. They will grow in any soil, can be readily increased by cuttings, and there is no difficulty whatever in the pruning. They grow well in fields or orchards, in lines, borders, or groups. In the North of France they are planted in orchards by the side of Plum and Cherry trees, which protect them from the white frosts.

Red and White Currants (Ribes rubrum).—There is always a sure demand for Red and White Currants in the market, for direct consumption, and for the jam, liqueur, and syrup manufactories. A large trade is done in Currants at Saint-Denis, Sannois, Montmorency, and in the country round. The *Rouge* variety is preferred, and is used for making jam and syrup. About 4 kilos. are produced by each bush. Near Sceaux the early white dessert Currant *Blanche hâtive* is most grown. This variety produces about 2 kilos. per bush, value 40 centimes. The *Blanche hâtive de Versailles* variety, with larger fruit and amber-coloured stalk, is cultivated at Châtenay-Aulnay. Fontenay, Verrières, Bagnolet, and Montreuil are all equally successful in the cultivation of Currants. The early ripening varieties, with an equal yield, bring in 50 per cent. more than the others.

The first consignments of Red and White Currants at

Bordeaux will fetch up to 60 francs per 50 kilos.; this price drops to 50, 40, and 30 francs during the height of the season. Red Currants, being of more value to the preserver and to the chemist, and for ordinary household purposes, will fetch 10 francs per 100 kilos. more than the white ones. In France we estimate that 1 are of Currant bushes will produce 20 francs' worth of fruit.

The Lambersaert and Lompret plantations in the North, with bushes $1\frac{1}{2}$ mètres across, will yield up to 2,000 francs per hectare, the purchaser gathering the fruit at his own expense. On such fertile soil, and with a climate so favourable to Currants, bushes will produce as much as 18 kilos. of fruit, value 40 centimes per kilo. In the north-west of Lille and round about Lomme Currant-growing is very popular. In large plantations 10,000 bushes are grown per hectare, yielding 6,000 kilos. of fruit. The rows of Cherry and Plum trees, planted at a distance of 10 mètres, largely add to the value of the field, and also protect the Currant and Raspberry bushes from spring frosts.

The village of Champigneulles, near Nancy, has one entire side planted with Currants, the bushes being shaded here and there by standard Cherry, Plum, and Pear trees.

The confectioners of Bar-le-Duc, of such renown, purchase a large supply of the *Rouge* variety from Rosières-devant-Bar, Lavallée, and Ancerville; and also of the *Blanche* variety from Bar-le-Duc and Behonne. The jam manufactories at Bar-le-Duc and Ligny turn out annually 200,000 pots of Currant jelly and jam. Currants are also largely grown round about Andelys, and are sold to the jam and liqueur makers in Rouen and London.

Black Currants (Ribes nigrum).—One can always be sure of a sale for Black Currants on account of the large quantity used in the distilleries, but we need not trouble at that, for as it is the public-houses are supplied with far too many inferior wines. The Dijon Black Currants have a well-known reputation. They are abundantly cultivated in the Bourgogne district, especially from Dijon to Chagny, and from Nolay to Montbard. The hill-side vineyards of Vougeot, Vosne, Chambolle, and Marsannay also produce the finest Black Currants—the very cream of Black Currants. The bushes are planted among the vines, or along the

roadsides, or in fields, the bushes being from 1 to $1\frac{1}{2}$ mètres apart, and each yielding about 1 kilo. of fruit, value 30 to 50 centimes, according to the relative plenty or scarcity of the season. Five thousand bushes can be grown on 1 hectare, and according to the average yield one can reckon that 1,500,000 bushes will give 10,000 hectolitres of *liqueur de cassis*, or Black Currant spirit. The Dijon manufactory uses annually 2,000,000 kilos. of Black Currants, bought at 60 to 70 francs per 100 kilos., and it is evident that the plantations extending from Mâlain to Chagny, although very extensive, are not sufficient by themselves to supply the great demand made by the distilleries.

The Aube hills, which produce the excellent Ricey wine, are now also used for Currant plantations, the fruit produced being bought up by the Cote-d'Or distilleries. When Black Currants are scarce a proportion of leaves and young shoots are mixed under pressure with the fruit; for, although inferior, they contain to a certain extent the essential and distinctive properties and flavour of the fruit.

The Paris market receives its supplies of Black Currants partly from the neighbouring country, but more especially from the Montmorency valley. Paris receives in one year 5,000,000 kilos. of Red and White Currants, and 2,100,000 kilos. of Black Currants. Not far from Paris fields of Black Currants are to be seen, planted in rows or squares—between Mantes and Vernon, and at Boissy-Saint-Léger, Méry-sur-Oise, round about Grignon, and at Sceaux, Rosny, &c. There are also vast plantations at Pantin, near the Vaujours fort. The bushes are planted as much as 2 mètres apart, which enables the plough to be used in between them. A grower recently planted 35 hectares for the purpose of supplying a distillery. It is estimated that 1 hectare will yield about 8,000 kilos. of fruit, at 50 to 70 francs per 100 kilos.; therefore the net profit should be 1,000 francs.

At Langres there is an enclosure of 3 hectares of Black Currant bushes ten years old, planted $1\frac{1}{2}$ mètres apart. The 1882 crop sold wholesale at 60 francs per 100 kilos., and yielded 13,000 francs to the owner, out of which he had to pay the gathering expenses, at the rate of 45 centimes the basket of 12 kilos. Good workmen can earn up to 5 and 6 francs a day at the picking, &c. The purchaser packs the fruit on the spot and despatches it in casks to his manufactory near Paris.

THE GOOSEBERRY (*RIBES UVA-CRISPA* OR *GROSSULARIA*).

Gooseberries may be grown in gardens, grafted into the stock of the *Ribes aureum*. But we generally cultivate it in the natural way, propagated by cuttings or layers. Nowhere in Europe is this fruit more appreciated than in England. Gooseberries are largely cultivated at Rosendaël, near Dunkerque, grown in rows in the kitchen-gardens, together with the Black Currant, Cherry, and half-standard Plum trees, for the purpose of protecting the vegetables from the sea breezes. The production of the large varieties of Gooseberries is so great that up to 2,000 kilos. are sent to the London market every day with the Potatos from the same place. Gooseberries are also popular in the North of France, but they are not grown at all in the South. At the present time, French nurserymen propagate millions of the variety called "Industry," which is not affected by mildew; and the plants are sent to the fruit farmers of the United States.

THE NUT (*CORYLUS*).

Hazel-nuts grow wild in parks and forests, and on borders of large properties, and are sometimes found planted among orchard trees. Very little care is needed for their cultivation, and the fruit is easy to gather, and stands carriage very well. For trade purposes the *Noisettes franche*, *Aveline*, and *Provence* varieties are preferred. In the Var district, and at Décapris, near Hyères, the *Grosse de Provence* variety is cultivated in plantations, which produce 800 to 1,000 francs' worth per hectare, not counting the profit from the Strawberries and Violets, which surface the ground and benefit by its irrigation. In this rich district plantations are made at the rate of 100 to 150 Nut bushes per hectare. The first real crop produced is in the fifth year. The fresh Nuts are consigned to Paris in August, or collected, dried, and sold on the spot in September to merchants for the confectioners and chocolate makers. Paris alone takes 500,000 kilos. of them.

Bushes trained on short stems of from 50 to 80 centimètres, thanks to a moderate irrigation, live a long time without needing any special treatment. Garthe and several districts of La Vendée and Bretagne have borders of Nut bushes separating the different properties, and forming hedges to roads and pathways. The town of Mans exports annually 4,000 hectolitres of

Nuts. In the Clermont-Ferrand neighbourhood the *Petite blanche* variety is preferred, which, although larger, is less productive, and has not such a fresh flavour. The Pyrénées-Orientales is another centre for the cultivation and trade in Nuts. Many hundred hectares are utilised for this purpose at Cérét, Taillet, Arles-sur-Tech, Amélie-les-Bains, Montalba, Calmettes, Oms, &c. The best known Nut is the *de Cérét* variety, with a hard shell and a white kernel, a favourite with confectioners. The *grosse Aveline* variety is more used as a dessert Nut. There is also a large trade in shelled kernels, and some crushing machines break as many as 1,500 kilos. of Nuts daily. Roussillon produces from 500 to 1,500 kilos. of Nuts per hectare, the average price being 50 francs per 100 kilos. In 1886, 250,000 kilos. of Nuts were sent from this district to Paris, Marseilles, and Bordeaux.

THE WALNUT (JUGLANS).

Walnuts do not require any special care in cultivation, the only thing which they resent being a cold or wet situation exposed to the spring frosts. The severe winters of 1709, 1789, 1829, 1871, and 1879 killed a great number of Walnut trees. There are some very late varieties which only commence to blossom when the April and May frosts are no longer to be feared. In the Centre of France they are known under the name of the *Saint-Jean* Walnut. This variety is always harder and less agreeable to eat than the *Ordinaire*, à *Coque tendre* (thin-shelled), and *Grosse* kinds, which are good varieties and more widely distributed. When one wishes to reproduce the characteristics of a particular variety, one must do so by grafting, using special precautions.

The Walnut is a good fruit for commerce, as it keeps well and is easily managed, and carries so well. In 1885 France produced 1,590,182 cwts. of Walnuts, representing a value of 25,028,462 francs after deducting the different commissions. The Drôme department occupies the first place, and then come those of Corrèze and Lot. From a business point of view Isère and Dordogne might also be named as producing Nuts valued at 33 francs and 20 francs per cwt., whilst the three more productive departments are classed at 10 francs, 13 francs 30 cents., and 17 francs per cwt.

The Isère Walnuts.—In the Isère district, where good varieties are propagated by grafting, the *Mayette*, *Franquette*, *Parisienne*, and *Marchande* varieties are cultivated for local consumption. It appears that the two last-named varieties require a lighter soil than the *Mayette* and *Franquette*; these two prefer a deep, stony, fertile soil, whilst the *Chaberte*, bought by the oil manufactories, is not so particular as to the nature of the soil, as is also the case with *Ronde*, *Culonne*, and *Thévenin* varieties, nuts specially suited for the oil industry. Rows of trees are scattered about in the fields, often accompanied by vine “trellises,” separated by cornfields and meadows.

Walnut cultivation has extended to the high valleys of Graisivaudan, as may be seen, for example, in Canton Gancelin. All the railway stations situated along this territory receive consignments of Walnuts. In 1880 the Gancelin station forwarded 100,000 kilos. of nuts. In the valley of Isère, around Saint-Marcellin, you may see trees bearing 5 to 8 hectolitres of Walnuts, selling at 20 francs per hectolitre. But even by averaging the produce at only 50 francs per tree, there is still a good profit, there being no expenses of cultivation to consider. This neighbourhood is one of the richest in Walnut trees, yielding annually 30,000 hectolitres of the *Mayette* and 50,000 of the *Chaberte* varieties, the first-named being sold at 15 francs per hectolitre for direct consumption, and the latter to the oil manufactories at 3 francs. The gathering costs about 1 franc per hectolitre. The Vinay and Tullins cantons export the *Mayette* variety to St. Petersburg to the number of 2,000,000 nuts. The proprietors in these cantons make 2,000 francs by their Walnut trees. The fruit is sent to Marseilles on willow rafts, which are floated down the Rhône, the whole, both raft and fruit, being sold upon landing. Everywhere the walnuts from Isère are the best in the market. They are sometimes called by the local name “Archiduchesse.” The 1885 crop was estimated at 2,000,000 francs.

The Dordogne Walnuts.—Dordogne has its plantations in the Sarladais district. In 1840 it was estimated that 3,727 hectares of land in this department were devoted to the cultivation of Walnuts, the number of trees being 600,000, of which 30,000 belong to Canton Sarlat. The trees are grown in plantations along the hillsides and in the valleys; they are also to be

seen by the roadside and in fields. The amount of Walnuts produced in 1887 was officially stated to be 74,000 cwts. The following are the best varieties :—

The *Coque tendre* (thin-shelled) variety ; it is rather too early, but produces excellent oil.

Lottarel, or *Nogarel* ; good, and widely grown.

The *Montignac* ; round fruit, half-tender shell, good.

The *Anguleuse*, or à *Coque dure* (hard-shelled) ; a good oil nut.

Tardive, de la Saint-Jean ; second quality, late variety.

Couturée, Couturas, or Pointue ; good fruit, somewhat elongated. Good wood for cabinet work.

A good bearing tree will produce 80 kilos. of Walnuts. A hectolitre of the ordinary nuts weighs from 35 to 36 kilos., or of picked ones 38 to 40 kilos. At the oil factories they make about 18 kilos. of oil from 100 kilos. of nuts. There are trees in the Excideuil canton which produce 70 francs' worth of nuts, that is to say from 4 to 5 hectolitres. The Thonon canton, in proportion to its size, has the largest number of Walnut trees in the central mountainous region.

Three oil factories at Poitiers have an annual production of 6,000 hectolitres of Walnut oil. The Lot department produces 150,000 cwt. of Walnuts from 3,000 hectares of alluvial and calcareous soil, and has at least 100 oil-making machines. The gigantic trees near the station at Garnat have produced as much as 12 cwt. of Walnuts. Five thousand hectares of Walnuts are cultivated in the Loire department on land having an altitude of 700 mètres above the sea level. Walnuts are grown in the limestone soil of Limagne and in the "porphyrous" soil of the forests. The inhabitants of Puy-de-Dôme consume the nuts themselves, or extract the oil and sell the wood to the cabinet-makers, gun-makers, and wooden-shoe makers.

The Ardèche department does a trade in Walnuts with Chomérac and Rochemaure, the price realised being from 30 to 40 francs per 50 kilos. The commercial value is, however, lower in the Royanez and Diois (Drôme) districts. Walnuts in their natural state are there worth 12 francs per hectolitre ; but when the nut has been taken out of the shell for the oil

manufactories, the value rises to 80 or even 100 francs the hectolitre. The amount of Walnuts produced by the Drôme department equals, and often exceeds, a quarter of the whole annual production of France. Like the nuts of Brive, the Corrèze variety has its reputation in the market. In the Savoie district the tree is to be seen in the plains, valleys, and hillsides. The produce is sold to the speculative brokers. One tree will yield on an average 50 kilos. of nuts. It is said that the Haute-Savoie exports annually 400,000 francs' worth of Walnut-wood. In the Hautes-Alpes around Gap, and in the Veynes valley, graftings are taken from the *de Tullins* variety; indeed, from all the Isère varieties.

Walnuts are thought much of in Corsica, at Omessa and Santa-Lucia. A Walnut tree forty years old will produce up to 3 hectolitres of fruit.

THE PEACH (*AMYGDALUS PERSICA*.)

The Peach is the most refined of all fruits, and is particularly in request on account of the rapidity with which the tree comes into bearing and the delicacy of its produce.

To grow Peaches as standards out of doors requires a warm climate, with an even temperature, just as the vine does. In the central districts, commencing at Lyons and going north as far as Brussels, Peaches can only be grown on a wall with a sunny aspect; but when both these requirements are provided very fine fruit may be grown.

Peaches can, of course, be grown far more cheaply as standards in the open air, and will fetch a very fair price; but those grown on trained trees on walls are more tempting looking, and, of course, dearer, as it is more expensive to cultivate fruit in this way.

In the whole of our southern zone, from Bordeaux to Nice, Peach trees are profitably grown as standards in the open air, in the fields and orchards, or amongst the vines. The ports of Bordeaux and Marseilles ship large cargoes of Peaches coming from the South-west, the South, and the South-east of France. The grafted variety which predominates in the best plantations in France is *Amsden June*, a variety of American origin having the advantages of making a good standard tree and of ripening its fruit very early in the open air. At the present

time the *Amsden* Peach can be bought in the streets of Paris three weeks before the *Montreuil* variety. The tree is strong in growth and blossom, and its fertility leaves nothing to be desired; a moderate pruning in the autumn is sufficient.

When we come to the method of training Peach trees on walls, our thoughts are at once carried to Montreuil, near Paris, which has a reputation two hundred years old for its gardens and trained specimen trees. From amongst the Peaches sent to the Paris market, the best and freshest are chosen out, packed with great care, and despatched to the North of Europe, where Peaches can only be grown under glass.

Peach-growing for Profit.—For this purpose the trees may either be planted in orchards, or in rows, or scattered about in the vineyards, or they may be trained against walls. We will consider the results of both methods.

1. *Cultivation as Standards.*—Peaches are grown as standards towards the Centre of France, in the West, and over the whole of the South. There are, however, a few exceptions—namely, in the Franche-Comté, near the gates of Besançon, Peach plantations may be seen dotted amongst the vineyards, on the hills with an east aspect, at the village of Beure. These *Beure* Peaches yield on an average annually from 40,000 to 50,000 francs. The commune of 1,100 inhabitants sells yearly from 100,000 to 150,000 francs' worth of different kinds of fruit, not counting the profit from the vineyards and the neighbouring districts of Avanne and Velotte, which obtain similar financial results. In the Dauphiné district the *Peach de Syrie*, called the “*de Tullins*” variety, is cultivated, named after a canton in the Isère district, where it has been propagated for many years. This variety reproduces itself from seed. The fruit is good, firm and well coloured, and is sent to Grenoble and Lyons, and to other towns roundabout, and even to Paris.

The country round Nice still remains faithful to the Niçarde variety, a Peach with a tough skin, highly coloured, ripening in September, whilst the plain of Sauvebonne and the Gapeau valley produce more of the soft-skinned varieties. There is one orchard at Décapris, near Hyères, which yields 50 kilos. of Peaches per tree, the trees being six years old, and of both the freestone and clingstone varieties. The owner of this estate, who is the winner of the Prize of Honour, planted in 1877 and

1878 one hundred trees in the valley of Sauvebonne, of the *Amsden* variety, which yielded in the spring of 1882 3,500 kilos. of excellent fruit, ripe about the 20th of June. The *Alexander* variety, which is hardly less early, and several other American novelties, the greater number of which are of the *Amsden June* type, resisted in the same way, and better than any others, the hard frost on March 9, 1883, on account of their late blossoming. The owner plants about 300 Peach trees per hectare, according to the character of the other things with which they are associated. The first crop is gathered in the third year, and a plantation will continue to yield for twelve years at least at the rate of 1,000 francs per hectare, not counting the crop of Strawberries which cover the surface of the ground. In 1893 150,000 kilos. of the *Amsden* variety, produced by the Décapris estate, were forwarded to the station at Hyères. Each tree in a plantation sixteen years old will yield on an average 60 to 80 kilos. of fruit.

In 1893 a Peach-grower in Provence gathered as many as 3,000 kilos. of the *Amsden* variety every day during the season. The Peach plantations in the Crau d'Arles district have reached such an importance that the Salons market, of such renown, has become insufficient, and the other communes of the canton have established similar markets for the sale of Peaches. Just as the Basses-Alpes grow the *Brunet* and *Mézel* varieties for preserving, so the Ariège department grows the *Ricard* for the large "Peach fairs," and the extreme South-west the *Madeleine hâtive*, a free-stone variety, for direct consumption.

In the Pyrénées-Orientales the following early varieties are grown among the vines: *Saint-Assisclé*, *Grosse Madeleine*, *Piquerolle*, *Montreuil*, *Saint-Jacques*, *Saint-Jean*, *Pavie-Madeleine*, *Palonne*, and *Précoce jaune*. In 1880 the fruit sent in cases to the Paris market was sold at 135 francs the 100 kilos., which gives a net profit of 70 francs. It is estimated that 2,000 Peach trees give a net profit of 3,000 francs. Forty thousand Peach trees are grown in the Rivesaltes territory, all planted twelve years ago. The whole department contains 100,000 trees. The fruit is sold at an average price of 25 francs per 100 kilos.

2. *Cultivation as trained Wall Trees.*—For profitable culture several free-growing and good varieties should be chosen, ripen-

ing in succession, so as to prevent having to deal with too large a quantity at a time, as the fruit is difficult to manipulate, and soon goes back and spoils.

If it is desired to have many varieties they should be composed of the following, which I mention in order of ripening:—

1. July and August Peaches: *Amsden*, *Alexander*, *Rouge de mai*, *Précoce de Hale*, *Précoce de Rivers*, *Galande*, *Madeleine*, *Grosse Mignonne ordinaire*, *Grosse Mignonne hâtive*, *Baron Dufour*, *Précoce de Crawford*, and *de Malte*.

2. September and October Peaches: *Reine des Vergers*, *Belle Beausse*, *Admirable*, *Bourdine*, *Salway*, *Baltet*, *Lady Palmerston*, and *Princesse de Galles*.

The largest centres of production are Montreuil, near Paris, and Ecully, near Lyons, where the method of training Peach trees has been brought to perfection, as well as the number of varieties increased. The *Montreuil* fruit is always considered the best in the market. It has greatly enriched the district whose name it bears. Montreuil, which is a favoured spot both for soil and aspect, has 300 hectares of land surrounded by walls, the inner sides of which are used almost entirely for growing trained Peach trees. The total produce of these gardens is estimated at about 3,500 francs per hectare from Peaches cultivated in this way. The severe winter 1879–1880 caused losses to the value of 2,500,000 francs, including Peaches on trellises and walls, and in orchards; but there is no doubt that owing to the replacement of the dead trees by new ones, and to the fresh plantations made, the district will soon regain its former prosperity. There are 600,000 mètres of fruit walls at Montreuil, counting the walls used for dividing the different properties, which are invaluable for concentrating the heat and keeping off the cold, as well as increasing the available space for trained trees; and so, calculating that 1 mètre of wall produces 22 to 25 Peaches, one arrives at a sum of 12,000,000 Peaches as an average annual yield. Or, say that there are 300 hectares enclosed, of which 1 hectare can yield 40,000 peaches, or 1 acre 15,000, and we arrive again at a total of 12,000,000 Peaches. The first ripe fruits sell at from 2 to 3 francs apiece, and the latest, when there is no longer any competition to be feared from the South, will fetch even more. Peaches are most plentiful from the 15th of August to the 15th of September.

The Montreuil grower, endeavouring to ensure a continuous sale of fruit without any interval, has for some years largely grown *Hale's Early* as a connecting link between *Amsden* and *Early Grosse Mignonne*. The variety *Baltet*, which ripens about October 15, ends the season of good Peaches.

In 1892 Montreuil produced 600,000 francs' worth of Peaches and Apples, and 200,000 francs' worth of other fruits; it also sent out a total of 800,000 francs' worth of vegetables, and flowers to the value of 300,000 francs, besides a quantity of Grapes, the produce of 45 hectares of vines.

THE PEAR (*PYRUS COMMUNIS*).

We have now come to the most useful and popular fruit both for the table and for trade; for on account of its successional ripening, its tempting appearance, and the variety in its flavour, the Pear will always offer great attractions to the gardener, the merchant, and the amateur fruit-grower. Between the *Doyenné de Juillet* and the *Citron des Carmes*, varieties which open the series of good Pears, and the *Doyenné d'hiver*, the *Bergamote Esperen*, and the *Charles Cognée* varieties, which close the list ten or eleven months later, are to be found fifty different sorts, which means at least one sort a week—all selling readily, and already well known and appreciated by the consumers.

There are a great many Pear-tree orchards in France supplying markets, towns, factories, farms, and private houses. Everyone knows the orchard of standard trees which entail no expense of cultivation, and also the orchard of dwarf or bush trees, which, however, produce less fruit, but of a much better quality than the standards; moreover, a far greater number of trees can be planted on an equal space; so that both systems are really profitable. I also recommend mixed orchards, composed of permanent standards interlined with temporary dwarf varieties; this seems the most sensible and productive plan. The market gardeners and small cultivators round about Paris plant lines of Pear trees in the middle of their vegetable or other gardens, where they receive daily care.

Summer Pears for Commercial Planting.—The small early Pears have a pretty appearance and sweet scent, and they are the first in the market. They always have a ready sale

Orchards of summer Pears, planted with a view to profit, should certainly contain:—

I. *Standards.*

Beurré d'Amanlis.
 Epargne.
 André Desportes.
 Blanquet.
 Doyenné de Mérode.
 Monsallard.
 Rousselet.
 Citron des Carmes.
 Brandywine.
 Beurré Lebrun.

II. *Bush Trees.*

Williams (or half-standard).
 Favorite de Clapp.
 Docteur Jules Guyot.
 Monsallard.
 Doyenné de Mérode.
 Triomphe de Vienne.
 Madame Treyve.
 Souvenir du Congrès.
 Brandywine.
 Doyenné de Juillet.

Summer Pears find favour everywhere; their enticing appearance and pleasant and agreeable aroma make them always alluring. The fruit merchants never forget it, and buy up the early crops in advance, being always sure of a rapid sale. But for a merchant of this kind the quality of the fruit is of quite secondary importance, its good looks and ability to stand rough handling in transport being the chief considerations. The buyer is only a chance customer, a bird of passage, whom he takes no great pains to please. After buying the summer Pears, he will take the autumn ones, and then the winter ones, which are dearer and less plentiful. But when spring has once more come back, he recommences his purchases of summer Pears, and consoles himself by storming at the merchant who deceived him last year.

Some choice varieties of trained trees are cultivated round about Paris, which we must not omit to mention.

The Montmorency valley, containing the parishes of Groslay, Dormont, Saint-Brice, Montmagny, &c., supply an excellent example. The fields of Asparagus and Gooseberries are intersected by rows of Pear trees of the following varieties:—*Williams*, *Beurré d'Amanlis*, and *Doyenné de Mérode*, summer sorts; and *Louise-Bonne*, *Duchesse*, and *Beurré Diel*, autumn sorts. About 130,000 kilos. are exported, valued at from 25 to 50 francs per 100 kilos. The sorting and packing is done by specially appointed workmen, and the boxes thus packed and

labelled are sold according to the shipper's trade-mark and reputation.

The temperate climate near the Loire and its tributaries encourages the fruit to ripen earlier—towards the end of July—but by the time the fruit reaches the foggy shores of the Thames the cost is considerably increased. We have heard of an orchard at Angers, consisting of two hectares, planted with *Beurré Giffard* and *Williams*, both as dwarf bushes, which yields 10,000 francs; also of a market gardener at Nantes who makes 1,500 francs from his rows of *Williams* and *Duchesse*. The Pomological Society of America mentions a farm-orchard in Surrey (Virginia) where 20,000 trees were planted on 80 hectares, nearly all being *Williams* and only about one-twentieth *Clapp's Favourite*. The fruit is gathered between June 20 and July 10, and is then left several days on shelves in the fruit-room before being packed in cases and shipped to New York and Boston. In 1882 the company which manages the farm sent off 4,000 cases of Pears, valued at 75,000 francs, which enabled them to pay a dividend of 50 per cent.

Autumn Pears suitable for Trade Plantations.—Market planters will do well to grow the following varieties, as they are suitable for trade purposes. We name them in order of merit.

I. *Standards.*

Beurré Diel.	Beurré d'Aprémont,
Louise-Bonne d'Avranches.	Triomphe de Jodoigne.
Beurré d'Angleterre.	De Tongre.
Fondante Thirriot.	Beurré Capiaumont.

II. *Bush Trees.*

Duchesse d'Angoulême.	Beurré Dumont.
Beurré Diel.	Beurré Baltet père.
Beurré Bachelier.	De Tongre.
Beurré Clairgeau.	Doyenné blanc.
Louise-Bonne d'Avranches.	Madame Bonnefond.
Charles-Ernest.	Colmar d'Arenberg.
Marguerite Marillat.	Beurré Hardy.
Triomphe de Jodoigne.	Président Mas.
Sucrée de Montluçon.	Fondante Thirriot.
Fondante des Bois.	Beurré Capiaumont.
Alexandrine Douillard.	Antoine Delfosse.

III. *For Training on Walls.*

Beurré gris doré.

Crassane.

Though the summer Pears tempt one by their early maturity, those of the autumn are none the less valuable to the grower, on account of their abundance, their beauty, their quality, and their less rapid ripening. The largest business transactions carried on in Pears are done with the autumn varieties, as might be easily proved by a visit to the market at that season, or by examining the railway company's books. The Angers station forwards 800,000 kilos. of Pears between July and January, the maximum being just at the time when the autumn Pears are gathered. The picking of the fruit is often done early, so as to prolong the season and to facilitate carriage and sale. The greater part of the waggons and boats are filled up with the small fruits, which are sold by costermongers in the streets of Paris; but the beautiful picked specimens of *Louise-Bonne*, *Duchesse*, *Clairgeau*, *Diel*, and *Colmar d'Arenberg* are packed in cases and sent by passenger train to England and Russia. Our colleague, Anatole Leroy, of Angers, assures us that the *Duchesse* variety is better in its native home than it is anywhere else. Merchants will pay 15 centimes as a wholesale price, but at St. Petersburg they easily fetch "a rouble"—i.e. 2 fr. 50 c. apiece. In a neighbouring department a grower at Cérisy (Orne) gathers annually 300,000 Pears, the greater part being *Williams*, *Duchesse*, *Beurré d'Amanlis*, *Beurré Diel*, *Beurré Clairgeau*, *Beurré Hardy*, *Louise-Bonne*, *Nec plus Meuris*, *De Tongre*, *Triomphe de Jodoigne*, *Doyenné du Comice* (this last being grafted on the Quince), and some winter varieties: *Passe-Crassane*, *Olivier de Serres*, *Bergamote Esperen*, and *Doyenné d'hiver*, a wall variety. The fruit is carefully gathered, the best specimens being sold by the piece, and the rest in baskets of 15 kilos. packed in husks of oats, and then sent to Paris, England, or Germany. It has been remarked by the owner that *Beurré Dumont*, *Beurré Six*, and *Beurré Bachelier* do not stand carriage as well as the above-named varieties. Most of the trees are trained in chandelier shape, in vertical or oblique cordons, as espaliers, or grown against a wall. The yearly sales yield an income of 20,000 to 25,000 francs. *Doyenné du Comice* can only be profitably grown when under the most

favourable conditions, the tree being grafted on the Quince, and trained in palm-leaf or chandelier shape, with a long stem.

The variety *Charles-Ernest* gives superb results in the neighbourhood of Versailles, and *Beurré Dumont* in the North.

About 45 miles outside Paris there is a plantation of pyramids, *Duchesse* and *Louise-Bonne*, which yields 15,000 francs per hectare, after deducting all expenses of gathering, packing, carriage, and sale. At Amiens, a garden of 15 ares, containing 140 trees, most of them *Duchesse*, produces from that variety alone as much as 800 francs' worth of Pears, the plantation being ten years old. It is estimated that a *Beurré d'Angleterre* Pear tree, twenty years old, will yield 150 kilos. of fruit. The money value of each tree is therefore 22 francs 50 cents. At least one hundred tall *Beurré d'Angleterre* trees may be grown on 1 hectare of land, which, after twenty years' growth, would yield 2,250 francs, not counting the annual crop of hay grown under the trees, which may be estimated at two or three thousand kilos.

Winter Pears for Commercial Plantations.—The favourite winter Pears for trade growing are, in order of merit :—

I. Standards.

Curé.	Sœur Grégoire.
Nouvelle Fulvie.	Olivier de Serres.
Charles Cognée.	Doyenné d'Alençon.
Chaumontel.	Beurré Rance.

II. Bush Trees.

Bergamote Esperen.	Doyenné d'Alençon.
Beurré d'Hardenpont.	Marie Benoist.
Passe-Crassane.	Doyenné de Montjean.
Charles Cognée.	Beurré Sterckmans.
Olivier de Serres.	Duchesse de Bordeaux.
Nouvelle Fulvie.	Royale Vendée.
Sœur Grégoire.	Curé.
Passe-Colmar.	Beurré de Luçon.

III. Wall Trees.

Doyenné d'hiver.	Saint-Germain d'hiver.
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Winter Pears offer this advantage to the grower, that he can

always be sure of a market for them in the North of Europe, where, owing to the shortness of the summer heat, it is impossible to grow them; and also for the hotel-keepers, who during the winter season can obtain no other fresh fruit except Pears, Apples, and Grapes. In this case a fruit storehouse is indispensable to the cultivator if he is to profit by the advantages offered by the late season sales. It is important to select fine and good specimens; the smaller ones do not sell nearly so well, and varieties liable to fall prematurely will not keep, and lose great part of their value.

If the *Doyenné d'hiver* will grow successfully in a selected spot as a bush tree—that is to say, if it does not become spotted—it ought to be planted in the first row of the orchard; but if not, then a wall is necessary for it. One year a Chambourcy grower supplied Paris with 100,000 Cauliflowers, and the same number of Pears, of which half were *Doyenné d'hiver*. The trees are grafted on the Quince, and grow on walls 3 mètres high, and are trained as double cordons or as little four-armed chandeliers. They are all grown with a long stem. The blossoms and fruit are sheltered from the spring frosts and from the sudden hot suns in the summer. The fruit is regular in form and well-coloured, which is of prime importance for a good sale in the market. The *Doyenné d'hiver*, which grows well in sheltered places, is not successful in a wind-swept orchard; whilst, on the contrary, the *Doyenné d'Alençon* is a favourite in the North, where it yields a crop of sound and exquisite fruit grown in the open. This shows that it is necessary to take account of the surroundings and local conditions, and profit by other people's experience, unless one is willing to take the risks of a long and costly apprenticeship. This remark applies specially to Pear trees on walls—*Doyenné blanc*, *Beurré gris*, *Crassane* (autumn), *Saint-Germain*, and *Bon Chrétien* (a winter Pear). Except the last variety, which does best in the South, the others thrive in the East and West, and often in the North on fertile soil, the tree being grafted on the Quince. They will always do well as bush trees if planted in a favoured position. I have seen them growing in this way in several orchards in the Centre and South of France. They are grown in Normandy on walls, the trees being trained in fan-shape, with either high or low stem, grafted on the Quince. Near Louviers,

Gaillon, and Andelys some growers annually obtain an income of 10,000 francs from their orchards. The finest specimens are now sent to the northern capitals of Europe, whereas formerly they went to San Domingo.

Let me quote as an example of successful culture the "commune" of Leroy (Eure), where the *Bon Chrétien* variety is cultivated, where all the fruit which will not pass through a ring .07 mètre in diameter is bought by Russia at 30 francs per 100 Pears; and one of my correspondents tells me that at Moultier-Allemand (Hautes-Alpes), in the Durance valley, two Pear trees of the *Royale d'hiver* variety were in 1865 so laden with fruit that their crop fetched 800 francs, not including the owner's own supply and presents to his friends.

THE APPLE (*PYRUS MALUS*).

This is the fruit which of all others ought to tempt all market growers, on account of its being good nearly all the year round, and keeping fresh and good for eating. It also will bear a lot of rough handling and carriage. In fact, it is a good all-round fruit. How often we have watched it being loaded wholesale on boats or waggons! If the fruit is fairly presentable, it is sent to market in sacks or large baskets, but the choicest specimens are packed in small hampers or baskets with dry hay or oat straw to protect them. It is not at all necessary to praise the Apple, for, as we have already said, it is the most popular fruit for direct consumption either for the market, for the workman, the traveller, the hunter, or the schoolboy, who always prefers an Apple to any other fruit. The housewife considers it of first-rate importance among household necessities; and the broker has no hesitation in buying an enormous quantity of this favourite fruit at one time.

The Apple tree is not particular as to soil, and is largely cultivated in the country at farms and along the roadsides and lanes, its only fault in the latter case being the drooping habit of its branches; but, of course, it is easy to choose varieties with erect branches, and grow them like Oranges. But for the less frequented roads, along the pastures, the heaths, cattle enclosures, and waste land, any kind of Apple will suffice.

First, let us consider the table varieties—to be eaten with a knife or spoon, either fresh or cooked—and then we shall come to the cider and preserving Apples.

Apples for Commercial Plantations.—In all countries where Apples can be grown they are the object of trade cultivation, both in the fruit garden and orchard. Examples of orchards yielding enormous crops are to be seen in every Department, so we will not trouble to enumerate them. We will class the varieties according to their respective seasons.

Summer Apples.—The following early varieties are recommended for market plantations:—

I. <i>Standards.</i>	II. <i>Dwarf Trees and Bushes.</i>
Transparente de Croncels.	Borovitski.
Rambour d'été.	Transparente de Croncels.
Astrachan rouge.	Saint-Germain.

Apples for Dessert and Cooking, either half-standards or dwarfs:—

Gladstone.—A free-growing tree, and hardy with regard to resisting the cold. Fair sized, deep red-coloured fruit; good for Apply jelly and stewed fruit. Ripe in July.

Transparente blanche.—Same as above in growth; fruit large; dead ivory colour; for early season jelly. Ripe in July.

Hawthornden.—Extremely fertile tree; fairly large; white mother-of-pearl in colour; juicy and sweet; for jellies.

Keswick Codlin makes a well-shaped tree; fertile; fruit good; abundant in Scotland; suitable for family and household use.

Lord Suffield.—Very fertile variety; one of the largest fruits; ivory-white in colour; good for dessert; flesh firm; appreciated for household use.

The summer varieties do best on dry soils, because the sap so soon ceases to rise that the trees could not nourish fruits ripening later. It is well to grow a few trees of these kinds for the grower's own consumption, and also for sale in the market; but they should not be planted to excess, because Peaches and Pears are just commencing to ripen at the same time. Too often the early, mealy-fleshed Apples are sent to market; but this is contrary to the interests of both seller and

buyer, for at this time of year juicy and acidulous fruits are much preferred.

Autumn Apples for Market Plantations.—The varieties to be preferred are:—

I. *Standards.*

Reinette grise d'Automne.

Belle-fleur rouge.

Reine des Reinettes.

Gravenstein.

II. *Dwarf Trees and Bushes.*

Grand Alexandre.

Reine des Reinettes.

Calville de St.-Sauveur.

Cellini.

A farmer desirous of making money by the sale of large dessert Apples will find the autumn varieties pay best; and it is, in our opinion, far better to experiment with dwarf varieties grafted on the "paradise" or "doucin" stock, and composed of choicer varieties more likely to satisfy the taste of the general consumer, and not be hindered by waiting for standards to grow.

Below are given some choice varieties for household use; they find a ready market, and are profitable for cultivation:—

Cox's Pomona.—A very productive tree; good coloured fruit; used for table purposes, and in the kitchen.

Calville rouge.—An autumn variety, with fairly large fruit; purple-carmine in colour; for jam and cooking purposes. Ripens from October to December.

D'Eclat.—Very large fruit; yellowy white colour; good for stewed fruit and jam. From October to January.

De Cantorbéry.—A very productive tree; one of the largest fruits; dull white; used for tarts, jellies, and preserves.

Warner's King.—Productive tree; first quality in fruit and size; suitable for jams and tarts.

Blenheim Orange.—The generous growth of the tree is more like that of an Orange. Good fruit for dessert and household use.

Belle Dubois.—Very large fruit; greenish white in colour; for the kitchen and tarts, &c. From November to January.

D'Eve.—Large fruit, creamy white; for stewed fruit and tarts. From September to March.

Reinette de Willy.—Fairly large fruit; butter colour, speckled with brown; for jellies and pastry. From November to February.

Winter Apples for Market Plantations.—Cultivators will find the following varieties to be the best for market growing; they are arranged in order of their commercial value:—

I. <i>Standards.</i>	II. <i>Dwarf Trees and Bushes.</i>
Reinette du Canada.	Calville blanc.
Reinette de Cuzy.	Reinette du Canada.
Reinette de Caux.	Api rose.
Les Reinette grise.	Pépin de Londres.
Les Reinette dorée.	Belle-fleur jaune.
Reinette tardive.	Bedfordshire Foundling.
Baldwin.	Pépin de Parker.
Belle-fleur jaune.	Reinette de Cuzy.
Pépin de Londres.	Les Reinette grise.
Pépin de Newtown.	Les Reinette dorée.
Bon Pommier.	Baldwin.
Royale d'Angleterre.	Dumelow's Seedling.
Calville de Maussion.	Jacquin.
Pépin de Ribston.	Pépin de Ribston.
Pépin de Sturmer.	Wagener.
Jacquin.	Pearmain d'Adams.

The *Reinette franche* and *Calville blanc* varieties should only be grown as orchard trees where there is a good situation, and where the boughs would not be liable to canker or become mossy.

Certain kinds of winter Apples can also be grown to advantage, although they are "local fruit"—that is to say, fruit which is usually grown only in certain districts. A fair number of late-flowering varieties, which escape the spring frosts, have spread and become naturalised in many parts of France.

The Apple tree is so general that every country seems to have its own particular favourite varieties. The tree will also flourish everywhere, and in all climates. Mountainous countries are very favourable for Apple cultivation.

In the East and South-east, at the foot of the Alps and Jura mountains, the *Reinette* and *Calville* varieties are much grown. The Asse and Bléone valleys, and the Chablais and Faucigny hills, send consignments of Apples to all the principal markets in France, Switzerland, and Italy. The Cévennes begin in the Gard department, with orchards composed of the *Reinette du Vigan*, sheltered with vast groves of Chestnut trees. The

Reinette du Canada is grown in the Limagne and Veyre valleys at Puy-de-Dôme. The cantons of Ambert, Arlanc, Issoire, Saint-Dier, Montaigne, &c., derive a large income from Apples.

The centres of the trade are Clermont, Riom, Aigueperse, and Saint-Amand-Tallende; whilst a large number of the ship-loads of Apples which come to Paris are sent from Pont-du-Château.

The lowlands are no less favourable to the Apple tree. In Flanders, for instance, the Aresnes district, where merchants from the North, Belgium, and England assemble. We have been told of a grower in Jolimetz who sells the entire crop of his orchards wholesale for as much as 10,000 francs, and of another at Quesnoy who has sent to England upwards of 20,000 francs' worth of the *Bon Pommier* Apple, a variety having the reputation of realising there 1,000 francs per hectare. Landrecies is another central point in the North where the crops of this Apple are first collected, and then dispersed, almost the whole going towards the Seine. But surely this pretty local Apple is none other but the *Double bonne-haute* grown in the Picardy orchards? A proprietor at Cateau gathers annually 30,000 kilos. And, again, we find the same variety being brought up at Sainte-Menehould by waggon-loads, as many as a hundred loads at a time, out of which the Paris confectioners make a very large profit.

The Liancourt valley also supplies the market and confectioners with another kind of local Apple with a reddish skin and hard flesh, *i.e.* the *Duret* or *Cateau*, the *Duret salée* or *Cateau d'oignon* varieties. They are bought on the spot by the basketful, and are also sent away in sacks to be sold under the name of "*Petite reinette*." One village with a population of only 300 people makes 100,000 francs by this variety alone.

The Sarthe and Mayenne departments send consignments of the *Reinette dorée* and *de Jaune* or "*du Mans*" varieties to Paris in the late season. The town of Nantes exports 150,000 cases, each weighing 75 lbs., without counting the boat-loads which, in conjunction with Angers, it sends to Saumur, Orleans, and other towns in the Loire district. The boats unload in the large towns by means of the canals which connect the two rivers.

Waggon-loads of Apples, as well as other things, arrive daily at the Ivry station. M. Husson tells us, in his interesting book on the provisions of Paris, that the fruit is unloaded from the boats on to the wharf, and then carried to the Mail market, where the fruiterers, pastrycooks, and costers purchase their supplies.

From September to January Paris receives by water as many as 130 boats loaded with about 300,000 Apples each, or 40,000,000 Apples in all. Normandy, Brittany, Picardy, Artois, and several other provinces send their fruit in this way. Some send only just what is over, but others send the greater part of all they produce to England, which receives at the same time consignments of *Court-pendu*, the Belgian *Belle-fleur*, the Dutch *Dubbele Gulden Reinet*, and the American *Newtown Pippin* and *Baldwin* varieties.

The profit derived from open-air cultivation is all the more noticeable on account of the first outlay, and maintenance expenses, being comparatively small. Round about Paris Apples are largely cultivated in gardens for trade purposes. Excellent fruit is produced on "cordons," "candélabres," and from walls in the open air. At Rosny a wall 4 mètres long by 2 mètres 80 high, facing south, upon which are trained twenty *Calville blanc* Apple trees twenty years old, is said to yield 1,500 fruits a year, sold at 75 cents. each. Another wall near it, where the trees are placed closer, has yielded even more fruit. The trees are grafted on "doucin" or "paradise" stocks with a high stem, and the greatest care is taken with them.

THE PLUM (PRUNUS).

The Plum is a tree very suitable for profitable growing, on account of its being robust and strong enough to resist the evil influences of both soil and climate; it also requires but little attention during cultivation. And further, the fruit is always in request, either for drying or for direct consumption, or for distillation, and, in fact, for a variety of other household, culinary, or manufacturing purposes.

Market Plantations of Plum Trees.

I. <i>Dessert Plums.</i>	II. <i>Standard Orchard Trees.</i>
Reine Claude.	Précoce de Tours.
Mirabelle.	Coe's Golden Drop.
Des Béjonnières.	Mirabelle grosse.
Favorite hâtive.	De Kirke.
Monsieur jaune.	Damas violet.
Mirabelle précoce.	Jaune tardive.
Jaune hâtive.	Reine Claude diaphane.
Monsieur hâtif.	Reine Claude d'Althan.
Tardive musquée.	Reine Claude violette.

III. *Dwarf Trees for the Fruit Garden.*

Mirabelle.	Reine Claude de Wazon.
Monsieur jaune.	Mirabelle précoce.
Reine Claude.	Monsieur hâtif.
Des Béjonnières.	De Kirke.
Favorite hâtive.	Coé à fruit violet.

The *Reine Claude* and the *Mirabelle* are the varieties preferred by most growers; no other kind can compete with them in the quality of the fruit when fresh, and also for culinary and household purposes, except only for drying and for "prunes," when other varieties should be chosen. Near Paris, in the market gardens, Plums are to be seen at every step, especially the excellent *Reine Claude* variety, and it is the same in every other large town; 2,500,000 kilos. of *Reine Claude* and 1,500,000 kilos. of *Mirabelle* are sent to Paris from all parts every year. In several of the villages near Bar-sur-Aube, the *Reine Claude* trees in the vineyards have produced Plums to the value of 60,000 francs in one crop. Near Sainte-Menehould the amount has been known to reach 80,000 francs. In 1874 the village of Vitry-le-Brulé (Marne) sold 100,000 francs' worth of Plums. In Picardy, the Beauvieux commune (Aisne) is literally covered with *Reine Claude* plantations. The inhabitants realise an extraordinarily large sum by the sale of fresh fruit, and by distilling that which is over-ripe.

The Marne valley, the heights between Nesles and Condé (altitude 230 mètres), are, so to speak, simply "wooded" with Plum trees. In 1878 the trees were so laden with fruit that the crop realised as much as 75 francs per tree, the gathering expenses being paid by the purchaser. In 1882, in the Brie, a grower near Meaux estimated the produce of one hectare of *Reine Claude* to be worth 4,000 francs, the trees being ten years old. One hundredweight of ripe Plums has been known to fetch in Paris as much as 48 francs, all growing expenses deducted.

Thanks to the favourable climate, the consignments from the Drôme and the Pyrénées-Orientales are the first to arrive in the market, and next come those from the Gironde. The Taillefer estate at Montussan contains 4,860 *Reine Claude* trees, which in 1878, although very young, yielded there as much as 4 francs' worth of fruit per tree; five years later this orchard was able

to supply the Saint-Loubès railway station, and also 7,000 francs' worth of Plums to one Parisian jam-maker. One of the Bordeaux makers buys daily during the season 2,000 kilos. of *Reine Claude*, and in years of scarcity the price rises to as much as 80 francs per 50 kilos. Béziers, Pézenas, and Tarascon do an important trade in *Reine Claude*; in fact, large Plum plantations are to be found almost everywhere between the Mediterranean and the ocean.

In reference to the *Reine Claude*, let us note, by the way, that, in Hérault, growers have observed that the blossom of the *Reine Claude de Wazon* does not suffer from the effects of the sea winds so much as other varieties do.

A large quantity of Plums, the *Mirabelle* variety being often the commonest, is produced by the North-east of France. Champagne and Lorraine send consignments to Paris, and also to the local markets and jam-makers. In the neighbourhood of Lunéville the fruit is prepared on the spot before leaving the country. The *Mirabelle* is peeled, put in a sugar syrup, and then sent away in bottles or boxes. The villages of Amagney, Deluz, and Laissey (Doubs) produce a yearly average of 50,000 francs worth of *Mirabelle*, and the plantations continue to increase.

Nowadays the centre for the trade cultivation of the *Mirabelle* in Lorraine seems to be near the Meuse, near Saint-Mihiel and Verdun, between Apremont and Damvilliers. The orchards in the plain or on the hillside, together with the trees scattered about amongst the vines, have sent many hundreds of cartloads to one single railway station, and have thus given the Meuse market a high reputation amongst those merchants who trade chiefly in the *Mirabelle*, and also amongst the jam manufacturers. The Parisian brokers arrive at the beginning of the gathering season, and announce, by means of the public crier, their readiness to buy the crop, and the prices they offer. The earliest and the latest crops being the scarcest, are also the dearest. Thus first, second, and third crop *Mirabelles* are sold at 20, 15, and 22 francs per 100 kilos. respectively. The buyers pack the fruit at once, and then send it to Paris.

One would not be far wrong in estimating that at the rate of 15 francs per hundredweight, a *Mirabelle* tree would yield 1 franc at the age of 6 years; 8 francs at the age of 12 years;

12 francs at the age of 16 years ; 15 francs at the age of 20 years, and onwards.

Drying-Plums suitable for Market growing.

The Agen country has become rich through the extensive cultivation of the *d'Ente* Plum, sometimes called *Robe-Sergent* or *d'Agen* ; and also by transforming the fruit grown, into prunes. The owners of the plantations find it most profitable to dry the fruit, as well as grow it, themselves. Wholesale firms carry on a business amounting to hundreds of thousands of francs. The principal firm at Cassaneuil exports annually prunes to the value of 4,000,000 francs ; Bordeaux produces as much as 15,000,000 francs' worth, half of which amount is shipped to Germany, Belgium, Holland, Russia, England, and America. In 1872 the Lot-et-Garonne department produced prunes to the value of 25,000,000 francs, and statistics show that this sum has doubled itself within the last twenty years. At the present time the *Ente* Plum trade causes capital to the extent of 20,000,000 francs to change hands in the Agen branch of the Banque de France.

The *Agen* Plum is cultivated on light, sandy, or clayey-chalky soil, such as is found in the Lot valley and on the slopes and hills of the Garonne, at Villeneuve-d'Agen, Castelmoron, Clairac, Monclar, le Temple, Sainte-Livrade, Aiguillon, Tonneins, Castellar, &c. The neighbourhood of Marmende, Agen, and Villeneuve-sur-Lot seems to be the most favourable for it, especially the last-mentioned, whereas that of Nérac is the least. The spring fogs are bad for the tree during its flowering period. The trees are planted in rows, filled up with vines, the space between the rows being used for Wheat ; a distance of from 6 to 8 mètres between the trees is sufficient, and an offset of vine is for a time planted in between. The rows are from 8 to 10 mètres apart. A Wheat-field of one hectare is worth 3,000 francs under ordinary circumstances, but when it also includes such a plantation of *Ente* Plums it is worth 4,000 francs more. One hectare of Plum trees, planted at an interval of 3 mètres, can easily yield from 2,500 to 3,000 kilos. of Plums, which will yield 800 kilos. of prunes, worth 54 francs per 50 kilos. on an average—the net profit being 720 francs. It is usually estimated that 100 orchard trees will produce 5 metric quintals of prunes. The 1885 crop in the Lot-

et-Garonne department has been estimated at 175 quintals, which represents a total value of 12,000,000 francs. The tree is most productive when from fifteen to twenty years old, and will then yield up to 50 kilos. of fresh fruit. When the tree is well cared for, it will go on producing for as many as fifty years, and the older and stronger it is, so much the better is its fruit. Plum trees are to be seen in the beautiful valley of the Lot, from Aiguillon to Fumel and Castelmoron, and also from the Monségur canton to the Gironde, and from Monpazier, Eymet, and Monpont to the Dordogne. The right bank of the Garonne, with its rich soil and genial climate, is studded with fertile plantations, whereas the left bank is not so favourable, owing to its pebbly, dry soil.

A grower in Dordogne informs us that in 1882, by his crop of *Ente* and *Agen* Plums, he made as much as 6,000 francs, and that is not counting the amount paid to him by smaller farmers holding land on condition of handing over to him as owner a settled portion of their produce. Tarn-et-Garonne has followed the movement, and sells its *Agen* Plums at 100 francs per 100 kilos., especially in the Moissac canton. The Gironde department is rich in plantations of the *Ente* variety, large consignments of which are sent to the Bordeaux market. The less interesting *Verdane* kind grows wild on the Latresne and Bouillac slopes.

In the Basses-Alpes the *Perdrigon blanc* and the *Perdrigon violet* Plums are grown for the manufacture of *Brignole* and *Pistole* prunes. The *violet Perdrigon* is peeled with a knife, the stone taken out, skewered on a stick, sun-dried, flattened by hand, and dried again previous to being packed up in a box. This prune goes by the name of *Pistole* in the trade, and is supplied by the grower at 2 francs per kilo. About 4 or 5 kilos. of fresh fruit is needed to make 1 kilo. of *Pistole* prunes. The other variety of *Perdrigon*, commonly called "*Reine Claude blanche*," is boiled and left to dry in the shade, without being peeled or stoned; 3 or 4 kilos. of fresh fruit make 1 kilo. of *Brignole* prunes. Everywhere drying-Plums are to be met with, but these have only a local reputation.

The *Pruneau de Tours* are obtained from the *Sainte-Catherine* variety, grown particularly in the district of Chinon from Huismes to Saumur, and within a distance of about 10 kilomètres from

there. The owners or farmers usually have as many as ten to fifteen ovens, in which they themselves prepare the prunes; hence the varying qualities, which depend upon the ability of the cook. The fruit is cooked six or eight times in succession; the last operation consists of imparting to the fruit the white or "floury" appearance.

Some experienced amateurs prepare a very fine dessert by inserting one Plum into another, and then putting a Sweet Almond in for the stone.

The following varieties, classed in order of merit or popularity, are those preferred for cooking and drying, either in the sun or by means of a stove:—

The Agen	South-west.
Quetsche d'Allemagne	} East and North-east.
Quetsche hâtive	
Sainte-Catherine	} West, South-east, and Centre.
Perdrigon	
Reine Claude de Bavay	

THE VINE (VITIS).

The Vine is a plant largely cultivated, not only in the vineyard, but also in the garden, where it may be grown on trellis-work in the open, or sheltered by a wall. It may be grown to advantage commercially.

Vineyards for Profit.—As we shall see later on, the market cultivation of Vines can be pursued really profitably with only one variety, the *Chasselas doré*, commonly called "*Chasselas de Fontainebleau*." But we enumerate a few others, arranged in their order of ripening:—

Early Grapes:—*Morillon noir*, *Gamay de juillet*, *Madeleine royale*, *Lignan blanc*, *Madeleine angevine*.

Mid-season Grapes:—*Chasselas doré*, *Chasselas rose*, *Pineau noir*, *Chasselas violet*, *Portugais bleu*.

Late Grapes:—*Frankenthal*, *Boudalès*, *Muscat blanc*.

There are also many local varieties, which are fairly productive in their native places.

Most of the following varieties are suitable for table use, and are greatly in demand for wine-making:—The *Gamay*, from the Centre of France; the *Mondeuse* and *Persan* from the South-

east; the *Aramon*, *Carignane*, *Olivette*, *Spiran*, from the South; the *Malbeck* and *Sémillon*, from the South-west; the *Melon*, *Pulsard*, *Valet blanc et rose*, *Savagnin*, *Troussé*, from the Jura district; the *Mourvèdre* and *Clairette* or *Blanquette*, from the Olivier district; the *Agostenga* or *Vert de Madère*, from the Alpine district; the *Malvoisie*, from Spain and Italy, &c.

From the vineyards in the Ampuis plain, at the foot of the Côte-Rôtie, are exported the *Lignan blanc* variety, which ripens at the same time as *Chasselas*, whereas the growers in the Hérault district cultivate the *Portugais bleu*.

In our own vineyards we are beginning to propagate one called *Gamai de juillet*, found in a vineyard in the neighbourhood of Londreville, the rich Vine district of the Aube, so well known to consumers in the neighbourhood, and also to the Bordeaux merchants. This variety ripens before that of the different kinds of *Morillon*, *Madeleine*, and *Ischia*; and will grow well in cold places, and spots exposed to the early autumn fogs.

Besides those vineyards which are cultivated solely for wine-making purposes, there are others grown entirely for supplying Grapes for direct consumption. Without mentioning the cultivation of large Grapes in the South—the *Panse* Grape for preserving purposes, the *Muscat d’Alexandrie* for drying—it will be quite sufficient if we mention, among other things, the sum of 20,000 francs realised recently by a grower at Meyreuil, in Provence, for his *Clairette* and *Olivette* Grapes consigned to the Paris market. The Bordeaux markets are glutted with *Malbeck* Grapes, whilst the choice Médoc vineyards, and also those at Toulouse, produce more of the *Boudalès* or *Prunelas*, a variety much appreciated in Languedoc, where it is known by the name of *Cinsau*. Another variety often confused with the *Boudalès* is the *Ulliade*, which is taken straight from the vines to the consumer’s table, as its thin skin does not allow of much carriage.

During September and October Nice receives weekly as much as 200,000 kilos. of Grapes, sent by steamer from Corsica. The pick of this will sell at once for from 22 to 24 francs per 100 kilos. In 1879 the Nice wine merchants went to Corsica to make their wine on the island, and paid for the Grapes on the spot the sum of 10 francs per 100 kilos.

At quite the beginning of the season Paris receives consignments of Grapes labelled "*Chasselas*," which is a variety grown in the open air at the foot of the Pyrénées. It is an early local white Grape. Another Grape under the same name is grown in the Centre of France, but it is not yet much known. At this time of year the growers round about Paris, from Montreuil to Argenteuil, begin to make money with their *Morillon hâtif* variety, and afterwards by their *Chasselas*. A buyer will always be found for a basket of *Chasselas*, no matter at what time of year, or at what price. Thus the growers at Thomery where the *Chasselas* plantations are a well-known tradition in every family, are able by their method of culture to offer fresh Grapes every day, partly on account of their glass houses heated with hot-water pipes, and partly also by preserving the fruit dry or in water. The *Chasselas* plantations at Thomery occupy 125 hectares of land lying to the north-east, on sloping ground by the Seine, sheltered from the north and west winds by high hills. The soil is sandy, deep, fresh, and of a nature to become easily warmed, and also to retain the heat received during the summer far into the autumn, which are conditions very favourable to the development and ripening of the fruit. All the gardens are surrounded by walls 3 mètres high, and all the plantations, no matter how small, are divided by partition-walls. The report about the vineyards in the Seine-et-Marne department in 1887 states that there are 200 kilomètrés length of enclosure walls, and estimates that a kilo. of Grapes is grown on every mètre of wall, so one can reckon the whole length of "trained" vines to be 1,000,000 mètres.

There is a little village on the outskirts of the forest of Fontainebleau where one hectare well planted is worth about 80,000 francs. The largest proprietors do not own more than two hectares. One hectare, well tended, will yield on an average from 9,000 to 10,000 kilos. of Grapes—that is to say, about 8,000 francs worth of *Chasselas*, which will leave a profit of from 2,500 to 3,000 francs for the owner. The Grapes are packed in little baskets lined with ferns, or in boxes ornamented with pink and white paper. They are transported in waggons holding about 2,000 baskets. Each season 270 carts, containing 500 kilos. apiece, are sent by road to the Paris market. The annual produce of Thomery is valued at 2,000,000 kilos. of the *Chasselas*

variety—that is, including the produce of the neighbouring communes, Veneux, By, Montfort, Champagne, Sablons, and Moret, where the *Chasselas* is largely cultivated.

Such an excellent result has produced several rivals for Thomery, and already there are two places not far behind it in regard to produce, namely: (1) Conflans-Sainte-Honorine (Seine-et-Oise), with its sloping chalky soil. The vineyards are said to be worth 50,000 francs per hectare. (2) Beaune (Côte-d'Or). Here the favourable Haute-Bourgogne soil gives a particularly sweet scent to the Grape, which, in combination with its good looks, makes it a favourite with even the most dainty connoisseurs. Small hampers of these find a ready market in Paris, where about 1,000,000 kilos. of *Chasselas* are sold from the commencement to the close of the season.

Competition of another kind has also sprung up. Some owners of vineyards of white Grapes, who have hitherto used the fruit only for wine-making, are now giving up the wine-press altogether, and send the fresh fruit to Paris instead. The wine-dressers in the East, the Centre, and the South have set the example. Bar-sur-Aube, Baroville, and the places round send to Troyes, Chaumont, and Paris all their *Chasselas*, or, as it is also called, "Muscadet." The grower finds it pays better to send the Grapes by rail, carefully packed, than it does to incur all the risks of pressing them, keeping in cellars, and chancing the fluctuating price of white wines.

An enormous number of baskets of *Chasselas* Grapes are received at the Pouilly-sur-Loire station; every day during the gathering time, in good years, twenty-five or thirty waggon-loads are sent to Paris. The commercial comings and goings change the country into one large fair just at this time, and it is reckoned that there are as many as 600 brokers and consigners at work.

The two varieties most extensively cultivated in the Tarn-et-Garonne are the *Chasselas ordinaire* and *Gros Coulard*; these are of early maturity, and bear a Grape of exceedingly rare colouring. In 1877 there were said to be 137 hectares of *Chasselas* plantations, each hectare yielding on an average 3,000 kilos. of Grapes, making a total yield of over 400,000 kilos. The sale takes place at the Montauban market, the average price being 30 centimes per kilo., making a total of 123,300 francs. The fruit is bought on the spot by merchants, who send it direct to Paris.

More towards the East the Ardèche mountains are very favourable for the production of *Chasselas*. A very good Grape, which fetches a very high price, is produced in the neighbourhood of Saint-Péray and in the Erioux valley, but still the *Chasselas* is preferred by most of the growers. The Toulaud vineyard, in the same part, produces a *Chasselas* far superior in quality to any grown in the South. It will fetch from 10 to 20 francs more per 100 kilos. than those from Valence and the neighbourhood. The *Chasselas* and *Boudalès* varieties grown at Toulaud are the best sent to the English and Russian markets. At the time of the gathering the railway stations at Valence and Voulte receive thousands of little rectangular wicker baskets filled with Grapes destined for the capital.

It was just the same during the profitable period before the invasion of the phylloxera—that is to say, from 1867 to 1877. At that time the Hérault and du Gard vineyards forwarded by rail, beginning from July 20, 800,000 kilos. of Grapes, which were sold for 22 francs per 100 kilos. at the station, and the whole amount of 150,000 kilos. of table Grapes (the greater part being *Chasselas*) were sold on the spot for 20 francs per 100 kilos. A vineyard in the Gard district, consisting of one hectare of *Chasselas*, has been reported as producing, in good and bad years alike, fruit to the value of 10,000 francs—price agreed upon beforehand.

The Drôme department has had in the same way as the others its special periods of abundance, and at such times the railway station of Valence receives as much as 800,000 kilos. of fresh Grapes. Here, also, we find *Chasselas* in abundance, as it is the planter's favourite.

Let us hope that Vine cultivation will know another equally prosperous period.

We will not discuss Vines cultivated under glass further than just to mention the leading names :—

Black Alicante.	Muscat Champion.
Black Hamburgh.	Grizzly Frontignan.
Gros Colmar.	Canon Hall Muscat.
Forster's Large White.	Trebbiano.
Lady Downe's Seedling.	Waltham Cross.
Muscat of Alexandria.	White Nice.
West's Saint-Pierre.	Syrian.
Royal Muscadine.	Royal Ascot.
Duchess of Buccleugh,	Madresfield Court, &c.

THE DOGWOOD (CORNUS MAS).

A native of the East, the Dogwood is planted by the peasants in a corner of the enclosure. Its fruits ripen towards the end of the season, and are either immediately consumed fresh or made into jelly or syrup. The housewife markets the fruit, and may thus obtain from 5 to 10 francs per tree. The red-fruited variety, which is more or less large and early, is the most popular.

THE MEDLAR (MESPILUS).

The Medlar is a fruit of second- or third-rate quality. It grows along the banks of streams, or is grafted on the Hawthorns in the hedges, or is dotted about in the wide, open spaces of the meadows. It is trained as a half-standard or as a weeping bush.

In the West and Centre of France, and in Normandy, growers sent to market Medlars to the value of 500, 800, and 1,000 francs. The growers of Puisaye throw the fruit before it is ripe into the press with Pears and Apples for making cider.

THE CHESTNUT (CASTANEA).

The Chestnut has constantly been used as food by the peasants of the mountainous regions of the Auvergne, and of Limousin, Dauphiné, Forey, Vivarais, Quercy, Roussillon, Savoy, Corsica, and on the hills of Périgord, Berry, Poitou, Bas-Bugey, Brittany, and Vendée, especially whenever the cereals and the vines have ripened their crops badly.

The largest Chestnut groves exist in the departments of Corrèze and Dordogne. In the latter, 2,500,000 quintals of Chestnuts are produced, and represent 23,000,000 francs. One-fifth of them is exported. Haute-Vienne comes next in amount of production, and furnishes Chestnuts from Lusignan; then the Ardèche, which supplies the Lyons market with Chestnuts for table use. The Vesseaux Chestnuts for confectionery, known as the *Groussaude* variety, come from Corrèze.

Corsica sends to Italy its Chestnut farina, used in the preparation of "pottona" or "polenta dolce."

The varieties cultivated bear local names. Nevertheless, such Chestnuts as *Printanière*, *Exalade*, *Grosse rouge*, *Verte du Limousin*, *Nouzillarde*, may be recommended as large and fertile

fruits. The trees are propagated by grafting on the wild type obtained from seeds.

THE OLIVE (OLEA).

The Olive is an edible and economic fruit of great value, and its cultivation extends from Drôme to the Eastern Pyrénées, through twelve departments.

The harvest of 1892 exceeded 1,221,000 quintals of fruit, representing 26,000,000 francs in value.

The departments of the Var and Bouches-du-Rhône represent nearly one half of the total production; then come the Alpes-Maritimes and the Haute-Garonne, while the Olives of Vaucluse enjoy a high reputation.

The Olive is propagated from its own suckers, which are grafted when the stock perishes through age or exhaustion.

The good kinds have a free growth, with green or blackish fruits of a medium or large size. Their nomenclature is too confused to be precise, owing to being known under local or *patois* names.

THE ORANGE, LEMON, AND CITRON (CITRUS).

Confined to the extreme South-east, the Orange flourishes on the country hillsides. In 1892 the department of the Alpes-Maritimes produced 35,300 quintals of Oranges and 55 of Lemons. The Lemon enjoys an equable climate at Mentone, while the *Mandarine* Orange loves the warmth of Cannes. The *Seville* and *Bergamot* Oranges supply the flower trade as well as the perfumery and pharmaceutical business.

The island of Corsica engages in the cultivation of the Citron, the fruits of which are used in confectionery, and realise 3,000,000 francs for the proprietors. A hectare, which contains about 200 Citron trees, produces from 6,000 to 8,000 kilos. of fruit, and gives a revenue of 1,200 to 1,500 francs. Holland is the chief outlet for preserved Citrons.

Algeria has rich Orange groves. The regions of Blidah, Bouffarik, Bône, Bougie, Philippeville, and Toudja are favourable to *Citrus aurantium*. I may mention one plantation of 40 hectares on which each tree bears at least 800 fruits every year. Algeria actually exports 3,000,000 kilos. of Oranges and Lemons.

THE PERSIMON (DIOSPYROS).

Besides the Italian Persimon, or Date-plum, some species of American or Asiatic origin are also cultivated in France. Among these are the Virginian Date-plum, or Persimon (*Diospyros virginiana*), and its variety *coronaria*, the pulp of which is not so acrid as that of the type.

The Japanese Persimon (*D. Kaki*) produces a pretty fruit, having the appearance of an orange-coloured or vermilion Tomato, and its flesh is eaten when it becomes mellow.

Cultivated in the South from Nice to Montpellier, the Japanese Date-plum is sent to Paris, to London, and St. Petersburg.

In the South of France, which is a favoured region on account of the warmth and the proximity of the sea, are grown certain other kinds of fruits, intended either for local consumption or for commerce. Among them are the Strawberry Tree (*Arbutus Unedo*), the Loquat (*Eriobotrya japonica*), the Pomegranate (*Punica granatum*), the Jujube (*Zizyphus*), the Pistachia, &c.

PART II.

THE BEST FRUITS FOR AMATEUR CULTIVATION
IN THE GARDEN,

OR FOR THE FARMER'S ORCHARD, EITHER FOR HOUSEHOLD
CONSUMPTION OR FOR MARKET.

Lists of the Fruit arranged in Order of Ripening.*

I. APRICOTS.

Abricot précoce—end of June, beginning of July; Abricot gros St.-Jean—first fortnight in July; Abricot Défarges—first fortnight in July; Abricot précoce de Boulbon—middle of July; Abricot commun—July; Abricot Angoumois—all through July; Abricot Luizet—last fortnight of July; Abricot royal—end of July, beginning of August; Abricot Alberge—end of July, beginning of August; Abricot Jacques—July and August;

* In regard to the nomenclature of the fruits cultivated in France, we have retained the popular names under which they are grown, rather than the many English and American names which have been Gallicised.

Abricot à trochets—all through August ; Abricot Pêche—August and September.

II. ALMONDS.

A. *Hard-shelled Varieties*.—Grosse ordinaire—middle season ; Grosse verte—late-flowering ; À flots or À trochets ; Matheronne ; Molière.

B. *Soft-shelled Varieties*.—À la Dame—early ; Princesse, À la Reine, Sultane—early ; Ronde fine ; Grosse tendre—late.

III. CHERRIES.

A. *Cherries*.

Anglaise hâtive—beginning of June ; Impératrice—beginning of June ; Belle de Choisy—all through June ; Reine Hortense—June and July ; Lemercier—June and July ; Grosse transparente—beginning of July ; Royale nouvelle—beginning of July ; Montmorency—July ; Gobet—July ; Belle de Chatenay—second fortnight in July ; Franche or Commune—end of June, beginning of July.

B. *Griottes (Black Cherries)*.

De Portugal—first fortnight in July ; Noire—second fortnight in July ; du Nord—August.

C. *Bigarreaux*.

1. *White-fruited Bigarreaux*.—Gros blanc—second fortnight in June ; Jaune de Butler—June and July.

2. *Pink-fruited*.—Elton—all through June ; Napoléon—June and July.

3. *Red-fruited*.—Gros rouge—July ; De Mézel—end of June.

4. *Black-fruited*.—Jaboulay—beginning of June ; Cœur noir—June and July.

D. *Guignes (White Heart Cherries)*.

Guigne précoce—end of May ; Guigne pourpre hâtive—end of May ; Guigne Beauté de l'Ohio—first fortnight in June.

IV. CHESTNUTS.

1. Châtaigne, Châtaigne grosse rouge, Châtaigne Printanière ordinaire, Châtaigne Nouzillarde, Châtaigne verte du Limousin.

2. Châtaigne marron de Lyon, Châtaigne marron du Luc, Châtaigne marron d'Aubray, Châtaigne marron d'Agen, Châtaigne marron de Lusignan.

V. QUINCES.

Coing ordinaire, Coing d'Angers, Coing de Portugal, Coing Bourgeaut, Coing Champion.

VI. RASPBERRIES.

1. *Ordinary Red-fruited Raspberries*.—Ordinaire à gros fruit, de Hollande, Barnet or Hornet, Royale de Herrenhausen, Falstoff, Fillbasket, Superbe d'Angleterre.

2. *Yellow-fruited Varieties*.—Ordinaire à gros fruit, Orange de Binckle, de Hollande, César, Aurore.

3. *Autumnal Red-fruited Varieties*.—Merveille des quatre saisons, Belle de Fontenay, Surpasse Falstoff, Perpétuelle de Billard.

4. *Autumnal Yellow-fruited Varieties*.—Surpasse Merveille, Surprise d'Automne, Sucrée de Metz.

VII. CURRANTS AND GOOSEBERRIES.

A. *Currants*.

1. *Red-fruited*.—À gros fruit, Cerise, Hâtive de Bertin, La Fertile, La Versaillaise.

2. *White-fruited*.—À gros fruit, Blanche hâtive de Versailles, Blanche de Hollande.

3. *Black-fruited*.—Cassis à gros fruit, Cassis de Naples, Cassis blanc (for liqueur).

B. *Gooseberries*.

Numerous varieties to be classed in the following groups:—
1. Round or oblong fruit. 2. Smooth or hairy fruit. 3. White, green, yellow, red, or pink fruit. The nomenclature of these varieties is very extensive, especially in England.

VIII. NUTS.

Free or Ordinary Nuts.—À pellicule blanche, À pellicule rouge.

Filbert Nuts.—À pellicule blanche, À pellicule rouge.

Bunched Nuts.—Noisette de Provence.

Spanish Nuts.—À fruit long, À fruit rond.

IX. WALNUTS.

Common Walnut tree, À coque tendre, À gros fruit, De la St.-Jean, Chaberte, Franquette, Mayette, Parisienne.

X. PEACHES AND NECTARINES.

1. *Peaches.*

Amsden—June and July ; Alexander—June and July ; Saunders—June and July ; Grosse Mignonne—end of August ; Galande—second fortnight in August ; Madeleine rouge—end of August ; Cumberland—June and July ; Downing—June and July ; Waterloo—June and July ; Rouge de Mai—June and July ; Précoce Rivers—end of July ; Précoce de Hale—July and August ; Favorite de Bollwiller—beginning of August ; Précoce de Crawford—first fortnight in August ; Baron Dufour—middle of August ; Madeleine Hariot—second fortnight in August ; De Malte—August and September ; Admirable—first fortnight in September ; Belle Beausse—first fortnight in September ; Alexis Lepère—first fortnight in September ; Reine des Vergers—middle of September ; Nivette—second fortnight in September ; Bourdine and Vilmorin—middle and end of September ; Bonouvrier—end of September ; Princesse de Galles—end of September ; Lady Palmerston—September and October ; Baltet—September and October ; Salway—October.

2. *Nectarines.*

Précoce de Croncels—second fortnight in July ; Lord Napier—all through August ; Newington—August ; Balgowan—middle of August ; Galopin—end of August ; Orange—August and September ; Ananas—August and September ; Petite violette—August and September ; Grosse violette—beginning of September ; Victoria—middle of September ; Elruge—second fortnight in September.

XI. PEARS.

1. *Summer Pears.*—Doyenné de Juillet—middle of July ; Citron des Carmes—end of July ; André Desportes—end of July ; Epargne—end of July, beginning of August ; Beurré Giffard—end of July and August ; Précoce de Trévoux—second fortnight in July ; Blanquet—July and August ; Brandywine—beginning and middle of August ; Favorite de Clapp—August ; Dr. Jules Guyot—second fortnight in August ; Monsallard—end of August ; De l'Assomption—August and September ; Williams—August and September ; Beurré d'Amanlis—August and September ; Madame Treyve—August and September ; Sénateur Vaisse—

August and September; Souvenir du Congrès—August and September; Beurré Lebrun—September; Doyenné de Mérode—September; Rousselet de Reims—September; Triomphe de Vienne—September; Comte Lelieur—September.

2. *Autumn Pears.*—Beurré Hardy—September; Beurré Dalbret—September; Seigneur—end of September; Marguerite Marillat—September and October; Doyenné blanc—September and October; Doyenné roux—September and October; Urbaniste—September and October; Louise Bonne d'Avranches—September and October; Beurré Capiaumont—October; Beurré gris doré—first fortnight in October; Pierre Tourasse—first fortnight in October; Nouveau Poiteau—October and November; Conseiller de la Cour—October; Fondante Thirriot—October; Sucrée de Montluçon—October and November; Marie-Louise—October and beginning of November; De Tongre—October; Doyenné du Comice or Panaché—October; Beurré d'Apremont—October and November; Madame Elisa—end of October; Alexandrine Douillard—October; Fondante des Bois—September and October; Beurré superfin—September; Beurré d'Angleterre—September and October; Colmar d'Arenberg—October and November; Beurré Dumont—October and November; Antoine Delfosse—second fortnight in November; Duchesse d'Angoulême—October to December; Soldat laboureur—November; Nec plus Meuris—November; Beurré Clairgeau—October to December; Président Mas—October to December; Fondante du Panisel—November; Beurré Six—November; Crassane—November; Madame Bonnefond—November and December; Figuè d'Alençon—November and December; Triomphe de Jodoigne—November and December; Beurré Diel—November and December; Beurré Bachelier—November and December; Charles-Ernest—November and December; Beurré Baltet père—November and December; Zéphirin Grégoire—November and December.

3. *Winter Pears.*—Curé—November to January; Colmar Nélis—November to January; Beurré d'Hardenpont—November to January; Passe-Colmar—November to January; Sœur Grégoire—December and January; Beurré Millet—December and January; Beurré de Luçon—December to February; Nouvelle Fulvie—December to February; Passe-Crassane—December to March; Saint-Germain d'hiver—December to March; Marie

Benoist—January to February ; Chaumontel—February ; Royale Vendée—January and February ; Le Lectier—January ; Besi de Saint-Waast—January ; Beurré Rance—December to March ; Beurré Sterckmans—January to March ; Olivier de Serres—January to March ; Duchesse de Bordeaux—January to April ; Bergamote Arsène Sannier—January to March ; Bergamote Hertrich—January to March ; Joséphine de Malines—January to March ; Notaue Lepin—January to April ; Doyenné d'Alençon—January to April ; Doyenné d'hiver—January to April ; Doyenné de Montjean and Charles Cognée—January to April ; Beurré Henri Courcelles—February to April ; Bergamote Esperen—February to May ; Bon-Chrétien d'hiver—March to June (espalier).

4. *Cooking Pears.*—Certeau d'Automne—middle of September to end of October ; Messire-Jean—November and December ; Martin-sec—December to February ; Râteau gris—January and February ; Catillac—February to April ; Sarrasin—March to June ; De Prêtre or Calonet—November to February ; Bon-Chrétien d'Espagne—November to January ; Franc-réal—November to February ; Bergamote Philippot—December to March ; Bési des Vétérans—January to March ; Colmar des Invalides—January to April ; Colmar van Mons—January to April ; Angleterre d'hiver—January to April ; Bergamote de Parthenay—January to April ; Bellissime d'hiver—February to April ; Rousselon—February to April ; Léon Leclerc—March to April ; Bretonneau—March to May ; Tavernier de Boullongne—May to June.

XII. APPLES.

1. *Summer Apples.*—Astrachan rouge—middle of July ; Rose de Bohême—July and August ; Saint-Germain—end of July and August ; Borovitski, or Duchesse d'Oldenbourg—August ; Transparente de Croncels—August and September ; Rambour d'été—September.

2. *Autumn Apples.*—Ananas—September and October ; Cellini—September and October ; Gravenstein—September to November ; Reinette Burchardt—October and November ; Grand Alexandre—October to December ; Reinette grise d'Automne—October to December ; Calville de St.-Sauveur—November and December ; Belle-fleur rouge—November to January ; Reine des Reinettes—November to January.

3. *Winter Apples*.—Doux d'argent—December to February; Belle-fleur jaune—December to February; Bedfordshire Foundling—December to February; Royale d'Angleterre—October to January; Reinette d'Anthézieux—November to February; Reinette de Cuzy—November to February; Pépin de Parker—November to February; Pépin de Ribston—November to February; Reinette du Canada—December to March; Calville de Maussion—January to March; Reinette Baumann—February to March; Calville rouge d'hiver—January to March; Bon Pommier—January to March; De Châtaignier—January, March, April; Reinette grise—January, March, April; Reinette dorée—winter; Fenouillet—winter; Court-pendu plat—January to April; Pearmain d'Adams—January to April; Reinette franche—January to April; Calville blanc—January to April; Api rose—January to May; Reinette des Carmes—February to May; Reinette de Caux—February to May; Baldwin—February to May; Pépin de Londres, or London Pippin—February to May; Pépin de Sturmer—March to May; Pépin de Newtown—February to June; Reinette tardive—March to June; Jacquin—maturity from one year to another.

4. *Cooking Apples*.—Under this heading we will place Apples which are of special use in the kitchen, for jams, marmalades, pastry, and also for drying. Among dessert Apples there are some which are also of the first quality for household use; the following may be mentioned: Transparente de Croncels, Gravenstein, Ananas, Cellini, Belle-fleur rouge, Belle-fleur jaune, Les Rambour, Doux d'argent, Bedfordshire Foundling, Royale d'Angleterre, Pépin de Parker, Reinette franche, Les Reinette grise, Les Reinette dorée, Les Calville, Les Court-pendu, Les Fenouillet.

The following are also Apples of double use, and of a certain sale in the market, for table purposes or for the kitchen: Monsieur Gladstone—July; Transparente blanche—July; Hawthornden—August; Codlin de Keswick—August; Lord Suffield—August; De Lait—August; Cox's Pomona—July and August; Calville rouge d'Automne—October and December; D'Eclat—October to January; De Cantorbéry—autumn; Warner's King—end of autumn; Blenheim Orange—end of autumn; Belle de Pontoise—November to

February; Belle Dubois—November to February; D'Eve—September to March; Reinette musquée—November to February; Reinette de Willy—November to February; Drap d'or—November to February; Reinette luisante—November to March; Reinette plate de Champagne—November to March; Rambour d'hiver—November to March; Pigeon—November to March; Francatu—December to May; Wagener—January to March; Reinette de Damason—February to March; Wellington (Dumelow's Seedling)—end of winter; Reinette Thouin—January to June; Amélie—February to June.

XIII. PLUMS.

1. *Fresh Fruit.*—Jaune hâtive—middle of July; Damas rouge de Biondeck—middle of July; Favorite hâtive de Rivers—middle of July; Mirabelle précoce—second fortnight in July; Précoce de Tours—end of July; Des Béjonnières—beginning of August; Monsieur hâtif—middle of August; Monsieur jaune—middle of August; Reine Claude—August; Petite Mirabelle—all through August; Grosse Mirabelle—second fortnight in August; Damas violet—second fortnight in August; Reine Victoria—August and September; Reine Claude diaphane—August and September; De Kirke—end of August and beginning of September; Reine Claude d'Althan—end of August and beginning of September; Reine Claude violette; Reine Claude de Wazon—middle of September; Tardive musquée—middle of August to end of September; Jaune tardive—end of September; Goutte d'or de Coé, or Coe's Golden Drop—end of September; Coé à fruit violet; Mirabelle tardive—end of September and October.

2. *Fruits for Drying.*—Quetsche hâtive—August; Perdrigon—August; D'Agen—end of August and September; Sainte-Catherine—September; Quetsche d'Allemagne—September; Quetsche d'Italie—middle of July; Reine Claude de Bavy—end of September.

XIV. DESSERT GRAPES.

Gamay de juillet—end of July in the South and August in the Centre; Précoce Malingre—middle of August; Morillon hâtif—August; Précoce de Courtiller—middle of August; Madeleine royale—end of August; Madeleine angevine—end of August; Lignan blanc—end of August, beginning of Septem-

ber; Chasselas Vibert—August and September; Portugais bleu—beginning of September; Chasselas doré—beginning of September; Chasselas rose—September; Chasselas de Falloux—September; Chasselas violet—September; Pineau noir—second fortnight in September; Pineau gris or rosé; Muscat noir—September; Muscat blanc—September and October; Boudalès or Cinsau—September and October; Frankenthal or Black Hamburg—October; and other hothouse varieties mentioned before.

XV. PERSIMONS.

Costata, Mazeli, Kæmpferi, Hatchiya, Guibochi, Tsuru, Yemon, Zenzi, Berlandieri.

XVI. FIGS.

Blanquette, Dauphine, Grise Précoce, Angélique, Céleste, Buissonne, Bourjassotte, Blanche de Versailles, Dorée Bellone, Datte.

XVII. MEDLARS.

Ordinaire, de Hollande, Sans pepin.

XVIII. DOGWOODS.

Rouge, Précoce, À gros fruit, Jaune.

XIX. ORANGES.

Orange, Mandarine, Citron, Limon, Bergamote, Bigarade, Cédrat, and others.

XX. OLIVES.

Douce blanche, Grosse noire, d'Espagne, Moureau, Picholine, Provençale, Verdale, de Salerne.

MANURES AND THEIR USES.

By Mr. WM. GEO. WATSON.

[Read September 10, 1895.]

Plant Food.

IF abundant and invigorating food be given to an animal it increases in weight and fatness, whereas on a scanty and poor diet it continues thin and weakly. It is precisely the same with plants. If they find in the soil all the substances which they require, in sufficient quantity and in suitable form, they will grow more vigorously and produce better crops than when they meet with those substances (or, perhaps, even only one of them) in insufficient quantity. Every soil not absolutely barren is capable of bearing plants. Left to itself it would soon become clothed with vegetation. Even when the soil is covered deeply with water it does not cease to be a dwelling-place for plants although these are of a different organisation from the plants growing upon the surface of the land. Plants, like animals, must obtain nourishment, and in order that a plant may live and grow it is necessary that its four organic constituents—carbon, hydrogen, oxygen, and nitrogen—should be absorbed by it; and that this absorption may take place, it is essential that they should be presented to the plant in a suitable form.

Plants obtain the elements of which they are built up partly from the atmosphere and partly from the soil. Ninety-five per cent. of all the substances found in plants is obtained from the atmosphere, and the increase of the earth's produce is due more to the help of Nature than to the skill of man; but the 5 per cent. obtained by the plant from sources other than the atmosphere is just as necessary to the growth of the plant as is the other 95 per cent., for without it neither the oxygen, hydrogen, carbon, or nitrogen could be assimilated.

All fertile soils contain organic and inorganic matters, and every plant, in like manner, is made up of an organic and an inorganic part. Carbon, oxygen, hydrogen, and nitrogen are found in all plants and animals, and are called the organic elements.

Carbonic acid, or carbon dioxide, exists in the atmosphere. It is made up of the two elements carbon and oxygen. Every animal that breathes, and every fire that burns, adds carbon dioxide to the air. A grown-up person breathes into the atmosphere in twenty-four hours 19 cubic feet of carbon dioxide; and all this becomes the food of plants. In round numbers, it may be stated that carbon forms one-half of the dry combustible matter of every plant, and this element, as it is abundantly supplied by the atmosphere, may be entirely disregarded in the manures to be supplied to crops by the gardener. Carbon dioxide is absorbed by the leaves of all plants exposed to light. In the dark this does not take place. Sunlight, a temperature not lower than 50° Fahr., and the presence of green colouring matter or chlorophyll, are essential for this process. The respirations of plants and animals are identical. Both absorb oxygen, and breathe out carbon dioxide. This is very evident in animals, but not so in plants, for the following reason. In the latter a feeding process, occurring at the same time and exactly opposite in nature to their respiration, takes place; the chlorophyll separates and stores up as food the carbon of the carbon dioxide, restoring oxygen to the air. This nourishing process is far more actively displayed by a plant than its respiration. The absorption of carbon dioxide by plants is in proportion to the area of their leaves. For example turnips present an area of six times the surface of the soil in which they grow, and the quantity of carbon assimilated is stated by Warington to be often as much as 17 cwts. per acre, whilst the leaves of Wheat, which have a more limited area of surface, are said to absorb, when an average crop is grown, about 11 cwts. per acre.

By far the larger proportion of the carbon in plants is obtained from the air, but in soils where humus or vegetable matter is decomposing a small quantity is also absorbed by the roots; the absorption of carbon always being in the form of carbon dioxide.

The plant absorbs water from the soil by means of its roots and rootlets, and with the water a variety of food elements dissolved in it. The root takes up the soluble salts and all diffusible substances which are present in the water which they draw up from the soil. These substances are potash, magnesia, iron, nitric acid, phosphoric acid, and sulphuric acid.

Besides furnishing the plant with its ash constituents, the root has the important function of supplying nitrogen, which it nearly always takes up in the form of nitrates. A plant is capable of making use of nitrogen in the form of nitric acid or ammonia. The faculty with which ammonia and other nitrogenous substances are converted into nitric acid in the soil is so great that nitrates become by far the most important source of nitrogen at a plant's disposal.

Necessity for Manure.

If we try to grow crop after crop on the same piece of land with no other preparation than digging or ploughing the land, and sowing the seed, we always find that after a greater or less number of years, according to the nature of the soil, the crop begins to show a great falling-off in yield, no matter how favourable the seasons may be. Facts like these, which are well known to everybody, easily lead to the belief that crops take something out of the land. These substances—whatever their nature—are necessary to the fertility of the land, and, far from being inexhaustible, the stock of fertility in an ordinary soil will not stand anything like a continuous drain. The fertility lost by the soil is actually due to the substances contained in the crop removed. This is made clear by the result of not removing the crop, but, instead, allowing it to rot on the ground or turning it in. When this is done, not only is the fertility of the soil not lessened, but it is generally increased, and this is one of the methods sometimes employed by gardeners and farmers to improve their land.

For thousands of years it has been known to all people engaged in horticulture and agriculture that to restore the lost fertility to the soil it was not necessary to return the whole of the crops taken off, but that the manure of the animals which consumed the crops, if spread on the land and dug in, would suffice to make the soil nearly equal in productiveness to what it was before. By this it is very evident that the most important ingredients given up by the soil to the crops are contained in the excreta of the animals fed upon it.

From time immemorial it has been the custom to collect and to preserve the manure from all classes of farm animals, and to spread it upon the land periodically.

Some nations have for long ages carried out the idea of preserving the fertility of the soil by this means a step further, and have made it the custom to apply to the land the manure from the human beings for whose support both crops and beasts are raised, and into which, therefore, the greater portion of the fertilising ingredients at last passes.

The reason why the fertility of cultivated land is so easily exhausted was not known even by the best versed amongst our own forefathers, nor even to the nations who knew so well from a useful point of view how to dispose of human excreta.

They could not answer the important question, "What are the substances which reduce the fertility of the soil by their loss?" or the equally interesting questions naturally following as to these substances being few or many; whether all crops remove the same ingredients; the proportions in which they are removed by different crops and systems of cropping; the proportion in which they occur in the soil, and the proportions in which they are returned by the different forms of animal and vegetable refuse known as manures.

The Value of Chemistry.

Science, especially chemical science, has answered these questions for us, and so enabled us to make still better use of the manures already known and in common use, and it has done much more than this by suggesting that these fertilising and valuable ingredients of manure may be met with in other forms. By knowing exactly what to look for, it has found for us sources of fertility, in some cases ready to our hands; in other cases, existing in great deposits, which can be profitably brought even from far-off countries, and has discovered in the most unlikely, and apparently worthless, materials real mines of wealth when applied to the enrichment of the soil.

It is not absolutely necessary now, as formerly, to test the value of a manure by trying it in the garden, since chemical analysis will find out for us whether it contains the proper fertilising ingredients, how much there is of them, and in what forms, and so will give an answer in a few hours, which will anticipate the result of months or years of experience.

Hundreds and thousands of tons of manure of all kinds are bought and sold every year in the markets on the result of

chemical analysis alone, and there are very many cases in which it is the only safe guide a purchaser can have.

Again, if any new substance is proposed or brought forward as a manure, and chemical analysis shows it to be destitute of particular fertilising ingredients, we know at once it will be of no use to buy it or try it, and in this way are saved from throwing away time and money and losing the crops as well.

Rotation of Crops.

It has been before stated that when the same crop has been grown year after year without manure on the same land, the falling-off is very rapid, and some crops refuse to grow at all after two or three years of such treatment, when the soil is said to be "sick" of the particular crop grown.

By growing other crops for a few years this sickness, whatever be its cause, is removed, and the original crop can be taken again. A judicious rotation of crops enables the land to recover from the partial exhaustion produced by previous crops, and in the arrangement of a suitable rotation the greatest care should be exercised, not only on farm lands but in gardens as well.

It is, of course, quite possible, by very careful cultivation and suitable manuring, to grow the same crop for many successive years on the same garden plot, as has been done in the case of wheat and barley and roots with such marked success by Lawes and Gilbert, of Rothamsted; but gardeners who do not limit themselves to the production of one particular plant will benefit by arranging such a rotation that each succeeding crop may not require for its main support the same substances, or in the same proportion as were removed by the previous crop grown. Crops of the most opposite class ought, as much as possible, to alternate with one another, and each particular plant should be repeated as seldom as possible on the same plot of land. It is constant variety of crop, with suitable manuring, that will yield the largest total produce with the most economy, whatever the rotation may be.

Classification of Manures.

The various manures or plant-foods used in this and other countries for returning to the soil the ingredients lost by cropping have been classified by Drs. Stöckhardt and Voelcker as follows:—

THIS TABLE IS BY DRS. STÜCKHARDT AND VOELCKER.

Nitrogenous	Carbonaceous	Potash	Soda	Phosphoric acid	Various	Calcareous	Silicious
Ammoniacal salts Peruvian guano	Farmyard dung Straw	Kaimit Carnellitè	Salt Nitrate of soda	Bones Thomas's phosphate Guanos	Gypsum Iron sulphate	Lime Marl	Silica Coal ashes
	Animal substances (blood, flesh, wool, &c.) Ammoniacal liquor	Malt-dust Urine	Urine Soap-boilers' refuse	Coprolites	Magnesium sulphate	Gypsum Coal ashes	Farmyard dung Sand
Putrid urine	Green manure	Wood ashes	Sodium sulphate	Mineral phosphate Animal matter		Gas-lime	Straw
Short dung	Peat	Leaves	Sodium carb.	Dung Straw, &c.		Carb. of lime	Peat ashes, &c.
Horn shavings Bones dissolved		Green manure Burnt clay Fish-potash Guano				Thomas's phosphate	
Oil-cake, Malt dust							
Fresh urine							
Half-inch bones Woollen rags Long dung							
Saltpetre Nitrate of soda Nitre earth							

[Copied from *Agricultural Journal* of Bath and West of England and Southern Counties Association.]

Stable or Farmyard Manure.

Stable or farmyard manure, regarded by gardeners and others as the most important fertiliser for all cultivated soils, is a mixture of the solid and liquid excrements of animals, with straw, moss, &c., used as litter.

The quality of the manure will necessarily depend—

- (1) On the animals from which it is obtained.
- (2) On their age and condition.
- (3) On the character of their food.
- (4) On the quality of the straw employed as litter.
- (5) On its management when accumulating.
- (6) On its subsequent treatment.

Farmyard and stable manure is distinguished by the fact that it contains almost all the constituents which the land requires in order to grow crops. Of inorganic constituents, it possesses potash, soda, lime, magnesia, oxide of iron, silica, chlorine, phosphoric acid, and carbonic acid, all of which are found in the ashes of plants.

The organic constituents are represented by various nitrogenous compounds, which give rise to ammonia and humic acids, the latter forming the chief part of the dark-coloured organic material or humus, from which, by means of nitrification, nitrogen is supplied to growing crops.

This complexity of its composition renders stable and farmyard manure an almost perfect as well as a general manure.

Yet it is a mistake to suppose that it contains *all* the necessary plant-foods required for the growth of crops. The use of stable and farmyard manure alone, has a tendency to withdraw from the soil a considerable amount of phosphate of lime and nitrogen. For a large amount of phosphate of lime and nitrogen (originally in the soil, and afterwards in the food of farm animals) is used up in the formation of the bones, nerves, and muscles of the animals producing the manure. For example, the nitrogen, phosphates, &c., sold off a farm in the form of flesh, bones, and milk are obviously never returned to the soil in the excreta of the horses, cows, or other animals.

Therefore it becomes a matter of the utmost importance that certain other fertilising substances besides that produced in stables and farmyards must be put into the soil if our gardens are to remain fertile.

Composition of Farmyard Manure.

Professor Tanner gives the following valuable table:—

	Fresh		Rotten		Price	
	No. of lbs. in each ton	Value	No. of lbs. in each ton	Value		
		s. d.		s. d.	Per lb.	
Water	1,428 $\frac{1}{4}$	—	1,689 $\frac{1}{4}$	—	—	
Soluble organic matter	55 $\frac{1}{2}$	2 0	83	4 0	Ammonia 6d.	
Soluble inorganic matter	Soluble silica	5 $\frac{1}{4}$	—	5 $\frac{3}{4}$	—	
	Phosphate of lime	6 $\frac{3}{4}$	0 5	8 $\frac{1}{2}$	0 6 $\frac{1}{2}$	$\frac{3}{4}$ d.
	Lime	1 $\frac{1}{2}$	—	2 $\frac{1}{2}$	—	—
	Magnesia	$\frac{1}{4}$	—	1	—	—
	Potash	12 $\frac{3}{4}$	3 3 $\frac{3}{4}$	10	2 9	3 $\frac{3}{10}$ d.
	Soda	1 $\frac{1}{4}$	—	$\frac{1}{2}$	—	—
	Sodium chloride	$\frac{3}{4}$	—	$\frac{3}{4}$	—	—
	Sulphuric acid	1 $\frac{1}{4}$	—	1 $\frac{1}{4}$	—	—
Carbonic acid and loss	4 $\frac{3}{4}$	—	2 $\frac{3}{4}$	—	—	
Value of Soluble matter	—	5 8 $\frac{3}{4}$	—	7 3 $\frac{1}{2}$	—	
Insoluble organic matter	577	6 9	287 $\frac{1}{4}$	4 3	Ammonia 6d.	
Insoluble inorganic matter	Soluble silica	21 $\frac{3}{4}$	—	32	—	—
	Insoluble silica	12 $\frac{1}{2}$	—	22 $\frac{1}{2}$	—	—
	Oxide of iron and phosphates	13 $\frac{1}{2}$	0 6 $\frac{1}{2}$	21 $\frac{1}{4}$	0 8 $\frac{3}{4}$	$\frac{3}{4}$ d.
	Lime	25	—	37 $\frac{1}{2}$	—	—
	Magnesia	3 $\frac{1}{4}$	—	2	—	—
	Potash	2 $\frac{1}{4}$	0 7 $\frac{1}{2}$	1	0 3 $\frac{1}{4}$	3 $\frac{3}{10}$ d.
	Soda	$\frac{1}{2}$	—	$\frac{3}{4}$	—	—
	Sulphuric acid	1 $\frac{1}{4}$	—	1 $\frac{1}{2}$	—	—
Carbonic acid and loss	10 $\frac{3}{4}$	—	29	—	—	
	2,240	7 11	2,240	5 3		
Value of insoluble matter	—	7 11	—	5 3		
Value of soluble matter	—	5 8 $\frac{3}{4}$	—	7 3 $\frac{1}{2}$		
Total value of 1 ton of manure	—	13 7 $\frac{3}{4}$	—	12 6 $\frac{1}{2}$		

Treatment of Farmyard Manure.

One of the oldest methods for the treatment of stable and farmyard manure is the well known "dung maxel" or "heap" method. The fresh manure is piled up in heaps to ferment and mature. Sometimes these heaps are covered with soil, the object being to prevent volatilisation of ammonia and to keep out the rain.

The most valuable constituents of dung are those contained in the urine of animals.

The straw or litter absorbs this liquid, though some of it is liable to drain away unless an excessive quantity of litter is used. A loss thus arises, and a still greater loss is incurred if, in the course of fermentation, the dark brown liquor is allowed to trickle from the mass. This liquor contains not only the constituents of the urine, but valuable solid matters which have become soluble during the fermentation. Straw will absorb any ordinary liquids. An endeavour should be made to restrict its absorbent powers entirely to the excretions of the animals, and for this purpose the litter should be kept out of reach of rain or other water. The washing out of manure of its fertilising ingredients will at the same time be prevented.

For the better preservation of dung, therefore, covered places have been recommended. The floors of these places should be so constructed that the drainings may flow into a tank.

Another advantage of a covered place is that dung may accumulate in it to a considerable depth, when an occasional treading will help to make the mass uniform in texture and quality.

The use of roughly chaffed straw and peat moss litter will aid in the formation of a well and consolidated bed of dung. It is sometimes advantageous to pump the contents of the liquid manure tank over the dung heap to prevent the loss of ammonia given off while the heap is fermenting. Whenever the manure heap is seen to be steaming there is sure to be a loss of carbonate of ammonia going on.

Fermentation of Stable Manure.

During the fermentation of stable or farmyard manure various changes take place. The straw, vegetable matters, &c., along with the excreta, undergo a certain change brought about

by the agency of microscopic organisms. This change is termed nitrification, and is due to the life-work of certain micro-organisms present more or less in all soils. Amongst these* *Bacillus tardecrescens*, *Bacterium ureæ*, and *Bacillus fluorescens* all nitrify organic matter (like urea), forming small quantities of nitrates.

One of the first products formed during the nitrification of organic matter is ammonia. The ammonia is then oxidised and becomes nitric acid. The nitric acid combines with certain bases (like potash, soda, and lime) already in the soil, forming nitrates which are soluble in water, and which thereby become valuable plant-foods.

Other changes besides nitrification occur in the organic matter of stable manure during its fermentation. One of these is the oxidation of the carbo-hydrates. The carbon of these substances is converted into carbonic and organic acids. These acids are neutralised by the potash, lime, &c., of the soil, at the same time producing active and dormant plant-foods.

The temperature of fermentation should not be allowed to rise in the centre of the heap above 150 Fahr., as loss of ammonia is the result. It should be regulated by water, or, as was before stated, by pumping liquid manure over the heap.

The heap should not be drenched, or the valuable nitrogenous compounds will run into the drains. A strong odour coming from the heap shows that a wasteful fermentation is going on. If the manure contains too small a proportion of litter, the urea contained in the urine is quickly converted into ammonium carbonate, which is a very valuable compound. The volatile ammonium carbonate may be "fixed" by watering the manure heap with a solution of commercial iron sulphate. It is also recommended to spread on the floors of stables, cow-houses, &c., sawdust moistened with a solution of iron sulphate.

Variation in the Composition of Stable and Farmyard Manure.

1. According to the animals from which it is produced. Stöckhardt states that, amongst all the herbivorous animals, the excreta of cows contain the smallest quantity of nitrogen with the largest amount of water; and that they pass but slowly into

* See *Nature*, Oct. 13, 1892, p. 576.

putrefaction, and become less heated in the manure heap than the excreta of other animals. The excreta of horses are much richer in nitrogen, and less watery than those of cows; their texture is more dense, and they cohere but loosely. For this reason they can be readily distributed, and pass more quickly into decay, and consequently become the sooner available for plant-food. The excreta of sheep contain still more nitrogen and less water than those of horses; they are easy of decomposition, although of a very compact nature. The excreta of pigs vary in composition probably more than those of almost any other farm animal, owing to the immense difference in the methods of feeding, &c.

2. The age and condition of animals affect the composition of the manure heap; for growing animals, in their rapid formation of bone and tissue, require both organic and inorganic substances, which they obtain from the food supplied. Full-grown adult animals do not require these foods in so large a proportion, and, consequently, the manure of a young beast will always, with the same foddering, be less valuable than that of a full-grown adult animal.

Again, a hard-worked beast will furnish less manure, and that of smaller value, than one comparatively at rest.

The composition and value of the excreta voided by milking cows will vary, even with the same description of food, according to the production of milk. When in "full milk" the manure will be more deficient in quality than when the animal is "nearly dry."

3. The character of the food will influence the quality of the manure by the greater or less amount of water which it contains.

A ton of manure derived from green fodder will only be about one half the value of the same weight obtained by the consumption of dry food.

4. Quantity and kind of straw employed as litter. Straw has a much less manurial value than the excreta of animals, and consequently the manure will be strong or weak in exact proportion to the quantity of liquid urine absorbed. Stable and farm-yard manure rich in urine will also pass more rapidly into fermentation, and become more quickly available as plant-food, than when poor in that constituent.

When made from oat straw the manure will have a greater value than when wheat or barley straw has been employed as litter. Wheat straw is superior to barley straw in the amount of potash and nitrogen it will yield.

Use of Stable and Farmyard Manures.

The physical effect of these manures upon soils is equally important with its chemical influence. The general rule according to which short or well-rotten dung is applied to light, open soils, and long fresh dung to heavy, compact soils, is intimately associated with the mutual physical relations of soils and manure.

The fresher the dung the less ready are its constituents to enter into combinations available as plant-food; and in this form a stiff clay soil is well adapted to hold or retain it till the occurrence of those chemical reactions which result in rendering the nutrient ingredients of the manure presentable to the plant.

The older and the more rotten the dung before application, the more promptly are its fertilising ingredients available; and as light, porous soils are deficient in retentive power, it is well they should receive dung in an advanced state of decomposition, and at a time when the crop is ready, or almost ready, to make use of it, loss of manurial substance by means of the drainage waters being thus avoided.

Long or "green" manure helps to open up stiff tenacious soils, and the fresh straw provides air-channels, along which the atmosphere can find its way into the recesses of the soil, oxidation being thereby promoted. Conversely, the application of short or much decomposed dung to a light or sandy soil has the beneficial effect of making it firmer, and of rendering it less readily permeable by water.

Bones as a Manure.

For a long time bones have been used as a manure; and as they contain so large an amount of organic matter and phosphate of lime, it is easy to understand why impoverished soils should be greatly improved by what is called "boning."

At one time bones used to be roughly broken and applied in the proportion of 20 cwts. or 30 cwts. per acre; but as it was observed that the bones did not readily crumble or dissolve when

treated thus, they were gradually employed in smaller and smaller pieces, until at last they are reduced to actual powder before using, and it is found that the finer the bones are ground, the more quickly is the improvement of the soil evident.

About two-thirds of the weight of bones consist of mineral matter, which is composed chiefly of phosphate of lime, and their value as a fertiliser depends to a very great extent on their phosphoric acid, which, in combination with the lime, forms phosphate of lime. The organic portion of bones (cartilage, gelatine, &c.) contains nitrogen, which, decomposing in the soil, forms ammonia, and assists in the fertilising action of the phosphate of lime.

One of the best forms of nitrogen for manure is that furnished by the organic matter of bones, after having undergone a partial decomposition by acid; and it is to this fact, added to the superiority of the phosphate associated with it, that the preference given by gardeners to bone manures when of good quality is to be attributed. Several kinds of bone-meal are now to be met with, and are generally considered superior to ordinary bone-dust, since many of them contain dried animal matter in addition to the bone.

Superphosphate of Lime.

To bring bones into a condition whereby their constituents become more quickly available for plant food would naturally attract the attention of gardeners and farmers. When bones are ground to a powder, wetted, and then treated with sulphuric acid, disagreeable gases pass off, and most of the bones dissolve. In time the residue dries more or less into a solid mass, and if the quantity of acid and bones have been properly proportioned a moist greyish substance has been formed, which is known as superphosphate of lime.

Raw bones are not much used for making superphosphate, but it is now almost wholly prepared by mixing sulphuric acid, with bone-ash (which is imported in considerable quantities from South America) and various mineral phosphates, such as coprolites and apatite.

The solubility of phosphate of lime depends on what kind of phosphate it is, whether it is made from bones, coprolites, or other mineral phosphates. The insoluble is called "tribasic,"

because it contains three equivalents of lime to one of phosphoric acid. The soluble phosphate is called "monobasic," because it contains one equivalent of phosphoric acid to one of lime.

Insoluble tribasic	Soluble monobasic
Phosphoric acid . . . { Lime Lime Lime	Phosphoric acid . . . { Water Lime Water

When sulphuric acid is added to the tribasic phosphate, two parts of lime are removed, and their places taken by two of water, which is always present in sulphuric acid, converting the tribasic into monobasic phosphate of lime. The liberated two parts of lime unite with two parts of the sulphuric acid to form gypsum.

A soluble superphosphate is too acid to enter at once into the food of plants, but when mixed with the soil it undergoes a preparatory change, which weakens its acid character and increases its diffusive powers.

Dr. Voelcker states that the absorption of phosphates is more rapid and complete in exact proportion to the amount of lime present in the soil.

Lime is intimately connected with the fixation of soluble phosphates. It acts by combining with the acid phosphates to form a less soluble but more neutral compound called "dibasic" phosphate of lime :—

Less soluble dibasic
Phosphoric acid . . . { Lime Water Lime

Uses of Superphosphate.

The value of superphosphate will greatly depend on the presence of available nitrogenous matter, or of potash, in the soil. Two parts of superphosphate by weight to one of potash, applied in the proportion of 3 to 5 cwts. per acre, is said to be a good manure for Potatos, Turnips, Beet-roots, &c., but its value

is greatly increased by the addition of sulphate of ammonia or nitrate of soda.

Either alone or with potash it is also recommended for Beans, Peas, and almost all garden crops. Equal weights of superphosphate and Peruvian guano make an excellent garden manure in the proportion of about 3 cwts. per acre; but for restoring the phosphates in light, sandy soils bone-meal is better than superphosphate, because the soluble phosphate of the latter is more easily washed out by the action of rain passing through the land.

It is a valuable manure for all green crops, and very useful in the early growth of Turnips, especially in hastening the young plants beyond the stage when they are attacked by the "fly."

Warington, in his "Chemistry of the Farm," says that "when applied as a top-dressing for wheat, 2 cwts. of superphosphate with 1 cwt. of nitrate of soda will be found a suitable mixture." But experience has shown that a much better result is obtained by putting the superphosphate into the land with the seed and applying the nitrate of soda in the spring as a top-dressing when the plant-growth is active. Whether this could be done with any garden crops is more doubtful.

An equal weight of common salt mixed with the nitrate of soda is also found to be beneficial when there is abundance of decomposing organic matter in the soil.

Phosphatic Slag or Thomas's Phosphate

is a by-product containing phosphorus which is removed in the smelting of iron by the Thomas-Gilchrist process. This phosphatic slag contains 15 to 20 per cent. phosphoric acid. Ground to a very fine powder, it makes a cheap and useful phosphatic manure, which has been extensively applied on large tracts of moorland in Germany. It should be well dug into the soil so as to be near the roots of the crop. The soils best suited for this manure are those of a peaty or of an organic nature. There is little doubt that this valuable and unlimited source of phosphoric acid would prove highly beneficial on the soils of the Fen district of this country.

Nitrate of Soda.

Nitrate of soda is imported in large quantities from South America, and is a valuable source of nitrogen to most species of

plants. It is especially suited for clay lands. The soda which it leaves in the soil apparently helps to render the potash and phosphates in the soil available to crops. It is quicker in its action than any other nitrogenous manure, and is, therefore, the best manure to employ when a late dressing has to be given.

Nitrate of soda, as imported from Peru, contains 5 to 10 per cent. of impurities, and it bears a price proportionate to the quantity of pure sodium present in it. When of good quality it contains about 15 per cent. of nitrogen, equal to 18 per cent. of ammonia, and is, therefore, richer in that constituent of plant-food than Peruvian guano. Its ready solubility renders it not well suited for light, sandy, open soils, and there can be no doubt that the best effects are produced by several small quantities applied at intervals.

Nitrate of soda is more easily washed out of soils than any other manure, and is best applied in the spring, or when the crop is actually growing and ready to make use of it. To get the full value out of nitrate of soda, the soil must be well supplied with phosphates and potash, for the nitrate does not contain either, and is, therefore, not a complete manure.

Guanos.

This valuable manure consists chiefly of the dried excrement of sea birds, and is found on rocky islets in parts of the world where rain seldom falls. The droppings of myriads of birds, by which such places are frequented, have accumulated during untold ages, and are now found in enormous deposits. The principal supply, both for quantity and quality, has hitherto come from the Cincha Islands off the coast of Peru. In past times the gardener could calculate upon getting guano containing nitrogen equal to 16 or 18 per cent. of ammonia, and it was fairly uniform in composition, so that analysis was unnecessary; but the best guano obtained now contains only about 11 or 12 per cent., and very often not more than 9 or 10 per cent., of ammonia.

Genuine Peruvian guano is the best manure imported of all the artificial manures. One ton of Peruvian guano is estimated by Nesbit to be equal in fertilising properties to over 33 tons of good stable or farmyard manure. Nitrogen guanos are excellent manures for all garden crops.

The late Dr. Voelcker states that the phospho-Peruvian

guanos, found in some of the islands of the West Indies, are by far the most valuable fertilisers, whether natural or artificial, which have ever been offered to the public. Voelcker recommends them especially for Potatos and root crops.

Texas guano is the pure excrement of large numbers of bats, deposited in certain caves near the coast. Dr. Voelcker says that Texas guano contains nitrogen in three distinct forms, viz. as organic matter, as ammonia salts, and in the form of nitrates. The two latter sources of nitrogen are readily available plant-foods, while the organic matter requires time for its decomposition; therefore it must form a reserve, or latent supply which becomes active after a time.

Guanos, owing to their high price, are, and have been, greatly adulterated. The substances used for adulterating are sand, clay, gypsum, salt, powdered brick, and limestone. Sometimes Peruvian guanos are adulterated with cheap mineral phosphates in a finely ground state. Such phosphates have not the same horticultural or money value as the phosphates contained in genuine Peruvian guanos. The cultivator should, before he purchases guano, have a written guarantee stating the percentage of nitrogen and calcium phosphate present, and if any doubt is entertained of the genuineness of the manure it should be sent to an analytical chemist for analysis.

Lime.

Lime is one of the most widely diffused substances in nature, existing in chalk, limestone, marble, marl, calcareous spar, organic remains, &c. The bones of all vertebrate animals are composed chiefly of phosphate of lime. It is also found in the shells of beetles, crabs, lobsters, oysters, &c. Lime forms a large percentage of the weight of the ashes of plants, and therefore it is a very necessary plant-food.

All crops do not contain lime in the same proportion, and the quantities are not constant even in the same plant.

Lime is obtained by exposing pure limestone or chalk to a red-heat, the product being stone-lime, quicklime, burned lime, and caustic lime. Sometimes it is obtained by burning oyster-shells, or shells of other fish, converting them into quicklime termed "shell-lime."

Lime has been used as far back as the time of the Romans for manuring fruit trees, for which it is most important.

Lime is a constituent of all plants ; its function is connected with the building up of the tissues and the formation of cell-walls. It is not only a direct plant-food, but is one of the most effective manures, and should be studied from many points of view.

(a) Lime acts upon the various ingredients contained in soils. It changes those that are inert into plant-foods, and destroys the bad qualities of the ingredients that are prejudicial to plants. It gives fertility to boggy peats, or organic soils, by neutralising the injurious organic acids present in the soil. Therefore lime acts as an excellent antidote for "sour" land.

(b) By decomposing organic matter, lime hastens the process of nitrification.

(c) Lime improves the physical nature of the soil, and has a tendency to promote a healthy growth of plants.

(d) In the working of clay lands lime is very valuable. Besides converting insoluble compounds into soluble ones, it renders such lands more friable, and thereby facilitates cultivation.

(e) It has also beneficial effect upon sandy soils of a light nature. It renders them less porous, therefore better able to resist the parching action of the sun's heat during a hot, dry summer. Lime also helps to retain moisture in light sandy soils.

Mode of applying Lime.

On cultivated land, and old gardens in which there is a large quantity of humus, a heavy dressing of unslaked lime should be applied in order to produce the necessary degree of fermentation ; whilst on shallow lands having a few inches of soil only a light dressing, occasionally repeated, appears to be the better method. The benefit to be derived from lime greatly depends upon the nature and condition of the soil. Most lands are much improved for two or three crops by lime, but frequent repetition will often not have the same good effect.

A proportion of from three, six, to nine tons of lime per acre may be regarded as light, medium, and heavy dressings.

Gas-Lime.

Lime is used in the purification of coal-gas. The residue, after the purification, is known as gas-lime. It is a mixture of

calcium hydrate and calcium carbonate with sulphite and sulphide of lime. The two latter compounds are in themselves poisonous to plant-life, but they are both converted into gypsum, or sulphate of lime (a plant-food), by exposing the gas-lime to the action of the atmosphere.

Gas-lime is best applied in the autumn at the rate of two to five tons per acre, but as a plant-food this manure has much less value than either quicklime or carbonate of lime.

To prepare fresh gas-lime for use in the garden, it may be spread out on a layer of pond-mud, night-soil, or coarse vegetable refuse and exposed to rain and air. It is an excellent agent in decomposing seaweeds for manure.

Potash Manures.

Every plant requires a certain amount of potash for its growth and development. Potash is said to play an important part in the "nutrition" of chlorophyll, and its presence is absolutely indispensable to the formation of starch in the green leaves of plants. Kainit, or crude potash salts, is the commonest form in which potash is now employed as a manure.

It seems to be particularly suited for Potatos, as it both increases the weight of the produce and improves the quality of the tubers. It may be used at the rate of 3 cwts. per acre, and mixed with superphosphate, nitrate of soda, and ammonium salts.

Dr. Voelcker, by analysis, shows kainit to contain:—

From 23 to 25 per cent.	sulphate of potash,
„ 14 to 28	„ salts of magnesia,
„ 30 to 48	„ chloride of sodium.

An excess of potash manures, however, is said to have a tendency to foster the development of parasitic fungi.

Seaweeds as a Manure.

In the Channel Islands and on the Scottish and Irish coasts, and in the Isle of Wight, the seaweeds are used as manure. The weeds are carted off the shore during the autumn and winter, and are placed in large heaps to rot, sometimes mixed with coarse farmyard manure and gas-lime. After it has thoroughly decomposed it is applied to the land at the rate of about 10 or 15 tons per acre.

Decomposed seaweeds form an excellent manure for Potatos, Turnips, and almost all vegetables, their composition being chiefly nitrate of potash.

Fish as a Manure.

The refuse of the fisheries and whole fish are often used as manure. The best way to use them is in the form of a compost made with three or four times their weight of earth, with alternate layers of lime. The heap is finally covered with earth to prevent the loss of ammonia during the fermentation. By this method the fish are rapidly decomposed, and make a rich compost, which may be used at the rate of about $1\frac{1}{2}$ tons per acre.

Chloride of Sodium (Common Salt).

Salt has been used as a manure from very ancient times. Its action upon plant-life is not thoroughly understood. It acts chemically and mechanically upon the land, producing various changes therein which are beneficial to crops. Salt destroys weeds, noxious insects, snails, and slugs. It retains moisture in dry sandy soils.

Asparagus, Turnips, Beet, Seakale, and various crops are benefited when occasionally dressed with slight sprinklings of salt; but care should be taken that none falls on the growing leaves.

Refuse Material as Manure.

Woollen rags are largely used in Kent as a manure for hops. Wool contains a large proportion of mineral matter—chiefly potash salts—but very little inorganic matter is found in woollen rags or shoddy. Woollen rags and shoddy decompose very slowly in the ground. They should be dug in five or six months before they are required to act; there will, however, probably be but few gardens in which they are used.

Dried or liquid blood is an excellent manure for vines, and when of good quality it contains about 15 per cent. of ammonia.

Soot is generally employed as a top dressing in spring, and for making soot-water, whose virtues are known to all gardeners.

Economical Employment of Manures, &c.

It is obviously to the gardener's no less than to the farmer's interest in these days to see that he gets the largest return from

his land for the smallest possible outlay. To do this he must spare no pains to nourish his crops on the particular foods best suited for them. The true economy of manure can only be understood by becoming acquainted with the special characters and capacities of the crops cultivated. The composition of a crop is no sufficient guide to the character of the manure appropriate to it, even when the composition of the soil upon which it is grown is known. It is not only the materials required to form a crop, but the power of the crop to assimilate the materials, which must form the basis of judgment. These principles have been much overlooked by many scientific writers, who have advised the manuring of land in every case with all the constituents required by the crops. This is both impracticable and unnecessary. In the case of an absolutely barren soil it might be necessary to supply all the constituents of plant-food before good garden crops could be raised ; but this would not be required under any ordinary circumstances.

When garden land is in a fairly good condition the total amount of plant-food is considerable, and luxuriant growth may be obtained by adding to the stores of the soil the few particular elements of food which the crop it is wished to grow has most difficulty in obtaining.

Storage of Manure.

Great care must be taken with the stable and farmyard manure in its storage and treatment, and that it may produce the best results the gardener must use his judgment as to when and how to apply it.

In a great many cases the management and use of stable and farmyard manure is not so carefully attended to as it ought to be. Valuable liquids are allowed to drain away into ditches and drains. Fermentation is allowed to go on too vigorously, resulting in a great loss of carbonate of ammonia ; and insufficient and inferior bedding is used as litter, &c.

A gardener, therefore, who purchases artificial manures, but does not look carefully after the drainings of stable or farm, is an extravagant gardener, for he brings the same article upon his garden that he might have gratis if he took more care.

In applying artificial manures the gardener should have a

good knowledge of the physical and chemical conditions of his particular soil, and the requirements of the crops to be grown.

To obtain this knowledge he should have some knowledge of chemistry, and it is to be regretted that a great many gardeners know little or nothing of this subject, and in many cases apply manures blindly.

Trials by Experiment.

When the gardener has obtained a general knowledge of the nature of manures and the wants of different plants, it will be of great service in guiding his practice if he determines by actual experiment what is the relative amount of increase he obtains from the application of different manures to his various crops; the influence of climate and season, with the previous manurial conditions of the land, being always taken into account when interpreting the results.

The experimental plots need not be large, but the choice of them should, however, be carefully made, in order that they may adequately represent the general character of the garden; and where possible another plot should be experimented on in an identical manner, in order that the results obtained from the first plots may be checked by the results from the second.

None of these experiments will, however, be of value unless the chemical and mechanical composition of the soil has been previously noted.

In the United States of America experimenting stations are established in every State. Each station is connected with the State Agricultural and Horticultural College. The officers of each station include a botanist, a horticulturist, an entomologist, a bacteriologist, a veterinarian, and a meteorologist. All kinds of crops, grasses, fruits, vegetables, &c., are cultivated in various ways and conditions, and periodical and annual reports are distributed gratis to any grower in the State by the Federal Government. It is much to be desired that something of a similar nature should be done in this country.

DISCUSSION.

Mr. H. W. WARD, gardener to the Earl of Radnor, Longford Castle, Salisbury, expressed great faith in artificial manures. He believed that their use rendered many crops less liable to the attacks of insect pests than if farmyard manure was used.

He was of opinion that many of the gases generated in the soil by farmyard manures were more or less injurious to the development of the roots, and rendered them peculiarly liable to the attacks of fungoid diseases. He was not particular as to the kind of artificial manures he employed, as he found them all useful.

Mr. GEO. BUNYARD endorsed Mr. Ward's remarks as to the value of artificial manures, especially when used in the culture of Potatos. Tubers of a moderate size were wanted, and artificial manures were more valuable towards this end than farmyard manure, which had a tendency to make the tubers large and coarse. He mentioned "rape-dust" as a valuable manure, which he had used with the best results for many years. This manure was the refuse of rapeseed after the colza oil had been expressed, and in Kent it was extensively used for dressing the hop gardens, after the land had been manured with farmyard manure. The rape-dust itself is rather a greasy manure, but, mixed with salt in about equal proportions, it loses that character. Since its use as a manure disease has been singularly conspicuous by its absence. Rape-dust is a splendid manure for Asparagus, and it should be applied to the soil just before the plants begin to sprout.

The refuse of the tanyards was, in days gone by, a very valuable manure. If it can be obtained, and have a little liquid manure added, tan is excellent for mulching purposes.

THE TERCENTENARY OF THE INTRODUCTION OF POTATOS INTO ENGLAND.

By the Hon. T. E. H. W. KRICHAUFF, Cor. Memb. R.H.S., and
Chairman of the Agricultural Bureau of South Australia.

THE history of some of our most important plants, which we cultivate either for food, fodder, or other purposes, is very interesting, and in many instances teaches us not to lose courage, but to give another trial, even if we hear that others have not succeeded in growing a newly introduced plant, or do not speak well of it, although recommended in other countries.

The most important plants that have been used by man for food are nearly all annual, biennial, or tuberous-rooted, and they do not require any length of time to wait for a return; but I am certain that none has such an interesting history as the Potato, which may have been cultivated in some parts of America for many centuries previous to its introduction into Europe. Three centuries have passed since that fortunate occurrence, and I think it is a fit time now to congratulate ourselves that this long-neglected food is on every table.

The history of the introduction of the Potato may have been written unknown to me, but I wish to record what little I have been able to discover, and I hope that others will add to it further interesting details. The Potato has been found wild in Chili, in the mountains of Valparaiso and Mendoza, in Peru near Lima, Quito, and Santa Fé de Bogota, also in Mexico on the Pic of Orizaba. It was first introduced into Europe between 1580 and 1585 by Spaniards from Quito, and they soon forwarded some to Italy. Sir Walter Raleigh obtained them afterwards from Virginia through some colonists whom he had sent out. Sir Francis Drake, in the year 1586, does not seem to have brought home the real Potato, but the Batata, or so-called "Sweet Potato," and, so far as is known, Batatas were used in England as a delicacy some time before the introduction of the Potato. Sir Walter Raleigh planted Potatos, according to Camden's "Britannia," first on his estate at

Youghal, near Cork, and they were cherished and cultivated for food in that county long before their value was known in England, though they were carried over from Ireland to Lancashire. The great English botanist Gerard planted Potatos in his garden, and here we know the exact year, viz. 1596. It is therefore probable that he obtained them from Sir Walter, who may have introduced them in 1595. Gerard recommended them, however, merely as a delicate dish, not as common food; and Parkinson mentions that the tubers were sometimes roasted and steeped in sack and sugar, or baked with marrow and spices, and even preserved and candied by the comfit-makers. For a long time they were, in fact, used only as dainty bits, and in a written book for housekeeping kept by Queen Anne, the wife of James I. (1603-1625), it is stated that a small quantity of Potatos were purchased at two shillings a pound. The Government, through the Royal Society (as I found somewhere, but have mislaid the reference), tried to push the cultivation after 1668, but progress was slow. In English books on gardening of the year 1719, as in that by the famous nurserymen London and Wise, the Potato was not even mentioned, and Bradley speaks of them as inferior to Skirrets and Radishes. Only in the eighteenth century did they become better known and more cultivated in England; yet they were chiefly found in the gardens of peers and rich men up to about 1784. We find, however, that already 1,700 acres in the county of Essex alone were planted with Potatos for the supply of the London market in the year 1796. What enormous quantities will be required for the same purpose now! It may be that by cultivation and by means of raising new varieties from seed the Potato has been very much improved during the last fifty years; otherwise it is strange that Cobbett, in his "English Gardener" of 1838, should say that he will not have the Potato cultivated as a substitute for bread, as it has been established by evidence taken before Committees of the House of Commons that to raise Potatos for the purpose would be a thing mischievous to the nation; and John Sheehan said of the Paddy-go-easy gentry, as he called the intensely Celtic race, that old Cobbett used to say if the Potatos were swept away from the face of Ireland, and poor Paddy inspired with the idea that he must feed on beef and mutton and bread, he would work as hard as any fellow in

Europe to gain the price of such first-rate fare, and nothing could stop the tide of prosperity from flowing in upon him.

In Scotland a few plants could be found in gardens at Edinburgh in 1725. Only a few of the tubers were taken carefully from each plant in autumn. The others were left in the ground as recommended by Evelyn, and covered with litter against the frost. After 1760 they were more generally cultivated in Scotland, and the above plan abandoned for our present mode of cultivation.

Clusius, a well-known botanist, cultivated Potatos first in Vienna and Frankfort-on-the-Main as early as 1588 (George Don says 1598). They became, however, only somewhat better known at the time of the Thirty Years' War, and were not generally grown until long afterwards. A Dutch officer distributed Potatos in Bohemia, and the Rev. Werner in Bamberg, in 1716. In parts of Southern Germany, however, they must have been cultivated previous to 1684, for it is mentioned in the books of the Church at Bieberau, in Hesse, that the clergyman had, amongst other things, also received his tithe from Potatos grown there. Although introduced into Saxony in 1680, they were but seldom cultivated except in the Erzgebirge, where cereals always grow but poorly. The wealthier farmers of Saxony considered Potatos no good except for pigs, and a clergyman who tried to encourage their growth was nicknamed the Potato-clergyman.

Frederick the Great of Prussia was more successful than his father in introducing the cultivation of Potatos into Pomerania and elsewhere; but he had recourse to his soldiery, who had to force the farmers to plant them, the same as he did with the planting of white Mulberries at each village in Brandenburg. If it had not been for the famine in Germany in 1771-2, the great benefit of the cultivation of Potatos would not have been so generally acknowledged.

In France we find that the Potato was placed on the royal table in the year 1616; but it was Parmentier, an apothecary, who really introduced it, and did all he could to get it generally cultivated, though not without the assistance of the Government. In 1771 a high prize was offered by the Academy of Besançon for the discovery of a new food which would fill the place of cereals in case of a famine. Parmentier showed his

Potatos, and Louis XVI. gave him fifty morgen of land to plant them on. When showing the first flowers of his Potatos, the king used them as a button-hole bouquet, Queen Marie Antoinette had them in the evening in her hair, and at once princes, dukes, and high functionaries went to Parmentier to obtain such flowers. All Paris talked of nothing but Potatos and the cultivator of them. The king said, "France will thank you some time hence, because you have found bread for the poor." And France has not forgotten Parmentier, for I saw myself in 1882 Potatos growing on his grave in the grand cemetery of Paris, the Père la Chaise, and I was assured that they were planted there every year, so that his services might never be forgotten by Frenchmen.

From the above short and incomplete history of their introduction, it is clear that, although now so universally used on our tables, for the feeding of domestic animals, for distillation, and many other purposes, the Potato is one of those few plants which was only accepted for more general use after it had been known, and here and there cultivated, in Europe for fully one hundred or nearer two hundred years. And of how many more famines should we have heard if Potatos had not been so generally cultivated during the last hundred years? The breaking out of the Potato disease in 1846 and later was for the poor, one of the greatest calamities during the last half-century, and we rejoice that means have now been found to combat it.

SECOND ANNUAL
GREAT EXHIBITION OF, AND CONFERENCE ON,
BRITISH-GROWN FRUIT,

HELD AT THE CRYSTAL PALACE, September 26, 27, and 28, 1895.

THE second of the Society's great Shows of British-grown Fruit was, if possible, even more magnificent than its predecessor of 1894. Never, in fact, before has such a grand display of home-grown fruit been brought together in one place, and the interest it excited was evidenced by the number of visitors to the Show, which this year reached a total of 36,293, as against 23,680 in 1894.

The Apples without doubt were the special feature of the Show this year, and the display of this the most generally useful of all British fruits was without any exaggeration the finest that has ever been seen in this or any other country in the world, and easily established the supremacy of our own home-grown Apples, at least in the attributes of flavour, size, and quality, over the finest picked specimens of foreign importation. The brilliancy of the colouring was also this year remarkable, so that even in this, which is usually their one (but only) point of superiority over British fruit, the foreign examples were fully equalled if not excelled. It is impossible to convey by words any adequate description of how grand the Apples were.

Another very noticeable point was the extreme beauty of Mr. Rivers' group of dwarf trees in pots. Apples, Pears, Grapes, Figs, Nectarines, Peaches, all were there, and all laden with gloriously coloured, luscious-looking, juicy fruits. Baskets of fruit were placed amongst the stems of the trees, and the inter-spaces gracefully filled up with Selaginella and other mosses.

Messrs Sutton's Tomatos must also certainly be described as another noticeable point, the brilliant colouring compelling the attention of the eye to a vividness which seemed almost to crave for the relief of some less self-assertive colour. Beautiful as this fruit is, and deservedly popular as it has of late years become, 60 feet by 6 feet of nothing but Tomatos—weighing almost two

tons!—was enough to satiate even their greatest admirers. The fruits had all been grown out of doors, demonstrating both the wonderful improvement that has taken place in the Tomato and the exceptional magnificence of the summer of 1895. From an educational point of view this exhibit was of great utility, as it enabled anyone to at once compare one variety with another in regard to shape, size, colour, and fertility.

The Apples and Pears shown by Messrs. Bunyard, Messrs. Pearson, Messrs. Jefferies, Mr. Berwick, Mr. Watkins, Mr. Tayler, Messrs. James Veitch, Messrs. Lee, Messrs. Cheal, Messrs. Laing, Mr. Wells, Messrs Paul, Mr. Taylor, Messrs. W. Paul, Mr. Wyatt, The Earl of Radnor, Messrs. de Rothschild, Messrs. Spooner, Messrs. Peed, and others were truly wonderful, exhibiting the perfection of cultivation.

Nor must the exhibit sent by Her Majesty the Queen be overlooked, consisting as it did of 100 dishes of the finest fruit of all seasonable kinds.

The following gentlemen very kindly gave their help towards the prize fund, viz. :—

LIST OF SUBSCRIBERS TO THE PRIZE FUND.

	£	s.	d.
Balderson, H., Corner Hall, Hemel Hempstead	1	0	0
Bartrum, Rev. Dr., D.D., Wake's Colne, Halstead, Essex	0	10	6
Bunyard & Co., The Old Nurseries, Maidstone	5	5	0
Dunn, Malcolm, Dalkeith Palace Gardens, N.B.	2	2	0
Empson, J., Amphill House Gardens, Bedford	0	10	6
Haywood, T. B., Woodhatch, Reigate	2	2	0
Kay, Peter, Claignar, Finchley	1	1	0
Laing & Sons, J., Forest Hill, S.E.	1	1	0
McIndoe, J., Hutton Hall Gardens, Guisborough	1	1	0
McKenzie, J., Linton Park Gardens, Maidstone	0	10	0
Milner, R., Penrice Castle Gardens, Swansea	0	10	6
Pearson & Sons, J. R., Chilwell, Notts	5	5	0
Peed & Sons, J., Roupell Park Nurseries, W. Norwood, S.E.	1	1	0
Rivers & Son, T., Sawbridgeworth, Herts	5	5	0
Smith, R., Shrewsbury	0	10	0
Spooner & Sons, S., Hounslow	1	1	0
Sutton & Sons, Reading	5	0	0
Thomas, Owen, Royal Gardens, Windsor	1	1	0
Turton, T., Maiden Erlegh, Reading	1	0	0
Veitch & Sons, J., Royal Exotic Nurseries, Chelsea	5	5	0
Veitch & Sons, R., Royal Nurseries, Exeter	1	1	0
Walker, J., Ham Common, Surrey	1	1	0
Watkins, John, Pomona Farm, Withington, near Hereford	1	1	0
Whiteley, William, Westbourne Grove	2	2	0
Woodward, Geo., Barham Court Gardens, Teston, Maidstone	1	0	0
The Worshipful Company of Gardeners	6	0	0
Weir, Archibald, Bendarrock, Ottery St. Mary, Devon	2	2	0

For the prizes there were 1,783 entries, as compared with 1,301 last year, and the following analysis (for which we are indebted to the kindness of the editor of the *Gardeners' Magazine*) shows that there were, of Apples, 1,938 dishes of 201 varieties; of Pears, 779 dishes of 98 varieties; of Grapes, 97 dishes of 18 varieties; of Plums, 101 dishes of 28 varieties; of Nectarines, 18 dishes of 6 varieties; of Peaches, 80 dishes of 19 varieties; of Cherries, 12 dishes of 1 variety; of Nuts, 26 dishes of 8 varieties; of Melons, 10 dishes of 7 varieties; of Damsons, 18 dishes of 7 varieties; of Figs, 9 dishes of 6 varieties; of Quinces, 14 dishes of 3 varieties; of Medlars, 2 dishes of 2 varieties; of Bullaces, 3 dishes of 1 variety; of Apricots, 1 dish; of Bananas, 1 cluster; of Tomatos, 67 dishes of 26 varieties. Total, 3,176 dishes of 435 varieties, as compared with 2,148 dishes of 357 varieties in 1894. But large as these numbers are, it should, in estimating the extent and magnitude of the Show, be borne in mind that the analysis is only of the fruit sent for competition, and that it takes no account of that sent simply for exhibition, which it is estimated almost, if not quite, equalled in number of dishes that sent for competition.

ANALYSIS OF FRUIT EXHIBITED.

APPLES.

Varieties.	Dishes.	Varieties.	Dishes.
Cox's Orange Pippin ...	122	Bramley's Seedling ...	26
Ribston Pippin ...	111	Mother, American ...	23
King of the Pippins ...	91	Alfriston... ..	22
Peasgood's Nonesuch ...	79	Lady Henniker ...	20
Warner's King ...	72	Fearn's Pippin ...	19
Lord Derby ...	61	Margil	19
Cox's Pomona ...	53	Adams' Pearmain ...	18
Lord Suffield ...	53	Lord Grosvenor ...	18
Emperor Alexander ...	51	Baumann's Red Winter Reinette	17
The Queen ...	49	New Northern Greening ...	17
Worcester Pearmain ...	49	Queen Caroline ...	17
Stirling Castle ...	38	Newton Wonder... ..	16
Lane's Prince Albert ...	37	Beauty of Kent ...	14
Bismarck ...	36	Gloria Mundi ...	13
New Hawthornden ...	34	Mère de Ménage ...	13
Cellini ...	34	Reinette du Canada ...	13
Pott's Seedling ...	34	Royal Jubilee ...	13
Ecklinville ...	33	Rosemary Russet ...	12
Blenheim Orange ...	32	Annie Elizabeth ...	11
Golden Noble ...	29	Washington ...	11
Wellington (Dumelow's Seedling)	29	Duchess of Oldenburg ...	10
Loddington (Stone's Apple) ...	29	Frogmore Prolific ...	10
Gascoigne's Scarlet Seedling ...	28	Tyler's Kernel ...	9
Tower of Glamis ...	27	Yellow Ingestrie ...	9

Varieties.	Dishes.	Varieties.	Dishes.
Golden Spire	8	Swedish Reinette	2
Waltham Abbey Seedling .	8	Tom Putt	2
Wealthy	8	Castle Major	2
King of Tompkin's County	7	Pine-Apple Russet	2
Mannington Pearmain...	7	Keswick Codlin... ..	2
Belle Dubois	7	Winter Hawthornden	2
Bess Pool	6	Wyken's Pippin	2
Calville Rouge Précoce...	6	Okera	2
Cornish Gilliflower	6	Bow Hill... ..	2
Egremont Russet	6	Wadhurst Pippin	2
Grenadier	6	Old Ribbed Greening	2
Jefferson... ..	6	Landsberger	2
Manx Codlin	6	Five Crown Pippin	2
Striped Beefing	6	Herefordshire Pearmain	2
Hollandbury Pippin	5	Opetien	2
Lady Sudeley	5	Northern Dumpling	2
Sandringham	5	Chelmsford Wonder	1
Scarlet Hawthornden	5	Crystal Palace	1
Scarlet Nonpareil	5	Farmer's Seedling	1
Red Beitigheimer	5	Foster's Seedling	1
Hoary Morning	5	Irish Peach	1
Bedfordshire Foundling	4	Red Astrachan	1
Cornish Aromatic	4	Ambling's Seedling	1
Court Pendu Plat	4	Withington Fillbasket...	1
Gold Medal	4	Winter Peach	1
Gravenstein	4	Lemon Pippin	1
Dutch Mignonne	4	Small's Admirable	1
Mrs. Barron	4	Yorkshire Greening	1
Hornmead's Pearmain	4	Golden Reinette	1
Kerry Pippin	4	Turner's Seedling	1
None sh	4	Norfolk Beefing	1
Tibbels Pearmain	4	Biggs' Pride	1
Twenty Ounce	4	Bridgwater Pippin	1
Brownlee's Russet	3	Grantonian	1
Hambledon deux Ans	3	Lord Lennox	1
Hawthornden	3	Nannie	1
Maltster... ..	3	Calville Blanche	1
Melon	3	Winter Ribston... ..	1
Nelson Codlin	3	Seaton House	1
Yorkshire Beauty	3	Edinburgh Castle	1
Schoolmaster	3	Scarlet Pearmain	1
Winter Queening	3	Stump, American	1
Mabbott's Pearmain	3	St. Lawrence	1
Belle Pontoise	3	Busiter Pearmain	1
Colonel Vaughan	3	Dridge's Beauty	1
Brabant Bellefleur	3	Devonshire Quarrenden	3
Duchess' Favourite	3	Councillor	1
Beauty of Hants	2	Sykehouse Russet	1
Caygate Pearmain	2	King of the Apples	1
Cockle Pippin	2	Summer Pippin	1
Court of Wick	2	Golden Russet	1
Duke of Devonshire	2	St. Edmund's Pippin	1
Flanders Pippin	2	Wormsley Pippin	1
Histon Favourite	2	Dutch Codlin	1
Royal Russet	2	Old Nonpareil	1
Sturmer Pippin... ..	2	Bassett Pippin	1
Stubbs' Seedling	2	Barker's Seedling	1

Varieties.	Dishes.	Varieties.	Dishes.
Duchess of Gloucester ...	1	Costard ...	1
Prince's Pippin ...	1	Lewis' Incomparable ...	1
Hubbard's Pearmain ...	1	Hitchin Pippin ...	1
Silver Russet ...	1	Catshead ...	1
Murfit's Seedling ...	1	Beauty of Wilts ...	1
Town Pippin ...	1	Royal Codlin ...	1
Stoup Liddington ...	1	Glory of the West ...	1
Dolphin ...	1	Pomona's Pride ...	1
Hanwell Souring ...	1	Crimson Devonian ...	1
Golden Pippin ...	1	Jacques Label ...	1
Crimson Queening ...	1	Duke Constantine ...	1
Betty Geeson ...	1	Scarlet Golden Pippin ...	1
Ringer ...	1	George the Fourth ...	1
Reinette d'Osnabruck ...	1	Jeannette Moyle ...	1
Minshal Crab ...	1	Tibbett's Incomparable ...	1
Magnum Bonum ...	1	Winter Peach ...	1
Transparent de Conseils ...	1	Dartmouth Crab ...	1
Yorkshire Greening ...	1		
Galloway Pippin ...	1		1,938
Scarlet Tifling ...	1		

APRICOTS.

Moorpark ...	1
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BULLACES.

Bullace ...	3
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BANANA.

Banana ...	1
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CHERRIES.

Morello ...	12
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DAMSONS.

Prune ...	5	Shropshire ...	1
Cluster ...	3	Bradley's King ...	1
Farleigh ...	3		
King of Damsons ...	3		18
Cheshire ...	2		

FIGS.

Brown Turkey ...	4	Bourjasotte Grise ...	1
Ischia ...	1	Nubini ...	1
Black Turkey ...	1		
Negro Largo ...	1		9

GRAPES.

Muscot of Alexandria ...	21	Foster's Seedling ...	3
Alicante ...	17	Buckland Sweetwater ...	2
Gros Maroc ...	13	Chasselas Napoleon ...	2
Black Hamburgh ...	8	Alnwick Seedling ...	1
Lady Downe's Seedling ...	6	Appley Towers ...	1
Madresfield Court ...	5	Olga de Wurtemberg ...	1
Gros Colmar ...	5	Golden Queen ...	1
Mrs. Pince's Muscat ...	4	Trebbiano ...	1
Mrs. Pearson ...	3		
Barbarossa ...	3		97

MEDLARS.

Varieties.	Dishes.	Varieties.	Dishes
Dutch	1	Nottingham	1
			2

MELONS.

Hero of Lockinge	3	Royal Favourite... ..	1
Countess... ..	2	Hero of Weston... ..	1
Yorkshire Beauty	1		10
Sutton's A1	1		
Golden Perfection	1		

NECTARINES.

Pineapple	7	Victoria	1
Elruge	5	Humboldt	1
Pitmaston Orange	3		18
Albert Victor	1		

NUTS.

Filbert	7	Prolific	1
Walnut	6	Chestnut	1
Cosford Cob	4	Webb's Prize Cob	1
Kent Cob	4		26
Hazel	2		

PEACHES.

Sea Eagle	17	Exquisite	1
Barrington	11	Royal George	1
Walburton Admirable	10	Seedling	1
Prince of Wales	7	Albatross	1
Lord Palmerston	5	Salway	1
Late Admirable	5	Violette Hâtive	1
Golden Eagle	4	Grosse Mignonne	1
Gladstone	4	Bellegarde	1
Princess of Wales	4		80
Nectarine	3		
Thames Bank	2		

PEARS.

Pitmaston Duchess	69	Beurré d'Amanlis	14
Louise Bonne of Jersey	55	Doyenné Boussoch	14
Marie Louise	54	General Todtleben	14
Durondeau	42	Josephine des Malines... ..	13
Beurré Diel	35	Brockworth Park	12
Bon Chrétien (Williams's)	30	Emile d'Heyst	12
Souvenir du Congrès	29	Triomphe de Vienne	12
Doyenné du Comice	28	Winter Nelis	12
Glou Morceau	19	Beurré Clairgeau	10
Duchesse d'Angoulême	17	Princess	9
Conseiller de la Cour	17	Madame Treyve	9
Beurré Hardy	16	Grosse Calebasse	9
Beurré Superfin... ..	16	Vicar of Winkfield	9
Catillac	15	Nouvelle Fulvie... ..	7
Fondante d'Automne	15	Van Mons. (Léon Leclerc)	7
Marie Louise d'Uccle	15	Beurré Bosc	6
Uvedale's St. Germain	15	Beurré Bachelier	5

PEARS—*continued.*

Varieties.	Dishes.	Varieties.	Dishes.
Conference	5	Maréchal Soult	1
Flemish Beauty	5	Cornish Beauty... ..	1
Thompson's	5	General Tomkins	1
Gansel's Bergamot	5	Soldat Laboureur	1
Margaret Marillat	5	Huyshe's Princess of Wales	1
Fertility	4	Seckle	1
Gratioli of Jersey	4	Reintres Jardine	1
Marie Benoist	4	White Doyenné... ..	1
Easter Beurré	4	Baronne de Mello	1
Triomphe de Jodoigne... ..	4	Doyenné de Mérode	1
Duchess de Bordeaux	3	Beurré Perran	1
King Edward	3	Sylvestre d'Automne	1
Beurré de Capiaumont... ..	3	Bergamotte de Millepieds	1
Beurré Rance	3	Beurré d'Ezec	1
Fondante de Thirriot	2	General Eillon	1
Comte de Flanders	2	Napoleon	1
Beurré Sterckmans	2	Bishop's Thumb	1
Brown Beurré	2	Bergamot d'Esperen	1
Léon Leclerc de Laval	2	André Leroy	1
Beurré Jules Van Geert	2	Directeur Alphand	1
Beurré Alexandre Lucas	2	Délices d'Hardenpont	1
Dr. Jules Guyot	2	Urbaniste	1
Beurré Baltet père	2	Hacon's Incomparable... ..	1
Forelle	2	Victoria	1
Verulam... ..	2	Comte de Lamy	1
Bellissime d'Hiver	2	Le Lectier	1
Magnate... ..	2	Gilgil	1
Beurré d'Aremberg	1	Charles Ernest	1
Clapp's Favourite	1	Beurré Fouqueray	1
Hessle	1	Alexandre Lambre	1
Jargonelle	1		
Monarch	1		779

PLUMS.

Coe's Golden Drop	32	Green Gage	1
Grand Duke	8	Orleans	1
Belle de Septembre	7	Victoria	1
Reine Claude de Bavay	7	Lawsons Golden Gage	1
Monarch... ..	6	Decaisne... ..	1
Pond's Seedling	6	Late Gage	1
Bryanston Gage	4	Purple Gage	1
Magnum Bonum	4	Impérial du Milan	1
Jefferson... ..	2	Brahys Green Gage	1
Kirke's	2	Ickworth Imperatrice	1
Transparent Gage	2	Poupart's	1
Cox's Emperor	2	Wyedale... ..	1
Golden Gage	2	Cheshire... ..	1
Archduke	2		
Blue Imperatrice	2		101

QUINCES.

Pear-shaped	12	Portugal... ..	2
Apple-shaped	2		
			16

TOMATOS.

Varieties.	Dishes.	Varieties.	Dishes.
Perfection	14	Golden Perfection	1
Ham Green Favourite	9	Yarde's Perfection	1
Duke of York	6	Hackwood Park... ..	1
Trophy	3	Ignotum... ..	1
Polegate... ..	3	Early Ruby	1
Lady Bird	3	Palmer's Triumph	1
Old Red Improved	3	Chemin Rouge... ..	1
Challenger	3	Mayflower	1
Conference	3	Acquisition	1
Frogmore Prolific	2	Market Favourite	1
Seedling... ..	2	Yellow King	1
Sutton's A1;	2	Cestrian	1
Masterpiece	2		
Eclipse	2		67

PRIZE LIST.

DIVISION I.

Fruits grown under Glass or otherwise.

Open to all.

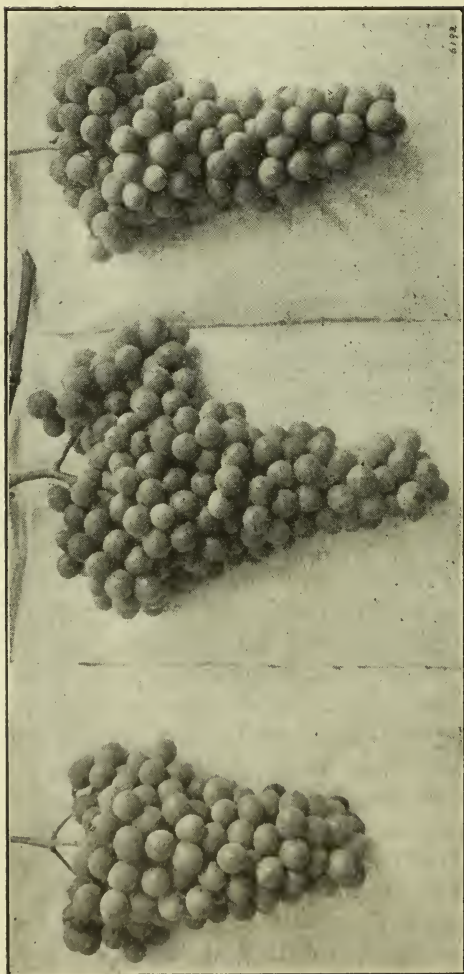
Class 1.—Collection of 12 dishes of Ripe Fruit; not less than 6 kinds, nor more than 2 varieties of a kind. First, £7. 10s., Sir. J. W. Pease, Bart., M.P., Guisboro' (gr. Mr. McIndoe); second, £5, C. E. Keyser, Esq., Stanmore (gr. Mr. Gleeson); third, £2. 10s., Earl of Harrington, Derby (gr. Mr. Goodacre).

Class 2.—Collection of 8 dishes of Ripe Fruit; not less than 4 kinds, nor more than 2 varieties of a kind. Pines excluded. First, £5, Messrs. de Rothschild, Acton (gr. Mr. Reynolds); second, £3, Lady H. Somerset, Ledbury (gr. Mr. Harris); third, £2, Mrs. Wingfield, Ampthill (gr. Mr. Empson).

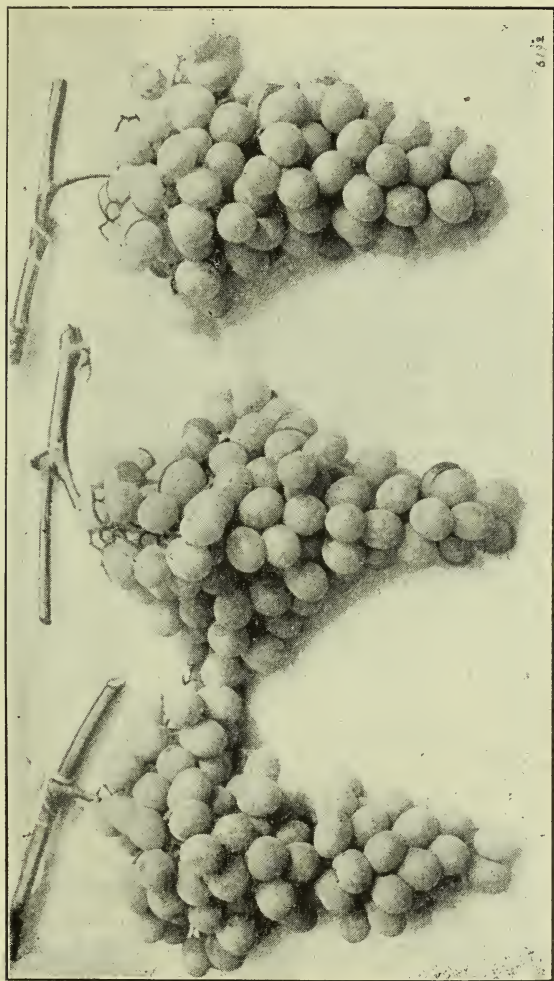
Class 3.—Grapes, 6 distinct varieties, 2 bunches of each; both Black and White must be represented. First, £5, Earl of Harrington, Derby (gr. Mr. Goodacre); second, £3, Messrs. de Rothschild, Acton (gr. Mr. Reynolds); third, £2, C. Bayer, Esq., Forest Hill (gr. Mr. Taylor).

Class 4.—Grapes, 3 distinct varieties, 2 bunches of each. First, £2. 10s., P. T. Phillips, Esq., Whitfield (gr. Mr. Grindrod); second, £1. 10s., C. J. Massey, Esq., Garliestown (gr. Mr. Day); third, £1, Sir E. H. Carbutt, Cranleigh (gr. Mr. Belcher).

Class 5.—Grapes, Black Hamburg, 3 bunches. First, £1. 10s., C. Bayer, Esq., Forest Hill (gr. Mr. Taylor); second,



F. W. FLEMING, ESQ.'S (gr. MR. W. MITCHELL), FIRST PRIZE THREE BUNCHES OF MRS. PINCE'S
MUSCAT GRAPE, CLASS 9. (*Gardeners' Magazine.*)



W. K. D'ARCY, Esq.'s (gr. MR. W. TIDY), FIRST PRIZE THREE BUNCHES OF MUSCAT OF ALEXANDRIA
GRAPE, CLASS 10. (*Gardeners' Magazine.*)

£1, J. W. Fleming, Esq., Romsey (gr. Mr. W. Mitchell); third, 10s., J. A. Tulk, Esq., Chertsey (gr. Mr. Newman).

Class 6.—Grapes, 3 bunches of Madresfield Court. First, £1. 10s., C. J. Massey, Esq., Garliestown (gr. Mr. Day); second, £1, C. Bayer, Esq., Forest Hill (gr. Mr. Taylor); third, 10s., Earl Cowley, Chippenham (gr. Mr. Gibson).

Class 7.—Grapes, Gros Colmar or Gros Maroc, 3 bunches. First, £1. 10s., Earl Cowley, Chippenham (gr. Mr. Gibson); second, £1, C. J. Massey, Esq., Garliestown (gr. Mr. Day); third, 10s., Messrs. de Rothschild, Acton (gr. Mr. Reynolds).

Class 8.—Grapes, Alicante, 3 bunches. First, £1. 10s., Messrs. de Rothschild, Acton (gr. Mr. Reynolds); second, £1, H. Tate, Esq., Streatham (gr. Mr. Howe); third, 10s., Mr. J. Bury, Byfleet.

Class 9.—Grapes, any other Black Grape, 3 bunches. First, J. W. Fleming, Esq., Romsey (gr. Mr. Mitchell); second, £1, C. Scrase Dickens, Esq., Horsham (gr. Mr. Kemp); third, 10s., C. Bayer, Esq., Forest Hill (gr. Mr. Taylor).

Class 10.—Grapes, Muscat of Alexandria, 3 bunches. First, £1. 10s., W. K. D'Arcy, Stanmore (gr. Mr. Tidy); second, £1, Alderman Chaffin, Bath; third, 10s., Mrs. Wingfield, Amptill (gr. Mr. Empson).

Class 11.—Grapes, any other White Grape, 3 bunches. First, £1. 10s., C. Bayer, Esq., Forest Hill (gr. Mr. Taylor); second, £1, Messrs. de Rothschild, Acton (gr. Mr. Reynolds); third, 10s., W. Laurence, Esq., Hollingbourne (gr. Mr. Robinson).

Class 13.—Tomatos, 4 dishes of distinct varieties, 9 fruits of each. First, £1. 10s., H. Tate, Esq., Streatham (gr. Mr. Howe); second, £1, Mr. E. Ryder, Orpington; third, 10s., Mr. G. Garraway, Bath.

Class 14.—Tomatos, 1 dish of 9 fruits of 1 variety. First 7s., Mr. G. Helman, Lewes; second, 5s., Mr. Sanders, Halton; third, 3s., R. Summers, Esq., Streatham (gr. Mr. Richards).

Class 15.—Tomatos, 6 ripe clusters as cut from the plants, of 1 variety. First, £1, Mr. J. Gore, Polegate; second, 15s., F. G. Arbutnot, Esq., Bexley (gr. Mr. Wells); third, 10s., Mr. J. Hill, jun., New Maldon.

Class 17.—Collection of Hardy Fruit, grown partly or entirely under glass, to illustrate orchard-house culture (nurserymen

excluded). First, £3, Martin R. Smith, Esq., Hayes (gr. Mr. Blick); second, £2, Sir Mark Collet, Bart., Kemsing (gr. Mr. Potter); third, £1, Sir J. W. Pease, Bart., M.P., Guisboro' (gr. Mr. McIndoe).

DIVISION II.

Open to Nurserymen only.

Class 18.—Collection of Fruit Trees bearing fruit, in pots. R.H.S. Gold Knightian Medal, T. Rivers & Son, Sawbridgeworth.

Class 19.—Collection of Hardy Fruits, grown partly or entirely under glass, to illustrate orchard-house culture. First, R.H.S. Silver Gilt Knightian Medal, G. Bunyard & Co., Maidstone; second, Silver Knightian Medal, J. R. Pearson & Sons, Chilwell.

Class 20.—Collection of not more than 100 distinct varieties of Hardy Fruits, in baskets or dishes, grown in the open. R.H.S. Gold Knightian Medal, G. Bunyard & Co., Maidstone.

Class 21.—Collection of not more than 50 distinct varieties of Hardy Fruits, in baskets or dishes, grown in the open. R.H.S. Silver Gilt Knightian Medal, Mr. H. Berwick, Sidmouth; second, Silver Knightian Medal, Mr. W. Tayler, Hampton.

Class 22.—Collection of not more than 50 distinct varieties of Pears, in baskets or dishes, grown in the open. R.H.S. Silver Gilt Knightian Medal, Mr. J. Watkins, Pomona Farm, Hereford.

Class 23.—Collection of not more than 50 distinct varieties of Apples, in baskets or dishes, grown in the open. First, R.H.S. Silver Gilt Knightian Medal, G. Bunyard & Co., Maidstone; second, Silver Knightian Medal, Mr. J. Watkins, Hereford.

DIVISION III.

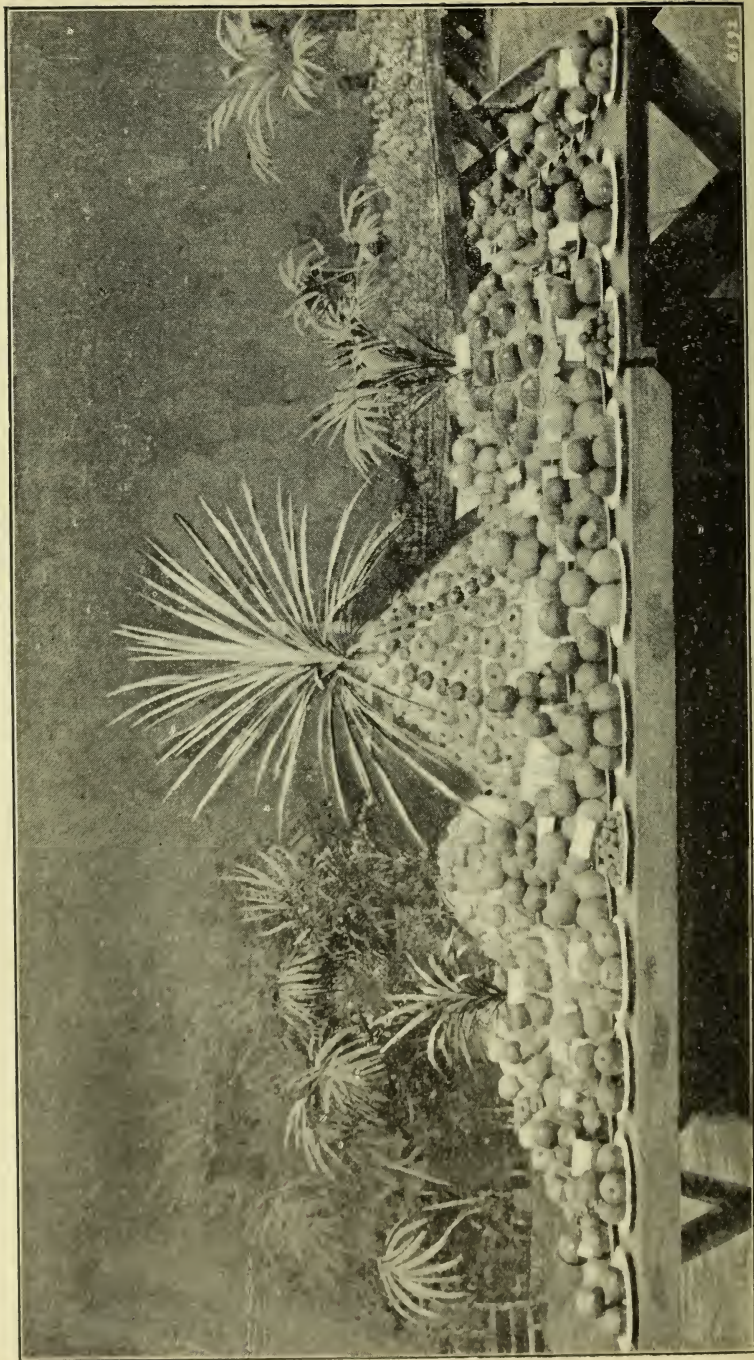
Fruits grown in the Open Air.

Open to Gardeners and Amateurs only.

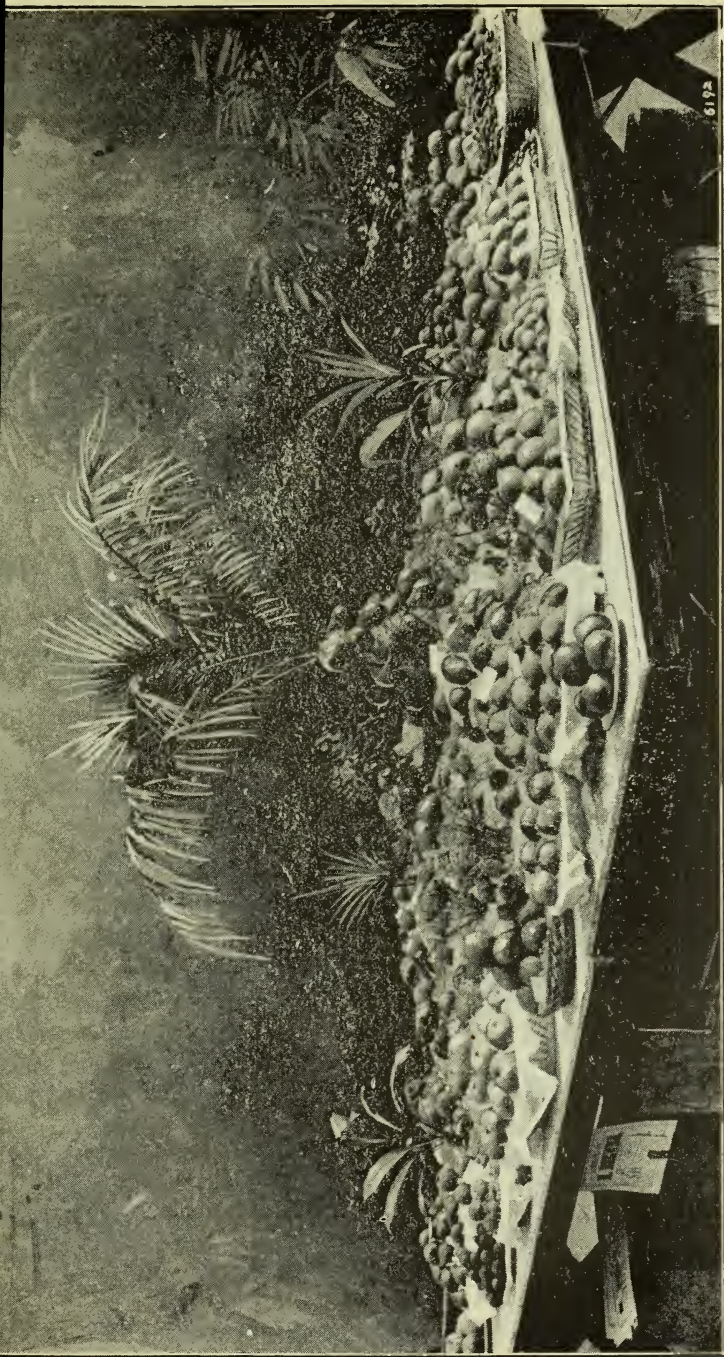
Class 24.—Apples, 18 dishes, distinct, 12 Cooking, 6 Dessert. First, £3, R. Leigh, Esq., Teston (gr. Mr. Woodward); second, £2, Sir E. G. Loder, Horsham (gr. Mr. Goldsmith); third, £1, J. Colman, Esq., Reigate (gr. Mr. King).

Class 25.—Apples, 12 dishes, distinct, 8 Cooking, 4 Dessert. First, £2, Mr. Startup, West Farleigh; second, £1, Austin T. Killick, Esq., Maidstone; third, 15s., J. K. W. Digby, Esq., Sherborne (gr. Mr. Pragnell).

Class 26.—Apples, 9 dishes, distinct, 6 Cooking, 3 Dessert.



MESSRS. G. BUNYARD & CO.'S FIRST PRIZE COLLECTION OF ONE HUNDRED VARIETIES OF HARDY FRUITS, CLASS 19. (*Gardeners' Magazine.*)



MR. H. BERWICK'S FIRST PRIZE COLLECTION OF FIFTY VARIETIES OF HARDY FRUITS, CLASS 21. (*Gardeners' Magazine.*)

6192

First, £1. 10s., J. Hargreaves, Esq., Reading (gr. Mr. Turton); second, 15s., Mr. S. H. Goodwin, Mereworth; third, 10s., P. T. Phillips, Esq., Whitfield (gr. Mr. Grindrod).

Class 27.—Cooking Apples, 6 dishes, distinct. First, £1, R. Leigh, Esq., Teston (gr. Mr. Woodward); second, 15s., C. Lee Campbell, Esq., Ross (gr. Mr. Wright); third, 10s., Sir E. Paul, Twickenham (gr. Mr. Burton).

Class 28.—Cooking Apples, 6 dishes, distinct. First, 10s., Mr. Sanders, Halton; second, 7s., Austin T. Killick, Esq., Maidstone; third, 5s., J. R. Brougham, Esq., Carshalton (gr. Mr. Jones).

Class 29.—Dessert Apples, 6 dishes, distinct. First, £1, R. Leigh, Esq., Teston (gr. Mr. Woodward); second, 15s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith); third, 10s., H. St. Vincent Ames, Westbury-on-Trym (gr. Mr. Bannister).

Class 30.—Dessert Apples, 3 dishes, distinct. First, 10s., C. Scrase Dickens, Esq., Horsham (gr. Mr. Kemp); second, 7s., W. L. Redhead, Esq., Carville Hall, Brentford (gr. Mr. A. Bridges); third, 5s., J. Hargreaves, Esq., Reading (gr. Mr. Turton).

Class 31.—Dessert Pears, 18 dishes, distinct. First, £4, Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith); second, £3, R. Leigh, Esq., Teston (gr. Mr. Woodward); third, £2, H. C. Moffatt, Esq., Ross (gr. Mr. Spencer).

Class 32.—Dessert Pears, 12 dishes, distinct. First, £2. 15s., Sir W. Geary, Tunbridge (gr. Mr. Cotterell); second, £1. 15s., J. K. W. Digby, Esq., Sherborne (gr. Mr. Pragnell); third, £1, A. Offer, Esq., Handcross Park (gr. Mr. Warren).

Class 33.—Dessert Pears, 9 dishes, distinct. First, £2, Earl Cowley, Chippenham (gr. Mr. Gibson); second, £1, Sir E. Paul, Twickenham (gr. Mr. Burton); third, 15s., J. R. Brougham, Esq., Carshalton (gr. Mr. Jones).

Class 34.—Dessert Pears, 6 dishes, distinct. First, £1. 10s., H. St. Vincent Ames, Esq., Westbury-on-Trym (gr. Mr. Bannister); second, 15s., Mrs. Crawford, Reigate (gr. Mr. Slogrove); third, 10s., Dowager Lady Freake, Twickenham (gr. Mr. Rickwood).

Class 35.—Dessert Pears, 3 dishes, distinct. First, 15s., W. N. Cazalet, Esq., Tunbridge (gr. Mr. Fennell); second, 10s., G. H. Field, Esq., Sevenoaks (gr. Mr. Edwards); equal third, 5s., Messrs. W. & E. Wells, Hattonhurst, Hounslow (gr. Mr. G. Thompson), and Mr. W. Harston, Dartford.

Class 36.—Stewing Pears, 3 dishes, distinct. First, 15*s.*, R. Leigh, Esq., Teston (gr. Mr. Woodward); second, 10*s.*, Sir W. Geary, Tunbridge (gr. Mr. Cotterell); third, 5*s.*, Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith).

Class 37.—Stewing Pears, 1 dish of 1 variety. First, 7*s.*, J. H. Rogers, Esq., Llanelly (gr. Mr. J. Cleave); second, 5*s.*, Earl Cowley, Chippenham (gr. Mr. Gibson); third, 3*s.*, G. H. Field, Esq., Sevenoaks (gr. Mr. Edwards).

Class 38.—Peaches, 3 dishes, distinct. First, £1. 10*s.*, R. Leigh, Esq., Teston (gr. Mr. Woodward); second, £1, Sir J. W. Pease, Bart., M.P., Guisboro' (gr. Mr. McIndoe); third, 10*s.*, Hon. G. M. Fortescue, Maidenhead (gr. Mr. Herrin).

Class 39.—Peaches, 1 dish of 1 variety. First, 10*s.*, R. Summers, Esq., Streatham (gr. Mr. Richards); second, 7*s.*, Viscountess Falmouth, Mereworth (gr. Mr. Markham); third, 3*s.*, R. Sneyd, Esq., Newcastle, Staffs. (gr. Mr. Wallis).

Class 40.—Nectarines, 3 dishes, distinct. First, £1. 10*s.*, Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith).

Class 41.—Nectarines, 1 dish of 1 variety. First, 10*s.*, Messrs. de Rothschild, Acton (gr. Mr. Reynolds); second, 7*s.*, Lady H. Somerset, Ledbury (gr. Mr. Harris); third, 3*s.*, Countess Camperdown, Shipston-on-Stour (gr. Mr. Masterson).

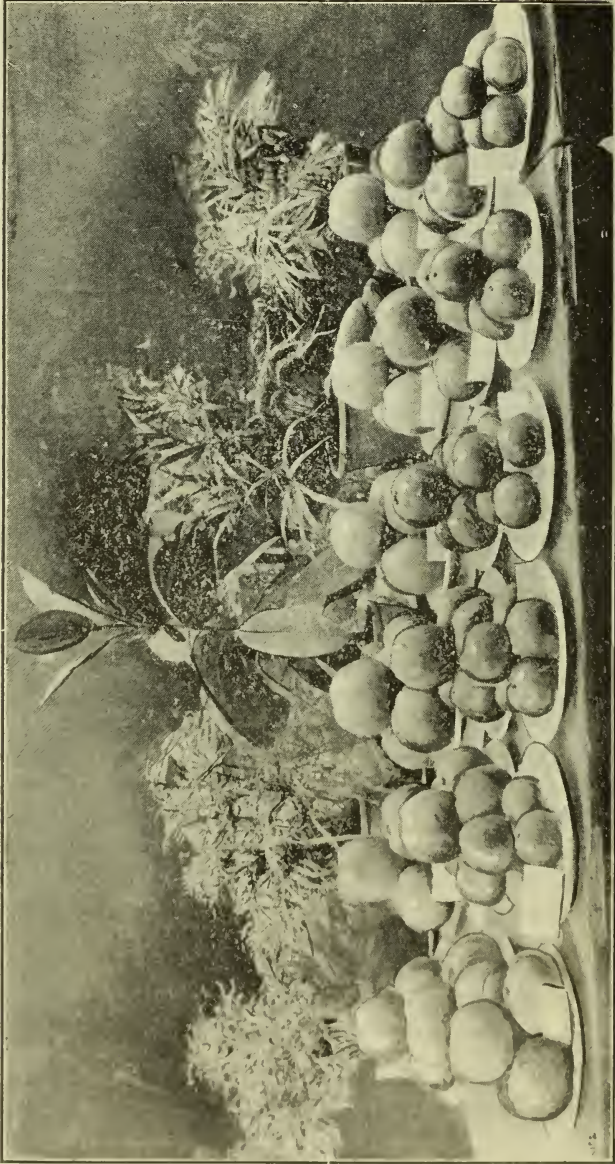
Class 42.—Plums, 4 dishes of Dessert, distinct. First, £1, Sir J. W. Pease, Bart., M.P., Guisboro' (gr. Mr. McIndoe); second, 15*s.*, C. J. Massey, Esq., Garliestown (gr. Mr. Day); third, 10*s.*, Countess Camperdown, Shipston-on-Stour (gr. Mr. Masterson).

Class 43.—Plums, 1 dish of Dessert, of 1 variety, not Gages. First, 7*s.*, Hon. G. M. Fortescue, Maidenhead (gr. Mr. Herrin); second, 5*s.*, Dowager Lady Freake, Twickenham (gr. Mr. Rickwood); third, 3*s.*, W. N. Cazalet, Esq., Tunbridge (gr. Mr. Fennell).

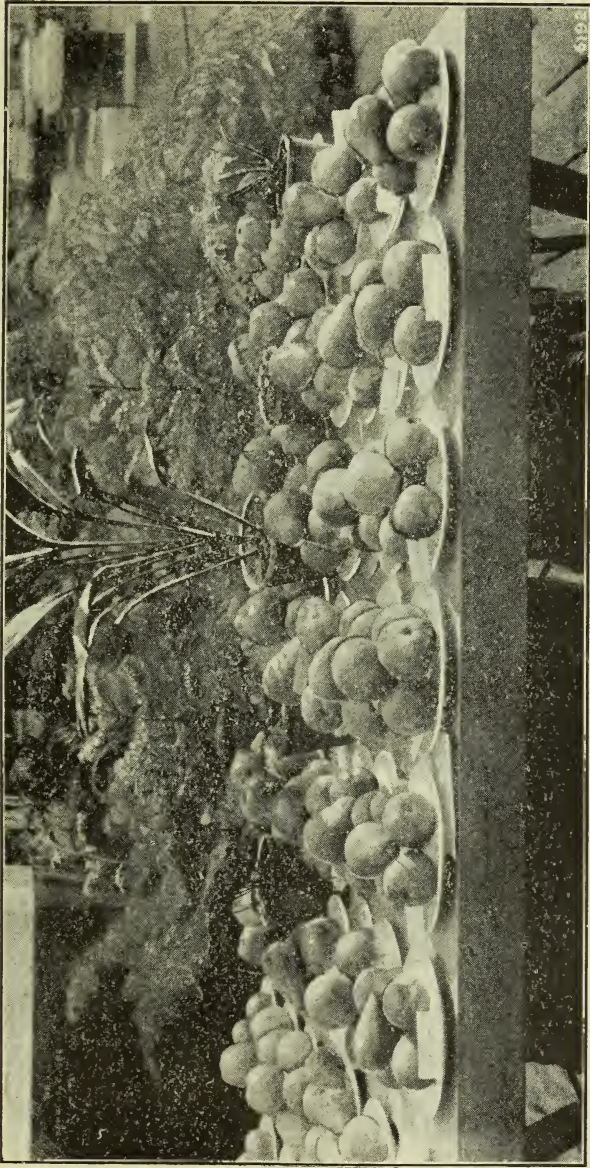
Class 44.—Plums, 4 dishes of Cooking, distinct. First, £1, C. J. Massey, Esq., Garliestown (gr. Mr. Day); second, 15*s.*, Sir J. W. Pease, Bart., M.P., Guisboro' (gr. Mr. McIndoe); third, 10*s.*, Mr. J. Nowell, Abergavenny.

Class 45.—Plums, 1 dish of Cooking, of 1 variety. First, 7*s.*, Mrs. Wingfield, Ampthill (gr. Mr. Empson); second, 5*s.*, Mr. Sanders, Halton; third, 3*s.*, Mr. G. Tebbutt, Isleworth.

Class 46.—Gage Plums, 1 dish, any green or golden variety.



ROGER LEIGH, Esq.'s (gr. Mr. G. WOODWARD), FIRST PRIZE COLLECTION OF EIGHTEEN VARIETIES OF APPLES, CLASS 21.
(*Gardeners' Magazine.*)



SIR E. G. LODER'S (gr. MR. G. GOLDSMITH) FIRST PRIZE COLLECTION OF EIGHTEEN VARIETIES OF DESSERT PEARS, CLASS 31
(*Gardeners' Magazine*.)

First, 7s., C. R. Adeane, Esq., Cambridge (gr. Mr. Hill); second, 5s., Sir J. W. Pease, Bart., M.P., Guisboro' (gr. Mr. McIndoe); third, 3s., Mr. J. Nowell, Abergavenny.

Class 48.—Damsons and Prunes, 3 dishes, distinct. First, 15s., W. N. Cazalet, Esq., Tunbridge (gr. Mr. Fennell); second, 10s., Austin T. Killick, Esq., Maidstone; third, 5s., Major Dugdale, Sturminster (gr. Mr. Ryall).

Class 49.—Bullaces, 1 dish. First, 7s., Mr. G. Tebbutt, Isleworth; second, 5s., F. G. Arbuthnot, Esq., Bexley (gr. Mr. Wells); third, 3s., W. N. Cazalet, Esq., Tunbridge (gr. Mr. Fennell).

Class 50.—Morello Cherries, 1 dish. First, 7s., Countess Camperdown, Westbury-on-Trym (gr. Mr. Masterson); second, 5s., Mr. Nowell, Abergavenny; third, 3s., C. J. Massey, Esq., Garliestown (gr. Mr. Day).

Class 51.—Nuts, collection of (may include Walnuts, Filberts, Cobs, Chestnuts, Hazel, &c.), 1 dish of each. First, £1. 10s., J. Hargreaves, Esq., Reading (gr. Mr. Turton); second, £1, S. H. Goodwin, Esq., Mereworth; third, 10s., Viscount Gage, Firle Park, Lewes (gr. Mr. G. Helman).

Class 52.—Quinces, 1 dish. First, 7s., J. W. Fleming, Esq., Romsey, Hants (gr. Mr. W. Mitchell); second, 5s., J. Colman, Esq., Reigate (gr. Mr. King); third, 3s., Mr. G. Garraway, Bath.

DIVISION IV.

Single Dishes of Fruit grown in the Open Air.

Open to Amateurs and Gardeners only.

DESSERT APPLES.

Class 53.—Adams' Pearmain. First, 7s., J. Hargreaves, Esq., Reading (gr. Mr. Turton); second, 5s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); third, 3s., Roger Leigh, Esq., Teston (gr. Mr. Woodward).

Class 54.—Cox's Orange Pippin. First, 7s., J. Hargreaves, Esq., Reading (gr. Mr. Turton); second, 5s., C. Lee Campbell, Esq., Ross (gr. Mr. Wright); third, 3s., J. C. Borland, Esq., Sutton, Surrey (gr. Mr. Collins).

Class 55.—King of the Pippins. First, 7s., Mr. A. Wyatt, Hatton; second, 5s., Mr. J. Turner, Brighton; third, 3s., C. Lee Campbell, Esq., Ross (gr. Mr. Wright).

Class 56.—Mannington's Pearmain. First, 7s., J. Hargreaves, Esq., Reading (gr. Mr. Turton); second, 5s., Sir Mark Collet, Bart., Kensing (gr. Mr. Potter); third, 3s., Captain Carstairs, Newbury (gr. Mr. Ross).

Class 57.—Margil. First, 7s., H. C. Moffatt, Esq., Ross (gr. Mr. Spencer); second, 5s., Mr. A. Wyatt, Hatton; third, 3s., J. A. Foster, Chertsey (gr. Mr. Buxton).

Class 58.—Mother (American). First, 7s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); second, 5s., H. C. Moffatt, Esq., Ross (gr. Mr. Spencer); third, 3s., C. Lee Campbell, Esq., Ross (gr. Mr. Wright).

Class 59.—Reinette de Canada. First, 7s., R. Leigh, Esq., Teston (gr. Mr. Woodward); second, 5s., J. L. Bucknall, Esq., Beckenham (gr. Mr. Munro); third, 3s., Mr. H. C. Prinsep, Uckfield.

Class 60.—Ribston Pippin. First, 7s., Mr. A. Ocock, Arun Gardens, Rudgwick; second, 5s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); third, 3s., Messrs. W. & E. Wells, Hounslow (gr. Mr. Thompson).

Class 61.—Rosemary Russet. First, 7s., Mr. P. Cavanagh, Roehampton; second, 5s., J. Hargreaves, Esq., Reading (gr. Mr. Turton); third, 3s., W. L. Redhead, Esq., Brentford (gr. Mr. Bridges).

Class 62.—Scarlet Nonpareil. First, 7s., Mrs. Wingfield, Amphill (gr. Mr. Empson); second, 5s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); third, 3s., R. Leigh, Esq., Teston (gr. Mr. Woodward).

Class 63.—Worcester Pearmain. First, 7s., Mr. G. Wakefield, Bearstead, Maidstone; second, 5s., Mr. Killick, Maidstone; third, 3s., A. Tate, Esq., Leatherhead (gr. Mr. Mease).

Class 64.—Any other variety. First, 7s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie), with St. Edmund's Pippin; second, 5s., Hon. G. M. Fortescue, Maidenhead (gr. Mr. Herrin), with Early Red Calville; third, 3s., Mr. P. Cavanagh, Roehampton, with Jefferson's Apple.

COOKING APPLES.

Class 65.—Alfriston. First, 7s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); second, 5s., R. Leigh, Esq., Teston (gr. Mr. Woodward); third, 3s., Mr. P. Cavanagh, Roehampton.

Class 66.—Bismarck. First, 7s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); second, 5s., R. Leigh, Esq., Teston (gr. Mr. Woodward); third, 3s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith).

Class 67.—Blenheim Orange. First, 7s., Capt. Carstairs, Newbury (gr. Mr. Ross); second, 5s., J. A. Tulk, Esq., Chertsey (gr. Mr. Newman); third, 3s., Mr. T. W. Startup, West Farleigh.

Class 68.—Bramley's Seedling. First, 7s., Austin T. Killick, Esq., Maidstone; second, 5s., R. Leigh, Esq., Teston (gr. Mr. Woodward); third, 3s., Capt. Carstairs, Newbury (gr. Mr. Ross).

Class 69.—Cellini. First, 7s., Austin T. Killick, Esq., Weaving, Maidstone; second, 5s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); third, 3s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith).

Class 70.—Cox's Pomona. First, 7s., Capt. Carstairs, Newbury (gr. Mr. Ross); second, 5s., Mr. S. H. Goodwin, Mereworth; third, R. Leigh, Esq., Teston (gr. Mr. Woodward).

Class 71.—Duchess of Oldenburg. First, 7s., C. Lee Campbell, Esq., Ross (gr. Mr. Wright); second, 5s., Mr. S. H. Goodwin, Mereworth; third, 3s., D. P. Bouverie, Esq., Highworth (gr. Mr. Haines).

Class 72.—Dumelow's Seedling (*syns.* Wellington and Normanton Wonder). First, 7s., Mr. T. Ridgwell, Orsett, Grays; second, 5s., Capt. Carstairs, Newbury (gr. Mr. Ross).

Class 73.—Ecklinville Seedling. First, 7s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); second, 5s., R. Leigh, Esq., Teston (gr. Mr. Woodward); third, 3s., Hon. G. N. Fortescue, Maidenhead (gr. Mr. Herrin).

Class 74.—Emperor Alexander. First, 7s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); second, 5s., J. A. Foster, Esq., Chertsey (gr. Mr. Buxton); third, 3s., R. Leigh, Esq., Teston (gr. Mr. Woodward).

Class 75.—Gascoigne's Scarlet (*syn.* Glory of England). First, 7s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); second, 5s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith); third, 3s., R. Leigh, Esq., Teston (gr. Mr. Woodward).

Class 76.—Golden Noble. First, 7s., R. Leigh, Esq., Teston (gr. Mr. Woodward); second, 5s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); third, 3s., Mr. G. Garraway, Bath.

Class 77.—Golden Spire. First, 7s., R. Leigh, Esq., Teston

(gr. Mr. Woodward); second, 5s., Sir E. G. Loder, Horsham (gr. Mr. Goldsmith); third, 3s., Mr. T. W. Startup, West Farleigh.

Class 78.—Grenadier. Second, 5s., R. Leigh, Esq. (gr. Mr. Woodward); third, 3s., Hon. G. W. Fortescue, Maidenhead (gr. Mr. Herrin).

Class 79.—Hawthornden (New). First, 7s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); second, 5s., H. St. Vincent Ames, Esq., Westbury-on-Trym (gr. Mr. Bannister); third, 3s., R. Leigh, Esq., Teston (gr. Mr. Woodward).

Class 80.—Lane's Prince Albert. First, 7s., Capt. Carstairs, Newbury (gr. Mr. Ross); second, 5s., Mr. H. C. Prinsep, Uckfield; third, 3s., C. Lee Campbell, Esq., Ross (gr. Mr. Wright).

Class 81.—Lord Derby. First, 7s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith); second, 5s., R. Leigh, Esq., Teston (gr. Mr. Woodward); third, 3s., Mr. G. Wakefield, Bearstead.

Class 82.—Lord Grosvenor. First, 7s., R. Leigh, Esq., Teston (gr. Mr. Woodward); second, 5s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); third, 3s., Mr. R. Webb, Beenham, near Reading.

Class 83.—Lord Suffield. First, 7s., J. Hargreaves, Esq., Reading (gr. Mr. Turton); second, 5s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); third, 3s., Sir E. Paul, Twickenham (gr. Mr. Burton).

Class 84.—Mère de Menage. First, 7s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); second, 5s., H. C. Moffatt, Esq., Ross (gr. Mr. Spencer); third, 3s., Capt. Carstairs, Newbury (gr. Mr. Ross).

Class 85.—Northern Greening. First, 7s., Mr. H. C. Prinsep, Uckfield; second, 5s., J. R. Brougham, Esq., Carshalton (gr. Mr. Jones); third, 3s., Sir W. Geary, Tunbridge (gr. Mr. Cotterell).

Class 86.—Newton Wonder. First, 7s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith); second, 5s., P. Crowley, Esq., Croydon (gr. Mr. Harris); third, 3s., C. Lee Campbell, Esq., Ross (gr. Mr. Wright). (First prize presented by Messrs. J. R. Pearson & Sons, Chilwell, Notts.)

Class 87.—Peasgood's Nonesuch. First, 7s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); second, 5s., R. Leigh, Esq., Teston (gr. Mr. Woodward); third, 3s., Mr. Sanders, Halton.

Class 88.—Pott's Seedling. First, 7s., Mr. T. Ridgwell, Grays; second, 5s., Mr. P. Cavanagh, Roehampton; third, 3s., Mr. G. Helman, Lewes.

Class 89.—Spencer's Favourite, *syn.* Queen Caroline. First, 7s., R. Leigh, Esq., Teston (gr. Mr. Woodward); second, 5s., Mr. T. W. Startup, West Farleigh; third, 3s., C. Lee Campbell, Esq., Ross (gr. Mr. Wright).

Class 90.—Stirling Castle. First, 7s., Capt. Carstairs, Newbury (gr. Mr. Ross); second, 5s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith); third, 3s., Mr. J. Finch Hill, Watford.

Class 91.—Stone's, *syn.* Loddington Seedling. First, 7s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); second, 5s., R. Leigh, Esq., Teston (gr. Mr. Woodward); third, 3s., Capt. Carstairs, Newbury (gr. Mr. Ross).

Class 92.—The Queen. First, 7s., Mr. Sanders, Halton; second, 5s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); third, 3s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith).

Class 93.—Tower of Glamis. First, 7s., R. Leigh, Esq., Teston (gr. Mr. Woodward); second, 5s., Capt. Carstairs, Newbury (gr. Mr. Ross); third, 3s., Mr. T. W. Startup, West Farleigh.

Class 94.—Warner's King. First, 7s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); second, 5s., R. Leigh, Esq., Teston (gr. Mr. Woodward); third, 3s., C. Lee Campbell, Esq., Ross (gr. Mr. Wright).

Class 95.—Waltham Abbey Seedling, *syn.* Dr. Harvey. First, 7s., Mr. T. W. Startup, West Farleigh; second, 5s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie); third, 3s., C. Lee Campbell, Esq., Ross (gr. Mr. Wright).

Class 96.—Any other variety. First, 7s., F. S. Cornwallis, Esq., Linton (gr. Mr. Mackenzie), with Gloria Mundi; second, 5s., R. Leigh, Esq., Teston (gr. Mr. Woodward), with Belle Dubois; third, 3s., Mr. T. W. Startup, West Farleigh, with Tyler's Kernel.

DESSERT PEARS.

Class 97.—Beurré Diel. First, 7s., Earl Percy, Brentford (gr. Wythes); second, 5s., H. St. Vincent Ames, Esq., Westbury-on-Trym (gr. Mr. Bannister); third, 3s., Sir E. G. Loder, Horsham (gr. Mr. Goldsmith).

Class 98.—Beurré Hardy. First, R. Leigh, Esq., Teston (gr. Mr. Woodward); second, 5s., Mr. H. C. Prinsep, Uckfield; third, 3s., C. R. W. Adeane, Esq., Cambridge (gr. Mr. Hill).

Class 99.—Beurré Superfin. First, 7s., R. Leigh, Esq., Teston (gr. Mr. Woodward); second, 5s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith); third, 3s., Sir W. Geary, Tunbridge (gr. Mr. Cotterell).

Class 100.—Bon Chrétien (Williams's). First, 7s., Mr. Sanders, Halton; second, 5s., Hon. G. N. Fortescue, Maidenhead (gr. Mr. Herrin); third, 3s., Mrs. Duddell, Brighton (gr. Mr. Spottiswood).

Class 101.—Conference. First, 7s., R. Leigh, Esq., Teston (gr. Mr. Woodward); second, 5s., Earl Percy, Brentford (gr. Mr. Wythes); third, 3s., J. W. Melles, Esq., Chingford (gr. Mr. Nicholson).

Class 102.—Maréchal de la Cour. First, 7s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith); second, 5s., J. K. W. Digby, Esq., Sherborne (gr. Mr. Pragnell); third, 3s., R. Leigh, Esq., Teston (gr. Mr. Woodward).

Class 103.—Doyenné du Comice. First, 7s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith); second, 5s., R. Leigh, Esq., Teston (gr. Mr. Woodward); third, 3s., G. H. Field, Esq., Sevenoaks (gr. Mr. Edwards).

Class 104.—Durondeau. First, 7s., J. Borland, Esq., Sutton, Surrey (gr. Mr. Collins); second, 5s., Mr. J. Sims, Maidstone; third, 3s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith).

Class 105.—Emile d'Heyst. First, 7s., R. Leigh, Esq., Teston (gr. Mr. Woodward); second, 5s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith); third, 3s., Mr. J. Nowell, Abergavenny.

Class 106.—Fondante d'Automne. First, 7s., Earl Cowley, Chippenham (gr. Mr. Gibson); second, 5s., W. A. Calvert, Esq., Holmwood (gr. Mr. Rogers); third, 3s., Mr. H. C. Prinsep, Uckfield.

Class 107.—Glou Morceau. First, 7s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith); second, 5s., Sir W. Geary, Tunbridge (gr. Mr. Cotterell); third, 3s., P. Lawrence, Clapham Park (gr. Mr. Chard).

Class 108.—Josephine de Malines. First, 7s., Capt. Carstairs, Newbury (gr. Mr. Ross); second, 5s., H. St. Vincent Ames, Esq., Westbury-on-Trym (gr. Mr. Bannister); third, 3s., C. R. W. Adeane, Esq., Cambridge (gr. Mr. Hill).

Class 109.—Louise Bonne of Jersey. First, 7s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith); second, 5s., J. Colman, Esq., Reigate (gr. Mr. King); third, 3s., Mr. J. Nowell, Abergavenny.

Class 110.—Marie Louise. First, 7s., Sir C. Paul, Twickenham (gr. Mr. Burton); second, 5s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith); third, 3s., Mr. H. C. Prinsep, Uckfield.

Class 111.—Nouvelle Fulvie. First, 7s., H. C. Moffatt, Esq., Ross (gr. Mr. Spencer); second, 5s., Earl Percy, Brentford (gr. Mr. Wythes); third, 3s., W. N. Cazalet, Esq., Tunbridge (gr. Mr. Fennell).

Class 112.—Pitmaston Duchess. First, 7s., Earl Cowley, Chippenham (gr. Mr. Gibson); second, 5s., R. Leigh, Esq., Teston (gr. Mr. Woodward); third, 3s., Sir W. Geary, Tunbridge (gr. Mr. Cotterell).

Class 113.—Souvenir du Congrès. First, 7s., Messrs. W. & E. Wells, Hounslow (gr. Mr. Thompson); second, 5s., J. Hargreaves, Esq., Reading (gr. Mr. Turton); third, 3s., Sir E. Loder, Bart., Horsham (gr. Mr. Goldsmith).

Class 114.—Thompson's. First, 7s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith); second, 5s., Earl Cowley, Chippenham (gr. Mr. Gibson); third, 3s., Sir W. Geary, Tunbridge (gr. Mr. Cotterell).

Class 115.—Triomphe de Vienne. First, 7s., Mr. Sanders, Halton; second, 5s., R. Leigh, Esq., Teston (gr. Mr. Woodward); third, 3s., Earl Cowley, Chippenham (gr. Mr. Gibson).

Class 116.—Winter Nelis. First, 7s., Mr. H. C. Prinsep, Uckfield; second 5s., Sir E. G. Loder, Bart., Horsham (gr. Mr. Goldsmith); third, Dowager Lady Freake, Twickenham (gr. Mr. Rickwood).

Class 117.—Any other variety. First, 7s., G. H. Field, Esq. (gr. Mr. Edwards), with Madame Treyve; second, 5s., Sir W. Geary (gr. Mr. Cotterell), with Duchesse d'Angoulême; third, 3s., W. A. Calvert, Esq. (gr. Mr. Rogers), with Princess.

DIVISION V.

Dried Fruits, not preserved in fluid or sugar.

Class 118.—Collection of Dried Fruits. First, R.H.S. Silver Gilt Knightian Medal, Mr. W. A. Trotter, Ledbury.

Class 119.—Apples, sliced, 1 lb. weight. First, 15s., Mr. W. A. Trotter, Ledbury.

Class 120.—Apples, whole, 1 lb. weight. First, 15s., Mr. W. A. Trotter, Ledbury; second, 10s., Mr. B. W. Bull, Mr. Ramsden.

Class 121.—Plums, whole, 1 lb. weight. First, 15s., Mr. W. A. Trotter, Ledbury; second, 10s., Mr. B. W. Bull, Mr. Ramsden.

Class 122.—Cherries, whole, 1 lb. weight. First, 15s., Mr. W. A. Trotter, Ledbury.

DIVISION VI.

Special Prizes.

Class 123.—Six varieties of Hardy Fruits, grown in the open air, two gallons of each; at least two kinds of fruit must be represented. Open to *bonâ fide* market growers only. Prizes presented by the Worshipful Company of Gardeners. First, £3, Mr. S. H. Goodwin, Mereworth; second, £2, Mr. G. Tebbutt, Isleworth; third, £1, Mr. A. Wyatt, Hatton.

Class 124.—One bushel (42 lbs.) of a Cooking Apple, and a half-bushel (20 lbs.) of a Dessert Apple, packed for market in as many packages as may be considered desirable. The cost of the packages, and method of packing employed, must be stated. Amateurs and private gardeners only. First, £2 (prize presented by Archibald Weir, Esq., of Ottery St. Mary), P. T. Phillips Esq., Whitfield (gr. Mr. Grindrod).

Class 125.—The best packed basket (or other package) of Grapes, 12 lbs. weight of fruit, received by rail. Open. First, £1. 10s., Mr. Cooper, Sunninghill; second, £1, Mr. G. Gore, Polegate; third, 10s., Lady H. Somerset, Ledbury (gr. Mr. Harris).

Class 126.—The best packed box (or other package) of Peaches, 24 fruits, received by rail. Open. First, 15s., F. G. Arbuthnot, Esq., Bexley (gr. Mr. Wells); second, 10s., P. T. Phillips, Esq., Whitfield (gr. Mr. Grindrod); third, 5s., A. J. Howard, Esq., Isleworth (gr. Mr. Pentney).

Class 127.—The best packed box (or other package) of Ripe Pears, 24 fruits, received by rail. Open. First, 15s., F. G. Arbuthnot, Esq., Bexley (gr. Mr. Wells); second, 10s., A. J. Howard, Esq., Isleworth (gr. Mr. Pentney); third, 5s., J. J. Colman, Esq., Gatton Park, Reigate (gr. Mr. W. King).

Very Highly Commended.

A Collection of Fruit from Her Majesty the Queen, Royal Gardens, Windsor (gr. Mr. Owen Thomas).

A Collection of Tomatos grown and ripened out of doors, by Messrs. Sutton & Sons, Reading.

A Collection of Fruit from the Ealing Nurseries of Messrs. Chas. Lee & Son, Hammersmith.

A Collection of Fruit from Messrs. J. Cheal & Sons, Crawley.

A Collection of Fruit from Messrs. J. Laing & Sons, Forest Hill.

Two fine Pineapples from E. Keyser, Esq., Warren House, Stanmore (gr. Mr. Gleeson).

Highly Commended.

A Collection of Fruit from Messrs. J. Veitch & Sons, Chelsea.

A Collection of Fruit from Messrs. Spooner & Sons, Hounslow.

Commended.

A Collection of Fruit from Messrs. J. Peed & Sons, West Norwood.

MISCELLANEOUS EXHIBITS.

Messrs. J. Veitch & Sons, Chelsea, exhibited some sprays and fruits of *Rubus laciniatus*, a fine Blackberry; also Alpine Strawberry "Quatres Saisons," white Grapes, Currants, Damsons, ornamental Crabs, sprays of the large and beautiful Winter Cherry *Physalis Franchetii*, and specimens of *Magnolia Watsonii*, and several Berberies, including a new Japanese species, *B. Hakodate*.

Mr. H. A. Orr, of Bedford, exhibited specimens of his light trays suitable for storing and preserving fruit, &c. The trays are so ingeniously arranged that a vast quantity of fruit can be stored in a small compass.

The Horticultural College, Swanley, exhibited over forty dishes of well-known Apples.

The Earl of Radnor, Longford Castle, Salisbury (gr. Mr. H. W. Ward), exhibited Melons the Earl's Favourite.

Mr. T. S. Ware, Tottenham, exhibited a large collection of Dahlias and Begonias.

Mr. H. J. Jones, Lewisham, had a collection of Begonias and Chrysanthemums.

Messrs. Cutbush & Son, Highgate, exhibited Watford Beauty Single Dahlia and Polegate Tomato.

Messrs. J. Cheal & Sons, Crawley, exhibited a mixed collection of Dahlias.

Messrs. W. Paul & Son, Waltham Cross, exhibited a charming collection of cut Roses.

Mr. B. Ladhams, Shirley, Southampton, had a large collection of Hardy Flowers.

THE JUDGES.

The following gentlemen kindly acted as Judges, and the best thanks of the Society are due to them for their labours: Messrs. H. Balderson, W. Bates, G. Bunyard, J. Cheal, W. Crump, A. Dean, J. Douglas, J. Fraser, M. Dunn, T. Glen, W. J. Grant, J. Hudson, W. Iggulden, W. Jarman, W. Jefferies, H. Markham, J. McIndoe, J. McKenzie, E. Molyneux, G. Norman, A. Outram, G. Paul, A. H. Pearson, T. F. Rivers, C. Ross, J. Smith, O. Thomas, A. Turner, J. Walker, J. Watkins, A. Weir, J. Wright, and George Wythes.

THE OPENING AND LUNCHEON.

The Show was opened at 12.30 P.M. by the Sheriffs of London, Mr. Alderman Samuel and Mr. Alderman Hand, who drove down to the Palace in state, and were received at the chief entrance by Sir Trevor Lawrence, Bart., President of the Society, and the other members of the Council, and by the members of the Gardeners' Company, by whom they were conducted round the Show, inspecting the objects of most interest.

At 1.30 the Sheriffs, with Mrs. Samuel and Mrs. Hand, honoured the President with their company at luncheon, when about one hundred in all sat down.

The PRESIDENT, in proposing the toast of "The Queen," said that he did so with the greatest satisfaction, because Her Majesty had long been the Patron of the Royal Horticultural Society, and had always taken the greatest interest in its welfare, the present continuance of that interest being admirably expressed by the magnificent display of fruit which she had so graciously directed to be sent from the Royal Gardens, and which contributed in no small degree to the additional interest and beauty of the Show.

The PRESIDENT next gave "The Sheriffs of the City of London," and after thanking them most cordially for the encourage-

ment of their presence, he said that he believed the Society had shown them such fruit as they had never seen before, for he was confident that a finer collection of hardy fruit had never been seen in any exhibition in the kingdom. And he might add that he was absolutely certain that the Lord Mayor had not seen anything that would compare with it during the exhausting series of enjoyments, exhibitions, and dissipations which he had recently been undergoing in France. He need hardly say how greatly obliged they all were to those who had been good enough to contribute to the Show from all parts of the country, and he felt sure that the important industry of fruit cultivation in Great Britain and Ireland must receive a very considerable stimulus from such shows as the present, for did they not abundantly prove that in fairly genial seasons we could successfully produce at home such hardy fruits as could not be beaten in any part of the world? Referring to fruit-drying, he said that it was eminently desirable in years of glut like the present for producers to have the opportunity of fruit-drying to fall back upon when the market prices for fresh fruit were unremunerative; but in his opinion, before fruit-drying could become a real and practical success in this country, it was absolutely necessary for the growers to enter into co-operation and dry on a large scale at some central factory, and not for each one to be drying his own comparatively little surplus fruit only. He then drew attention to the need of the exercise of greater care and skill in picking, handling, and packing fruits, if we wish to compete on equal terms with the foreigner, who has long and successfully studied these so-called minor points, and ended by saying that he thought the Society deserved the thanks and support, not only of fruit-growers and farmers, but of the whole country at large, for drawing periodical attention to these and similar points.

Mr. Alderman and Sheriff SAMUEL, in responding, said that it had given him and his brother Sheriff the greatest possible pleasure, not only to open and see such a splendid collection of fruit, but also to receive such a kind welcome as had been accorded to them that day. The City of London had by their Guilds always from the earliest times taken the keenest interest in anything that tended to promote the welfare of the country. He fully agreed with the President that there was not only room for extended fruit culture, but that it was most desirable to

establish, if possible, the new industry of fruit-drying, so largely carried on by foreigners, and the Royal Horticultural Society would, he thought, be adding yet another to the many claims it had on the support of the public if they could in any way, by the force of word or example, tend to institute on a practical basis this industry, which was at present almost if not quite unknown in this country.

Mr. Sheriff HAND proposed "Success to the Royal Horticultural Society," and remarking on the fact that the Society already numbered more than 3,000 Fellows, he asked, "What might not be done during the next twenty-five years in the way of improvements in fruits, and packing and drying, if only half of these 3,000 really applied themselves to the work?"

The PRESIDENT briefly responded, and proposed the health of "The Judges," thanking those gentlemen in the Society's name for all they had done to promote the wellbeing of the Show.

Mr. MALCOLM DUNN returned thanks for the Judges in a few appropriate words.

CONFERENCE.

THURSDAY, SEPTEMBER 26, 1895.

The chair was taken by Mr. EDMUND J. BAILLIE, F.R.H.S., F.L.S., of Chester, at 4 P.M., who at once called on Mr. George Bunyard, of Maidstone, who read the following paper:—

NEW FRUITS OF RECENT INTRODUCTION.

By Mr. GEO. BUNYARD, F.R.H.S.

It is obviously somewhat difficult to fix the exact meaning of such a relative word as "new," especially as some of the varieties which I shall mention would more truthfully be described as recently come to the front, or as having recently attracted attention, than as being absolutely "new." However, "new to commerce" will sufficiently indicate the point I have in view.

I should add that these notes are in every case made from my own personal experience, and have not been compiled on mere hearsay, nor from the naturally somewhat sanguine and eulogistic hopes and descriptions of the raisers. At the same

time, it must be borne in mind that one cannot speak so confidently of new friends as of old, and it is quite possible that longer experience may cause me to modify my opinion of some of the following varieties.

The letters F.C.C. or A.M., in heavy type, indicate that the variety has received a First Class Certificate or an Award of Merit from the Royal Horticultural Society.

Starting alphabetically, the Apples come first, and in both the Dessert and Kitchen Sections [many fine new fruits have recently been brought forward.

APPLES (DESSERT SECTION).

Allington Pippin.—This received a F.C.C. from the R.H.S. under the name of *South Lincoln Beauty*, but as there are already several *Lincoln Pippins*, it has been re-named as above. It is of remarkably fine flavour, of good appearance, and just the right size for a dessert fruit. It will, I think, succeed where *Cox's Orange* fails, and I consider it equal in other respects to that fine variety, which in growth it greatly resembles. It promises to be a very free bearer. **F.C.C.**

Armored.—A little russety Apple of the *Sam Young* type, of high flavour. Raised by Mr. Charles Ross. It is bearing with me this year for the first time, and fruiting freely. It will, I think, be a valuable variety where dessert Apples are required in April and May. **A.M.**

Beauty of Bath.—An August fruit of great beauty and high colour. It is rather acid, which, while it is a recommendation with a few, is probably considered by most people to be a fault in an eating Apple. On the whole, I think it will prove more of a market fruit, its colour making it sell well, than a gardener's variety. **F.C.**

Christmas Pearmain.—This is a soft-fleshed, briskly flavoured variety; a good grower and regular bearer, flourishing where *King of the Pippins* fails.

Lady Sudeley.—No new dessert Apple of late years has risen so rapidly in public favour as this has done. In flavour, colour, perfume, and beauty it takes precedence of all August and September varieties. It wants but little pruning, as it bears on the points of the shoots. It must, however, be used as soon as gathered from the tree, as storing spoils its flavour. **F.C.C.**

May Queen.—Though raised by Mr. Haywood, of Worcester, many years ago, this variety is still but little known. It is, however, a capital dessert Apple for February and March, and is a great bearer. **A.M.**

Okeza.—A pretty rosy-salmon-coloured fruit, in perfection in September and October. It is a particularly elegant Apple of a curious egg-shape, looking like wax, and carrying a soft and delicate bloom. Of fine brisk flavour, but it requires to be ripened in the fruit-room, as the flesh is hard when first gathered from the tree. A good grower and fair bearer.

Rivers' Early Peach.—I have not fruited this as yet, but it is in almost all respects a counterpart of *Irish Peach*, save that it is of a much better habit, fruiting freely on spurs, instead of only on the points like the Irish Apple, which gives a tree of the latter a very naked appearance.

September Beauty.—One of Mr. Laxton's seedlings. It is of very rich flavour and soft texture, and is worthy of cultivation, although it is not a great bearer until the tree attains some age. It is generally good and handsome in colour, and the past hot season seems to have suited it well. **F.C.C.**

South Lincoln Beauty.—See *Allington Pippin*. **F.C.C.**

Wealthy.—An American variety, with soft flesh and pleasant flavour, being in season in October. It succeeds admirably with us at Maidstone, and bears its lovely crimson fruits in both perfection and profusion.

Williams' Favourite.—An August fruit of great promise and merit. I have grown it for seven years, and it has proved itself a good grower and a profuse bearer. The flavour is very aromatic and the flesh soft, and it is of a splendid colour. **A.M.**

Atalanta, **A.M.**, *Beauty of Stoke*, **F.C.C.**, *McIndoe's Russet*, and *King Harry*, **A.M.**, have not as yet fruited with me, so that for the present I must be content with only mentioning their names.

APPLES (CULINARY SECTION).

Belle de Pontoise.—For this grand late variety, which keeps until May, we are indebted to Sawbridgeworth. It bears well and is a vigorous grower, and will make a fine orchard tree. The fruit is large and handsome.

Bismarck.—A seedling from Tasmania, which has already taken a foremost place on account of its extreme fertility, size,

and beauty. Its vigorous growth as an orchard tree is rapidly bringing it to the front for market growers, whilst grafted on the Paradise it is a perfectly wonderful bearer. Even on quite young trees, and in the South and West, the fruit is of a fine colour. It cooks like a *Wellington (Dumelow's Seedling)*, and keeps till Christmas. At this very Crystal Palace Show one grower assures me that the crop he has just gathered from trees planted only two years ago would, at 4s. a bushel, have brought him in at the rate of £100 an acre. **F.C.C.**

Byford Wonder.—A late-keeping variety of great weight and substance, which we owe to Hereford. Apples of this class will always be valuable after Christmas. In growth it resembles *Blenheim Orange*. **A.M.**

Chelmsford Wonder.—This variety, from Messrs. Saltmarsh, should prove a useful late heavy Apple. It partakes of the *Wellington (Dumelow's Seedling)* type. **F.C.C.**

Early Rivers.—A fine variety, which I have seen bearing well at Sawbridgeworth. It is said to succeed where *Lord Suffield* will not. It may be described as a late *Suffield*, and not so liable to bruise in transit. The tree is a good grower with bold foliage.

Hambling's Seedling.—This grand fruit, raised by Major Hambling, will, I venture to say, prove a great acquisition amongst late varieties for both orchard and garden planting, as large fruits are scarce in March. The tree is free from canker, vigorous in growth, and a splendid bearer. **F.C.C.**

Mrs. Barron.—In growth this Apple is very distinct from any other, and will prove most valuable in gardens of small size, where there is little space to spare. It bears abundantly, and is of first-rate quality for cooking in October. *Large American* proves to be identical with this.

Newton Wonder.—Messrs. Pearson, of Chilwell, have brought this Apple into notice. As an orchard tree it is vigorous, on the Paradise restricted, while it is a very free bearer, and I anticipate that with *Bramley's Seedling* it will altogether supersede the tender and much-cankered *Wellington (Dumelow's Seedling)* in our orchards and gardens. It is a really grand new variety. **F.C.C.**

Tyler's Kernel.—Hardly a new variety, but one as yet insufficiently known. It makes a vigorous orchard tree, such as

one would expect to get 25 bushels off. The fruit is of pleasing appearance, its scarlet cheek giving it a market value. It bears freely and keeps till January. **F.C.C.**

Vicar of Beighton.—This handsome fruit, so much fancied by our old friend the late Mr. Shirley Hibberd, cannot as yet be recommended, as it is apt to cast its fruit prematurely, is prone to canker, and is an awkward grower. Perhaps it may yet improve.

White Transparent.—A very lovely and useful variety which we owe to Messrs. Rivers. Its waxy primrose colour and capital cooking quality should make it a great favourite. The tree is a good grower, but evidently likes a warm corner; it must also be used as soon as gathered, as it somewhat rapidly decays. It is by far the best first-early kitchen Apple, and to those who like a brisk acid fruit in the hot days of August it will also be a favourite for eating. **A.M.**

Bowhill Pippin, **A.M.**, and *Duke of York* will, I think, take a good place ere long; while *Gospatric* and *High Canon*, **F.C.C.**, sent out ten years ago, have already made their way as useful fruits.

CHERRIES.

New varieties are not very plentiful, but the honour of introducing a few really good ones rests with Messrs. Rivers, of Sawbridgeworth.

Cleveland Bigarreau, *Emperor Francis*, **F.C.C.**, and *Ludwig's Bigarreau* must take first rank amongst the White Heart section, as is also the case with *Black Hawk* and *Géant d'Hedelfingen*, **F.C.C.**, amongst the Black Hearts, *Géant* being an especially grand, firm late variety.

Windsor, an American red-black, is likely to prove useful among late black Cherries.

Rivers' Early, which quite takes the lead, and, though not strictly new, cannot be too well known.

NECTARINES.

Much as we are indebted to Messrs. Rivers in the other departments of fruit, nothing, I think, that they have ever introduced equals—certainly nothing surpasses—their magnificent group of new Nectarines, of which I will mention but a few.

Rivers' Early.—This glorious new Nectarine is not only of exquisite flavour, juicy, and fresh, yet rich and luscious, but it is

also a good grower, and seven or eight days earlier than any other known variety. It crops even on trees only a year old, and if well thinned the size is magnificent. I think it will succeed on the open wall as well as under glass. **F.C.C.**

Newton and *Spenser* are "food for the gods" among late varieties, and their enormous size, grand colour, and exquisite flavour at once place them in the very foremost rank. Their wood is stout and very short-jointed, indicating heavy crops and good constitution.

Dryden.—One of the finest new mid-season varieties.

PEACHES.

Messrs. Rivers again take the lead, and their introductions have done much to lengthen the season of Peaches for culture under glass.

The Americans have undoubtedly sent us some fine early Peaches, but they are valued, I think, one and all, more for their precocity than for their flavour. Amongst the more recent, *General Lee*, *Early Canada*, and *Harper's Early* are not so good as *Hale's Early*, **F.C.C.**, which was introduced some twenty years ago.

Alexander, **F.C.C.**, *Waterloo*, and *Amsden June*, **F.C.C.**, are very early, but unless under exceptionally good conditions they do not possess rich flavour, though they are juicy and pleasant. Their great merit is that they are three weeks earlier than any others.

A word as to failure with these early American varieties under glass. If a low temperature is kept until they have set their fruit, no difficulty will be experienced in setting the blooms. As soon as the setting is over the day and night temperature can be raised, when they soon begin to swell and astonish one by the quickness with which they come to maturity; but a continuance of forcing heat during the flowering time will almost certainly cause them to cast the young fruit. This difficulty does not occur in the open air, and they are valuable additions to early wall fruit. With trees of these varieties grown in an orchard-house in pots, the flavour may be very greatly improved if they are stood outside in the open air for the last fortnight of their ripening; they then put on a fine colour, and become good in flavour, though they can under no circumstances be classed as

first-rate. A really first-class early Peach is still a thing of the future.

Dymond and *Goshawk*, though not actually new, are too little known. They are fine additions to the mid-season class, and are both of really good constitutions.

PLUMS.

Once more we have gratefully to acknowledge our indebtedness to Messrs. Rivers, of Sawbridgeworth.

Stint is a decided gain amongst early dessert varieties.

Early Transparent Gage, *Late Transparent*, **F.C.C.**, and *Late Golden Transparent*, **F.C.C.**, are welcome additions to the Sawbridgeworth race of Gages. They all possess the best and richest flavour, and extend the season at both extremities.

Reine Claude du Comte Althan is one of the red-skinned Gages of exquisite flavour, and is a good bearer and grower.

Rivers' Monarch.—A most welcome addition to late Plums; large and black, ripening at the end of September. It cooks magnificently, and at that late season is not to be despised on the dessert table. The tree is a good grower and a profuse bearer. **F.C.C.**

DAMSONS.

Bradley's King.—This is by no means new, but it is far too little known. It takes the first place amongst Damsons for rich flavour, and when the trees have gained a little age it bears well every year. It is unequalled for private gardens.

PEARS.

Beacon.—A profuse bearer on the Quince, but a slow grower. It also succeeds admirably on the Pear stock. The fruit is sweet and pleasant, but must be gathered before it is fully ripe. August and September.

Beurré Dubuisson.—A remarkably fine Pear of curiously long shape; juicy and delicious in flavour. It bears well, but grows slowly. December and January. **F.C.C.**

Beurré Fouqueray.—A fine green Pear, introduced by Messrs. Veitch; which will probably take the place of *Beurré Bachelier*. It is a free bearer and hardy. October. **F.C.C.**

Beurré Julie.—A small but a first-class Pear, which deserves to be much better known. It is a profuse bearer. October and November.

Beurré Mortillet.—Often of immense size; juicy and refreshing. A very distinct Pear, and a good bearer. Late October.

Conference.—One of the Sawbridgeworth seedlings. An elegantly shaped fruit of fine flavour; the flesh buttery, and of a peculiar salmon colour. A great bearer and good grower. October. **F.C.C.**

Directeur Alphan.—A late stewing Pear.

Directeur Hardy.—This has not yet fruited with us, but it is placed in the first rank on the Continent. It is a good grower. October and November.

Fondante de Thirriot.—Of moderate size, but handsome and very good. A good grower. December.

Gilgil.—A stewing Pear for October and November.

Le Lectier.—A large Pear of uneven shape, but of fine quality. It is a good grower, and keeps till January. **F.C.C.**

Marguerite Marrillat.—An immense fruit with fine colour, and when in first-rate condition as good as *Comice*. It is a splendid grower and bearer. September and October.

Striped Doyenné du Comice.—This has yet to be proved, but it is said to succeed better than its parent, which in some soils is tender.

Of older introductions, Rivers' *Magnate* and *Princess* both maintain their characters.

Before leaving the subject of Pears we would, in passing, remark on the very undeserved neglect which late Pears meet with at the hands of so many growers. *Beurré de Jonghe*, **F.C.C.**, *Doyenné d'Alençon*, *Marie Benoist*, and *Duchess de Bordeaux*, **F.C.C.**, are with us very fine and reliable varieties. They are by no means new, but they are very little known, although in the South and West they succeed admirably as pyramids in the open, and in colder districts would, I doubt not, do well on walls.

QUINCES.

Several new varieties have been sent us from America, where the Quince finds greater favour than it does in this country, but as yet we must suspend our judgment until they have been proved.

RASPBERRIES.

Keighly Queen.—Although it has received a First Class

Certificate, I cannot recommend this new variety; it was discarded as soon as proved. *Superlative* still holds the first place amongst the reds. **F.C.C.**

Surpasse Fastolf.—A variety from the Continent, and a good red.

In Yellow Raspberries we have for a long time stood still, but a very large-fruited one may be looked for in 1896.

STRAWBERRIES.

A great advance has been made of late years, and all Strawberry lovers must regret that Mr. Thomas Laxton, who has done so much in this direction, should not have been spared to see the success of his magnificent *Royal Sovereign*.

Laxton's No. 1.—A fine-flavoured variety, and the earliest.

King of the Earlies.—Another of Mr. Laxton's raising; early, and one of the best for flavour.

Royal Sovereign.—This bids fair to be the finest Strawberry introduced of late years, both for garden and market purposes. The flavour is excellent, the flesh firm, the berry large, and the plant prolific. In season it follows closely after *King of the Earlies*. **F.C.C.**

Sensation.—A very fine fruit, but somewhat soft.

George Rundle and *May Queen* have not yet been sufficiently good with us to warrant me in recommending them.

Incomparable, raised by Mr. Ridgwell, is an improved *Goliath* of firmer substance. **A.M.**

Latest of All.—Another of Mr. Laxton's seedlings, but unfortunately named, as it ranks more as a late mid-season variety than as a really very late one. However, it is one of the very best of recent introductions, its fine size, *Queen* style, and splendid flavour marking it out at once for general cultivation. **F.C.C.**

Empress of India, **F.C.C.**, *Gunton Park*, **F.C.C.**, and *Lord Suffield*, **F.C.C.**, are three very fine seedlings raised by Mr. Allan, of Gunton Park. They are a departure in the direction of more distinct flavour, whereas many recent varieties seem only to have aimed at increased size.

Auguste Boisselot, **F.C.C.**, *Edward Lefort*, *La France*,

Souvenir de Kieff, and *Unser Fritz*. These, though perhaps not strictly new, are Continental varieties introduced chiefly by Mr. George Paul, and are all of value in a collection of Strawberries.

May I be permitted to point out that many growers in trying new Strawberries hardly give them time to show their true qualities in different and differing seasons? For example, take the extreme heat and drought of 1893 and 1895, and compare them with the wet season of 1894, and it will be obvious to all who have any knowledge of Strawberries that you cannot expect the same satisfactory results from the same varieties in such opposite seasons, and, as a matter of fact, you will find the good varieties of 1893 amongst the bad ones of 1894, and *vice versa*. To ensure a supply in every season varieties suited to all seasons, wet or dry, hot or cold, must be cultivated, and therefore I would ask all growers to hesitate before discarding a new variety because it has not succeeded in any one particular season, for if it has failed in a dry year it may not unlikely prove very valuable in a wet one. Good gardeners should provide as far as possible against all variations of climate and divergency of seasons. For this reason I still believe in *Noble* and *Competitor*, for though they failed in 1894, and were then much spoken against, they have proved of the greatest value in hot, dry seasons, and may probably do so again. Fruit of really fine flavour can never be expected in seasons of soaking wet, when the sun cannot act on the fruit to advantage.

VINES.

From time to time we receive really fine varieties, but new Grapes are very slow in making their way with the public. Grapes should, I think, soon be divided into two sections—
(i) Showy, handsome varieties to grow for the market, and
(ii) Choice varieties of high flavour to grow for one's own private table. The following can be recommended:—

Appley Towers.—This may be best described as a late *Black Hamburg*, and is very fine. **F.C.C.**

Diamant Traube.—A very fine Grape of the Sweetwater race. **F.C.C.**

Lady Hutt.—A white Grape of grand flavour and very large bunches; ought to be much more widely grown. **F.C.C.**

VARIOUS FRUITS.

The Japan Wineberry (*Rubus phœnicolasius*) deserves notice. It is a useful fruit for tarts, &c., and being also a handsome climbing or trailing plant, with a pretty weeping habit and red stems, I think it has a future before it. **F.C.C.**

The American Brambles have, in my opinion, proved a failure.

In conclusion, let me say that before we can admit the introduction of so many New Fruits it will be necessary to exercise unsparingly and impartially the work of selection amongst both the new aspirants for favour and also amongst the old and more established varieties. No one can doubt but that in almost every department there are already too many (or at least ample) varieties, whilst at the same time no one can also doubt but that in every department there is room for the introduction of a really first-class novelty. But it must be first-class, and growers all the country through should remember that when they send up any novelty or seedling to the Fruit Committee of this Society, they must not be disappointed at its being left unnoticed, unless it is manifestly superior *in some respect* to all similar fruits ripening at the same season. The superiority may be in flavour, fertility, habit, size, colour, or what not, but manifest superiority is essential. They should also bear in mind that the new-comer must not be content with manifesting a superiority in one respect if at the same time it displays inferiority in another. For instance, it is no true advance to gain size and lose flavour, or to gain flavour and size in a tree that is subject to canker or is a shy bearer. The great desideratum, of course, is to advance in all points of excellence, and the least that should be accepted in admitting a new friend to favour is that in one point at least it exceeds, and in all others equals, all similar established varieties with which it competes or whose place it seeks to supply. Nothing can stand the ordeal of a passage round our Society's Fruit Committee's table, and a tasting by twenty to thirty expert fruit growers, unless it is presented in good order, and be in itself of really sterling merit.

DISCUSSION.

The CHAIRMAN said they had listened to a most interesting paper which opened up ground for good discussion. He noticed that Mr. Bunyard did not allude to a variety of Strawberry which surpassed the *Royal Sovereign*; he referred to *Laxton's Monarch*.

Mr. BUNYARD said he had not yet tried it.

Mr. ROUPELL remarked that it was a dark horse.

The Hon. Mr. PLAYFORD (South Australia) said that he was a grower come from the other side of the world—the colony of South Australia. As colonists they had been exceedingly anxious to get the best varieties to grow in the open. He sent to Mr. Bunyard, who forwarded several varieties, which, although they travelled 16,000 miles, all turned out well. He would like to say that he thought that in growing for profit it was a great deal better to confine themselves to the very best varieties, and only a few of them. There was one Plum he thought might be introduced into this country, the Japanese Plum. It was very much like an ordinary Peach—a cross between a Peach and an Apricot. There was one Plum called *Red Heart*, a most excellent fruit. He, however, devoted himself principally to the cultivation of Cherries. The first Cherries he got were the *Early Purple King*. It was the very earliest variety, and made a splendid show, as did *Early Lyons*. He also grew *Tunford Bigarreau*, which, if gathered before it was ripe, would not lose its flavour after it was picked; the *Black Tartarian*, *Knight's Black*, *Waterloo*, which will keep well in extreme cold, and *St. Marguerite*, a very large, firm, black Cherry, were other varieties that he grew. He had picked something like 30 tons of Cherries a year. He had between 15 and 20 acres of land, but by no means the whole of this was devoted to Cherries. He was also growing a Blackberry that came from the Himalayas, and some of these had been sent to Kew Gardens.

Mr. CRUMP, replying to a remark made by Mr. Rivers, who was not distinctly heard, said he had had nothing to do with the raising of the *May Queen* Apple. He had, however, got a model tree, and the variety was one which should be grown by everyone.

Mr. ROUPELL said he was very much struck by the remarks of the gentleman from South Australia. He, however, must dissent from some of his opinions. He was afraid if they selected only a few Apples and a few Pears, and so on, they

would remain stationary. If their efforts were confined and cramped entirely by the mercantile element, they would soon put a stop to progress. They did not all work for merely pounds, shillings, and pence. Many of them worked for the love of the thing; but if people could get a profit out of horticulture, so much the better. He had himself a crop of *Diamant Traube*, and he was glad to find that Mr. Bunyard had learnt its merits. He would not like to leave the *Nanny*, an excellent Sussex Apple, out of a selection of fifty. The list of first-class Apples was, however, so large that it was a matter of great difficulty to reduce the number to anything like fifty; and their friend from Australia would do wisely to try all the sorts sent out to him, and not to stick to the dozen he had got. If he did not do so, he would find himself left out in the cold.

Mr. BUNYARD, in replying on the discussion, said he would not advise anyone to embark on the Plums from Japan. He had got all the varieties he could, and he had only had two bear fruit, after twelve years. With regard to the *Nanny* Apple, there was one objection—it very seldom cropped.

A hearty vote of thanks was proposed by the CHAIRMAN to Mr. Bunyard for his paper.

Mr. GRANT, in seconding the proposition, said up till recently he had been associated with Roses, but for the last five years he had gone in for fruit, and he was satisfied with the results obtained. He did not think they need fear the competition of their Australian or American cousins, who were not going to equal anything they saw in the Palace that day.

On the second day of the Conference, Friday, September 27, the chair was taken by Mr. GEORGE BUNYARD at 3.30 P.M.

PRUNING FRUIT TREES.

By Mr. A. H. PEARSON, F.R.H.S.

I HAVE been asked to read a paper upon this subject, and I must say I approach the task with a certain amount of trepidation. So much has been said and written on the pruning of fruit trees that one might fancy it somewhat hackneyed; and yet I find from experience that there is still a great deal of darkness in the mind of the average amateur upon this subject, and even the great lights of horticulture differ very materially upon some important points. Let us take, for instance, the very first question which arises in the mind of the ordinary amateur. He purchases some fruit trees from a nurseryman, and his first question is, Should these trees be pruned at the time of planting? I think I may safely say that nine authorities out of ten would, a few years ago, have replied with one voice, No, by no means prune them. For it is not so long ago that a little band, whom I might liken to Macaulay's "dauntless three," withstood a host of experts upon this very question, and, I am glad to say, withstood them with such obstinacy that, although the question was not settled, it was left as an open one; and even to-day I read articles recommending that, broadly speaking, newly planted fruit trees should not be pruned, from the pens of those to whose opinions I would pay the greatest respect, but from whom, upon this particular point, I must most decidedly differ. The advocates of non-pruning assert that, the transplanting being a considerable check to the tree, this result should be counteracted by leaving the branches full length for the first year, so that they may produce as much foliage as possible, and thus induce active root-action; whilst those who advocate the pruning of newly transplanted trees take an entirely different view of the matter, and argue that as the act of transplanting is one which, however, carefully carried out, must entail some check upon the roots, and also in all probability some reduction of their length, the

branches should also be shortened to maintain the balance; and, further, that the long shoots left on the tree cause a considerable amount of needless evaporation of the stored-up sap, and make it much more difficult to secure the tree from being rocked about by the wind; and, lastly, that it defeats the end in view, inasmuch as the development of leaves from the full-length shoots is so poor compared with that from shortened shoots, that root-action is retarded rather than advanced. These ideas have been gaining ground during the past few years, and the demonstration plots of some of our County Council authorities have aided in no small measure to throw light upon this and other kindred subjects. Of course the results upon experimental plots, and the results which come under the observation of every intelligent nurseryman from the planting of trees under his own supervision, are results which are measured by the eye, and which may, to some extent, be read differently; but, happily, we have to-day established in this country, thanks to the enterprise of His Grace the Duke of Bedford, an experimental fruit station, where the results of experiments will be accurately recorded by men of science, so that prejudices, whether on the one side or the other, will not be allowed to bias the judgment of results. It is yet early to ask for too much information from an authority so recently established, though we shall, doubtless, learn much in the near future; but I am told that, according to the measurements taken this year, the leaf surface upon the unpruned trees is 15 per cent. less than that upon the trees which had their branches pruned back. That the appearance of the pruned trees is far more promising than that of the unpruned ones, I know from personal observation.

Having at some length opened this much-vexed question, let me hasten to say that the manner of pruning a newly planted tree must depend greatly upon the tree to be operated upon, and the results which one wishes to obtain. Broadly speaking, all young, well-grown, and vigorous trees should have their branches shortened after planting to one-third of their original length. If the planting is done *very* early in the season, the pruning may with advantage be deferred for a week or two, in order to minimise the risk of the buds which are left being dried up; but in the case of trees planted later in the season, the pruning may be done at once.

The question of pruning newly planted trees has plunged us somewhat into the middle of our subject, and it would, perhaps, be as well to retrace our steps, and to ask, What are the objects to be attained by pruning fruit trees? These should be, firstly, to obtain fruit, and, secondly, to form trees of a nice shape and to enable them to continue fruit-bearing. With many planters the first object seems to be lost sight of altogether, whilst others equally neglect the second. I may say at once that, although the principles of pruning are simple in themselves, the application of them is a matter which requires a good deal of judgment; the mode of pruning depends so very much upon the kind of tree to be operated upon, the stock upon which it is growing, and the form of tree which one desires to have as a result of one's cultivation. Possibly this is the reason why so many people fail to secure good results from their pruning, whilst others find this work the most interesting they have in connection with their garden. From what I have said it will be seen that it is impossible to lay down any hard and fast rules upon pruning; each case must be taken upon its merits. Nevertheless, there are two rules which can always be kept in view, and which seem to me to form the basis of nearly all pruning. They are, first, that all the branches must be so disposed as to admit the sunlight and air into the middle of the tree, for without this fertility is impossible; secondly, that all leading shoots should be as strong as possible, in order that a free flow of sap may be maintained; and that the side shoots should be as weak as possible, in order to favour the formation of fruit spurs. Let me further state as an axiom that *the more a branch is shortened by pruning, the stronger will be the growth resulting from the remaining buds.*

Now let us take a few examples and bring common sense to bear upon them, for, after all, one's judgment is quite as useful in pruning as the knife. To begin with, we will suppose that we have purchased some standard trees of Apples, Pears, or Plums which have been well grown. If the trees are young, say three or four years old, the shoots should be cut back to one-third of their length, taking care to prune to an outside bud, so as to produce a tree with an open head. The reason we thus prune back these shoots is that our first care, with standard trees,

must be for a few years to secure good growth and form fine open heads which will carry fruit for generations ; and those who seek, as many do, to obtain fruit at once make a fatal error.

If young standard trees are left unpruned, they will make scarcely any growth the following season, but the buds will just push out a few leaves, and, remaining nearly dormant, will the following year be transformed into bloom-buds, and if these produce fruit the long branches will be broken down and the tree ruined for life ; if, on the other hand, one wishes to prune them back the first year after planting, a whole season has been lost, and it is often very difficult to find buds to prune to, as the buds on the lower portion of these long branches will have failed to develop, and are what we technically call "blind."

Pyramid Trees should be treated much in the same way as standards. Young vigorous trees should be closely pruned ; older trees, being more formed, do not require such severe pruning, as the foundation of the tree is already laid, and what one wants is rather to continue the work already begun than to cut hard back, and so form strong shoots. Older transplanted trees merely require the longest shoots shortening, in order to maintain the balance of the tree and to prevent, as a consequence of their being left too long, their lower portions having undeveloped buds. I may also say that it is frequently advisable to thin out entirely a few of the branches upon formed or specimen trees, where they are placed too closely together, as this is an operation which seldom receives attention at the hands of the nurseryman.

Of course these remarks about pyramid trees are based upon the supposition that they have been carefully pruned during their youth in the nursery. When one reads in the horticultural press of pyramid trees being purchased and planted which had stems 3 feet and over in length devoid of a branch, these remarks are not applicable. Such trees can only be treated by being cut hard back to 15 or 18 inches from the surface of the ground, and allowing them to start again, if one is possessed of sufficient patience to await the result, the alternative being to dig them up and burn them.

Cordon Trees.—These should have the leading branch left as long as possible, the only object of shortening it at all, if well

ripened, being to ensure the whole of the buds breaking. Now as we want the buds to form fruit spurs, it is obvious that they should be as weak as possible; and bearing in mind the fact that the more one prunes away the stronger will the growth be from the remaining buds, let us err rather on the side of cutting away too little rather than too much. Certain varieties of Pears—for example, Marie Louise and William's Bon Chrétien—may have their shoots left full length without any fear of the lower buds remaining dormant, whilst others, such as Jargonelle, Beurré Superfin, Catillac, &c., would, if the shoots were not shortened, have perhaps half their length entirely bare, the buds having failed to show any sign of life. This is equally true of various kinds of Apples and Plums.

Espalier-trained Trees.—These should have the leading shoot pruned back to about 14 inches from the top pair of branches—*i.e.*, of course, provided the proper buds can be found there to make growths to form the next pair; if not we must cut where the bud is, be it an inch or so higher or lower. The side branches, which are about 1 foot apart, should be treated just in the same way as the cordons already described. I trust I have made it clear that the pruning of a cordon or espalier tree should be the exact opposite of that recommended for a standard tree, for the simple reason that in the case of a standard tree the result which one wishes to obtain is *growth*, whilst for the already formed trained tree one wants short *fruit spurs*.

Summer Pruning.—I have no hesitation in saying that, as ordinarily carried out, summer pruning is the main cause of our garden fruit trees being unfruitful, whereas if properly done it should have the most beneficial effect. All side shoots of cordons, and side shoots from the branches of espalier or other trained trees or pyramids, should be gone over during the season of early growth (May) and pinched back with the finger and thumb nail to three leaves. These shoots will then commence to grow again from the upper buds, and should be pinched back to two leaves (making five); sometimes a third pinching is necessary in a wet autumn, when growth is protracted until late in the season. The result of this treatment will be that the side shoots will be thin and weak, and so pre-

disposed to form fruit spurs, whilst the leading shoots and those required for extension will have had an extra amount of sap thrown into them, and will consequently be strong, clean, and vigorous. An alternative method is to allow the side growths to become somewhat firm, and about the end of June to break them half through at four leaves from the base, leaving the broken shoots hanging down; a check is thus given to the shoots, which causes the remaining buds to swell, but the broken shoots will still take a certain amount of sap, and thus form a safety valve, which prevents the lower buds from bursting into growth. This method of treatment almost always produces bloom buds, but it is not so frequently adopted as it might be, on account of the broken shoots looking somewhat untidy in gardens.

In the subsequent autumn or winter pruning of the side shoots leave always on young and vigorous trees three buds; on old trees two will suffice. The reason for leaving three buds is that one or two, generally two, *must* make growth, while we want the lowest one to remain nearly dormant and just put out a leaf or two so as to develop into a fruit bud next year. The mode of summer pruning one often sees practised is very different to that here described. It consists in allowing the side shoots to grow freely until July, and then cutting them hard back to two buds. The result is that the shoots are far thicker and stronger than they should be, and consequently more liable to make strong wood next season. The tree receives a great check from the removal of so much foliage, and finally the buds left are almost certain to break out into growth the *same* season. Close pruning like this quickly transforms a tree into a dense thicket of shoots impervious to sun or air, and totally unfitted for bearing fruit. I have not unfrequently seen lines of pyramid fruit-trees pruned so as to look like sugar cones, into which it would be next to impossible to insert one's hand; and indeed, unless one were birds'-nesting, there would be no necessity to do so, for it is quite certain that fruit could not be produced there. I would repeat that close pruning is responsible for more failures in garden fruit culture than all other causes put together, and I blame the method of close summer pruning, because the trees are thus subjected to two close prunings a year instead of one, and thus become thickets in about half the time. The excuse made for

close pruning is generally that the operator wishes to avoid having large, unsightly spurs, such as one frequently sees on old trees. But the reduction of spurs, necessary as it is, must be deferred *until bloom buds are formed*. As soon as one has a really developed bloom bud on the spur any growth extending beyond it may and should be removed, so as to give the tree a neat appearance, prevent the overcrowding of foliage, and have the fruit which one is expecting as close to the main feeding supply—viz. the leading branch—as possible. No buds beyond the fruit bud are necessary to draw up the sap, as the bloom bud is provided with its own foliage. Nor is there any danger of the bloom bud breaking into growth by close pruning; the mistake is when people prune closely *before* the bloom buds are formed.

It will be understood that the foregoing remarks refer to such fruits as are grown upon the spur system, including Apples, Pears, and Plums; and, after all, these are our most important fruit trees, and those which are most usually under the care of the amateur. Peaches, Nectarines, Apricots, Morello Cherries, &c., are fruited on the shoots grown the previous year, and consequently the treatment consists in laying in fresh shoots every autumn and pruning away those that have borne fruit. Any shoots not likely to be required for nailing in should be pinched back during the early season, so as to allow those that are left to become better ripened. I have not thought it necessary to say much upon this point, as such trees are generally under the care of a professional gardener, and, of course, in the limits of a paper like this it is impossible to touch upon everything connected with this subject. I would add, in conclusion, that all stone fruits hate the knife, and the more pinching one can do to save subsequent pruning the better will the trees like it, and the less shall we be troubled by gumming and other evils.

It may be asked if a paper upon fruit-tree pruning is in any way complete without some remarks upon root pruning. Possibly not whilst our old gardens contain trees worked upon the strongest growing stocks, which the cultivator would fain keep to some restricted form of growth; possibly not whilst planters continue to crowd manure into the soil and about the roots of garden trees at the time of planting; but when people have all learned to plant trees worked upon such stocks as are suitable

for the form of tree which they desire to produce, and when they have also learned that most garden soil is amply rich enough to ensure healthy growth, and that manure (except as a mulch) is better withheld until the tree commences to bear fruit, then, I think, the days of root pruning will be numbered. Meantime I look upon it more in the light of a surgical operation to be undertaken advisedly than as one of the routine operations of the fruit garden. When it has to be undertaken care should be exercised, or the cure is apt to be as bad as the disease. In the case of young trees there is, of course, no difficulty in the matter; but with old trees, when the roots have extended to a considerable distance, there is a great danger of killing the tree. The *modus operandi* of root pruning is this: As early as possible in the season, as soon as the leaves turn yellow, and before they fall off, get out a trench round the tree to be operated upon; cut back the strong roots (with an *upward* cut of the knife), and drive a spade under the ball of soil in which the tree stands, so as to sever any taproots which may be working down into the subsoil; fill up the trench again as quickly as possible with some good loam and old manure from a spent hotbed, and the shortened roots will make plenty of young fibres before the advent of winter. The distance at which the trench should be got out will vary with the age and size of the tree. There is an old saying that the spread of the roots equals the spread of the branches; but however true this may be in the case of naturally grown and unpruned trees, it does not apply to closely pruned pyramids, the roots of which will be found to spread wider than the branches. When really old trees have to be dealt with, it is best to prune only half-way round the tree one season, and to complete the circle next year.

DISCUSSION.

Mr. ARNOLD said he had paid a deal of attention to the paper, particularly with regard to the pruning of cordons. He found from practical experience that it answered well to go round the trees, say in June. Instead of cutting away the lateral growths, he broke them and left them hanging, and he found that when they wanted to cut back finally to the third bud, it answered to break the branch at the fourth bud, as they would find that the

first bud below the break would develop into an unmistakable fruit bud.

Mr. COLVILLE BROWNE (Hextable) said he should like to corroborate the remarks of the last speaker. As one who had a good deal to do with fruit-pruning, he found the greatest benefit to be derived in private gardens—he was not quite sure whether it would answer in large establishments—by breaking off the breast shoots and the superfluous shoots. It was noticeable that below the break or below the twist they certainly did get an unmistakable fruit bud. It was very curious, and he thought it might be advantageous to bear it in mind with respect to rank growers like the Pitmaston Duchess. If they had some good system of bending or twisting with rapid growers, they would obtain very much better results in the long run and have less work for the knife. He found there was more harm done by the pruning-knife than from any other cause. Magnificent trees were sent out from the nurseries and spoilt in four or five years. He thought, however, nurserymen were greatly to blame, because they did not give all the information they ought to. They had to thank Mr. Pearson for giving them so much valuable information that day.

Mr. FLETCHER (gardener to Mr. Thompson, of Maidenhead) bore testimony to the value of the paper, and said those who had lately taken up the work of fruit culture needed such light and guidance. He was very pleased to hear Mr. Pearson speak about newly planted trees, and he thought it might be taken for granted that as a rule newly planted trees should be pruned. He knew there had been a controversy on the subject, but he was not certain which side won. They should be guided by common sense a great deal, and by circumstances. In fact, a great deal should be left to individual judgment.

Mr. RIVERS said he could fully bear out what had been said about twisting the branches. Constant pinching was not a success, and with cordon trees one pinching was enough, and it should be done in June. He was once in a garden at Rouen belonging to a professor. The trees were beautifully arranged, but there was hardly a fruit on them. He asked the gardener whether there was any fruit in the orchard, and the gardener said there was. They had not got any fruit on the cordons

because, added the gardener, they were pruned on the professor's system. With regard to root-pruning, he thought it was absolutely necessary occasionally.

A gentleman asked whether it might not be worth while to get over the difficulty by preparing the trees before transplanting, in the same way as they ought to do with Raspberry canes.

Mr. BUNYARD, referring to a suggestion which had been made that trees should be pruned by the nurserymen before they sent them out, said that it was practically impossible, for nurserymen were already very hard pressed for time just at the transplanting season, and, besides, people would not like to pay 3s. 6d. for a well-pruned tree, because they would think it too small for the money. It should also be remembered that these trees were entrusted to railway companies. They were handled by inexperienced persons, and sometimes seriously damaged. If the trees were sent out properly pruned, and were then damaged, they would never be got into proper form again.

Mr. PEARSON said he hoped he had made it quite clear that close pruning was the thing he was fighting against. Replying to questions, he said that at present we had no dwarf stock for Plums. With regard to the bending-down of branches, one method was that adopted by their old friend, Shirley Hibberd, who used to tie bricks and stones to the ends of them. As to giving information in a catalogue, his experience was that the reader would take no notice of what was said, as he would be sure to think that the nurseryman had his own axe to grind. With regard to pyramids, there are a number of them which must not be pruned at all at the end of the branches. Cherries did not like the knife. As regards standard trees—Apples, Pears, and Plums—he believed most strongly in pruning them at the time of planting.

THE PRIZE ESSAYS.

On the third day of the Conference (Saturday, September 28) the chair was taken at 3.30 P.M. by Mr. PHILIP CROWLEY, F.L.S., F.Z.S., &c., Treasurer of the Society.

In the early spring of 1895 the Council of the Society offered a prize of £10 for the best essay, not exceeding 10,000 words in length, on "The Commercial Aspects of Hardy Fruit Growing." In response to this offer a number of essays were sent in, and Mr. John Wright, Mr. A. F. Barron, and the Rev. W. Wilks were appointed to examine them and report to the Council. The examiners at once perceived that two of the essays were undoubtedly superior to the remainder, and they then gave the closest examination to these two, but with the result that, with every desire to discriminate between them, they were unable to do so on any reasonable ground, and they therefore considered it better to report the two as equal. The Council having received this report from the examiners, decided to increase the prize-money by £5, and divide it between the two successful essayists, Mr. Lewis Castle and Mr. S. T. Wright.

Before this report of equality had been made, notice had been given to the Fellows of the Society, and others, that the prize essay would be read at the meeting on the third day of the Crystal Palace Show. It was absolutely necessary, therefore, that one of the two essays should be read (or parts of it, for there was not time for the whole), and Mr. S. T. Wright's was chosen for the purpose—not in any sense as signifying that it was considered at all superior to Mr. Castle's, but simply because a choice having to be made it was thought to contain rather less statistical matter, which, whilst being most valuable to a reader, is somewhat less suitable for listeners.

It should be added that, in accordance with suggestions made to the writers, both essays have been slightly added to and amended since they were sent in, with the object of supplying certain points of information which had been either overlooked or purposely omitted in order to conform with the stipulated 10,000 words.

PRIZE ESSAY ON THE COMMERCIAL ASPECT OF
HARDY FRUIT GROWING.

By Mr. LEWIS R. CASTLE.

No subject connected with the cultivation of land in the United Kingdom is of greater importance at the present time than an inquiry into the condition of hardy fruit culture, and the probability of its extension being generally advantageous. The prevailing depression in agriculture, the decreasing returns from farm land, with the attendant deteriorating cultivation, render it imperative that attention be paid to every means which affords a reasonable prospect of improving a staple industry.

Two great sources of erroneous impressions have, however, to be carefully avoided; one is unreliable statements of results, and the other is the more pardonable enthusiasm which induces optimistic views that can seldom be fully realised. It is essential, therefore, if substantial good is to accrue, that the subject be reviewed impartially. The results of many years' experience in some of the best and worst districts of the United Kingdom are, therefore, here given with the object of enabling a fair judgment to be formed on the whole question—of the difficulties to be encountered, the expenses to be provided for, the risks to be avoided, and the returns to be expected from the capital, knowledge, and labour devoted to hardy fruit culture.

THE DEMAND FOR FRUIT.

All who are familiar with our large cities know that enormous quantities of fruit are disposed of, and that for fresh hardy fruit at a moderate price the demand is unlimited. The vast supplies of imported fruits also prove this, the annual value of the importations during the past five years (1890–1894) having exceeded £4,500,000.

The importation of Apples in the last three years, which have been fairly typical seasons, are especially interesting. In 1892 the returns show that 4,514,700 bushels of Apples were brought into Great Britain, valued at £1,353,812, an average of a fraction under 6s. per bushel. In 1893 the total fell to 3,459,984 bushels, valued at £843,532, an average of 4s. 10d.

per bushel. The comparatively small crop in England in 1894 favoured the importers, and in that year the total rose to 4,967,411 bushels, valued at £1,376,411, an average of 5s. 6d. per bushel; the increase, as compared with 1892, being over 450,000 bushels, and with 1893 of 1,500,000 bushels. Yet within the past four years the Agricultural Returns show an increased area for Great Britain placed under fruit culture of about 10,000 acres.*

The consumption of fruit in a preserved state has also been largely assisted by the low price of sugar. Many preserving firms either grow their own fruit or purchase of the producers to the extent of thousands of tons annually, at low prices certainly, but it is a never-failing source of return in seasons of large crops.

FRUIT-GROWING DISTRICTS.

In Kent the total area under orchards and small fruits exceeds 40,000 acres, well cultivated and closely cropped, but giving very diverse returns. Instances could be enumerated where considerable capital has been expended, and there has been no lack of industry, and yet the growers are on the verge of bankruptcy. These are, it is true, the exceptions, and they are not more numerous in proportion than in any other trade, and cannot reasonably be adduced as proofs that fruit-growing is not a profitable undertaking generally. They serve to show, however, that the indiscriminate advocacy of fruit culture as a panacea for all the evils of agricultural depression and bad trade is fraught with danger.

A few of the Kentish fruit-farmers are successful in no ordinary degree, and are advancing rapidly to that happy state of independence which all engaged in trade find so difficult to reach nowadays. But it is only under favourable circumstances, backed up by such capital, knowledge, experience, and business acumen as would produce marked results in any trade. The majority of fruit growers cannot be said to be gaining more than a comfortable living, and then only by assiduous attention to

* In the past ten years (1885 to 1894) the total amount of imported Apples has exceeded 33½ millions of bushels, valued at over 9½ millions sterling, or an average of about 5s. 6d. per bushel. In the same period the area under orchards in Great Britain has increased by 20,000 acres, the total for 1894 being returned at 214,187 acres. The area under small fruits is 65,487 acres.

their business. All alike complain of the low prices now obtained, and the difficulties of contending with imported produce.

That the returns are not so advantageous as they were in past years is unquestionable, but too much importance must not be attached to mere "complaints." Though prices are lower and supplies increased, the demand has also largely extended, and there are larger markets. It can be affirmed with confidence that, were it possible to compile a huge debit and credit account respecting the financial condition of all the fruit growers in Kent, not only would the balance be satisfactory, but it would show how the producing power of highly rented land can be increased under the best cultivation.

Kent is, however, a favoured county in many respects; and the same may be said, perhaps, of Hampshire, Sussex, Surrey, Middlesex, and Essex. In the western counties of Gloucester, Hereford, Worcester, Somerset, and Devon, which have from 18,000 to 27,000 acres each, mainly devoted to orchards, the results are very similar, where new plantations have been formed on the best market-garden system, with a proportion of small fruits and good methods of culture.* The Vale of Evesham is, perhaps, more strictly comparable to Kent, for a colony of fruit growers has there been formed, and the area under fruit is being extended, though the same "complaints" are heard as with many of the Kentish growers.

In Wales the total acreage is distributed over twelve counties, but the principal centres are Brecon (chiefly orchards), Denbigh, Glamorgan, Montgomery, and Radnor; but there has been a general falling off in the acreage, the difficulties and expense of carriage being largely in the way of extending fruit culture in the Principality.

Scotland also does not show a large acreage—a total of about 7,000 acres—but excellent fruit is grown in the counties of Lanark (2,400 acres), Perth (1,100 acres), Haddington (500 acres), and Edinburgh (360 acres), the Scotch Apples, Gooseberries, and Strawberries often comparing very favourably in size, quality, and price with those grown in more southern regions.

* A large proportion of the older orchards are, however, in a very unsatisfactory condition, and hundreds of acres might be cleared with advantage, replanting in accordance with modern practice.

In Ireland there are only two districts of any consequence, and these of small area, where fruit-growing has been established on a proper basis. One is in Armagh, and the other in the Fingal district near Drogheda. The last named is the more satisfactory both as regards the system of culture adopted, the condition of the plantations, and the return realised. Still there are hundreds of acres in Ireland equally well adapted for fruit culture as the Fingal district, but where the land is either occupied with poor vegetable crops or with old useless trees covered with moss and lichen.

As to special centres of cultivation for particular crops, perhaps the most remarkable is afforded by the Strawberry regions near Swanley, in Kent, and Botley, in Hampshire. At the latter place about 300 acres are almost exclusively devoted to this fruit. Enormous quantities of fruit are despatched from this part, as can be judged from the fact that in one week no less than 200 tons have been forwarded by train. From Swanley over 600 tons have been despatched in one month.

CONDITIONS ESSENTIAL TO SUCCESS.

If anyone is about to grow an acre or two of fruit as a part of mixed cultivation, and expects to have more produce than can be disposed of in his own immediate neighbourhood, yet not sufficient to pay for sending long distances, it is important that the situation chosen be within a moderate distance of one or more large towns easily reached by road or rail. For more extended cultivation proximity to a railway station is of the first importance, and preferably to one on a main line, so that populous centres may be reached either north or south.

SOIL.—The ideal soil is a fertile loam on a porous subsoil. This is not always obtainable, but that which is exceedingly light and poor, or clayey, cold, and water-logged, should be avoided. From such land satisfactory results cannot be expected; but there are many intermediate soils that under suitable cultivation can be rendered profitable.

ASPECT.—A great assistance in this direction is a favourable aspect, especially where early produce is desired. Many growers in the home counties are gaining good profits from a moderate extent of ordinary land which is either sheltered from keen

winds or has a slight inclination in a southerly direction, which secures the full benefit of the sun's rays early in the season. Elevation also demands attention, for in the low districts and near watercourses late spring frosts are always more frequent and more disastrous in their effects than on higher ground. Shelter from the south-west is valuable against equinoctial gales, which are apt to dash down much fruit in early autumn.

LAND TENURE.—Another of the general conditions necessary to success is the tenure of the land, for it is not a wise commercial proceeding for anyone to invest his capital, time, and skill in forming fruit plantations without suitable security of tenure. Happily, there is not much difficulty now in obtaining leases of twenty-one years on good land; but where there is, and the land is rented for market garden purposes, provision is now made by the Market Gardeners' Compensation Act, 1895, for ensuring a fair valuation on the termination of the tenancy. In fact, upon small holdings generally, if the tenant plants fruit trees and bushes with the permission of the landlord, he can obtain compensation upon the basis of the value of the improvements to an incoming tenant.*

LABOUR.—Where a large area is allotted to fruit alone, the facility of securing labour at the time of fruit gathering is an important consideration, and this is one reason which induces so many growers to start in the neighbourhood of market gardens, and where fruit is already extensively cultivated. The rent of the land may be double or treble that asked for equally good ground elsewhere, yet there is generally a floating population of labourers in some degree accustomed to the work, and at busy seasons men flock to these centres. This is of no slight importance, for in few cases where fruit is grown for profit can sufficient hands be permanently employed to be independent of casual labour at gathering time.

KNOWLEDGE.—Of essential personal requirements, a practical training and the knowledge derived from keen observation are indispensable for any man to ensure a prospect of success on his own account. If a capitalist is investing his money in an exten-

* It is within my knowledge that many landowners would gladly make any reasonable arrangement with tenant farmers and others, with regard to planting fruit trees where soil and situation are suitable. Over $4\frac{1}{2}$ million acres (in Great Britain alone) of cultivated land are, however, at the present time occupied by the owners.

sive undertaking of which he possesses little or no technical knowledge, he must obviously entrust it to the superintendence of a man duly qualified. Otherwise costly mistakes will be made, and the payment of even moderate interest on the outlay will be a severe drain on the resources. Without these precautions a deplorable collapse will in all probability occur, and the investor, disgusted with his failure, will treat the possibility of making fruit-growing profitable as a myth existing only in the imagination of interested persons.

Business aptitude is also a necessity. In the keen competition of the present time every detail requires the closest consideration, in order to ensure an economical system of working and a speedy realisation of the produce.

Familiarity with market methods and public requirements are also helpful, with close watching of seasons and crops, and keeping up to or in advance of the times. Above all, if a man is working on his own account, he must be industrious and be prepared to work from early morning, doing with his own hands everything he possibly can on a small holding, or on a large one closely superintending every operation.

CAPITAL.—In the consideration of the amount of capital required, many persons have been misled by unduly low estimates of the expenses, and have embarked in the business with a capital that they soon proved to be totally inadequate. If a man who is already engaged in market gardening or farming, from which he derives his living, can set apart an acre or two without interfering seriously with his returns, and can raise the trees, bushes or plants himself, utilising the labour he already employs for planting, his expenses will be small, and the actual capital required limited to the rent of the land, the labour of planting, cultivation, and the purchase of stock to start with. On the other hand, if a large extent of land is to be closely planted with fruit trees and bushes purchased of an age when they may be expected to become productive the season after planting, the capital required to provide for the first year will be from £20 to £100 per acre, and in some instances it has reached £150.

MARKET FRUITS.

The only fruits which can be satisfactorily grown in the open air in Great Britain for profit are Apples, Pears, Strawberries,

Gooseberries, Black and Red Currants, Raspberries, Plums, Cherries, and Nuts, and of these at least two—viz. Pears and Cherries—are practically restricted to so few localities, or are so uncertain, that they hardly come within the scope of general market culture. In a very few instances Peaches and Nectarines pay for the attention they receive, but this is only where private gardens have been devoted to commercial purposes, and where there are good walls and healthy, well-trained trees to start with; so that these will not demand further notice.

APPLES constitute by far the most important hardy fruit crop, but their value is not sufficiently recognised. They are in constant demand, they cover a long season, and it is only the early and soft-fruited varieties that have to be “rushed” into the market; the majority can be kept in excellent condition and at small expense for months, thus adapting the sale to the grower’s convenience or the state of the markets. Firm maincrop or late-keeping Apples are the safest to grow with a prospect of ensuring an increasing return.

Dwarf trees on the Paradise stock become productive in four or five years from the budding or grafting, and will continue bearing under good cultivation and in favourable soils for twenty or thirty years. They are easily cleansed if infected with insects, the labour of gathering is reduced to a minimum, and, what is even more important, the trees are less damaged in gathering the fruit, or by the wind. The value of dwarf Apple trees has been abundantly proved in market gardens, fruit farms, and private gardens, and if the fruit-growing of the future is to be rendered a profitable business there is no doubt that this form of tree will constitute the mainstay of the industry. Many who have planted, tried, and proved their advantages are extending their plantations, and no better indication is needed that results are satisfactory.

If it is desired to try standard Apples, the few required per acre, at 20 or 30 feet apart (108 and 48 respectively), will not add very greatly to the expense, nor will they reduce the number of dwarf trees materially; but it is only advisable in the case of land held on a long lease, or which is being cultivated by the owner. To have to wait six or seven, or in some instances even ten years, before the returns are remunerative is not what men dependent on the produce of the land for their living can afford to do.

STRAWBERRIES constitute, under some circumstances, a profitable crop, but (i) they are expensive to cultivate; (ii) in seasons of abundance the prices fall low; (iii) the fruit is liable to be damaged by excessively wet weather; (iv) a dry season will greatly reduce the supply; and (v) late frosts will occasionally spoil a whole crop.

Notwithstanding these difficulties, however, and the increasing number of home growers, Strawberries, if well managed, still give a good return for the outlay, as it is almost the only fruit that is free from the competition of foreign growers. Early fruits of large size and bright colour always realise good prices; but they must be placed on the market quickly, for the value is rapidly reduced as the supply increases, and the profits are not large on those sold at preserving prices.

The essentials of success with Strawberries may be summed up briefly as follows: Grow prolific varieties bearing large, bright, handsome fruit, firm enough to stand carriage well, and of good flavour, if that character can be combined with the previous ones, which are of more importance from a market point of view. Plant early, keep the ground clear of weeds, supply manure liberally, renew the plantations every three or four years at the most, gather frequently and early enough in the day for the best fruit to be carefully sorted and sold in punnets, exclude all damaged fruits, pack firmly, and endeavour to have the fruit on sale as speedily as possible.

GOOSEBERRIES generally bring but small prices, but they afford regular crops, the cultivation is not costly, there is a general demand, and there are two distinct seasons for sale—when the fruit is green and when it is ripe, which is a considerable advantage.

Large early green Gooseberries bring the best returns, and the grower who can secure the market with good samples a few days in advance of the general supply is sure of a satisfactory price. Exceptionally fine, well-selected, ripe fruits can also be sold profitably in punnets; but the bulk of the crop must be disposed of at "popular prices," either for eating fresh or preserving. Large quantities of green Gooseberries are now preserved whole in bottles, and this provides an outlet for good fruit when the first prices are reduced. Only large, firm, perfect fruit can, however, be used for this purpose.

BLACK AND RED CURRANTS are useful crops, especially the first named, which are extensively employed in preserving, both for jam and jelly; they are also extremely productive, yielding nearly double the weight that Red Currants do from an equal area of ground, and they continue profitable for a number of years with comparatively little attention. They are, moreover, adapted for damper and cooler situations than most other small fruits. Red Currants of the best varieties, with large berries and bunches of rich colour, command a good sale. White Currants are only in very limited demand.

RASPBERRIES should only be grown in quantity where they can be readily disposed of for preserving, or sufficiently near a large town to be able to convey the fruit to market with the least possible delay. No hardy fruit is so soon spoilt after gathering, and in a wet season they are useless for any purpose but jam-making. They require very frequent gathering, and only the firmest, finest fruits can be sold in punnets. Liberal supplies of manure and good cultivation are essential for Raspberries, which then give a large return in weight of crop, and in some seasons command highly remunerative prices; but the cost of cultivation and marketing is a large set-off against this.

PLUMS yield the heaviest crop of all hardy fruits, but they are very uncertain; in some seasons the crops are almost entirely destroyed by frosts, and in others there is such a glut of fruit that they can scarcely be sold at any price. The development of the Continental and American system of drying Plums, which has only been partially tried in this country, would assist in improving the value of these fruits. Taking an average of seasons, however, Plums are, under good management, fairly profitable, as they afford three markets: (i) as dessert fruit, (ii) for culinary purposes, and (iii) for preserving.

CHERRIES cannot be recommended for *general* culture. In a few districts, as in Kent, Hertfordshire, and the West of England, they are profitable, but the present supplies are almost entirely derived from trees planted many years ago, and new plantations are only seen, as a rule, in the districts indicated.

Of PEARS, from the Channel Islands and France handsome fruits are sent in abundance. When the soil and climate are suitable, Pear culture, especially dwarf or trained trees, is profitable; but, taking Great Britain generally, it is not a crop to be recommended for extensive cultivation.

NUTS have been profitable in some districts, and even now substantial returns are obtained from established thriving plantations. But those who plant Nuts have a long time to wait for paying crops, and their chief advantage is that they can be grown in stony soils and shady situations where few other things will succeed, but dressings of manure are required to ensure the best progress. The bushes make good sheltering screens for low-growing fruits.

PROFITABLE FRUIT PLANTATIONS.

Various methods of arranging fruit plantations are followed by growers for sale. Typical examples will be given of some which have afforded satisfaction, and they can be modified according to circumstances.

The square system is generally preferred, and is convenient for cultivation by horse labour; the alternate or triangular system is also often adopted, and admits of more trees at the same distances each way; but in either case close planting is necessary to bring the largest possible return from the ground, the bush fruits and Strawberries ensuring early saleable produce.* Standard Apples are frequently planted more closely than in Example 1, but their places are more profitably occupied by either Plums or dwarf Apples, which come into bearing earlier. Excellent results are obtained from separate plantations of each fruit, but it does not pay to leave highly rented ground unoccupied while the permanent crops are coming into bearing. Strawberries and Raspberries, when grown extensively, are best allotted separate space, and the former are usually planted more closely in the rows—say, 1 foot apart for the first year or two, and then each alternate plant is removed. When fully developed, Nuts require more space than that stated for planting, and the method might be modified by having the rows 10 or 12 feet apart, filling up with extra bush fruits.

Dwarf Pears can be substituted for some of the Apples if desired, or Damsons for Plums. The details refer only to existing plantations that are giving good results.

* In all cases of very close planting, thinning becomes essential in a few years, and allowance should be made for the extension of plantations by this means. Horse labour, obviously, can only be employed in cultivation where greater distances are allowed between the trees and rows.

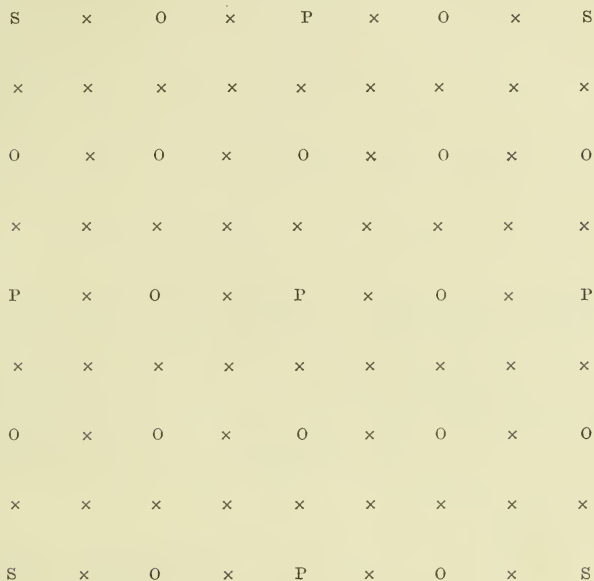
METHODS OF ARRANGEMENT.

DIAGRAMS OF PROFITABLE EXISTING PLANTATIONS. (See p. 293.)

Scale —1 inch = 10 feet.

S = Standard Apples. P = Standard Plums or Damsons. O = Dwarf Apples.
 ⊕ = Dwarf Plums or Damsons. × = Gooseberries and Currants. . = Strawberries.

No. 1 SQUARE.



No. 2 SQUARE.



No. 3 SQUARE.



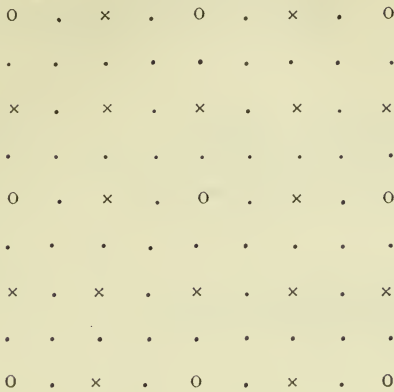
No. 3A ALTERNATE.



No. 5 SQUARE.



No. 6 SQUARE.



The above diagrams will serve to illustrate the arrangements of which details are given below, but the methods indicated in Nos. 7 to 14 are so simple that illustration is unnecessary. The exact number of trees or bushes to be planted may be varied by the boundaries of the land or the convenience of the grower. The figures given are for rectangular plots.

	Distance apart in feet.	No. per acre.
<i>Diagram 1.</i> —Standard Apples	30	48
Standard Plums and Damsons	15	145
Dwarf Apples	$7\frac{1}{2}$	581
Gooseberries, Currants	$3\frac{3}{4}$	2,323
		<hr/> 3,097 <hr/>
<i>Diagram 2.</i> —Standard Plums and Damsons	20	108
Dwarf Apples	10	327
Gooseberries and Currants	5	1,307
Strawberries	$2\frac{1}{2}$	5,227
		<hr/> 6,969 <hr/>
<i>Diagrams 3 and 3A.</i> —Dwarf Apples and Plums	9	537
Gooseberries (in Apple rows)	$4\frac{1}{2}$	537
Gooseberries and Currants (between rows)	3	1,611
Strawberries	2	4,833
		<hr/> 7,518 <hr/>

4. (No Diagram.)—Dwarf Apples and Plums	9 × 12	403
Gooseberries (in rows)	4 $\frac{1}{2}$	403
Gooseberries and Currants (between rows)	3	1,209
Strawberries (2 rows each side)	2	7,254
		<hr/> 9,269
Diagram 5.—Dwarf Apples and Plums	9 × 12	403
Gooseberries (in rows)	4 $\frac{1}{2}$	403
Gooseberries and Currants (2 rows)	3	2,418
Strawberries (1 row each side)	2	3,627
		<hr/> 6,851
Diagram 6.—Dwarf Apples	10	435
Gooseberries and Currants	5	1,307
Strawberries	2 $\frac{1}{2}$	5,227
		<hr/> 6,969
7.—Dwarf Apples	10	435
Strawberries	2	10,455
		<hr/> 10,890
8.—Dwarf Apples (small growers)	6	1,210
Strawberries	3 × 2	6,050
		<hr/> 7,260
9.—Gooseberries and Currants	6	1,210
Strawberries	2	9,680
		<hr/> 10,890
10.—Gooseberries and Currants	5	1,742
Strawberries	2 $\frac{1}{2}$	5,227
		<hr/> 6,969
11.—Nuts	6	1,210
Gooseberries and Currants	3	3,630
		<hr/> 4,840
12.—Nuts	9	537
Gooseberries and Currants	3	4,303
		<hr/> 4,840
13.—Strawberries	2 × 1	21,780
„	2 × 1 $\frac{1}{2}$	14,520
„	2 × 2	10,890
14.—Raspberries (small growers)	2 × 3	7,260
„ (large growers)	2 × 4	5,445

VARIETIES OF FRUIT.

The question of what varieties of fruits are adapted for market is a very difficult one to answer in a manner equally useful to all. In some districts certain varieties succeed admirably, while in others they are comparatively worthless. When it is possible to examine a district thoroughly, valuable information may be obtained concerning what can be relied upon. Information must also be sought in the markets to which the supplies are to be conveyed, as any variety that has a local reputation is often preferred to others. A general indication is afforded by the facts which all experienced market growers have proved, namely, that fruit for sale in large quantities must possess both size and good appearance as essentials; for high quality fruit, of less tempting appearance, there is a limited sale at good prices, but the seller must know exactly where to place it. In the case of the soft fruits firmness is important, as there is less danger of deterioration during journeys by road or rail. Avoid having too many varieties; it increases the labour of gathering and decreases the prospect of a quick sale. When a grower can send a large bulk of one sort of fruit to market of uniform quality, he is far more likely to obtain purchasers than if he has a number of small consignments of different varieties. Indeed, some salesmen will not accept small lots on any terms, unless the fruit is of unusual quality.

The following are market varieties of proved usefulness, named in the approximate order of gathering, those also suitable for standards having an asterisk placed in front of them:—

APPLES, *Dessert*.—Mr. Gladstone, Devonshire Quarrenden, *Yellow Ingestrie, Worcester Pearmain, King of the Pippins, *Cox's Orange Pippin, and Braddick's Nonpareil.

APPLES, *Culinary*.—*Keswick Codlin, *Lord Grosvenor, *Potts' Seedling, Cox's Pomona, *Ecklinville, Stirling Castle, *Warner's King, New Hawthornden, Lane's Prince Albert, Newton Wonder, Dumelow's Seedling, *Bramley's Seedling, with the newer and promising *Bismarck. The last five are excellent for storing until spring.

PEARS.—Clapp's Favourite, Williams's Bon Chrétien, Louise Bonne of Jersey, Pitnaston Duchess, Beurré Hardy, Beurré Clairgeau, Marie Louise d'Uccle, *Fertility, *Hessle, Doyenné du Comice, Catillac (for stewing), and Josephine de Malines.

PLUMS.—Rivers' Early Prolific, The Czar, Victoria, Pershore or Gisborne's, Pond's Seedling, and Monarch.

DAMSONS.—The Prune and Crittenden's, or Bradley's King.

GOOSEBERRIES.—Early Sulphur (ripe), Keepsake, Whinham's Industry, Warrington (ripe), Crown Bob, Whitesmith, and Lancashire Lad.

BLACK CURRANTS.—Baldwin's and Lee's Prolific, or Black Naples.

RED CURRANTS.—Red Dutch, Raby Castle, and White Dutch.

STRAWBERRIES.—Royal Sovereign, Vicomtesse Héricart de Thury, Sir J. Paxton, President, Eleanor, British Queen or Dr. Hogg. Newer varieties of promise are Monarch and Latest of All.

RASPBERRIES.—Superlative, Carter's Prolific, and Bauniforth's Seedling.

CHERRIES.—Early Rivers, Elton, Governor Wood, May Duke, Kent Bigarreau, Black Eagle, Kentish, and Morello.

NUTS.—Kent Cob, Cosford, and Prolific.

INTERMEDIATE CROPS.

A market gardener and hardy fruit grower must crop every foot of ground at his command. By liberal supplies of manure he can minimise the soil exhaustion, and where the cost is not prohibitive it pays better to buy manure than to leave ground vacant. For this reason such extremely close cropping should be adopted as in ordinary gardening would be condemned as crowding. Even at the distances already given for fruit trees and bushes it is usual at first to utilise the spaces between for crops that can be quickly raised and renewed. Near large markets, especially in the neighbourhood of London, large quantities of spring and early summer flowers or vegetables are raised. On the average these pay a fair percentage on the outlay, although much labour is required in cultivation and preparing for market.

Where the grower is not wholly dependent upon the fruit crops, he is in a safer position at starting, for then a bad season or two may not bring complete ruin, as is sometimes the case under the reverse circumstances. Part of the land devoted to vegetable culture on the best system of market gardening, such as men have to follow when paying £8 to £10 per acre, should

secure current expenses and a living, which in some instances is still further assisted by a few cheaply erected and economically worked glass-houses.

DISPOSAL OF PRODUCE.

There are difficulties to be overcome in fruit culture which sometimes tax a man's knowledge and patience to the utmost, but in the majority of instances they rank second to the task of finding a profitable market for the crops when grown. The difficulty is in inverse proportion to the bulk of the produce—namely, the small crops or the early supplies of larger plantations cause the greatest perplexity to the cultivator. A co-operative system of marketing has been tried and found satisfactory in a few instances where there are numerous small growers in one district. In Cambridgeshire a large fruit grower, who is also a salesman, collects the fruit of small holders and sends it to market with his own at "truck rates," charging a small commission on the sales of the produce. Under certain circumstances this plan might be extended with advantage.

When situated within a moderate distance of a good-sized provincial market, a small grower has several methods of selling the produce at his command. He may have a stall in the market, which in small towns will only provide for one day a week, or in the large cities three days a week; he may supply hotels, also local greengrocers, or he can take a shop and sell his own produce. The last requires careful consideration, for rents and rates are high in towns, and it is only advisable where there is a good opening for such a business; then it may be profitable, as some have proved.

Larger growers, whether devoted to fruit culture alone or partly to that in conjunction with market gardening, have not the same difficulties to contend with as the smaller men. Horses must be kept for the ordinary work, and these are utilised for the conveyance of the fruit either to market or station. Again, larger quantities can be forwarded at a time, thus securing lower railway rates, and trustworthy salesmen can be easily found in all the large centres, who will readily undertake to dispose of regular consignments of even quality. Occasionally a grower may act as his own salesman, but few are adapted for this branch of the business, and, when the cost of railway journeys with other

expenses is deducted, it will be usually more advantageous to pay the salesmen's commission.

GRADING AND PACKING FRUIT.

British growers are beginning to recognise the importance of paying more attention to selecting fruit, and packing it to better advantage than has been customary in the past.

The prices realised for well-sorted fruit are from 20 to 50 per cent. in advance of those for fruit of all sizes mixed, and this even when the lowest quality has been entirely rejected. For exceptionally fine dessert fruit the proportion is still higher. Many fruits can be sorted into two grades, and some into three, with a beneficial result, notwithstanding the extra labour involved.

Packing and packages are of equal importance, for the best fruit is often rendered unsaleable if damaged in transit, or its value is greatly reduced. In a general way British growers employ baskets (of various sizes) for all fruits, but though these are preferable for soft fruits, yet for Apples and Pears boxes might with advantage be much more generally used. A few have tried them with satisfaction, and that a demand is springing up for them is shown by the fact that several large firms now produce suitable boxes at a very cheap rate. From France, Italy, Holland, Belgium, the Channel Islands, Canary Islands, &c., nearly all the consignments of fruit come in light strong boxes of convenient size, with scarcely any packing beyond paper shavings or a sheet or two of thin coloured paper. American Apples come in barrels without any packing material whatsoever, and the secret is the strict exclusion of damaged or over-ripe fruit, and very firm but careful packing.

The neglect of grading is commonly attended by an equal want of care in packing; bruised and bad fruit are shot into bushels, sieves, or baskets of various kinds, and by the time they reach the retailer or the salesman the fruit has materially deteriorated in value. Careless packing lowers the average returns to growers by fully 10 per cent. Boxes for Apples and Pears can be had to hold the regulation bushel or half-bushel, or smaller sizes are made to hold an average weight of any desired amount; but when employing boxes or cases to which market men are unaccustomed, the actual net weight or the number of

the fruits enclosed should be branded on or affixed to the sides. For smaller weights of selected fruits the cost of the box is so low that it would be wise to include it in the price of the fruit, thus avoiding, to growers, salesmen, and purchasers alike, the immense amount of trouble involved in the returning of the boxes.

MARKET MEASURES AND WEIGHTS.

BUSHEL.—Apples and Pears are chiefly sold by the bushel, the former averaging 40 lbs., the latter 5 to 8 lbs. more. Plums from 56 to 70 lbs.

SIEVE.—Half- or quarter-sieves are much used for soft fruits. Half-sieves of Gooseberries, Currants, and Strawberries average 24 lbs., of Plums 28 lbs., of Apples 20 to 24 lbs. They are also used for Pears and Cherries.

POT.—A provincial measure, which varies somewhat in different districts. It is usually about 64 lbs. for Apples, and 72 lbs. for Pears, Plums, or Damsons. Half-pots are also used.

PECK.—Often used for Strawberries and other soft fruits; about 12 lbs. In the case of Gooseberries, 16 lbs.

SLEEK.—Sometimes used in Scotland, and nearly equivalent to the English bushel. Average: Pears, 50 lbs.; Plums, 60 lbs.; Apples, 40 lbs.

STRIKE.—A local measure nearly corresponding to the pot. Apples, 64 lbs.; Pears, 72 lbs.

STONE.—Soft fruits are sometimes sold by the stone of 14 lbs., and larger quantities by the hundredweight of 112 lbs.

STORING.

Where Apples and Pears constitute a large proportion of the fruit grown, provision must be made for storing, as it is not always desirable to market the whole crop directly it is gathered. All that is essential is to secure safety from frost, exclude rain, and ensure sufficient ventilation to prevent the accumulation of moisture. Sheds may be converted for the purpose, or a plain wooden structure, with boarded sides and thatched roof, can be erected at a small cost. Wherever some such means of storage has been adopted growers have proved the advantage in obtaining better all-round prices for their produce; but this is chiefly applicable to the larger market growers.

An excellent design for a fruit store will be found in the Royal Horticultural Society's *Journal*, Vol. XVIII., page 145.

DISPOSAL OF SURPLUS.

Another matter of importance is the disposal of surplus fruits in a season of glut, and here we have either to depend upon the fruit preservers, or, if we have sufficient extent of land to render it profitable to do so, the fruit can be converted into pulp or jam on the place. This necessitates the erection of buildings, the purchase of boiling apparatus, and considerable labour; but in numbers of examples a good percentage return has been obtained on the outlay by the prices secured for pulped fruit, which in some cases would hardly have paid for the gathering. Certainly wherever a large extent of land is devoted to fruit-growing something of this kind must be done, or contracts entered into with established firms to supply them in quantity, or much loss will occasionally be experienced. For colonies of fruit-growers a co-operative arrangement for preserving would be advantageous.

EXPENSES OF FRUIT CULTURE.

Having indicated the general aspect of fruit culture as a commercial undertaking, we pass to the actual cash expenditure involved. The gross and net profit returns will afterwards be reviewed, and the reader will then be in a position to form his own judgment as to the present position of growers, and the prospects of those entering on the business. Statements of facts, substantiated by personal experience, will be given as concisely as possible.

RENT.—In rural districts ordinary farm land suitable for fruit culture can now be had at 20s. to 40s. an acre, and in some cases generous landlords are returning to their tenants 25 to 50 per cent. of this amount. For market garden land, already in cultivation, the rental value varies from £4 to £10 an acre, and if any portion is planted with established fruit trees it ranges from the last-named amount up to as much as £20 an acre near large cities.

RATES AND TAXES.—These differ according to the district, but generally average from 10 to 20 per cent. on the rateable value, which itself varies from two-thirds of the rent to the full rent, but in some very exceptional cases even exceeding it.

FENCES AND IMPLEMENTS.—As a rule the land taken up for market gardens or fruit growing is already furnished with hedges or fences, but if these have to be provided the expense is a serious item. Near public roads a fence will be needed as protection while a hedge is growing. An open wooden fence, three or four feet high, with three or four rails, tarred, will, with labour and material, cost about 2s. 6*d.* a yard. A quickset hedge and ditch will cost about 1s. a yard.

Implements for cultivating the soil will cost from £5 to £20, according to the extent of the land and the number of regular hands employed.

DRAINING.—If permanent plantations are being formed, this preliminary must have attention, though in the case of land that has been already efficiently drained for agricultural purposes the expense would be saved.

The cost of cutting drains and laying pipes varies somewhat in different districts and according to the nature of the soil, but the rate per acre, for most districts, will average as follows:—

Depth	Distance apart	Cost per acre
2½ feet	15 feet	£2. 10s. to £3
2½ "	20 "	£2 to £2. 10s.
2½ "	25 "	£1. 10s. to £2
2½ "	30 "	£1. 5s. to £1. 10s.
3 "	15 "	£3. 10s. to £4
3 "	20 "	£2. 10s. to £3
3 "	25 "	£2 to £2. 10s.
3 "	30 "	£1. 15s. to £2

The cost per acre for pipe tiles 2 inches by 12 inches, at 20s. a thousand, would be, at 15 feet apart, £2. 18s.; at 20 feet, £2. 4s.; at 25 feet, £1. 16s.; at 30 feet, £1. 10s.

ROADS.—It may be necessary to construct roads, but as this is a great expense, giving no return except in economising labour, they should be as few as possible, consistent with carrying out the work. Roads 9 feet wide would suffice for ordinary purposes, and if they have to be made up with material carted a distance the expense will be enormous, and in some cases quite prohibitive. Scarcely any rough material can be had for less than 3s. a load, including cartage, and this only when it is near

at hand. It may often be impossible to find anything suitable under 5s. or 6s. a load. At these rates the cost would be from 6d. to 1s. per square yard. Where clay is abundant, and especially in districts where coal is cheap, ballast burnt on the ground is the cheapest road material. It will cost, including the fuel (slack coal), digging the clay, and burning, from 1s. to 2s. 6d. per cubic yard of burnt ballast, or 3d. to 6d. per square yard of road; the labour of spreading the material being additional.

PREPARATION OF THE LAND.—The cheapest method of preparing land for fruit planting is ploughing, but, except in the case of well-cultivated and properly drained land having a porous subsoil, this is not the most satisfactory. Ordinary ploughing, where others have to be employed to do the work, will cost from 10s. to 15s. an acre. Where the land is ploughed it must also be harrowed before planting, preferably in two different directions, which will cost 3s. or 4s. an acre.

For ground previously well cultivated digging one spit deep may suffice, and if manure is to be applied at the same time either this or trenching is a necessity. In moderately free soil digging costs from 3d. to 4d. a square rod, or £2 to £2. 14s. an acre, but on the heavier soils better suited for fruit it will average 6d. per rod or £4 an acre. Forking may be reckoned at the same cost, always remembering that if the land be foul with twitch or other root-spreading weeds it will be nearly double.

In preparing old pasture land for fruit trees, the turf is best removed if it is infested with wireworm and other pests. Near towns it can be sometimes sold if cut early in the year, and will bring 3s. to 4s. per 100 turves 3 feet long by 1 foot wide. If cut by the purchaser the price is usually 2s. 6d. per 100. Otherwise it is better burnt on the land, and will cost about 12s. to 15s. an acre. With younger pasture in a clean state, the turf may be broken up and turned in as the digging or trenching proceeds, but the work will cost 2s. to 3s. a rod.

TRENCHING.—The cost of trenching, or double digging, *i.e.* digging two spits deep—the most thorough mode of preparing land for fruit trees—varies according to the method pursued and the character of the soil. The plan usually adopted with land of which the subsoil is either very heavy, or for some other reason unsuitable to be brought to the surface, is to remove the

surface soil one spit deep and two spits wide to the end of the plot to be trenched, then turning over the next spit with a fork or spade, completely breaking it up, but keeping it in the same relative position, the next top spit being turned on to that. This may be performed by a man and a youth at 6*d.* a square rod for the former and 3*d.* the latter, or it may require two, and even three, men at 6*d.* each a square rod, the total cost being thus 1*s.* 6*d.* a rod. In very tough, heavy land, men will sometimes work in gangs of three or six, the payment being by measurement as much as 1*s.* 8*d.* a rod; but, except in regard to hastening the work, day labour is quite as economical as the latter rate, if good workmen are engaged and well superintended.

Payment by the day for men in rural districts is from 2*s.* to 2*s.* 6*d.*, but near towns and for more skilled labour it is from 3*s.* to 3*s.* 6*d.* a day, with 4*s.* for a few experienced useful men for special work or as foremen. Women are paid from 1*s.* 6*d.* to 2*s.* a day, and boys or youths from 6*d.* to 1*s.* 9*d.* a day, in proportion to their age, strength, and usefulness. For any large market garden and fruit farm combined, a regular staff of men and boys is essential, so that they may become accustomed to the routine work.

MANURE.—When manure has to be brought a distance it is a considerable addition to the expenses. Where it is not to be had in the immediate neighbourhood, and the produce has to be taken by carts into large towns, the cheapest plan is to arrange for the carts, having discharged their load of produce, to be at once filled with manure for the return journey home. The same thing may be done where produce is sent off by rail, if the trucks of manure have been previously ordered to be at the station from which the fruit is to be despatched. In the former case it may not cost more than 2*s.* to 3*s.* a ton, or even less under special arrangements for taking a quantity. In most populous cities particular firms undertake the collecting and redistribution of stable manure, and then it costs from 5*s.* to 8*s.* a ton in trucks from yard to station, 20 to 60 miles by train, the only further cost to be reckoned being the carting on to the land, which will be determined by the distance from the station and the utilisation or not of the same carts, &c., which have taken the produce to the station. The cost per day for man, horse, and cart hired may be 6*s.* or 7*s.*

The application and spreading of manure on clear ground will cost 1s. 6d. to 2s. 6d. an acre, in proportion to the heaviness of the dressing; but if it has to be spread between trees and bushes already on the ground the cost may be as much as 5s. an acre, digging or forking into the soil being reckoned at about the same rates as already stated.

Artificial or chemical manures afford a ready means of supplying the requirements of fruit trees and bushes where the cost of farmyard manure is heavy and the expenses of cartage high. Several specially prepared compounds can now be had at moderate rates; or with a little study a grower can secure a mixture suited to his soil or the needs of the plantation. Superphosphate of lime, potassium salts, nitrate of soda, and sulphate of ammonia are the principal substances employed, in dressings of 600 to 700 lbs. per acre. A mixture that has been tried with good results consists of 3 cwt. superphosphate, 2 cwt. muriate of potash (potassic chloride), and 1 cwt. sulphate of ammonia, nitrate of soda being substituted for the sulphate of ammonia on chalk soils.

The superphosphate with potassium salts can also be employed as a regular dressing in February, supplying nitrate of soda at the rate of 1 cwt. per acre as an additional help after the crops are set in early summer. The prices of chemical manures vary according to the supplies and the demand, but they range from about £5 to £15 per ton; average cost per acre for sustaining fertility, £2. 10s. to £3.*

COST OF TREES AND BUSHES.—The purchaser of fruit trees will be wise to visit the nursery of some well-known firm and select sturdy, well-developed specimens for himself. It may cost him a little more, but the extra expenditure is a judicious outlay. Standard Apples on the Crab, three years old, cost from £5 to £10 per 100, more being charged for a few special varieties. Dwarf Apples on the Paradise are from £4 to £7. 10s. per 100; dwarf Pears on the Quince or Pear stock from £5 to £7. 10s. per 100; Plums and Damsons, £4 to £5 per 100. Gooseberries and Currants, two or three year old plants, 15s. to 25s. per 100; year-

* Current prices per ton are as follows: Superphosphate, £5; sulphate of ammonia, £14; muriate of potash, £10; nitrate of soda, £13; sulphate of potash, £8; sulphate of magnesia, £8. Kainit, containing 25 per cent. of sulphate of potash, is quoted at £4; bone-meal, £6. 10s.; and basic phosphate, £3.

lings or rooted cuttings, 5s. to 10s. per 100. Raspberries vary from 15s. to 20s. per 100, or plants of the commoner varieties from 20s. to 50s. per 1,000. Strawberries, strong plants in pots, from 15s. to 40s. per 100, novelties reaching 60s.; but for established runners the price may be 5s. to 10s. per 100. Filberts can be purchased at £2 per 100.

PLANTING.—On moderately retentive land that has not been specially dug or trenched, preparing stations for well-developed Apples, Pears, or Plums, allowing 2 feet square for each, and breaking the base of the station with a fork, costs 2s. per 100, or by day work it will cost rather more. For bush fruits, stations 1 foot square, under the same conditions, will cost 1s. per 100. On land properly prepared a short time before planting, the cost will be nearly 50 per cent. less. A man and boy, or two men, should follow closely to plant both trees and bushes. Only really reliable men should be entrusted with this work, and they should be paid by the day. An active man, with assistance, can plant 100 to 150 dwarf Apples and Pears in a day, or double the number of bush fruits and Strawberries.

The expense of staking need only be incurred with standard trees, and it may cost from 2*d.* to 6*d.* a tree, including preparing the stakes, tarring, and tying, but will vary according to the material employed.

ROUTINE COSTS.

HOEING is one of the principal operations connected with fruit culture, and in ordinary soil this costs 4s. to 5s. an acre, the total expense per annum depending upon the condition of the land. About six times a year may be taken as the average for the first season or two; but if the land be foul with twitch, bell-bine, or thistles, forking will also be needed, which is best done by ordinary day labour.

PRUNING.—This is often paid for per hundred or thousand bushes or trees, but preferably it should be done by a trained regular daily or weekly hand. The cost for bush fruits will be 20s. to 30s. an acre, Black Currants being the cheapest and Gooseberries the most expensive. For Apples, Pears, or Plums the cost will depend upon their size and condition.

SPRAYING.—As the most effectual means of contending with the numerous insect pests that affect fruit trees and bushes,

spraying is also an expense to be reckoned upon. For dwarf trees and young standards the various knapsack distributors are the most economical; they cost from 30s. to 35s. each, and can be readily used by one man. By employing some of the prepared insecticides, one man can spray two or three acres a day thoroughly, at a total cost of a few shillings an acre. For large standard trees more powerful and expensive machinery is necessary.

GATHERING FRUIT.—It is better to employ regular hands at this work where possible. On very large fruit farms, of course, it cannot be done, and the custom is to pay by measure or weight at the following average rates, bountiful crops being cheaper to gather and poor crops dearer: Apples, Pears, Plums, Damsons, and Cherries by the bushel, at 3*d.* to 1*s.*, or from 15*s.* to 50*s.* a ton, the smaller stone fruits being the most expensive and Apples the cheapest. Bush fruits, Gooseberries and Currants, gathered by the peck of 12 to 14 lbs., will average 3*d.* to 6*d.*, or £2 to £4. 10*s.* a ton, while Strawberries and Raspberries are 12-lb. pecks, and cost 4*d.* to 6*d.*, or £3. 10*s.* to £5 a ton. Gathering fine fruit into punnets costs more.

STORING.—When it is required to store Apples or Pears, and there is no existing building that can be converted for the purpose, an erection of some kind becomes necessary; but this should not be a heavy expense, as from £20 to £50 would suffice for a building that would hold the crops of a large extent of ground. In the Royal Horticultural Society's *Journal* for January 1895 a description is given of a cheap and useful building 30 feet long and 12 feet wide, which cost £30.

PACKAGES.—Baskets vary slightly in cost from different makers, but the following are the average prices: Ordinary shallow punnets, to hold 1 or 2 lbs. of Strawberries or Raspberries, are 5*s.* 9*d.* to 7*s.* 6*d.* a gross. Chip baskets (now much used) can be had in sizes from $\frac{1}{2}$ lb. to 5 lbs. (the 1 or 2 lb. sizes are the most convenient), either with or without handles, square or octagonal in form, at from 4*s.* to 9*s.* a gross. Wooden boxes, to hold a bushel of Apples, Pears, or Plums, cost 7*s.* 6*d.* a dozen; half-bushel sizes cost 4*s.* 9*d.* a dozen. Bushel and half-bushel sieves and baskets vary greatly in cost.

Packing material used for the finer samples of firm fruits is chiefly cotton wadding, which costs 12*s.* per 12 dozen yards;

“wood wool,” which has been improved in quality lately, and is now sold quite free from odour, at 20s. to 30s. a cwt., and packing paper at 5s. a ream.

Where bushel or half-bushel baskets and large boxes are employed, securing return of the empties becomes an important matter, a charge being made upon them. Some salesmen supply their own baskets, but they then naturally charge a higher rate of commission.

RAILWAY RATES.—These differ considerably on different lines, and for the various fruits and the distances conveyed, and there are still some gross inconsistencies demanding correction; but in a general way for large quantities, and particularly where several companies run into the same town, the rates are not outrageously unfair. The sender of small consignments is, however, placed at a very great disadvantage. Examples will best illustrate the expenses under this heading. Taking four large cities in England, all over 100,000 population, the distances in miles from a certain station in the country where fruit is grown are in round numbers 50, 70, 150, and 180 miles respectively, and the charges by rail, including delivery into the markets, are as follows, the rate per ton in every case being for consignments over 3 cwt. :—

Fifty Miles. — Strawberries and Raspberries, per ton, 20s. 5d.; $\frac{1}{2}$ cwt., 1s.; 1 cwt., 1s. 6d.; 2 cwt., 2s. 7d.; 3 cwt., 3s. 7d. Gooseberries, Plums, Cherries, and Currants, 17s. 8d. per ton, $\frac{1}{2}$ cwt., 10d.; 1 cwt., 1s. 3d.; 2 cwt., 2s. 3d.; 3 cwt., 3s. 1d. Apples, 14s. 11d. per ton; $\frac{1}{2}$ cwt., 9d.; 1 cwt., 1s. 1d.; 2 cwt., 1s. 10d.; 3 cwt., 2s. 8d.

Seventy Miles. — Strawberries and Raspberries, 22s. 11d. per ton. Gooseberries, Plums, Cherries, and Currants, 19s. 10d. per ton. Apples, 16s. 4d. per ton; $\frac{1}{2}$ cwt., 10d.; 1 cwt., 1s. 2d.; 2 cwt., 2s.; 3 cwt., 2s. 11d.

One Hundred and Fifty Miles.—Strawberries and Raspberries, 34s. 8d. per ton. Gooseberries, Plums, Cherries, and Currants, 30s. per ton. Apples, 23s. 6d. per ton; $\frac{1}{2}$ cwt., 1s. 1d.; 1 cwt., 1s. 8d.; 2 cwt., 2s. 11d.; 3 cwt., 4s. 1d.

One Hundred and Eighty Miles.—Strawberries and Raspberries, 36s. 8d. per ton. Gooseberries, Plums, Cherries, and Currants, 31s. 10d. per ton. Apples, 25s. 2d. per ton; $\frac{1}{2}$ cwt., 1s. 10d.; 2 cwt., 3s. 1d.; 3 cwt., 4s. 4d.

OTHER CHARGES.—Salesmen's commission varies from $7\frac{1}{2}$ to 10 per cent. on the price realised, with weekly settlements, or otherwise by arrangement.

The charges for stalls or stands in markets differ greatly, as also do the tolls charged on produce taken into them for sale.

PRESERVING FRUIT.

The erection of suitable buildings, purchasing necessary machinery, and providing labour for preserving fruit on a large scale, requires a considerable expenditure of capital, and is an investment needing the most careful consideration. In a smaller way £50 to £100 will provide the needful boilers, &c., for the utilisation of the surplus fruit from a large area to be pulped or converted into jam. One ton of fruit and 15 cwt. of sugar will produce $1\frac{1}{4}$ tons of jam, saleable in jars at £30 to £50 a ton, according to kind and quality. Some mixed jams are sold as low as £20 a ton. The expenses to be counted against this are interest on capital sunk in buildings and machinery, an allowance for depreciation, cost of the fruit, sugar, fuel, labour, and jars, though the latter, being usually charged separate and returnable, may be included in capital expenditure. One of the largest and best factories has from ten to twenty steam pans in use, each of which can turn out 1 cwt. of jam in a few minutes, so that 40 or 50 tons are prepared each day. In this case only white Dutch crushed sugar is used.

DRYING OR EVAPORATING FRUIT.

This, though extensively carried out in America for Apples, is but little adopted with us, and, unless it can be applied profitably to such fruits as Plums, it is not likely to pay. Where green Apples are valued at 6*d.* to 1*s.* a bushel it is a different matter; but in Britain the market must be very low if they will not sell for 2*s.* 6*d.* or 3*s.* a bushel, and this is as much as the dried fruit will bring. The evaporating apparatus is sold in various forms and sizes, at prices ranging from £5. 5*s.* to £50, which will dry respectively from 5 to 50 bushels of Apples a day. A bushel of green Apples will yield, after paring, coring, and slicing, $6\frac{1}{2}$ lbs. of dried fruit, and costs about 6*d.* to dry, or 1 lb. of coal is expected to produce 1 lb. of dried fruit. The labour must be reckoned in addition. The subject of fruit-drying was

very well treated of in the Royal Horticultural Society's *Journal*, Vol. XII., p. 532.

AVERAGE RETURNS.

The expenses of hardy fruit culture having been reviewed somewhat fully, because they are too often underrated in published estimates, the average profits are compressed into a small space, and low averages taken in every instance. They are also put in a form that admits of their being compared with each individual's experience, with the returns obtained in favourable seasons and in the reverse, and with those of small or large growers. They can be also applied to mixed plantations.

Black Currants at 4 feet apart, or 2,722 bushes per acre, will yield for the first three years from planting an average of 1 lb. of fruit per bush, or about $1\frac{1}{4}$ tons per acre. At 2*d.* a lb., or £18 a ton, this yields £22 to the acre. After three years the produce may be taken at 2 to 4 lbs. a plant, or $2\frac{1}{2}$ to 5 tons per acre, equalling £45 and £90 respectively. It is a valuable and regular crop, but in some seasons the bulk may have to be sold as low as 1*d.* per lb. The returns at other distances can be readily estimated from the above statement.

Red Currants at 3 feet apart, or 4,840 to the acre, will yield for the first three years an average of 1 lb. of fruit each, representing 2 tons per acre. At 1*d.* a lb., or £9 a ton, this gives a return of £18 an acre. After three years the yield will be at the average rate of 2 lbs. a plant, or about 4 tons to the acre, representing £36 in cash return. Large crops will be produced occasionally, and better prices obtained.

Gooseberries at 3 feet apart, or 4,840 to the acre, will yield for the first three years an average of 1 quart, or nearly $1\frac{1}{2}$ lb. per bush, making 3 tons to an acre, and this at 1*d.* per lb., or £9 per ton, produces £27 an acre. After three years the returns may be more than doubled. Established, well-grown bushes yield 3 to 4 quarts each, or even more than this.

Raspberries planted 2 feet apart, in rows 4 feet asunder, or about 5,450 to the acre, will, when established, yield 1 lb. per stool, equal to about $2\frac{1}{2}$ tons an acre. At the low average of 2*d.* a lb. for 2 tons, and 4*d.* a lb. for the $\frac{1}{2}$ ton of selected fruits, this will bring £54 an acre. In the first season after planting no appreciable returns will be obtained, and in the second season

no more than half a crop can be expected, which at the same price as those already given, namely, 1 ton at 2*d.* a lb., and $\frac{1}{4}$ ton at 4*d.* a lb., will yield a return of £27 per acre. In bad seasons the crops will be considerably less, or the returns may be reduced by unfavourable weather when the fruit is ripe. On the other hand, for fine selected early fruits 6*d.* a lb. can be sometimes obtained for limited quantities.

Strawberries planted 2 feet apart will take nearly 11,000 to the acre, and at an average of $\frac{1}{2}$ lb. per plant for four years the total annual return will be 2 $\frac{1}{4}$ tons. About 10 per cent., or, say, $\frac{1}{4}$ ton, of early selected fruits may realise 4*d.* a lb., or at the rate of £36 the ton; the remaining 2 tons being sold at 2*d.*, or £18 the ton, brings the total up to £45. If the general crop is early and the fruit fine much higher prices can be ensured, and established thriving plants will yield 1 lb. to 2 lbs. of fruit each.

Standard Plums and Damsons planted 15 feet apart, or 193 to the acre, will give an average for the first five years after planting of 10 lbs. per tree, or 1,930 lbs. to the acre; and at 1*d.* to 2*d.* per lb. this brings in £8 to £16 the acre, the price being £9 to £18 the ton. Fine selected dessert fruits will fetch twice the last-named price, and the produce of established trees in full bearing will be three or four times the average stated above, or about £64 the acre. All the preceding crops are reckoned as occupying the whole ground, but Plums only represent a portion of the total produce per acre. Dwarf Plums do not yield such large crops individually, but can be planted more closely, so that the returns do not differ materially.

Established standard Cherry trees yield 4 to 5 tons of fruit per acre, which at 1*d.* the lb. (£9 per ton) will bring £36 to £45 per acre; but when the crops are sold by auction on the trees, as is customary in Kentish orchards, they bring £30 to £40 the acre.

Dwarf Apples of the most prolific varieties on the Paradise stock, 10 feet apart, or 435 to an acre, will yield, taking an average of ten years, $\frac{1}{4}$ to $\frac{1}{2}$ a bushel per tree per annum, or 100 to 200 bushels per acre, equal to 3 $\frac{1}{2}$ tons of fruit, the bushel averaging 40 lbs. This at 1 $\frac{1}{2}$ *d.* per lb. (5*s.* a bushel, £13. 10*s.* a ton) for good fruits yields £50 an acre. Mixed fruits of poor quality will not pay an average of 5*s.* per bushel, but, on the

other hand, the return can be increased by selecting the finer dessert fruits to be sold by the dozen, or planting more closely. Established standard Apple trees produce 5 tons or more to the acre, but generally yield a lower average price, £9 to £12 per ton.

Pears at the same distance as the Apples yield less return, unless where exceptionally fine fruits are grown to be sold by number in boxes, when a good return may be realised. Healthy established orchard trees will also yield large crops occasionally, but can only be sold at low prices, generally averaging £9 per ton, or £18 to the acre.

Nuts are very uncertain; fabulous returns are stated to be obtained, but they are contrary to my experience. A crop of 28 lbs. is a good one for a small tree, but prices are extremely low as a rule.

RESULTS AND PROSPECTS.

The average yield of hardy, well-cultivated, and carefully selected fruit per acre will be worth about £30 to £40, which is increased in well-managed mixed plantations containing Apples and Plums. The average annual expenses are £10 to £20 an acre, exclusive of the capital sunk in the first preparation of the land and in planting, which I have already said may range from £50 to £100 per acre. Thus, if a fruit grower can clear expenses (including his own time and labour), and secure an average annual balance of £10 to £20 an acre, he may be satisfied with his work. In good seasons he will have more, and wide experience points to the conclusion that, under the conditions enumerated as essential to success, it is at least possible for a man to earn a comfortable living at fruit-growing and pay a fair interest on his own or other people's capital. The enterprise must, however, be started and carried out strictly on a commercial basis, by men who have acquired a thorough knowledge of the subject, who have their hearts in the business, and who are prepared to work energetically and wait patiently for the results of their labour.

PRIZE ESSAY ON THE COMMERCIAL ASPECT OF HARDY FRUIT GROWING.

By Mr. S. T. WRIGHT, F.R.H.S.

IN consequence of the agricultural depression, and the difficulty of making the cultivation of land profitable, landowners and others have been at a loss to know what things they could grow in the future with a reasonable prospect of a fairly remunerative return on their investment. When the venture is spread over a series of years, conducted on sound principles, and with energy, there is probably no crop that will yield such an interest on the outlay as hardy fruits. Pessimists and others who take a gloomy view of the future prospects of fruit culture in the United Kingdom quote our uncertain climate, foreign competition, preferential rates, and many other objections against its success, but we question if they have any practical knowledge on which they base their statements. We certainly have a somewhat fickle climate, but not much more so than in other parts of the world, for we frequently read of frost or a wave of cold doing immense damage to the fruit crops both on the Continent and in America, and even those who have most to say against our climate must acknowledge that fruit growers in this country never experience such a disastrous result as that felt in Florida this very year (1895), when the Orange groves suffered so severely from frost that it will take years, it is said, for the trees to fully recover their former fruitful condition; so that, even if we do suffer from changeable weather, our competitors also labour to some extent under similar disadvantages.

Foreign competition is, undoubtedly, a serious matter, and must be deliberately looked in the face by present and future fruit growers. We must all collectively and individually make up our minds that unless we improve on our present system of culture generally, also in our methods (or want of method) in packing and marketing fruit, foreign competition will become even more keen in the future than it is now. As the thousands of trees planted by our rivals during the last few years come into full bearing, their shipments will greatly increase to the British markets, which they admit are the best in the world. It seems

strange that a practical and energetic nation like the British should have permitted foreigners to step in and to a great extent monopolise their own markets with produce that can be grown better in every respect (except, perhaps, as regards colour) at home ; grown also at a good profit when cultivated on a proper system. I am confident that there is really little to fear from the foreigner in hardy fruit growing ; every year fruit grown by myself realises a higher price in the market than the choicest samples received from abroad, and the demand is so great that I have been unable to meet it. When we can do this without having any particular advantages as to soil, situation, or markets which are not possessed by hundreds of people in various parts of the country, there is no reason why they also should not obtain similar results, and make hardy fruit culture the success it really ought to be in the future. At the same time, it should be fully understood that the cultivation must be thorough, not simply sticking a tree in the soil and expecting it to grow and produce full crops every year without any further attention, but giving the very best treatment possible in pruning, manuring, fighting insect foes, and also to all other details that may be necessary to the welfare of the trees.

FRUIT GROWERS OF THE FUTURE.

There have been many so-called friends of the farmers who have advised them as a class to go in for fruit culture instead of corn growing, dairy farming, &c. ; but it must be patent to all who are acquainted with farmers that as a body they are at present utterly unfit for the work, as they have neither the requisite technical knowledge nor the training necessary to make the undertaking succeed. And if they started fruit growing, the chances are that they would make a miserable failure of it, and lose more money by it than by following that occupation to which they have been trained from their youth.

The fruit grower of the future must be a man who has had a proper education in the work, a man of untiring energy and perseverance, with good business habits, and sufficient capital both to purchase his stock and also to wait until the trees arrive at a bearing state. Or, failing such men, capitalists could step in, buying the land and the stock, and employing a competent man to manage the business at a fixed annual salary, plus

such a commission on sales or profits as might be arranged to the mutual satisfaction of employer and employé. With good land in a suitable fruit-growing district success is practically assured on the above lines, but capitalists are urged to be careful to only employ a manager who can bring positive proof of his training and abilities as a fruit grower. Otherwise, what might be a most remunerative investment would in all probability prove the reverse.

As a case in point, it may be of interest to state that the writer knew a gentleman who bought land, and went into hardy fruit culture on a rather large scale, with the idea that in a few years he would obtain a fair rate of interest on his outlay; and his expectations would, without any doubt, have been realised if he had engaged a good man as manager, but, unfortunately, he entered into an agreement with one who was absolutely worthless for such a position, and the gentleman informed the writer that he lost several thousand pounds by his venture. This instance will prove the importance of securing a thoroughly capable man, who is able to make the business a commercial success instead of a loss.

Another class of men who will probably come to the front by degrees are the men who are employed as labourers in hardy fruit plantations, some of whom take a keen interest in the work, and follow out in their own allotments or gardens what is done where they are employed, budding or grafting their own trees, and gradually filling their gardens with fruit trees, finding out that more money can be made in this way than by any other crop they can grow. Two labourers who work under the writer have made very handsome profits from fruit growing, and their gardens are now so full of fruit trees that they have taken allotments for Potatoes and other vegetables.

The question is frequently asked why skilled professional gardeners do not take up fruit growing, as it pays so well, instead of being content to remain as gardeners. The answer is that comparatively few gardeners have the needful capital to enable them to do so, the great majority of even head gardeners having to be extremely careful to make both ends meet, so that saving money is out of the question. Some few are more fortunate, or perhaps have money left them; most of these do set up on their own account, usually making a very good living thereby. Some

such are well known to the writer, and they have informed him how well their Apples, Plums, bush fruit, and Strawberries have paid, proving that there is always a keen demand for really well-grown fruit.

It would be difficult to over-estimate the value of growing only really high-class fruit, and it is to be hoped that in the future all fruit growers will recognise how vital this is to their interests. There need be no fear that our markets will ever be glutted with such produce. There is ample room for great improvement, not only in the quality of the fruit itself, but also in the grading, packing, and mode of consigning it to market. It is unnecessary to go into details here as to imports and their influence; it will suffice to say that the demand for first-class fruit is increasing so rapidly every year that there is an excellent opportunity for growers to succeed admirably in the future if they will but work on the proper lines.

LAND SUITABLE FOR FRUIT GROWING.

The importance of selecting land adapted to fruit culture cannot be over-estimated, for on that depends in a great measure the success of the venture. Like all other commercial businesses, the surroundings, site, distance from stations and markets, and all other items that have a bearing on the results, should have the most careful consideration, as it would be sheer folly to make an outlay without some reasonable prospect of adequate returns.

If possible, land should be selected with a slope to the south or south-west, naturally sheltered either by plantations at a little distance, or by the formation of the ground, from cutting east winds or western gales. Abundance of good fruit can be, and is, grown on land with very different aspects, but there is always a risk of damage being done; for example, trees on an eastern aspect suffer more from frost than those facing otherwise, by reason of the sun's rays falling directly on the buds or blooms in the early morning whilst the frost is still upon them, whereas on other aspects most of the frost has left the trees before the sun-rays reach them, and thus they escape the injury inflicted on the others.

Protection from westerly gales is another very desirable feature. Everyone engaged in hardy fruit culture has had ex-

perience of the serious damage done by west winds when the fruit has attained a good size, unless there is some protection. A violent gale will often strip the trees of all their best fruit, and cause what promised to be a most profitable crop to become, comparatively speaking, a failure. This is particularly the case if the fruit trees are grown in standard form. If, then, there is no natural protection, a belt of Spruce or Scotch Firs should be planted at least 100 yards away from the plantation, putting in the fruit trees and those for shelter at the same time, so that by the time the former required protection the latter would be large enough to supply it. Provided the soil is good and fertile, it does not, in my opinion, signify so materially as some people think what the subsoil is, very fine fruit being produced on soil resting on limestone, various forms of sandstone, gravel, or clay. On all these subsoils I have been able to produce good crops of fruit every year, except in seasons when the climatic conditions have been very unfavourable.

Land that is liable to be flooded, and very "thin" land with a chalky subsoil, must be planted with caution; in fact there is a great risk in attempting to grow fruit in such situations. I have found one of the best tests of the suitability of land for fruit to be to take note of the Elm trees; if these are very large, healthy, and well grown, fruit trees will succeed; but if the Elms are small and badly developed, it is courting failure to plant fruit trees, though the smaller kinds of fruit will often grow upon such lands. Good drainage, either natural or artificial, is most essential, and without it success is very doubtful.

The distance of the fruit plantation from a railway station, and the cost of carting, ought to be taken into consideration, as any item that will cause unavoidable expenditure should be carefully thought over before commencing to plant. It is a great advantage to have the choice of more than one station on different lines, for when there are two or more companies running in opposition to each other, the producer not only reaps a benefit in the lower freight charges, but also in the promptness with which his fruit is put upon the market. My experience is that when the grower is practically confined to one line or company, he has frequent cause to complain of delays in delivery, in addition to heavy charges for conveyance. It is most important, therefore, that the site fixed upon for the fruit

plantation should be well placed as regards railway accommodation.

The distance from markets is not so important as many people imagine. Intending fruit growers are apt, I think, to attach too much importance to being within a moderate distance of a good outlet, and look upon the land and its suitability as a secondary matter instead of making that the first consideration. It is utterly useless to have land close to the best market in the kingdom if it will not grow produce that will pay for cultivation. Our own nearest good market is 140 miles away, and yet we find that it pays handsomely to send it that distance, as we can realise such prices as are never known in places nearer to us. The extra cost in carriage is not very much, and the receipts obtained for this slightly increased outlay are returned over and over again.

APPLES.

The Apple may be termed the king of British fruits, and looking at the enormous importations annually, which certainly show no sign of decreasing, there is no fruit holding out a better prospect of profitable return in the future. The soil and climate of the United Kingdom are so admirably suited to Apple-growing, that if the cultural requirements are but given proper attention to we can more than hold our own against the world. But to make the cultivation of Apples the commercial success it deserves to be, we must radically alter our present system, or rather want of system, by growing the trees better and exercising more honesty and care in sorting and packing the fruit.

It may be asked, What is the most paying system to follow? I do not hesitate to say that the most profitable system is to grow a limited number of varieties as dwarf trees on a soil which has been proved capable of growing full crops of large Apples. As the many and great advantages of dwarf trees become more fully recognised, they are certain to be much more extensively planted in the future, to the gain of the planter and the country. First and most important is the quick return given by such trees as compared with standards. The latter must do exceptionally well to produce anything like a paying crop under twelve or fourteen years from the time of planting, whilst dwarfs will begin to pay the second year from planting.

Some years ago I planted a number of *Lane's Prince Albert*,

costing 2s. a tree, or £10 a hundred. They were planted at the end of October or early in November in well-prepared situations. The following season a few Apples were produced, but the year after—*i.e.* the second year from time of planting—a crop was borne that sold at 22s. per cwt., and averaged 3s. 6d. per tree. Of course this is an exceptional case, but it proves what can be done by planting dwarf trees carefully on suitable soil, with proper management afterwards; and there is no reason why similar or possibly better results should not be achieved in the future. I may add that the trees have continued to bear heavy crops of fruit in almost every subsequent year. There are several other varieties which have produced nearly as good results in the same time; these will be referred to under the notes on the most remunerative sorts to plant.

The second advantage of dwarf trees is the ease with which all operations connected therewith can be performed from the ground level, as compared with standards, which require ladders, &c. Summer and winter pruning can be done in a more thorough manner, so that each shoot can have plenty of light and air, which, reacting on the fruit, causes it to attain a size and colour seldom found on standards, and consequently, when put on the market, the fruit realises top prices.

Again, all who have standard Apple trees are aware of the difficulty experienced in combating insect pests; in fact, when the trees are high the grower is practically helpless, as a thorough washing is almost impossible. On the other hand, with bush trees every shoot and every leaf can be sprayed with a proved insecticide, and the enemies to a far greater extent destroyed. In the future the dealing with insect foes will demand close attention, if healthy trees and profitable crops are to be secured. I am, therefore, strongly of opinion that dwarf trees are the best kind to plant, and I have for years proved their worth commercially.

The third advantage of such trees is that by their dwarfness they are much less injured by the gales than high trees are, from which most of the largest Apples are not unfrequently blown down and spoiled for market purposes. With the low trees the case is different, for it must be a very rough wind indeed that will fetch any great quantity of fruit down; such an occurrence only happens about once in four years if the situation is fairly

sheltered; and even when unusually high winds cause the fruit to fall, it has only a few feet to drop from the dwarf trees, and consequently is not much bruised, and if picked up immediately and consigned to market it will sell freely at satisfactory prices. It may be stated here that all possible despatch should be used in sending wind-fallen fruit away quickly, so as to get it on the market before there can be any glut of the same. On one occasion we had a violent gale pass over us, bringing down a great weight of Apples; those from standard trees were generally smashed, and useless to send away, but the fruit from the dwarfs was scarcely injured. Varieties such as *Ecklinville Seedling*, *Warner's King*, and *Golden Spire* made 15s. per cwt., and *Worcester Pearmain* sold for 24s. per cwt., proving beyond question the value of dwarf trees.

The fourth advantage is that all malformed fruit can be plucked from the trees while small, so that when the fruit is gathered it can be put straight from the trees into the hampers with very little sorting, and fastened down to be sent to market at once. The less fruit is handled before reaching the purchaser, the better its appearance and the higher its value. Again, by thus gathering the fruit, and putting it into the hampers as picked, there is no attempt at deception, as the Apples are of a uniform size and quality throughout the package. Buyers quickly note this honesty, and the sender acquires a reputation that makes his consignments eagerly sought after. The insane policy of topping the packages with the finest fruit, with a mass of very inferior "stuff" beneath, cannot be too strongly condemned; purchasers resent such fraudulent methods by paying a low price and giving the sender anything but a complimentary name.

Having decided on the form of tree to be grown, it is important that early orders should be given to a nurseryman of the highest repute, who would not permit a bad tree, or one not true to name, to leave his nursery. Many of our leading firms annually burn numbers of trees simply because they do not consider them up to their standard of excellence, and it will pay any intending fruit grower to purchase all his trees from such a source rather than buy from a firm which is careless in this respect, for when trees are badly grown or wrongly named the labour and expense incurred is frequently thrown away, and what should have been a profit turns out a loss.

Another important matter is the stock upon which the trees are worked. For standards, the Crab and stocks raised from Apple pips are the best, while nothing will equal the English or Broad-leaved Paradise for dwarf trees. On this latter stock Apples will commence to give returns the second year after planting, and if given proper attention will continue prolific for at least twenty years. We know of trees that on good soil and with careful management have scarcely missed cropping for over thirty years, proving that this stock is sufficiently long-lived to make the trees more than pay all expenditure.

The distance we have grown dwarf trees has been 9 feet apart each way—*i.e.* 537 trees to the acre; but if I had to plant again another foot would be given—*i.e.* 435 trees to the acre. Strong-growing varieties of Apples planted as standards will not have too much room for full development at 30 feet apart, or 48 trees per acre. Weaker or slender-growing sorts may be planted 24 feet apart—*i.e.* 75 trees per acre.

PROFITABLE VARIETIES OF APPLES.

It is a very difficult matter to say definitely which are the most profitable varieties to plant, because soils and situation exercise a considerable influence on the growth and bearing powers of most varieties. On our light, sandy, and somewhat shallow soil, resting on the old red sandstone, the following have not only proved very prolific, but have also produced fruit of a size that has secured the best prices in different markets.

Ecklinville heads the list, as the trees are heavy bearers and require little pruning; moreover, the fruit is ready for sale in August, when, owing to its large size and excellent culinary properties, it always sells at good prices. During the past ten years the lowest price obtained for this variety has been £12 per ton, and the highest £22 per ton, the difference between the figures being accounted for by the supply and demand being good or bad.

Lane's Prince Albert follows, on our soil, as the next best paying variety, running *Ecklinville* very close indeed, as it combines all its good qualities with the additional merit of keeping perfectly sound until the end of May if stored in a suitable fruit-room. Considering how many early or comparatively early varieties of Apples have been planted of late years, it

is a question whether *Lane's Prince Albert* will not be the most remunerative to plant for the future, at least on soils where it is known to succeed, as it can be sold at once from the tree if prices are high, or it can be kept six or eight months if necessary, and sold at any time when there are short supplies and full prices. We have sold it direct from the trees at £22 per ton, and never at less than £16 per ton.

Golden Spire is a continuous cropper, never failing unless the climatic conditions are exceptionally bad. The fruit is of large size, handsome, and of a bright golden colour. On the average of the past ten years it has realised £15 per ton.

Worcester Pearmain is another excellent market Apple, as it is remarkably prolific; and though the fruit is not very large, yet on account of its brilliant colour it always sells freely at from £14 to £26 per ton. It should be noted that trees of *Worcester Pearmain* will bear the same weight of fruit as equal-sized trees of the three previously mentioned varieties, which accounts for its being fourth on the list.

Warner's King takes fifth place, being a good bearer with very large fruit, selling at £16 per ton.

The following varieties all come about equal on our light soil, the difference between their returns being so small as hardly to warrant, from a commercial point of view, giving more distinction to one than to another: *Cox's Pomona*, *Cox's Orange Pippin*, *King of the Pippins*, *Lord Suffield*, *Potts' Seedling*, *Yorkshire Beauty*, *Stirling Castle*, *Tower of Glamis*, *Maltster*, and *Dumelow's Seedling* (also known as *Wellington* and *Normanton Wonder*).

All of the above varieties have proved very profitable as bush trees, and, with the exception of *Lane's Prince Albert* and *Stirling Castle*, will also answer planted as standards. *Lane's Prince Albert* assumes a more or less weeping habit when grown as a standard, the weight of the fruit pulling the branches down so much that it is difficult to get any fair-sized heads to the trees; and *Stirling Castle* grows too weakly to make a really fine standard tree.

Naturally the question will be asked, how much fruit a bush tree will carry without unduly distressing itself? The answer must depend upon the soil, situation, and cultural skill brought to bear upon it. We have gathered an average of more than

56 lbs. of fruit from bush trees under 7 feet high and 5 feet through, but to do this there must be close attention to feeding and all other necessary requirements. But take half this weight as an average picking from each bush tree, 28 lbs. per tree, and this sold at the rate of 12s. per cwt., returns 3s. per tree, and anyone fond of going into figures may easily calculate the gross profit per acre. However, it must be understood plainly that such results can only be obtained by planting a few thoroughly proved varieties on good land in a favourable situation, with strict attention to pruning, manuring, destruction of insect enemies, and untiring energy. Under such conditions Apple-culture will be a great commercial success in the future.

PLUMS.

We find Plums next to Apples in giving profitable returns when they are grown as bush trees, and all the skill and attention given requisite to obtain good crops and fine fruit that will realise high prices. But to obtain such desirable results the land must be well adapted to the growth of the trees, and sufficient fertilisers applied to enable them to fully mature their fruit without enfeebling the trees for the next year's crop. When trees are liberally supplied with plant-food they are so little exhausted by bearing, that heavy loads of fruit are borne every year unless climatic influences are exceptionally bad; and it is a well-known fact that strong, vigorous, well-fed trees are able to resist without injury an amount of frost and cold that would seriously cripple weak and poorly fed ones.

Of late years much has been heard of growers who have found the price of Plums so low that they did not pay for the picking, the fruit being, in consequence, left to rot on the ground. Now wherever this was the case it points out to my mind very clearly that something was wrong; either the size of the fruit must have been small, the varieties inferior, the soil and situation unfavourable, or the system of marketing stood in great need of improvement. As a proof of this, I may say that one season, when the wail was particularly loud as to the low prices prevailing for Plums, we had a gross return of £176 from one acre of *Victoria* Plums grown on bush trees, planted at 8 feet apart each way. The lowest price we have made in the past ten years has been 7s. per cwt., and the highest 24s. per cwt. for *Victorias*.

Frosts may occasionally cause the trees to be a complete failure for a season, but, take one year with another, Plums are well entitled to rank next to Apples for profit.

PROFITABLE VARIETIES OF PLUMS.

Victoria, up to the present time, has given the largest return as a rule; but so many trees of that variety have been planted of late years, that it is doubtful if it will continue to be as profitable to plant in the future, and we would suggest that *Rivers' Early Prolific* and *The Czar* should be more extensively planted for early supplies, and *Rivers' Monarch* for a late crop.

Rivers' Early Prolific is a well-known, regularly cropping, early sort, ready at the end of July, and sells at paying prices, sometimes fetching 25s. per cwt.

Czar is valuable for marketing immediately *Rivers' Early Prolific* is over, and before the *Victorias* are ready. We have sold this variety at 27s. per cwt. as the highest, and 13s. 6d. per cwt. as the lowest price.

Extraordinary statements have been made in the past as to what can be realised by growing *Coe's Golden Drop*, but we have never found it profitable, although our soil is excellent for Plum growing. A variety that promises to be a decided acquisition for providing late supplies when most others are over is *Rivers' Monarch*, and is likely to pay more in one year than *Coe's Golden Drop* will in seven, as it possesses a vigorous and fruitful constitution, the fruit attains a large size, and is of a handsome purple colour, which causes it to sell well in the market at very profitable prices. Some growers find *Pond's Seedling* remunerative, and are also planting the very late *Grand Duke*.

In consequence of the enormous quantity of mid-season varieties that are now grown in the country, there is every prospect of such an early sort as *Rivers' Early Prolific*, and a semi-early like *The Czar*, paying much better in the future than will the planting of more mid-season sorts; and very late varieties that have proved of sterling merit for the market also deserve increased attention. But like all other kinds of fruit that are grown for sale, only a very limited number of varieties ought to be planted, and these should all be tried sorts, not only as to their cropping power, but also as to their value in the market over a series of three years at least. With every kind of fruit I

think we are too much given to unduly enlarging our list of varieties, only to find that we should have been considerable gainers if we had been more chastened in our selection.

MANURING PLUMS.

Another matter that should claim earnest attention in the future is the question of manures. In districts some distance from towns natural or farmyard manures cannot be obtained in sufficient quantities to properly dress a fairly large fruit plantation, consequently the grower must fall back upon chemical fertilisers to maintain the available plant-food in the soil. Many people have a great prejudice against the continual application of what they term "artificial" manures, but it may be of interest to state that for the past ten years a large proportion of our fruit plantations have had no other manure, with the result that heavy crops of fruit have been produced, which have not only sold at the highest prices in the market, but have also taken many premier honours at some of the chief fruit exhibitions in the kingdom. Our Plum trees have had absolutely no other manure, and they now appear in better condition to mature heavy crops than ever they did since they were planted, thus proving conclusively that by a proper application of chemical manures adapted to the soil and the trees, excellent crops of fruit can be secured for a long succession of years, other matters, of course, being equal.

MARKETING PLUMS.

But supposing we have grown the Plums as well as it is possible to grow them with the means at our command, there comes the question of how and where to market them. In dealing with this question the grower must be ruled to some extent on the distance the fruit will have to travel before being sold. If the market is comparatively close, the fruit may be allowed to become fairly ripe before it is picked, as it will be a little heavier and better coloured, the risk of injury being less in proportion to the less distant carriage. On the other hand, when the fruit has to be sent 100 miles or more, it must not be permitted to get fully ripe, as, unless the packages are very small, some of the fruit, if ripe, is certain to be smashed or damaged by its own inherent weight, and will then present anything but an attractive appearance when put upon the market.

Our practice is to pack all our Plums in half sieves or half "flats," lining them with soft hay, or preferably bracken; then placing clean paper over that, and arranging the paper so that it hangs over the sides sufficiently to cover the Plums entirely when the package is full. A little more hay or bracken is then placed on the top and securely fastened down. In this way the fruit is enclosed in the paper, little or no movement can take place, and, after travelling the 140 miles it has to be sent, the Plums appear as if just gathered from the trees. The half sieve or half "flat" will contain 18 or 20 lbs. of fruit; and if this is gathered at the time the Plums are changing colour and commencing to become soft, not a fruit would be in the least damaged, even if the packages had to travel 500 miles. Larger receptacles are dangerous, as Plums quickly sweat in a bulk of 40 or 50 lbs. and upwards, and if any delay occurs in transit, the whole is practically spoiled.

Another matter intimately affecting the price of Plums is the grading. Small and large fruits should never be mixed up together, but each be sorted out and packed in separate lots.

PEARS.

This delicious fruit is always in at least fair demand, and many people imagine, from the high prices ticketed upon them in the leading fruiterers' windows, that a magnificent profit must be made by the growers. My experience is that no hardy fruit is more uncertain. The trees themselves, as well as the blossom and the fruit, are so much influenced by variations in the temperature and soil that it is only in particularly favoured districts that Pear culture can be considered a commercial success. In such localities there is no question that Pear-growing will be a source of profit, providing every cultural attention is given to the trees; for no matter how well adapted the place may be for the purpose, really good results can only be obtained by skill and sound management. Under these conditions very handsome sums are realised, and as a proof of how well Pears pay, we see growers extending their plantations more or less every year. This is a step in the right direction with all kinds of fruit as well as Pears; for when we find that any particular kind of fruit answers exceptionally well, and gives

the best returns over a series of years, it is wise to plant most of that kind, rather than speculate on untried ones.

PROFITABLE VARIETIES OF PEARS.

Out of a fairly large collection of Pears, we have found the following to pay the best, as being the most fruitful and realising the highest figures in the market:—

Louise Bonne has few, if any, superiors. Grown in any form of tree, on a suitable soil for Pear culture, it is always prolific, and its beautifully coloured and deliciously flavoured fruit may be depended upon always to fetch a fair price. Grown as a bush tree, we have had 28 lbs. of good fruit from a tree the second year after planting, which sold at 14s. per cwt.; but this yield per tree was quite an exceptional instance, and must not be expected generally.

Beurré Clairgeau is another free-bearing variety. The fruit is large and highly coloured, and though not of extra good flavour or quality for dessert, it sells at prices that will pay the grower very well. The highest value that we have sold it at has been 1s. 6d. per dozen fruit, and the lowest 15s. per cwt. In each case the produce was from bush trees.

Clapp's Favourite appears likely to supersede *Williams' Bon Chrétien* to some extent as a market Pear, as it crops more freely on most soils, and possesses a lovely colour combined with size, and is not so liable to become spotted with black patches; it also realises a higher price when put on the market at the same time as *Williams' Bon Chrétien*.

Pitmaston Duchess is a grand Pear for market, where it will succeed, but in some places in which other varieties give satisfaction it fails to bear well, and is by no means profitable. With this variety, and indeed with all others, it will be advisable to discover how it behaves before planting many trees.

Beurré Hardy is a splendid sort to grow in bush form. It produces excellent crops in most seasons. The fruit is large, heavy, and handsome, and on many soils of very superior flavour. Another advantage is the close, compact habit of growth. We find bush trees planted at 8 feet apart each way have sufficient room to develop into large and fruitful trees.

Where *Doyenné du Comice* will answer, no Pear will surpass it for flavour, as it is equal, if not superior, to *Marie Louise*

in that respect, and far more prolific as a bush tree. Fruiterers who know the variety will willingly pay a good price for large and well-formed fruit of it; and as this variety becomes better known, it is probable that it will be very extensively planted in the future.

Marie Louise d'Uccle can scarcely be styled a first-rate dessert Pear, but it is one of the most free-bearing sorts we have. The fruit attains a fair size, and sells on the average at 12s. per cwt.

All the above varieties are in season before or up to Christmas, after which period dessert Pears are scarce in the market; but a variety in use from Christmas and onwards that has been in excellent demand of late years is *Josephine de Malines*. If it is allowed to hang on the trees as long as possible, in fact until there is danger of sharp frost, the fruit will frequently keep till early in March, and if sold then will bring from 20s. to 30s. per cwt., although the fruit is below the average size; but owing to the demand for Pears early in the new year, size is not so important as a nice appearance and good flavour. *Josephine de Malines* is also a heavy cropper on both the Pear and Quince stocks.

A class of Pears which will, I think, pay for increased planting are stewing varieties, as there is a steadily growing demand for them. By planting hardy prolific varieties like *Catillac*, *Uvedale's St. Germain*, *Verulam*, and *Vicar of Winkfield*, as fine a lot of stewing Pears can be placed on the market from October to March as anyone could desire to have. Judging by our experience, this class of Pears are more hardy, prolific, and not so particular as to soil or situation as are the dessert kinds. Indeed, if dessert Pears are scarce, and the season has been a favourable one for ripening the fruit well, both *Verulam* and *Vicar of Winkfield* are by no means despicable for dessert, thus selling for more than if sold for stewing.

In consigning Pears to a salesman or other source, the same remarks as previously made on carefully sorting the fruit are applicable. Any small or blemished examples mixed with good fruit lowers the value very much. Another item in sending away Pears is to take great care in packing, so as to avoid the slightest injury. Our practice is always to send away the fruit immediately it shows signs of becoming mellow. In this state it travels more safely, and, if not ripe enough on arriving at its

destination, the salesman will keep it until it will bring in the utmost value.

CHERRIES.

The foreign Cherries are so poor in quality compared with home-grown ones that there is every prospect of this popular fruit maintaining its value and paying well in the future. Considering how remarkably well Cherries succeed in most parts of the kingdom where fruit can be grown, it is strange that Kent should practically have a monopoly of them, for though many trees are distributed throughout the country, they can be only found in any numbers together in Kent. There are thousands of acres, especially in the West of England, that are admirably suited for growing the finest Cherries, which would sell readily in the manufacturing towns of Wales and the busy centres in the Midlands and the North of England, with which there is generally a good railway service.

I have urged the importance of only growing a few varieties of any kind of fruit. This holds good with Cherries more than with any other kind, because of the trouble with birds. For this reason only one variety, or varieties which all ripen at the same time, should be planted in an orchard, thus enabling a man with a gun to guard the fruit for the comparatively short time it is necessary to protect it. Fixed objects to scare the birds are of little use; we have tried windmills arranged with clappers on tin, which make a great noise, but birds quickly get accustomed even to these, and will calmly eat the fruit close to the apparatus while making its loudest din.

Very early or very late varieties, as a rule, are the most remunerative, thus escaping the gluts and consequent low prices. But even when the markets are flooded with Cherries, fruit of extra large size and good colour will sell at reasonable prices.

Amongst early varieties, *Early Rivers* holds a high position, and is sure to be extensively planted in the future. The tree in either bush or standard form is a great bearer, and the fruit is of large size, jet black in colour, and of a very pleasant flavour. A cottager in the western counties this year (1895) had a brisk demand for all her fruit at 6*d.* per lb. The Cherries were very fine and fit for sale before other sorts were ready, and no doubt she made a handsome sum from her tree of *Early Rivers*.

Elton is a red variety only a few days later than the last named, and a great and continuous bearer.

Governor Wood is another reliable and excellent variety. The fruit is pale in colour, and produced in great quantities on trees of all forms, ripening about the same time as *Elton*.

Amongst late Cherries, *Florence* is one of the very best, and will pay for planting, as the fruit hangs well after ripening and always sells at a good price.

The new *Emperor Francis* promises to be a decided acquisition to late sorts, as it crops freely, and the fruit is very fine and keeps sound until the middle of September.

Cherry trees, planted as standards, should either have bush fruit or Strawberries grown between them, or else be pastured with sheep or pigs, to make the land as rich as possible, for the more they are supplied with stimulants the heavier the crop and the larger the fruit. Pruning standard trees is a very simple operation, as it consists in merely thinning out the shoots whilst the trees are young and removing any growths that cross or rub each other, so as to lay the foundation of a good and well-balanced head.

There is a possibility of making a fair profit by planting *Morello* Cherries as bush trees, for they bear very freely worked on either the Cherry or the Mahaleb stock, and really fine fruit sold late in the season will realise on the average 6*d.* per lb., and sometimes double that price. A large grower on the Continent assured the writer that he found the English market so good for *Morellos* that he had planted five acres of bush trees, and he fully expected the investment to prove a thorough success. Continental growers are keenly alive to the requirements of our fruit buyers, and take prompt steps to cater for the same; therefore, to meet them on equal terms we must be equally sharp and businesslike, seizing every opportunity of supplying fruit that is in good demand. And judging from the experience of late years, there is a growing inquiry for fine late *Morello* Cherries.

As to the profits arising from Cherry culture, a great deal depends upon the grower himself and the skill or good management he exercises. Mr. George Bunyard, in his excellent work on "Fruit Farming for Profit," puts the average return at £30 an acre in the Kentish Cherry orchards; but by planting only

the very best varieties, and liberally manuring the trees, to enable the fruit to swell to an extra large size, a better average result can be obtained.

Another item of interest is the ease with which Cherries may be dried. The dried Cherries which the writer tasted from Mr. Trotter, gardener at Bromsberrow Place, near Ledbury, were excellent, and cooked admirably, proving that in seasons of abundance the fruit can be sold at a remunerative rate in a dried state.

BUSH FRUITS.

For a man with but limited capital, bush fruit and Strawberries offer the greatest prospect of commercial success, as the first cost in purchasing them is comparatively small, and under fairly good treatment quick returns are secured.

Where Black Currants will grow well, I question if any bush fruit will pay so quickly, or give such a return per acre. We have always found a first-class demand for the fruit at prices never lower than £22 per ton, and sometimes much higher. However, putting the yield at three tons per acre when the bushes are in full bearing, we have £66 per acre. Deducting picking expenses at the rate of 4s. per cwt. (the price that we pay for gathering Black Currants and Raspberries), brings the figures down to £54 per acre, which will leave a good round sum for net profit after rent, manure bills, and all other expenses are paid.

Land most suitable for Black Currant culture should be at least moderately deep, fertile, moist yet properly drained, and if it lies with a warm aspect so much the better, as it will enable the grower to put the fruit on the market before any great quantity arrives from other growers. It would be difficult to state how long a plantation of Black Currants will continue profitable, so much depends on the mode of pruning and the manuring, and also the keeping in check of insect foes. If the major portion of the old wood is cut out immediately the fruit is all gathered, and every encouragement given to the strong young growths from the bottom to ripen well, very large fruit will be produced in quantity, and the bushes will continue healthy and vigorous for an indefinite period.

The varieties that we have found to grow best on our light

soil are *Lee's Prolific* and *Baldwin's*. The fruit of both is borne freely in large clusters, and the individual berries are large and well coloured.

The grower of Black Currants has little to fear from foreign competition, as foreigners cannot put this fruit on the British markets in anything approaching the condition the home grower is able to do; and considering that prices have risen rather than fallen of late years, owing to the increased demand, there is a capital prospect in the future for Black Currant growing.

RED CURRANTS are not in great demand, but if the fruit is very large there is a good sale for limited quantities, and it will pay fairly well to devote a small plot to this fruit. On both heavy and light soil we have found no variety produce better results than *Raby Castle* when obtained true to name; the bunches are very long under liberal manuring, and the berries of great size and splendid colour, realising 3*d.* per lb. when sold to local fruiterers. *Knight's Early* is probably the best early sort, and sells at about the same rate.

WHITE CURRANTS must be very fine indeed to fetch good prices, and it would be rather a risk to plant any quantity, as it is more than possible they would not be a commercial success. *Versailles* is a very large and fairly productive variety, and on our soil is the best white sort.

RASPBERRIES under good management on suitable soil are a very profitable crop, but before planting Raspberries largely it should be ascertained if pickers can be engaged in the district. We found this picking question a difficult trouble, as enough hands could not be locally obtained, and the fruit rapidly spoils if not picked when ripe, and from this cause a considerable loss may occur.

A soil that will grow Black Currants well will also suit Raspberries, pursuing much the same treatment—viz. liberally mulching with manure, not digging amongst the roots, removing all old wood or canes as soon as the fruit is gathered, and only permitting a limited number of canes (six or eight) to each stool. By these means the best possible results will be secured, provided insect foes are kept under control.

There are many so-called varieties of the Raspberry, some of which are difficult to recognise or distinguish from one another; but the greatest bearers are *Carter's Prolific*, *Northumberland*

Fillbasket, and *Superlative*. Each of these produce stout vigorous canes, which will support a full crop of fruit without stakes or other assistance.

With Raspberries, again, we have little to fear from foreign competition, as they cannot be sent over to us in a pleasing state. Some growers attach considerable importance in Raspberry growing to the being near a good market; but this is really not so necessary as might be thought, as the fruit can be picked wet or dry, and put into tubs provided by the salesman, and consigned to him as jam fruit, which usually travels at a lower railway rate. We have sent much fruit away in this manner, warning the railway men to keep the tubs upright, so that there is no escape of the juices. A stout piece of paper is firmly secured over the tops of the tubs when they are about six inches short of being full to the top. This allows a little movement of the liquid that will ascend to the surface, and, unless there is great carelessness on the part of the men handling the tubs, no loss will be sustained of the contents. Cleanliness must be insisted upon amongst the pickers, as a few stalks left in the fruit, or any dead leaves or other rubbish, reduces the value to a considerable amount. Prices vary according to the seasons. I have known Raspberries to be worth £50 a ton in years of scarcity, and in abundant seasons the value has been down to £20 a ton.

The yield from an acre of Raspberries planted 5 feet apart each way will vary with the seasons, and also with the skill and good treatment afforded them; but under the best conditions in a favourable year (allowing three years to elapse from the time of planting) three tons per acre may be grown, whilst in a poor season we have had only half a ton to the acre. On the whole, after carefully going into all the details for and against Raspberries as a market investment, I think they will prove fairly remunerative and deserving of the attention of present or future fruit growers.

GOOSEBERRIES, as a rule, are a reliable and profitable fruit, and ought to be planted on every fruit plantation of any size, as they come into bearing early from the time of planting, and prove of great assistance in meeting expenses. Unlike Raspberries, we have to face a strong competition in Gooseberry growing, as the French send us large consignments, which it

would be folly to despise, as they are very good indeed, and look very attractive when put on the market in the green state in which they arrive. But if we plant only the very finest varieties, and do them thoroughly well in every respect, we can more than hold our own against the French or any other competitors. By planting such excellent varieties as *Keepsake* and *Whinham's Industry* on good land, fairly sheltered from cold winds, we can obtain large berries almost as early as the imported fruit, superior to it in size and appearance, and selling at prices ranging from 11s. to 25s. per cwt., according to the supply and demand. Other extensive growers have found the following varieties to give satisfactory results—*Lancashire Lad*, *Crown Bob*, *Whitesmith*, and (for bottling) *Warrington*. The profits, except in specially favourable circumstances, can scarcely be considered large, as the expenses of picking are somewhat heavy and if the berries are late the prices are low. A fair average net return per acre is about £20. Sometimes very high figures are made, but these extraordinary results must not be looked upon as an indication of what can be done generally.

STRAWBERRIES.

Judging from the immense quantities of Strawberries planted of late years, in addition to the great area previously devoted to the crop, many would think that the supply must be more than equal to any possible demand; such, however, does not appear to be the case, as the price keeps up to the same average as formerly when less quantities were grown, and I see no reason why Strawberry culture should not give as good a profit in the future as in the past. No great amount of skill is requisite to produce heavy crops of fine berries, provided a fertile soil planted with the best varieties is at hand, and due attention given afterwards to mulching, removal of runners, and the destruction of weeds.

It is very probable that *Royal Sovereign* will be a universal favourite amongst market growers in the future, as it is early, vigorous, large, and freely produced, of firm flesh, travelling well, in fact all that one could desire for the market. *Sir Joseph Paxton* is still the favourite maincrop Strawberry for market, and no mistake will be made in relying upon it as one of the best and most certain varieties to plant. *Sir Charles Napier* and *Stirling*

Castle are also good maincrop sorts. The latter variety I saw in grand form at Lord Sudeley's fruit farm, where it was considered one of the best that they grew for jam-making. Laxton's *Latest of All* promises to be a decided acquisition. It crops well, and the fruit is large and of good quality, and ought to be valuable as it comes into use somewhat later than the other varieties mentioned.

A long list of Strawberries is quite unnecessary, as a few varieties of sterling merit, grown thoroughly well, will pay infinitely better than will a number of sorts.

Some sensational results are occasionally obtained per acre from Strawberries; and again, owing to gluts, very low returns rule. Our salesman, who receives large consignments from both Southern and Northern growers, informs me that the average price per ton over a long series of years is £20, and from inquiries made amongst growers on different soil in districts far apart, the average yield is two tons per acre, taking good and bad seasons together. This estimate is a low one, and may be looked upon as the result of very ordinary cultivation, and capable of being doubled or trebled by thorough culture and liberal manuring, combined with a judicious system of marketing the earliest and best fruit and the latest in punnets, and sending only the smallest and mid-season fruit for boiling-up purposes.

SHELTER.

Shelter is often recommended for fruit plantations, and Firs or other trees have been named for the purpose; but my experience is that if any such protection is given those trees are most suitable and profitable that will pay for their room. DAMSONS are remarkably hardy, and form a splendid break to the gales, and, as the trees are not fastidious as to soil or situation, they quickly develop into a fruitful size, and the produce always sells well. Every year we get inquiries for large quantities of Damsons at profitable rates, and both bush trees and standards will begin to prove remunerative in five years from the time of planting. *King of the Damsons* is one of the best, and *Farleigh Prolific* is another reliable sort.

Webb's Prize Cob, or any of the Filbert Nuts, also make a good shelter for a fruit plantation, and pay well to plant, rarely failing to crop, and if given fair treatment prove themselves

grateful, as shown by the heavy clusters of fine Nuts, that will sell on the average at 3*d.* a lb.

PACKING FRUIT.

The method in which fruit is packed exercises more influence on the prices obtained than many growers seem to suppose, and there is plenty of room for vast improvement in this respect. Such fruit as Apples, Pears, and Plums ought to be carefully sorted, making it up into uniform samples, marking them as 1, 2, 3, or A, B, C, and taking care never to mix the varieties. By this means the buyer can see at a glance what he is purchasing, and is willing to pay an enhanced price for the fruit.

The fraudulent practice of topping with the finest fruit should never under any circumstances be permitted, as it is a deliberate attempt to deceive, and is certain to bring its own punishment on the sender by giving him an evil reputation in the market. We have proved that perfect honesty in marketing fruit is the best policy, and pays by the higher prices obtained, our salesman in Manchester writing that no fruit that goes into that market realises such prices or is so eagerly sought after by buyers.

In addition to grading and honest packing, cleanliness should be insisted upon, and rigidly enforced, as fruit that appears clean in itself and in the package is appreciated by all purchasers, who will gladly pay more for the same than for fruit less attractive.

Large packages are not advisable ; we find the " flat " answer best for Apples and the commoner varieties of Pears, and the half " flat " for Plums, Cherries, and Currants. In each case the " flats " are lined with soft hay or bracken. This is covered with clean paper, and the fruit placed in layers therein until full. Paper is then placed over the top, with a little hay on the top again. The lid is then fastened down, labelled, and is ready to send away. Soft fruits are sold in punnets ; the finest fruit is selected for this purpose, and the bulk is sent in half sieves or half " flats," except Strawberries and Raspberries, which are sent in tubs, the salesmen in each case providing the packages if requested to do so.

MANURING.

The fruit grower of the future must manure more liberally

than has been hitherto generally done if he wishes to make a commercial success. Farmyard manure is a complete plant-food, but varies in strength considerably. For fruit trees in full bearing twenty tons per acre will not be too much, but I prefer chemical manures, as being equally effective, easier to apply, and they can be given at any time of the year if the trees exhibit any signs of exhaustion in producing their crops. On a light soil I have employed chemical manures entirely for ten years with excellent results. For Apples, Pears, Plums, and bush fruits the following has proved very good : 3 cwt. muriate of potash and 5 cwt. superphosphate per acre. On heavier soil 5 cwt. of bone-meal per acre answers well. For Strawberries 2 cwt. of muriate of potash and 2 cwt. of nitrate of soda per acre is very stimulating, and increases the size of the fruit. The best time to apply these manures is immediately the fruit is set, as it will then assist it to swell and develop into large size. If applied before the crops are set there is still a risk of there being no fruit that season owing to climatic or other causes, and then the manure would force a strong growth, and thus do more harm than good in many instances.

PRUNING.

The value of judicious pruning can scarcely be over-estimated, as thousands of trees are so mutilated annually that good crops become an impossibility. No elaborate pruning is necessary, but simply to regulate the branches, so that each one may have plenty of light and air to mature the wood and bloom-buds. Trees that have a gross and unfruitful habit can frequently be brought to free bearing by merely thinning out of the congested growth, and permitting those shoots that remain to grow on almost unchecked. In two years trees so treated will, as a rule, produce excellent crops.

INSECT FOES.

The limits of this essay will not permit a detailed account of these and their destruction ; but more attention to this matter is imperative to make fruit culture profitable. We must commence to deal early with the enemies, as it is much easier to destroy them in their infancy.

One of the best methods of destroying insect enemies is an

application in the winter, or while the trees are dormant, of 1 lb. of caustic soda (Greenbank's 98 per cent.) and 1 lb. of crude commercial potash, dissolved in 10 gallons of hot water, and applied to the trees warm, in the form of a spray. This solution will kill the eggs of many insects, and dislodge large quantities by thoroughly cleansing the trees of all lichen or mossy growths on the branches, leaving them remarkably bright and clean. This preparation I have used for several years, and attach to it great importance, as aphides of all kinds and red-spider have scarcely caused us any trouble at all since this dressing has been employed; but if any of these pests have appeared, no time has been lost in spraying with one of the many excellent insecticides now on the market, always taking care to have the liquid warm, as it is then more deadly to insect life than when cold.

American blight is a great scourge, but may be eradicated by perseverance with 1 lb. of carbolic soft-soap dissolved in 2 gallons of hot water, and 1 quart of petroleum added, thoroughly mixing the whole together while warm, and then brushing all infested parts with the preparation. Another remedy, recommended by Mr. Cox, of St. John's Nurseries, Worcester, is to simply touch each spot attacked by American blight with a brush dipped in olive oil.

The Winter and Codlin moth larvæ have worked great havoc in many fruit plantations. For these pests, 1 oz. of Paris green to 20 gallons of water is the best remedy I know amongst insecticides; but, as this compound will not dissolve in water, it is important that the Paris green be kept in constant suspension, and thoroughly mixed with the water, to ensure the liquid being of uniform strength throughout. The Codlin moth, or Apple grub as it is frequently termed, has been completely ousted from our plantation of bush trees by means of this Paris green. Poultry are a valuable aid if allowed to roam amongst the trees when not fruiting, as they devour immense quantities of insects and their eggs.

Gooseberry caterpillars are easily destroyed by washing the bushes well with 2 oz. of "Killmright" dissolved in 1 gallon of hot water, applying it warm to the bushes. Two washings have always cleared our bushes of this enemy.

With the Black Currant mite and the Raspberry-bud

weevil my experience is that good and liberal manuring, and carefully removing by hand all infested buds, is the most effectual remedy. There are a host of other enemies to the fruit grower, but those mentioned are the most general, requiring plenty of energy and perseverance to conquer.

DISCUSSION.

Mr. J. WRIGHT said the subject of fruit culture was a far too serious matter for anyone who had but a little money to take up, without technical knowledge to carry it through; but, when everything was well considered, and a thoroughly practical man could be put in charge, the work would give a good return for the labour and capital invested. If they read this paper and the other prize essay, they would have in a small compass the most valuable production, the most sound instruction, and the safest guide on the subject which had ever appeared in the English language. Although Dr. Hogg had been precluded from attending that meeting, that gentleman had authorised him to say that he would give a large silver medal to Mr. S. T. Wright and to Mr. Lewis Castle, the writers of the Society's two prize essays.

Mr. LEE CAMPBELL said he was very proud to tell them that, by careful work on the part of his gardener and himself, he had risen to the top of his profession. He started fruit growing as an experiment, but, after a very long residence on the Continent, he was sure that we were far ahead of the foreigner. He was, however, sorry to say that the foreigner had got more than the thin end of the wedge in, and he was afraid it would take a great deal to drive it out. Whether we could ever succeed thoroughly in that direction was doubtful. He had proof that our English fruit was not inferior in any respect to fruit produced abroad. A short time since he wrote to his salesman, Mr. John Mills, of Manchester, asking him to give him a faithful and candid opinion of how his fruit compared with that of the foreigner. Mr. Mills wrote as follows:—

“With reference to your inquiry, I can confidently state that your varieties of Apples realise at least 30 per cent. more on an average than any other English varieties of Apples sold in this market, and that you are by far the best grower of Apples in

England. Your *Worcester Pearmains* average 40 per cent. better, *Ecklinvilles* average 33 per cent. better, *Peasgood's Nonesuch* average 25 per cent. better, *Keswicks* average 80 per cent. better, *Warner's Kings* average 30 per cent. better.

“Several of your varieties of Apples, such as *Transparents*, *Brown's Codlins*, and *Maltsters* I do not receive from other growers, but Apples similar in appearance which are sold here realise on an average 30 per cent. less than yours. This is owing to the superior eating quality of your Apples, which is much appreciated by any buyers who have once had the opportunity of purchasing your fruit, and they are always eager to purchase your consignments, when advised by wire, even before they come to hand, as your packing is done honestly and can always be relied upon, and consequently the sales remain in the hands of a few large buyers.

“The only trouble with your fruit is that the varieties do not last long enough for them to become generally known, which would increase the competition for their purchase. For instance, there were only about three consignments in bulk of *Transparents*, and the customers were quite excited for more, and were willing to pay increased prices for further lots; this applies generally to all your fruit. I could easily dispose of the produce of thirty or forty more growers of fruit equal in quantity, quality, and packing at more remunerative prices than I have been able to send you, as this would enable the various kinds to become better known.

“As to foreign competition, there is no doubt but that the cheap rates enable foreign competitors to place their fruit upon the various markets here, with the result that prices are brought much lower than they otherwise would be, and this must exclude a portion of native production from coming to market, which otherwise would have come if it had not been crowded out by foreign supplies.

“As to railway rates, at present rates are much too high; with lower rates and a better Land Bill it would enable us to successfully compete with foreign supplies, as then farmers would have confidence to speculate, and would be able to keep out all importation of foreign Apples to this country.”

Now 30 per cent. was a profit in itself—at least growers thought so, although, perhaps, shopkeepers were not content with it. Recently they had gone in almost entirely for barrels

for conveying fruit. They thought this was much preferable to the old style, as there was a certain movement in the flats, and the ends of the withies caught against the fruit and damaged it. They put between 50 and 60 lbs. in a barrel. Mr. Mills also told him that his *Peasgood's Nonesuch* Apples averaged 50 per cent. better price than the Canadians.

The question of foreign competition, he held, was a national matter, and the subject of railway rates, and the preferential rates given to the foreigner by our English companies, would have to be seriously gone into. As an instance, he mentioned that in America five guineas a ton was charged for transit for a distance of 3,500 miles; he paid the Great Western Railway Company 27s. a ton for 140 miles. If his goods were carried on the same basis as Oranges were carried in America, the freight ought to be about 4s. Owing to the railway companies' high charges thousands of tons of fruit had to rot, as it would not pay to place it upon the train. The French Apples had an advantage over the English Apples between Southampton and London of something like 7s. 6d. a ton. Butter again, from and to the same places, showed a preference in favour of the foreigner of 219 per cent. Englishmen could not stand against that. With regard to fruit growing, he would warn people against indiscriminate planting, which would only be making a rod for their own backs, and, like indiscriminate dabbling in African mines, would make the victims wish they had never taken the matter in hand.

Mr. GEORGE GORDON said we should be a great deal more careful about our packing. In the case of Plums, although it might not be pleasant to Englishmen to confess it, the French cultivators were far and away in advance of us. The English method really spoilt the fruit, which presented anything but an attractive appearance when it was finally shovelled into the customer's basket. Then, again, if we were to take full advantage of our opportunities, we should be able to utilise our fruit in seasons of plenty by drying and preserving. There was no necessity to rely on the sun for drying—that could be done in an ordinary oven.

The CHAIRMAN mentioned that he had dried his own fruit in the oven, which answered satisfactorily. There were, however, two good drying-machines—the Mayfarth and the Wass—one of which was at Chiswick Gardens, where it might be inspected.

A POPULAR TREATISE ON THE PHYSIOLOGY OF PLANTS. By Dr. Paul Sorauer. Translated by Prof. F. E. Weiss, B.Sc. (London : Longmans, Green & Co.)

Since the publication of Lindley's standard work on "The Theory and Practice of Horticulture" we cannot recall any work that is likely to be of more use to the practical gardener than that which forms the subject of this notice. Like many other admirable treatises, this one also comes from the Continent, being the work of Dr. Paul Sorauer, Director of the Experimental Station at the Royal Pomological Institute in Proskau (Silesia). For the English translation we are indebted to Prof. F. E. Weiss; of Owens College, Manchester, and there is now no reason why the British gardener should be behind his German or Austrian *confrère* in the matter of learning all he can about his business. From some cause or other British gardeners—with some few noteworthy exceptions—seem to care but little about the scientific aspect of their profession, and it is by no means uncommon to meet with one of the old school who is fond of utilising the worn-out phrase that "an ounce of practice is worth a ton of theory." Such an assertion will not bear investigation for a moment, for if a gardener has not first some idea, some theory, in regard to the results of his practical work, he is like a man groping in the dark, a pure automaton without brains, who trusts to chance that his work may turn out a success. The gardener who is scientific as well as practical will, on the other hand, think out his work well, so that he may accomplish it in the easiest and best manner possible.

Such an one will, of course, frequently make mistakes, but these only serve to teach and guide him for the future. To be able to think clearly is one of the great requisites of gardening, and to assist in this process we can confidently recommend Dr. Sorauer's "Popular Treatise on the Physiology of Plants for the Use of Gardeners," which is published by Messrs. Longmans, Green & Co. It will be found of great service to those whose ideas are not altogether warped by a firm belief in "rule of thumb" methods alone. The functions of each portion of the plant are lucidly explained, the main object being to instil into the mind of the gardener logical reasons for everything he does.

As an example of the author's advice, we may quote him in reference to the vexed question of pruning recently transplanted trees :—

“In trees and shrubs which are transplanted the root-system is always injured ; the most apparent injury is the absence of root-tips and of the absorptive region immediately behind them. In the case of such a reduction of the absorptive root-tips, it is evident that the plant would possess too large an amount of foliage if all the branches which had been formed were left intact. How can the root-system which has been damaged and cut in taking it out of the soil absorb sufficient water for the full development of all its leaves? However much we may water the root, it will be of little avail ; it may even be injurious to the plant, as the saturation of the soil with water may cause decay to set in at the cut ends. We must, therefore, emphatically contradict the view, which is still held and acted upon by some, that in transplanting trees and bushes the branches should be left unpruned.”

The reasons in favour of pruning the branches of transplanted trees are here given with force, and it is interesting to know that Dr. Sorauer's views are gradually gaining hold amongst gardeners in Great Britain.

Dr. Sorauer's book is full of valuable information from cover to cover—a distance of some 250 pages—and it should certainly find a place on the bookshelf of every gardener who has a desire to excel in his profession. There may, of course, be principles advocated in the work which to some will seem strange at first, but as a rule these will be found to work out well if put to the test.

While we have nothing but praise for the information in the book itself, we cannot help wishing that a more copious index had been furnished. There are many interesting passages in the book, to which no reference whatever has been made in the Index, and we should like to see in the second edition, which we hope is being prepared, a very great improvement in this respect.

KERNER AND OLIVER'S NATURAL HISTORY OF PLANTS. (London : Blackie & Son.)

The public—and more especially the horticultural public—are deeply indebted to the well-known publishers, Messrs. Blackie & Son, for having put into their hands one of the finest treatises on the history of plants which has appeared during recent years. Professor Kerner's "Pflanzenleben" is the tangible result of the author's studies and researches for many years past in connection with every phase of plant-life. The original was written in German, and now we have a complete English translation from the pen of Professor F. W. Oliver, an eminent English botanist who, it may be mentioned, carried out most elaborate experiments a few years ago in connection with the Scientific Committee of the Royal Horticultural Society, showing the injurious effects of London fog upon cultivated plants.

In the "Natural History of Plants"—which is the English title of Professor Kerner's "Pflanzenleben"—an exhaustive and charmingly written review of the vegetable kingdom is given. The original German has, for the most part, been faithfully translated into English; but Professor Oliver has not hesitated, as he says, to add or substitute new matter, a process which has been rendered necessary since the original was written, owing to the advance in botanical knowledge in the meantime; and he has actually rewritten the systematic portion from the Thallophytes to the end of the Gymnosperms, and, in part, the Monocotyledons also. The English edition will therefore have a great advantage over the German in being brought up to date by such an able authority.

The work has been published in sixteen monthly parts, so as to bring it within reach of all, and now it is complete. There are altogether nearly 1,000 original woodcuts, dealing for the most part with remarkable peculiarities of plant-life, and also 16 coloured plates which serve to illustrate interesting deductions of the author.

Not the least important part of the work is the copious Glossary and Index which have been given in the last part. In this respect also the English edition is far superior to the German

the latter, indeed, having no glossary of terms at all. The English Glossary occupies 14 pages, and contains about 900 definitions of technical terms, which cannot fail to be of the greatest use to the student of plant-life. The Index, however, is a *magnum opus*, and has been compiled by Mr. Geo. Brebner. It occupies 59 pages, and contains about 14,000 references, or about 6,000 more than the German edition. Such an admirable work as this must appeal to every lover of plants, and we feel sure that all who become possessed of it, and take the trouble—or rather the pleasure—of reading it, will feel that they have learned something worth knowing about the wonderful workings of plant-life.

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PART III.

ETIOLATION AS A PHENOMENON OF ADAPTATION.

By FRANCIS DARWIN, F.R.S., F.R.H.S., &c.

[Read July 9, 1895.]

ETIOLATED plants differ from normally grown specimens—(1) in the absence of chlorophyll; * (2) in form. It is with the last-named phenomenon—the deformity of etiolated plants—that I am concerned.

The deformity varies greatly in different plants: the best known appearances are those presented by a seedling bean or a potato tuber which has been allowed to germinate in the dark. The shoots differ notably from light-grown shoots in two particulars—viz. the great length of the internodes and the dwarfing of the leaves. This, as is well known, is not the only form assumed by etiolated plants, although certain theorists have built up hypotheses which meet no other case. If one of the cereals is forced to grow in the dark, its leaves are not dwarfed, but, on the contrary, elongated. The same thing is true of some other monocotyledons as well as of certain dicotyledons with radical leaves. These two types of etiolation will serve for a preliminary

* With certain well-known exceptions.

consideration of the causes which have been suggested to account for the facts.

Light being necessary for the normal nutrition of green plants, it is not surprising that botanists should, as a rule, have looked at etiolation either as a simple case of starvation or more vaguely as a pathological condition produced by disturbed nutrition.

Thus Kraus* held that where etiolated leaves remain small, it is due to the want of the formative material with which light would have supplied them. In one of his experiments he etiolated a vine shoot, and having covered one half of a dwarf leaf with opaque material, he allowed light to reach the rest of the plant. The result was that the illuminated half of the leaf developed chlorophyll and increased in size, while the darkened half remained small.

The conclusions of Kraus were met by a research of Batalin's.† He exposed etiolated plants to faint light for an hour or two every two or three days, regulating the duration and degree of illumination so that no chlorophyll was formed. The result was that the partly lighted plants developed leaves several times as big as those which were continuously darkened. This shows plainly that the deformity of the completely etiolated plants was not due to the nutritive disturbance of darkness, and did not, in fact, depend on the absence of assimilation.

This was also the conclusion of Vines,‡ who starved his experimental plants, not by darkness, but by depriving them of CO₂, so that, although exposed to light, they were unable to assimilate.

Recent work § has, however, shown that interference with the chlorophyll-function has a remarkable effect on the leaves: not merely their growth, but their periodic movements—in fact, their life as a whole—depending on the presence of CO₂. These researches make it clear that the element of nutrition has to be reckoned with to a greater extent than the above quoted experiments of Batalin would seem to show. The subject is

* *Pringsheim's Jahrbücher*, 1869-70, vii.

† *Bot. Zeitung*, 1871.

‡ *Arbeiten d. bot. Instituts in Würzburg*, Bd. ii. 1878. Godlewski's paper in the *Bot. Zeitung*, 1879, p. 90, confirms this result.

§ Vöchting, *Bot. Zeitung*, 1891, p. 113, and Jost, *Pringsheim's Jahrbücher*, 1895, p. 403.

too wide and too complex for discussion in the present form. The point which I wish to emphasise is that with our present knowledge no theory of etiolation based on disturbed nutrition as a cause can possibly explain the observed facts. Take, for instance, Sachs's* theory, according to which the cause of etiolation is the absence of certain unknown formative materials, which can only be manufactured in green leaves in light. How is such a theory as this to explain the fundamental fact that the leaves of cereals and other monocotyledons become abnormally long though narrow in darkness? It would be necessary to invent more hypotheses—for instance, that the material required for growth in length can be manufactured without light, whereas the material for growth in breadth cannot so be manufactured. The same general objection holds against any nutrition theory of etiolation: that though disturbed nutrition can be conceived as producing deformity in general, we cannot at present see how it can produce the diverse types of deformity which we know to exist.

Almost everyone who has written on etiolation has treated it as a disease or pathological condition without attempting to correlate the particular abnormality with the biology of the normal plant.

As far as I know, Godlewski† is the only writer who has frankly taken the opposite view.‡ I agree with him in believing that etiolation is a phenomenon of adaptation, in which the particular deformity due to changed environment is of necessity correlated with the character of normal growth. The difference between the commonly received view (which I may call the *nutrition* theory) and that of Godlewski§ (the *adaptation* theory) may be made clear by an illustration from the domain of human deformity. Rickets may be induced by feeding an infant, too

* *Vorlesungen*, 1882, p. 647.

† *Biolog.: Centralblatt*, Oct. 15, 1889. Godlewski, however, points out that a similar idea was formulated by Boehm in a popular work, *Die Nährstoffe der Pflanze*, 1886.

‡ Sachs shows, however, a tendency to this view in his classical paper, *Bot. Zeitung*, 1863.

§ In Godlewski's interesting paper the author confines himself to the consideration of the main facts exhibited by etiolated plants, *i.e.* the increased internodal growth and dwarfed leaves of the dicotyledonous stem, and the elongated narrow leaves of the monocotyledons. He is not to be held responsible for the speculations on other aspects of the case contained in the present paper.

young for such a diet, on farinaceous food. The deformity—swollen wrists and beaded ribs—is the result of improper food, but it is not an adaptative phenomenon, the deformity is not in any way fitted to remove the cause of the disease. But in the case of etiolation, I believe that the deformity is specially adapted to give the plant the best chance of escaping the cause of the evil, namely, darkness.

In attacking the problem, the most obvious point to be considered is the mode in which darkness normally enters into the life of a green plant. From our present point of view the darkness of night may be neglected, and only those circumstances considered which produce darkness of long duration. The simplest cases are those in which shoots develop underground—for instance, from the subterranean tuber of a potato. An eye develops into a shoot, bearing small leaves, which do not attain their full size until they reach the light. If the flower-pot containing the potato is placed in a dark room, the shoot, on emerging from the soil, will continue to grow, under the influence of darkness, as though it were still under ground. So that in becoming a typical etiolated shoot, it simply continues the normal underground habit, of which the growth of internodes rather than of leaves is the characteristic. The same thing is true of a seed (*e.g.* a bean) planted in the ground: its plumule behaves like the potato shoot, and if kept in a dark room, it continues to grow in the air as though it were still under ground.

The characteristic feature in the case is that the whole energy of growth is thrown into elongation of internode, the production of leaf being in abeyance. This is clearly a useful distribution of growth; for if the shoot never emerges into light its leaves are useless: it will be time enough to grow leaves when there is a chance of making use of them. And the only chance of reaching the daylight, on which the activity of the leaves depends, is that all available strength should be devoted to the elongation of the stem on which the leaves are carried. Godlewski made a *Phaseolus* grow through a darkened tube of such length that, when at last the shoot was allowed to reach the light, it was so much exhausted that it never thoroughly recovered. But to reach the light at any cost was its one chance of escaping certain death, and for such an end the deformity of etiolation is well fitted. It should be especially

noted that, according to what I have called the adaptation hypothesis, *darkness does not act simply as a disturber of nutrition, but indirectly as a signal or stimulus*: as long as the darkness-signal is continued the plant responds with exaggeration of internode and dwarfing of leaf; daylight, on the other hand, is a signal to the plant that it may slow down internodal growth and begin to develop its assimilating machinery.

It is worth inquiry how far other details in the form of etiolated plants can be explained on a similar principle. The shoot or plumule of a seedling *Phaseolus* is well known to end in a hook, and to make its way through the resisting soil by means of the smooth convex side of the arch. This is believed to be an adaptation by which the delicate tip of the plumule is protected from injury as it makes its way up through the earth. As soon as the plumule is above ground and free from the resistance of the soil, it can safely become straight. We might, therefore, expect that the absence of resistance would be the signal which would tell the plumule to become straight. But this is not so; the signal for which it is waiting is daylight, and if kept in the dark it remains arched as though still underground.* The interest of this case is that the plant is guided by the absence or presence of light in its reaction to a part of its environment which has no essential relation to light. The arch in the plumule of the etiolated *Phaseolus* seedling is therefore a case of a response to a signal of a more complex nature than the production of long internodes and dwarf leaves.

Precisely similar cases are familiar to botanists. The flowers of the *Crocus* and *Tulip* are singularly sensitive to changes of temperature, and can be made to open by a rise of a few degrees and close again by a corresponding degree of cooling. These movements of the perianth are believed to be serviceable in protecting the pollen, not from heat or cold, but from wet. When a bright day is overcast and rain threatens, the *Crocus* gets a hint of what is coming in the falling temperature, while other flowers make their weather forecast from the darkened sky rather than from the chilling of the air.

I have dwelt on these cases because they throw light on a well-known form of etiolation occurring among fungi.† The

* Wortmann, *Bot. Zeitung*, 1882, p. 915.

† Brefeld, *Bot. Zeitung*, 1877, p. 386.

mushroom-like *Coprinus stercorarius*, when grown under normal conditions so that it easily emerges into daylight, has a well-formed cap (*pileus*) and a short stalk which increases in length as the spores ripen. But if the *Coprinus* is grown in darkness hardly any caps are formed, and those which are developed remain dwarfed; while the stalk, on the contrary, grows enormously, even to as much as two feet in length. This corresponds precisely to the etiolation form of a bean or a potato, the dwarf caps of the *Coprinus* representing the undeveloped leaves, and the overgrown stalk the exaggerated internodal development. How the case of *Coprinus* is explained on the nutrition theory I do not know, but from the point of view of adaptation it is easy to understand. The function of the stalk and *pileus* is to scatter the spores, and daylight serves to signal to the plant that it has reached the outer world, where its spores will have a chance of being distributed. Until this signal is given, the whole energy of growth is thrown into the lengthening of the stalk, while the production of spores is in abeyance. Brefeld says that the enormously etiolated stalks cease to grow in length, and develop caps and spores as soon as they are exposed to light. The same sort of thing may be seen in flowering plants; a *Narcissus* grown in darkness makes an enormously elongated scape—a despairing effort to reach the outer world where it may receive and distribute pollen. Again, the etiolated *Crocus* produces under like conditions a flower-tube of exaggerated length. The remarkable fact that the flowers of many species are checked in development by darkness* may possibly belong to the same category.

We must now return to the main problem. Assuming that etiolation is a case of adaptive response to signals or stimuli, how far do the fundamental facts support such a view? The growth of the leaves of such plants as the cereals, of *Crocus*, and of *Hyacinth*, entirely accords with Godlewski's theory. The only way in which they can escape from darkness into light is by their own growth; there is no elongation of stem to carry them out, so that if they were dwarfed by darkness they never could escape into daylight. Another point in their manner of growth points to the same conclusion: they are not only abnormally long, but

* Vöchting, *Iringsheim's Jahrbücher*, Bd. xxv. 1893.

also abnormally narrow*—in other words, the energy of growth is thrown into the direction that leads to escape. As soon, however, as they are illuminated, they grow in width; that is to say, when elongation is no longer necessary, the leaf can afford to increase in width, and thus to gain a greater assimilating area. Similar facts have been observed in the radical leaves of some Dicotyledons, where, in the same way, abnormal elongation is the only hope of escape into daylight. In some leaves again the same principle is followed with a difference: the lamina remains dwarfed while the petiole is greatly elongated. Similar facts may be gathered from Vöchting's † curious observations on Cacti, which in continuous darkness fail to develop the wing-like expansion of their stems, so that, like the narrow leaves of etiolated Monocotyledons, they do not increase in assimilating area without the stimulus of illumination. The nutrition theory cannot explain these facts, nor is it any help to refer them to the "tonic influence" of light—a restatement of fact which is sometimes put forward as an explanation.

A few outlying or exceptional cases may be noted. In 1863 Sachs pointed out that climbing plants, *e.g.* the Hop, are exceptional in the matter of etiolation. He stated that a Hop-stem developed in complete darkness does not exhibit the exaggerated elongation so characteristic in one type of etiolation.

In other words, the internodes of the darkened plants were practically of the same length as those of the normal specimens cultivated in the light. I am inclined to believe that this case is explicable when the biological meaning of the climbing habit in plants is taken into account. A climbing plant is one whose whole organisation is adapted to reaching light at a small expenditure of solid matter, so that its length of stem in proportion to its weight is enormous in comparison with the same relation in plants which support their own weight. It comes to this: the normal, light-grown Hop is already exaggerating internodal growth to the utmost in its search for light—so that etiolation cannot produce its usual effect. The Hop is not a solitary instance. Sachs remarks that the vernal shoots of the Sweet Potato, developed normally in daylight, have the habit of

* They also remain folded up, which, as Godlewski (*loc. cit.* p. 486) points out, would favour their emergence from the soil.

† *Pringsheim's Jahrbücher*, xxvi. 1894.

etiolated plants, and he goes so far as to suggest the name of *naturally etiolated plants* for the class. This term is not particularly appropriate from the standpoint of the nutrition theory, but if we consider etiolation as an adaptation in relation to the search for light, it is suitable enough.

One more case may be mentioned as illustrative of Godlewski's theory. *Marchantia*, one of the Liverworts, is a well-known cryptogamic plant which grows like a flat green plate on the ground. *Marchantia* reproduces itself vegetatively by means of *gemmae*, minute bodies which play the part of tubers. These *gemmae* absolutely refuse to germinate in darkness; instead of exaggerating their growth in one direction, like the potato-shoot, they do not attempt the task of escaping into the light.* If it is remembered how slight must be the chance of escape from darkness, in the case of a minute plant growing flat on the surface of the soil, it will be allowed that the best chance of life lies in waiting; the dry leaves, earth, or other *débris* which cover the *gemma* may, by some lucky accident, be removed, whereas the chance of freeing itself by growth is too small to make it worth while to attempt it. I do not lay great stress on this case because there is a lack of supporting evidence. Indeed in certain similar cases germination actually occurs in darkness. Thus the spores of some ferns, though not of all, produce a prothallus even in the absence of light. There are, however, similar instances of Fungi refusing to make a start in life until there is some chance of success. The cases referred to are those in which the spores only germinate in a nutrient solution; the presence of food gives them a signal that it is safe to make a start. If they are in pure water, it is, figuratively speaking, better policy to wait. The resemblance to etiolation is clear; the *gemma* or spore which cannot germinate until it receives a certain signal, behaves like those leaves which refuse to grow until they are stimulated by the presence of light. These examples are moreover useful as showing how widely spread is the principle of dependence

* For the sake of those readers who are unused to the modern points of view of plant physiology, it is worth while to state that the power of replying to a signal or stimulus does not *in the least* imply the existence of consciousness. Nor does the fact that the behaviour of a plant under given conditions is of such a nature as to give the best chance of preserving the life of the individual, or of continuing the species, imply anything of the sort.

on signals. This principle—that the life of plants, like that of animals, is a series of responses to stimuli—is a conception really old enough, but which, curiously enough, has only become a canon of plant physiology within the last fifteen years. It has proved to be a conception of the greatest value, and I cannot doubt that the phenomena of etiolation will be brought within its scope, nor can I doubt that this must be done along the lines suggested by Godlewski, although further inquiry and research may doubtless suggest modifications.

THE CARNATION IN SCOTLAND.

By Mr. R. P. BROTHERSTON.

[Read July 23, 1895.]

A CHARMING description of the Carnation is that given by William Lawson, a Yorkshire gentleman who lived in the latter part of the sixteenth century, and who published manuals on fruit culture, on bees, and on flowers and vegetables. The edition from which I quote is a black-letter one, dated 1617; but there was one twenty years earlier, and I have also seen another, a later one, of the middle of the seventeenth century, bound up with "Markham's Husbandry." (In passing, it may be noted that Markham advocated wooden hives for bees, while Lawson preferred straw skeps.) This is what he writes in "The Countrie Housewife's Garden" concerning the Carnation:—"July flowres, commonly called Gillyflowres, or, Clove-Jully-flowres (I call them so because they flower in July), they have the name of Clove of their sent. I may well call them the King of Flowres (except the Rose), and the best sort of them are called Queene-July-flowres. I have of them 9 or 10, severall colours, and divers of them as bigge as Roses; of all flowres (save the Damaske Rose) they are the most pleasant to sight and smell. . . . Their use is much in ornament and comforting the spirites by the sense of smelling." He advises the renewal of Carnation plants "every third or fourth year by means of 'slippes,' of which, owing to their tender nature," he is careful to note, "they must not be twisted," a common practice

at that time with all kinds of cuttings. Lawson planted at "Michaeltide, or somewhat before that," as he says, "they may be settled in and taken with the ground before winter."

In the estimation of the general public, the relative position held by the Rose and the Carnation to each other, and to all other hardy plants, still remains unchanged, and Lawson's remarks in this respect apply with the same force to-day as they did when first enunciated three centuries ago.

In speaking of the Carnation in Scotland, I shall do so, not in a general manner, but with particular reference to methods that experience has taught me are best suited to the means at my own command. Before, however, I enter upon a discussion of the more salient points of Carnation culture, I may be permitted to indicate a somewhat curious distinction resulting from the difference of a southern and a northern climate. It is this. Many varieties that in Scotland produce full and large blooms fail to do so when grown in the gardens of the south of England. Midas, Mrs. Muir, and Germania are examples of this class. Others, again, which are highly praised by English growers, when transplanted across the Tweed, yield us for the most part only large, straggly, and ungainly blooms; Cantab is one such, and I have seen in a Scottish garden Uriah Pike in a most unkempt condition. With this slight difference, I imagine that Carnations do not vary greatly if at all in the two countries, while their cultural treatment as a whole is pursued on very much the same lines.

Were I asked to mention what in my opinion are the cultural details that are of the greatest importance in determining the fullest measure of success, I should unhesitatingly say, Early layering, followed by planting the layers as soon as they are in a fit condition to move. There are, of course, other matters that are essential to securing satisfactory results, but these are comparatively of secondary importance. Early layering, coupled with early planting, is, indeed, at the foundation of any and all success, and I have known planting deferred a fortnight spoil the ultimate success of plants which were otherwise full of promise. As an indication of what is meant by "early," I may say that our first layers were put down about July 1st and the bulk were finished ten days later. Planting is followed by excellent results when carried out in the first and second week of September, but if

delayed till the end of that month there is a risk of failure. The beneficial effects of early planting are these: The plants become firmly established before winter, and are quite unaffected by the hardest frosts. They begin to flower earlier, and produce on an average five to ten times the number of blooms, and these too of finer quality. Many varieties assume a modified perpetual habit, and do not stop the production of flowers until the approach of winter puts a period to the growth of vegetation. The plants, again, make more grass, which comes earlier into condition for layering than it does on weakly plants; and, finally, these early layers root more quickly than those put down later.

The position I should prefer for Carnation beds would be a border sheltered from the east but with full exposure to the west; where, in winter, the plants would be somewhat protected from frosts and from the evil east winds of spring; and where, in summer, they would be sheltered during the hottest part of the day from burning sunshine, whilst at the same time receiving sufficient warmth in the latter part of the day to supply all their needs. However, it is only occasionally that such an ideal position can be secured, and Carnations do well almost anywhere, provided they are not closely shut in by trees.

The soil ought, if possible, to be in such good condition as not to require manuring when the beds or borders are prepared for planting. It is doubtful, indeed, if the addition of manure is ever beneficial, and it is always attended by risk to the health of the plants. I have the greatest hesitation to apply fresh manure under any conditions; a dressing of leaf-soil, not too much decayed, is vastly to be preferred. The soil again is better if dug some time previous to planting, and if it has been under potatoes or some such quickly grown crop, I have put in Carnations without any digging at all; and in our light soil I invariably have to make it firm beforehand. A little nice compost mixed with the soil to place round the roots of each plant causes them to become established more quickly.

For yellow Carnations, and those with a delicate constitution, a layer of soil a few inches thick, composed of leaf soil and sand, mixed into the surface of the ground, is necessary to produce strong and healthy growth. The beds for these should also be raised a few inches above the general level. Carnations exceedingly dislike deep planting. I have experimented with very

delicate varieties, spreading out the roots on the surface of the ground, and covering them with a very little soil, and they have never failed to grow. For the general stock the depth to plant is gauged by the length of the tongue of each layer, that being the only portion of the stem put underground. I need not point out that the Carnation is a plant of a somewhat shrubby character, and the woody nature of its stem indicates shallow planting as the reasonable method to pursue. Each of the young plants is tied to a short stick, and when planting is finished a very thin layer of dry mushroom dung is spread over the beds, and allowed to remain until the spring, when it is hoed into the surface soil.

No matter how firm one's belief may be in the superior excellence of autumn planting, a number of plants are always left until spring. Bought-in plants come to hand too late, and these along with seedlings, the layers of which have been rooted late, are best wintered under glass, and put into the garden as early as possible in March. The safe wintering of Carnations is secured by keeping the plants in a cool, airy house, and perfectly dry at root. From October until the beginning of February the plants require no water, and its application is generally injurious. I cultivate a quantity in pots for the production of flowers in May, June, and July, and these plants are seldom watered in winter. Though the soil becomes exceedingly dry, the plants get plumper day by day, and in spring, when the embargo is taken off, and they again get water, they go ahead splendidly.

For the first ten days after planting pots should be kept in readiness to place over the plants to shelter them from sharp frosts or hot sunshine, the latter being perhaps even more trying than frost. During the spring and early summer months an occasional hoeing is beneficial, and water in a season like the present (1895) is very necessary. Spring is also the most suitable time to apply manure; for Carnations, though they dislike manure in the soil, are nevertheless not averse to a fair amount of good feeding. It is, however, best applied on the surface, and when the plants are in vigorous growth. Soot is very good, as are also superphosphate of lime, nitrate of soda, and sulphate of ammonia. But it is always better to under-feed than to over-feed. If one can hit the happy medium, well and good, but by no means let a superfluity be given.

The practice of thinning the buds is not by any means commonly pursued. For exhibition purposes thinning is, of course, indispensable, but many people are not so certain that anything is to be gained by it for ordinary purposes. For my own part, I thin out both buds and grass, and sometimes even the flower stems, and I have no more doubt as to the benefits derived from it than I have with regard to thinning grapes and vine shoots, or to the planting of any crop thinly. If it were possible to lay down axioms in matters horticultural, I am certain that the almost universal habit of over-cropping in every shape and form would be one of the points mentioned: and an over-crop of buds and grass on a Carnation is certainly quite as prejudicial as over-cropping is to any other plant.

The Carnation in Scotland is less afflicted with insect pests and plant diseases than in England. The *Helminthosporium* is scarcely ever seen, and, so far as I am aware, the carnation maggot is quite unknown. It is, however, much troubled with rust, with the eel-worm, and with green-fly. And, occasionally, game and small birds do much mischief. Rust appears to be largely a climatic disease; possibly, altogether one of weather. The eel-worm one can say very little about, its behaviour is so erratic. There can be no doubt, however, that plants grown grossly more frequently fall a prey to its insidious attacks than others grown more naturally. But it does not invariably follow that the absence of manure secures immunity. I saw a large collection of Malmaisons the other day which were badly smitten. Two years ago I saw the same plants, and they were then in perfect condition, and I was assured that neither by addition to the soil nor by any other means had they ever been treated to any kind of manure. The commonly advised recipe to burn affected plants is sufficiently drastic and, no doubt, perfectly effective. But one is somewhat shy about adopting it when hundreds or thousands of valuable plants are at stake, and, above all, when there is no certitude that a new stock may not prove to be equally infested. What appears to me to be the better course is to layer only very short, healthy tips, to pot and plant in pure soil—a little peat being valuable,—to employ chemical manures or soot only, and to be particularly careful as to watering. Every affected leaf should be removed as soon as noticed.

Green-fly is sometimes very troublesome. The best antidote

I have tried is Bentley's Quassia Extract. Tobacco Powder is equally effective, but it sometimes damages the tender buds, while the former is perfectly innocuous.

A few remarks on varieties may appropriately form a conclusion to this paper. It is to be understood that I have strictly had in view the cultural requirements of sorts suitable for home use only, *i.e.* for borders, for pots, and for cutting. It is also from that point of view that the kinds I am about to name are selected. I grow German, French, and English varieties, each of which possesses characteristics sometimes markedly different, sometimes not so pronounced, but among each are some having first-class qualities.

The German section is mainly characterised by a sturdy habit of plant, by well-formed flowers, and, in the fancy classes, by peculiar and harmonious markings. Very many are quite unsuitable for gardens. Among those I have tried, the best are *Germania*, yellow; *White Lady*, satiny white; *Meta*, a carmine "*Painted Lady*"; *Theodore*, heliotrope; *Jessica*, brilliant rose; *Von Bennigsen*, a red and yellow fancy; and *Schlosser*, a yellow fancy Picotee. These are all first-class in every respect.

Of French varieties I have had a very large number through my hands. Many of them possess a vigorous and free-flowering habit, which makes them of much value as garden plants. The flowers, however, are generally deficient in quality, and few, if any, are possessed of the upright habit of growth which one looks for in a good border Carnation. Among those I cultivate, the best are *Countess of Paris*, blush, a very early sort; *Hardouin Mansard*, deep pink, very late; *Honoré de Balzac*, soft rose; and a fancy heliotrope, flamed-scarlet variety, the name of which I have not got.

The English varieties are in many cases not all that one would desire, but among them are some that are unsurpassed for general good qualities. We find among them strong, vigorous, upright growers having flowers of the highest quality as to form, and colours of the brightest as well as of the softest shades. Among the very best are the following:—

White Flowers.—The Spy; Lady Ridley; Mrs. Eric Hambro, an improved Niphetos; Ellen Terry (like a huge Malmaison); Mrs. F. Godfrey, fine frilled edges.

Light colours.—Waterwitch, like Countess of Paris, but

of upright habit; Lady Nina Balfour, flesh, rich clove scent, and one of the best of all Carnations.

Rose and pink.—Midas, very fine, soft and shell-like; Ketton Rose; Valkyrie, salmony rose; Sadek, deep rose, extra fine; Queen Anne, light rose; Duchess of Fife, soft rosy clove; Waverley, deep pink, late-flowering.

Red.—Oriflamme, light scarlet; Haye's scarlet; Lady Audrey Buller, fiery scarlet, perhaps the finest in this class; Alene Neuman; and Duke of Hamilton, flamed.

Crimson.—Crimson Pearl, extra free and fine; Mephisto, deep shade; Henry Irving, very dark flower of perfect shape; Uriah Pike.

Yellow.—Corunna, clear yellow, extra free, perhaps the finest of all for the garden; Miss Audrey Campbell, very soft shade; Duke of Orleans, gold tint. All of these produce very large blooms. Sigurd, The Pasha, and The Beau are a trio producing fine flowers in varying shades of Apricot. All are fine.

Among yellow fancies, Agnes Chambers is an excellent border variety; Harlequin, deep yellow, marked with rose and crimson, is in every respect a grand kind; Florrie Henwood is also fine; Cowslip is a still deeper yellow, marked with carmine and white; Primrose League is specially good; George Cruikshank, deep buff, marked scarlet, is in every respect a magnificent variety; Marigold is of the same type, and I hope may prove equally fine; Jeannie Robertson, somewhat like Harlequin, but with a buff ground, is a striking variety. The best purple is Foxhall Beauty; while Raby, with all its faults, is still a necessity. There are, of course, many others well worth growing, but the above are the choicest in my collection.

HARDY BAMBOOS.

By Mr. A. B. FREEMAN-MITFORD, C.B.

[Read August 13, 1895.]

WHEN first your Secretary did me the honour of asking me to read you a paper on the subject of my favourite plants, I hesitated for some time before obeying his call. I felt it, however,

to be so high a compliment, that my vanity perhaps got the better of my discretion, and I could not refuse an invitation so gracefully tendered. I knew, moreover, that I might count upon your indulgence to a mere amateur without any pretension to scientific knowledge, who in riding his hobby has often stumbled and met with not a few falls, and whose misadventures might possibly save others from tripping against the like stones of offence.

There have been days, many days, during the past winter (1894-5) when I doubted whether this paper would ever be written; whether, indeed, there could possibly be such a thing as a Bamboo hardy in this country. But it is remarkable that out of an ordeal which burnt up such native plants as Gorse and Ivy, Holly, Junipers, and even Yews; which killed old-established and apparently thoroughly acclimatised Bay-trees, Portugal Laurels, and other evergreen shrubs, and wiped off the face of the earth Pampas grass of thirty years' standing, certain species of Bamboos should have emerged almost scatheless, while of forty-four varieties planted out in the open there is not one the roots of which have not proved their vitality by sending up new shoots even where the old ones have been cut back to the ground. Some individual plants, indeed, feebler than their neighbours, have succumbed, but that, as I shall presently endeavour to show, was owing to errors committed in the planting. There is no single species of those which I shall enumerate which has entirely failed. The severity of the last winter has thus rendered us one signal service by demonstrating that with proper care at the outset we have at our disposal a new element of beauty and grace which will resist the severest weather of the average Midland climate.

Moreover, it must be borne in mind that the bitter months of January and February 1895 came as a severe blow upon plants which had already been sorely tried by a succession of seasons ill adapted to the requirements of Bamboos. In the summer of 1893 we had an exceptional drought; this was followed by a more than usually cold winter. Then came the wet, sunless summer of 1894, and an autumn which lasted until the end of December, when the sudden check came, killing back the weak, overgrown shoots of Roses and other climbers. It would be difficult to imagine conditions more unfavourable than those

under which our Bamboos were struggling. There had been no sun to ripen the growth which had gone dribbling on through the unnaturally mild months of late autumn and early winter, and when with the new year the thermometer suddenly jumped down to nearly zero, it might have been expected that the *coup de grâce* would have been dealt. And yet the plants lived.

As regards the more permanent effect of the trial to which they have been subjected, I think it may be said with some assurance that there has been nothing worse than a severe check. The winter of 1893, which wellnigh wrecked the beautiful gardens of the Scilly Islands, killing many rare plants which had stood there for many years, was cruelly felt in Ireland. Mr. Osborne, Mr. Smith Barry's gardener at Fota Island, in a letter to me, thus describes the damage done to *Thamnocalamus Falconeri*: "The above-named Bamboo throws up numerous canes here, from 20 feet to 25 feet. I have often wondered at the reports in gardening papers in England of its sending up canes from six feet to eight feet high, but unfortunately I have learned the reason this season. We had an unprecedentedly sharp frost in January last (1894), which killed the tops of all the *Thamnocalamus*, with the result that instead of throwing up a few monster canes to the height mentioned, they have thrown up numerous small canes about six feet or eight feet high round the old stools. It must take several years of mild winters before they reach their usual strength." The frost registered at Fota was 26° Fahrenheit below freezing point. Now what happened in the case of *Thamnocalamus Falconeri* at Fota in 1894 is precisely what has occurred with me, and in other places similarly situated as to climate, in 1895 in regard to other species. Some plants have not thrown up a single new shoot. Those that have thrown up new shoots have done so in a half-hearted and feeble way. The gradual annual increase of size in the new culms, which is such a marked and satisfactory feature in Bamboos, is not to be found. The stems of this year are no bigger than those of last year. Almost all the plants lost the greater part, if not the whole, of their leaves; but this is now made up for by a most abundant and luxuriant foliage, and the plants, though no taller than last year, are in full beauty. What I am afraid of is that the recent wet and warm weather will encourage the appearance of new

stems, which will not have time to ripen, and will consequently be doomed should we have another severe winter.

Moreover, it must be remembered that what takes place above ground is an outward and visible sign of what is going on under ground and out of sight. The rhizomes need to be ripened as much as the culms; and the chief reason why so many species, such, for instance, as *Phyllostachys mitis* and *P. aurea*, which are rampant travellers in their own country, send up their shoots only immediately round the old culms here, is that the points of the rhizomes, not being thoroughly ripened, are every year killed back to a very large extent.

At its best our climate reverses the order of things to which Bamboos owe their vigorous growth in their native homes. In the far East the hot season is also the wet season; whereas with us the summer is generally dry, while the winter months are wet. Heat and moisture in combination are what is required; and then in Bamboo-land it is such heat and such moisture! The luxuriant grace which is born of these, and which is the chief characteristic of a Bamboo grove, is something of which we can only produce a very feeble copy; but even that humble imitation will add an elegance to our wild gardens which no other plant can give. Indeed, a Bamboo cane, waving its plumes some eighteen or twenty feet high in the air, is no contemptible feature, and this much, we know, can be attained, and in fact has been attained by Lord de Saumarez at Shrubland, by Sir Edmund Loder at Leonardslee, and by others. My own plants are as yet in their infancy, yet I have had culms of *Arundinaria Simoni* thirteen feet high. Under the most favourable conditions of steaming summer heat in China or Japan, it takes some five years to grow a fine plant of Bamboo. We must not be surprised if in this country the same plant has to struggle for well-nigh double the time before it asserts the full vigour of which it is even here capable. Some impatient persons are annoyed because, in their second year, their plants of *Phyllostachys mitis* or *Phyllostachys nigra* do not spring up into mid-air, and this too after subjecting them to such treatment as was of itself almost enough to kill them. Patience we must exercise, but there are some very simple precautions which will do much to save long waiting and weariness of heart, and will coax a newly imported Bamboo into growth in a surprisingly short time.

In the following remarks I am taking it for granted that any one who attempts planting Bamboos on a large scale will import his plants either from the south of France or even from Japan. Up to the present time few of our own great nursery gardeners have given much attention to this family: indeed, there are not a few varieties which it is impossible to procure in England, and the fog which has surrounded the nomenclature has made it difficult in many other cases to procure the true sorts.

As a matter of course, the proper time for Bamboos to travel is during the autumn and winter, when the plants are at rest. I received my first large consignment of Bamboos in the month of November. They arrived in excellent state from the south of France, having hardly lost a leaf. Trusting to their apparently healthy and vigorous condition, I put them at once into carefully prepared beds in the open ground, mulched the roots heavily with well-rotted cow-manure, and covered them well over with dead leaves. In spite of this precaution, such treatment was almost tantamount to signing their death-warrant. In a very few days the leaves had all withered and disappeared. During the long winter months I had nothing but bare canes to show, and when the following spring came those that were not killed outright were slow in sending up perhaps one, or, at most, two meagre and enfeebled shoots. It was a great disappointment, and the more provoking in that, since those plants were received, we have not had a single really favourable season. They were put out in the autumn of 1891. In 1892 they were struggling for bare life against a total rainfall of only 21·86 inches. In 1893 we had again a most cruel drought, with a total rainfall of 23·82 inches. In 1894 no sun, though we had a rainfall of 31·01 inches; of the winter I have already spoken. It is not surprising that up to the present those unhappy Bamboos should have made little or no progress. However, if they have had but a sorry chance in life themselves, they have taught us a lesson. In the average climate of the Midlands it is absolutely useless to plant out Bamboos until they have recovered from the fatigues of the journey.

We now treat them very differently. When a consignment of Bamboos is received we soak the roots well for twelve hours. We then pot them, taking great care not to disturb the roots. They are then placed for the winter in a cool house. Very little

water is given to the roots, but the leaves are constantly syringed. Many species, in spite of this, lose their leaves, but early in February the axillary buds begin to swell, and by the end of March the plants are in full leaf again. The pots are then watered freely, and root action soon begins to take place. New shoots are seen to pierce the soil. Not a plant has been lost. By the middle of May, watching the weather, we begin hardening off our Bamboos just as we should Geraniums or bedding-out plants, and at the end of the month or in the first days of June they are planted out in their permanent homes. In taking them out of their pots great care must again be taken not to tamper with the roots. They are as brittle as glass, and any interference with them is in the highest degree dangerous. The roots, however pot-bound the plants may appear, will soon find their way about. If any roots should have come out through the hole at the bottom of the pot, we break the pot rather than attempt to pull them through. The beds should be double-dug, and consist of as rich good loam as can be found. Mulch with cow-manure and tuck them up snugly in a blanket of dead leaves or straw to prevent evaporation in summer and save the rhizomes from frost in winter. If it be feasible, the newly planted Bamboos should be watered and syringed in dry weather, but the rains of heaven are what they like best. It is a good plan to surround the new beds with wire-netting; this has the double effect of keeping out rabbits and pheasants, which do harm by scratching round the roots in the newly turned-up soil and keeping in the dead leaves. In a year or two, when the plants shall have been thoroughly established, the wire-netting may be removed and the Bamboos left to take care of themselves.

It is not too much to say that yearlings treated in this way are healthier, brighter, and give better promise of growing into good favour than others of the same species which have been wrestling with adversity for four years. The present condition of my last-arrived plants, as compared with their elder brethren, furnishes a good object-lesson.

The species which have so far offered the sturdiest resistance to the rough handling which they have received from our climate are, amongst the taller and more graceful Bamboos, *Phyllostachys nigra* with its congeners *Phyllostachys nigropunctata* and *Phyllostachys Boryana*, the lovely *Phyllostachys Henonis* and the rare

Phyllostachys Marliacea, the "Shibo chiku" of the Japanese. To these may be added *Phyllostachys viridiglaucescens*. All these are at the present moment in supreme beauty, though even they have this year not sent up such vigorous culms as I had hoped for. Among the dwarfs, *Bambusa Veitchii*, *Bambusa palmata*, *Bambusa tessellata* or *Ragomowski*, and *Bambusa pygmæa* are the stoutest. Indeed, *Bambusa Veitchii* is growing so rampantly as even here to illustrate the following remark of Professor Sargent in his "Forest Flora of Japan." He says: "In Japan the forest floor is covered even high on the mountains, and in the extreme north, with a continuous, almost impenetrable, mass of dwarf Bamboos of several species, which makes travelling in the woods, except on long-beaten paths and up the beds of streams, practically impossible. These Bamboos, which vary in height from three to six feet in different parts of the country, make the forest floor monotonous and uninteresting, and prevent the growth of nearly all undershrubs except the most vigorous species. Shrubs, therefore, are mostly driven to the borders of roads and other open places, or to the banks of streams and lakes, where they can obtain sufficient light to enable them to rise above the Bamboos; and it is the abundance of the Bamboo, no doubt, which has developed the climbing habit of many Japanese plants, which are obliged to ascend the trees in search of sun and light, for the Japanese forest is filled with climbing shrubs which flourish with tropical luxuriance." A remarkable statement! If our dwarf Bamboos do not quite fulfil all these conditions, I have little doubt that they will do so at any rate to the extent of furnishing a woodland carpet which may replace nettles, docks, and such like unsightly rubbish in many a home-covert and wild garden.

Among the Arundinarias the palm for beauty, grace, and hardihood must be given to the beautiful species to which, as it has not hitherto been described, I have ventured to give the name of *nitida*. The story of this lovely plant is somewhat curious. When the Bamboo Garden was being formed at Kew Mr. Bean came across it in Messrs. Veitch's collection, where it was named *Bambusa nigra*; from this (*nigra* being a *Phyllostachys*) it is, of course, absolutely distinct. At that time the only Arundinaria known to have black stems was the Himalayan *Arundinaria khasiana*, and with this species, which had been

somewhat perfunctorily described by Munro, the plant now under notice was conjecturally identified by Mr. Watson, the assistant-curator of Kew Gardens. As *Arundinaria khasiana*, accordingly, it was described by Mr. Bean in the *Gardener's Chronicle*, and by myself in the *Garden*. A new light, however, was thrown upon the subject by Mr. Gamble's monograph of the Bambuseæ of British India, from which it is clear that this *Arundinaria* agrees only in its black stems with *Arundinaria khasiana* (which is closely allied to *Arundinaria falcata*); and, moreover, that there is not among the Bambuseæ of the Himalayas any known plant agreeing with it.

So it became necessary to find a fatherland and a history for this unknown waif. At the request of the Director of Kew, Messrs. Veitch made a careful search in their books, and ascertained that this plant was received in 1889 from Dr. Regel, the then Director of the Botanic Gardens of St. Petersburg. Professor Batalin, the present Director, on being written to, very kindly set the matter at rest by informing the authorities at Kew that the seed was collected by the Russian traveller, Mr. Potanin, in Northern Szêchuan. He has since sent authentic specimens grown under glass in the St. Petersburg Botanic Garden from Mr. Potanin's seed, which leave no doubt as to their identity with the misnamed *Arundinaria* of Kew Gardens. The same plant has since been identified in the collection of Dr. Henry, who found it in Hupei.

An exceptional interest attaches to the discovery of the true home of *Arundinaria nitida*, as bearing out the belief of the Director of Kew, that new additions to our collections of hardy Bamboos might be expected from the North-West of China, into which region, as was first pointed out by Mr. H. J. Elwes, there is a marked extension of the Himalayan flora.

Arundinaria nitida in habit approaches more nearly to *Arundinaria racemosa* among the Himalayan species than to any other; and it is noteworthy that *Arundinaria racemosa* has, like *nitida*, well withstood the attacks of the late miserable winter, perhaps the most trying to plant life of any on record, snow not having fallen in sufficient quantities to protect the roots adequately against the severe frost.

We are as yet without any knowledge of the size that *Arundinaria nitida* will attain with us. At Kew, in its second year,

it grew to a height of 6 ft. 6 in., having been only a foot high when first introduced. The gracefully arched, round stems are very slender, and of a dark purple colour, almost black. The leaves are of a more brilliant green on the upper surface, rather fairer underneath; one edge is very minutely serrated; the other is almost without teeth. The tessellated variation is very conspicuous even to the naked eye, whereas, by the bye, in *Arundinaria khasiana* the cross veins are specially stated to be most rare or absent. The length of the leaves is from two to three inches, the breadth about half an inch. The hairy processes on the leaf-sheaths are infrequent, and not persistent. The petiole is well defined. There is a lovely bloom like that on a plum or grape on the half of the merithal, which the sheath has covered. *Arundinaria nitida* seems to be a rather shy and retiring plant, dreading the full light of the sun, under which its leaves rapidly curl up. It should therefore be planted in a shady place.

I have ventured upon this digression because these few words upon the subject of *Arundinaria nitida* are really the only novelty which I have to offer.

The more frequently seen *Arundinarias* have not stood the winter so well. *Arundinaria japonica*, or *Métaké*, has suffered much. The culms of 1894 have nearly all been cut back; the foliage now shown is indeed luxuriant, but is almost invariably borne upon stems of previous years. *Arundinaria Simoni* was badly mauled. Always a shabby plant in spring, it was this year an emblem of misery until midsummer. The persistent character of the dead leaf-sheaths greatly mars its value as an ornamental plant, and I often doubt whether it ought to be introduced in gardens, except where there is a collection of *Bambuseæ*. *Arundinaria japonica*, on the other hand, is, after it has established itself, a noble plant, and in all but the most unfavourable years a real ornament to any garden. I once saw a green clump of it on a promontory jutting out into a piece of ornamental water in a garden on the borders of Epping Forest, which was a perfect picture of luxuriant subtropical vegetation.

Another beautiful member of the family, which has for the most part come well out of the ordeal by frost and drought, is *Bambusa Castillonis*, the "Kimmei chiku" of the Japanese. The variegation of this species, evidently a *Phyllostachys*, is

extremely beautiful, and, when well established, it must be a grand addition to our list of hardy exotics.

I have not as yet spoken of *Phyllostachys mitis*. I know that in many places it is a most conspicuous ornament, and indeed perhaps the most conspicuous of the Bambuseæ. But with me it has hitherto been a disappointment—the greater because so much was expected of it. Possibly, if my plants had been longer established, if they had had one really good season, or if they had been more wisely treated on their first arrival, the result might have been different. As it is, the new shoots, instead of increasing in bulk and in height every year, as they should have done, have rather dwindled, and certainly the culms of 1895 are in most cases inferior to those of 1894. The best shoots of last year came very late, and, not having had time to ripen their wood under a sunless sky, perished miserably under a persistent frost of last February. This year's shoots, on the other hand, though more puny, have shown themselves in better time, and have had a more propitious sun to ripen them. I consider, therefore, that the plants are in better condition altogether, and more promising for the future, than I have seen them since they were first set to face the difficulties of their new home four years ago. Of those planted more recently I can speak with even greater confidence.

There are one or two Bamboos of which I have not yet had sufficient experience to speak with any certainty. Two of these, the imposing *Bambusa fastuosa* of M. Latour Marliac and the extremely curious *Bambusa heterocycla*, hold out the greatest hopes of a brilliant future. But all things considered, if I were to start planting bamboos with the view of ornament only, and apart from the collector's mania, I should feel inclined to confine myself to the species to which I have alluded above. The list includes all the best and most elegant of the tribe, and although there are many others which have great merit, the airy grace, which is the chief distinction of the family, may be obtained by employing a comparatively limited number of species.

Much of the success, from an ornamental point of view, must depend upon the surroundings of the plants. Background is of the utmost consequence, and I know none better suited to Bamboos than that afforded by a fine group of hollies. The dainty green foliage and elegant curves of the one are set off to

the greatest advantage by the stiffer dignity and dark sheen of the other. Never is this better seen than where these are combined with rocks and water. Nor is this sheltering background necessary for ornament alone. Wind is a deadly enemy to bamboos, especially in early spring, when some screen from the north and east is absolutely essential. Some time ago I saw a fine lot of Bamboos set out in a row in one of our public gardens with no backing but a long line of high iron railings; nothing could be worse adapted for showing off the plants, which, flogging the air first in one direction and then in the other, were never at peace for a moment. The leaves and branchlets were all bruised, tattered, and torn, while the effect aimed at was hopelessly missed. Had they been massed in a suitable framing, what a lovely picture they would have made! As the plants were only potted and plunged, not planted in the open, I hope that another year may see them safely anchored in some haven of rest under the lee of a protecting bank of friendly shrubs. Bamboo and all subtropical plants should, in my judgment, be paraded in battalions, not in rows like the thin red line of which we read in military histories.

I have, up to the present, only mentioned those hardy Bamboos which, so far as my own experience goes, are best worthy of being grown, first, as adapting themselves more readily to the conditions under which they will have to live in the average English climate, and, secondly, as furnishing typical specimens of their race. These, however, are only a fraction of those that may be hopefully cultivated by those who would go further than they would be led by the mere love of ornament; though many of those which I shall now enumerate are most beautiful and attractive as well as curious.

The hardy Bamboos which have hitherto been grown in this country, and all of which I have myself cultivated, are as follows:—

1. *Arundinaria falcata*.
2. *Thamnocalamus Falconeri*.

(It seems, perhaps, absurd to begin a list of hardy Bamboos with two species which, except in the most favoured localities, die down every year, but these two are so generally found in gardens that I could not omit them. They should not be attempted in the Midlands.)

3. *Arundinaria macrosperma*.—(The solitary species of the United States of North America.)

4. *Arundinaria humilis*.

5. *Arundinaria Fortunei*, *foliis variegatis*.

6. *Arundinaria auricoma*.

7. *Arundinaria Maximowiczii*.—(Query: the same as *auricoma*?)

8. *Arundinaria chrysantha*.—A dwarf, probably a variegated form of the green *A. Fortunei*.

9. *Bambusa pumila*.—(Query, *Arundinaria*?) Often confounded with *Arundinaria humilis*, but evidently distinct.

10. *Arundinaria Hindsii*.—*Bambusa erecta* of French gardeners. A beautiful species.

11. *Arundinaria Hindsii*, var. *graminea*: a slender variety of the above.

12. *Arundinaria japonica*.—Better known under its Japanese name of Métaké.

13. *Arundinaria Simoni*; synonym, *Narihira*.—The tallest of hardy *Arundinarias*, but not much to be recommended for reasons given above; moreover, a terrible straggler, fit only for the wildest and roomiest places.

14. *Arundinaria Simoni variegata*.—Less in stature than the type; leaves more or less striped with silver; open to the same objections as the type.

15. *Arundinaria nitida*.—Described above.

16. *Arundinaria Veitchii*.—As I have already said, a most valuable dwarf for forest carpeting.

17. *Bambusa senanensis*.—Possibly, as some botanists hold, a distinct species, but so like *Arundinaria Veitchii* as hardly to be distinguished from it.

18. *Bambusa tessellata* or *Ragamowski*.—A very handsome dwarf plant with the largest leaves of any of the hardy Bamboos.

19. *Bambusa palmata*.—Semi-dwarf; very large leaves; a rampant grower and extremely handsome.

20. *Bambusa angustifolia*.—A lovely dwarf Bamboo. *Bambusa Vilmorini* of French gardens.

21. *Bambusa Nagashima*.—Another dwarf; hardly worth growing except for collections.

22. *Bambusa marmorea*.—The Kanchiku of Marliac, a very distinct and pretty dwarf.

23. *Bambusa pygmæa*.—The best and smallest of the dwarfs, creeps about with marvellous rapidity, forming a dense carpet in two or three years.

24. *Bambusa disticha*.—Mismamed *nana*, the true *nana* being a tropical Bamboo; a very pretty dwarf, the origin of which is unknown, possibly, as Mr. Watson of Kew thinks, the *Chusquea tessellata* of New Grenada, described by Munro.

25. *Bambusa Laydekeri*.—Apparently semi-dwarf; very distinct, but of no conspicuous beauty; worthy of a place in a collection.

26. *Bambusa quadrangularis*.—The square-stemmed Bamboo, of which five groves are to be seen near Osaka, in Japan. Up to the present, in the face of many difficulties, it has survived with me, but has not yet made any high growth.

27. *Bambusa heterocyclus*.—The Japanese Kikochiku, or tortoiseshell Bamboo, so called from the curious arrangement of the alternately and partially suppressed internodes at the base of the stem, which sheath it in plate-armour like the scales of a tortoise. Apparently perfectly hardy, but has not yet thrown up any new culms; planted out in the spring of 1894.

28. *Bambusa Marliacea*.—A very handsome and rare plant.

29. *Bambusa fastuosa*.—A conspicuously fine plant introduced this year, of which we have, therefore, no experience. M. Latour Marliac assures me that it is very hardy and an extremely free grower.

30. *Phyllostachys bambusoides*.—Several different species have been sent out under this name. But the true plant has been received from Hong Kong, and is growing freely.

31. *Phyllostachys aurea*.—This plant has also been received from Japan under the name of *Bambusa sterilis*.

32. *Phyllostachys mitis*.—The tallest of the tribe. I have mentioned above the difficulties which beset its cultivation. This is the species of which the young shoots are eaten. Hence the synonym *edulis*.

33. *Phyllostachys sulphurea*.—A handsome Bamboo; very like *mitis*, but smaller.

34. *Phyllostachys Quilioi*.—Introduced by the French admiral, Du Quilio, from Japan in 1866.

35. *Phyllostachys viridiglaucescens*.—A graceful, elegant, and very hardy species.

36. *Phyllostachys flexuosa*.—Very like the last, but smaller and with some well-marked distinctions.

37. *Phyllostachys violescens*.—Suffers considerably every winter, but grows rampantly again in spring.

38. *Phyllostachys Henonis*.—My favourite in the whole group for grace and elegance.

39. *Phyllostachys nigra*.

40. *Phyllostachys nigropunctata*.—A variety of the last.

41. *Phyllostachys Boryana*.—Also supposed to be a variety of *nigra*, but very distinct.

42. *Phyllostachys Castillonis*.—A beautiful variegated species.

43. *Phyllostachys Kumasasa*; syn. *P. viminalis*, Marliac.—A very pretty dwarf.

Since the above list was drawn up three Indian species—*Arundinaria racemosa*, *Arundinaria aristata*, and *Thamnocalamus* (or *Arundinaria*) *spathiflorus*—have proved perfectly hardy. Eliminating *Arundinaria falcata* and *Thamnocalamus Falconeri*, which are not to be relied upon, we have no less than forty-four species of Bamboos which we may reasonably hope to see thrive in our pleasure grounds.

I would call attention to the fact, which I have already pointed out in the *Garden* newspaper, that every one of these forty-four varieties has the venation of the leaves tessellated. It is remarkable that no Bamboo with striated venation has hitherto proved hardy. Witness *Arundinaria falcata*, *Thamnocalamus Falconeri*, and certain of the Japanese and Chinese Bamboos with striated leaves which have uniformly proved to be failures. I do not, of course, pretend that all Bamboos with tessellated leaves will be hardy—indeed, we know that that is not the case—only that none has so far succeeded that is without that qualification. It is a curious coincidence that the only hardy Palm, *Chamærops excelsa*, also has tessellated leaf-veins.

As regards the geographical distribution of our hardy Bamboos, it is to be observed that almost all of them come from China or Japan. The Himalayas have so far yielded us only three absolutely hardy species, *Arundinaria racemosa*, *Arundinaria aristata*, and *Thamnocalamus spathiflorus*; the United States of America one, *Arundinaria macrosperma*, the typical *Arundinaria* of Michaux. From the Andes we have nothing, unless indeed

Bambusa disticha should prove to be, according to Mr. Watson's surmise, which I have mentioned above, *Chusquea tessellata*. From Africa we have no single species.

There is no doubt in my mind that, seeing there are many Bamboos growing at high altitudes in the Himalayas and in other parts of Asia, in the Andes and in Africa, we shall in time add largely to our collections of these interesting and beautiful plants. Nor is it by any means certain that the resources even of China and Japan have been exhausted. It is only within the last few months that the origin of *Arundinaria nitida*, one of the loveliest as well as one of the hardiest of its kind, has been traced by the authorities at Kew to the province of Szêchuan. It is hardly unreasonable, therefore, to suppose that the same almost unexplored region may yield other kinds equally lovely and equally reliable. The cultivation of Bamboos is as yet in its infancy. We do not know what results we may obtain from the plants we have got. Still less do we know what may be in store for us. Of one thing I am certain. We have added a new feature of distinction, grace, and elegance to our gardens, and one which cannot fail to be more and more sought after as it becomes better known and appreciated. With this conviction before me, I would fain impress upon all those interested in horticulture—whether as nurserymen, or cultivators, or amateurs—the great importance of lifting the nomenclature out of the darkness by which it is surrounded. At the present moment Bamboos are sent out under any and every name, to the despair and bewilderment of those who receive them. The impetus which has been given to this, as I think, important branch of horticulture at Kew will furnish those who seek for information with a living catalogue, and I look forward with confidence to the time when *Phyllostachys mitis* will no more be sent out for *aurea*, or *Quiloi* for *viridiglaucescens*, than an Oak for an Elm or a Rose for a Carnation.

I have very briefly and very perfunctorily touched only upon the fringe of my subject. There are many matters in connection with hardy Bamboos upon which I should have liked to say a few words. Above all I should have wished to raise some questions upon the mystery of the periodical inflorescence which would perhaps call forth some interesting remarks from those learned in the subject, and indeed in this company I feel strongly

that my part should be confined to questioning. This subject of the flower, however, is one which would demand an afternoon to itself, and happily it is one with which British horticulture is only in very rare cases likely to be concerned. I may venture to hope that some scientific botanist may one day devote a paper to its elucidation, and if the hint thus thrown out should bear fruit the few observations which, with great diffidence, I have laid before you to-day will not have been made in vain.

THE CULTIVATION OF CODIÆUMS (CROTONS) AND DRACÆNAS.

By the late Mr. C. F. BAUSE, F.R.H.S.

[Read August 27, 1895.]

THE genus *Croton*, of the natural order Euphorbiaceæ, contains a large number of handsome foliage stove-plants, which are well adapted for most decorative purposes. They form handsome objects for exhibition, and are indispensable for table decorations.

The species and hybrids are very numerous, and almost every one of them is worth growing, so wide is the difference between them in both the form and colour of their foliage. Some of the broad-leaved kinds make particularly fine plants if grown with one stem to the height of two to three feet, while those with leaves of medium width may be grown in bush form, and as such make handsome plants. The narrow-leaved section contains many first-class varieties, and few other plants are so well adapted for table decoration on account of their elegant habit and the rich colouring of their leaves.

To grow Crotons well they require a strong heat with a thoroughly moist atmosphere, plenty of light, and only moderate shading. During the winter months they do well in a temperature of 60° at night, with a rise of a few degrees in the daytime, but during the spring the temperature may with advantage rise from 5 to 10 degrees higher. Air should be admitted whenever the weather will permit, and when the sun-heat is strong, shading

should at that time of the year be given, but always somewhat sparingly. Many varieties may be grown without any shading whatever throughout the whole season; others again, to grow them well, must be shaded, or the top leaves will become small and too highly coloured, and will soon drop off. Syringing is one of the chief points in their culture, and to it great attention must be paid. In the winter-time syringing depends entirely on the state of the weather and the temperature of the house; and on cold sunless days it is sufficient to simply keep the house in a moist state. But whenever syringing do it well, it being far better to thoroughly wet the foliage all over than only to half do it. Good syringing means keeping insects down. Red-spider is the worst enemy of the Croton, and if allowed to multiply too freely it is a most difficult thing to get rid of, and is sure to spoil the top of the plant.

During the summer, on very hot sunny days, give air freely, but so as not to cause a draught, which is the sure forerunner of insects, particularly at that time of the year.

Attention must also be paid to the potting material that is used. The Croton requires a rich, moderately heavy soil: two parts of good yellow loam, pulled to pieces with the hand and the finer particles sifted out of it, and one part of good peat or leaf-soil, with a liberal addition of silver sand, makes a good compost. It must be of a porous character, and the potting must be done firmly.

As a rule, Crotons can be grown in comparatively small pots, provided that care is taken in watering and the drainage is ample. During hot, drying weather, the plants should be looked over several times a day, particularly those which are pot-bound; at any other time of the year once a day is sufficient, but at no time of the year should they suffer from want of water, particularly those that are well rooted. Newly potted plants should be treated with care, and not be watered too heavily until they begin to root through to the sides of the pots. Where quantities are grown they should have a house to themselves; but if a few are kept among other stove-plants, they should be put together at the warmest part of the house. Large plants may be grown among other miscellaneous subjects, if elevated on pots so that they stand freely above the other plants.

The propagation of Crotons is chiefly done by cuttings, or if

extra large tops on old plants are wished to be removed, then the process of "ringing" must be resorted to. They are also raised from seed, this plan being adopted mostly for the production of new varieties. The wood of the branches or tops chosen for propagating should be firm to root them quickly, as, if the cuttings taken are too tender, they take a long time to root, and many leaves dry up and drop. Each cutting should be clean cut with a sharp knife under a node or leaf-joint, and may be put singly in small pots in light sandy soil, and placed under a bell-glass. The way for raising large quantities is to plant them in a bed, under lights in cocoa-fibre refuse or sand. During the time they are to make their roots [the material must be kept in a moist state, and never allowed to become dry. The bottom heat of the bed should vary from 75° to 80°, and the cuttings should be kept carefully shaded until they have rooted. Many varieties will be found sufficiently rooted to be potted into small pots at the end of three weeks; a few will take a month. After being potted in small pots they should again be placed in a close case for a fortnight or so, till well rooted. A little air may then be admitted and the young plants gradually hardened off, so that they can be shifted into another house if desired. The soil for potting the cuttings should be light, with a fourth part of sand; but, as the young plants improve and require shifting into larger pots, the soil recommended for full-grown plants should be used.

When large tops are to be rooted, that part of the stem of the old plant where the roots are desired to be formed, should have a few leaves removed, one or two incisions made with a sharp knife, and some Sphagnum Moss put round the stem and firmly tied with a little matting. Another plan is to put a 60 or 48 pot round the stem, cut the pot in halves, lengthways, and place the two halves on opposite sides of the stem, then fill the pot up with a mixture of fibrous peat, from which the finer portions have been removed, Sphagnum Moss, and a little sand. In this material large tops root freely, if the compost is kept uniformly moist. Generally about a month elapses before roots begin to appear, and as soon as the pot is well filled with roots, a larger one should be put round. This is very necessary in all cases where the top is at all large and heavy, as by this means more roots will be formed and the newly struck plant will then stand

parting from its parent without flagging. The stem should be cleanly cut just below the pot, and the new plant be stood in an empty pot in a moist close house for the first few days, when it will soon be found to be perfectly established.

If seeds have been obtained by cross-fertilisation, which is done to produce new varieties, they should be sown as soon as they are ripe in pots filled with porous sandy soil, and kept thoroughly moist. The pots should be placed in a warm house on a stage, not in a close case which renders the seedlings liable to damp off as they come up. As soon as they can be handled the seedlings should be pricked off in pots with a similar soil till ready to be potted singly in small pots and grown on among the general collection.

DRACÆNAS.

Considering their utility as regards habit, colour, and durability, the *Dracæna* family stands out most prominently among fine foliage plants. They are, with very few exceptions, of comparatively easy cultivation, and being quick in growth are therefore the more valuable either for exhibition, table decoration, or for the embellishment of apartments.

The numerous species and varieties are principally cultivated in warm houses, but a few are essentially greenhouse plants. The coloured-leaved section may be divided into broad, medium, and narrow-leaved varieties. Of these the broad-leaved ones generally make the finest specimens, and are therefore best adapted for exhibition. The medium-leaved varieties adapt themselves to all purposes, while the narrow-leaved are the most in demand for table decoration. The section of which *D. Goldieana* is the type form very handsome variegated plants, while the green varieties, such as *Danelliana*, are most useful decorative subjects from being so very hardy. The varieties of *D. indivisa* make splendid specimens planted out in the garden during the summer, or if grown in pots they do well in a cool position. Such species as *D. Draco*, *D. umbraculifera* and others are mostly grown in a stove and may be considered as plants for a collection, their utility for decorative purposes being valueless.

All those which require stove treatment during their growth should be kept in a uniform temperature, varying, however,

according to the time of year. During the winter months, when the days are short, about 60° should be maintained at night, and also on cold sunless days. Generally the temperature rises naturally a few degrees during the daytime through the influence of the sun or changes of the weather. Towards the spring 65° is necessary, with a rise of 5° to 10° . During the summer months a temperature between 70° and 80° should be maintained, together with a circulation of air from the roof of the house. In spring and autumn air should be admitted only on fine warm days.

A thoroughly moist atmosphere is also necessary, the plants being very subject to thrip and red-spider; consequently the house should be moistened several times a day. Syringe the plants once a day during the summer time, in the forenoon, with soft water if possible, and be particular to let the syringe play well from below, so that the foliage may be thoroughly wetted on both sides. Keep the walls clean by whitewashing them twice a year.

During the winter-time syringing must be regulated according to the weather, and generally at this season of the year twice a week will be sufficient to keep the plants clean and the foliage in a healthy state. Green-fly will be found troublesome at times, but they can be easily kept under by dusting with tobacco-powder on the part affected, which is mostly the heart of the plants. If red-spider should appear, the plants must be washed at once with clean soft water.

The varieties differ materially as regards their durability for decorative purposes, the coloured leaves of some being found to last far better than others, but this depends to a great extent on the mode of cultivation. If they are grown in a high temperature and with a moist, close atmosphere, the foliage becomes tender, and coloured leaves so produced will never last long intact. Make it a rule, therefore, to grow the plants close to the glass and elevated on empty pots if the bed is at all low. Pay every attention to keep the soil in a *regular* state of moisture; do not let the roots suffer from dryness, and every day see that each plant is watered when the soil is still moderately moist. Irregularity in treatment, such as dryness at one time, followed by excessive watering, combined with a damp atmosphere at another, causes most of the roots to rot, the leaves become

infested with spots, and the bottom of the stem just above the soil gets hardened, and so stops further growth.

As a potting soil use two parts of good fibrous loam, one of leaf soil and one of peat. Let it be porous and picked with the hand, and add one-sixth of silver sand. Have the whole thoroughly mixed, which will form a porous compost.

Do not allow the plants to become root-bound in a small state, but use the size of pots according to the purpose for which the plants are intended to be grown. Many species and varieties may be grown into large specimens, but most of them are equally suitable for small pots as they develop their character in a young state. For general use, 5- and 6-inch pots are the most convenient, in which sizes perfectly well-coloured plants can be grown. Those intended to be grown into large specimens should be re-potted several times at intervals, until finally potted in 12-inch pots. A layer of good drainage is indispensable, and the thickness of it should depend on the size of the pots used. The soil being coarse, it should be pressed firm, not hard.

Particular attention should be paid to shading. It is absolutely necessary to protect *Dracænas* from the strong rays of the sun, if the foliage and colour are to be kept in a fresh and healthy condition. If too much exposed to direct sunlight, the leaves turn rusty, and the lower ones drop off.

Most of the *Dracænas* can be very readily propagated, but some species require time to get up a stock. They are propagated by means of cuttings, roots, stems, and seeds. The numerous introductions and hybrids of the coloured section can be propagated at any time throughout the year; but where a quantity is intended to be grown for decorative purposes, and well-coloured plants about 12 to 24 inches are required during the autumn and winter months, October will be found the most suitable time for increasing them; those propagated in the beginning of the year usually come in ready for use the following spring. All plants intended to be cut up should have the top taken off first, and the stems cut in portions of two inches in length, with a sharp knife, so that the skin may not be bruised with the fingers, or the pieces will be liable to rot after being put in heat. They should be laid in cocoa-fibre refuse, or sand, in a close case in bottom heat about 75°, and slightly covered with the same material, and be kept of an even temperature

and uniformly moist. In a very short time they will begin to grow, and the young shoots as soon as they are strong enough should be cut off. Many of them will have made roots already. These should at once be potted in small pots, and those not rooted put in a bed as cuttings, and potted up afterwards.

D. Goldieana, *D. Sanderiana*, *D. fragrans*, and others intended for cutting up, should, if the plants are small, have the top taken off, when side shoots will soon begin to grow, and these may again be taken off as soon as large enough to form a strong cutting. If the plants are large, and well furnished with leaves, the stem should be cut in pieces, with one or two leaves attached to each, and put in the bed in a close case, or else each cutting put in a small pot in light sandy soil. Generally in about a month or six weeks the cuttings will be found well rooted.

D. indivisa, *D. australis*, and similar kinds are increased by means of seeds generally imported from their native country, and in this way are propagated freely, and grown in large quantities. Home-grown seeds should be sown soon after being harvested, and imported ones as soon as they come to hand. They should be sown in 48 pots in a light sandy soil. Peat and sharp silver sand mixed is a most suitable material. The pots should be filled rather more than half full with potsherds, and a layer of the soil about an inch deep be placed upon them, the seeds being only slightly covered with a little finer sifted soil. The seedpots may be placed in any part of a moist warm house, but the soil must be kept in a constant state of moisture. When the seeds begin to germinate care must be taken with the watering, as if kept too wet the seedlings will damp off, while if, on the other hand, the soil should at times become too dry, those not yet germinated will suffer. Care should therefore be taken with the watering until they have all come up. As soon as the seedlings can be handled they should be transplanted, and in due time be potted in single pots.

NUT-GROWING IN ENGLAND.

By Mr. J. OMER COOPER, F.R.H.S.

[Read October 15, 1895.]

THE nut, the subject of the paper I have been induced to write, is one that should be interesting to all gardeners and fruit-growers, and to those who have large estates, for the nut will often grow and thrive where few other things will.

The word "hazel" (Anglo-Saxon *hæsel*) is supposed to be derived from the Anglo-Saxon *hæs*, a behest, connected with *hātan*, equal to the German word *heissen*, to give orders; and the hazel-wand was the sceptre of authority with the shepherd chieftains of olden times.

The common Hazel (*Corylus Avellana* of Linnæus, and belonging to his twenty-first class, *Monocia*, containing all plants having male and female flowers separate on the same root) is distributed throughout Europe, North Africa, Central and Russian Asia, except the most northern parts.

In the natural system the tree belongs to *Corylaceæ*, which includes all plants which have their male flowers arranged in aments, commonly called catkins, which are very noticeable during the autumn and winter. These cylindrical, drooping, yellow male catkins are from 1 to 2½ inches in length. The female flowers are bright purple or crimson, small, sessile, resembling leaf-buds, and proceed from the apex of the largest buds; and the minute inner bracts, by their enlargement, eventually form the husk of the nut. The ovary is not visible till nearly midsummer, and is not fully developed before autumn.

The nuts have a length of from half to three-quarters of an inch, and grow in clusters. Clusters of two or three nuts are the result of the equal development of two or all the three carpels of the original flower, of which, ordinarily, two become abortive. Fusion of two or more nuts is also not uncommon. The bark of the older stems is of a bright brown, mottled with grey; that of the young twigs is ash-coloured, glandular, and hairy. Shakespeare refers to the colour of the hazel-nut in his "Taming of the Shrew," act ii. scene 1, where Petruchio says: "Kate, like the hazel-twigg, is straight and slender; and as brown in hue as hazel-nuts, and sweeter than the kernels."

In the variety *Corylus purpurea* the leaves, as also the pellicle of the kernel and the husk of the nut, are purple; and in *Corylus heterophylla* they are thickly clothed with hairs.

The Hazel is commonly found in hedges and coppices, and as an undergrowth in woods, and reaches a height of some 12 feet or so, but occasionally it is much taller.

Its Uses.

The wood of the Hazel is whitish-red, close in texture, and pliant, and has, when dry, a weight of 49 lb. per cubic foot; it has been used in cabinet-making and for toys and turned articles. Curiously veined veneers are obtained from the roots; and the root-shoots are largely employed in the making of crates, coal-baskets, hurdles, withes and bands, whip-handles, and other articles. The rods are reputed to be most durable when from the driest ground, and to be especially good where the bottom is chalky. The light charcoal afforded by the Hazel does well for crayons, and is valued by gunpowder manufacturers. The Hazel makes an excellent hedge, and would no doubt be oftener employed for this purpose were it not for the nut-gatherers, who, in their active vigour to secure if only an unripe nut, will break it down and cause much damage. It makes excellent cover for birds, and in the autumn the rich yellow tint acquired by the leaves adds greatly to the beauty of landscapes.

Keller, in his "Lake Dwellings," tells us that Hazel nuts formed part of the food of the ancient lake-dwellers of Switzerland and other countries of Europe. By the Romans they were sometimes eaten roasted.

A belief in the efficacy of divining-rods of Hazel for the discovery of concealed objects is probably of remote origin. Rods of Hazel were considered serviceable for finding silver lodes and water. The virtue of the Hazel wand was and still is supposed to be dependent on its having two forks; these are to be grasped in the hands, with the fingers uppermost, but with moderate firmness only. This rod in proper hands is believed to indicate where springs of water are to be found.

Mr. B. Tomkins, of Chippenham, who has been largely employed as a water-finder, has published a little work on the theory of water-finding by the divining rod.

Cultivated nuts are for the most part called Filberts.

Derivation of the Name.

The word Filbert, according to Junius and Skinner, is corrupted from *full* and *beard*, or *full of beard*, from its long beards or husks, whence it is called in Germany *bart-nusz*, *i.e.* beard-nut; but according to Gower it is from Phillis, "Phillis was shape into a nute-tree that all men might see; and, after *Phillis*, *Philberd* this tree was cleped (called) in the Yerd." And we read in Spenser's Phillis, "Philbert there away compar'de with Mirtle and the bay." In German it is usually called "Nut from Lombardy" (*nux Lombardica*). But in Chambers's Etymological Dictionary we find: "Filbert, the fruit or nut of the cultivated Hazel (probably so called from St. Philibert, whose day fell in the nutting season, August 22; so in German it is Lambertsnuß, St. Lambert's nut)."

When brought into Britain.

At what period the large cultivated Filberts were brought into Britain is very uncertain. That it did not originate here naturally, but was an imported plant, is evident from the name. It is not improbable that it was first introduced into the county of Kent, where it is more extensively cultivated than in any other part of the United Kingdom.

How propagated.

The Filbert can be propagated by suckers and layers and by grafting. When propagated by seed, they seldom, if ever, come true, not one in a hundred as a rule being worth growing, and a great loss of time has to be incurred in waiting for the fruit. Layers and suckers afford the strongest and earliest bearing trees. My own experience is that the best plants are obtained from layers, and I believe the Maidstone growers agree with me in this. The layers become well rooted in about twelve months, and then, after pruning, are bedded out in the nursery for two or three years. Grafted Filberts are less liable than others to be encumbered by suckers at the root.

How and where to grow them.

The Filbert may be economically grown on the borders of plantations or orchards, or in open spots in woods, or in rows on either side of a road or footpath, so as to form an agreeable shade. When grown for market purposes in plantations made in the autumn, the ground should be well drained, the trees placed at a distance of 12 feet apart and 12 feet from row to row; sometimes they are grown 24 feet apart, with an Apple, Plum, or some other fruit-tree between. This is a very economical plan, because when the crop of nuts is small the crop of fruit may be large. Some growers give a space of nine feet between, and some even less than this. The late Mr. Richard Webb planted his trees in squares 8 feet 3 inches apart. I prefer planting them in squares 12 feet apart, or, where other fruit-trees are grown with them, 24 feet apart in the rows, and the rows 12 feet apart.

Soil.

Filberts thrive best in a rich, dry loam, deeply worked, with a rocky or stony bottom; but in a rich soil it is difficult to bring them into an early bearing state.

In and around Maidstone the soil upon which the nuts are planted varies very much, but, generally speaking, it is a rich loam, with a subsoil of limestone or Kentish ragstone. This kind of soil seems particularly suitable to the Filbert. Ground good for Hops is also good for Filberts. A clay or stiff loam containing an abundance of flints also suits them well. There are some kinds of Filberts which seem to do well in almost any kind of soil; indeed they will grow wherever the common Hazel is to be found.

Pruning.

To obtain a good tree the practice in Kent is to select a stout upright shoot 3 feet or more in length; this is cut down to about 18 inches, of which the lower twelve are kept free from out-growth. The head is pruned to form six or eight strong branches, and by judicious use of the knife, and by training, preferably on a hoop placed within them, they are caused to grow

outwards and upwards to a height of about 6 feet, so as to form a bowl-like shape, and so that the upper portions can be easily reached by a man standing on the ground, both for the purpose of pruning and of gathering the fruit. Excessive luxuriance of the laterals (often arising from the richness of the soil in which they are planted) may be prevented by root-pruning, or by checking them early in the season and again later on by cutting back to a female blossom bud, or else spurring nearly down to the main branch in the following spring. Many growers in July or August break (without quite severing) the strong yearling shoots. This is found to be better than pruning with a knife, because it allows the sap to continue to flow slowly down the broken piece, thus preventing a second growth; it also helps to ripen the wood and swell the buds below the fracture. In winter the broken ends are cut off with a sharp knife.

Some growers adopt an altogether different method and grow Filberts as bushes, merely cutting out the centre growths as you would with Gooseberries and Currants, and shortening the strong yearly growths. In all cases the ground should be kept clear of weeds, and all suckers from the roots hoed off or severed with a sharp knife.

Productiveness.

Williamson, in a productive year (1819), obtained from fifty-seven trees, mostly not above six years old, and growing on 360 square yards of ground, 2 cwt. of nuts. The late Mr. Webb, of Calcot, in a year when Cob-Filberts were by no means abundant, gathered from half an acre of ground 1,300 lb. and upon another, three-quarters of an acre, 1,700 lb.; these he actually sold at £7 per 100 lb., being at the rate of £170 an acre. A gentleman in Kent tells me that on a plantation of $8\frac{1}{2}$ acres, now in about its forty-fifth year's growth, his maximum quantity has been 2 tons an acre and his minimum $2\frac{3}{4}$ cwt. an acre; the average for the last five years being 1,621 lb. an acre, which includes one very small and one very large crop. The trees are planted 12 feet \times 12 feet, or 300 trees to an acre, and at 24 feet apart are planted Apples and Damsons alternately. But this gentleman, who is considered one of the best growers in Kent, does not advise planting Damsons at all in a nut plantation:

1. Because they soon cover the ground with spawn, which requires grubbing up twice during the summer, creating expense ;
2. They rob the nut-trees too much ;
3. They are frequently infested with green-fly, which make the nuts underneath foul by their droppings, rendering the nut less saleable and checking the growth of the young wood ;
4. They exclude sun and air too much ; and, lastly, they do not pay.

A writer in the *Gentleman's Magazine* of 1788 says that in certain conditions of growth the trees may bear almost exclusively male or female flowers. Those produced at the first blossoming are stated to be female only, but their fertilisation may be secured by suspending amongst them a branch with male bloom. A better way, I think, is to grow a hedge of those nut-trees which generally bear a large quantity of catkins, and these trees, if allowed to grow high, will both answer the purpose of providing pollen for the female bloom and at the same time form a protection to the plantation.

The Sorts of Filberts generally grown.

In Kent the Kent or Lambert's Cob is principally grown, also Cosford and the Red-skinned Filbert, and this last-named is grown in very many gentlemen's gardens throughout the country. Webb's Prize Cob Filbert is now very extensively grown ; it is a large, hardy, and most prolific variety, and always commands a good price in the market. The Cob Filberts, which are likely to become the Filberts of the future, are the last-mentioned, the Duke of Edinburgh (which was awarded a certificate by the Royal Horticultural Society, October 9, 1883), the new Cob Davianum, and the Improved Cosford Cob. There are many other good sorts of nuts grown, none of which, however, are likely to compete with the above.

Enemies of the Filberts.

Kaltenbach enumerates ninety-eight insects which attack nuts. Among these the beetle *Balaninus nucum*, or nut-weevil, seen on Hazel and Filbert from the end of May till July, is very destructive to the nuts. The female lays an egg in the green, upright, tender nut, on the kernel of which the larva subsists till September, when it bores its way through the shell and enters the earth, to undergo transformation into a chrysalis :

the growth of the shell does not seem to be retarded or in any way changed by this operation, as is generally the case with other fruits when penetrated by insects.

The leaves of the Cob Filberts are frequently found mined on the upper and under side respectively by the larvæ of moths. Of these the larvæ of *Chimatobia brumata* and of *Hibernia defoliaria* (the winter moth) are the most destructive. They also suffer from caterpillars of the *Geometrinæ* family, known by the name of "Loopers." Aphides and frog-fly, or frog-hopper, also attack them.

Parasitic on the roots of the nut-tree is found the curious leafless *Lathræa squamosa*, or Toothwort, of the natural order *Orobanchaceæ*.

Darwin states that the tomtit has been observed to pass over the Filbert whilst destroying other nuts. The nut-hatch may be heard with its rap, rap, rap wherever Filberts are grown in any quantity in the south of England; it very adroitly fixes the nut in a fork of the tree or a hole in the bark and hammers away until the shell is broken, when it eats the kernel, and handfuls of shells thus broken by the nut-hatch may be picked up from under the trees. Squirrels also are very fond of nuts, and will travel some distance to a nut plantation. In Calcot Gardens, in a small plantation of about 10 acres, as many as fifteen squirrels have been shot in a single season. The field mouse, too, not only eats the nut during the season of its ripening, but will lay up a stock for the winter. The writer has found many a nest stored with about two dozen of the largest, finest, and heaviest nuts buried in the earth by this thrifty little creature.

POTATOS.

By Mr. ARTHUR W. SUTTON, F.L.S., F.R.H.S.

[Read October 29, 1895.]

WHEN I was asked to read a paper on Potatos before the Royal Horticultural Society, our esteemed Secretary was kind enough to intimate that the Council had purposely chosen a general title in order to leave me at liberty to take up any branch of the subject I might prefer.

Such an expression of confidence was naturally very much appreciated by me, although in some respects it rendered my position more difficult. In itself the subject of Potatos may not be particularly attractive even to the majority of horticulturists, and it is so comprehensive that one scarcely knows where to commence. Perhaps the task might have seemed easier had one specific aspect of this wide question been chosen; but then I should probably have realised that I could only follow others, far more competent than myself, who had already placed the results of extensive research before the horticultural world. Possibly the knowledge that every point had been so fully dealt with induced Mr. Wilks to leave the speaker a free choice in attempting to find new features of interest. However this may be, I consented to do the best I could under the circumstances.

INTRODUCTION OF THE POTATO.

Concerning the introduction of the Potato into England, the following extract from "Loudon's Encyclopædia," published in 1836, is of sufficient importance to find a place in any paper on Potatos:—

"It appears probable that the potatoe was first brought into Europe from the mountainous parts of South America in the neighbourhood of Quito, where they were called *papas*, to Spain, early in the sixteenth century. From Spain, where they were called *battatas*, they found their way to Italy, and there received the same name as the truffle, *taratoufli*. From Italy they went to Vienna, through the Governor of Mons in Hainhault, who sent some to Clusius in 1598. To England the Potato found its way from North America, being brought from Virginia by the colonists sent out by Sir Walter Raleigh in 1584, and who returned in July 1586, and 'probably,' says Sir Joseph Banks, 'brought with them the potatoe.' Gerarde, in his Herbal, published in 1597, gives a figure of the potatoe under the name of Potatoe of Virginia, whence, he says, he received the roots; and this appellation it appears to have retained, in order to distinguish it from the *battatas* or sweet potatoe (*Convolvulus battatas*), till the year 1640, if not longer. . . . Gough says the potatoe was first planted by Sir Walter Raleigh

on his estate of Youghall, near Cork, and that they were soon after carried into Lancashire. Gerarde and Parkinson however mention them as delicacies for the confectioner and not as common food. Even so late as Bradley's time [1716, in his "Historia Plantarum Succulentarum"] they are spoken of as inferior to skirrets and radishes.

"The use of potatoes, however, became more and more known after the middle of the eighteenth century and has greatly increased in all parts of Britain within the last thirty years. It is also very general in Holland and many parts of France and Germany, and is increasing rapidly in Russia. In Spain and the East and West Indies they are not much cultivated owing to the heat of the climate; but in all the temperate parts of North America, Australasia, and South America they are grown by the colonists. In China they are cultivated, but not extensively, owing to the slow progress which everything new makes in that country. Indeed, no root hitherto discovered is so well adapted for universal use as the tubers of the potatoe; for, having no peculiarity of taste, and consisting chiefly of starch, their farina is nearly the same as that of grain. Hence with the flower [*sic*] of potatoes, puddings and such preparations as do not call the gluten of wheat-flower into action may be made equal to those of millet or rice, and excellent bread with a moderate proportion of good wheat-flour. Potatoe starch, independently of its use in the laundry and as a hair-powder, is considered an equally delicate food as sago or arrow-root. As starch and sugar are so nearly the same that the former is easily converted into the latter, the potatoe yields a spirit equal to that of malt by distillation and a wine or beer by the fermentative process."

Monsieur Henry L. de Vilmorin, in his lecture on the best kinds of Potato, read before the Agricultural Society of Paris on January 30, 1888, mentions that towards the end of the sixteenth century the Potato was introduced directly into England, where it rapidly obtained a position amongst the common vegetables of the garden. On the Continent, however, its progress was

attended with greater difficulty. The prejudices which existed against its general use were, however, combated with energy by certain men devoted to the public welfare, such as Duhamel du Monceau, Inspector-General of Naval Construction, Mgr. du Barral, Bishop of Castres, and the Minister Turgot himself. It was reserved, however, to Monsieur Parmentier to succeed where so many able men had failed, and his success was due above all things to his perseverance and the tact with which he used his intimate knowledge of the character of *les Parisiens*. Instead of trying to convince them by argument, he undertook, with the consent of the King, Louis XVI., to plant Potatos on the plain of Les Sablons, and, surrounding his experiments with an air of mystery, he had the plot guarded by a cordon of troops, and thus succeeded in adding to the curiosity of the population. He then invited a number of scientific and influential men to a banquet where every dish was either composed chiefly of Potatos or was served up with Potatos as an accompaniment. This proved the most eloquent demonstration possible of the culinary properties of the new vegetable, and his cause was gained. During the end of the eighteenth and the early years of the nineteenth century the Potato made great progress, and when in 1813 the Central Society of Agriculture undertook to provide, as a basis for study of the culture of the Potato, a collection of the varieties then in use throughout the French Empire, it brought together no less than 115 to 120 varieties.

Count Rumford in the middle of the last century tells of the trouble he experienced in persuading the people of Munich to use the Potato as food, even in a time of great scarcity. Only by his disguising the Potato in a kind of soup did they gratefully accept his offering.

Were we anxious to discuss the various species of tuber-bearing Solanums, has not Mr. Baker, in his very able paper read before the Linnæan Society in January 1884, entitled "A Review of the Tuber-bearing species of Solanums," given the result of such careful research that none but the most rash would attempt to follow him in the same field of inquiry? Or, if one wished to trace the history of the Potato and its susceptibility to disease, are we not confronted with the complete and exhaustive paper contributed by Lord Cathcart to the "Journal of the Royal Agricultural Society of England," Part I., April 1884?

On the practical details of Potato culture alone we have many treatises, varying in length and differing in style. They include volumes on new or improved methods of growing the crop, such as the "Jensen" system of earthing up; the proper time to plough and manure the land; the most suitable soil for Potatos;



No. 1.—JOHN GERARDE.

(Reproduced by photography from Gerarde's "Herbal.")

FIG. 30.

the varieties adapted for different soils; the manures which ensure the largest marketable return; economical modes of planting, lifting, and storing; and other topics which we are now compelled by stress of time to pass unmentioned.

The important question of disease-prevention remains for consideration. At the present time, the Potato fungus is fought by two methods, differing fundamentally in principle. By the system originated in France, an effort is being made to frustrate the insidious attacks of the *Phytophthora*, or *Peronospora*. The crop while growing is either sprayed with the liquid Bordeaux



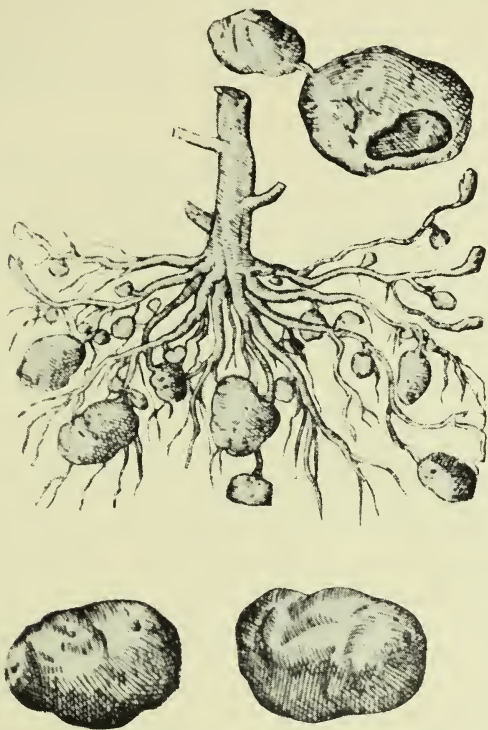
No. 2.—REPRODUCTION OF GERARDE'S ENGRAVING OF VIRGINIAN POTATO FOLIAGE.

FIG. 31.

mixture known as "Bouillie Bordelaise," or the plants are dusted with a powder consisting of similar chemical constituents. The other system is attempting to accomplish the same end by raising and distributing seedlings having a robust constitution, capable of resisting the attacks of the fungus. In this system I have for years taken a deep interest, and it has occurred to me that it might be possible to succeed in popularising this branch of ex-

perimental work, especially if aided by photographs * illustrating various stages in the history of the experiments I have conducted. To these I have added a few examples of related species.

We have already seen that the Potato was introduced into Europe early in the sixteenth century, and into England about



NO. 3.—REPRODUCTION OF GERARDE'S ENGRAVING OF THE VIRGINIAN POTATO.

FIG. 32.

the year 1586. I wish I could show you a picture of what the Potato was like as first grown by Sir Walter Raleigh and others ; but photography was not then known, and I have not met with any authentic engraving of that time.

The first illustration is a portrait of Gerarde, reproduced from the frontispiece of his well-known "Herbal," and it will

* The illustrations were shown during the delivery of the lecture by means of lantern slides, prepared by Messrs. Newton for the purpose.

be noticed that in Gerarde's hand is a spray of the Potato plant with flowers and berries. From this it is evident that he regarded the Potato plant as one of the most important and valuable of those described in the "Herbal."

Illustrations Nos. 2 and 3 are photographs taken from Gerarde's engraving of the Potato plant on page 927 of his work, and no doubt these illustrations represent the Potato as grown in his garden. After a lapse of three hundred years his somewhat quaint description of the plant and its uses may not be without interest. It is as follows :—

"Virginian Potato hath many hollow flexible branches trailing upon the ground, three-square, uneven, knotted or kneed in sundry places at certaine distances, from the which knots cometh forth one great leafe made of divers leaves, some smaller and others greater, set together upon a fat middle rib by couples, of a swart greene colour tending to rednesse, the whole leafe resembling those of the Winter-Cresses, but much larger, in taste at the first like grasse, but afterwards sharp and nipping the tongue, from the bosome of which leaves come forth long round slender foot-stalkes, whereon grow very faire and pleasant floures, made of one entire whole leafe, which is folded or plaited in such strange sort that it seemes to be a floure made of five sundry small leaves, which cannot easily be perceived except the same be pulled open. The whole floure is of a light purple colour striped downe the middle of every fold or welt with a light show of yellownesse, as if purple and yellow were mixed together. In the middle of the floure thrusteth forth a thicke flat pointall yellow as gold; with a small sharp green pricke or point in the midst thereof. The fruit succeeds the floures, round as a ball, of the bignesse of a little bullesse or wilde plunme, green at the first and blacke when it is ripe, wherein is contained small white seed lesser than those of mustard: the root is thicke, fat and tuberous, not much differing either in shape, colour, or taste, from the common Potatoes,* saving that the roots hereof are not so great nor long, some of them are as round as a ball, some oval or egge-fashion, some longer, and others shorter,

* The allusion is to the sweet Potato, *Convolvulus Batatas* (*Ipomœa Batatas*, Kew Index), then known as the common Potato.

the which knobby roots are fastened unto the stalks with an infinite number of threddy strings.

“It groweth naturally in America, where it was first discovered, as reporteth Clusius, since which time I have received roots hereof from Virginia, otherwise called Norembega, which grow and prosper in my garden as in their owne native country.

“The leaves thrust forth of the ground in the beginning of May; the flours bud forth in August, the fruit is ripe in September.

“The Indians call this plant pappas, meaning the roots; by which name also the common Potatoes [again referring to the sweet Potato] are called in those Indian countries. Wee have its proper name mentioned in the title [“Potatoes of Virginia”]. Because it hath not only the shape and proportion of Potatoes, but also the pleasant taste and vertues of the same, we may call it in English, Potatoes of America or Virginia.

“The temperature and vertues be referred to the common Potatoes [the sweet Potato], being likewise a food, as also a meat for pleasure, equall in goodnesse and wholesomenesse to the same, being either roasted in the embers or boiled and eaten with oile, vinegar and pepper, or dressed some other way by the hand of a skilfull Cooke.

“Bauhine saith that he heard that the use of these roots was forbidden in Bourgondy (where they call them Indian Artichokes) for that they were persuaded the too frequent use of them caused the leprosie.”

This picture suggests many thoughts and comparisons. How little like the fine, handsome, and even tubers now exposed for sale by the greengrocers in London and elsewhere! What a change, too, in public opinion as to the value of the Potato between Gerarde's time and our own! Then it was regarded as a luxury of questionable value or utility by the wealthy few; now it is in demand as a daily necessity by all classes throughout the civilised world, and the consumption is enormous.

ACREAGE IN THE UNITED KINGDOM, FRANCE, AND GERMANY.

Here it may be interesting to note that the area of Potatos planted in the United Kingdom in 1894 amounted to 1,232,055

acres, averaging 3 tons 15 cwt. 2 qrs. 20 lbs. per acre, or a total of 4,662,147 tons grown in the United Kingdom, besides a large quantity imported (for 1893 the figures were 14,140 tons). Reckoning the entire population as 37,880,764, this would allow about $2\frac{1}{2}$ cwt. for every man, woman, and child per annum; but these figures make no allowance for the quantity annually consumed in feeding cattle, which is always considerable, and varies in proportion to the market value of Potatos; nor do they take into account the large quantity planted as seed.

Monsieur H. de Vilmorin has very kindly sent me the figures for France, and he tells me that the area under cultivation is annually about 3,342,500 acres, and the total yield for the whole of France is 10,100,000 tons, or, making allowance for the quantity exported and imported, the consumption amounted to 10,000,000 tons. Whilst in England Potatos are grown almost entirely for use as an esculent, Monsieur Vilmorin estimates that about two-fifths, or 4,000,000 tons, are annually used in France in the manufacture of starch and alcohol.

I also learn from my friend Herr Fritz Benary, of Erfurt, who has placed in my hands very valuable statistics, that the area devoted to Potatos in the German Empire in 1893 was 7,592,165 acres. The total quantity of Potatos harvested amounted to 32,277,851 tons, or, allowing for the quantities imported and exported, 32,376,497 tons, which was the total quantity available for use. Out of this total 6,074,732 tons were reserved to plant the crops of the following year, leaving 26,301,765 tons for consumption as food and for manufacturing purposes. Of this immense quantity, Herr Benary says that 1,313,584 tons were employed for distilling; but he is unable to state what proportion of the remaining 24,988,180 tons was used in the manufacture of starch, as no statistics are obtainable.

From the figures quoted we get some idea of the enormous commercial and economical advantages which have accrued from the introduction of the Potato into Europe.

IMPROVEMENT AND DETERIORATION.

It would now be interesting to trace the steps by which the great improvement in the cultivated forms of the Potato has been brought about. Fortunately, in this instance the old rule that

“like produces like” does not hold good; for had the development of the Potato been restricted by such limitations, it is probable that our present supply would be similar in character to those of which Gerarde speaks. And here it is necessary to refer to a misunderstanding arising from the fact that “seed Potatos” and “Potato seed” are sometimes regarded as synonymous terms. “Seed Potatos” are grown from perfectly true and reliable stocks, the crops being carefully examined year after year with the special object of ensuring the perpetuation, unmixed, of any given variety. Frequently the tubers of an ordinary crop,



No. 4.—POTATO FLOWER.

FIG. 33.

which are too small for market, are kept back for planting, and dignified with the title “Seed Potatos.”

I need scarcely remind you that Potatos are mere enlargements of underground stems, shortened and thickened, in which starch is stored up in smaller or larger proportion according to the characteristics of the several varieties. Like other underground stems, the tubers possess buds or eyes, from which, by fresh shoots, the plant is capable of redevelopment; and although the tubers may be preserved through the winter for planting again in the following spring, they are neither more nor less

than portions of the plant which died down and apparently ceased to exist in the previous autumn. Hence the life of a single Potato plant may be prolonged year after year until through weakness or deterioration it comes to an end. It will therefore be obvious that improvement by selection of the tubers is impracticable. Anyone can demonstrate this by planting a tuber which from any cause may be misshapen. The produce



NO. 5.—POTATO BERRIES AND FOLIAGE.

FIG. 34.

will revert to the uniform type of the variety to which it belongs. The only modification of this rule I am acquainted with is in the cases where *all* the tubers of one plant show a uniform divergence in character, either for better or worse. When this is so it is possible that, by the selection of all or any of these tubers, a slightly different Potato might result, as in the case of some types of the Ashleaf section, which are dwarfer and more com-

pact, or else taller and coarser-growing, than others. Outside the Ashleaf class, however, I know of no such instances. A really first-class seedling Potato is not liable to degenerate so quickly as is generally supposed. If degeneration sets in soon after its



No. 6.—POTATO BERRIES.

FIG. 35.

introduction, it merely proves that the variety is one which ought never to have been brought to public notice.

RAISING SEEDLINGS.

Potato seed, on the other hand, is totally distinct in every way, being the seeds formed in the Potato berries which some,

though not all, varieties of Potatos bear freely. Before describing the berries and the seeds they contain, I give an illustration (No. 4) of the well-known Potato flower.

Illustrations Nos. 5, 6, and 7 show some of the berries in their natural condition, and others cut to display the arrangement of the seeds within the berries. A berry may contain from 100 to 300 seeds, the average of five berries examined being 232, and as



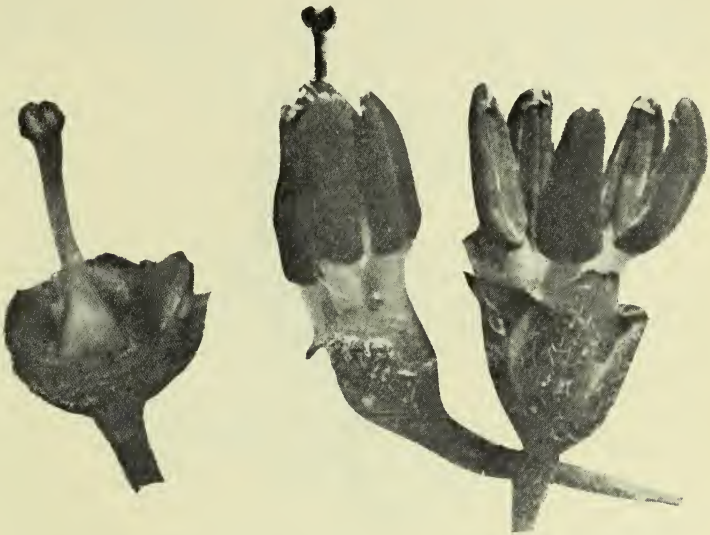
No. 7.—POTATO BERRY SLICED. (ENLARGED.)

FIG. 36.

the parent plant appears able to control but slightly the distinctive character of its progeny, and as all the different seeds from one potato berry may produce plants differing from one another, not only in form, but many of them in colour also, it is here we find the great possibilities for improving the race by selection of the better seedlings. Even if no cross fertilisation of flowers was attempted, great improvement might be made by the selection of the most promising seedlings during the first

few years of their existence; but where judicious crossing of the best known varieties is undertaken we can in a great measure combine in some of the resulting seedlings the merits of both male and female parents, although even then no two seedlings from the same berry may be exactly alike.

Those who attempt to raise seedling Potatos must possess abundant patience. Like many other species which are not habitually multiplied by seed, the Potato has a remarkable



No. 8.—PISTIL OF POTATO
FLOWER. (ENLARGED.)

No. 9.—ANTHERS CLOSED AROUND STIGMA, ALSO
EXPANDED. (ENLARGED.)

FIG. 37.

tendency to revert to the wild form. It may be necessary to cultivate 100, or even 1,000 seedlings, before finding one which is really worthy of a place amongst the better varieties already existing. M. Vilmorin says that in France the raising of seed Potatos has been proceeded with in a somewhat haphazard manner; whereas in England, on the other hand, a more systematic method has been followed, richness in starch, excellence of flavour, power of resisting disease, with little tendency to develop haulm, being the characters we on this side the Channel generally

seek. Unfortunately, he says, they are not always able to profit in France by progress realised in England, because the French have a marked preference for Potatos with yellow flesh, whereas in England, for many years past, there has been a preference for white-fleshed Potatos. On this account even the celebrated *Magnum Bonum*, which my house had the honour of introducing in 1876, after having enjoyed a brief popularity in the Paris markets, has been almost abandoned as a table variety on account of the flesh being too pale in colour. M. Vilmorin remarks that in Germany considerable attention has been given to the raising of seed Potatos, and more particularly with the



NO. 10.—INNER SURFACE OF ANTHERS SHOWING POLLEN. (ENLARGED.)

FIG. 38.

object of obtaining varieties which are specially adapted for the production of alcohol and starch.

Illustration No. 8 shows the Potato flower with the anthers removed, leaving only the pistil. In artificial crossing it is necessary to remove the anthers at a very early stage, to prevent the pistil being impregnated with pollen from its own anthers.

Illustration No. 9 shows the arrangement of anthers around the stigma, both closed and expanded.

No. 10 exhibits the inner surface of three anthers and their pollen.

No. 11 is a photograph of a Potato seedling at the end of

the first year, or perhaps, more correctly speaking, the second year. In this case the flower was fertilised in the summer of 1894, and the seed was sown in the spring of 1895. The photograph was taken in September of the year last named.

Illustration No. 12 shows us a similar seedling in its fourth year, and indicates the gradual maturing of the tubers into a fixed and regular type. I may add that it is not until the



No. 11.—POTATO SEEDLING, FIRST YEAR.

FIG. 39.

fourth or fifth year that it is possible to say how far the character of the seedling is fixed or not.

SPECIES AND VARIETIES.

It may now be interesting to notice other species and varieties of Potatos of more or less distinct forms and characteristics.

No. 13 is a photograph of *Solanum etuberosum*, grown for many years in the Edinburgh Botanic Gardens by Mr. R.



No. 12.—POTATO SEEDLING, FOURTH YEAR.

FIG. 40.



No. 13.—*SOLANUM ETUBEROSUM*.

FIG. 41.

Lindsay, from whom I obtained specimens in 1887, which have been cultivated in our Trial Grounds since, with the result that the tubers have considerably increased in size.



No. 14.—PAPA AMARILLA.

FIG. 42.

Writing in 1887, Mr. Lindsay stated that the original plants had been left in the same beds for at least thirty years. They produced long, running shoots having very few and small tubers. Five or six years before 1887 a few tubers were



No. 15.—AFRICAN POTATO.

FIG. 43.

planted in well-manured ground, and this practice had been continued, with the result that the tubers had gone on increasing in size. When left in the ground all the winter the tubers appeared to be quite unaffected by frost, and no disease had been observed.

Mr. Baker, in his paper already referred to, speaks of *Solanum etuberosum* as probably only a variety of *Solanum tuberosum*.

I have not myself observed anything in this Potato denoting that it was deserving of cultivation either on its own account or for crossing with the ordinary *Solanum tuberosum*, which it seems so nearly to resemble.

Illustration No. 14 is the "Papa Amarilla." This Potato I received from Mr. Charles ap Thomas, who has spent a great part of his life in Peru; and knowing that I took an interest



NO. 16. — POTATO FROM THE ROCKY MOUNTAINS.

FIG. 44.

in tracing the history of the cultivated Potato, he offered to obtain for me in 1887 a consignment of tubers of the "Papa Amarilla," which is much grown in Peru, and is in some respects unlike our own cultivated varieties. After carefully growing this variety for eight years, I entertained no doubt that, however suited to Peru, it is of no use in this country, where it fails to produce a satisfactory crop, and is not free from disease.

Illustration No. 15 represents a Potato which a correspondent saw growing in South Africa, and of which he sent us tubers, thinking it very different from any he had seen in England. This has been grown at Reading for seven years, and is distinct from

all Potatos I know in tuber, foliage, and flower. The foliage is exceedingly dark in colour; the stems very erect and bushy, growing more densely than any other variety; the leaves are so round as to appear at first sight unlike those of the Potato.



NO. 17.—RED FIR-APPLE POTATO.

FIG. 45.

The tubers are mostly oblong, with the eyes or buds almost as strongly developed as in the Fir-apple varieties, and are in colour white mottled with purple. It bears a profusion of purple flowers. We saw no disease until 1894; then it suffered badly.



NO. 18.—WHITE FIR-APPLE POTATO.

FIG. 46.

Illustration No. 16 represents a Potato found growing apparently wild in the Rocky Mountains by Mr. R. A. Strickland, and sent to us through Mr. Hunt, of the Reading Y.M.C.A., in February 1893. It is almost a counterpart of the large white

Fir-apple Potato, which it resembles both in tubers and foliage. The tubers are often the shape of a spruce fir cone, the eyes being very numerous and deeply set. Much diseased in 1894.

Illustration No. 17 is taken from the so-called Red Fir-apple



No. 19.—BLACK CONGO POTATO.

FIG. 47.

Potato, so named from a peculiar formation of the tubers. This has been grown at Reading for very many years, but has never shown any tendency to assume the form or characteristics of the ordinary Potato of commerce.



No. 20.—ALMOND POTATO.

FIG. 48.

No. 18 is a picture of the small White Fir-apple, which has also been grown, with the same results, at Reading, and differs from the Red Fir-apple chiefly in colour.

The Black Congo Potato is portrayed in Illustration No. 19. This Potato, like the Fir-apple varieties, has the buds or eyes very strongly developed, and though the flavour is excellent when

cooked in the ordinary way, it is chiefly grown for the colour of the flesh, which is dense purple, almost black. On account of this deep colour the tubers are useful for ornamental cookery.

The Potato shown in Illustration No. 20 is grown rather extensively in Norway. Commander F. W. E. Crowe, who sent it to us, considered this to be extremely valuable for the supply of so-called new Potatos throughout the year. The tubers



No. 21.—POTATO MONSTROSITY.

FIG. 49.

seldom exceed the size of an almond, and by lifting the crop before it is quite ripe the close texture peculiar to new Potatos is retained indefinitely.

Growers of Potatos occasionally meet with tubers that have assumed singular and fantastic forms. Illustration No. 21 shows one of these monstrosities of a very common type. There is no need to multiply illustrations of the malformed specimens, for scarcely any two are alike. As a rule, they are forced out of



No. 22.

EXAMPLES OF TUBERATION AT THE AXILS OF THE LEAVES.

FIG. 50.



No. 23.

character by obstructions in the soil, aided, sometimes, by renewed growth after drought has arrested development.

Illustrations Nos. 22, 23, and 24 represent plants taken from our Trial Grounds during the past season. Owing to an injury to the stem, the plants were unable to produce tubers below



NO. 24.—EXAMPLE OF TUBERATION AT THE AXILS OF THE LEAVES.

FIG. 51.

the surface of the ground, and did their utmost to atone for this failure by a vigorous attempt at tuberation from the axils of the leaves.

Before referring to *Solanum Maglia*, selected by Lord Cathcart as possibly the most suitable species for crossing with *Solanum tuberosum*, in order to originate a new race of Potatoes

which should be more or less disease-proof, I should like to call attention to a spray of *Solanum nigrum* (No. 25), a very common weed in some gardens, which is interesting here from the fact



No. 25.—*SOLANUM NIGRUM*.

FIG. 52.

that its flowers and berries so much resemble those of the *Solanum tuberosum*.

For the same reason I have had photographed (No. 26) berries of the *Solanum Dulcamara*, the poisonous "Bitter-sweet," so often



No. 27.—*ATROPA BELLADONNA* (*SOLANUM LETHALE*).

FIG. 53.



No. 26.—*SOLANUM DULCAMARA*.

found in hedgerows growing alongside blackberries. Although the flowers and berries so much resemble those of the Potato, it is interesting to notice how widely two plants belonging to the



NO. 28.—*SOLANUM MAGLIA*—FLOWERS AND FOLIAGE.

FIG. 54.

same genus may differ. Indeed, the genus includes a number of extremely variable plants, and contains, probably, more species than any other genus of flowering plants, there being upwards of 700 *Solanums*, of which only six kinds are tuber-bearing.

The spray shown in Illustration No. 27 will, of course, be instantly recognised as the Deadly Nightshade (*Atropa Bella-*



No. 29.—*SOLANUM MAGLIA*—TUBERS.

FIG. 55.



No. 30.—HYBRID SEEDLING POTATO.

FIG. 56.

donna). This plant, although alluded to by Gerarde, and also by Sir J. E. Smith in his "English Flora," published in 1824, as

Solanum lethale, is not now considered to be a true *Solanum*, notwithstanding its obvious similarities.



No. 31.—SUTTON'S RINGLEADER.

FIG. 57.



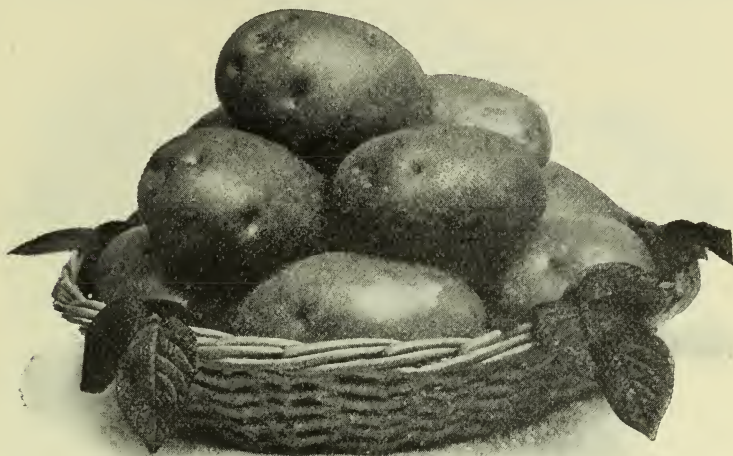
No. 32.—SUTTON'S HARBINGER.

FIG. 58.

HYBRIDISATION.

Illustration No. 28 represents flowers and foliage of *Solanum Maglia*. Chiefly on account of the fact that the dreaded Potato

fungus produces most havoc in damp seasons, it was very much hoped by Lord Cathcart that, if hybrid seedlings could be obtained



No. 33.—SUTTON'S A1.

FIG. 59.



No. 34.—SUTTON'S EARLY REGENT.

FIG. 60.

between the *Solanum Maglia* (whose habitat is that of low-lying, marshy places near the coast of the islands of the Chonos Archipelago) and the *Solanum tuberosum*, which most authorities

consider a native of the higher slopes of the Andes, a new race of Potatos might be secured that would resist disease. Here I



No. 35.—SUTTON'S SUPREME.

FIG. 61.



No. 36. — SUTTON'S TRIUMPH.

FIG. 62.

may say, in parenthesis, that it is not at all impossible that *Solanum tuberosum* may have had its origin as a littoral plant



No. 37.—SUTTON'S WINDSOR CASTLE.

FIG. 63.

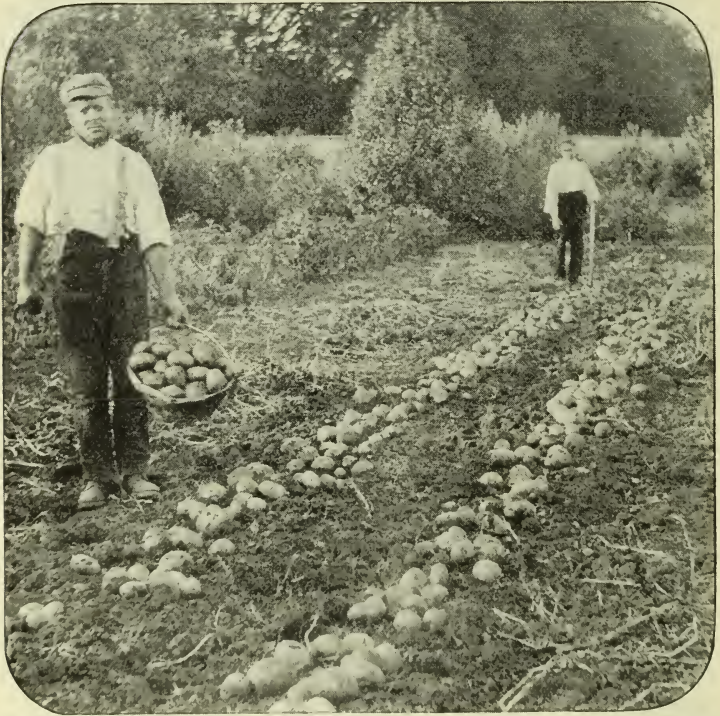


No. 38.—SUTTON'S SATISFACTION.

FIG. 64.

instead of being a species from elevated or mountainous regions. This idea is supported by the fact that Potatoes flourish so amazingly on the warp lands of our eastern seaboard.

Although many hundred flowers of *Solanum Maglia* were artificially fertilised with pollen from cultivated varieties, only five were successful, resulting in five seed berries. From these



No. 39.—CROP OF SUTTON'S SATISFACTION.

FIG. 65.

seed berries but two seedlings were secured, and only one of these showed any promise whatever, the second having to be grown under glass to prevent its dying away.

The tubers of *Solanum Maglia* are shown in Illustration No. 29, and I regret to say that in 1894 the outdoor crop was almost entirely destroyed by disease, whilst some grown indoors escaped.



No. 40.—THE SUTTON FLOURBALL.

FIG. 66.



No. 41.—SUTTON'S MAGNUM BONUM.

FIG. 67.

The Hybrid Seedling just referred to is represented in Illustration No. 30. This, although a vast improvement on the *Solanum Maglia*, is very far behind the ordinary cultivated Potato in appearance, crop, and qualities. This seedling has now been grown for eight years, and in 1894 the crop was slightly diseased, although it had previously been almost free from attack.

MODERN INTRODUCTIONS.

Illustrations Nos. 31 to 41 illustrate some of the highest types of Seedling Potatos which my house has had the honour



NO. 42.—UNSPRAYED AND SPRAYED POTATO PLOTS.

FIG. 68.

of introducing to the public, the crosses having been made in the majority of cases by the late Mr. Clarke, so well known as the raiser of Sutton's Magnum Bonum Potato. Two were effected by Mr. Robert Fenn, one of the oldest and best authorities living on the artificial crossing of Potatos.

DISEASE-PREVENTION.

I must not conclude without referring to the use of the *Bouillie Bordelaise* as an application for preventing Potato disease. Illustration No. 42 shows two plots of Sutton's Magnum Bonum

Potato growing side by side during the past season ; that on the right-hand side having been sprayed three times and that on the left hand not having been sprayed at all. It will be seen that the effect was very marked. The growth of the sprayed plants continued some time after the unsprayed portion had died down. The weights of the two plots when lifted were as follows :—The sprayed, 3 cwt. 1 qr. 25 lbs., and the unsprayed, 3 cwt. 1 qr. 4 lbs. Strange to say, the quantity of diseased tubers was precisely the



No. 43.—TOMATO FLOWERS.

FIG. 69.

same in both plots, viz., 4 lbs. It is, therefore, a question whether the additional weight per acre would compensate the grower for the somewhat laborious task of spraying his crop three times during the growing period.

In the elaborate series of experiments conducted this year in conjunction with Professor Gilchrist, of the University Extension College, Reading, we found that in the first and second early varieties no advantage is gained by spraying. These crops finished their growth before disease could attack the plants, and the

dressing did not appreciably lengthen the period of growth ; in fact there was an actual loss on the sprayed plots. The experiments proved that sorts which are peculiarly liable to disease, especially when grown in gardens, if treated with a judicious



No. 44.—BUNCH OF TOMATOS AND FLOWERS.

FIG. 70.

application of the *Bouillie Bordelaise*, will yield a crop of sound Potatos, even in years when ordinary crops are decimated by disease.

GRAFTING.

The experiments I have made with the related plants Tomato and Potato may be of general interest. Formerly the Tomato

was known as *Solanum Lycopersicum*; now it is recognised as *Lycopersicum esculentum*.

Illustration No. 43 represents a spray of Tomato flowers, and No. 44 shows a bunch of Tomatos and flowers which strongly resemble the flowers and berries of Potatos.



NO. 45. REPRODUCTION OF GERARDE'S ENGRAVING
OF THE TOMATO PLANT.

FIG. 71.

Illustration No. 45 is reproduced from Gerarde's illustration of the Tomato plant as known to him in 1597. This is extremely curious when compared with our present varieties, and so is his description of the plant:—

“Apples of Love grow in Spaine, Italie, and such hot countries from whence my selfe have received seeds for my garden, where they doe increase and prosper.

“ It is sowne in the beginning of April in a bed of hot horse-dung, after the manner of musk Melons and such like cold fruits.

“ The Apple of Love is called in Latine *Pomum Aureum*, *Poma Amoris*: Lycopersicum: of some *Glaucium*; in English, Apples of Love and Golden Apples; in French,



NO. 46.—POTATOS GRAFTED WITH TOMATOS.

FIG. 72.

Pommes d'amours. Howbeit there be other Golden Apples whereof the Poets doe fable, growing in the Gardens of the daughters of *Hesperus*, which a Dragon was appointed to keepe, who, as they fable, was killed by *Hercules*.

“ The Golden Apple, with the whole herbe it selfe is cold, yet not fully so cold as Mandrake after the opinion of

Dodonæus. But in my judgment it is very cold, yea, perhaps in the highest degree of coldness: my reason is because I have in the hottest time of Summer cut away the superfluous branches from the mother root, and cast them away carelessly in the allies of my Garden, the which



NO. 47.—TOMATOS GRAFTED WITH POTATOS.

FIG. 73.

(notwithstanding the extreme heate of the Sun, the hardness of the trodden allies, and at that time when no rain at all did fal) have growne as fresh where I cast them, as before I did cut them off; which argueth the great coldnesse contained therein. True it is that it doth argue also a great moisture wherewith the plant is possessed, but as

I have said, not without great cold which I leave to every man's censure.

“In Spaine and those hot Regions they use to eat the Apples prepared and boiled with pepper, salt, and oyle: but they yeeld very little nourishment to the body, and the same naught and corrupt. Likewise they doe eate the



No. 48. — TOMATO GRAFTED WITH POTATO.

FIG. 74.

Apples with oyle, vinegre, and pepper mixed together for sauce to their meat, even as we in these cold countries doe Mustard.”

Illustration No. 46 represents a Potato grafted with a Tomato. One tuber was planted in each pot on March 22, and when the growth attained a height of 4 to 5 inches the Potato stem was cut off half an inch above the level of the soil, and a Tomato graft

was introduced on May 8. As a result the Potato roots maintained in growth by the Tomato foliage have produced a crop of Potatos in the pot, as shown in the photograph; and the Tomato foliage above ground has produced a crop of Tomatos, nourished by the Potato roots in the pot.

Illustration No. 47 shows the process reversed. The Tomato



NO. 49.—TOMATO GRAFTED WITH POTATO, SHOWING TUBERATION ABOVE THE GRAFT.

FIG. 75.

plant was cut off half an inch above the surface, and the Potato graft introduced. The Tomato roots did not, of course, produce Potatos, but the Potato plant above ground produced one truss of flowers and seven berries. In order to extend this interesting experiment, the Tomato flowers have been fertilised with Potato pollen, and the Potato flowers with Tomato pollen, for further experiment next year. These photographs were taken on August 14 ;

but on examining the plants recently, it was found that two of the Potatos growing on Tomato stalks appeared suddenly to be aware of the fact that, although producing flowers and berries, they had not yet produced tubers, and it being "never too late to mend," they have, as will be seen in Illustrations Nos. 48 and 49, produced tubers from the axils of the leaves and stems.

SUBSTITUTES FOR LARCH.

By Dr. MAXWELL T. MASTERS, F.R.S., F.R.H.S., &c.

[Read November 12, 1895.]

THE speaker, in introducing the subject, explained the nature and course of the disease which is causing such havoc in Larch plantations that it is believed comparatively few perfectly satisfactory plantations can now be found. From the circumstances of the case there seems to be little or no chance of our being able to cope with or to stamp out the disease. It is not practicable to carry out, on the large scale required, measures which, where financial considerations can be more or less disregarded, may be successfully adopted. Foresters and planters under such circumstances have a right to seek information from botanists as to the substitutes that are likely to be available. Fortunately there are many. In making a selection from them, the first thing to do is to consider the requirements of the case. The ideal substitute for Larch would be one that is easily and cheaply procurable, perfectly suitable to our soil and climate, one that will not start into growth too early in spring, and one that will rapidly and at a low cost produce timber of good quality. A glance through the *Report of the Conifer Conference*,* held in the Chiswick Garden in October 1891, will enable any one to see that there are many conifers which already more or less fully realise the ideal above stated, whilst if a demand sprang up there are many more that might be turned to profitable account. As bearing specially on the subject, the lecturer mentioned the papers by Mr. A. D. Webster on "Conifers for Economic Planting"; by Mr. Malcolm Dunn, on the "Value in the British Isles of Introduced Conifers"; and by Mr. D. F.

* See Advertisements at end.

Mackenzie, on the "Timber of Exotic Conifers." To these and other papers in the same volume the speaker alluded as the sources whence he had himself derived much information, as also from Dr. Somerville's paper on the "Larch Disease" in the Transactions of the English Arboricultural Society, vol. iii. part iv. (1894).

The standard communications on Larch disease of Prof. Marshall Ward and Mr. J. B. Carruthers were alluded to, whilst for information on American trees and timber the Report on the forests of North America (exclusive of Mexico) in the Tenth Census Report, published by Prof. Sargent in 1884, is all but inexhaustible. The volumes of Dr. Schlich's "Manual of Forestry" may also be consulted with advantage. The reports of Mr. J. G. Lemmon to the California Board of Forestry for 1887 to 1888, 1889 to 1890, are full of valuable detail, but are unfortunately not easily accessible.

Dealing first with species which have been long enough in cultivation to allow of an estimate of their merits being made, the speaker said that for most practical purposes probably the Corsican Pine, *Pinus Laricio*, will be found the best. It is perfectly hardy, grows rapidly, produces plenty of seed, yields excellent timber, which is easily worked, and, taking all things into consideration, is probably the best substitute for Larch that we have.

The Weymouth Pine, *Pinus Strobus*, has been cultivated in this country for a century and a half, but though much esteemed in the United States, it has proved a disappointment in this country. It was introduced to Longleat, in Wiltshire, in 1700.

As to *Abies Nordmanniana*, the Crimean Silver Fir, the speaker believed it to be one of the best timber trees we have, its wood being probably better than that of the Silver Fir. It is hardy, not fastidious as to soil, a quick grower, and not liable to be injured by spring frosts as the Silver Fir is. Some specimens of the timber shown were excellent in quality, and were produced from a tree grown by the speaker, which unfortunately had to be felled in consequence of the attacks of a woolly aphid or Chermes, to the attacks of which this tree seems unfortunately particularly liable.

The Douglas Fir, *Pseudotsuga Douglasii*, is considered by many foresters to be the very best substitute for Larch, and there

can be no doubt of its value under favourable conditions. The tree is exceedingly variable, and no doubt its hardihood and the quality of its timber vary also according to the particular variety and the locality where it grows. If grown in exposed situations the leader is apt to be broken by the wind, and a too portly rook might cause similar injury. Such mutilation, however, would be of less consequence than in a true Pine, as a new leader readily forms. The tree is a quick grower, and produces excellent timber, but it is not suitable for chalky soils nor for very wet marshy places. The Douglas Fir, though only introduced about 1824, has already grown into a timber tree, and won the suffrages of experts.*

Incidentally the speaker alluded to the splendid services rendered by Douglas as an officer of the Society in introducing valuable plants, and expressed a wish that the Society might again exert itself in this direction. The absence of any portrait or other memorial of Douglas or of Fortune in the Council Room was also commented on.

Menzies' Spruce, *Picea sitchensis*, also introduced by Douglas, grows in a cold moist climate, stretching along the low coast from Alaska to California. It is quite hardy in this country, grows rapidly, and produces excellent timber. The speaker alluded to a small plantation in East Kent, planted by his father about sixty years ago, composed entirely of this Spruce, which had attained fine proportions on a loamy soil overlying chalk.

The Redwood, *Sequoia sempervirens*, introduced by Hartweg, another of the Society's collectors, is a near ally of the Wellingtonia (*Sequoia gigantea*), but produces good sound timber. It would be valuable for hop-poles, as it sends up numerous shoots from the cut stump, a peculiarity not shared in by other Conifers. It is believed that the tree has been used for this purpose in East Kent. It likes moisture, grows fast, and would be suitable for coppice. In places, however, it is tender, and the young shoots are apt to be injured by spring frosts.

* See Report on the plantations of this tree on the Earl of Mansfield's estates in Perthshire, as quoted from the *Perthshire Constitutional* in the *Gardener's Chronicle*, October 8, 1887, and November 19, 1887. See also Dr. Schlich's Comments on the same tree, 9, c. 18. In the *Journal of the Society of Arts*, December 21, 1894, is a paper of General Michael on Forestry, in the course of which he alludes to a newly formed plantation of Douglas Fir at Balmoral, where it outstrips Larch, Scotch, and Spruce.

Of the value of the Albert Fir, *Tsuga Mertensiana*, the speaker had had no personal opportunity of judging. Scottish foresters, however, speak of it favourably.

The Conifers before mentioned have all been in cultivation long enough to afford good grounds for forming an opinion as to their value.

There are many others which have not been under observation for so long a time, but which are highly promising. Foremost in this category the speaker placed Lobb's Cypress, *Thuja gigantea*. This is perfectly hardy, grows with great rapidity, seeds in this country in profusion, so that seedlings can be cheaply obtained, and produces very durable timber. Its long, straight "sticks" are well adapted for use as telegraph-poles. Indeed, considering its hardiness and relative indifference to soil and aspect, this tree may be looked on as one of the most promising for the future.

Lawson's Cypress, *Cupressus Lawsoniana*, is generally known as a small pyramidal bush grown exclusively for ornamental purposes. Nevertheless our American friends give it an excellent character as a tree producing hardy, easily worked timber abounding in resin. It has been known to them for many years as the Port Orford Cedar. The bushy habit might be alleged as unsuitable for the production of timber, but this could be obviated by close planting, and is indeed lost as the tree grows older. In the spring of 1895 the young growths of this cypress in the vicinity of London suffered from the abnormal frost of February as they had never before been observed to do. It was remarkable also that some of the many seedling varieties suffered much more than others, e.g. the fastigate form known as *Erecta viridis* was more injured than the spreading forms.

The Nootka Sound Cypress, *Cupressus nootkatensis* alias *Thuiopsis borealis*, is another very hardy species which no frost such as we are likely to get hurts. It is easily procurable, is not particular as to soil, and furnishes excellent timber, so that it may confidently be recommended to be planted as a timber tree.

Libocedrus tetragona, which grows in the most cheerless parts of Chile, might be employed with advantage in damp, ungenial situations if it could be procured in sufficient quantities. Its timber is said to be almost indestructible. The New Zealand species, *L. Doniana*, would probably succeed in Western Ireland.

The Californian *Libocedrus decurrens* is more promising and more suitable to the English climate than the two last named.

Of the Japanese Conifers not much can yet be said as timber-producing trees. The *Cryptomeria*, so much used in Japan, is not hardy enough to be safely recommended for planting here on a large scale, unless in exceptional situations. Seeds can readily be procured, and the timber is of good quality. The *Cupressus obtusa* and *C. pisifera* (Retinosporas of gardens) are largely used in Japan as timber trees, but at present they are not very promising in this country. *Abies brachyphylla* is almost certainly likely to prove a useful timber tree in the future if seeds can be obtained in sufficient quantity.

For sandy, barren wastes *Pinus uncinata*, *P. rigida*, *P. Banksii*, and *P. inops* might be utilised, for, though their timber is of relatively little value, their roots serve to bind the sand and their branches afford good shelter.

For seaside places there is nothing better or more hardy than the Austrian Pine, *Pinus Laricio*, var. *austriaca*. *P. insignis* is very valuable but rather more tender. *Pinus muricata* may also be commended for such situations. *Cupressus macrocarpa* is an excellent seaside tree, affording good shelter and valuable timber.

Many more species might be alluded to as likely to prove serviceable timber trees, but at present they are not easy to procure in quantity, and *definite* information as to their qualities is not yet obtainable.

The following figures relating to value of the species mentioned in this note are taken from Mr. F. D. Mackenzie's paper in the Conifer Congress Report before alluded to:—

The Scotch Pine being taken as	100
Cupressus Lawsoniana stands at	120
Pinus Laricio	125
Abies Nordmanniana	125
Cedrus Deodara	142
Cupressus macrocarpa	190
Tsuga Mertensiana	200
Sequoia sempervirens	204
Larix europæa	216
Picea Menziesii	220
Pseudotsuga Douglasii	225

Dr. Masters's remarks were illustrated by numerous specimens of the wood of the trees mentioned by him. For some of these the lecturer's thanks were due to Messrs. A. D. Webster, A. C. Forbes, G. Croucher, T. Tender, A. Harding, Anthony Waterer, the late Mr. Maurice Young, Mr. Noble, and others.

The specimens included a large section at the root of the Douglas fir planted in 1874 in Perthshire. A smaller section from a tree sown at Cultoquhey in 1844, "from seed taken from a tree [? seed] given by Douglas to Lord Lynedoch in 1824. The height of this tree is 84 feet, the circumference at the root is 13 feet."

Abies nobilis, from Ochertyre. A section from a tree blown over in November 1893. It was planted by Mr. Croucher in 1861, when it was about 2 feet high, but at the time of its fall it was 78 feet in height. At 9 feet from the ground the stem measured 18 inches in diameter; at 18 feet, 15 inches; and at 27 feet, 12 inches in diameter.

Thuja gigantea.—Of this, fine specimens of timber were contributed from Mr. Croucher, Ochertyre, Mr. A. C. Forbes, Mr. Harding, and others.

Pinus Laricio.—A good illustration from Mr. A. D. Webster.

Good illustrative specimens of the timber of *Sequoia sempervirens*, *Picea sitchensis*, *Libocedrus decurrens*, *Abies Nordmanniana*, *Pinus insignis*, *P. Laricio austriaca*, *Cupressus macrocarpa*, *Cedrus Libani*, *C. Deodara*, and others, were furnished by the speaker from his own collection.

DISCUSSION.

Mr. E. H. WOODALL, of Scarborough, remarked that the Redwood was killed in the north of England, and Mr. RIVERS also called attention to its tender character.

Mr. D. T. FISH said he was rather disappointed more could not be said that day as to the cure of the larch disease. In reference to David Douglas, who was about twenty years older than himself, he said that he happened to be born on the opposite side of the road to him in a place near Perth, and he was glad to hear the Douglas fir mentioned in such favourable terms. He would like to add a word in support of the proposal to procure a portrait of Douglas, as he had introduced so many valuable

plants to the country through the Society's gardens. At a place called New School a tomb was erected to his memory. As to the Douglas fir, he said there were many varieties, but the green kinds were the best, having harder wood. He had seen hundreds of trees of the Douglas fir, and he could speak as to its value. It was the only sweet-smelling spruce known, and its foliage, if squeezed into a cup of water, was a splendid antiseptic. The Douglas fir likes a little shade, but it should also be exposed somewhat, and will keep pace with the larch in growth, and, besides, there was no cleaner fir grown.

In reference to Mr. Fish's remarks about the varieties of Douglas fir, Dr. MASTERS said that was most natural, as the tree was found over a vast stretch of country, at all elevations, ranging from sea-level to 12,000 feet, and therefore was subject to many climatic changes.

ASPARAGUS CULTURE.

By Mr. JAMES MASON.

[Read November 26, 1895.]

In offering my experience on Asparagus culture, it must not be supposed that I contemplate giving a scientific or learned discourse; I simply offer a few remarks and suggestions illustrative or descriptive of my experience and observation during the greater part of an active business life as a wholesale grower for the London markets.

Asparagus officinalis is a liliaceous plant, and is one of a large family of plants, mostly natives of Africa, generally distinguished by small, fine leaves, some of them being very beautiful in their habit of growth. The common kind, *A. officinalis*, is considered to be indigenous to the sunny shores of the Mediterranean; it has also been found wild in Western Europe, and on the western and south-western shores of England. Its flower is very insignificant, of a greenish-white colour, and is followed by a small round red berry about the size of holly berries. When it has arrived at this stage of its growth, its beautiful feathery habit makes it universally admired,

and around London it is used largely for decorations at harvest festivals, &c.

Asparagus as a vegetable is justly held in the highest esteem, possessing as it does many qualities not belonging to any other vegetable in our gardens. It has been extensively grown for very many years in England and other parts of the world. It is said by some writers to have been grown by the Romans at a very early date, previous to the Christian era, and others tell me that Pliny mentions it in his *Historia Naturalis*. By old writers on gardening it was known as Sperage, and by London people, or, at least, by London dealers, it is now known and spoken of as "Grass." It possesses properties said to be very beneficial in kidney diseases and the like complaints, and its use is often ordered by medical men. As to the manner of cooking, that I must leave in abler hands than mine, with this one remark, if you wish to have its full flavour and delicious softness, always have it fresh and bright, and not what gardeners call cankerly.

French and Spanish growers send it very largely to our markets, but the quality of foreign grass is not comparable to our own home-grown, although in the matter of size both the French and Spanish produce it much larger than we can. The home-grown, however, possesses much more succulent and tender qualities than that which is imported, which is considered by consumers tough and strong. I quite agree with many writers on this vegetable, that we British growers allow far too much of the foreign Asparagus to be sent into this country to supply our markets; for with proper care and cultivation we can grow it, if not so large, yet, as I said just now, much better in quality, and the quantity could hardly be overdone if grown at a reasonable price, as I am convinced it could be, at least for the London and great provincial markets.

One great advantage which Asparagus possesses over many other vegetables is, that its carriage is comparatively light and easy, its compactness making it capable of transmission by railway at no great expense, so that I may say, without fear of contradiction, that it can be grown profitably in England if soil, condition, energy, and capital are studied. It is already grown largely in Cambridgeshire and in Worcestershire, about Evesham and the surrounding districts of Offenham (I believe the late Mr. James Myatt introduced it in the last-named locality). It is

also largely grown in Bedfordshire and other places too numerous to mention.

Asparagus is propagated by seed, which should be sown about the middle of March in drills or rows* about 18 inches apart on good land (not wet or coarse), so as to obtain what gardeners call hard plants, that is well-ripened buds. The seed, which is very hard, should be covered with about two inches of fine mould. The drills or beds should have been previously prepared by having a good winter's cultivation, which will keep it in a great measure free from weeds. The very hard nature of the seed necessitates its lying in the ground for some considerable time before it germinates, hence the great necessity to have the ground clean. I remember on one occasion trying some seed with a hammer to see if it was good, and to my surprise I found it so hard that it actually penetrated the wood instead of breaking, as I wished it to do. I have also known it used instead of shot in the destruction of small birds.

Five or six pounds of seed will be sufficient, if sown thinly, to produce enough plants to plant an acre the following year after sowing. Some old gardeners advise it to be sown in the autumn, in October or November, but I venture to differ entirely from them, and say, Sow early in the spring. Others recommend the seed to be sown the first week in May, but this must be unwise, as sometimes we get a long continuance of dry weather afterwards, when it is very difficult for seed to germinate. The seed having been sown thinly (say 3 inches distant from each other), as soon as the young plants appear above the ground they must be hand-weeded, or hoed with a very small hoe, and when strong enough thinned out to about 4 inches apart, water them freely with diluted manure water, if the summer is dry, and let them have the benefit of all the sun and air they can. The plants under this treatment will no doubt be strong and good, and fit for the following spring planting.

SOIL.

The soil of England differs so much that this must be taken largely into account in the cultivation of all our plants and vegetables. Most of the good land near the sea coast is suitable for the growth of Asparagus, but some of the poor sand would

* Some prefer sowing it in beds, which should be 4 or 5 feet wide.

not yield enough to pay for its culture ; indeed, it would end in complete disappointment if its cultivation were attempted in such soils, for one of the main requisites of Asparagus is that it should have a good depth of earth, though any soil of good ordinary texture, whether good sandy, friable loam, or what is generally known as garden soil, properly manured and trenched, will suit the plant. Under any circumstances let the land, if not naturally so, be made porous by the addition of ashes or similar material which may be at hand. Coarse, rough, wet land is not suitable for Asparagus. I have known it to be grown on such land, but it came very rough, crooked, and cankered.

The ground should be trenched 3 ft. deep with a good heavy coating of manure (45 or 50 tons to the acre), well mixed with the land. This should be done in the autumn of the year, say November or December, and the soil laid up in ridges of 2 or 3 ft. wide. Before the time of planting it ought to be turned over to the depth of 18 to 20 in., thoroughly incorporating the manure with the top spit to make it in good tilth for spring planting. I have no doubt seaweed is a capital manure ; I have heard it very highly spoken of, but have not myself had any experience of it. A small quantity of salt, 5 or 6 cwt. to the acre applied in two or three dressings, is very good for the plant. The salt should not be applied when the plant is at rest, but when it is in full growth ; the best time is during the months of June and July, or August. If Asparagus is carefully and properly planted, it will produce good heads for twenty, thirty, or even forty years, always remembering not to cut *any* after midsummer.

In my young days there was a large area of land under Asparagus culture in close proximity to London, on the south-eastern side, in the vicinity of Deptford, New Cross, and Lewisham, but this part has been taken possession of by the house-builders and railways. It was considered a grand sight in those days to see the beds done up, beautifully regular, and absolutely neat, the workmen priding themselves as to who should complete his task the best. Sometimes the edges of the beds were sown with Dwarf French Beans, or Coleworts ; these were planted to come in late in the autumn after the cutting of the Asparagus was over.

PLANTING.

This should be done in the spring, and not, as some recommend, in the autumn. On one occasion I planted some good strong plants in November, and, to my surprise, quite ninety per cent. of them died, although they were planted under fairly good conditions. The Asparagus plant not being woody-fibred does not grow in the winter, and being so very succulent will not bear planting too soon. If possible choose dry open weather for planting, but do not let the plants be exposed to the sun or wind, or the fibres will be injured, and retarded growth will be the consequence. The plants should be dug up as they are required, about March or April, according to the season, as soon as they begin showing signs of pushing their buds; on no account before this. Thus we may establish a rule—planting may commence *as soon as fresh growth begins*. Select the strongest of the plants, rejecting the weakly ones. By this means the plantation will be much more even than if all the plants are put in promiscuously. The smaller plants can be planted by themselves, and so the crop will be even all over. They should always be planted in shallow trenches, chopped out with a spade, 1 ft. 6 in. apart, and 4 in. deep; the plants should then be evenly placed along the lines about 18 in. distant in each row, and if placed alternately it will leave them 9 in. apart on the bed. Six feet should be left between each two rows, and so on in succession. This is the old-fashioned way, the alley or space between being used the first year for some close-growing crop which will not overhang the Asparagus.

But I think the better way is to grow Asparagus in single rows, planting it about 1 ft. apart in the rows, and 2 ft. 6 in. between each row; there is not so much labour needed nor so much earth required to be moved.

Some growers advise planting two- or three-year-old plants, but this is altogether wrong. If it is desired to establish a plantation for a number of years, plant none but one-year-old plants. But if you *will* have Asparagus for the table the first year of planting, three-year-old transplanted plants must be obtained. Of course this will be expensive; some good heads will no doubt be obtained, but the bed will be very disappointing afterwards. I say, therefore, emphatically one-year-old plants

are better than two, and two better than three, for a permanent bed.

In the spring following the first year of planting, a little earth should be placed on the beds or rows, as the case may be, leaf mould, or thoroughly decayed manure, being well incorporated with it. The following spring some more mould, say 4 or 5 in., should be applied. If success has attended our efforts this, the third year, we may gather some of the best heads from the strongest stools, and the bed will require no further attention this year, except to be kept free from weeds. The following winter, about November, take three parts of the mould from off the beds, and expose it to the influence of the weather, replacing it again in February. This, the fourth year, we may cut a full crop of Asparagus, and so in perpetuity, if the beds or rows are carefully attended to.

Some people advocate the system of sowing the seed where it is to remain for a permanent crop, and although something may be said in its favour, still it is not to be compared to planted beds, as blanks are sure to occur among the seedlings and the crop will not be so regular as by the former method.

It should be understood by all Asparagus growers that the plant forms its buds for the following year during the summer. A ready illustration of this may be made by placing the four fingers and thumb round a piece of pencil, the pencil representing the growing Asparagus, the buds forming themselves round it for the following year. If cutting is continued too late, these buds, which should be perfecting themselves for the following year, are thrown up prematurely by the plants, and smaller buds are formed in their place. The foliage, which dies down about November, should be removed and burned, spreading the ashes on the beds, which, as before mentioned, should be partially levelled.

If green Asparagus only is required, it will not be necessary to earth up the beds to anything like the extent before recommended. A few inches of earth only need be thrown on the beds or rows in such case. But the earthing-up system has many advantages; first, the heads are much tenderer, whiter, and improved in flavour; secondly, it protects the buds from the early spring frosts, and from the influence of the light and atmosphere. Indeed, in my opinion, it is something like Seakale,

which is undeniably and universally pronounced much better if grown, as gardeners call it, "naturally," that is to say, earthed up in the same way as Asparagus should be. I do not advocate a very large quantity of mould being placed upon the beds, but they should be made up 5 or 6 in. above the roots. The French, Dutch, and Spanish growers blanch their Asparagus much more than we English gardeners do.

If required, Asparagus may be had all the year round ; but to obtain it from October to April it would be necessary to force it during these months, and I shall not attempt in the present paper to describe the various methods of forcing. But supposing that it is desired to continue cutting Asparagus after midsummer a portion of the ground should be marked off, and all the buds cut, say, every other day. It will then continue to throw up buds until September, though, of course, becoming weaker and weaker as the season advances. It is then best to destroy the plants entirely, and start again with fresh ones. On one occasion I gathered a few bundles of good Asparagus in the month of November from the open ground, and they were sold at a good price in Covent Garden market ; but, of course, this was very exceptional.

The French method of growing Asparagus is somewhat different from ours. They plant it in trenches deep or shallow according to the whim or fancy of the cultivator, but at a much greater distance apart than the English grower, and by this means much larger buds or heads are obtained, though not in such quantity. A large part of the Argenteuil Asparagus is said to be grown in the vineyards and orchards in clumps or as single plants ; and doubtless this method has its advantages, as it fills up many gaps in the vineyards that otherwise would be left bare. It is said that these isolated plants in the vineyards continue to produce good buds for thirty or forty years. But I am not at all sure that it would be wise to adopt this plan in England ; indeed, I think our climate is too sunless for good Asparagus to be grown in our orchards. However, I certainly think good results might be obtained by adopting a modification of the French plan, provided, of course, that we are satisfied with a small quantity of large heads, instead of a larger number of smaller ones. We might grow it in clumps of three or four plants, or even singly, in rows about 3 ft. apart, placing

boxes or Seakale pots over the plants, and filling them entirely with earth. The boxes or pots should, of course, be removed when "grass" is cut; one great advantage of this method is that the Asparagus may be forced where it grows, without destroying the roots. No doubt certain advantages belong to each method of culture; the experimentalist should try all. The Argenteuil growers produce edible Asparagus nearly all the year round, although during part of the time it is very small, what we in England call "*Sprue* grass."

Then as to cutting or gathering. The cutter must be very careful, or he will spoil many of the young heads. A kind of knife called an Asparagus knife is the best, having teeth like a saw, particular attention being given so as not to injure the young growing buds. The heads are best when about two inches above ground; if gathered before then you lose, in consequence of the buds not being fully developed.

The enemies of Asparagus are comparatively few—viz. Asparagus Beetle, Cockchafer grubs, and a few others.

As to marketing, package, and carriage, that must be left to the grower to use his own judgment and discretion in the disposal of the produce.

THE BRUNSWICK METHOD OF ASPARAGUS CULTURE.

Communicated by Mrs. JOHNSTON, F.R.H.S.

SEED should be carefully selected from plants grown for the purpose on a well-manured, light soil, and thinned out so as to form strong stools.

A sandy, loamy soil is the best for growing Asparagus, but any soil can be used where expense is no object, and a sufficient mixture of sand and manure is added. On a heavy clay soil, however, the crop will be later, and where grown for profit will not pay so well.

A light upper soil allows the stalks to penetrate easily, and a loamy subsoil is most nourishing for the roots; but Asparagus

thrives well in pure sand, if well manured, and comes there earliest to perfection.

The plants should be set as soon as vegetation begins to move in the spring, care being taken to disturb the roots as little as possible. Avoid weak plants or those having many thin shoots.

Plant in rows (two in each bed), the plants being about half a yard apart and alternated, the rootstock about an inch below the surface. When, later on, the plants are covered with earth, they should be about 10 inches deep.

In the middle of June go through the beds, and plants that have made no growth should be removed and replaced by strong ones. This may be done up to the middle of July. Keep the beds well weeded and hoe lightly between the roots; water occasionally the newly planted roots, the established ones will not need it.

Remove the withered foliage in November, spread 3 inches of short dung or compost, and cover it with about 2 inches of earth from the ridges.

Before the Asparagus begins to shoot in the second year, cover with the earth from the sides so that beds and ridges are now on a level. In June, look through the beds and again replace plants that have failed, planting the new ones as deep as the old; but, so as not to overload the roots, leave a hollow over them at first, and mark with a stick in order that you may remember to spare them in the first cutting of the ensuing year.

In the autumn, dress again with manure.

In the third spring cover the beds again with soil, so that the beds are now about three inches higher than the ways between.

The beds should now be about 39 inches wide, and the gangways a foot and a half.

If the plants have grown well, a cutting may be made in the third year. Cut before the shoots have pierced the soil; the earth will be raised and loosened sufficiently to indicate where to seek the Asparagus stalks. In cold weather cut once a day, in warm weather twice, so that the Asparagus may be fresh and white; when coloured it is not so highly esteemed.

The length of stalk most prized in Brunswick is about

6 inches; in Berlin it is liked longer, but then the lower portion is apt to be hard and less well flavoured.

The earth should be carefully levelled with the hand after cutting, or it will not be so easy to find the shoots next time. Always remove the withered stalks in the autumn before the seed falls, and manure regularly.

Liquid manure can scarcely be overdone; Asparagus will consume and will benefit by incredible quantities of it; but if liquid manure is not used the gangway should be filled with manure in the third autumn, and in the fourth spring the earth from the gangways spread over the beds, now a yard and a quarter wide, and from 6 to 8 inches high.

Cutting in the fourth year may continue till the middle of June.

Where the culture is carried on in fields, a wide trench should be made down the middle of each field, to be filled with liquid manure or guano, but on a large scale this is scarcely practicable on account of expense, as one preserving establishment will have, perhaps, seventy acres under cultivation.

Long manure should never be used, as the straw is an obstacle to the piercing through of the young shoots.

The following year's cultivation is to be similar to the fourth year. Never cut later than July 1, as that would interfere with the perfect development of the rootstocks and of the subsequent crops. Manure annually the beds and the ways alternately.

Asparagus grown in this way produces not only very well flavoured but very large stalks, weighing seven to ten to the pound, and they have been produced as large as half a pound each.

In Brunswick and the neighbourhood there are now about 1,000 acres devoted to Asparagus, proving very profitable. The greater part of it is preserved and exported in barrels or tins all over Europe, and to the United States of America, and very excellent it is, large and white and tender throughout its whole length.

A FEW NOTES ON ROCK-GARDENS.

[Read by Mr. H. SELFE LEONARD, F.R.H.S., before the Horticultural Club,
January 14, 1896.]

ROCK-GARDENS and rockeries of every kind are multiplying fast, and if the love of plants and of flowers goes on increasing, these, I cannot doubt, must increase too. For how otherwise can such variety, amount, and permanence of plant beauty be brought together within so small a space? How otherwise can these be "mounted" to so great advantage? How otherwise can the plantsman's hunger, for a garden interesting and beautiful all the year round, be so well satisfied? Little wonder that so many, like the squalling infant grabbing at Pears's soap, "won't be happy till" they "get it," *i.e.* a rockery if not a rock-garden. And they are right.

I would accentuate the fact that a chief value of rock-garden or rockery is, that if wisely furnished its beauty is maintained (as the herbaceous border's is not) throughout the year, including the winter months, and if garnished with many flowers through but nine months out of the twelve, yet it is so with plants of beauty and interest, during all.

And I recommend to others my own practice, when planting a new rockery for myself or for others, first to plant it as (so to speak) "it will look in winter." Half the plantable space may well be used in making such an evergreen framework. I should rather say everliving than evergreen.

For much beautiful and persistent foliage, whether of shrub, of carpenter, or of other plant, is not green, but silvery, or grey, or golden, or even purple. The wealth of material for this purpose is vastly greater than is commonly taken advantage of. The list is far too long to rehearse, and must be extracted from the leading catalogues, or, even better, noted down *in situ* in a large collection. But I may perhaps advantageously indicate the classes of plants at least which most contribute to this valuable part of the rockery's furniture.

As regards both shrubs and plants, there is in my view no more important, if often forgotten, rule than this, *viz.* to confine

oneself to quite dwarf and low-growing subjects on the rockery proper, unless this be on a very unusually large scale, or except as regards quite outlying portions of it. For a special charm of the well-furnished rockery is the number and variety of contrasting colours and forms which the eye takes in in one view; and this *coup d'œil* is impeded and lost if gross subjects are allowed to intrude upon the foreground.

Again, the best "suggestion," to my thinking, which a rock-garden can convey is that of the vegetation of high and wind-swept alps, where trees, even most shrubs, cannot stand, and where plant life is confined to shrubs of recumbent and rigid habit, or to plants which nestle and lie low that storm and wind may pass over them.

But while, on the one hand, perhaps the "highest ideal" of the rock-garden is found in this direction, on the other anything like it has rarely if ever been yet attained. Perhaps we may well be content that this should be so. For while the rock-garden or rockery is the most suitable home for Alpine plants proper, custom and convenience have admitted to it also, hardy dwarf plants of all kinds, shrubs as well as plants, whether Alpine or not.

Nor need this be deprecated. Only let it be remembered that while one cultural treatment will suit the Alpines proper, another may be needful for those dwarf plants which are not so; as, for instance, bulbs on the one hand, and plants from warm latitudes on the other.

This presents a real difficulty for the many, who have not available, in themselves or their gardeners, the time and knowledge necessary to discriminate and supply the diverse wants of each set of plants. In such cases it is well to confine the planting to the easier Alpines, plus that large number of dwarf hardy subjects which on one ground or another the same conditions happen sufficiently to suit. If this be done, and the selection be carefully made at starting, the cultural prescriptions for the rockery will be reduced very much to this: Plant in well-drained, gritty, deep, and otherwise suitable soil, and water when surface dry in summer. Weeding goes without saying; transplanting to new soil after some years is good for many or most, and necessary for a few.

Before leaving this corner of the subject I may just remind

you that while it is for Alpines and such moisture-loving plants generally, that the aid of rocks or stones in planting is called in, yet rockeries have uses—partly similar, partly dissimilar—for other classes of plants. For Ferns and for bog or wood plants they are admirable homes, and this in sites (as under trees) where no true Alpine will flourish. Not infrequently the site proposed for a rockery is a bank running forward from trees, and running back under them. Of course the nearness of the tree roots must always make such positions culturally bad. But if these objections can be mitigated, or if need compels that they be borne with, such a site may be pleasingly utilised by furnishing the rockery beneath the trees with ferns and wood plants and the front with the robuster sorts of ordinary Alpine and rock plants.

I believe also I am rightly informed that rockeries are now not unknown in the stove-house for Orchids and the like. And those acquainted with the Riviera will recall how in many great gardens there, more especially at Monte Carlo, large arid rockeries make the most effective homes for Aloes, Cactus, Agaves, and other heat-loving plants. Of such, however, I need not further speak.

Not further to digress, let me now indicate generally the classes of shrubs and plants of evergreen or persistent foliage which best go to make the permanent framework, and so the winter beauty, of rockery or rock-garden.

First and foremost are the dwarf, or pigmy, conifers—generally round-headed, flat, even bullet-headed. Among the *Abies excelsa*, or Mountain Spruce, are found a number of invaluable dwarf varieties, all too little seen. Some of the following are probably entitled to specific rank, and are not varieties merely:—*Abies clanbrasiliana*, *A. Remonti*, *A. pygmæa*, *A. pumilio*, and many others, all of truly mountain character. Then the dwarfer Junipers are admirable for the purpose; for, besides some better known kinds, they contribute creeping and procumbent species, like *tamarascifolia*, *prostrata*, *cupressoides*, and others, whose form, while much wanted to clothe many positions in the rock-garden, is not at all so well supplied by perhaps any other genus. Among these Junipers, too, are found two really beautiful little Tom Thumb species, or varieties, in *J. echinoformis* and *J. hibernica nana compacta*. I scarcely

know why, but while dwarfs and pigmies seem ugly in the animal, they are likeable in the vegetable world.

The Yews yield some, but not many, dwarf forms suitable for our purpose; and the Scotch Firs a few more, including a good dwarf golden form. Some of these would in course of years pass the assigned limit of height, and have to be shifted to the rear, but they are such slow growers that for a great number of years they will remain dwarfs. The well-known *Thuopsis dolabrata* is a conifer of this class; and a great favourite with me for the purpose in hand is the little *T. latevirens*, which is not unlike a giant Selaginella. Unfortunately large-sized stock of it is none too plentiful, growers who cater for the many seeming to shirk a plant so slow growing.

The dwarf flat-headed miniature of the Weymouth Pine (*P. strobus nanus tabulæformis*) is another choice form to be specially named, and there are a few globose dwarf forms of Thuja and of Lawson's Cypress of beauty and value. But I have instanced enough among conifers.

Passing to other dwarf evergreen shrubs, the small mountain Rhododendrons, popularly known generally as "Alpen Roses," are many, characteristic, and invaluable. These, of course, contribute blossom colour, as well as evergreen foliage. Mention must specially be made of the hybrid *R. præcox*, for the beauty of its early pink Azalea-like flowers. Often have I seen the snow lying thick beneath them.

Of Cotoneasters dwarf enough, the little *thymifolia* is one of the best; *microphylla* becomes too large too soon. Both are fine in berry, but with me they are not of the very hardiest, nor are they the easiest to transplant successfully. In a somewhat different category are the two creeping Cotoneasters. *C. rupestris* and *C. congesta*, which closely follow the surface of a stone in their growth. They are thus very useful. Perhaps, however, the very best of the Cotoneasters is the comparatively new *C. horizontalis*, which is, however, deciduous. On the other hand, it has neither of the weak points just named, and for its splendid sail-like habit and the beauty both of its leafage and fruit it is quite indispensable, and in the forefront of rock-plants.

Then there are the Daphnes, among which the beautiful white-flowered and early, almost winter-blooming, *D. Blagayana*

must be named, as well as the old *D. Cneorum* and the newer *Fioniana*. Among Berberis, nothing taller than the useful dwarf *B. dulcis nana* can well be included here. But to it must be added the pretty procumbent *B. empetrifolia*.

It is a moot question whether variegated forms are wisely admitted to the rock-garden. Anything like positive pronouncement is out of place, and it is really a question of taste. If they are admitted, the Box and the Yew will contribute more varieties than they otherwise will. But in any case they contribute many. Tree Ivies I personally admire much, and if not admissible to the ideal Alpine garden (for in the high Alps the Ivy is not found), they will be found useful in any other rock-garden. And while the commoner Ivies are things to be there studiously avoided, there are some few beautiful little forms, like *H. conglomerata* and *minima*, which are in place and keeping.

These, along with *Euonymus radicans variegata* and a few others, are wanted for the special purpose of lightly mantling, without wholly concealing, a too naked surface of rock. Finally, I must name that pretty little silver-frosted shrub, *Santolina alpina* (not to be confounded with the grosser *S. incana*), as a subject too little used for imparting variety of leaf-colour to the picture.

I have not probably even indicated—certainly, I have not enumerated—one-half of even the best evergreen shrub furniture available for our purpose. But it is time that I turn towards another part of the subject.

The evergreen furniture should, in my judgment, not only consist of shrubs. I strongly recommend the inclusion, if only for the sake of their foliage, of large masses of carpeting plants. I instance among the best things for this purpose the silvery Antennarias, the Thymes, especially the Woolly Thyme (*T. lanuginosus*), the deep, yet vivid, green *Herniaria glabra*, and its golden variety; *Veronica prostrata*, a sheet of brilliant blue in spring and summer, and of neat and pleasing foliage always; *Veronica repens*, a close-growing turf of “milk and water” blue flowers; and mossy, even incrusting, Saxifrages. The masses of such evergreens as these may take many forms: “mats” of them upon the tops or sides of the mounds or banks; “cascades” of them over projecting rocks or ledges; flowing streams of them in the gullies; spreading floods of them in the lower ground of

rockery or rock-garden. Such subjects, if practicable, should be planted by the square foot or by the yard, and a cheap supply would doubtless soon be forthcoming if only (in the language of economists) "effective demand" for it arose.

Thus far, I have been naming some of the best evergreen carpeters, useful, therefore, for the rockery's "framework." But I need scarcely say how much the list of carpeters will be increased when there come to be included in it those whose beauty mainly lies in their flowers, such as the Aubrietias, Alyssums, American Phlox, and a host of others. A good stock of large pieces of such subjects seems to be perhaps the most essential acquisition of any who would start the culture of rock-plants, if only in a border. The following are the evident advantages of starting with these large "pieces," rather than with small "year-old" plants. They are, so to speak, bound to grow, unless wilfully killed (an experience some of us have had). They rapidly yield further stock, and are therefore in the long run cheap. Only by means of them can you get large effect rapidly. Being surface-rooting they can be moved about as wanted from place to place during eight or nine months out of the twelve.

Evergreen shrubs, then, dwarf only and generally choice, and "carpeters" in masses, generally evergreen, are, in my view, the first and most important matter to give attention to in the furnishing of the rock-garden.

I now pass on to make a few observations on the subject of the prevailing styles of rock-work structure.

At the head of the short list I think must perhaps come the best work of Messrs. Pulham, as seen at Battersea Park and elsewhere. As regards size and large effect, there is still nothing, I think, to rival it.

Some of their work, as you know, is constructed (as is to be preferred) from natural stone. Where such a size in the blocks is wanted as cannot well be had (or moved) in natural stone, clever imitation of it (in cement and otherwise) is resorted to, and those who are not in the secret would rarely detect imitation.

It may be admitted that this artificial work is not yet perfect, and that in its earlier days it had many defects, now pretty well surmounted. It still has with many the bad character of being unsuited to receive plants. This character is now, I think, not

well deserved. The original defect in this particular has been remedied by a change of plan; by the "plant pockets" now being made (so to speak) "bottomless," and to rest *wholly* on the underlying soil, and no longer making them mere pockets in the rock, drained by a hole into the soil. Messrs. Pulham, as I have said, use natural stone where possible. No other work than theirs, that I have personal knowledge of, proceeds on the lines of imitating, on a scale large enough to be effective, the *stratifications* found in nature.

Next in importance probably, but hardly second in merit perhaps—and high in both—are the many fine rock-gardens made by Mr. Potter, of Messrs. Backhouse & Son. These may even be preferred to Pulham's work by many who cannot tolerate the notion of any imitation in material, and Mr. Potter has, with natural stone only, achieved large effects.

So much as regards rock-garden construction having large size and effect for its purpose. I pass to a suggestion or two in regard to those more simple and inexpensive constructions for the reception of rock-plants (even rockeries they cannot always be very fitly termed, though for brevity's sake I call them so) to which the most of us are of necessity limited.

Without expense at all proportionate, we may imitate the rock-garden at Kew, and proceed as there by excavating a "defile" on the flattest and most unpromising of sites, the soil excavated being thrown up right and left, thus doubling the height of the banks. The space used may be small (there it is large), the rocks or stones used may be many or few. At Kew the two banks have been crowned or backed (wholly, I think) by Rhododendrons. But I should prefer the plan of leaving these banks to be faced on both sides, and perhaps also crowned, with rock-plants and rocks, sloping to turf.

This plan of excavation is very generally adopted. It is economical of soil, and is the best, probably, when the soil is light and drainage complete. Where the natural soil is heavy, the site low, or drainage is inadequate, the rockery is better lifted wholly above the natural level. You may then make it "barrow-shaped"—long and low (though not often advisedly narrow). Some natural informality of outline should be observed. Or you may have it in the form of a mere stony bank, where a slope in the ground lends itself to that plan; or in that of a spur

running out from bank or slope, or in that of ridge or mound. In most regards I have found simple stone-strewn banks answer admirably. The unpretentious simplicity of the plan is really in their favour, and they are even more suggestive of nature than are many or most of our more ambitious rockeries. But in one particular they may be defective unless precaution be used. The water runs from them too rapidly and easily. To obviate this, either the slope should be made very gradual, or the surface should be so broken and uneven (*e.g.*, by rudely "pocketing" it) that the rain is caught. I may here say that while, of course, it is not difficult to adapt the planting to any aspect, a cool aspect (east or even north) is more than usually desirable in such cases if Alpines furnish the banks in question.

I need not stay to ridicule the grotesque erections of rubbish in burrs, cinder, bricks, and the like, which not infrequently pass for rockeries—though the abundance of ridicule which has been cast upon them has not yet secured their disappearance. Suffice it to say this, that all that is wanted culturally is a body of good, deep, gritty, suitable soil, exceptionally well drained, in an airy and exposed position, shaped naturally, however simply, and, if may be, faced with stones, large or small, wholly or partially, to diminish evaporation and to help to equalise temperature. Many existing "borders" answer, or can readily be made to answer, these requirements, and to form a good and sufficient rockery in which even the choicest Alpines may be grown as well as in the largest and most costly rock-garden.

In districts where stone is scarce, it is not uncommon to use, instead of it, blocks of slag or cinder from foundry or factory. Carefully chosen as regards shape and size, and then dipped in or otherwise coated with cement, these may be found a fair substitute. But I find them never a wholly satisfactory one, plants generally disliking proximity to them. The reason I suspect to be that such substances generally contain acids or other elements noxious to plant life, which can rarely if ever be wholly imprisoned or neutralised by any cement covering.

I have only to add in this connection a suggestion or two derived from experience. The Scotchman who was commending "honesty as the best policy" enforced his recommendation, you will recall, by the assurance that he had "tried baith"; and I too

must own that I have done in the past, as my own garden will testify, more bad work than good.

First, let me say that in dealing with comparatively small stones, say anything under 2 or 3 cwt., it is, I think, a mistake to seek to get any "large effect" out of them. Such stones are, perhaps, as useful, "culturally," as rocks of as many tons; but "effect" in any large sense can rarely be had from them; and when this is not recognised, affectation and failure of attempt are the first suggestions conveyed, it may be unconsciously, to the onlooker. In such cases it is far better to let the stones be seen but little, even not at all. I hold it an error to make such stones (as is said) "go as far as they can," as by exposing the whole of them or of their largest sides. A method precisely the contrary should, I think, be pursued. Bury in the surface, and for from half to two-thirds of their bulk, any stones of comparatively mean size. They will thus equally, or better, fulfil their general functions. Thus to leave but their corners exposed above ground is the best means of concealing their smallness, for the corner of a large rock buried deep looks but as big as that of a stone buried less.

The stones should in general rest on their largest flat side, both for reasons of stability and of "naturalness." The "tilting on end" plan, which most of us have from time to time adopted "under stress," cannot, I think, be otherwise defended, and should be masked by suitable overgrowth where it has been unfortunately (or necessarily) adopted. The general "contour" of a rockery should, in my view, never be, avoidably, unnaturally regular. On the other hand, we should never, in our efforts to avoid that fault, be drawn into making it bizarre, or even unnaturally varied. Frost, weather, and water, are the tools with which nature shapes her rock-gardens, their lines and surfaces; and if these tools will not suffer hardness of outline they will as insistently disallow freak and fancy in the work.

And this leads me to my last observation in this connection, as regards the shaping of the surface soil. At least in the "cheap and useful" class of rockery which I am now considering, the soil surfaces left exposed should, in my view, be relatively large. Indeed, in many cases (as when little good stone is to be had) the tops of, say, the mounds may often best be furnished with plants only, to the exclusion of stone. I am, of course, speaking

broadly, for where practicable it is well also to have parts of the work creviced and pocketed for plants liking such treatment, or wanting such "setting." But, at least, large spaces should be general or frequent, that unbroken masses of plants may be seen. Now how to shape these surfaces. I know of no change to me so great, worked by effort so trivial, as that which I have often effected by a quarter of an hour's work with rake and spade upon shapeless piles of soil in a new-made rockery. If the soil is fairly loose, the rake (teeth and back) may do alone. Score the sides of the piles into such depressions and little gullies, of wavy outline, as nature makes everywhere—both on a small and a large scale—by water action, and the effect, however simple, will become natural and pleasing. If the surface is to be planted with carpeters, as I recommend, these depressions need not be deep, in order that their outlines may still be retained and seen when they are planted. They must be deeper, of course, when planted with taller plants, and when it is wished to keep the outline.

But I must cease these notes, which are necessarily rough, and some will think arbitrary. They certainly deal with matters which are largely questions of taste, and will, I hope, provoke criticism. Were I to continue I should have to enter upon the really vast subject of the literally thousands of species of fine rock-plants, on each class of which much might well be said. I will therefore only add one or two general observations.

The first, that most bulbs, though effective and otherwise valuable, are not generally in place in the rock-garden, because suffering from the summer watering which is there needed. There are, however, a few which are exceptionally accommodating. And, as well as bulbs, numbers of other plants from low altitudes which need similar summer conditions may well be grown in the neighbourhood of Alpines, by the simple expedient of giving up to them a separate section of the rock-garden, and leaving it generally unwatered in summer.

Next, that the small "gems" of the rock-garden, plants whose beauties are not seen at a distant glance, should evidently be so placed that they may easily be seen and studied; if may be, somewhere near the level of the eye, and at least in positions where they will easily be approached, and at the same time not overgrown by larger subjects. It is an excellent plan

to gather [such together into a selected spot, bed, or ledge of the rockery, guarded and prepared with extra care. Contrariwise, comparatively coarse beauties may be splendid when seen from afar, and care should be taken to put them at that distance from the passer-by, which will lend the needful enchantment.

In planting the ups and downs of a rock-garden it is generally well to accentuate both, by planting carpeters in the depressions, and subjects comparatively large on the hillocks. This point is commonly forgotten.

Whether tallies should obtain in the rock-garden must, I think, remain a question of taste—or, rather, a question of taste and utility together. Evidently much is to be said on both sides, as also for the medium course of tallying only those which, on ground of rarity or of winter disappearance, really need it.

Specially interesting bits in the rockery may be made in several ways, as by collecting side by side for contrast many beautiful species of the same genus, or even many allied genera, or plants from the same habitat (especially if not elsewhere found), or plants of similar form (*e.g.* the crucifers) but in different colours, or even plants of the same colour but varying forms.

And my last observation is, to enforce the recommendation that masses (if need be of comparatively few sorts) should generally be planted rather than but a plant or two of many. When once the right place for a plant has been found, plant there the whole available stock, and as nearly as may be in much such fashion as it would be found in nature. My ideal of a rock-garden is (as was once said of a famous wild garden) less a garden proper than “a place where alpiners and other rock-plants grow wild.” For evident reasons I think that its occupants should be confined to natural species, or to hybrids but little removed from them, and that florist’s flowers should find no place among them.

Postscript.—At the request of the Secretary of the Royal Horticultural Society, I have made the following lists of rock shrubs and rock plants for publication in company with the foregoing notes. Needless to say, these lists are merely careful “selections,” and in no sense claim to be in anywise complete.

It is worth while to add, in regard to the first three lists, a word of caution. These lists contain a certain number of Conifers and Shrubs which, while suitable occupants even of the rockery (and still more of the rock-garden) for a number of years, ultimately reach a size necessitating their removal to "more commodious premises."

LIST I.

A selection of Conifers, dwarf, small, or of slow growth, generally suitable for the rock-garden or rockery.

Abies balsamea globosa	Abies Merkii
„ Clanbrasiliiana	„ polita
„ compacta	„ pumila
„ conica	„ pygmæa
„ dumosa	„ Remonti
„ Maxwelli	

Many of the foregoing are (botanically) varieties of *Abies excelsa*

Cupressus Lawsoniana globosa	Retinospora ericoides
„ „ minima	„ obtusa nana
Juniperus cupressifolia fœm.	„ pisifera
„ „ mas.	„ „ aurea
„ chinensis aurea (Young's Golden)	Taxus baccata adpressa
„ drupacea	„ „ aurea nova
„ echiniformis	„ „ elegantissima
„ hibernica	„ „ ericoides
„ „ compressa nana	„ „ fructu-luteo
„ japonica	„ „ hibernica
„ „ aurea	„ „ Mitchellii
„ neoboriensis	„ „ microphylla
„ prostrata	„ „ nana
„ tamariscifolia	„ „ pendula gracilis
„ tripartita	„ „ pyramidalis
Pinus contorta	„ „ Washingtoniana
„ excelsa	Thuiaopsis borealis compacta
„ Strobilus nanus tabulæformis	„ „ glauca
„ „ umbraculiferus	„ „ lutea
„ sylvestris beuvronensis	„ „ variegata
„ „ globosa	„ dolabrata
„ „ pygmæa	„ „ variegata
„ „ aurea	„ lætevirens
Prumnopitys elegans	Thuja occidentalis japonica pygmæa
	„ recurva nana

LIST II.

A selection of evergreen, or nearly evergreen, rock shrubs other than Conifers.

Alyssum argenteum	Olearia Haastii
" spinosum	Pernettyas in var.
Andromeda japonica	Raphiolepis ovata
Azalea amœna	Rhododendron arbutifolium
" rosæflora	" chamæcistus
Bambusas, of sorts	" ferrugineum
Berberis dulcis nana	" " album
" empetrifolia	" " majus
" virescens (= angulosa)	" hirsutum
Buxus arborescens, in great variety.	" myrtifolium
Choysia ternata	" præcox
Cissus, many species (but except	" racemosum
C. ladaniferus and C. laurifolius	Santolina alpina
they are tender)	Vaccinium Vitis-idæa
Cotoneaster congesta	Veronicas (New Zealand shrubby),
" horizontalis	some others prove thus far too
" microphylla	tender to be admitted, but the
" rupestris	following may be with probability
" thymifolia	of success:—
Daphne Blagayana	Veronica anomala (of Edinburgh)
" Cneorum	and V. anomala (of
" Fioniana	Kew) distinct
" Phillipi	" angustifolia
" rupestris	" buxifolia
Diplopappus chrysophyllus	" carnosula
Erica carnea (other Heaths in var.)	" Colensoi glauca
Euonymus radicans fol. var.	" glauco-cærulea
Gaultheria procumbens	" Haastii
" Shallon	" Hectorii
Hedera arborea in var.	" Kirkii
" helix conglomerata	" Lyallii
" " minima	" pinguifolia
Jamesia americana	" salicifolia
Ledum Lyoni	" Traversii
Ligustrum coriaceum	" vernica

LIST III.

A selection from the best *deciduous* Shrubs, generally dwarf, suited to the rock-garden.

Aralia Maximoviczii	Fuchsia pumila
" spinosâ	Genista Andreana
Arundo Donax variegata (the type is	" hispanica
too large)	" pilosa
Cratægus Lelandi	" præcox
Cytisus Ardoinei	" " (and others)
" purpureus	Hypericum Moserianum
Euonymus europæus, var. mon-	Hypericum patulum
strosus	Koelreuteria paniculata

Muhlenbeckia complexa	Rosa rugosa alba
Ononis natrix	„ spinosissima
Pentstemon Scouleri	and other single species
Philadelphus microphyllus	Rubus deliciosus
„ Lemoinei	„ spectabilis
„ „ erectus	[Other species are fine for large
Polygonum compactum	spaces in rock-gardens, but not
Pyrus Cydonia Maulei	for the forefront]
„ „ nivalis (white flowers)	Salix Jacquini, and other creeping
Rhus Cotinus, var. atro-purpurea	Alpine species
„ glabra laciniata	Spiræas. The majority of the shrubby
Ribes alpinum pumilum aureum	species are too large; but the fol-
Rosa alpina	lowing are suitable:—
„ pyrenaica	Spiræa Bumalda
„ pimpinellifolia	„ „ var. “Anthony
„ rubrifolia	Waterer”
„ rugosa	„ crispifolia

LIST IV.

A selection of some of the best low-growing rock plants, *suitable for massing as carpeters or otherwise*, as indicated in foregoing notes.

Many sorts, otherwise suitable, I have excluded from this list, because, at this date at least, they are not found in sufficient quantity in commerce to be easily procured in the needful quantity.

Achillea Clavennæ	Campanulas, abietina; carpatica in
„ tomentosa	var.; elatines; garganica in var.;
„ umbellata	G. F. Wilson; Mariesii; Porten-
Alchemilla alpina	schlagiana; pulla; pumila; pumila
Alsine pinifolia (and others)	alba; pelviformis; Raineri; tur-
Alyssum alpestre	binata; Waldsteiniana; and others
„ montanum	(dwarf varieties only)
„ saxatile	Cardamine trifoliata
„ serpyllifolium	Cheiranthus alpinus
Anemone apennina	Coronilla iberica
„ Pulsatilla	Dianthus cæsius
„ ranunculoides (and others)	„ deltoides (and many other
Antennaria sericea	species)
„ sylvestris	Draba brunniæfolia
„ tomentosa	„ aizoides
Antirrhinum Asarina	Erodium macrodenum
Arabis alpina	Genista sagittalis
„ androsacea	Geranium argenteum
Arenaria balearica	„ cinereum
„ cæspitosa	Gypsophila cerastioides
„ „ aurea	„ repens
„ montana	Hepaticas in var.
Aster alpinus in var.	Herniaria glabra and H. g. aurea
Aubrietia deltoidea (in many varieties)	Heuchera sanguinea
„ tauricola	Hutchinsia alpina

Hypericum Coris	Polygonum vaccinifolium
" reptans	Potentilla dubia
Linaria alpina	" nitida
" nana rosea	" splendens
Lithospermum prostratum	" tridentata
Lychnis alpina	Primula rosea, and a few other
" Lagasca	species (only) are suitable
" pyrenaica	Ramondia pyrenaica (in shade)
Myosotis of sorts (perennial kinds	Rubus arcticus
best)	Salix reticulata (and other small
Nierembergia rivularis	creeping Alpine species)
Omphalodes verna	Saponaria ocymoides in var.
Onosma taurica	Saxifrages, mossy and encrusted (in
Papaver alpinum (other species too	great variety)
gross)	Sedums and Sempervivums (various)
Phlox amœna	Thymus citriodorus argenteus
" Lindsayana or lilacina	" lanuginosus
" setacea, The Bride	" serpyllus albus
" " " Vivid " (and many	" " coccineus
other less fine vars.)	Tiarella cordifolia
" stellaria	Tunica saxifraga
" verna (= reptans)	Veronica prostrata
Polemonium reptans	" saxatilis
Polygala Chamæbuxus purpureus	" repens, and others
Polygonum Brunonis	Waldsteinia trifoliata

Note.—The limited and special purposes for which I have made the foregoing lists will have been noted. These lists include but the smaller part of the total number of good rock plants in commerce. The larger residuum is too long to tabulate, and it may best be learnt from the leading catalogues.—
H. S. L.

1-18C no. 7. 140-141

EXTRACTS FROM THE PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

REPORT ON KIDNEY BEANS, 1895.

A large collection of these was received from

- | | |
|----------------------------------|------------------------------------|
| Messrs. Henderson, New York. | Messrs. Barr & Son, London. |
| Messrs. Vilmorin, Paris. | Messrs. Harrison, Leicester. |
| Messrs. Benary, Erfurt. | Messrs. Nutting & Son. |
| Messrs. R. Veitch & Son, Exeter. | Messrs. Hurst & Son, London. |
| Messrs. Sutton & Sons, Reading. | Messrs. J. Veitch & Sons, Chelsea. |

The seeds were sown on May 10, and were inspected by the Committee on two occasions, those Highly Commended being marked with × × ×.

For handy reference, they have been divided into three sections:—

1. Scarlet Runners.
2. Runner Kidney Beans, or Haricot.
3. Dwarf Kidney Beans.

Section I.

SCARLET RUNNER BEANS.

1. *Chelsea Giant* (J. Veitch & Sons).—Pods very large and fleshy; very productive; ripe seed white.
2. *Elephant* (Nutting & Son).—Flowers deep scarlet; pods very large and long; ripe seed dark purple.
3. *Giantess* (Hurst & Sons).—Similar to Painted Lady.
4. *Girtford Giant* (Barr & Son).—Pods short, thick, and fleshy; ripe seed dark purple.

5. *Leviathan* (Barr & Son).—Pods large, 6 to 8 inches long, and flat; very prolific. $\times \times \times$

6. *Mammoth Painted Lady* (Barr & Son).—Similar to the ordinary form. (No. 8.)

7. *Ne plus ultra* (J. Veitch & Sons).—Pods long, narrow, and straight; very uniform and neat.

8. *Painted Lady* (J. Veitch & Sons).—An old well-known variety, distinguished by its pale rosy-pink flowers. Pods of medium length; dried seed pale grey speckled.

9. *Prize Winner* (Sutton & Sons).—Pods long and narrow; of regular form, and handsome; dried seed pale grey speckled. $\times \times \times$

10. *Sutton's A 1* (Sutton & Sons).—Pods from 8 to 10 inches long; handsome and prolific. $\times \times \times$ A.M. September 10, 1895.

11. *Titan* (J. Veitch & Sons).—Same as Elephant.

12. *White Runner* (Copp).—Pods very large, 7 to 9 inches long, broad, and fleshy; very prolific; ripe seed white. $\times \times \times$

Section II.

RUNNER KIDNEY BEANS.

A.—Seeds white.

1. *Beurré blanc* (Vilmorin).—Plant of free growth. Pods short, about 4 inches long; greenish yellow; seeds small.

2. *Blanc Géant sans parchemin* (Vilmorin).—Pods 6 to 7 inches long; flat, fleshy; pale yellow. A poor cropper.

3. *Dutch Case Knife—Large Broad White* (Benary).—Pods flat; 4 to 6 inches long, 1 inch in width; seeds flat. Rather a poor cropper.

4. *Intestin* (Vilmorin).—Pods 3 to 4 inches long, roundish; deep green; seeds small. A poor cropper.

5. *Princesse* (Vilmorin).—Pods from 4 to 6 inches long; ripe seed very small; round. A poor cropper.

6. *Princesse ronde*.—A large selection of No. 5.

7. *Sabre à très grande cosse* (Vilmorin).—Large podded sabre. Plant of moderate growth. Pods 6 to 7 inches long; thin. A poor cropper.

8. *Sugar, earliest* (Benary).—Similar to No. 7.

9. *Sugar, very long podded* (Benary).—Pods long, 6 to 8 inches; flat. A poor cropper.

B.—Seeds particoloured.

10. *Coco-bicolore prolifique* (Vilmorin).—Plant of free growth. Pods from 6 to 7 inches long; pale-green and streaked with red; seed prominent; dried seeds white, with a buff-coloured eye. A pretty free cropping ornamental variety.

C.—Seeds dark purple.

11. *Veitch's Climbing* (R. Veitch & Son).—Plants of free vigorous growth. Pods borne successively in great abundance; straight, $\frac{1}{4}$ inch in breadth, 7 to 8 inches long; fleshy; seeds purplish crimson. A needed acquisition.

12. *Sutton's Tender and True* (Sutton & Sons).—Same as No. 11.

[This Bean, Nos. 11 and 12, was first received by the Society in April, 1885, from Mr. H. W. Ward, under the name of "Climbing Canadian Wonder."]

13. *Climbing French* (Barr & Son).—Same as No. 11.

14. *Mont d'or, or Golden Butter* (Benary).—Plant of moderate growth, cropping freely. Pods 6 to 7 inches long; deep golden yellow; fleshy; tender.

15. *Beurré de Mont d'or* (Vilmorin).—Same as No. 14.

16. *Flageolet Wax* (Benary).—Plant of free growth; prolific. Pods long and curved; pale yellow; fleshy. An early bean of very good quality.

D.—Seeds black.

17. *Golden Butter* (Barr & Son).—A later and paler selection of No. 14 with black seeds.

18. *Large Algiers* (Benary).—Plant of free growth. Pods six to seven inches long; deep green; seeds large.

E.—Seeds tawny.

19. *Epicurean* (Sutton & Sons).—Plant of moderate growth. Pods small; pale green. A fair cropper.

20. *Hungarian Butter* (Benary).—Plant of vigorous growth. Pods 7 to 8 inches long, narrow, twisted; pale green; borne in large clusters very freely; ripe seed long and narrow.

21. *Cosses Violette* (Vilmorin).—Plant of free vigorous growth. Pods 6 to 8 inches long, twisted; of a deep purplish blue colour. A very heavy cropper; very striking on account

of the colour of the pods. A good edible podded variety and very tender. The pods lose the purple colour on being cooked, and become as green as others.

22. *Transylvanienne Butter* (Benary).—Plant free and leafy. Pods 3 to 4 inches long, flat; seeds prominent. A poor cropper.

23. *Transylvanian* (Barr & Son).—Same as No. 22.

24. *St. Fiacre Mangetout* (Vilmorin).—Plant of free growth. Pods long, narrow; deep green; rough or uneven.

25. *Emperor Frederick* (Benary).—Plant of weak growth. Pods 4 inches long, flat, thin; seeds small. A poor crop.

Section III.

DWARF KIDNEY BEANS.

A.—Seeds black.

26. *Cylinder Black Wax* (Henderson).—Pods curved, small, round, fleshy; greenish yellow. Ripe seed long. Rather a poor bearer. Fit for use August 2nd.

27. *Prolific Nigger* (Harrison).—Plant of free compact growth. Pods long, narrow, even, fleshy; deep green colour. Ripe seeds long and narrow. A very excellent variety. Fit for use July 18.

28. *Yosemite Mammoth* (Henderson).—Plant vigorous; leaves large. Pods short and fleshy. A poor bearer. Fit for use August 2.

B.—Seeds black speckled.

29. *Bagnolet à feuille gaufré* (Henderson).—Plant of moderate growth. Pods of medium size and flat; pale green. A good cropper. Fit for use July 22.

30. *Refugée*, 1,000 to 1 (Henderson).—Plant of free growth. Pods 3 to 4 inches long, flat; pale green. Ripe seed small. A good cropper. Fit for use August 20.

30A. *Refugée*, extra early (Henderson).—Plant of free growth. Pods of medium size, green, round; a good early bearer. Fit for use July 22.

31. *Refugée Wax* (Henderson).—Pods very small and pale yellow. A poor, worthless variety. Fit for use August 15.

C.—Seeds white.

32. *Everbearing* (Hurst & Son).—Plant of a very distinct habit, the flower stems branching, and growing in racemes 13 inches long, thus bearing in succession. Pods borne in great abundance. Deep green. Dried seed small and flat. Early. Fit for use July 18.

33. *Emperor William* (Carter & Co.).—Plant weak. Pods long and flat. A poor bearer. Fit for use July 22.

34. *Mangetout Extra Early* (Vilmorin).—Plant dwarf, pods long, round; very full, fleshy; deep green. A great bearer. Very early. Fit for use July 18. $\times \times \times$ **F.C.C. A.M.** August 13, 1895.

35. *Lyonnaise* (Vilmorin).—Plant of vigorous growth. Pods green, long, narrow, much curved. Ripe seed long. A great bearer. Fit for use July 18.

36. *White Seeded Wax* (Henderson).—Pods short, flat, white. Ripe seed large and round. A poor cropper. Fit for use July 29.

37. *White Valentine* (Henderson).—Pods short, deep green, roundish. Fit for use July 22.

D.—Seeds white, with purple eyes.

38. *Improved Golden Wax* (Henderson).—Plant of free growth. Pods flat, greenish yellow. An excellent bearer. Fit for use July 18.

39. *Keeney's Rustless Golden Wax* (Henderson).—Plant of free habit. Pods flat and yellow. A fair cropper. Fit for use August 2.

40. *Wardwell's Kidney Wax* (Henderson).—Greatly resembles Golden-eyed Wax. Fit for use July 18.

E.—Seeds pale green.

41. *Flageolet Roi des Verts* (Vilmorin).—Plant of robust growth; leaves large; pods long, narrow, deep green. Ripe seed long and flat. A handsome bean, and a great bearer. Fit for use July 18. $\times \times \times$ **A.M.** August 13, 1895.

42. *Vert de Faudrensis* (Vilmorin).—Same as No. 41.

F.—Seeds dun speckled.

43. *Longfellow* (Henderson).—Plant of moderate growth. Pods long, narrow, green. Very prolific. Fit for use July 24. $\times \times \times$ **A.M.** August 13, 1895.

G.—*Seeds tawny.*

44. *Beurré Doré Naine* (Vilmorin).—Plant of moderate growth. Pods 4 inches to 6 inches long, nearly straight; of a clear golden yellow; seed round. A great cropper. Fit for use July 18. × × × **A.M.** August 13, 1895.

45. *Du Bon Jardinier* (Vilmorin).—Plant of moderate growth; very prolific. Pods green, small, roundish. Fit for use July 25.

46. *Horticultural* (Henderson).—Plant of moderate growth. Pods of medium size, flattened; green, spotted with brown; seed large and round. Fit for use July 25.

47. *Red Valentine* (Henderson).—A poor grower; pods small, round, green. An early variety. Fit for use July 12.

48. *Stringless Dwarf* (Carter & Co.).—Plant vigorous. Pods pale green, of medium length, round; fleshy. Seed long and narrow. A great bearer, fit for use July 18.

49. *Daniels' First Early* (Daniels).—Plant of moderate growth. Pods long, green, flat; seed round and large. An excellent cropper. Fit for use July 18.

50. *Nain Parisien* (Vilmorin).—Plant of dwarf, free growth. Pods long, green, speckled. Ripe seed speckled, long, and narrow. A good bearer, and fit for use July 18.

51. *Lima Beans* (Henderson).—Of these there are several varieties, quite distinct from the other Beans, but they do not succeed in this climate, very rarely producing pods.

 TRIAL OF CABBAGES, 1895.

A collection of seventy-six varieties of Cabbage was kindly furnished by the following seedsmen for trial:—

Messrs. Barr & Son	Messrs. Nutting & Son
„ E. Benary	„ Sutton & Sons
„ Daniels	„ James Veitch & Sons
„ Henderson	„ Vilmorin & Co.
„ Hurst & Son	„ Daniels Bros.
„ Kent & Brydon	

The seeds were sown on May 19, and planted out when fit. The weather proving favourable, the plants grew without any check. They were examined twice by the Committee, who Highly Commended those marked $\times \times \times$. As a trial of Cabbages sown in spring for use in summer and autumn the trial was fairly complete; but for Cabbages sown in autumn for use in early spring, other conclusions would be arrived at.

THE COMMON OR WHITE CABBAGE.

1. *Early York* (J. Veitch & Sons).—Stem short; head small, ovate; leaves fleshy, glaucous green, smooth. An excellent variety for summer use, and stands the dry weather well. Early and distinct.

2. *Superfine Early Dwarf York* (Barr & Son).—A very fine selection of Early York. $\times \times \times$ **A.M.** September 10, 1895.

3. *Large York* (Veitch & Sons and Barr & Son).—A large and later variety of the Early York.

4. *Early Étampes* (J. Veitch & Sons); *Exprés* (Vilmorin & Co.); *Sutton's Earliest* (Sutton & Sons); *Best of All* (Barr & Son); *Earliest of All* (J. Veitch & Sons).—These are all selections of the Early Étampes, more or less true.

Stem of moderate length; head of medium size, somewhat ovate; leaves of fair size, pale green, smooth. It hearts rapidly, becoming very solid if left standing.

This is the earliest variety of Cabbage that we have, and the most suitable for sowing in the spring to come in for late summer use. Early Étampes. $\times \times \times$

5. *Ellam's Early* (Nutting & Son); *Ellam's Early Dwarf Spring* (J. Veitch & Sons).—Stem short; head moderately large, conical, pointed; leaves bright green. Hearts form very quickly in early spring.

6. *Atkin's Matchless* (J. Veitch & Sons).—Stem short; head small, pointed; leaves deep green, cockled. Hearts firm and solid. For use in mid season; very distinct.

7. *Sutton's Little Gem* (Sutton & Sons).—Plant small and compact; stem short; leaves bright green, fleshy; hearts small, conical, and firm. For mid-season use. A remarkably pretty and excellent variety. $\times \times \times$ **A.M.** September 10, 1895.

8. *Little Pixie* (J. Veitch & Sons).—Plant small and very

compact ; leaves pale green, fleshy ; heads short, with broad basis. A good, useful midsummer Cabbage for summer use.

9. *Improved Nonpareil* (Nutting & Son and J. Veitch & Sons) ; *Nonpareil Improved* and *Cocoanut* (Barr & Son) ; *Earliest of All* and *Cattell's Reliance* (Nutting & Son) ; *Dwarf, Autumn Cutting*, and *Wheeler's Improved* (Barr & Son).—The foregoing are all selections or variations of the old Nonpareil.

Plant of medium size ; heart medium, somewhat ovate, compact, forming quickly ; leaves smooth, pale green. Mid season.

One of the most generally useful varieties for summer and autumn use. Improved Nonpareil. $\times \times \times$

10. *Enfield Market, Dwarf Spring Cutting, Criterion Spring Cutting*, and *Nonesuch* (Barr & Son) ; *Blackwell Early* (Kent & Brydon).—Plant of larger size than the Nonpareil, with larger hearts, broad at the base, pointed, conical ; leaves bright green. This is the variety mostly grown for the London markets ; it stands the winter well.

11. *Early Offenheim* (J. Veitch & Sons).—A fine selection of Enfield Market ; very slow in running to seed.

12. *Robert Wrench* (Wrench & Co.).—A large and fine type of Enfield Market.

13. *Daniels' Defiance* (Daniels Bros.).—A very large variety ; pale green, soft.

14. *Leeds Market* (Nutting & Son) ; *Barr's Eclipse Spring Cutting* (Barr & Son).—An early hearting variety ; the heads large, broad at base, pointed, pale green. Recommended as a field variety. $\times \times \times$ A.M. September 10, 1895.

15. *Cœur de Bœuf* (Vilmorin & Co.) ; *Oxheart*.—Heads large, very broad at the bases, pointed ; leaves pale green. It hearts early and freely.

16. *London or Rosette Colewort* (J. Veitch & Sons).—This, although truly a Cabbage, is used in an open or unhearted state, and termed Colewort or Collard. The Rosette Colewort, if sown early, forms pretty uniform rosette-like hearts, which are quite ornamental, and of excellent quality as a Cabbage for autumn use.

17. *Hardy Green Colewort* (J. Veitch & Sons).—This is much appreciated as a Colewort, but as a Cabbage it is worthless.

18. *Sugar Loaf* (Barr & Son).—A very distinct variety.

Stem short; head very long, regularly oblong, somewhat resembling a Cos Lettuce; leaves light green, hooding over each other; heart soft, not fleshy. It is hardy and stands the winter well.

19. *Winnigstadt* (J. Veitch & Sons and Barr & Son); *Winnigstadt Sugar Loaf* (Benary).—Stem short; outer leaves large, dull glaucous green, undulated at the edges, the inner ones being twisted in a peculiar manner; head extremely firm and solid, roundish, but having the top pointed; very heavy. Excellent for sowing in spring for early autumn use, standing the dry weather well. $\times \times \times$ A.M. September 10, 1895.

20. *Large Early Conical* (Benary & Co.).—An early and inferior variety of *Winnigstadt*.

21. *Filder* or *Pomeranian* (Benary & Co.).—Stem long, frequently swollen under the head; outer leaves numerous, bright green, and rather large; head of a long conical shape, solid and compact; heart white with a pointed top. A very distinct late variety, grown extensively in Germany, but not much cared for in this country.

22. *Schweinfurt* (Benary & Co.).—Heads very large and broad, 15 to 20 inches in diameter, rather soft, easily crushed with the hand; outer leaves pale green with white variations, often tinged with violet red. Sown in spring it is fit for use early, but it is not a much approved variety.

DRUMHEAD SECTION.

23. *St. John's Day* (J. Veitch & Sons); *St. John's Day* (*Joannet*) (E. Benary); *Miniature Drumhead* (Barr & Son).—Stem very short, the head resting on the ground; head very solid, rather broader than its height; outer leaves few, deep green, shining. Heart white, crisp, and fleshy. Of fine quality, and is most useful when sown in spring for autumn use. $\times \times \times$ A.M. September 10, 1895.

24. *Christmas Drumhead* (Barr & Son and J. Veitch & Sons).—Heads large and broad; leaves smooth, glaucous green. A good winter Cabbage.

25. *Early Small White Erfurt* (Benary).—A medium sized Drumhead. Head small, flat, glaucous green. Hearts very firm and solid. Early.

26. *Gouffre d'Hiver* (Vilmorin).—A dwarf, deep green Drum-

head of medium size ; outer leaves deep green, undulated and lobed. Very solid.

27. *Plat de Paris* (Vilmorin) ; *Henderson's Early Spring* (Henderson).—Stem short, head large, flat, heart crisp and tender. A good summer Drumhead. Early.

28. *Quintal d'Auvergne* (Vilmorin).—Head very large, broad, flat, 15 to 20 inches in diameter ; leaves bright green, smooth ; heart firm and solid, remaining long in a fresh condition. Excellent.

29. *Drumhead* (J. Veitch & Sons) ; *Brunswick Short-stemmed* (Vilmorin & Co.) ; *Magdeburg* (Hurst) ; *Large White Magdeburg* (E. Benary & Co.) ; *Large White Brunswick Flat*, 1st quality (Benary).—These are all very similar in character and quality, according to selection.

Heads large, flat ; leaves glaucous, pale ; heart firm.

30. *Ulm Quintal Large White* (Benary).—A very pale green variety of the foregoing.

SAVOYS.

31. *Aure Small Curled* (Vilmorin).—Plant dwarf ; head of medium size ; outer leaves deep glaucous green ; heart very finely curled, firm, deep green. A very fine Savoy similar to the Victoria. $\times \times \times$ **A.M.** September 10, 1895.

32. *Early Aubervilliers* (Vilmorin).—Plant large ; head very large, 7 inches diameter, not much curled, rather soft and coarse. Comes early into use.

RED CABBAGE.

33. *Early Erfurt*, *Blood-Red Early Erfurt*, and *Blood-Red Berlin* (Benary) ; *Sutton's Dwarf Blood-Red* (Sutton & Sons).—These are very similar, and we therefore prefer to call them *Early Erfurt*. Plant short ; head of medium size, almost spherical, very firm and solid ; outer leaves few, dull purple ; inner leaves deep blood-red. A valuable variety for summer and autumn use, coming in long before the ordinary sort. $\times \times \times$ **A.M.** September 10, 1895.

34. *Red Dutch* (Barr & Son) ; *Mammoth Rock-Red* (Henderson) ; *Dutch Pickling* (J. Veitch & Sons) ; *Blood-Red Vein* (Benary).—All very similar. Plant tall ; head large, roundish, ovate, very firm, and solid ; outer leaves glaucous, dull red ; inner leaves deep blood-red. Useful for main crop to succeed *Early Erfurt*. $\times \times \times$ **A.M.** September 10, 1895.

TRIAL OF SUMMER LETTUCES, 1895.

For the purposes of this trial a collection of forty varieties was received from the following :—

Messrs. Benary, Erfurt.	Messrs. Vilmorin, Paris.
Messrs. Daniels, Norwich.	Messrs. J. Veitch & Sons, Chelsea.
Messrs. Harrison, Leicester.	Messrs. R. Veitch & Son, Exeter.
Messrs. Henderson, New York.	

The seeds were sown on June 8, and planted out when fit. The season was not altogether favourable for the growth of Lettuces, the early part of the summer being excessively dry and warm, and the latter part very moist. They were examined by the Committee on two occasions, the following being Highly Commended (× × ×) :—

1. *Grosse brune tête* (Vilmorin).—Large Brownhead.
2. *Icelandic* (R. Veitch & Son).
3. *Merveille de quatre saisons* (Vilmorin).—Marvel.
4. *Royal Malta* (Harrison & Sons).
5. *Romaine Balloon* (Vilmorin).—Balloon Cos.
6. *Romaine grise Maraichère* (Vilmorin).—Grey Cos.
7. *Satisfaction* (Benary).

CABBAGE LETTUCES.

1. *Batavia blonde* (Vilmorin).—Heads very large and loose ; of pale green colour, tinged with light red ; roundish ; outer leaves large and curled ; undulated and toothed at the edges, which are also tinged with red.

2. *Big Boston* (Henderson).—Heads large and soft ; pale green, the outer leaves slightly finer, tinged with red.

3. *Blonde d'Été* (Vilmorin).—Same as All the Year Round.

4. *Blonde Géante* (Vilmorin).—Heads large and loose ; pale green ; outer leaves large and crisped.

5. *Bossin* (Vilmorin).—Heart light green, with brown on the veins. Leaves very large, pale green, tinged with brown, spreading widely on the ground ; toothed and undulated on the edges, and spotted with brown.

6. *Buttercup* (Benary).—Heads small and firm ; pale yellow ; very fine quality. See No. 21.

7. *Daniels' Continuity* (Daniels).—Hearts small and firm outer leaves reddish brown; runs to seed early.

8. *Continuity* (R. Veitch).—Heads large, flat, and soft; deep green, spotted with dark brown occasionally; fit for use late. Very distinct.

9. *Crystals* (Benary).—Heads large, the hearts rather loose; leaves crisp and tender; pale green, tinged with red.

10. *Iceland* (R. Veitch).—Heads small and loose; very pale green; leaves undulated and curled; shining as if varnished. A very pretty Lettuce, and stands the dry weather well. $\times \times \times$ **A.M.** August 13, 1895. See Royal Malta, No. 24.

11. *Incomparable* (Benary).—Heads large and soft; pale green; the outer leaves tipped with red.

12. *Grosse brune tête* (Vilmorin).—Heads large and soft; pale green; outer leaves reddish bronze. A fine early Lettuce. $\times \times \times$ **A.M.** August 13, 1895.

13. *Herniman* (R. Veitch & Son).—Heads small and loose; leaves much curled; runs to seed rapidly. A very pretty Lettuce.

14. *Large Yellow Market* (Benary).—Very much resembles No. 11.

15. *Goutte lente à monter* (Vilmorin).—A selection of Tennis Ball. Head small; very solid and compact. It keeps a long time in condition even in summer.

16. *Lorthoïs* (Vilmorin), syn. Trocadero.—Heads large and moderately firm; the outer leaves crisped, dark green tinged with russet on the upper part. A very distinct and hardy variety.

17. *Merveille de quatre saisons* (Vilmorin), syn. Marvel.—Heads large, round, and compact; flattened on the top, soft but solid, deeply tinged with bright red, outer leaves coloured red on the exposed parts. An excellent Lettuce, turns in early and keeps well. **A.M.** August 13, 1895.

18. *Mignonette* (Henderson).—A small, very early variety, producing small firm heads, which run to seed very quickly.

19. *Neapolitan* (Vilmorin).—Heads very large, crisp, and tender; bright green; curled. An excellent and well-known late variety.

20. *Perfect Gem* (J. Veitch & Sons).—Heads small, compact, and solid; leaves dark green, thick, and fleshy. It stands the weather well.

21. *Pomme d'or* (Vilmorin).—Heads small, solid, and compact; pale yellow. A very good Lettuce. See No. 20.

22. *Queen of Summer* (Daniels).—Similar to Incomparable.

23. *Perpignan Improved* (Benary).—Inferior stock.

24. *Royal Malta* (Harrison).—Heads large, loose, crisp, and tender; leaves of a uniform light green, toothed and undulated. It stands dry summer weather well. $\times \times \times$ **A.M.** August 13, 1895. See Iceleaf, No. 10.

25. *Sanguine améliorée* (Vilmorin).—Heads small, firm, and solid; leaves speckled with bronze; hearts almost crimson.

26. *Satisfaction* or *Salamander* (Benary).—Heads large and soft; pale green; leaves tipped with red. An excellent selection. $\times \times \times$ **A.M.** August 13, 1895.

27. *Simpson Black Seeded* (Henderson).—Young plants, pale green, almost yellow; leaves undulated at the margin and curled; heart crisp and tender. A very pretty lettuce and one of the best for summer.

28. *Solid Headed Yellow* (Benary). See Incomparable, No. 11.

29. *Stubborn* (Benary).—Heads large and soft; pale green; outer leaves bronzy red. See *Grosse brune tête*, No. 12.

30. *Stubborn Large Yellow* (Benary).—A pale green selection of No. 29.

31. *Sunset* (Henderson).—Heads small and white.

32. *Verte Grasse* (Vilmorin). See No. 20.

COS LETTUCES.

33. *Brune Anglaise noire* (Vilmorin).—Young plants of a dull green; leaves spatulate, deeply toothed, tinged with red on the edges and veins; head pointed, pale green, tinged with dull brown, large and open, requires tying to make it blanch properly. A very hardy variety, but equally good for summer; best known as *Black Seeded Bath Cos*. $\times \times \times$

34. *Romaine Balloon* (Vilmorin).—Young plants, pale green; leaves erect, narrow, toothed; heads tall, large, broad, roundish, bright green. Rather late in forming heads and lasts well. **A.M.** August 13, 1895.

35. *Romaine grise Maraichère* (Vilmorin)=*Grey Cos*.—Very similar to *White Paris Cos*. $\times \times \times$ **A.M.** August 13, 1895.

36. *Romaine blonde Maraichère* (Vilmorin)=*White Paris Cos*.—Young plants, pale green; leaves almost erect, slightly

toothed and crimped; heads long, tall, rounded at the top; outer leaves large, light green, hooded over each other; very crisp and tender. The most generally approved variety of the Cos section.

37. *Romaine Verte Maraichère* (Vilmorin)=Green Paris Cos.—Very similar to White Paris: leaves of a brighter green.

38. *Romaine Pomme en Terre* (Vilmorin).—Plant short, thick, dark green, solid, resting close on the ground; outer leaves pointed, folded in two, very crisp, and slightly bitter taste.

TOMATOS GROWN FOR TRIAL, 1895.

Highly Commended (× × ×).

1. *Autocrat, The* (R. Veitch & Son).—Same as *Ponderosa*, No. 15.

2. *Cherry* (R.H.S. Gardens).—Small, round, red. Highly Commended by the Committee for fine flavour and quality as a dessert fruit. × × ×.

3. *Chemin* (R.H.S. Gardens).—An old variety. × × ×.

4. *Conference, The* (R.H.S. Gardens).—An old variety, and still one of the best. **F.C.C.** 1889.

5. *Duke of York* (Carter & Co.).—Fruit of medium size, somewhat flattened, smooth and even; colour deep red; flesh solid and good. A fine cropper. × × ×

6. *Early July* (Laxton Bros.).—Fruit small, or below medium size, flat, deep red. A great cropper, and early. × × ×

7. *Flying Dutchman* (R. Veitch & Son).—Fruit large, flattened, and slightly corrugated; colour deep red; flesh deep red, solid, and of good quality; trusses large. A great cropper.

8. *Frogmore Selected* (J. Veitch & Sons).—Fruit of medium size, borne in large clusters, deep red, slightly corrugated; flesh deep red, very juicy, and of good quality. A very prolific variety. × × ×

9. *Golden Nugget* (Benary, and Sutton & Sons).—An old variety. Highly commended for dessert use. × × ×

10. *Ham Green Favourite* (R.H.S. Gardens).—An old variety. × × ×

11. *Lemon Blush* (Benary and Daniels).—Same as *Blenheim Orange*.

12. *Long Keeper* (Benary).—Same as *Chemin*, No. 3.

13. *Open Air* (Laxton Bros.)—Very similar to *Early July*.

14. *Perfection Surpasse* (Barr & Son).—Same as *Perfection*.

15. *Ponderosa* (Benary).—Fruit very large and coarse, somewhat corrugated; flesh of a pale dull red, rather soft, but of pleasant flavour. This is the largest of all the Tomatos, and might be fitly termed monstrous.

16. *Reine des Hâtives* (Vilmorin).—Fruit of medium size, somewhat flat, and slightly corrugated, deep red; flesh deep red, melting, and of firm quality. Early and prolific.

17. *Rouge grosse lisse* (Vilmorin).—Fruit large, shining red, and similar to *Perfection*, but plant of distinct growth.

18. *Roseleigh Gem* (Sydenham).—A good selection of *Ham Green*; very prolific.

19. *Scarlet Ponderosa* (Benary).—A brighter-coloured variety of *Ponderosa*.

20. *Selected Ham Green* (Eckford).—A good selection of *Ham Green*.

21. *Sutton's Dessert* (R.H.S. Gardens).—**F.C.C.** 1894.

22. *Terra Cotta* (Benary).—Fruit of medium size, round, deep crimson scarlet; very pretty, and a great cropper.

Other varieties were received too late in the season to be tested.

POTATOS, 1895.

A collection of sixty varieties of Potatos was grown in the Society's gardens during the past year. The season being fairly dry, disease was not very prevalent.

The different varieties were sent by:—

Messrs. Barr & Son, Covent Garden.

Mr. Briggs, Beech Hill, Lea, Matlock Bath.

Messrs. Carter & Co., High Holborn.

Mr. Cockerell, The Gate House, Wirksworth.

Messrs. Daniels Bros., Norwich.

Mr. R. Dean, Ealing.
 Mr. Gilbert, Burghley Gardens, Stamford.
 Messrs. Harraway & Scott, Westminster.
 Messrs. Henderson & Co., New York.
 Mr. Hughes, Wentworth Woodhouse, Rotherham.
 Messrs. Hurst & Son, Houndsditch.
 Messrs. Kent & Brydon, Darlington.
 Messrs. Laxton Bros., Bedford.
 Mr. Leece, Aynsome Farm, Grange-over-Sands.
 Mr. Miles, Derwent Street, Leicester.
 Mr. Morse, Berkley House, Frome.
 Mr. Newland, Mundham, Brooke.
 Mr. Revens, North Street, Burwell.
 Mr. Ridgewell, Histon Road, Cambridge.
 Mr. Ross, Welford Park, Newbury.
 Mr. Sim, Greenmyre, Fyvie.
 Messrs. R. Veitch & Son, Exeter.
 Messrs. Vilmorin & Co., Paris.
 Mr. Webber, Tonbridge.
 Mr. Wiles, Grandpont, Oxford.
 Mr. Woods, Worksop.
 Messrs. Wrench & Sons, London Bridge.
 Mr. Wythes, Syon House Gardens, Brentford.

The collection was duly examined by the Fruit and Vegetable Committee on September 5, see page cliv.:—

Advancer (Carter & Co.).—Small, white, half round, smooth skin. A fair cropper.

Agreeable (C. Ross).—Large, round, rough skin. Much diseased.

Alpha (Carter & Co.).—Long kidney, reddish purple, rough skin; flesh white. A small cropper.

Beech Hill Beauty (Briggs).—Half round, medium size, smooth skin; flesh yellow. A good cropper.

Belle de Fontenay (Vilmorin & Co.).—Small kidney, white. A poor cropper, but early.

Bill Nye (Henderson & Co.).—Large, rosy pink, good shape; a poor cropper.

Bonnie Blush (Miles).—Half long medium size, fine form, rough skin. Early.

Bountiful (Carter & Co.).—Medium size, white kidney. A poor cropper.

Britannia (Vilmorin & Co.).—Medium size, irregular, white, rough skin, pink eye. An excellent cropper and free from disease.

Carmen No. 1 (Wrench & Sons).—Magnum Bonum type. Much diseased.

Carmen No. 3 (Wrench & Sons).—Rough Magnum Bonum. A good cropper.

Cockerell's Seedling (Cockerell).—Large, round, irregular, rough skin. A heavy cropper. **A.M.** September 10, 1895.

Conference (Barr & Son).—Round, medium size, smooth skin, pink eye. A small cropper.

Congress (Barr & Son).—Magnum Bonum type, large, smooth skin. A fair cropper.

Conqueror (Carter & Co.).—Half round, small. A good cropper.

Duke of York (Daniels Bros.).—Large Magnum Bonum, badly diseased. A good cropper.

Early Bird (R. Dean).—Long, narrow, somewhat shape of Magnum Bonum. A good cropper.

Early Crimson Flourball (Daniels Bros.).

Early Primrose (Daniels Bros.).—Medium-sized kidney, rough skin. A poor cropper and badly diseased.

Early Queen (Daniels Bros.).—Resembles Beauty of Hebron. Large, pale red. Much diseased.

Genuine (Ross).—Large, long, Magnum Bonum type. Much diseased.

Gilbert's Topper (Gilbert).—White, large, long, white skin, eyes full. A heavy cropper.

Goldfinder (Carter & Co.).—Similar to Reading Hero. White, smooth skin. A great cropper. Late.

Hallamshire Hero (Hughes).—Medium size, long kidney, smooth skin. A good cropper.

Hanaway's Seedling (Hanaway & Scott).—Large, very long ; a heavy cropper.

Ideal (Henderson & Co.).—Pink, large, rough skin ; a small cropper and much diseased.

King Richard (Carter & Co.).—Small, white ; badly diseased.

Late Perfection (Ridgewell).—Long, Magnum Bonum type, good form. A great cropper.

Leece's Seedling (Leece).—Large, long, irregular. A good cropper.

Market Favourite (Hurst & Son).—Round, rough skin, medium size. A fair cropper.

Morse's Seedling (Morse).—White, large, rough skin; a medium cropper; late.

Mountain Maid (Sim).—Small round, very rough dark skin; a good cropper, but much diseased.

Murphy (Laxton Bros.).—White, medium size, fine form; a good cropper.

Newland's Seedling (Newland).—White, large, half round, rough skin; an excellent cropper; late.

Nonpareil (Carter & Co.).—Medium size, half round; a moderate cropper and badly diseased.

Onward (Barr & Son).—White, medium size, smooth skin; a moderate cropper.

Pink-eyed Perfection (Wiles).—Medium size, round, rough skin; a good cropper.

Preference (Ross).—Small, half long; much diseased.

Pride of the West (Henderson & Co.).—Large, fine form; a moderate cropper and much diseased.

Pride of Tonbridge (Webber).—Medium size, fine form, smooth skin; a fair cropper. **A.M.** September 10, 1895.

Pierremont (Kent & Brydon).—Medium size; a fair cropper, but much diseased.

Reliable (Daniels Bros.).—Magnum Bonum type.

Reine des Polders (Vilmorin & Co.).—Large, long, irregular, coarse; a medium cropper; late.

Remarkable (Daniels Bros.).—Large, coarse, Magnum Bonum type.

Revens Seedling (Revens).—Similar to Magnum Bonum.

Rex (Ross).—Medium size, half round, rough skin; an excellent cropper, but badly diseased.

Robust (R. Veitch & Son).—Medium size, smooth skin; a poor cropper.

Saxon (Kent & Brydon).—Medium size, good shape, smooth skin; a moderate cropper.

Sirius (Harraway & Scott).—Small round; a good cropper.

Stamina (Ross).—Round, early; all the tubers were diseased.

Sutton's Perfection (Sutton & Sons).—Medium size, round, rough skin; a fair cropper.

Sutton's Satisfaction (Woods).—White, large, fine form, rough skin; an excellent cropper. **A.M.** September 10, 1895.

Sutton's Triumph (Sutton & Sons).—Medium size, round, rough skin, fine form; a good cropper. **A.M.** September 10, 1895.

Syon House Prolific (G. Wythes).—Large, half round, rough skin; an excellent cropper; late and a very strong grower. **A.M.** September 10, 1895.

Table King (Daniels Bros.).—Medium size, long, rough skin; a moderate cropper.

The Canon (Barr & Son).—White, medium size, smooth skin; a good cropper.

Triumph (Carter & Co.).—Large, long, irregular, smooth skin; a heavy cropper; late.

Veitch's No. 1 (R. Veitch & Son).—Similar to *Magnum Bonum*.

White Perfection (Daniels Bros.).—Small round, smooth skin; a heavy cropper.

Wood's Favourite (Ridgewell).—Large, round, eyes full, fine form; a fair cropper.

Wrangler (R. Veitch & Son).—Small, flat, round; a poor cropper.

REPORT ON CACTUS DAHLIAS, 1895.

The rapid accession of new varieties to this the most beautiful section of the Dahlia family, made it extremely desirable that they should be collected and grown together under the same conditions, and the so-called improvements noted. It is worthy of special remark that *Juarezii*, the oldest Cactus variety, is still quite one of the best.

The plants for this trial were received from :—

Mr. C. Turner, Slough.

Messrs. J. Veitch & Sons, Chelsea.

Messrs. R. Veitch & Son, Exeter.

Messrs. J. Cheal & Sons, Crawley.

Messrs. Dobbie & Co., Rothesay.

Messrs. H. Cannell & Sons, Swanley.

They were grown in ordinary garden soil and received no special attention.

The collection was duly examined by the Committee, who recommended the following awards :

Highly Commended (× × ×).

TO CACTUS DAHLIA.

1. *Bertha Mawley* from Mr. Turner and Messrs. Dobbie & Co.
2. *Cannell's Own* from Messrs. H. Cannell & Sons.
3. *Ernest Cannell* from Mr. Turner and Messrs. J. Veitch & Sons.
4. *Gloriosa* from Mr. Turner and Messrs. Dobbie & Co.
5. *Matchless* from Mr. Turner and Messrs. J. Cheal & Sons.
6. *Mrs. Glover* from Messrs. H. Cannell & Sons.
7. *Mrs. H. Cannell* from Messrs. H. Cannell & Sons.
8. *Purple Prince* from Mr. Turner.

TO DECORATIVE CACTUS DAHLIA.

9. *Baron Schröder* from Mr. Turner.
10. *Black Prince* from Messrs. Dobbie & Co.
11. *Cannell's Brilliant* from Messrs. H. Cannell & Sons.
12. *Harry Freeman* from Mr. Turner.
13. *Josephine* from Messrs. J. Veitch & Sons and Messrs. J. Cheal & Sons.
14. *Kynerith* from Mr. Turner, Messrs. J. Veitch & Sons, and Messrs. Dobbie & Co.
15. *Maid of Kent* from Messrs. J. Veitch & Sons and Mr. Turner.
16. *Mrs. H. Carter* from R.H.S. gardens.
17. *Mrs. Turner* from Mr. Turner.
11. *Rayon d'or* from Mr. Turner.
19. *Sir Hugo* from Messrs. J. Veitch & Sons.

Commended (× ×).

TO DECORATIVE CACTUS DAHLIA.

20. *Beauty of Eynsford* from Messrs. J. Cheal & Sons.
21. *Duchess of York* from Messrs. J. Cheal & Sons and J. Veitch & Sons.
22. *Empress of India* from Mr. Turner and Messrs. J. Veitch & Sons.

23. *Mrs. Basham* from Messrs. Dobbie & Co.

24. *Sydney Hollings* from Messrs. J. Veitch & Sons.

The collection was divided into two classes, viz. :—

I. Varieties of the true Cactus type, of which *Juarezii* is the example, and

II. Decorative Cactus varieties having broader and flatter petals (or florets), of which *Mrs. Hawkins* and *Constance* are well-known examples.

Class 1.—CACTUS VARIETIES.

1. *Apollo* (Turner, Veitch, Dobbie).—Plant of medium height; flowers crimson scarlet.

2. *Beauty of Arundel* (Turner, Cheal, Veitch).—Flowers large, rosy purple flushed with crimson. A sport from *Juarezii*.

3. *Bertha Mawley* (Turner, Dobbie).—Plant of dwarf habit; flowers borne well above the foliage, petals long and beautifully twisted. Very free. $\times \times \times$; **A.M.** September 6, 1892.

4. *Blanch Keith* (Turner).—Plant of medium height; flowers large, somewhat loose, borne well above the foliage; colour clear canary yellow.

5. *Cannell's Gem* (Cannell, Veitch).—Plant of bushy habit; flowers small; petals broad; colour orange red. Very free.

6. *Cannell's Own* (Cannell).—Plant of compact growth; flowers small, borne well above the foliage; colour reddish buff. Very free. $\times \times \times$

7. *Cannell's Velvet* (Cannell).—Flowers rich crimson, shaded magenta on outer petals.

8. *Countess of Gosford* (Turner, Cheal, Dobbie).—Petals long, narrow, and twisted; yellow; outer petals flushed with amber.

9. *Crawley Gem* (Cheal).—Plant of medium growth; flowers carried well above the foliage; colour crimson scarlet. Very early.

10. *Dean Hole* (Cannell).—Plant of free vigorous growth; flowers vermilion scarlet. Very bold and effective.

11. *Delicata* (Turner, Cheal).—Plant of dwarf compact habit; flowers delicate pink or soft peach shading to pale yellow. Very free.

12. *Ernest Cannell* (Turner, Veitch).—Plant of dwarf,

bushy habit ; flowers large and well formed ; colour bright red, darker centre. $\times \times \times$

13. *Ernest Cheal* (Cheal).—Flowers borne well above the foliage ; colour bright rosy scarlet. Very handsome.

14. *Gloriosa* (Turner, Dobbie).—A very fine free flowering variety ; flowers large and of a clear crimson colour ; petals long and narrow. $\times \times \times$; **A.M.** August 29, 1892.

15. *Juarezii* (Turner, Veitch).—Plant of medium growth ; flowers bright crimson.

16. *Lady H. Grosvenor* (Turner, Cheal, Dobbie).—Plant of medium growth ; flowers deep canary yellow ; outer petals flushed with amber.

17. *Lady Penzance* (Turner, Dobbie).—Plant of dwarf bushy habit ; very free flowering ; flowers rich yellow.

18. *Matchless* (Turner, Cheal).—Plant of free spreading habit ; flowers large, thrown well above the foliage ; rich velvety maroon. Very early and exceptionally free flowering. $\times \times \times$; **A.M.** September 20, 1892.

19. *May Pictor* (Turner).—Plant of dwarf compact habit ; very free flowering ; flowers of medium size, colour canary-yellow, running to a deeper shade.

20. *Miss Irene Cannell* (Cannell).—Plant of dwarf habit ; free flowering ; flowers soft pink, shaded with primrose.

21. *Mrs. A. Peart* (Turner).—Plant of bushy habit ; flowers creamy-white ; under surface of petals flushed with pink.

22. *Mrs. Glover* (Cannell).—Plant of dwarf habit ; moderately free flowering ; flowers of good shape, colour rosy-red, flushed with orange ; petals broad and sharply pointed. $\times \times \times$

23. *Mrs. H. Cannell* (Cannell).—A very free flowering variety ; flowers borne well above the foliage ; petals short, broad and pointed, colour bright amber shade. $\times \times \times$

24. *Mrs. Lakin* (Cannell).—Orange-scarlet, centre open.

25. *Professor Baldwin* (Turner).—A free and continuous blooming variety ; flowers very bright orange-scarlet. A sport from *Juarezii*.

26. *Purple Prince* (Turner).—Plant of dwarf compact growth ; very free flowering, colour deep purple, flushed with maroon. $\times \times \times$

27. *Sir Roger* (Cheal).—Plant of dwarf growth ; flowers reddish terra-cotta.

28. *W. H. Cullingford* (Cannell).—Plant of dwarf and bushy

habit; flowers large, chestnut flushed with red, shows centre badly.

CLASS II.—DECORATIVE CACTUS VARIETIES.

29. *Amphion* (Turner, Veitch).—Plant of medium height; flowers large, yellow flushed with cerise.

30. *Asia* (Veitch).—A very early flowering variety; flowers borne well above the foliage, colour delicate lilac running to white.

31. *Baron Schröder* (Turner).—A distinct and handsome variety of vigorous growth; flowers borne well above the foliage, colour clear purple. $\times \times \times$; **A.M.** August 25, 1891.

32. *Beauty of Brentwood* (Turner).—Plant of fine dwarf habit; flowers of good form, and of a rich purple shade.

33. *Beauty of Eynsford* (Cheal).—Plant of medium height; flowers thrown well above the foliage, colour light buff, shaded chestnut towards centre. $\times \times$

34. *Black Prince* (Dobbie).—Plant of dwarf free-spreading habit; flowers thrown well above the foliage, colour deep maroon. Very handsome. $\times \times \times$; **A.M.** September 9, 1890.

35. *Cannell's Brilliant* (Cannell).—Plant of vigorous and somewhat tall habit; very free flowering; flowers rich crimson. $\times \times \times$; **A.M.** October 24, 1893.

36. *Cannell's Favourite* (Veitch).—Flowers bronzy yellow, deeper centre. Very distinct.

37. *Centennial* (Veitch).—Plant of vigorous habit; flowers purplish magenta.

38. *Chancellor Swayne* (Dobbie).—Flowers purple. Very pretty.

39. *Charming Bride* (Cheal, Veitch).—Plant of dwarf spreading habit; very free flowering; flowers rosy-pink and white.

40. *Constance* (Veitch).—Plant of medium height; very free flowering; flowers white.

41. *Countess of Pembroke* (Dobbie).—Plant of dwarf habit; flowers borne freely, colour rosy-lilac.

42. *Countess of Radnor* (Turner, Cheal, Veitch).—Flowers yellow suffused with pink. Very pretty.

43. *Dr. Masters* (Dobbie).—Flowers white suffused with pink, outer petals rosy-pink.

44. *Duchess of York* (Cheal, Veitch).—Flowers large, borne well above the foliage, colour orange-red. A grand variety. $\times \times$

45. *Duke of Clarence* (Turner, Cheal, Veitch).—Plant of loose dwarf habit; very free flowering; flowers large, crimson, deeper centre.

46. *Edith Cheal* (Cheal).—Plant of vigorous habit; flowers small, petals broad, colour deep maroon.

47. *Empress of India* (Turner, Veitch).—Plant of vigorous habit; flowers large, deep crimson tipped with magenta. Very handsome. $\times \times$; **F.C.C.** September 21, 1886.

48. *Ernest Glasse* (Turner).—Purple flushed with magenta.

49. *F. W. Stanley* (Veitch).—Plant of dwarf habit; flowers red, outer petals suffused with orange.

50. *General Gordon* (Veitch).—A very free flowering variety; flowers orange scarlet.

51. *Harry Freeman* (Turner).—Plant of free growing, spreading habit; very free flowering; flowers large, borne well above the foliage, pure white. A magnificent variety. $\times \times \times$

52. *Henry Patrick* (Turner, Veitch).—Similar to but not so fine as Harry Freeman.

53. *Honorina* (Turner, Veitch).—Flowers large, straw yellow flushed with amber. Very fine.

54. *Josephine* (Cheal, Veitch).—Plant of fine habit; free flowering; flowers of good form, colour deep crimson. $\times \times \times$

55. *Kaiserin* (Turner, Cheal).—Plant of vigorous habit; flowers large, rich sulphur yellow, outer petals tinged with lemon.

56. *King of the Cactus* (Veitch).—Plant of tall habit; very free flowering; flowers bright crimson.

57. *Kynerith* (Turner, Veitch, Dobbie).—Plant of medium height; flowers of good form, colour clear vermilion. $\times \times \times$; **A.M.** August 25, 1891.

58. *Lady C. Dyke* (Veitch).—Flowers rich canary yellow, shows centre badly.

59. *Lady Skelmersdale* (Dobbie).—Plant of tall habit; flowers pale primrose.

60. *Lady Thompson* (Veitch).—Plant of medium height; flowers rich crimson, shaded purple.

61. *Lanceolet* (Dobbie).—Flowers reddish salmon.

62. *Lewis Castle* (Veitch).—Plant of dwarf, free spreading habit; flowers deep purplish magenta.

63. *Maid of Kent* (Turner, Veitch).—Plant of loose branching habit; very free flowering; flowers crimson, each petal tipped with white. Very showy. $\times \times \times$; **A.M.** September 9, 1890.

64. *Marchioness of Bute* (Veitch).—Plant of medium height; flowers white, each petal heavily tipped with rosy-pink.

65. *Miss Violet Morgan* (Turner).—A very free flowering variety; flowers primrose flushed with pink.

66. *Mr. W. A. Tait* (Veitch).—Flowers roundish, white, borne well above the foliage.

67. *Mrs. Basham* (Dobbie).—Plant of tall habit; flowers creamy white flushed with pink. $\times \times$; **A.M.** September 6, 1892.

68. *Mrs. Douglas* (Veitch, Dobbie).—Plant of dwarf habit; flowers pinkish salmon.

69. *Mrs. Gordon Shaw* (Cheal).—Flowers fiery crimson, tipped with purple.

70. *Mrs. H. Carter* (R.H.S.).—Plant of bushy habit; very free flowering, flowers large, colour lilac suffused with blush white. Very pretty. $\times \times \times$

71. *Mrs. Hawkins* (Veitch).—Flowers yellow, outer petals tinged with pink.

72. *Mrs. Horniman* (Cheal).—Plant of tall, vigorous habit; very late bloomer; flowers of medium size, yellow, edged with rosy pink.

73. *Mrs. Turner* (Turner).—Plant of free spreading habit; very free flowering; flowers very large, borne well above the foliage; petals broad; colour rich canary yellow. $\times \times \times$

74. *Old Gold* (Cannell).—Plant of dwarf habit; flowers of medium size; colour orange yellow.

75. *Oscar* (Turner, Dobbie).—Flowers thrown well above the foliage; colour orange red.

76. *Panthea* (Turner, Veitch).—Plant of vigorous growth; very free flowering; flowers reddish salmon.

77. *Rayon d'or* (Turner).—A distinct and free flowering variety; flowers pale orange with a band of white running through each petal. Very fine. $\times \times \times$; **A.M.** September 22, 1891.

78. *Robert Cannell* (Turner).—Plant of vigorous habit; flowers magenta: centre open.

79. *St. Catherine* (Turner).—Plant of medium height; flowers large, petals broad, colour yellow suffused with golden amber.

80. *Sir F. Montefiore* (Cheal).—Plant of tall growth ; flowers deep maroon, very rich. A seedling from Beauty of Arundel.

81. *Sir Hugo* (Veitch).—Plant of medium height ; very free flowering ; flowers clear crimson scarlet. × × ×

82. *Sydney Hollings* (Veitch).—Plant of vigorous growth ; moderately free flowering ; flowers deep claret colour. × ×

83. *Veitch's Snow White* (R. Veitch).—Plant of dwarf habit ; very free flowering ; flowers large, pure white.

84. *Viscountess Folkestone* (Dobbie).—Flowers primrose yellow, outer petals slightly flushed with pink.

85. *W. H. Myers* (Cannell).—Plant of free spreading habit ; very free flowering ; flowers light chestnut, tips of petals tinged with magenta.

86. *Yellow Mrs. Tait* (Veitch).—Plant of tall habit ; flowers borne well above the foliage ; colour canary yellow.

87. *Zulu* (Veitch).—Plant of dwarf, free spreading habit ; very free flowering ; flowers deep crimson flushed with magenta.

TULIP SOCIETY.

REPORT OF THE SECOND ANNUAL SOUTHERN SHOW OF THE ROYAL NATIONAL TULIP SOCIETY, held May 21, 1895, in connection with the ROYAL HORTICULTURAL SOCIETY'S GREAT SHOW at the INNER TEMPLE.

The exhibition was a distinct advance upon that of last year, the flowers shown being better in quality and larger in numbers. Much interest was taken in them, and their presence at the Great Show of the R.H.S. will undoubtedly help forward the revival of interest that is taking place in the English Tulip.

LIST OF AWARDS.

Class 1.—Twelve dissimilar rectified Tulips : *First*, James W. Bentley, Esq., Middleton, Manchester, with feathered bizarres, General Grant and Masterpiece ; flamed bizarres, Samuel Barlow and Hepworth's 194/64 ; feathered roses, Julia Farnese and Comte de Vergennes ; flamed roses, Mabel and Rose Celestial ;

feathered bybloemens, Friar Tuck and Elizabeth Pegg; flamed bybloemens, Chancellor and Talisman. *Second*, Thomas Haynes, Esq., Warwick, with feathered bizarres, Sir Joseph Paxton and Masterpiece; flamed bizarres, Sir Joseph Paxton and Ajax; feathered roses, Heroine and Rose Hill; flamed roses, Aglaia and Mabel; feathered bybloemens, Mrs. Pickerill and Adonis; flamed bybloemens, Amazon and Alice Maud. *Third*, C. W. Needham, Esq., Royton, Manchester, with feathered bizarres, Luke Ashmole and Masterpiece; flamed bizarres, William Wilson and Masterpiece; feathered roses, Modesty and Hilda; flamed roses, Alaia and Lady C. Gordon; feathered bybloemens, Trip to Stockport and Pegg's Seedling; flamed bybloemens, Carbuncle and Friar Tuck.

Class 2.—Six dissimilar rectified Tulips: *First*, C. W. Needham, Esq., with bizarres, Luke Ashmole feathered and Sir Joseph Paxton flamed; roses, Annie McGregor feathered and Lady C. Gordon flamed; bybloemens, King of the Universe feathered and King of the Universe flamed. *Second*, Thomas Haynes, Esq., with bizarres, Sir Joseph Paxton feathered and Sir Joseph Paxton flamed; roses, Heroine feathered and Mabel flamed; bybloemens, Adonis feathered and Bessie flamed. *Third*, J. W. Bentley, Esq., with bizarres Masterpiece feathered and Masterpiece flamed; roses, Anne McGregor feathered and Aglaia flamed; bybloemens, Beauty of Litchurch feathered and Charlemagne flamed. *Fourth*, Mr. George Edom, West Norwood, with bizarres Sir Joseph Paxton feathered and Dr. Hardy flamed; roses, Aglaia feathered and Aglaia flamed; bybloemens, Bessie feathered and King of the Universe flamed.

Class 3.—Three Feathered Tulips: *First*, J. W. Bentley, Esq., with Comte de Vergennes, Guido, and General Grant. *Second*, T. Haynes, Esq., with Mabel, Adonis, and Sir Joseph Paxton. *Third*, C. W. Needham, Esq., with Modesty, Bessie, and Luke Ashmole. *Fourth*, Mr. G. Edom, with unnamed varieties.

Class 4.—Three Flamed Tulips: *First*, T. Haynes, Esq., with Mabel, King of the Universe, and Sir J. Paxton. *Second*, Rev. F. D. Horner, Burton in Lonsdale, with Mabel, Hepworth's Seedling, and Samuel Barlow. *Third*, J. W. Bentley, Esq., with Mabel, Bessie, and Duke of Devonshire. *Fourth*, C. W. Needham, Esq., with Nanny Gibson, Bessie, and Dr. Hardy.

Fifth, Mr. G. Edom, with *Aglaiia*, Duchess of Sutherland, and Sir J. Paxton.

Class 5.—Six dissimilar breeder Tulips: *First*, Rev. F. D. Horner, with roses, Mrs. Barlow and Rosy Morn; bybloemens, Fairy and Desdemona; bizarres, Dragonfly and Storer's 3A. *Second*, J. W. Bentley, Esq., with roses, Mabel and Hepworth's 9/64; bizarres, Sir Joseph Paxton and Goldfinder; bybloemens, Glory of Stakehill and Elizabeth Pegg. *Third*, C. W. Needham, Esq., with roses, Madame St. Arnaud and Lloyd's Seedling; bybloemens, Glory of Stakehill and Elizabeth Pegg; bizarres, Sir Joseph Paxton and Goldfinder. *Fourth*, T. Haynes, Esq., with roses, Rose Hill and Mabel; bybloemens, Beauty of Litchurch and Talisman; bizarres, Dr. Hardy and Sir Joseph Paxton. *Fifth*, Mr. G. Edom.

Class 6.—Samuel Barlow Memorial Medals for one feathered and one flamed of any class: *First*, C. W. Needham, Esq., with Elizabeth Pegg feathered and Sir J. Paxton flamed. *Second*, Rev. F. D. Horner, with Seedling feathered and Mabel flamed.

For Collections of Tulips, J. T. Bennett Poë, Esq., London, was awarded the first prize of a Silver Flora Medal; a Silver Medal was awarded to J. W. Bentley, Esq., and Bronze Flora Medal to Mr. G. Edom.

GENERAL MEETING.

JULY 9, 1895.

Dr. MAXWELL T. MASTERS, F.R.S., in the Chair.

Fellows elected (14).—Mrs. M. Brookshank, Arthur S. Chandler, John E. Herbert, Capt. Holford, F. J. Knight, W. H. F. Mason, Henry Ormonde, W. J. Overhead, E. G. Reid, W. E. Tidy, G. Hebbard Tompkins, Chas. Walker, Thomas Wamsley, W. Wigram.

Society affiliated (1).—Harrow Horticultural Society.

A Lecture was given by Mr. Francis Darwin, F.R.S., on "Etiolation as a Phenomenon of Adaptation." (See p. 345.)

GENERAL MEETING.

JULY 23, 1895.

Mr. GEO. BUNYARD in the Chair.

Fellows elected (5).—Robert Cameron, A. G. Soames, Mrs. Radcliffe, Thomas Taylor, Mrs. M. Veal.

A Paper on the "Carnation in Scotland" by R. P. Brotherston was read by the Assistant Secretary. (*See* p. 353.)

GENERAL MEETING.

AUGUST 13, 1895.

Sir ALEXANDER J. ARBUTHNOT, K.C.S.I., in the Chair.

Fellows elected (8).—Ernest H. Ashby, Edw. Bird, H. J. Carden, J. I. Ecclestone, Mrs. F. Elkington, Walter Gibson, Lady Theodora Guest, G. H. Maycock.

A Paper on "Hardy Bamboos" was read by Mr. Freeman-Mitford. (*See* p. 359.)

GENERAL MEETING.

AUGUST 27, 1895.

Mr. ALEXANDER DEAN in the Chair.

Fellows elected (4).—Mrs. Wilfred Carey, John Miles Chambers, Thomas Mann, the Marquis of Normanby.

A Paper on "Codiæums (Crotons) and Dracænas," by the late Mr. C. F. Bause, was read by Mr. Geo. Bunyard. (*See* p. 374.)

GENERAL MEETING.

OCTOBER 15, 1895.

Mr. GEORGE NORMAN in the Chair.

Fellows elected (29).—Michael Barker, Wm. Batchelor, Chas. Berry, Thomas F. Blakewell, Lady Colville, Thomas Crapper, Countess of Dartmouth, William Harris Ellis, A. Goldwin, R. A. Milligan Hogg, Fredk. Lambert, Geo. Mantin,

Dr. Henry W. McConnel, Edw. Dawson Morgan, Prof. Welton M. Munson, H. A. Orr, Sir Henry Peto, Bart., Septimus H. Prichard, W. Reeve, W. T. Royle, William Sales, Henry Sherratt, J. Walter Smith, Thomas Spring, Chas. Alf. Teuton, Henry Tolson, Mrs. Horace Walpole, Ebenezer Way, W. Yates.

Associate (1).—Robert Cook.

Society affiliated (1).—Richmond Allotment Holders' Association.

A Paper on "Nut-Growing in England" was read by Mr. J. Omer Cooper. (*See* p. 381.)

GENERAL MEETING.

OCTOBER 29, 1895.

Sir ALEXANDER J. ARBUTHNOT, K.C.S.I., in the Chair.

Fellows elected (4).—Thomas E. Beaumont, Harold A. Peto Frank L. Clatworthy, Edwin Waterhouse.

A Lecture was given by Mr. A. W. Sutton, F.L.S., on "Potatos," and illustrated by magic-lantern slides. (*See* p. 387.)

GENERAL MEETING.

NOVEMBER 12, 1895.

Rev. W. WILKS, M.A., in the Chair.

Fellows elected (9).—R. A. Bush, Mrs. Cox, Charles H. Curtis, Everard F. James Thurn, — Pascoe, John Newmarch, Miss Philbrick, David C. Powell, Miss Jessie Welch.

A Lecture on "Substitutes for Larch," illustrated by specimens, was given by Dr. Maxwell T. Masters, F.R.S. (*See* p. 430.)

GENERAL MEETING.

NOVEMBER 26, 1895.

Mr. ALEX. DEAN in the Chair.

Fellows elected (11).—Lady Ashburton, A. J. Bliss, E. W. Cork, Edw. H. Fletcher, W. G. Norris, H. A. Parbury, Miss

A. E. Pope, Edw. Samuel Seasell, William Strike, Thomas Thew, Hans Trier.

Society affiliated (1).—North Warwickshire Horticultural Society.

A Lecture on "Asparagus Culture" was given by Mr. James Mason. (*See* p. 436.)

GENERAL MEETING.

DECEMBER 10, 1895.

Mr. JAS. HUDSON in the Chair.

Fellows elected (14).—Francis Prior Adey, Percy James Andrews, William Beadell Bacon, Captain A. J. Carstairs, Frederick Garrard, Robert Grey, J. H. Howard, J. Flower Jackson, Joseph Mercer, W. B. Parsons, H. Shepherd-Cross, A. J. Sinclair, James H. Watt, Charles Winn.

SCIENTIFIC COMMITTEE.

JUNE 25, 1895.

R. McLACHLAN, Esq., F.R.S., in the Chair, and six members present.

Primula scotica.—Mr. Wilson exhibited a pot containing some seedling plants, in blossom, of this North British species, which is found in pastures in Orkney, Caithness, and Sutherland. The flowers are homomorphic, not having the stamens and pistils of different length as in most other *Primulas*.

Round-leaved Beech.—Mr. Jackman exhibited small trees of *Fagus sylvatica*, with the leaves small, entire, and round. As the trees exhibited an erect form, with short branches, it would seem to be the result of some check to growth, the form of the leaf representing a less developed state than in the ordinary type of the tree.

Prehistoric Hazel.—Mr. Collenette of Guernsey forwarded some Hazel wood found in the peat near the coast of Guernsey. The same peat contains flint implements, stone rings, and

pottery, presumably Neolithic. No Hazel is now known to be indigenous to Guernsey.

Flies attacked by Fungi.—Mr. McLachlan exhibited specimens of *Melanostoma scalare* attached to flowering stems of a Grass, *Glyceria fluitans*. They were received from Mr. Ralph C. Bradley of Sutton Coldfield, who writes as follows:—“Whilst collecting in Blackroot Bog, Sutton, on June 16, I came across an extraordinary phenomenon. For a space of about a dozen square yards the flowering stems of *Glyceria fluitans* were covered with a large number of dead *Melanostoma scalare*, whose bodies were very much distended by a fungoid growth similar to that seen on the house-fly in the autumn. Some stems bore thirty to forty specimens, and fresh victims were constantly being added. I also found two flowering stems of Dock covered with the dead bodies in a similar manner. The flies were to be found only on the flowering part of the stems, and not on any leaves or herbage. Why *M. scalare* should be the only species attracted to the stems and attacked in this manner is very curious, as swarms of other insects were flying about, but did not seem to be tempted to join them in the least.” They were reserved for investigation.

SCIENTIFIC COMMITTEE, JULY 23, 1895.

Dr. MAXWELL T. MASTERS, F.R.S., in the Chair, and four members present.

Cypripedium malformed.—Dr. Masters described a curious case received from Messrs. Sander & Co., in which the sepals were normal, but the two petals and the lip were absent. The column was erect, terminating with three tabular stigmas, and bearing three petaloid two-lobed imbricating staminodes, on the edge of one of which was an anther. They appeared to represent the three outer stamens. One of the three stamens of the inner whorl was perfect, with a curved filament bearing a two-celled anther. The other two were absent.

Lavandula dentata Foliage.—Dr. Masters also drew attention to a peculiarity in the venation of the lobed leaves of this species, in that the “median” cord of each lobe is not central, but

close to one side. From this a cord runs round the sinus, giving the appearance of the cords running from the midrib to the base of the incisions, instead of to the apices of the lobes. It recalled the arrangement in a leaf of the common Hawthorn, but this has median cords as well as cords running to the base of the incisions; or, again, that of the cords in the petals of the Compositæ, which run up between the petals and round the margins of the divisions. A very similar occurrence is in the receptacular tube and calyx-limbs of the Cherry, though here, too, each sepal-lobe has its proper median cord as well. Marginal cords are general in the calyx of *Salvia* and other Labiates, and appear to be supplied for strengthening purposes.

Æcidium nymphæoides, DC.—Dr. Ch. B. Plowright forwarded specimens of this parasitical fungus, with the following observations:—“This *Æcidium* has been stated by Chodat to be connected with the *Puccinia* on *Scirpus lacustris*. In November 1877, *Puccinia scirpi* was found floating in the river Ouse at King’s Lynn. During the past winter I found it on the Bulrushes (*S. lacustris*) in the ‘Old Bedford’ at Earith, Huntingdonshire. On revisiting the spot this July the *Æcidium* on *Villarsia* was met with in great abundance. The æcidial cups occupy the upper surface of the leaves in the form of sufficiently obvious circular yellow spots. After the affected leaves have been removed from the water for a short time the mouths of the cups close by a process of inversion, as if they were immature; but when the leaves become thoroughly dry the cups again open. The *Scirpus* in the immediate vicinity of the *Æcidium* was affected with the uredospores.”

Æcidium Chenopodii.—Dr. Plowright also sent specimens of this fungus, with the following remarks:—“In the summer of 1893 Mr. Herbert G. Ward found, on the mud flats of Terrington St. Clements, an *Æcidium* on *Suæda maritima*. Shortly afterwards I met with the same fungus on the muddy shore on the opposite side of the estuary of the Great Ouse, near Babingly Sluice. It was accompanied by uredospores and a *Uromyces* (*U. Chenopodii*, *Duby*) on the same plant. By some botanists this fungus is regarded as identical with *U. salicorniæ*, DC., on *S. herbacea*. Doubtless the host plants are allied, but it does not therefore follow that the parasitic fungus is the same. *Salicornia herbacea* grows abundantly in the above-named localities, but

hitherto I have been unable to find the *Uromyces* upon it, although it is a British species."

Flies attacked by a Fungus.—With reference to the specimens brought before the last meeting, it is reported from an examination made at Kew that "the fungus is *Empus conglomerata*, *Thaxter* (a somewhat rare species), parasitic on Diptera, especially on the larvæ and imagines of *Tipulæ*. Distrib.—Europe and United States. This is the first record for Britain."

Grapes diseased.—With reference to the samples sent to a recent meeting, the following report has been received from Kew:—"The Vines are attacked by a fungus called *Glœosporium ampelophagum*, *Sacc.*, a well-known pest in vineyards, The mycelium of the fungus is perennial in the branches, and passes into the new shoots as they are developed. The first fruits formed by the fungus in the spring are found on the old wood, and the spores carried by the wind or rain or syringing reach the flowers and young fruit; the mycelium also travels along the tissues of the branches into the inflorescence. A mixture of equal parts of sulphur and powdered chalk should be applied to every part of the Vine, dating from the commencement of branch formation until the fruit is set. All shoots that are more or less covered with minute black specks should be cut away and burnt at once, as these are the fructification of the fungus."

Thornless Gooseberry.—MM. Letellier et Fils forwarded from Caen some growing plants of this variety, of which they have sent out four kinds, raised by M. Ed. Lefort, of Meaux, France. The usual triple spines were either quite absent or represented by mere rudiments only.

Potatos grown in "Jadoo" Fibre.—Jadoo fibre appears to be peat moss saturated with chemicals. The Potatos were very clear, clean, and apparently thin-skinned, but small. The committee could pass no opinion upon their value, as no information was received as to the composition of the material in which they were grown.

Sweet Williams, Sudden Reversion of.—Mr. Cannell sent some trusses, with small jagged-edged petals of a crimson colour, which had appeared among his long-selected beds of Sweet Williams, the margins of the petals being rounded and smooth. The form which, on its appearance, is never allowed to set seed,

approached the original wild condition, as described by Gerarde, which was apparently the only known form in his day (1597); but Lawrence (1726) describes many kinds, and observes that similar whole or *self-coloured* forms occasionally appeared. Gerarde (*Herball*, page 479, A.D. 1597) figures and describes the "Sweete William" as of a "deepe red colour," but gives no varieties of the broad-leaved kind. Lawrence in "A New System of Agriculture" (page 426, A.D. 1726) says: "There are two or three sorts of this pretty flower, and, indeed, the sorts are almost infinite if you nicely observe the diversity of stripes and colours, and the sportings of Nature even in flowers on the same stalk, there being hardly to be found two exactly of the same sorts, except they prove (as they do sometimes) *self-coloured*. The *single* ones differ only in the colour of their flowers, some are *red and white* prettily intermixt; others are mixt with a *deep crimson*, and from their seeds great varieties have been raised. There is also a *double* flowering kind of a beautiful *red*."

SCIENTIFIC COMMITTEE, AUGUST 13, 1895.

Dr. M. T. MASTERS in the Chair, and four members present.

Black Currant × *Gooseberry*.—A fruiting specimen of this hybrid was sent by Mr. Culverwell. It was previously received and described in the minutes of the Scientific Committee for June, 1890. The fruits are small, and have a very slight taste of the Black Currant. The bark reveals the scent more distinctly, while the skin of the fruit has the grandular hairs of the latter mixed with the ordinary hairs of the Gooseberry.

Lilies diseased.—Specimens of the foliage of *L. Lowi* and *L. nepalense* were received from Mr. Wallace, of Colchester, attacked by apparently the too common "Lily disease" fungus. Bordeaux mixture is suggested as the best remedy. He observed that the disease in his garden only attacks the Lilies received from Burmah. It was formerly thought that burning was the only means of extermination, but experience has shown that the bulbs may not be at all injured, and that as the disease may be very prevalent one year and very scarce the next, it will be better in future to leave the bulbs, only destroying the aërial portions attacked.

Lime and Bees.—A spray of a Lime tree was received from Mr. F. Enock, of 21 Manor Gardens, Holloway, to be named. It proved to be *Tilia petiolaris*, DC. He also observed that numerous dead bees were found under the tree, suggesting that the honey might be of a poisonous nature. In a communication from Kew, whither the specimen had been sent, it is observed: "We have long noticed at Kew that bees are killed after visiting the flowers, and quite a circle of dead bodies are found under the branches every summer." Mr. McLachlan remarked that this occurrence has been long known to entomologists, and by the watching of the trees by Mr. E. Saunders, he found that the death of the bees was caused by the attacks of tomtits, apparently by extracting their honey bags.

Lettuces attacked by Aphides.—Plants received from the Chiswick Gardens showed the roots to be badly infested by these insects. They were forwarded to Mr. G. B. Buckton, Haslemere, for further examination.

Potatos diseased.—A communication was received from Mr. Ashley, Elmeroft, Staines, stating that "the leaves appear to be spotted with brown, where holes appear; the leaves subsequently curl up. The disease occurs in patches, and gradually spreads. It is not confined to one sort of Potato alone. I noticed the same disease on some early Potatos about two months ago, and washed the leaves with very weak paraffin and water. This seemed to stop it." Having been forwarded to Kew for examination, the report is as follows: "The young leaves are in the first instance punctured by an insect; the wounds made are points afterwards attacked by a microscopic fungus—*Macrosporium Solani*—which completely destroys the tissue, hence the holes in the leaves. Spraying with Bordeaux mixture will destroy both insect and fungus; but if a solution of very weak paraffin has proved effectual it would be wise to continue its use. The great point in spraying, whatever the solution used, is to thoroughly wet the leaves. A little soft soap mixed with the liquid assists in doing this."

Photo of Cedrus Deodara struck by Lightning.—Mr. Weathers exhibited a photograph, taken at Kew at 7 A.M. August 12. It represented a *Deodara* which was shattered by lightning on the night of August 10. The main trunk is cleft in twain almost to the base, while large splinters and branches are scattered about

The wood is perfectly sound, and shows no signs of charring. The tree was about 30 feet in height.

Castanea vesca, Female replacing Male Flowers.—Mr. Henslow exhibited specimens of this exchange of sex, as being particularly abundant on a Chestnut tree this season; a probable result of the climate, as it is well known that external conditions often decide which sex shall predominate when a plant is naturally bisexual. He alluded to experiments by Mr. Meehan, Mr. Hoffman, and himself, in which seeds of bisexual plants gave rise to various proportions of males and females, according as they are sown very thickly or thinly.

SCIENTIFIC COMMITTEE, OCTOBER 15, 1895.

Dr. M. T. MASTERS, F.R.S., in the Chair.

Injury to Foliage by Wind.—Mr. Ch. Plowright, of Lynn, sent photographs showing how trees were damaged on the north sides by a cold wind on May 16, with the following communication:—"After a spell of fine weather, lasting until May 14, we began to think our fruit crop was safe for the year, but on the 15th the temperature fell, and on the 16th we had a gale from the north, accompanied by one or two hail showers. The effect was seen in a Hawthorn hedge facing north and south, for the foliage was shrivelled up on the north side, where it is dead, but remained bright green on the south side. Similarly three or four Pear trees showed a remarkable appearance; the north side was quite black, not a leaf had escaped, while the opposite side did not seem to have suffered at all. A row of Elms showed graphically which way the wind had blown, and some fine old Beeches assumed on their north side quite an autumnal hue. The Horse Chestnuts, from the size of their leaves, afforded very distinctive evidence of the injury they sustained, the foliage having turned a bright red. The above effects were general in this part of Norfolk; indeed, no tree at all exposed seems to have escaped. One of the most striking incidents is the Spruce Fir; at East Walton there is a row of these trees, whose young shoots have been killed by the cold wind on the north side, and hang like brown plumes at the end of the branches." Mr. Plowright does

not allude to the probable effect of salt, but as a north wind at Lynn is entirely a sea wind, the disastrous effect to the foliage was probably chiefly due to the presence of salt spray.

Young Apple Fruit.—Mr. T. Eyre, of Thorpe Lea, Egham, forwarded a sample of a second crop of Apples. Raspberries and other fruits, as well as Laburnum, in blossom, as the Secretary observed, have been recorded in Ealing and elsewhere this season.

Cattleya Mossiæ with Double Growth.—Mr. W. C. Walker forwarded a photograph of an abnormal specimen, with the following remarks:—"I enclose a photograph of *Cattleya Mossiæ* that has developed an unusual double growth. When it started after flowering it appeared little different from ordinary growth, but as it grew it formed the two distinct growths included in one green sheath at the base."

Aphides on Lettuces.—With regard to the aphides in the soil about the roots of Lettuces sent to the last meeting, Mr. G. B. Buckton, of Weycombe, Haslemere, reports as follows:—"As the earth was loose, the shaking during transit, and the comparative drought, killed the insects; but I secured fifty or more specimens. They were all pupæ of aphides, and I am satisfied that they are *Pemphigus lactuæ* (Passerini). This species is subterranean in its larval condition, and it attacks also *Sonchus* and *Melilotus*. On opening the box two winged flies escaped, one of which I secured, and it turned out to be a true *Pemphigus*. The pupæ are without nectaries, and almost if not quite blind. The winged female has moderate eyes, and black. A diagnosis of the insect will be found in 'Aphididæ Italicæ, Passerini,' p. 77, 1885."

Monstrous Anemone japonica.—Rev. C. Wolley Dod sent specimens of the foliage with the following remark:—"Six years ago I noticed a shoot with crimped leaves and separated it; next year, with ordinary soil and cultivation, it assumed this monstrous form. It has entirely lost the usual running habit, and does not increase." The leaves were enormous in size, evidently at the expense of the increase of the plant; they somewhat resembled gigantic crinkled Parsley leaves.

Supposed Spontaneous Hybrid Asters.—Mr. Dod also sent a flowering plant of a supposed hybrid between *A. Thomsoni*, *Clarke*, and *A. amellus*, *Linn.*, remarking: "This came from

seed collected in my own garden. It has now flowered for five years. It begins to flower early in July, and continues in flower till hard frost. It has never produced fertile seed. The other hybrid was between *A. Thomsoni* and *A. pyrenæus*, DC. *A. Thomsoni* produces good seed very sparingly, but one plant growing between two plants of *A. pyrenæus* produces good seed plentifully. Some of these seeds produce typical *A. Thomsoni*, and often the nondescript plant sent. This is entirely sterile. I have raised many, two or three years in succession. They always have a white pappus to the achene, which *A. Thomsoni* never has."

Some Historic Cedars.—Rev. G. Henslow described two large Cedars (*Cedrus Libani*) in the garden of the Rectory at Bishops Waltham, which, since their age is known, are perhaps worth recording. They were planted to commemorate the Battle of Waterloo. Both have lost some large boughs. One, indeed (No. 1), has so greatly suffered in a storm that nearly half the tree has gone. This one must also have lost its leader at a comparatively early date, as the main trunk now suddenly branches into five large erect minor trunks. It is 42 ft. in height. The other (No. 2) has retained its leader, and is about 50 ft. high. Three of its larger boughs have gone.

No. 1.—The girth of the trunk at the parting of the roots is 17 ft. The girth at a height of 5 ft. from the ground and just below the lowest bough is 15 ft. The girth of the lowest bough is 6 ft. This bough arises at a height of 5 ft. from the ground.

No. 2.—The girth of the trunk at the parting of the roots is 17 ft. The girth of the trunk at a height of 5 ft. from the ground is 14 ft. The girth of the base of the lowest bough is 5 ft. 2 in. This bough arises at a height of 1 ft. 3 in. from the ground. A bough at a height of 4 ft. 4 in. from the ground has been sawn off, revealing fifty-seven rings of growth. In all the boughs removed the eccentricity is remarkable; in one instance the centre is 4 in. from the upper surface, and 15 in. from the lower. The situation is high and the soil clay. Both trees are bearing cones.

Pear diseased.—Mr. Veitch of Exeter forwarded a Pear attacked by a fungus, which had assumed a remarkable spiral growth round the fruit.

Parsnip diseased.—Mr. Reid of Ealing forwarded a portion of a Turnip-rooted Parsnip, with purple interior, apparently due to some fungus.

SCIENTIFIC COMMITTEE, NOVEMBER 12, 1895.

Dr. M. T. MASTERS in the Chair, and five members present.

Death of Professor Riley.—Mr. McLachlan spoke of the great loss sustained by the death of this eminent entomologist of the Museum of Natural History, Washington. He was the State Entomologist of the Agricultural Department, Washington, and formerly for that of Missouri.

Hybrid Asters.—With reference to the specimens sent to the last meeting by Rev. C. W. Dod, Mr. Dewar reports as follows:—“Although not quite prepared to agree with him, neither am I disposed to materially differ from his suppositions. The chief difference was one of colour; the flowers of the supposed hybrids are undoubtedly somewhat larger than I have before seen; the colour, however, is quite distinct from that of typical *A. Thomsoni*. The cross between *A. Thomsoni* and *A. pyrenæus* (?) is in every respect, except its large flowers, typical *A. Thomsoni*. The other cross (?) differs little except in colour of flower from seedlings. *A. Thomsoni* is a very variable species, becoming of course considerably more so by cultivation.” Mr. Dod having kindly forwarded fruiting specimens of *A. Thomsoni* (*Clarke*) and of the hybrid to the Secretary, he found that they differed as follows:—The leaves selected from similar places were much larger and broader in the former, with more serratures; the hairs on the stem were shorter, but the involucrel bracts were less hairy, the tips being nearly glabrous. The pappus was markedly shorter than that of the hybrid; a few bore ripe achenes. In the hybrid several of the ray florets were bisexual with perfectly free stamens, the anthers being more or less rudimentary; a few of the ray corollas were of the quilled form. All the ovaries, disk and ray, were abortive. The above characters might be varietal only, but the presence of stamens, &c., perhaps indicates the effect of crossing.

Fungus on Pears.—With reference to the specimens received from Messrs. Veitch, of Exeter, at the last meeting, the follow-

ing report was received from Kew :—"The fungus on Pear is *Monilia fructigena*, *Pers.* The individual patches of fungus are limited in extent; the first form exhausts the necessary food for a limited distance beyond its fruiting area. Its spores germinate and grow just beyond this sterile zone; hence succeeding crops are more or less concentric, and separated by narrow sterile zones without fungi." They thus resemble Fairy-rings.

Cocos australis (*C. eriospatha*).—Dr. Masters exhibited orange-coloured Plum-like fruit received from Antibes, and sent by M. Naudin, and also by Mr. Hanbury. It is a native of Paraguay and Chili. It was the first occasion of its ripening in South Europe. The flavour resembled that of a Pineapple.

Cypripedium, *Hybrid*.—Mr. Veitch sent plants of *C. minosa* and cut flowers of the parents—viz., *C. × Arthurianum* (male) and *C. Spicerianum* (female). The former is the result of *C. insigne* × *C. Fairieanum*. Two offspring from the same pod showed considerable "dissociation," in that one more resembled the male and the other the female; but the peculiar purple and white staminode of the male was lost, the green one of the female parent being present in both. The spotted perianth of the male was very pronounced in one, while the white sepal of the female was reproduced with no spots, though the purplish labellum of the female appeared on both.

Rhododendron, *Hybrid*.—Mr. Veitch also sent a new form, *Numa*, the result of crossing the "bigener" *indico-javanicum* with *R. multicolor* var. *Curtisi*. *Indico-javanicum* resulted from crossing Lord Wolseley (a hybrid containing the three true species, *R. jasminiflorum*, *R. javanicum* (twice), and *R. Brookianum* var. *gracile*) with *Azalea indica*, "Stella." This produced rather contracted flowers of a brick-red colour.* This was crossed with the small crimson-flowered (1 inch) *R. mult.* var. *Curt.* *Numa*, bears large flowers (2 inches) of a deep red orange, with a shorter tube than that of the female parent. Hence the effect of the male is to transmit the form of the corolla; but that of the female, the colour as well as the foliage, which is lanceolate, larger and broader than the leaf of *R. mult.* var. *Curtisi*.

Black-skinned Apple.—Dr. Masters exhibited an Apple, the rind of which was of a deep purplish-black colour, the cellular

* Figured and described in "Journal R.H.S.," Vol. XIII., Pt. II., p. 21 (1891)

tissue within being light brown, apparently due to fermentation. Mr. Michael remarked that he had known Blenheim Orange Apples to assume a similar appearance.

Flies, dead, adhering to Barley.—Mr. Henslow exhibited a specimen prepared by the late Prof. J. S. Henslow, in 1840, of flies attacked by a fungus, and which had died upon ears of Barley.

SCIENTIFIC COMMITTEE, NOVEMBER 26, 1895.

Dr. M. T. MASTERS, F.R.S., in the Chair, and five members present.

Flies attacked by Fungus.—With reference to the specimens exhibited by the Secretary at the last meeting, it was reported that “the fungus is *Empusa culisis*, *R. Braun* (Alg. Unicell. gen., Nov., page 105). It is common in various parts of Europe, also in the United States, but not previously recorded for Britain.” The specimen was prepared by the late Professor J. S. Henslow in 1840.

Apple diseased.—The black-coated Apple brought to the last meeting proved to be attacked by “*Sclerotinia fructigena*,” *Rehm*. (Krypt. Flora, Discom., page 67.) The minute black lumps on the Apple are the sclerotia of the fungus, from which the ascigerous *Peziza* form grows. Negligence in spraying during the spring season, when the fungus is on the leaves only, accounts for its presence on the fruit.

Cocos Fruits.—The fruits exhibited at the last meeting proved on further investigation to be of *C. eriospatha*, and not of *C. australis*, as supposed.

Carnations attacked by Grubs.—Prof. Müller exhibited a number of weevil-like grubs which attacked the roots of *Dianthus glacialis*, completely destroying the stem, so that the upper part became detached. They were forwarded to Mr. McLachlan for examination, who has reported that they are probably those of *Hylemyia nigrescens*, of the group *Anthomyiidae* of dipterous insects.

Vine Stems, malformed.—Dr. Masters exhibited portions of Vine stems with hypertrophous growths of a tumorous appearance. There did not appear to be any fungus, but they consisted of new cork and wood only. Similar appearances had been seen

on Maréchal Niel Roses. It was probably due to some injury, perhaps frost, with a subsequent effort to heal the wound.

Hybrid Abies.—Dr. Masters also showed a branch from a hybrid between *Abies Pinsapo* (female) and *A. cephalonica* (male). An intermediate character was seen in the position of the resin canal, in that while in *A. cephalonica* it is situated adjoining the epidermis and in *A. Pinsapo* it is more deeply seated, in the hybrid there was one layer of cells between the canal and the epidermis. The general form and habit more nearly resembled *A. cephalonica*, while the strong branches and thick leaf approximated to *A. Pinsapo*. The cones, however, with very visible bracts were like those of *A. cephalonica*.

SCIENTIFIC COMMITTEE, DECEMBER 10, 1895.

R. McLACHLAN, Esq., F.R.S., in the Chair, and six members present.

Carnations attacked by Grubs.—With reference to *Dianthus glacialis* destroyed by larvæ, brought to the last meeting by Dr. Müller, Mr. McLachlan added to his previous observation that he presumed that they were of the same nature as those brought before the Scientific Committee in 1892. The perfect insect obtained from those grubs was then determined to be *Hylemyia nigrescens*. Many species of black flies infest greenhouses, and it is impossible to distinguish them from the larvæ alone; but on one occasion when they were bred they proved to be the species named above.

The Colour of Flowers.—The question was raised whether it would not be possible to carry out some experiments with various substances in the soil to test their effects upon the colours of flowers and fruits. Mr. Wilks remarked upon the effect produced by hoeing in quicklime and soot over the roots of various Apple trees, with the result that a crimson-scarlet hue was imparted to the fruit. With regard to the supposed action it was a question how far the lime could affect the colour, for if the ammonia was present in the form of sulphate, it would tend to fix the lime, though the soot itself would certainly be a vehicle for the ammonia. This is a known agent for improving the colour of Balsams, Weigela, &c.; peat also appears to have

a similar effect. Hence the deeper coloration would be due to the enhancing the assimilating powers of the foliage. The case of *Viola calaminaria* was mentioned, a species which absorbed salts of zinc from growing in localities where the carbonate of this metal was abundant; and Dr. Müller alluded to the peculiarity that it did not appear solely as an accidental ingredient to the plant, but that it actually entered into its constitution. Mr. Wilks was good enough to place some Apple trees at the disposal of the Committee for experimental purposes, and it is also proposed to use white Hyacinths as soon as the procedure shall have been determined upon by Dr. Müller and Dr. Russell. The Committee will be glad to receive information from any correspondent who may have had experience in the changes of colours through the action of the soil in any way.

Cypripedium, Origin of the Slipper.—Dr. Bonavia gave the following possible morphology of the labellum of this Orchid:—“In Canada a wild *Cypripedium* (*Selenipedium*) *acaule* has a natural slit down the median line on the front of the slipper. This suggests that the slipper may have been originally an open labellum, like that of other Orchids, while the incurving of the edges and their final fusion made a slipper. To-day at the meeting I saw a *Cypripedium* with its slipper open. This may have been an accidental rent; but, supposing this to be so, the fact that the rent occurred down the median line shows *a line of cleavage there*. Moreover, in several there was a distinct line down the middle, and in some the veins converged towards that line; in others both the veins and median line were obliterated.”

FRUIT COMMITTEE.

JULY 9, 1895.

Dr. ROBERT HOGG in the Chair, and eleven members present.

Awards Recommended:—

Silver Gilt Knightian Medal.

To Messrs. James Veitch & Sons, Chelsea, for a large collection of fruit containing thirty-nine varieties of Cherries, two of Raspberries, four of Currants, ten of Gooseberries, with a

collection of Currants shown on the branches, the whole forming a fine group of fruit.

To H. H. Gibbs, Esq., Aldenham House, Elstree (gr. Mr. E. Beckett), for a collection of remarkably well-grown vegetables, including almost every kind in season.

Silver Banksian Medal.

To Messrs. de Rothschild, Gunnersbury (gr. Mr. Hudson), for four dishes of Cherries in very fine condition gathered from aged trees.

To Mrs. Wingfield, Ampthill (gr. Mr. Empson), for a collection of fruit and vegetables showing high cultivation.

Award of Merit.

To Melon Epicure (votes, unanimous), from Mr. Mortimer, Farnham.

To Melon Nugget (votes, unanimous), also from Mr. Mortimer.

Cultural Commendation.

To Mr. E. Becker, Jersey, for good examples of Red and White Currants and Gooseberries.

To Wilberforce Bryant, Esq., Stoke Park, Slough, for very excellent examples of Humboldt Nectarine.

Other Exhibits.

The Marquis of Bute, Cardiff Castle (gr. Mr. Pettigrew), sent Cardiff Castle Melon. A very large, handsome, scarlet-fleshed variety.

J. C. Platt, Esq., Burntwood, Cheadley (gr. Mr. Richardson), sent Melon Brentwood Gem.

M. Burrell, Esq., Westley Hall, Bury St. Edmunds (gr. Mr. Bishop), sent Melon Westley Hall Companion.

Mr. A. Simpson, Horticultural College, Swanley, sent Melons—Gilberts Golden Queen, Her Majesty and the Empress.

Lord Howard of Glossop, Glossop Hall (gr. Mr. Ashton), sent Melon Baron Howard.

Earl Percy, Syon House (gr. Mr. Wythes), sent Melon The Champion.

Mr. Smythe, Basing Park, Hants, sent Melon named Smythe's Victory. The fruit being unripe, it was requested that it might be seen again.

J. Lyon, Esq., Caterham (gr. Mr. Papworth), sent a seedling Raspberry of some promise.

G. A. Farini, Esq., sent a basket of a small black American Raspberry, somewhat wanting in flavour, but which was said to make an excellent preserve.

Mr. Carmichael, 11 Pitt Street, Edinburgh, sent several seedling Strawberries.

From the Society's Garden, Chiswick, were sent twenty-four varieties of Red and White Currants.

Mr. Guy, Hertingfordbury Park, Herts, sent a new hybrid Melon, and specimens of a Pea named Parish Councillor, which were referred to Chiswick for trial.

Mr. Eckford of Wem, Salop, sent varieties of Peas, which were referred to Chiswick for trial.

Messrs. James Veitch & Sons, Chelsea, sent a large collection of their standard varieties of Peas.

The Earl of Radnor, Longford Castle, Salisbury (gr. Mr. Ward), sent Pea Longford Queen.

F. M. Portal, Esq., Malshanger, Basingstoke (gr. Mr. Kneller), sent a new Cucumber named Challenger, of handsome form.

The Marquis of Exeter, Burghley (gr. Mr. Gilbert), sent examples of Cauliflower Burghley Pet, which greatly resembled Dwarf Erfurt.

General Owen Williams, Great Marlow, sent fruits of a new Tomato, which it was recommended should be tried at Chiswick.

FRUIT COMMITTEE, JULY 23, 1895.

PH. CROWLEY, Esq., in the Chair, and nineteen members present.

Awards Recommended:—

Silver Gilt Knightian Medal.

To Messrs. J. Veitch & Sons, Chelsea, for a collection of eighty varieties of Gooseberries, four varieties of early Apples, and four of Pears.

Silver Banksian Medal.

To Messrs. W. & E. Wells, Hounslow (gr. Mr. Thompson),

for very large and beautiful bunches of Madresfield Court Grapes.

To Mr. J. Walker, Thame, Oxon, for a collection of fifty varieties of Gooseberries.

To H. P. Sturgess, Esq., Givons Grove, Maidenhead (gr. Mr. Peters), for a collection of twenty-four varieties of Gooseberries, the berries being unusually large and fine.

To Messrs. Johnson & Sons, Boston, for an interesting collection of thirty-three varieties of Peas, and four varieties of Broad Beans.

First Class Certificate.

To Tomato Duke of York (votes, unanimous), from Mr. E. Ryder, Orpington, Kent. Fruits of medium size, smooth, and regular in outline, of good colour and quality.

Other Exhibits.

Melons were exhibited by:—

1. Mr. Owen Thomas, The Royal Gardens, Windsor, who sent one named "The Orange," a pretty-looking variety.

2. Earl Percy, Syon, who sent a green-fleshed variety unnamed.

3. Mr. G. Dyke, Stubton Hall Gardens, Newark, who contributed a variety named Nuggett, which had been exhibited by Mr. Mortimer at the last meeting, and received an Award of Merit.

Col. Archer Houblon, Welford, sent a dish of Florence White Heart Cherries, a very excellent variety.

The Marquis of Exeter, Burghley, Stamford (gr. Mr. R. Gilbert), exhibited very large and fine Late Admirable Peaches and Cucumbers Metcalf Ringleader.

Mr. W. Carmichael, 14 Pitt Street, Edinburgh, sent several promising-looking varieties of Strawberries, of which plants were requested to be sent to Chiswick for trial.

M. Letellier & Son, Caen Calvados, France, sent two plants of a Gooseberry without the usual spines. These Gooseberries had been raised by M. E. Lefort, of Meaux. A few berries were sent at the same time—medium size, red skin, resembling a Warrington.

F. T. Griffiths, Esq., Wellington Road, Bilston, sent some well-preserved Filberts.

Dr. King, Boyfield House, Moulton Spalding, sent some Tomatos.

The Jadoo Company, Exeter, sent some Potatos grown in Jadoo Fibre.

FRUIT COMMITTEE, JULY 26, 1895.

MEETING AT CHISWICK.

H. BALDERSON, Esq., in the Chair, and seven members present.

Thirty-nine varieties of Lettuces growing in the gardens were examined, three $\times \times \times$ (equivalent to Highly Commended) being accorded to the following:—

1. Satisfaction or Salamander, Benary, Erfurt.
2. Large Brown Headed, Vilmorin, Paris.
3. Iceleaf, R. Veitch & Son, Exeter.
4. Royal Malta, Harrison & Son, Leicester.
5. Paris Grey Cos, Vilmorin, Paris.
6. Balloon Cos, Vilmorin, Paris.
7. Marvel, Vilmorin, Paris.

The collection of Dwarf Kidney Beans, consisting of thirty varieties, was next examined, $\times \times \times$ being accorded to the following:—

1. Roi des Verts, Vilmorin, Paris.
2. Mangetout Extra Dwarf Early, Vilmorin, Paris.
3. Early Golden Butter, Vilmorin, Paris.
4. Longfellow, Henderson, New York.

The last-named proved of exceedingly good quality when cooked.

The attention of the Committee was directed to a tree of Rivers's Early Favourite Plum on a west wall, which was quite ripe at this date, and of excellent quality. A First Class Certificate was recommended.

FRUIT COMMITTEE, AUGUST 13, 1895.

PH. CROWLEY, Esq., in the Chair, with sixteen members present.

Awards Recommended:—

Silver Knightian Medal.

To Messrs. Bunyard & Co., Maidstone, for a collection of

39 varieties of early Apples, amongst which were to be noticed : Early White Transparent, Red Astrachan, Sugar-loaf, Duchess of Oldenburgh, and Lady Audley ; also dishes of Red and White Mirabelle Plums, a small but very excellent early Plum, suitable for tarts ; not much grown in this country, but greatly esteemed in France.

To Messrs. Rivers & Son, Sawbridgeworth, for a collection of Apples, Pears, Plums, and Cherries. Amongst the Apples were noted Early Harvest, Early Julyan, Red Astrachan, Stirling Castle, and Duchess of Oldenburgh ; amongst Pears, Précoce de Trevaux, Beurré Giffard, and Beacon ; amongst the Cherries, Empereur François, Monstreux de Mezel, Noir de Guben, and Géant de Hedelfingen ; and amongst the Plums, Golden Transparent, Grand Duke, The Czar, and Monarch.

To Messrs. J. Veitch & Sons, Chelsea, for a large collection of Apples, Pears, Plums, and Alpine Strawberries in excellent condition.

Silver Banksian Medal.

To Mrs. Wingfield, Ampthill (gr. Mr. Empson), for 12 bunches of well-grown Grapes.

First Class Certificate.

To Cherry *Géant de Hedelfingen* (votes, unanimous), from Messrs. Rivers & Son, a large pale fruit of very superior texture and quality.

To Plum Rivers' Early Favourite, from Messrs. Rivers & Son, Sawbridgeworth.

Award of Merit.

To Lettuce Satisfaction (votes, unanimous), from Messrs. Benary, Erfurt.

To Lettuce Iceleaf (votes, unanimous), from Messrs. R. Veitch & Son, Exeter.

To Lettuce Royal Malta (votes, unanimous), from Messrs. Harrison & Son, Leicester.

To Lettuce Paris Grey Cos (votes, unanimous), from Messrs. Vilmorin, Paris.

To Lettuce Balloon Cos (votes, unanimous), from Messrs. Vilmorin, Paris.

To Lettuce Marvel (votes, unanimous), from Messrs. Vilmorin, Paris.

To Lettuce Large Brown Headed (votes, unanimous), from Messrs. Vilmorin, Paris.

To Dwarf Kidney Bean Longfellow (votes, unanimous), from Messrs. Henderson, New York.

To Dwarf Kidney Bean Roi des Verts (votes, unanimous), from Messrs. Vilmorin, Paris.

To Dwarf Kidney Bean Extra Dwarf Early (votes, unanimous), from Messrs. Vilmorin, Paris.

To Dwarf Kidney Bean Dwarf Golden Butter (votes, unanimous), from Messrs. Vilmorin, Paris.

All the above Lettuces and Beans had previously been Highly Commended at the last meeting of the Committee held at Chiswick on July 26.

To Improved Alpine Strawberry Rouge des Alpes améliorée (votes, unanimous), from Messrs. de Rothschild, Gunnersbury (gr. Mr. Hudson).

To Melon Middlesex Hero (votes, unanimous), from Earl Percy, Syon House (gr. Mr. Wythes).

To Apple White Transparent (votes, unanimous), from Messrs. Bunyard & Co., Maidstone. A large conical, brisk flavoured, early fruit of the colour of semi-transparent yellowish ivory or wax.

Cultural Commendation.

To Miss Henderson, Duneevan, Weybridge (gr. Mr. Taylor), for very large and fine specimens of Princess of Wales Peaches.

Other Exhibits.

A. Waterhouse, Esq., Yattenden Court, Newbury, sent a new seedling Grape named Black Diamond, and a Peach named "Epicure."

Mr. Wythes submitted three Melons, named respectively Excelsior, Thames Bank, and Middlesex Hero.

Josiah Cleaver, Esq., Leamington, sent a seedling Apple.

E. J. Preston, Esq., Kelsey Park, Beckenham, sent damaged shoots of Currants and Raspberries supposed to be due to the action of frost.

Dr. Masters, F.R.S., contributed some fruits which were the result of a cross between a Gooseberry and a Black Currant. They were extremely interesting, as the cross had undoubtedly been effected, but unless the fruit can be greatly improved by cultivation it is to be feared that it will prove useless as a fruit.

A Collection of 14 varieties of Plums came from the Society's Garden.

Messrs. J. Veitch & Sons, Chelsea, sent some large white Lettuces.

FRUIT COMMITTEE, AUGUST 16, 1895.

MEETING AT CHISWICK.

H. BALDERSON, Esq., in the Chair, and seven members present.

The following received $\times \times \times$, being equivalent to Highly Commended.

Tomatos:—

1. Duke of York, Carter & Co.
2. Frogmore Selected, J. Veitch & Sons.
3. Laxton's Early July, Laxton Bros.
4. Red Cherry (as a dessert fruit), R.H.S. Gardens.

Runner Beans:—

A 1 Runner, Sutton & Sons; J. Veitch & Sons.

Leviathan, Barr & Son.

Prizewinner, Sutton & Sons.

White Runner, Copp.

The awards made to *Veitch's Climbing Bean*, from Messrs. R. Veitch & Son, Exeter, and to *Sutton's Tender and True Bean*, from Messrs. Sutton & Sons, Reading, were confirmed; the Committee deciding that the two were identical.

The following Cabbages were awarded $\times \times \times$:—

Improved Nonpareil, Nutting & Sons; J. Veitch & Sons.

Early Etampes: J. Veitch & Sons; Vilmorin, Paris; Barr & Sons; Sutton & Sons.

FRUIT COMMITTEE, AUGUST 27, 1895.

PH. CROWLEY, Esq., in the Chair, and seventeen members present.

Awards Recommended :—

Silver Gilt Knightian Medal.

To Messrs. Veitch & Sons, Chelsea, for eighty-five dishes of fruit, including many varieties of Apples.

Silver Knightian Medal.

To Her Majesty the Queen (gr. Mr. Owen Thomas), Royal Gardens, Frogmore, for a collection of Plums (thirty varieties), containing most of the varieties in general cultivation in this country.

Silver Banksian Medal.

To Messrs. Spooner & Sons, for fifty varieties of Apples.

Award of Merit.

To Apple Williams' Favourite (votes, unanimous), from Messrs. Bunyard & Co. A very highly coloured early variety.

To Crab-apple Transparent Crab (votes, unanimous), from Messrs. Veitch & Sons. The fruit is large and good for a Crab and exceedingly ornamental.

Other Exhibits.

Seedling Melons were exhibited by :—

1. The Earl of Knowsley (gr. Mr. Doc).
2. Lord Foley, Esher (gr. Mr. Miller).
3. Earl Percy, Syon (gr. Mr. Wythes), who again sent Excelsior.

The Right Hon. Sir T. D. Acland, Bart. (gr. Mr. Garland), sent a seedling Peach resembling Royal George.

A seedling Nectarine came from R. Burrell, Esq., Bury St. Edmunds.

From Lord Foley came a collection of fruit, Apples, Pears, Grapes, &c.; and from Earl Percy a handsome dwarf kidney

Bean named Syon House Prolific, which was referred to Chiswick for trial.

Messrs. Cannell & Sons, Swanley, sent beautiful specimens of a Tomato named "The King."

Mr. T. Maclure, Hartley Grange, Winderfield, sent specimens of a new selected Pea.

W. H. Harford, Esq., Almansbury, Gloucester, sent a Bean named Hosking's New Prolific.



FIG. 76.—APPLE WILLIAMS' FAVOURITE. (From the *Gardeners' Magazine*.)

Mr. F. R. Eames, Twickenham, sent a Cucumber named Eames' Hybrid.

R. Davis, Esq., Castle Hill, Ealing, sent a Tomato which was referred to Chiswick for trial.

H. Grinling, Esq., Harrow Weald (gr. Mr. Rapley), sent Sutton's Perfection Tomato; and from Mr. R. W. Potten, Cranbrook, came specimens of the yellow-fruited *Malus Baccatas*.

FRUIT COMMITTEE, SEPTEMBER 5, 1895.

MEETING AT CHISWICK.

Mr. J. WRIGHT in the Chair, and six members present.

The collection of Potatos growing in the gardens (sixty-seven named varieties) was duly examined, the following being selected as of fine appearance and good cropping qualities—viz. :—

Syon House Prolific, Wythes.
 Advancer, Carter & Co.
 Rex, Ross.
 Cockerell's Seedlings, Cockerell.
 Sutton's Triumph, Sutton & Sons.
 Satisfaction, Woods.
 Wood's Favourite, Ridgewell.
 Duke of York, Daniels.
 Pride of Tonbridge, Webber.
 Newland's Seedlings, Newland.

These being again subjected to the test of cooking, the following were awarded × × ×, equivalent to Highly Commended :—

Syon House Prolific.
 Birmingham.
 Sutton's Triumph.
 Cockerell's Seedling.
 Pride of Tonbridge.

The collection of Cabbages was next examined, three × × × being awarded to the following :—

Superfine Early Dwarf York, Barr & Son.
 Sutton's Little Gem, Sutton & Sons.
 Leeds Market (as a field variety), Nutting & Sons.
 St. John's Day, Veitch & Sons.
 Winnigstadt, Barr & Son, Veitch & Sons.
 Small Curled Savoy, Vilmorin.
 Early Erfurt Red Cabbage, Benary.
 Sutton's Dwarf Blood Red, Sutton & Sons.

VEGETABLE SHOW, CHISWICK.

SEPTEMBER 10, 1895.

Schedule and Prize List.

Class 1.—Collection of Vegetables, 12 distinct kinds. First £5, Lady Theodora Guest, Inwood, Henstridge, Blandford (gr. Mr. Wilkins); second, £3, C. Hoare, Esq., Hackwood Park, Basingstoke (gr. Mr. Bowerman); third, £1. 10s., Sir John Shelley, Shobrooke Park, Crediton (gr. Mr. Mairs).

Class 2.—Collection of Vegetables, 9 distinct kinds. First, £3, Hon. W. J. Talbot, Glenhurst, Esher (gr. Mr. Waite); second, £2, Mrs. Wingfield, Ampthill House, Beds. (gr. Mr. Empson); third, £1, Rev. O. L. Powels, St. George's College, Woburn Park, Weybridge (gr. Mr. Basile).

Class 3.—Collection of Vegetables, 6 distinct kinds. First, £2, W. S. Portal, Esq., Malshangar Park, Basingstoke (gr. Mr. Kneller); second, £1, Mrs. Lloyd, Merton Lodge, Chiswick (gr. Mr. Addison); third, 15s., Mr. G. North, 28 Mitre Street, Buckingham.

Class 4.—Three Cauliflowers, 1 variety. First, 10s., Mrs. Wingfield (gr. Mr. Empson); second, 7s. 6d., Earl of Carnarvon, Highclere Castle, Newbury (gr. Mr. Pope); third, 5s., Sir John Shelley (gr. Mr. Mairs).

Class 5.—Three Borecoles (or Kales), 1 variety. First, 10s., Earl Percy, Syon House, Brentford (gr. Mr. Wythes); second, 7s. 6d., Mrs. Howard, Worton Hall, Isleworth (gr. Mr. Pentney).

Class 6.—Brussels Sprouts, not less than 2 quarts. First, 7s., C. Hoare, Esq. (gr. Mr. Bowerman); second, 5s., Earl of Carnarvon (gr. Mr. Pope); third, 3s., E. J. Preston, Esq., Kelsey Park, Beckenham (gr. Mr. Webster).

Class 7.—Spinach, 1 sieve. First, 5s., Mrs. Wingfield (gr. Mr. Empson).

Class 8.—Vegetable Marrows, 1 brace. First, 10s., Sir John Shelley (gr. Mr. Mairs); second, 7s. 6d., Mrs. Kingsmill, Syd-monton Court, Newbury (gr. Mr. Lye); third, 5s., Earl Percy (gr. Mr. Wythes).

Class 9.—Cucumbers, 1 brace. First, 10s., Mrs. Kingsmill

(gr. Mr. Lye); second, 7s. 6*d.*, Hon. W. J. Talbot (gr. Mr. Waite); third, 5s., Mrs. Wingfield (gr. Mr. Empson).

Class 10.—Scorzonera, 12 roots. First, 7s., Mrs. Howard (gr. Mr. Pentney); second, 5s., Mr. C. Osman, District School, Sutton, Surrey; third, 3s., Earl Percy (gr. Mr. Wythes).

Class 11.—Salsify, 12 roots. First, 7s., Hon. W. J. Talbot (gr. Mr. Waite); second, 5s., Earl of Carnarvon (gr. Mr. Pope); third, 3s., Mrs. Howard (gr. Mr. Pentney).

Class 12.—Beans (Runner), 1 dish, 30 pods. First, 7s., Mrs. Kingsmill (gr. Mr. Lye); second, 5s., C. Hoare, Esq. (gr. Mr. Bowerman); third, 3s., Sir John Shelley (gr. Mr. Mairs).

Class 13.—Beans (Dwarf, Kidney or French), 30 pods. First, 7s., C. Hoare, Esq. (gr. Mr. Bowerman); second, 5s., Earl of Radnor, Longford Castle, Salisbury (gr. Mr. Ward); third, 3s. Earl Percy (gr. Mr. Wythes).

Class 14.—Beans (Broad), 30 pods. First, 5s., Mrs. Kingsmill (gr. Mr. Lye); second, 3s., C. Hoare, Esq. (gr. Mr. Bowerman).

Class 15.—Peas, 50 pods. First, 7s., Mr. W. Palmer, Junction Road, Andover; second, 5s., Earl of Radnor (gr. Mr. Ward); third, 3s., Earl Percy (gr. Mr. Wythes).

Class 17.—Globe Artichokes, 6 heads. First, 7s., Lady Theodora Guest (gr. Mr. Wilkins); second, 5s., Mrs. Wingfield (gr. Mr. Empson).

Class 18.—Cardoons, 6 heads. First, 7s., Earl Percy (gr. Mr. Wythes).

Class 19.—Potatos (Kidney), 3 varieties, 9 tubers of each. First, £1, Earl of Carnarvon (gr. Mr. Pope); second, 15s., C. Hoare, Esq. (gr. Mr. Bowerman); third, 10s., Hon. W. J. Talbot (gr. Mr. Waite).

Class 20.—Potatos (Round), 3 varieties, 9 tubers of each. First, £1, Earl of Carnarvon (gr. Mr. Pope); second, 15s., Sir John Shelley (gr. Mr. Mairs); third, 10s., Mr. G. North.

Class 21.—Potatos (Kidney), 1 variety, 9 tubers. First, 7s., Mrs. Kingsmill (gr. Mr. Lye); second, 5s., Mr. G. North; third, 3s., E. J. Preston, Esq. (gr. Mr. Webster).

Class 22.—Potatos (Round), 1 variety, 9 tubers. First, 7s., Mr. G. North; second, 5s., Mrs. Kingsmill (gr. Mr. Lye); third, 3s., Mrs. Wingfield (gr. Mr. Empson).

Class 23.—Leeks, 6 heads. First, 10s., Mrs. Kingsmill (gr.

Mr. Lye); second, 7s., Sir John Shelley (gr. Mr. Mairs); third, 5s., Earl of Carnarvon (gr. Mr. Pope).

Class 24.—Onions, 3 varieties, 6 bulbs of each. First, 10s., Hon. W. J. Talbot (gr. Mr. Waite); second, 7s., Sir John Shelley (gr. Mr. Mairs); third, 5s., Earl of Radnor (gr. Mr. Ward).

Class 25.—Turnips, 3 varieties, 6 roots of each. First, 10s., Mr. G. North; second, 7s., Mr. C. Osman; third, 5s., Mrs. Wingfield (gr. Mr. Empson).

Class 26.—Turnips, 1 variety, 6 roots. First, 5s., Hon. W. J. Talbot (gr. Mr. Waite); second, 3s., Mrs. Kingsmill (gr. Mr. Lye).

Class 27.—Celeriac, 6 roots. First, 7s., Earl Percy (gr. Mr. Wythes).

Class 29.—Carrots, 3 varieties, 6 roots of each. First, 10s., Mr. G. North; second, 7s., Earl of Carnarvon (gr. Mr. Pope); third, 5s., Mrs. Wingfield (gr. Mr. Empson).

Class 30.—Carrots, 6 roots, 1 variety. First, 5s., Sir John Shelley (gr. Mr. Mairs); second, 3s., Lady Theodora Guest (gr. Mr. Wilkins).

Class 31.—Parsnips, 6 roots. First, 7s., Mrs. Kingsmill (gr. Mr. Lye); second, 5s., Hon. W. J. Talbot (gr. Mr. Waite).

Class 32.—Horseradish, 12 sticks. First, 7s., Hon. W. J. Talbot (gr. Mr. Waite); second, 5s., Earl Percy (gr. Mr. Wythes).

Class 33.—Beet, 6 roots. First, 7s., E. J. Preston, Esq. (gr. Mr. Webster); second, 5s., Hon. W. J. Talbot (gr. Mr. Waite).

Class 34.—Endive, 2 varieties, 3 heads of each. First, 10s., Hon. W. J. Talbot (gr. Mr. Waite); second, 7s., Mrs. Howard (gr. Mr. Pentney).

Class 35.—Lettuce, 2 varieties, 3 heads of each. First, 10s., Mrs. Kingsmill (gr. Mr. Lye); second, 7s., Hon. W. J. Talbot (gr. Mr. Waite).

Class 36.—Celery, 2 varieties, 3 heads of each. First, 10s., Lady Theodora Guest (gr. Mr. Wilkins); second, 7s., Hon. W. J. Talbot (gr. Mr. Waite); third, 5s., Mrs. Kingsmill (gr. Mr. Lye).

Class 37.—The best Collection of Salading. First, £1, Earl Percy (gr. Mr. Wythes); second, 10s., Hon. W. J. Talbot (gr. Mr. Waite); third, 7s., Mr. W. Salmon, Ivy Cottages, Elder Road, West Norwood.

Class 38.—The best Collection of Pot and Sweet Herbs. First, 10s., Mr. W. Salmon ; second, 7s., Hon. W. J. Talbot (gr. Mr. Waite).

Class 39.—Any other Vegetable. First, 7s., Hon. W. J. Talbot (gr. Mr. Waite), for Tomatos ; second, 5s., Rev. O. L. Powels (gr. Mr. Basile), for Cucurbita maxima ; third, 3s., Mr. Alberti, Horticultural Place, Chiswick, for Tomatos.

FRUIT COMMITTEE, SEPTEMBER 10, 1895.

MEETING AT CHISWICK.

PH. CROWLEY, Esq., in the Chair, and seventeen members present.

Awards Recommended :—

Silver Gilt Knightian Medal.

To Her Majesty the Queen, Royal Gardens, Windsor (gr. Mr. Owen Thomas), for a very complete collection of vegetables.

To Messrs. J. Veitch & Sons, Chelsea, for a large and representative collection of vegetables.

To Messrs. Sutton & Sons, for a very large collection of Tomatos, Potatos, &c.

To Sir Trevor Lawrence, Bart., Dorking (gr. Mr. Bain), for a collection of vegetables in great variety.

To Earl Percy, Syon House (gr. Mr. Wythes), for a large collection of choice vegetables.

To Messrs. R. Veitch & Son, Exeter, for a collection of vegetables.

To Messrs. Cannell & Sons, Swanley, for a large collection of vegetables.

Silver Knightian Medal.

To Messrs. Barr & Son, Covent Garden, for a collection of vegetables.

To Messrs. Spooner & Son, Hounslow, for a large collection of Apples.

Silver Banksian Medal.

To Messrs. Fellowes & Rider, Orpington, Kent, for a splendid exhibit of Tomato Duke of York.

Bronze Banksian Medal.

To Messrs. Dobbie & Son, for very excellent Leeks, Celery, Parsley, &c.

First Class Certificate.

To Melon The Earl's Favourite (votes, unanimous), from the Earl of Radnor, Longford Castle, Salisbury (gr. Mr. H. W. Ward).

Award of Merit.

To Runner Bean Sutton's A 1 (votes, unanimous), from Messrs. Sutton & Sons.

To Apple Rambour (votes, unanimous), from A. H. Smee, Esq., The Grange, Wallington (gr. Mr. Cummings). Fruit large and handsome.

To Kidney Beans Northumberland Prolific (votes, unanimous), from Earl Percy, Syon House (gr. Mr. Wythes). A handsome and very prolific variety.

To Potato Syon House Prolific, from Earl Percy, Syon House (gr. Mr. Wythes).

To Potato Satisfaction, from Mr. Woods.

To Potato Sutton's Triumph, from Messrs. Sutton & Sons, Reading.

To Potato Cockerell's Seedling, from Mr. Cockerell.

To Potato Pride of Tonbridge, from Mr. Webber.

To Cabbage Superfine Early Dwarf York, from Messrs. Barr & Son, Covent Garden.

To Cabbage Little Gem, from Messrs. Sutton & Sons, Reading.

To Cabbage Leeds Market (as a field variety), from Messrs. Nutting & Sons.

To Cabbage St. John's Day, from Messrs. J. Veitch & Sons, Chelsea.

To Cabbage Winnigstadt, from Messrs. Veitch & Son and Messrs. Barr & Son.

To Small Curled Savoy Cabbage, from Messrs. Vilmorin, Paris.

To Red Cabbage Early Erfurt, from Messrs. Benary, Erfurt.

To Red Cabbage Dwarf Blood Red, from Messrs. Sutton & Sons.

Cultural Commendation.

To Messrs. Rivers & Son, for large handsome fruits of Cox's Orange Pippin and Marshall's Seedling Apples.

To the Royal Horticultural Society, Chiswick, for very fine examples of Pear Souvenir du Congrès.

Cultural Commendations.

To Lady Theodora Guest, Inwood House, Blandford (gr. Mr. Wilkins), for a dish of Mangos grown in this country.

To Mrs. Wingfield, Ampthill (gr. Mr. Empson), for a collection of Carrots.

To Messrs. de Rothschild, Gunnersbury, Acton (gr. Mr. Hudson), for a collection of seven varieties of Peas. Very plump, and as fresh as if it had been midsummer.

Other Exhibits.

Two handsome Melons were exhibited by the Rev. the Marquis of Normandy, Mulgrave Castle, Whitby (gr. Mr. Corbett). Lord Foley sent several Melons named Archie Henderson.

The Duke of Richmond, Gordon Castle, Banff (gr. Mr. C Webster), sent fruit of two seedling Plums of some promise. It was requested that they might be seen again.

Messrs. G. Bunyard & Co., Maidstone, sent beautiful specimens of Apples Lady Sudeley and Akera, the latter introduced from Sweden.

Messrs. de Rothschild, Gunnersbury House (gr. Mr. Hudson), sent a fine dish of improved Alpine Strawberries.

Mr. E. L. Johnson, Ealing, sent some good Mushroom spawn.

Tomatos were exhibited by Mr. F. M. Burt, Worthing, who staged Burt's Surprise; by the Earl of Carnarvon, Highclere, (gr. Mr. Pope), who staged good examples from the open ground; by Mr. A. J. Ward, allotment holder, Richmond, who sent fruit of Chemin Rouge; by Mr. B. Alberte, Chiswick; by Mr. Palmer, Andover, who sent a new variety named Palmer's Triumph; and by Messrs. Laxton, who sent a collection grown in pots.

FRUIT COMMITTEE, OCTOBER 15, 1895.

PH. CROWLEY, Esq., in the Chair, and eighteen members present.

Awards Recommended:—*Silver Gilt Knightian Medal.*

To Messrs. Rivers & Son, Sawbridgeworth, for a large collection of Apples and Pears. The specimens were very large, clear skinned, and beautiful.

To H. H. Gibbs, Esq., Aldenham House, Elstree (gr. Mr. Beckett), for a large collection of vegetables of the finest quality.

Silver Knightian Medal.

To Messrs. Veitch & Sons, Chelsea, for a collection of 100 varieties of Apples.

Silver Banksian Medal.

To Messrs. Paul & Son, Cheshunt, for a collection of fifty varieties of Dessert Apples.

To the Dowager Lady Freake, Twickenham (gr. Mr. Brickwood), for a collection of 100 varieties of Apples and Pears.

To Mr. H. A. Orr, Bedford, for Orr's Patent Storing Trays for Fruit, which were highly approved by the Committee.

To Messrs. Dobbie & Son, Rothesay, for a collection of vegetables.

Cultural Commendation.

To Lord Rothschild, Tring (gr. Mr. Hill), for very excellent and highly coloured Doyenné du Comice Pears.

To Mr. Jones, Greenford Place, Sudbury, for a collection of Leeks.

Award of Merit.

To Plum The President (votes, unanimous), from Messrs. Rivers & Son, Sawbridgeworth. A large, late, dark purple fruit, resembling Late Duke.

Other Exhibits.

The Marquis of Downshire, Hillsborough Castle, co. Down (gr. Mr. Bradshaw), submitted his new Grape named Marchioness of Downshire.

Mr. Will Taylor, Hampton, sent examples of Grape Chasselas Rose, named Prince Olga de Wirtemberg. This is a pretty red-skinned variety of the Royal Muscadine, excellent for growing in unheated structures or in good seasons on an open wall.

From the Society's Gardens, Chiswick, came examples of Grapes grown on open walls, those ripening the most freely being Gamay Noir, Chasselas Noir, Millar's Burgundy, Chasselas Rose, and Royal Muscadine.

Melons were exhibited by Mr. Empson, who staged Anthony's Favourite; by Mr. Ward, who staged the Earl's Favourite—a variety which received a First Class Certificate on September 10; by R. Burrell, Esq., who staged Westley Hall Companion; and by Mr. Warren, Hampton, who staged Warren's Seedling.

New Apples were submitted by Mr. Palmer, Cobham Villas, Andover, who sent Stubb's Seedling, which was requested to be deposited at Chiswick for a time to test its keeping properties; by Mr. Empson, who staged three varieties; by Messrs. Spooner, who staged a variety called The Baron; by F. Willes, Esq., Lindula, Leighton Buzzard, who sent Lindula Seedling, said to have been raised from a pip thirty years ago; by Messrs. Paul & Son, Cheshunt, who sent a variety named Captain Sanders; by Mr. Owen Thomas, Royal Gardens, Frogmore, who sent two seedlings—one of them, named Frogmore Dessert, proving identical with Pomme de Neige.

Mr. John Miles, Dudley Villas, Portsmouth Road, exhibited a large Blenheim Orange Apple, of a bright crimson-scarlet colour all over.

Sir J. Pease, Bart., Hutton Hall, Guisborough (gr. Mr. J. McIndoe), sent a Pear named Charles Ernest—a large, pale, handsome fruit, but somewhat lacking quality.

Messrs. Nothard & Low exhibited, on behalf of E. C. Banks, Esq., Waterville, Nova Scotia, examples of a new variety of Gravenstein Apple, more highly coloured than the ordinary variety.

His Grace the Duke of Rutland, Belvoir (gr. Mr. Divers), sent a large exhibit of Celery, consisting of twenty-five varieties all exceedingly well grown. A new variety named Man of Kent was recommended to be tried at Chiswick.

Mr. Deverill, Banbury, sent some very large Onions, Ailsa Craig and Anglo-Spanish.

Some fresh Tomatos came from A. W. Young, Esq., Stevenage, named Young's Eclipse; and from Mr. Wells, Mint Street, Lincoln, were received three dishes of beautiful Potatos.

FRUIT COMMITTEE, OCTOBER 29, 1895.

PH. CROWLEY, Esq., in the Chair, and sixteen members present.

Awards Recommended:—*Silver Knightian Medal.*

To Messrs. Sutton & Sons, for a very large and interesting collection of Potatos representing most of the leading varieties now in cultivation, together with specimens of the various original species from which modern Potatos have sprung.

To Messrs. Cannell & Sons, for a collection of 100 varieties of Potatos.

To Mrs. Wingfield, Amptill (gr. Mr. Empson), for a very complete collection of vegetables, showing good culture, and very prettily set up with small ornamental gourds.

Silver Banksian Medal.

To Earl Percy, Syon House (gr. Mr. Wythes), for a large and varied collection of salads, comprising Celery, Batavian and Curled Endive, Tomatos, Beet, &c.

Silver Banksian Medal.

To Earl Percy, for a collection of seventy-six varieties of Apples and Pears.

To Messrs. D. & W. Buchanan, Forth Vineyards, Kippen, Stirling, for a stand of Grapes and Tomatos, garnished with beautifully coloured Vine leaves.

Award of Merit.

To Apple Pay-the-Rent (votes, unanimous), from Mr. R. Fenn, Sulhamstead, Reading. Fruit large, pale-green, said to be a very great cropper, and a good keeper.

To Melon Anthony's Favourite (votes, unanimous), from Mrs. Wingfield (gr. Mr. Empson). Fruit large, ovate, greenish-yellow, and of very fine quality.

Cultural Commendation.

To C. E. Shea, Esq., The Elms, Foots Cray, for some very highly coloured specimens of Gascoigne's seedling Apples.

Other Exhibits.

Mr. R. Fenn showed Cox's Orange, Apple, and fruits of *Solanum Fendleri*.

Mr. Owen Thomas, Royal Gardens, Frogmore, exhibited Melon The Duchess, a pretty-looking variety, which the Committee requested might be seen again.

FRUIT COMMITTEE, NOVEMBER 12, 1895.

PH. CROWLEY, Esq., in the Chair, and thirteen members present.

Awards Recommended :—

Silver Gilt Knightian Medal.

To Her Majesty the Queen (gr. Mr. Owen Thomas), Royal Gardens, Frogmore, for twenty-four smooth Cayenne Pine-Apples in magnificent condition, averaging from 7 to 8 lb., grown from rootless suckers planted October 24, 1894. These were splendid examples of good and rapid cultivation.

To His Grace the Duke of Rutland, Belvoir Castle, Grantham (gr. Mr. Divers), for a fine collection of Apples and Pears, containing about one hundred varieties of excellent quality.

Banksian Medal.

To Mr. Becker, Jersey, for a large collection of Apples and Pears, several of the Pears being very large and beautiful.

Cultural Commendation.

To the Earl of Rosebery, Mentmore, Leighton Buzzard (gr. Mr. Smith), for very large and fine examples of Grape Chasselas Napoléon, cut from a rod grafted on Muscat of Alexandria. The berries possessed some slight trace of the Muscat flavour, which was believed to be due to the stock.

Other Exhibits.

Mr. A. Waterer, Knaphill, Woking, sent fruits of Apple

Sanspareil for comparison with Rivers's Codlin. The Committee considered that they were quite distinct.

Mr. A. Mackay, King Street, Dunstable, sent an Apple named Ivanhoe, which proved to be Golden Noble.

The Rev. J. R. Dummelow, Newbury, sent examples of Black Hambro Grapes grown on an open wall. They were well ripened, but much bruised in transit.

Mr. Thomas, Royal Gardens, Frogmore, sent a late purple Plum named Frogmore Late. The fruits were somewhat damaged by frost.

Sir J. Pease, Hutton Hall, Guisboro', Yorks (gr. J. McIndoe), sent specimens of Pear Charles Ernest. A large handsome fruit, having a texture of flesh like Beurré Clairgeau, only richer. Recommended as a promising variety.

The following seedling Apples were submitted to the Committee, viz. :—

By Messrs. Veitch & Sons, Chelsea :—

1. Fraise de Hoffinger.
2. Reinette de Damason.
3. Welch Beauty.

By Mr. E. L. Thomas, Berkhamstead :—

1. Eureka.

By Mr. Divers, Belvoir, Grantham :—

1. Jenkinson's Seeding.
2. Dewdney.

By Messrs. Rivers & Son, Sawbridgeworth :—

1. Rivers's St. Martin.

By Mr. E. Becker, Jersey :—

1. Crimson Seedling.
2. Scarlet September Pippin.
3. Golden Nonpareil.
4. Spring Ribston.
5. Seedling No. 3.

FRUIT COMMITTEE, NOVEMBER 26, 1895.

T. F. RIVERS, Esq., in the Chair, and thirteen members present.

Awards Recommended :—

Silver Knightian Medal.

To Earl Percy, Syon House, Brentford (gr. Mr. Wythes), for a large assortment of green winter vegetables, viz. Cabbage, Savoy, Cauliflower, Brussels Sprouts, Endive, Borecole, &c.

To Messrs. Cheal & Sons, Crawley, Sussex, for one hundred dishes of Apples and Pears, prominent amongst the Apples being Bismarck, Washington, and Cox's Orange Pippin, and amongst the Pears Duchesse de Mouchy and Beurré Sterckmans.

Award of Merit.

To Apple Stubbs seedling (votes, unanimous), from Mr. Wm. Palmer, Cobden Villas, Andover. Fruit of medium size and flat; colour a deep shining scarlet; flesh white, tender, juicy, and of pleasant flavour.

Other Exhibits.

Seedling Apples were exhibited by Messrs. Laing & Son, Forest Hill, who sent a variety named Palmer's Seedling; by Messrs. Laxton Brothers, who staged a large, handsome variety named Bedford Scarlet, which seemed promising; and by Mr. E. Steward, 57 Carrington Street, Nottingham, who sent a seedling said to be a very late-keeping Apple. The Committee desired to see it in April.

Messrs. Lane & Son, Berkhamsted, exhibited a basket of splendid specimens of Lane's Prince Albert Apple.

Earl Percy, Syon House, submitted an unnamed seedling Apple, and the white-skinned Jerusalem Artichoke.

From Mr. W. Neild, Horticultural College, Bowden, Cheshire, came Neild's seedling Tomato.

FRUIT COMMITTEE, DECEMBER 10, 1895.

§ PH. CROWLEY, Esq., in the Chair, and twenty-six members present.

Awards Recommended :—*Silver Banksian Medal.*

To Lord Foley, Ruxley Lodge, Esher (gr. Mr. Miller), for a collection of Apples and Pears.

To the Earl of Carnarvon, Highclere, Newbury, for a collection of Onions.

To Messrs. Cannell & Sons, Swanley, for a collection of Onions, Leeks, and Beet.

Award of Merit.

To Apple Opal (votes, unanimous), from Captain Carstairs, Welford Park (gr. Mr. C. Ross). Fruit of medium size, and pale yellow; flesh tender, and briskly flavoured.

To Dobbie's Curled Green (votes, unanimous), from Messrs. Dobbie & Son, Rothsay.

Other Exhibits.

Lord St. Oswald, Nostell Priory, Wakefield (gr. Mr. Easton), exhibited three varieties of Apples in excellent condition, in order to show how well they succeed in Yorkshire.

Messrs. Curtis, Sandford, & Co., South Devon, exhibited ripe fruit of *Cyphomandra betacea*—Ceylon Tree Tomato.

Messrs. Laxton Bros. exhibited their Seedling Apple Bedford Scarlet, which appears promising.

Messrs. Jarman & Co., Chard, Somerset, exhibited two young Apple trees, in order to show their great vigour, which was very remarkable; also fruit of the variety Crimson King.

Mrs. Wingfield, Ampthill, Beds, sent two Seedling Apples of good appearance.

Messrs. B. S. Williams & Son, Holloway, sent a dish of Tomato Warden Park Favourite.

The following resolution, proposed by Dr. Hogg, and seconded by Mr. Smith, was carried unanimously :—

“The Committee desires to record its high sense of the valuable services which Mr. Barron has rendered to it during his long occupation of the position of Secretary, from which he is now

retiring, and to congratulate him on the distinction of having been placed by the Council on the roll of Honorary Fellows of the Royal Horticultural Society. The Committee will also heartily welcome him to a seat at this table, and expresses an earnest hope that he may long enjoy health and happiness, and find many opportunities for continuing to render distinguished service to horticulture and to the Society."

Mr. BARRON replied, thanking the Committee for their kindness, and expressing his regret in retiring from the office of Secretary, which he had held since 1865.

Mr. WRIGHT moved that the above proceedings be entered on the Minutes of the Committee.

Mr. WYTHES proposed, and Mr. BALDERSON seconded, that a vote of thanks be given to the Chairman, which was carried unanimously.

FLORAL COMMITTEE.

JULY 9, 1895.

W. MARSHALL, Esq., in the Chair, and thirteen members present.

Awards Recommended:—

Silver Flora Medal.

To Messrs. Wallace & Co., Colchester, for a large and very interesting group of hardy cut flowers—Calochortus, Iris, Brodiaeas, and Liliiums in great variety.

Silver Banksian Medal.

To Messrs. Barr & Son, Covent Garden, for a group of hardy cut flowers—Liliiums, Campanulas, Phloxes, Crinums, Iris, Pinks, and Sweet Peas.

To Mr. H. Eckford, Wem, Salop, for a very large and beautiful display of Sweet Peas in great variety.

To Mr. Turner, Slough, for a collection of Carnations and Picotees.

First Class Certificate.

To *Hemerocallis aurantiaca*, var. *major*, *Baker* (votes, unani-

mous), from Messrs. Wallace & Co. A very fine new variety from Japan; flowers large, colour deep orange yellow.

To *Arnebia cornuta* (votes, 10 for), from Messrs. Dobbie & Co., Rothesay. A pretty annual, growing about fifteen inches high, and bearing rich yellow flowers with deep velvety brown blotches on each petal.

Award of Merit.

To *Godetia Marchioness of Salisbury* (votes, unanimous), from Messrs. Daniels Bros., Norwich. Flowers rosy crimson, edged with white. A very free bloomer.

To *Streptocarpus Laing's Multiflorus* (votes, 6 for, 3 against), from Messrs. J. Laing & Sons, Forest Hill. Large blue flowers marked with purple in the throat. A very free flowering variety. (Fig. 77.)

To *Begonia Mr. F. Bostock* (votes, 4 for, 1 against), from Messrs. J. Laing & Sons. Flowers double, colour bright scarlet.

To *Calochortus luteus concolor* (votes, unanimous), from Messrs. Wallace & Co. Flowers of medium size, deep golden yellow, with brown blotches at the base of each petal.

To *Calochortus macrocarpus* (votes, unanimous), from Messrs. Wallace & Co. Flowers large, lilac-purple. Very pretty.

To *Begonia carminata* (votes, 11 for), from Messrs. J. Veitch & Sons, Chelsea. A pretty variety of dwarf habit, bearing bright red flowers in great profusion.

To *Rose Haileybury* (votes, 9 for), from Messrs. Paul & Son, Cheshunt. Flowers rich crimson, very sweetly scented.

To *Carnation Mrs. W. Bright* (votes, 7 for), from Mrs. McDonald, Chichester. Large, clear, yellow flowers, of good form.

Other Exhibits.

From G. F. Wilson, Esq., Weybridge, came a very fine flower of *Cereus Alice Wilson*.

G. A. Farini, Esq., Forest Hill, sent a double-flowered *Begonia* named Farini's striped.

From G. Daniels, Esq., Lime Tree Road, Norwich, came flowers of a very fine Ivy-leaf *Pelargonium* named Queen of Roses. The Committee asked to see a plant.

Mr. Robson Hindmarsh, Crag View, Alnwick, sent an unnamed Seedling *Begonia*.



FIG. 77.—STREPTOCARPUS MULTIFLORA.

(From the *Gardeners' Chronicle*.)

From Mr. H. Middlehurst, 11 Manchester Street, Liverpool, came some very fine Chrysanthemums, being the result of a cross between *C. latifolium* and *C. maximum*.

Mr. Beldam, The Lodge, Acton, sent a double purple and white Petunia named Laura M. Beldam.

Messrs. Cutbush & Sons, Highgate, exhibited Carnation La Villette.

From Messrs. E. F. Fairbairn & Sons, Edentown, Carlisle, came a free flowering Godetia named E. F. Fairbairn.

Mr. J. Douglas, Edenside, Great Bookham, sent a very pretty display of cut Carnations.

From Messrs. Sutton & Sons, Reading, came a group of *Nemesia strumosa* Suttoni, the colours ranging from pale yellow to deep crimson.

Mr. J. Forbes, Hawick, sent a collection of fifty varieties of Delphiniums.

From the Hon. W. Lowther, Campsea Ashe, Wickham Market, came a beautiful box of *Rosa moschata*.

Mr. A. Waterer, Knap Hill, Woking, sent a group of the new *Spiræa bumalda* Anthony Waterer.

ROSE SHOW.

HYBRID PERPETUALS.

Class 1. Twenty-four single trusses, distinct; amateurs. First, silver cup or £4, E. B. Lindsell, Esq., Bearton, Hitchin; second, £2, T. B. Haywood, Esq., Woodhatch Lodge, Reigate (gr. Mr. Salter).

Class 2. Twenty-four single trusses, distinct; open. First, £3, Mr. Frank Cant, Colchester; second, £2, Mr. B. R. Cant, Colchester.

Class 3. Twelve single trusses, distinct; amateurs. First, £1. 10s., J. Gurney Fowler, Esq., Glebelands, South Woodford (gr. Mr. Davis); second, £1, O. G. Orpen, Esq., West Bergholt, Colchester.

Class 4. Twelve single trusses, distinct: open. First, £1. 10s., Mr. B. R. Cant; second, £1, Mr. G. Mount, Canterbury.

Class 5. Six single trusses, distinct; amateurs. First, £1, R. H. Langton, Esq., Raymead, Hendon; second, 15s., K. H. Gifford, Esq., Holyrood, Streatham.

Class 6. Six single trusses of any one variety; amateurs. First, £1, T. B. Haywood, Esq. (gr. Mr. Salter); second, 15s., Rev. H. Pemberton, Havering-atte-Bower, Romford.

Class 7. Twelve distinct, three trusses of each; open. First, £2. 10s., Mr. B. R. Cant; second, £1. 10s., Mr. G. Mount.

Class 8. Twelve single trusses of any one variety; open. First, £1. 10s., Mr. B. R. Cant; second, £1, Mr. G. Mount.

TEAS AND NOISETTES.

Class 9. Twenty-four single trusses, not less than twelve varieties or more than three trusses of any one variety; amateurs. First, silver cup or £4, O. G. Orpen, Esq.; second, £2, H. V. Machin, Esq., Gateford Hill, Worksop.

Class 10. Twelve single trusses, not less than nine varieties, or more than two trusses of any one variety; amateurs. (No entries in this class.)

Class 11. Six single trusses, not less than four varieties amateurs. First, £1, R. H. Langton, Esq.; second, 15s., C. J. Graham, Esq., Coombe Road, Croydon.

Class 12. Six single trusses of any one variety; amateurs. First, £1, R. H. Langton, Esq.; second, 15s., O. G. Orpen, Esq.

Class 13. Twenty-four distinct single trusses; open. First, £3, Mr. Frank Cant; second, £2, Mr. B. R. Cant.

Class 14. Twelve distinct, three trusses of each; open. First, £2. 10s., Mr. Frank Cant; second, £1. 10s., Mr. B. R. Cant.

Class 15. Twelve single trusses of any one variety; open. First, £1. 10s., Mr. Frank Cant; second, £1, Mr. B. R. Cant.

FLORAL COMMITTEE, JULY 23, 1895.

W. MARSHALL, Esq., in the Chair, and seventeen members present.

Awards Recommended:—

Silver Flora Medal.

To Mr. Eckford, Wem, for a very beautiful display of Sweet Peas consisting of about fifty varieties, amongst them being several new ones of great beauty.

Silver Banksian Medal.

To Messrs. R. Wallace & Co., Colchester, for a group of cut flowers—*Lilium dalmaticum*, *L. Brownii*, *L. longiflorum giganteum*, and several very fine *Calochorti*.

To Messrs. H. Cannell & Sons, Swanley, for a group of Carnations and Picotees, together with several plants of *Canna Queen Charlotte*.

To Messrs. J. Veitch & Sons, Chelsea, for a very bright group of javanico-jasminiflorum hybrid *Rhododendrons*.

To Mr. M. Pritchard, Christchurch, for a group of hardy cut flowers—*Campanulas*, *Montbretias*, *Hemerocallis*, *Phloxes*, *Coreopsis*, *Gaillardias*, &c.

To Messrs. Paul & Son, Cheshunt, for a fine display of hardy cut flowers—*Heliopsis*, *Erigerons*, *Campanulas*, *Potentillas*, *Phloxes*, &c.

Bronze Flora Medal.

To Messrs J. Peed & Sons, Norwood, for a group of *Gloxinias*.

To Mr. Tidy, Rockhampton, Hants, for a group of Sweet Peas.

To Messrs. Dobbie & Co., Rothesay, for a large group of Sweet Peas.

Bronze Banksian Medal.

To W. C. Walker, Esq., Winchmore Hill (gr. Mr. Cragg), for a large group of well-flowered *Achimenes* in variety.

To Messrs. Webb & Brand, Saffron Walden, for a small group of very fine *Hollyhocks*.

To Messrs. T. Cripps & Son, Tunbridge Wells, for some very well-flowered plants of *Mutisia decurrens* and sprays of *Schubertia grandiflora*.

First Class Certificate.

To *Campanula Vidalii* (votes, unanimous), from J. T. Bennet-Poë, Esq., Holmwood, Cheshunt. A very distinct and beautiful half-hardy *Campanula* of shrubby appearance. The flowers, which are borne on spikes about three feet in length, are drooping and pure white.

To *Lilium aponicum Colchesteri* (votes, 13 for), from Messrs. R. Wallace & Co., Colchester. A grand Lily, introduced in 1804 from China, but very scarce in this country until recent

years. Flowers large, creamy white flushed with brown externally, and sweetly scented.

To *Davallia tenuifolia* *Burkei* (votes, unanimous), from Messrs. J. Veitch & Sons. A very graceful Fern, introduced from New Guinea. Fronds long, drooping, bright green, and deeply cut. A beautiful plant for basket culture.

To *Nymphæa marliacea chromatella* (votes, unanimous), from Messrs. J. Veitch & Sons. A very fine hardy Water Lily. Flowers large, sulphur yellow.

Award of Merit.

To *Gladiolus Dutreuil de Rhins* (votes, unanimous), from Sir Trevor Lawrence, Bart., Dorking. Flowers bright scarlet, flaked with white.

To the strain of *Pentstemon hybridus grandiflorus* (votes, unanimous), from Sir Trevor Lawrence, Bart. A very fine strain. Flowers very large, with widely expanded throat, and of rich and varied colours.

To *Cirsium eriophorum* (votes, 9 for, 5 against), from Lady Fortescue, Dropmore, Maidenhead. A plant of peculiar thistle-like growth. Flower heads thickly covered with a woolly grey substance; flowers reddish purple. Very distinct.

To Sweet Pea *Lady Grisel Hamilton* (votes, 6 for, 3 against), from Mr. Eckford. Flowers large; lilac.

To Sweet Pea *Mars* (votes, 6 for), from Mr. Eckford. Flowers scarlet, the wings shaded purple.

To Sweet Pea *Blanche Burpee* (votes, 7 for), from Mr. Eckford. A very large, pure white variety.

To *Nymphæa Laydekerii rosea* (votes, 9 for, 1 against), from Messrs. J. Veitch & Sons. A hardy Water Lily, with large, deep rose-coloured flowers.

To *Nymphæa odorata rosea* (votes, 9 for), from Messrs. J. Veitch & Sons. A very handsome, hardy Water Lily, with large sweetly scented rose-pink flowers.

Other Exhibits.

Sir Trevor Lawrence, Bart. (gr. Mr. Bain), sent a very pretty group of *Salpiglossis*.

From J. T. Bennet-Poë, Esq., Holmwood, Cheshunt, came some very well-flowered plants of *Streptosolen Jamesoni*, lifted

from the open ground ; also three plants of a very rare *Myrtus communis bætica*.

R. P. Brotherston, Esq., Tynninghame, Prestonkirk, sent a very fine bunch of *Carnation Germania*.

From B. G. Rowntree, Esq., Hermitage Place, Norton, Stockton-on-Tees, came a very free flowering double *Begonia* named *Marquis of Londonderry*.

F. W. Moore, Esq., Glasnevin, sent flowers of *Agapanthus* and of several varieties of *Crinum*, cut from plants growing in the open air.

G. A. Farini, Esq., Perry Vale, Forest Hill, sent a small group of *Begonias*.

Mr. G. Mount, Canterbury, sent a *Carnation* named *Nora*.

Messrs. J. Carter & Co., High Holborn, staged *Gloxinia Holborn Gem*.

From Messrs. J. Laing & Sons, Forest Hill, came *Begonias*, *Caladiums*, and *Streptocarpus*.

Mr. W. Baxter, Woking, sent a group of *Violas*.

Messrs. F. Sander & Co., St. Albans, sent *Begonia Duke of York*.

Messrs. W. Cutbush & Son, Highgate, sent a very fine *Cockscomb* named *Cutbush's Giant*.

FLORAL COMMITTEE, JULY 26, 1895.

MEETING AT CHISWICK.

W. MARSHALL, Esq., in the Chair, and eight members present.

The Committee examined the *Cannas*, *Violas*, and other plants in flower in the Gardens.

Award of Merit.

To *Canna J. G. Baker* (votes, unanimous), from Messrs. Paul & Sons, Cheshunt. Flowers orange-scarlet. A very fine variety.

Highly Commended (× × ×).

To *Viola Christiana* (votes, 6 for), from Dr. Stuart, Hillside, Chirnside, N.B. Flowers white, golden yellow eye ; of good habit.

To *Canna Capitaine de Suzzoni* (votes, unanimous), from Messrs. Vilmorin, Paris. Flowers large; rich canary yellow, spotted with brown.

To *Pentstemon Renommé* (votes, 4 for), from M. V. Lemoine, Nancy. A very fine variety bearing stout spikes of large reddish-crimson flowers; throat white, streaked with crimson.

Commended (× ×).

To *Canna Admiral Gervais* (votes, unanimous), from Messrs. Paul & Sons. A very free flowering variety of dwarf habit. Flowers bright scarlet margined with yellow.

To *Canna Charles Moore* (votes, unanimous), from Messrs. Paul & Sons. Flowers deep yellow, spotted and splashed with crimson; of dwarf habit.

To *Canna Comte Horace de Choiseul* (votes, unanimous), from Messrs. Vilmorin. A very fine variety, bearing large bright cherry-purple flowers; petals broad; of dwarf habit.

FLORAL COMMITTEE, AUGUST 13, 1895.

W. MARSHALL, Esq., in the Chair, and nineteen members present.

Awards Recommended:—

Silver Gilt Flora Medal.

To Mr. H. B. May, Edmonton, for a magnificent collection of rare and beautiful Ferns.

Silver Gilt Banksian Medal.

To Messrs. Kelway & Son, Langport, for a very large collection of *Gladiolus* and *Gaillardias*, together with specimens of *Rubus phœnicolasius* laden with its large handsome fruits.

Silver Flora Medal.

To Sir Trevor Lawrence, Bart., Burford Lodge, Dorking (gr. Mr. Bain), for cut flowers, amongst which were *Gladiolus*, *Montbretias*, and a large bowlful of very handsome *Anthuriums*.

Silver Banksian Medal.

To Mr. T. S. Ware, Tottenham, for cut flowers—*Phloxes*,

Achilleas, Liliums, Dahlias (Single and Pompon), Veronicas, and Rudbeckias.

To Messrs. J. Laing & Sons, Forest Hill, for a group of highly coloured Codiaëums (Crotons), also Streptocarpus, Bertolonias, Dracænas, and Ferns.

To Messrs. Wallace & Co., Colchester, for cut flowers—Gladiolus, Tigridias, Montbretias, Liliums, and the new *Hemerocallis aurantiaca major*.

To Mr. Walker, Thame, for a large collection of Show, Cactus, and Fancy Dahlias.

Bronze Banksian Medal.

To W. Robinson, Esq., Gravetye, East Grinstead, for a small collection of beautiful hardy Water Lilies arranged with their own foliage.

To Mr. McArthur, 4 Maida Vale, W., for a group of Bamboos and Lilies.

To Messrs. Barr & Son, Covent Garden, for hardy flowers—Phloxes, Heliopsis, Pentstemons, Liliums, and Kniphofias.

To Mr. Mortimer, Farnham, Surrey, for Cactus Dahlias.

First Class Certificate.

To *Anthurium Mariæ* (votes, unanimous), from Sir Trevor Lawrence, Bart., Dorking. A very handsome form, bearing a large white spathe tinged with rose; the spadix bright rose.

To *Brunsvigia Josephinæ* (votes, unanimous), from Earl Brownlow, Ashbridge, Great Berkhamstead (gr. Mr. Lowe). A very distinct Cape bulbous plant, bearing stout flower scapes about three feet high, each carrying about twenty crimson flowers.

Award of Merit.

To *Gladiolus Mrs. Beecher* (votes, 11 for), from Sir Trevor Lawrence. Flowers large; bright scarlet, shaded and spotted with white in the throat.

To *Montbretia Soleil Couchant* (votes, 13 for), from Sir Trevor Lawrence. Bright orange; flowers of medium size.

To *Dendrocalamus membranaceus* (votes, 15 for), from A. B. Freeman-Mitford, Esq., Batsford Park, Moreton-in-Marsh. A very graceful Chinese Bamboo. The linear lanceolate pale green leaves are about eight inches long and one inch broad.

To Cactus Dahlia Mrs. A. Beck (votes, 12 for), from Mr. T. S. Ware, Tottenham. Flowers bright orange scarlet, with long, narrow, sharply pointed florets.

To Cactus Dahlia Arthur Cheal (votes, 7 for, 6 against), from Messrs. J. Cheal & Sons, Crawley. Flowers deep crimson.

To Gladiolus Don Jose (votes, 10 for), from Messrs. Kelway & Son, Langport. Flowers of medium size; rich purplish rose.

To Gladiolus Earl Cadogan (votes, 5 for), from Messrs. Kelway & Son. Flowers large; scarlet flaked with rose.

To Gladiolus Duke of Devonshire (votes, 7 for), from Messrs. Kelway & Son. Flowers dull crimson; throat white.

To *Tigridia grandiflora immaculata* (votes, unanimous), from Messrs. Wallace & Co., Colchester. Very large pure white flowers.

To *Tigridia grandiflora aurea* (votes, unanimous), from Messrs. Wallace & Co. Large orange-yellow flowers, the bases of the petals blotched with crimson.

To *Sorbus aucuparia fructu-luteo* (votes, 12 for), from Messrs. G. Bunyard & Co., Maidstone. A very effective ornamental tree. Berries large, of a rich orange-yellow, borne in immense clusters.

To *Chrysanthemum coronarium* Princess May (votes, unanimous), from Mr. H. Brownhill, Sale, Cheshire. Large white flowers, with a pale yellow zone round a deep yellow disc in the centre.

To *Chrysanthemum coronarium* Sunshine (votes, unanimous), from Mr. Brownhill. A beautiful variety, with large rich yellow flowers.

To *Chrysanthemum coronarium elegans* (votes, unanimous), from Mr. Brownhill. Large white flowers, with a golden yellow disc.

To *Chrysanthemum coronarium* Chieftain (votes, unanimous), from Mr. Brownhill. Rich yellow flowers, with a purple disc.

Other Exhibits.

From F. W. Moore, Esq., Glasnevin, came a very fine spike of *Eucomis punctata striata*.

C. Tudway, Esq., The Cedars, Wells, Somerset, sent plants and flowers of a clove Carnation named Mrs. Tudway.

Sir Trevor Lawrence, Bart., Dorking, exhibited flowers of

Aster Thompsoni. The Committee requested that a plant might be tried at Chiswick.

Admiral R. P. Cater, King's Langley, sent a Begonia named Caterianum.

F. Reckitt, Esq., Caen Wood Towers, Highgate (gr. Mr. Burt), exhibited Lilium auratum Burtii.

From Mrs. Robb, Liphook, Hants, came fruiting examples of Prunus divaricata and Cratægus speciosa.

Mrs. Crawford, Gatton, Reigate (gr. Mr. Slowgrove), sent a small group of Lobelia cardinalis Crawfordensis.

Messrs. T. Cripps & Son, Tunbridge Wells, submitted Daphne Laureola atropurpurea, Cupressus Lawsoniana erecta Crippsi, and Asparagus Sprengeri. The Committee asked to see the last named again.

Mr. P. McArthur, 4 Maida Vale, W., sent a small plant of Eucharis Gortoni. The Committee asked to see this again.

Mr. J. Douglas, Edenside, Great Bookham, sent flowers of Carnation Britannia.

From Mr. Witty, Nunhead Cemetery, S.E., came a variegated Fuchsia named Pride of South London.

Mr. Burpee, Philadelphia, again exhibited his diminutive Sweet Pea Cupid.

Mr. M. Cuthbertson, Rothesay, exhibited two very fine Violas named Mrs. R. Kennedy Mitchell and William Haig.

Messrs. J. Cheal & Sons, Crawley, sent a small collection of Cactus Dahlias.

FLORAL COMMITTEE, AUGUST 27, 1895.

W. MARSHALL, Esq., in the Chair, and nineteen members present.

Awards Recommended:—

Silver Gilt Flora Medal.

To Messrs. Kelway & Son, Langport, for a large display of Gladioli; Ben Harrison, Princess Royal, and Helotes were specially noticeable.

Silver Flora Medal.

To J. Morgan, Esq., Dover House, Roehampton (gr. Mr.

McLeod), for a collection of well-coloured Codiaëums (Crotons); the varieties Prince of Wales, Picturatum, Lord Chelmsford, Sunshine, and Aigburthense were particularly good.

To Messrs. J. Veitch & Sons, Chelsea, for a very fine collection of Annual Asters in pots; the Quilled, Pompon, Japanese, and Chrysanthemum flowered sections being very well represented.

To Messrs. Barr & Son, Covent Garden, for a group of hardy flowers—Asters, Liliiums, Phloxes, Spiræas, and Gaillardias.

To Messrs. H. Cannell & Sons, Swanley, for Cannas, Cockscombs, Begonias, and Cactus Dahlias.

To Messrs. Paul & Son, Cheshunt, for a very fine group of hardy flowers—Asters, Phloxes, and Montbretias; also a very interesting collection of Rose fruits, showing the widely different shape of the hips in the different species and varieties.

Silver Banksian Medal.

To Messrs. Dobbie & Co., Rothesay, for a large group of annual Asters, in very good condition.

To Mr. Prichard, Christchurch, for a group of hardy flowers—Liliiums, Gladiolus, Coreopsis, Montbretias, and Anemones.

Bronze Flora Medal.

To Mr. T. S. Ware, Tottenham, for Lilies and Dahlias.

Bronze Banksian Medal.

To Mr. J. Ouvrard, Child's Hill, Kilburn, for a group of Phrynium variegatum.

Award of Merit.

To Scabiosa caucasica alba (votes, 13 for), from Mr. Prichard. Flowers large and white, or pale cream colour, but hardly as beautiful as the type.

To Kniphofia (Tritoma) Pfitzeri (votes, 10 for, 4 against), from Mr. Prichard. Flowers borne on very stout spikes; colour, rich orange scarlet.

To Gladiolus Kate Rose (votes, 12 for, 2 against), from Messrs. Kelway & Son. Large white flowers, suffused with purplish pink in the throat.

To Gladiolus Dolops (votes, 14 for), from Messrs. Kelway & Son. Scarlet flowers, flaked with crimson in the throat.

To *Gladiolus Brantford* (votes, 8 for, 4 against), from Messrs. Kelway & Son. Flowers deep crimson.

To *Robinia Neo-Mexican* (votes, 9 for, 3 against), from Messrs. Paul & Son, Cheshunt. Rosy pink flowers, borne on short racemes.

To *Alocasia Lowii grandis* (votes, unanimous), from Messrs. H. Low & Co., Clapton. A very beautiful variety, having large olive-green shield-shaped leaves, with prominent glaucous veins.

To *Dahlia Fabio* (Pompon) (votes, 13 for), from Mr. C. Turner, Slough. Flowers orange scarlet, the bases of the petals tinged with yellow.

To *Dahlia Nerissia* (Pompon) (votes, unanimous), from Mr. C. Turner. Bright rose colour.

To *Dahlia Purity* (Pompon) (votes, 10 for), from Mr. C. Turner. Flowers white, tinged with creamy white towards centre.

To *Dahlia Douglas* (Pompon) (votes, 7 for, 1 against), from Mr. C. Turner. Flowers deep crimson.

To *Dahlia Beatrice* (Cactus) (votes, 9 for, 1 against), from Mr. C. Turner. Flowers purplish rose, very distinct, and handsome.

To *Dahlia Leonora* (Cactus) (votes, unanimous), from Mr. C. Turner. Large, rich, rosy pink flowers.

To *Dahlia Dante* (Show) (votes, 5 for, 3 against), from Mr. C. Turner. Large deep maroon crimson flowers.

To *Dahlia Mabel Stanton* (Show) (votes, 10 for, 1 against), from Mr. C. Turner. Flowers large and of good form; colour, rich canary yellow.

To *Crab John Downie* (votes, 14 for), from Messrs. G. Bunyard & Co., Maidstone. A very free flowering hardy tree. The fruits, which are borne in great profusion, are ovate, and being of a bright red and yellow colour are most ornamental.

Other Exhibits.

C. F. Thompson, Esq., Llandaff, sent three varieties of *Gladiolus*.

From A. P. Croft, Esq., 41 Old Bond Street, W., came a plant of *Eucomis punctata*.

P. Fry, Esq., Addington, West Malling, exhibited a small group of Fuchsias.

Messrs. Dobbie & Co., Rothesay, sent examples of Giant White Comet Aster. The Committee requested that it might be tried at Chiswick.

Messrs. Osman & Co., Commercial Street, E.C., staged some very fine plumes of Pampas Grass.

Prize.

Class 1.—Twelve Gladioli, British raised, Gandavensis vars., sent out since the year 1887, distinct. Amateurs' Prize (Kelway Gladiolus Medal) to C. F. Thompson, Esq., Llandaff, Cardiff (gr. Mr. Mann).

FLORAL COMMITTEE, SEPTEMBER 10, 1895.

MEETING AT CHISWICK.

W. MARSHALL, Esq., in the Chair, and eighteen members present.

Award Recommended:—

Silver Flora Medal.

To Messrs. W. Paul & Son, Waltham Cross, for a collection of Autumn flowering Roses in great variety.

To Messrs. Barr & Son, Covent Garden, for a group of hardy flowers, amongst which were excellent examples of Liliums, Phloxes, Helianthus, and Pyrethrums.

To Mr. Mortimer, Farnham, for a fine group of Dahlias in great variety.

To Messrs. J. Cheal & Sons, Crawley, for a fine display of Show, Fancy, and Cactus Dahlias.

Silver Gilt Banksian Medal.

To Mr. T. S. Ware, Tottenham, for a group of Dahlias.

Silver Banksian Medal.

To Miss Hudson, Gunnersbury House, Acton, for a very pretty arrangement of flowers suitable for table decoration.

To Mr. Salmon, West Norwood, for a collection of Dahlias, Zinnias, Roses, Asters, and Violas.

To Mr. A. Waterer, Woking, for a group of *Picea pungens argentea*; a beautiful Conifer.

Award of Merit.

To *Helianthus* (Sunflower) Stoke Park Favourite (votes, unanimous), from Mr. J. Hughes, Stoke Park, Guildford. Flowers semi-double; petals broad; deep golden yellow.

To *Dahlia* Willie Batchelor (decorative), (votes, 10 for), from Mr. W. Batchelor, Uxbridge. Pale-yellow flowers tipped with scarlet.

To *Dahlia* Mrs. Gore Langton (votes, 13 for), from Mr. W. Batchelor. Flowers crimson scarlet, with a maroon crimson zone.

To *Dahlia* Madeline (Pompon) (votes, 9 for), from Mr. C. Turner, Slough. Clear yellow flowers tipped with rosy purple.

To *Dahlia* Claribel (Pompon) (votes, 9 for), from Mr. Turner. Flowers white flushed with purple.

To *Dahlia* Ganymede (Pompon) (votes, 9 for), from Mr. C. Turner. Flowers orange buff flushed with pink.

To *Dahlia* Zoe (Pompon) (votes, 5 for, 4 against), from Mr. C. Turner. Flowers rich yellow tipped with white.

To *Dahlia* Mrs. Wilson Noble (Cactus) (votes, unanimous), from Messrs. J. Cheal & Sons. Flowers salmon red. The florets long and twisted. A very handsome variety.

To *Dahlia* Rosebud (Pompon) (votes, unanimous), from Messrs. J. Cheal & Sons. Flowers clear rosy pink.

To *Phlox* Leonardo da Vinci (votes, 6 for), from Messrs. Barr & Son. Large white flowers with a centre rose.

To *Dahlia* Miss A. Jones (Cactus) (votes, unanimous), from Mr. West, Brentwood. Flowers bright scarlet.

To *Dahlia* Miss Nightingale (Cactus) (votes, unanimous), from Mr. West. Flowers orange scarlet flushed with purple.

Other Exhibits.

F. W. Moore, Esq., Botanic Gardens, Glasnevin, sent several hybrid *Kniphofias*.

From the Earl of Ducie, Tortworth Court, Gloucester, came examples of *Quercus Kelloggii* and *Q. lobata*.

Mr. Harris, Orpington, sent three varieties of *Dahlias*.

FLORAL COMMITTEE, SEPTEMBER 19, 1895.

MEETING AT CHISWICK.

W. MARSHALL, Esq., in the Chair, and seven members present.

Awards Recommended:—

Highly Commended (× × ×)

To Aster (annual) Lady in White, from Mr. Benary, Erfurt.

To Tagetes Légion d'Honneur, from Mr. Herbst, Richmond.

The Committee also inspected the Dahlias, and made several recommendations respecting them, which will be found in the Report on Dahlias on page cxix.

FLORAL COMMITTEE, OCTOBER 15, 1895.

W. MARSHALL, Esq., in the Chair, and twenty-seven members present.

Awards Recommended:—

Gold Medal.

To Earl Percy, Syon House, Brentford (gr. Mr. Wythes), for a magnificent group of Nepenthes, Crotons, Dracænas, Aralias, Palms, Ferns, and Begonias.

Silver Gilt Flora Medal.

To Mr. H. B. May, Upper Edmonton, for a large group of highly coloured Codiaëums (Crotons), the varieties Queen Victoria, Thomsoni, Newmani, Warreni, and roseo-picturatum, being specially noticeable.

Silver Flora Medal.

To Mr. T. S. Ware, Tottenham, for a large display of single Dahlias, Nerines, and Liliëums.

Silver Gilt Banksian Medal.

To Mr. H. J. Jones, Lewisham, for a group of pot Chrysanthemums arranged with Palms, Ferns, and Bamboos.

Silver Banksian Medal.

To Mrs. Wingfield, Amptill House, Amptill (gr. Mr. Empson), for a group of table plants.

First Class Certificate.

To *Abies Douglasi glauca pendula* (votes, 7 for, 3 against), from Messrs. Paul & Son, Cheshunt. A very graceful weeping variety, with foliage of a delicate glaucous hue.

To *Physalis Franchetii* (votes, unanimous), from Messrs. J. Veitch & Sons, Chelsea. For description and plate see Vol. XVII., p. cevi.

Award of Merit.

To *Violet Princess of Wales* (votes, unanimous), from Her Majesty the Queen, Windsor (gr. Mr. Owen Thomas), and from Messrs. H. Cannell & Sons, Swanley. Flowers borne on stalks nine inches long; colour deep blue with a white eye. Very sweetly scented.

To *Chrysanthemum C. B. Haywood* (Japanese) (votes, unanimous), from T. B. Haywood, Esq., Reigate (gr. Mr. Salter). Flowers large; colour creamy white.

To *Chrysanthemum Lago Maggiore* (Japanese) (votes, unanimous), from H. Briscoe-Ironside, Esq., Burgess Hill. Flowers deep golden-yellow.

To *Chrysanthemum Boule d'or 1895* (Japanese) (votes, unanimous), from Mr. H. J. Jones, Lewisham, and Mr. W. Wells, Redhill. Flowers large, golden-yellow, guard petals flushed with bronze.

To *Chrysanthemum Phœbus* (votes, unanimous), from Mr. H. J. Jones, Lewisham, and Mr. H. Shoemith, Woking. Flowers large, deep canary-yellow.

To *Carnation J. Gardiner Muir* (votes, 12 for, 4 against), from Messrs. J. Veitch & Sons. Flowers white, pink centre, sweetly scented.

To *Begonia Mrs. Heal* (votes, unanimous), from Messrs. J. Veitch & Sons. Flowers large, borne in clusters on stout erect spikes; colour, bright rose. A very pretty and useful winter-flowering plant.

To *Chrysanthemum Lady Esther Smith* (Japanese) (votes, unanimous), from Mr. R. Owen, Maidenhead. Flowers large, petals broad, white.

To *Chrysanthemum Yellow Gem* (Pompon) (votes, unanimous), from Mr. R. Owen. Flowers golden-yellow, and beautifully fimbriated.

To Chrysanthemum Pride of Madford (Japanese) (votes, unanimous), from Messrs. H. Cannell & Sons. Flowers large, crimson with silvery reverse.

Cultural Commendation.

To Messrs. F. Sander & Co., St. Albans, for a very well-grown plant of *Sarracenia Drummondii* major.

Other Exhibits.

From Her Majesty the Queen, Windsor (gr. Mr. Thomas), came a group of cut Chrysanthemums.

F. W. Moore, Esq., Glasnevin, sent examples of *Nerine atrorubens*.

From H. Briscoe-Ironside, Esq., Burgess Hill, came several exceedingly pretty decorative Chrysanthemums.

H. G. E. Green, Esq., King's Ford, Colchester (gr. Mr. Kettle), sent a well-flowered plant of *Hippeastrum striatum maculatum*.

G. F. Wilson, Esq., Weybridge, exhibited *Tricyrtis hirta*. A somewhat rare Japanese liliaceous plant with clusters of pearly white flowers, spotted with purple and suffused with pink. Stems, margins of leaves and peduncles hairy. (Bot. Mag. t. 5355.)

A. Laurie, Esq., Rockdale, Sevenoaks (gr. Mr. Francis), sent examples of a golden-leaved *Pelargonium* named *Francisii*, very similar to Crystal Palace Gem.

E. Mawley, Esq., Rosebank, Berkhamstead, sent flowers of single *Dahlia Beauty's Eye*.

Messrs. B. S. Williams & Son, Upper Holloway, sent several very fine *Nerines*.

Mr. J. Seward, Hanwell, sent flowers of a Japanese Chrysanthemum named *John Seward*. The Committee asked to see this again.

From Mr. E. F. Burfoot, Shoreham, Sussex, came examples of a very free-flowering single Chrysanthemum named *E. F. Burfoot*.

Mr. L. J. Endtz, Boskoop, Holland, sent a plant of *Cupressus Lawsoniana glauca Triomphe de Boskoop*.

From Messrs. Paul & Son, Cheshunt, came a very interesting group of hardy flowers.

FLORAL COMMITTEE, OCTOBER 29, 1895.

W. MARSHALL, Esq., in the Chair, and sixteen members present.

Awards Recommended:—*Silver Flora Medal.*

To Messrs. J. Veitch & Sons, Chelsea, for a group of Chrysanthemums in pots.

Silver Banksian Medal.

To S. T. Fisher, Esq., the Grove, Streatham (gr. Mr. Bond), for a group of highly coloured Codiaëums (Crotons) in great variety, Sunshine, Flambeau, Warreni, and augustifolium being very conspicuous.

First Class Certificate.

To *Lycoris aurea* (votes, 8 for), from Messrs. Wallace & Co., Colchester. A very rare bulbous plant introduced from China in 1777. Pale orange-coloured flowers carried in umbels on stout spikes 15 inches high.

Award of Merit.

To *Chrysanthemum* Mrs. Briscoe-Ironside (Japanese) (votes, unanimous), from H. Briscoe-Ironside, Esq., Burgess Hill. Flowers large and of good form, colour delicate blush. Very handsome.

To *Chrysanthemum* Miss Florence Lunn (Reflexed) (votes, unanimous), from H. Briscoe-Ironside, Esq. Flowers purplish amaranth.

To *Chrysanthemum* Mrs. Charles Blick (Japanese) (votes, unanimous), from Martin R. Smith, Esq., The Warren, Hayes, Beckenham (gr. Mr. Blick). Plant of dwarf habit. Flowers white, with creamy white centre.

To *Chrysanthemum* Beauty of Teignmouth (Japanese) (votes, unanimous), from Mr. J. Agate, Havant. Flowers large, crimson with silvery reverse.

To *Begonia* Success (votes, unanimous), from Messrs. J. Veitch & Sons. A very free flowering variety, bearing rich rosy-carmine semi-double flowers.

To *Chrysanthemum Dorothy Gibson* (Reflexed) (votes, unanimous), from Mr. R. Owen, Maidenhead. Flowers of medium size, colour bright yellow.

To *Chrysanthemum Rose Owen* (Incurved) (votes, unanimous), from Mr. R. Owen. Flowers of a delicate rose colour, florets tipped with white.

To *Chrysanthemum Mons Chenon de Leche* (Japanese) (votes, unanimous), from Mr. W. Wells, Redhill. Flowers large, colour rosy buff, petals margined with yellow.

To *Chrysanthemum Miss Annie Holden* (Decorative Single), (votes, unanimous), from Mr. H. J. Jones, Lewisham, and Messrs. H. Cannell & Sons, Swanley. A sport from Mary Anderson. Flowers single, colour sulphur yellow, disc deep yellow.

To *Chrysanthemum C. H. Curtis* (Incurved) (votes, unanimous), from Mr. H. J. Jones. Flowers large and of a rich clear yellow. Very fine.

To *Chrysanthemum Mrs. E. G. Whittle* (Japanese) (votes, 10 for, 1 against), from Mr. H. J. Jones. Flowers large, colour creamy white.

To *Chrysanthemum Queen of Buffs* (votes, unanimous), from Mr. H. J. Jones. Flowers buff, edged with purple.

To *Chrysanthemum Yellow Source d'Or* (votes, unanimous), from Messrs. H. Cannell & Sons. Flowers rich canary yellow.

To *Chrysanthemum Edith Tabor* (Japanese) (votes, unanimous), from Mr. R. C. Notcutt, Ipswich. Flowers large, petals long and of a rich yellow.

Other Exhibits.

C. E. Shea, Esq., The Elms, Foots Cray, Kent, sent flowers of *Chrysanthemums Maggie Shea* and *Miss Ellen Teichmann*. The Committee asked to see the last-named again.

From Messrs. H. Cannell & Sons, Swanley, came specimens of a *Chrysanthemum* named *Kentish White*. The Committee asked to see this again.

The Rev. J. P. Way, Warwick (gr. Mr. Tancock), sent a Seedling *Chrysanthemum* named *Gertrude Way*.

H. Briscoe-Ironside, Esq., Burgess Hill, sent sprays of a very promising *Chrysanthemum* named *Bambino*. The Committee asked to see a plant.

The Dowager Lady Freake, Fulwell Park, Twickenham

(gr. Mr. Rickwood), sent flowers of *Chrysanthemum Fulwell Park*.

Mr. T. R. Cuckney, Edenhall, Langwathby, R.S.O., sent flowers of a *Chrysanthemum* named *Cambria*. A sport from Marie Hoste.

From Mr. R. H. Allen, French Halles, Guernsey, came a very fine example of *Nerine Alleni*.

Mr. W. E. Tidy, Havant, sent six varieties of *Chrysanthemums*.

From Messrs. B. S. Williams & Son, Upper Holloway, came a plant of *Bouvardia Silver Queen* and flowers of *Chrysanthemum Reine d'Angleterre*.

FLORAL COMMITTEE, NOVEMBER 12, 1895.

W. MARSHALL, Esq., in the Chair, and twenty members present.

Awards Recommended:—

Silver Gilt Banksian Medal.

To Messrs. H. Cannell & Sons, Swanley, for a large group of *Chrysanthemums* and *Pelargoniums*.

Silver Banksian Medal.

To Earl Percy, Syon House, Brentford (gr. Mr. Wythes), for a collection of eighty varieties of *Chrysanthemums*.

To Mr. T. S. Ware, Tottenham, for a group of *Chrysanthemums* tastefully arranged with *Ferns* and small *Palms*.

To Mr. Gulzow, Bexley Heath, for a small group of *Cattleyas*, *Crotons*, *Dracænas*, *Palms*, and *Ferns*.

To Mr. Godfrey, Exmouth, for a group of *Chrysanthemums* in excellent condition.

Bronze Banksian Medal.

To A. J. Howard, Esq., Worton Hall, Isleworth (gr. Mr. Pentney), for a small group of *Capsicums*, *Aralias*, *Asparagus Ferns*, and *Chrysanthemums*.

To Mrs. Crawford, Gatton, Reigate (gr. Mr. Slogrove), for two boxes of *Chrysanthemums*.

To Mrs. Jones, Greenford Place, Sudbury, Harrow, for a group of single-flowered *Chrysanthemums* in very fine condition.

First Class Certificate.

To *Dracæna latifolia* (votes, unanimous), from H. O. O'Hagan, Esq., River Home, Hampton Court. A distinct and handsome species with large, broad, drooping leaves; colour deep green, with a narrow margin of pale yellow.

Award of Merit.

To *Pentstemon Cobæa* (votes, 12 for, 1 against), from Sir Trevor Lawrence, Bart., Burford Lodge, Dorking (gr. Mr. Bain). Flowers borne in clusters on spikes about two feet high, tubular, white, flushed with purple. Leaves sessile, shining green, and toothed.

To *Chrysanthemum Arona* (Japanese) (votes, 15 for), from H. Briscoe-Ironside, Esq., Burgess Hill. Flowers large, orange yellow.

To *Polystichum constrictum* (votes, 5 for), from W. Marshall, Esq., Bexley. A hardy Fern, with long, narrow fronds of a deep green colour.

To *Chrysanthemum Clinton Chaffout* (Decorative) (votes, 16 for), from Mr. W. J. Godfrey, Exmouth. Flowers of medium size, colour deep canary yellow.

To single *Chrysanthemum Annie Heard* (votes, 12 for), from Mr. Godfrey. Flowers white, borne in great profusion.

To *Rhododendron Numa* (votes, unanimous), from Messrs. J. Veitch & Sons, Chelsea. Plant of dwarf habit (Indo-Javanicum group), with small, leathery, deep green leaves. Flowers tubular, colour orange red, throat flushed with a deeper shade.

To *Chrysanthemum Vicar of Bray* (Japanese) (votes, unanimous), from Mr. R. Owen, Maidenhead. Flowers bronzy buff, shaded with orange towards the centre.

To *Chrysanthemum Mr. R. C. Kingston* (incurved) (votes, 12 for), from Mr. Owen. Flowers well formed; rosy pink tipped with white.

To *Chrysanthemum Robin Adair* (Anemone) (votes, 11 for, 1 against), from Mr. Owen. Petals soft pink; cushion large and very much raised; colour rosy purple and yellow.

To *Chrysanthemum Oceana* (Incurved) (votes, 12 for, 1 against), from Messrs. H. Cannell & Sons, Swanley. A handsome variety with large broad petals; colour deep golden yellow.

Other Exhibits.

Her Majesty the Queen, Windsor (gr. Mr. Thomas), sent examples of *Chrysanthemum Princess Ena*, and two varieties of Sweet Scented Violets.

From H. Tate, Esq., Allerton Beeches, Liverpool, came cut flowers of *Chrysanthemum Aristine Anderson*.

F. W. Moore, Esq., Glasnevin, sent flowers of *Billbergia amœna*, var. *Leopoldi*.

Frank Lloyd, Esq., Coombe House, Croydon (gr. Mr. Mills), exhibited flowers of a hardy *Chrysanthemum* named Mrs. Frank Lloyd.

From Dr. George Walker, jr., Wimbledon, came a pretty yellow-flowered Pompon *Chrysanthemum* named Dolly.

Messrs. A. G. Ely & Co., Chippenham, sent beautiful sprays of *Boussingaultia baselloides*.

From Mr. E. C. Goble, Ryde, came an exceptionally free-flowering single *Chrysanthemum* named Ewan Cameron.

Messrs. B. S. Williams & Son, Upper Holloway, staged specimens of *Chrysanthemum Philadelphia*.

Messrs. H. Cannell & Sons, Swanley, sent Incurved Japanese *Chrysanthemums* named Mrs. Hepper and Wood's Pet. The Committee asked to see both of these again.

FLORAL COMMITTEE, NOVEMBER 26, 1895.

W. MARSHALL, Esq., in the Chair, and twenty-one members present.

Awards Recommended:—

Silver Banksian Medal.

To Messrs. J. Veitch & Sons, Chelsea, for a group of hybrid Javanico-Jasminiflorum *Rhododendrons*. The plants small, well flowered, and of many shades of colour.

To Messrs. W. Paul & Son, Waltham Cross, for a group of a new hybrid Tea-Rose *Enchantress*.

To Mr. Owen, Maidenhead, for a group of *Chrysanthemums* in great variety.

Award of Merit.

To *Begonia Frœbeli incomparabilis* (votes, unanimous), from J. T. Bennet-Poë, Esq., Holmwood, Cheshunt. Leaves large,



FIG. 78.—*BEGONIA FRÆBELI INCOMPARABILIS* (SHOWING HABIT).
(From the *Gardeners' Magazine*.)

obliquely heart-shaped, and of a bright green colour. Flowers bright scarlet, borne on stalks nearly two feet in length. (Fig. 78.)

To *Chrysanthemum* W. Slogrove (Incurved Japanese) (votes, unanimous), from Mrs. Crawford, Gatton, Reigate. Flowers large; colour deep canary-yellow. Very handsome.

To *Chrysanthemum* Golden Dart (Decorative) (votes, unanimous), from Mr. E. H. Jenkins, Hampton Hill. Flowers of medium size, petals broad and sharply pointed; colour golden yellow.

To *Chrysanthemum* Bonnie Dundee (Incurved) (votes, unanimous), from Mr. Owen. Flowers of medium size; yellow flushed with bronze.

To *Chrysanthemum* Country of Gold (Decorative) (votes, unanimous), from Mr. Owen. Flowers small, petals narrow and twisted, and of a pale sulphur-yellow colour.

To *Chrysanthemum* Mrs. Ellen Newbald (Decorative) (votes, unanimous), from Mr. Owen. Flowers of medium size; colour clear yellow.

To Tea Rose Enchantress (votes, 10 for, 6 against), from Messrs. W. Paul & Son. A new free-flowering variety; flowers creamy white. (Fig. 79.)

To *Chrysanthemum* Surprise (Japanese Anemone) (votes, 7 for, 6 against), from Mr. H. J. Jones, Lewisham. Ray florets broad and slightly incurved; colour lilac flushed with white. The disc is very much raised and of a soft rosy purple colour.

To *Chrysanthemum* Olive Oclee (Japanese) (votes, 16 for), from Mr. H. J. Jones. A very fine variety; with large yellow flowers, flushed with bronze.

Other Exhibits.

F. W. Moore, Esq., Glasnevin, sent specimens of *Sphæralcea umbellata* (*Malva umbellata*).

From H. Briscoe-Ironside, Esq., Burgess Hill, came an exceedingly beautiful group of *Chrysanthemums*, mostly seedlings of his own raising.

The Hon. G. M. Fortescue, Dropmore, Bucks (gr. Mr. Herrin), sent specimens of Decorative *Chrysanthemum* Gold Thread.

W. H. Evans, Esq., Forde Abbey, Chard (gr. Mr. J. Crook), sent a spray of *Primula Floribunda*.

H. Grinling, Esq., Harrow Weald House, Stanmore, sent specimens of *Canarina campanulata*.

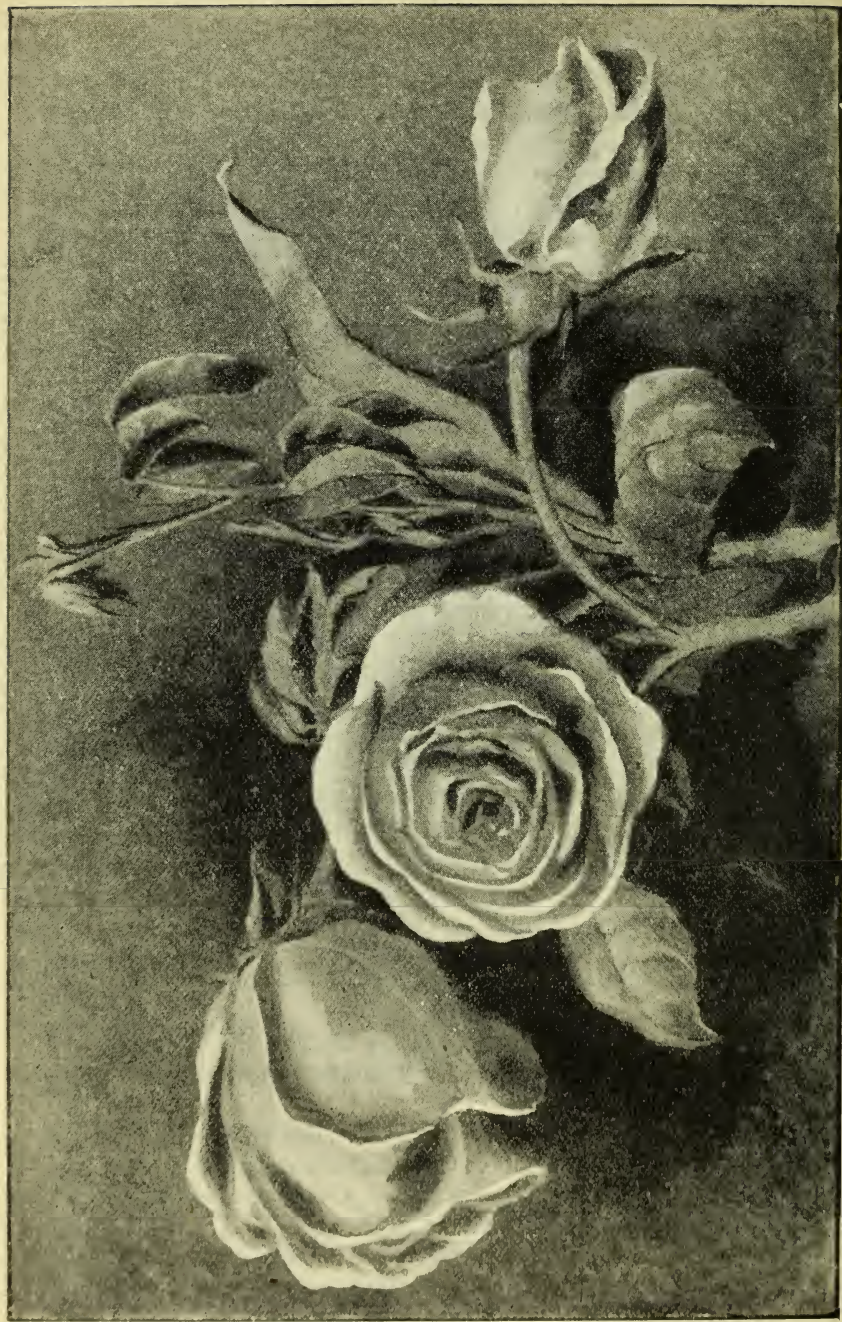


FIG. 79.—Messesrs. W. PAUL & SON'S WHITE TEA ROSE ENCHANTRESS. (From the *Gardeners' Magazine*.)

Mr. A. Kirk, Norwood Gardens, Alloa, N.B., sent a Chrysanthemum named Mrs. Kirk.

From Mr. W. Jenkins, Weybridge, came two new Chrysanthemums.

Martin Silsbury, Esq., Shanklin, I.W., sent some very promising seedling Chrysanthemums.

Mr. W. Wells, Redhill, sent two Chrysanthemums named Sir Trevor Lawrence and Harold Wells. The Committee asked to see these again.

FLORAL COMMITTEE, DECEMBER 10, 1895.

W. MARSHALL, Esq., in the Chair, and twenty-four members present.

Awards Recommended:—

Silver Banksian Medal.

To Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. Bain), for a beautiful group of Anthuriums, and a very fine pan of *Primula floribunda*.

To H. F. Tiarks, Esq., Foxbury, Chislehurst (gr. Mr. Lyne), for a group of Late Decorative Chrysanthemum Jeanette Sheeham.

To Mr. R. Owen, Maidenhead, for a large collection of Chrysanthemums, amongst which were some very fine unnamed seedlings.

Award of Merit.

To Chrysanthemum Strésa (Decorative Japanese) (votes, 15 for), from H. Briscoe-Ironside, Esq., Burgess Hill. A late-flowering variety, bearing medium-sized rich yellow flowers. A beautiful variety for decorative purposes.

Other Exhibits.

J. F. Bennet-Poë, Esq., Holmwood, Cheshunt, again sent *Begonia Frœbelii incomparabilis*.

The Hon. G. M. Fortescue, Dropmore (gr. Mr. Herrin), exhibited three plants in pots of *Oxalis Ortgiesii*.

From Messrs. H. Cannell & Sons, Swanley, came flowers of a seedling Chrysanthemum named Ashanti. The Committee asked to see this again.

ORCHID COMMITTEE.

JULY 9, 1895.

HARRY J. VEITCH, Esq., in the Chair, and twelve members present.

Awards Recommended:—

Silver Banksian Medal.

To Geo. Marshall, Esq., Claremont House, Great Grimsby (gr. Mr. Jas. Johnson), for a group of *Cattleya Warscewiczii*, *Epidendrum vitellinum majus*, *Odontoglossums*, &c.

To Messrs. F. Sander & Co., St. Albans, for an interesting group of Orchids.

Bronze Banksian Medal.

To Messrs. Hugh Low & Co., Clapton, for a group of *Cattleyas* and other Orchids.

Award of Merit.

To *Miltonia vexillaria* "Constance Wigan" (votes, unanimous), from Sir Frederick Wigan, Clare Lawn, East Sheen (gr. Mr. W. H. Young). A fine large flower, having the sepals and petals tinged with pink, and the large labellum pure white.

To *Vanda tricolor* var. (votes, 7 for, 1 against), from R. I. Measures, Esq., Cambridge Lodge, Camberwell (gr. Mr. H. J. Chapman).

To *Lælio-Cattleya* × *D. S. Brown* (*C. Trianae* × *L.-C.* × *Schilleriana*) (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. The flower resembled *L.-C.* × *Arnoldiana*, but was smaller and slightly darker in colour; sepals and petals rosy lilac, lip purplish crimson.

To *Brassia verrucosa* (votes, unanimous), from De B. Crawshay, Esq., Rosefield, Sevenoaks (gr. Mr. S. Cooke). A fine specimen of the favourite old species was shown.

Botanical Certificate.

To *Dendrobium speciosissimum* (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. This was the first appear-

ance of this pretty Bornean nigro-hirsute *Dendrobium*. Flowers white, the base of the lip pale rose, with an orange line in the middle.

To *Dendrobium bracteosum* (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. Flowers dull rose. A white form was also exhibited.

To *Lycaste Dyeriana* (votes, unanimous), from Messrs. F. Sander & Co. A curious Peruvian species, with glaucous leaves and similar habit to *Cattleya citrina*, but with angular pseudobulbs. Flowers pendant, pale green.

To *Polycyenis muscifera* (votes, unanimous), from the Hon. Walter Rothschild, Tring Park, Tring (gr. Mr. E. Hill). The plant shown was an excellent example, bearing three stout spikes. The flowers yellow, spotted with chocolate; lip hairy.

To *Luedemannia triloba*, *Rolfe*, *n. sp.* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). A golden yellow species, resembling in most particulars *L. Pescatorei*, but differing in the form of the lip.

To *Zygopetalum (Promenæa) stapelioides* (votes, unanimous), from the Hon. Walter Rothschild.

To *Oncidium olivaceum Lawrenceanum*, *Lehm.* (votes, unanimous), from Sir Trevor Lawrence, Bart., and the Hon. Walter Rothschild.

To *Sarcanthus filiformis* (votes, unanimous), from Arnold Witt, Esq., Maida Vale, W.

To *Masdevallia guttulata* (votes, unanimous), from Sir Trevor Lawrence, Bart.

To *Trichocentrum hymenanthum* (votes, unanimous), from Sir Trevor Lawrence, Bart.

To *Masdevallia coriacea* (votes, unanimous), from R. I. Measures, Esq., Cambridge Lodge, Camberwell (gr. Mr. H. J. Chapman).

To *Eria Clarkei* (votes, unanimous), from Messrs. W. L. Lewis & Co., Chase Side, Southgate. Resembling *E. convalarioides*, but with longer and more slender racemes.

Other Exhibits.

Messrs. Jas. Veitch & Sons, Chelsea, sent the singular *Dendrobium* × *porphyrogastrum* (*D. superbum* *Huttonii* ♀ × *D.*

Dalhousieanum ♂), and *Cypripedium* × *Dominianum albicans* (*C. caricinum* ♀ × *C. caudatum Wallisii* ♂).

De B. Crawshay, Esq., Rosefield, Sevenoaks (gr. Mr. S. Cooke), sent *Odontoglossum crispum* Mrs. De B. Crawshay.

F. A. Brown, Esq., Lawn Bank, Teddington (gr. Mr. Slatter), showed *Schomburgkia tibicinis*.

J. Gurney Fowler, Esq., South Woodford, and J. Forster Alcock, Esq., Berkhamsted, each sent fine varieties of *Lælia tenebrosa*.

Walter C. Clark, Esq., Liverpool, showed *Cattleya Warscewiczii*.

R. I. Measures, Esq., Cambridge Lodge, Camberwell (gr. Mr. H. J. Chapman), sent a selection of Orchids of great botanical interest.

Messrs. W. L. Lewis & Co., Chase Side, Southgate, exhibited a group of Orchids.

ORCHID COMMITTEE, JULY 23, 1895.

HARRY J. VEITCH, Esq., in the Chair, and nine members present.

Awards Recommended:—

Silver Banksian Medal.

To Messrs. Thos. Cripps & Son, Tunbridge Wells, for a group of *Disa grandiflora*, excellently well grown and grandly flowered.

First Class Certificate.

To *Phalænopsis* × *Luede-violacea* (*P. violacea* ♀ × *P. Luedemanniana* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Sons, Chelsea. A very handsome hybrid, with flowers resembling those of *P. Luedemanniana*. Sepals and petals light rosy purple, with fine wavy bars of a darker hue. Lip yellow, with red at the base; the front lobe crimson-purple.

To *Lælia Digbyana* (votes, unanimous), from Walter C. Walker, Esq., Percy Lodge, Winchmore Hill (gr. Mr. Geo. Cragg).

Award of Merit.

To *Angræcum Eichlerianum* (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. The species has the flat fleshy

leaves of *A. imbricatum*, and a solitary flower equal in size to *A. eburneum*; pale green, with the anterior half of the broad apiculate lip pure white.

To *Dendrobium speciosissimum* (votes, unanimous), from Messrs. F. Sander & Co. and Messrs. Hugh Low & Co. A white nigro-hirsute species from Borneo allied to *D. Jamesianum*, with yellow keel to the lip; previously awarded a Botanical Certificate. Several examples were shown, which displayed great variety, some having red markings at the base of the lip.

To *Dendrobium* × *porphyrogastrum* (*D. superbum* Huttonii ♀ × *D. Dalhousieanum* ♂) (votes, unanimous), from Messrs. Veitch & Sons, Chelsea. A most remarkable hybrid with racemes of four or five pale rose lilac flowers of singular structure. It was raised some years ago, and has been exhibited on several occasions.

Botanical Certificate.

To *Habenaria rhodocheila* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). A Chinese species related to *H. militaris*, but with plain green leaves and greenish flowers, with large orange-coloured labellum.

To *Maxillaria Hübschii* (votes, unanimous), from F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin. Resembling a small form of *M. grandiflora*; white, tipped with purple.

To *Mormodes pardinum* (votes, unanimous), from F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin.

To *Eria latibracteata* (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. A remarkable species with ascending spikes of whitish flowers striped with purple, and bearing at the base large orbicular pale-green bracts.

Other Exhibits.

Sir Trevor Lawrence, Bart., sent *Epidendrum alatum*.

R. I. Measures, Esq., Camberwell (gr. Mr. H. J. Chapman), showed *Maxillaria ochroleuca* and *Bulbophyllum Sanderianum*.

Fred Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. T. Stafford), staged large pans of *Miltonia vexillaria rubella* and *M. v. superba*.

J. T. Gabriel, Esq., Streatham Hill (gr. Mr. Rawson), sent *Cattleya Rex*.

J. Forster Alcock, Berkhamsted, showed *Lælio-Cattleya* × *Schilleriana*.

E. H. Woodall, Esq., St. Nicholas House, Scarborough (gr. Mr. Hughes), sent *Lælia crispa* Woodall's var.

W. C. Parks, Esq., Llanberis, Lower Tooting, showed a fine inflorescence of *Cattleya Warscewiczii* with five flowers.

G. H. Rolls, Esq., Bournemouth, sent for name *Grobya Amherstiae*, *Lælia crispilabia Lucasiana*, *Oncidium olivaceum*, and *Polystachya* sp.

F. W. Moore, Esq., Glasnevin, showed *Bulbophyllum Lobbii* var. *Colossus*, *Aërides multiflorum Lobbii*, and *Epidendrum paniculatum*.

Messrs. F. Sander & Co., St. Albans, sent an interesting group of Orchids.

Messrs. Hugh Low & Co., Clapton, exhibited a group of Orchids.

ORCHID COMMITTEE, AUGUST 13 1895.

F. W. BURBIDGE, Esq., M.A., in the Chair, and fourteen members present; also Dr. F. Kränzlin, of Berlin.

Awards Recommended:—

Silver Flora Medal.

To T. B. Haywood, Esq., Woodhatch, Reigate (gr. Mr. J. Salter), for a well-arranged group of *Odontoglossum Harryanum*, *Miltonia vexillaria*, &c.

Silver Banksian Medal.

To Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White), for a most interesting group of rare Orchids, including a splendid specimen of *Lælia monophylla*, with over forty flowers; *Maxillaria fucata*, with sixteen blooms; *Cypripedium* × *Sanderi-selligerum*, *Vanda Hookerii*; three distinct forms of *Phalænopsis Esmeralda*; *Calanthe natalensis*, &c.

To Baron Schröder, The Dell, Egham (gr. Mr. H. Ballantine), for a group of rare cut Orchids, among which were *Cattleya* × *Hardyana* Clark's var., *Mormodes luxatum eburneum*, *Vanda insignis*, *Cypripedium Stonei platytænium*, &c.

To J. Gurney Fowler, Esq., Glebelands, South Woodford (gr. Mr. J. Davis), for a group of excellently well-grown and profusely flowered Orchids, among which was a specimen of *Lælio-Cattleya* × *elegans*, with ten flowers on one spike.

To Messrs. F. Sander & Co., St. Albans, for an extensive group of Orchids in flower.

First Class Certificate.

To *Cypripedium* × *Massaianum* *superbum* (votes, unanimous), from Thos. Statter, Esq., Stand Hall, Whitefield, Manchester (gr. Mr. R. Johnson). The plant was shown as *C.* × *Lord Derby* (*C.* *Rothschildianum* ♀ × *C.* *superbiens* ♂), but on comparing it with two plants of *C.* × *Massaianum* (*C.* *Rothschildianum* ♀

C. × *superciliare* ♂ the Committee decided that, in spite of the difference in the parentage recorded, it could only be regarded as a fine form of *C.* × *Massaianum*, which had previously received an award of merit.

To *Dendrobium* *Phalænopsis* var. *hololeuca* (votes, unanimous), from J. T. Holmes, Esq., Beechen Cliff, Bath. This was the first wholly pure white form ever exhibited, that shown as *D. P. album* having a pink tinge on the lip.

To *Cattleya* × *Fowlerii* (*C.* *Leopoldii* ♀ × *C.* *Hardyana*) (votes unanimous), from J. Gurney Fowler, Esq., Glebelands, South Woodford (gr. Mr. J. Davis). This fine hybrid has the colour and general appearance of *Lælio-Cattleya* × *elegans* *Turnerii*, but the fine purple crimson lip is more ample. (Fig. 80.)

To *Cattleya* × *Eros* (*C.* *Mossiaë* ♀ × *C.* *Walkeriana* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Sons, Chelsea. The plant bore pseudobulbs shaped like those of *C. Walkeriana*, and the spreading side lobes of the labellum were as in that species. The flowers, which were nearly as large as *C. Mossiaë*, were of a warm rose hue, the front lobe of the lip being rich velvety crimson.

To *Odontoglossum* *Wattianum* (votes, 9 for), from Messrs. F. Sander & Co., St. Albans. This pretty species seems the only near ally of *O. Harryanum*, the concave form of the base of its white, violet-spotted lip being similar to that species.

To *Vanda* *cærulea* (votes, unanimous), from J. Gurney Fowler, Esq. (gr. Mr. J. Davis); and E. H. Woodall, Esq., Scarborough (gr. Mr. Hughes). Both examples shown were fine

'onès, that exhibited by Mr. Fowler, as Fowler's var., bearing four spikes, having together over forty very large rich blue flowers.



FIG. 80.—CATTLEYA × FOWLERII. (From the *Gardeners' Chronicle*.)

Award of Merit.

To *Lælia monophylla* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). The

fine specimen shown had over forty pretty orange scarlet flowers.

To *Odontoglossum Harryanum*, Haywood's var. (votes, unanimous), from T. B. Haywood, Esq., Woodhatch, Reigate (gr. Mr. G. Salter). A noble variety, with a rich yellow blotch in the centre of the lip, which was also marked with violet colour.

To *Maxillaria fucata* (votes, unanimous), from Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White). A handsome yellow, white, and purple species of the *M. grandiflora* class.

To *Lælio-Cattleya* × *Elstead Gem* (*Lælia xanthina* ♀ × *C. bicolor* ♂) (votes, unanimous), from C. Ingram, Esq., Elstead House, Godalming (gr. Mr. T. Bond). A pretty hybrid, with flowers as large as those of *L. xanthina*, and with similar yellow sepals and petals. The lip, which was flatly displayed as in *C. bicolor*, was rich crimson purple.

To *Cattleya Leopoldii*, Sander's var. (votes, 9 for), from Messrs. F. Sander & Co., St. Albans. A very fine and richly coloured form.

Botanical Certificate.

To *Eria stellata* (votes, unanimous), from Admiral Cator, Hazelwood, King's Langley (gr. Mr. G. Day).

To *Polycycnis Lehmannii*, *Rolfe n. sp.* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). (Fig. 81.)

To *Polystachya odorata* (votes, unanimous), from Sir Trevor Lawrence, Bart.

To *Dendrobium longicornu* (votes, unanimous), from Sir Trevor Lawrence, Bart.

Cultural Commendation.

To Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White), for a grand specimen of *Saccolabium caeleste* with fifteen flower-spikes.

Other Exhibits.

R. Brooman-White, Esq., Arddarroch, Garelochhead (gr. Mr. G. Roberts), sent a large form of *Odontoglossum Pescatorei*, and three varieties of *O. crispum*, one of which, with broad reddish hands at the base of the segments, was remarkable.

Messrs. B. S. Williams & Son, Upper Holloway, N., staged a group of *Cypripediums*.

Messrs. Hugh Low & Co., Clapton, arranged a group of *Saccolabium caeleste*, *Cattleyas*, &c.

S. G. Lutwyche, Esq., Beckenham (gr. Mr. Paterson), showed varieties of *Cypripedium Godefroyæ*, *Maxillaria stapelioides*, &c.

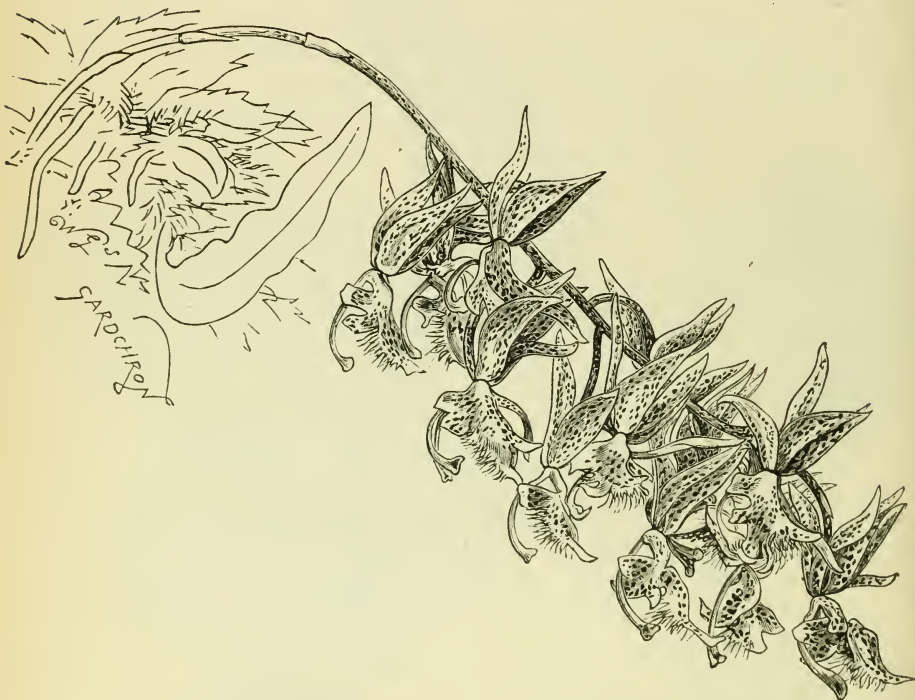


FIG. 81.—POLYCYGNIS LEHMANNII. (From the *Gardeners' Chronicle*.)

F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin, sent *Cattleya granulosa gigantea*.

Messrs. Heath & Son, Cheltenham, showed *Cypripedium* × *pendulum* (*C. Argus Moensii* ♀ × *C. philippinense* ♂).

Fred Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. T. Stafford), sent several large pans of the small-flowered form of *Miltonia vexillaria*.

ORCHID COMMITTEE, AUGUST 27, 1895.

Dr. MAXWELL T. MASTERS, F.R.S., in the Chair, and thirteen members present.

Awards Recommended :—*Silver Flora Medal.*

To Thomas Statter, Esq., Stand Hall, Whitefield, near Manchester (gr. Mr. Johnson), for a group in which *Lælia elegans* Oweniæ and *L. e. chelseensis*, *Cattleya Rex*, &c., were represented.

To Messrs. J. Veitch & Sons, Chelsea, for a group of Orchids, in which were noticeable the white *Cattleya Eldorado alba*, *Lælio-Cattleya Proserpine*, the rare *Grammatophyllum Rumphianum*, with three feet of greenish flowers, *Cælogyne Veitchii*, and several hybrid *Cypripediums*.

Silver Banksian Medal.

To Messrs. F. Sander & Co., St. Albans, for a collection including *Habenaria carnosa nivosa*, *Cattleya aurea* Hardy's var., white and rose-coloured forms of *Dendrobium bractescens*, &c.

First Class Certificate.

To *Cattleya aurea* Mrs. Fred Hardy (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. A beautiful variety, paler than the type. (Fig. 82.)

Award of Merit.

To *Dendrobium Hookerianum* (votes, unanimous), from Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White). A species with lemon-coloured flowers having a dark purple blotch at the base of the fringed lip.

To *Lælia elegans chelseensis* (votes, unanimous), from Thomas Statter, Esq., Stand Hall, Whitefield, Manchester (gr. Mr. R. Johnson).

To *Lælio-Cattleya* "Elstead Gem" (votes, unanimous), from C. Ingram, Esq., Elstead House, Godalming (gr. Mr. T. W. Bond). Sepals and petals orange; lip with a white tube and deep purple front.

To *Cælogyne Veitchii* (votes, unanimous), from Messrs. J. Veitch & Sons, Chelsea. Flowers white.

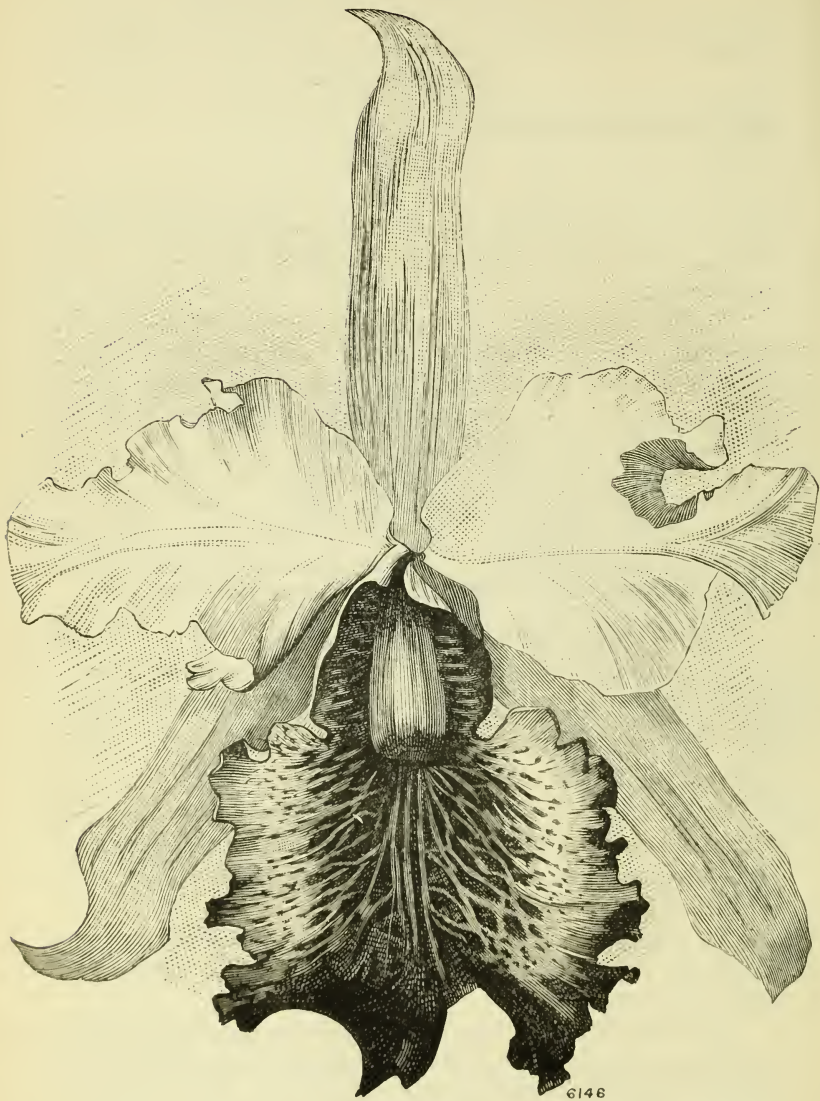


FIG. 82.—CATTLEYA AUREA MRS. FRED HARDY. (From the *Gardeners' Magazine*.)

Botanical Certificate.

To *Bulbophyllum Reinwardtii* (votes, unanimous), from F. W. Moore, Esq., Botanic Gardens, Glasnevin.

To *Aëranthus grandifolius* (votes, unanimous), from A. H. Smee, Esq., The Grange, Wallington (gr. Mr. C. W. Cummins). Flowers creamy white.

Cultural Commendation.

To De B. Crawshay, Esq., Rosefield, Sevenoaks (gr. Mr. Cooke), for *Odontoglossum Uro-Skinnerii* bearing two fine spikes of bloom.

To E. Woodall, Esq., Scarborough (gr. Mr. Hughes), for a fine specimen of *Odontoglossum coronarium*, Salt's var.

Other Exhibits.

Sir Trevor Lawrence, Bart., Burford (gr. Mr. White), exhibited *Stauroopsis philippinensis* with buff-coloured sepals and petals and a lilac lip, *Oncidium hæmatochilum*, and a large-flowered *Catasetum Bungerothii*.

E. Woodall, Esq., Scarborough (gr. Mr. Hughes), contributed a magnificent variety of *Vanda cærulea*, with flowers four inches across on seven well-furnished spikes, and several *Cypripediums*.

F. Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. T. Stafford), exhibited *Lælia elegans Turneri* and *Lælio-Cattleya* × *Hardyana*, with rose-lilac sepals and petals and a velvety purple lip.

Messrs. B. S. Williams & Son, Upper Holloway, N., exhibited a collection which included *Pachystoma Thomsoniana* and *Odontoglossum Kramerii*.

Messrs. W. L. Lewis & Co., Chase Side, Southgate, N., staged *Cypripedium Charlesworthii*, *C. × Evenor superbum*, *Habenaria Susannæ*, and several *Cattleyas*.

Messrs. H. Low & Co., Upper Clapton, E., exhibited a small plant of *Dendrobium speciosissimum*, male and female forms of *Cynoches chlorochilum*, *Cypripedium Charlesworthii* unicolor, &c.

ORCHID COMMITTEE, SEPTEMBER 10, 1895.

HARRY J. VEITCH, Esq., in the Chair, and four members present.

Awards Recommended:—

First Class Certificate.

To *Lælio-Cattleya* × *Clonia superba* (*C. Warscewiczii* ♀ × *L. Cattleya* × *elegans Turnerii* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Sons, Chelsea, S.W. A very fine hybrid approaching in size and form *C. Warscewiczii*, but with the glowing crimson colours of *L.-Cattleya* × *elegans Turnerii*.

Award of Merit.

To *Lælio-Cattleya* × *Parysatis* (*C. Bowringiana* ♀ × *L. pumila* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Sons, Chelsea. A pretty plant of dwarf habit, and with a twin-flowered inflorescence; the flowers somewhat resembling those of *L. præstans*, but of a more purple tint.

To *Lælio-Cattleya* × *Eunomia* (*L. pumila Dayana* ♀ × *C. labiata Gaskelliana* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Sons, Chelsea. The plant was dwarf. Flower resembling a small *C. labiata*. Sepals and petals light rose; base of the lip orange, front rich crimson.

To *Cypripedium* × *Carnusianum*, Veitch's var. (*C. Spicerianum* ♀ × *C. Haynaldianum* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Sons, Chelsea. Flowers on a dwarfer scape, and more richly coloured than the type. Also possessing a striking feature which so far has proved constant, viz., the disjoined lower sepals diverging right and left.

Botanical Certificate.

To *Maxillaria striata*, from F. W. Moore, Esq., Royal Botanical Gardens, Glasnevin, Dublin.

Other Exhibits.

A. H. Smee, Esq., The Grange, Carshalton (gr. Mr. Cummins), showed *Cattleya* × *Hardyana*.

Messrs. Jas. Veitch & Sons sent *Cypripedium* × *Thetis* (*C. Boxallii* ♀ × *C. philippinense* ♂) and *Lælio-Cattleya* × *Nysa purpurea*.

H. Shaw, Esq., Stamford House, Ashton-on-Lyne (gr. Mr. J. Cliffe), sent *Cypripedium* × *Whitelyanum* (*C. Boxalli atratum* ♀ × *C. Lawrenceanum* ♂).

ORCHID COMMITTEE, OCTOBER 15, 1895.

HARRY J. VEITCH, Esq., in the Chair, and seventeen members present.

Awards Recommended:—

Silver Flora Medal.

To J. Gurney Fowler, Esq., Glebelands, South Woodford (gr. Mr. J. Davis), for an excellent group of Orchids in flower.

Silver Banksian Medal.

To Messrs. F. Sander & Co., St. Albans, for a group of Orchids in flower.

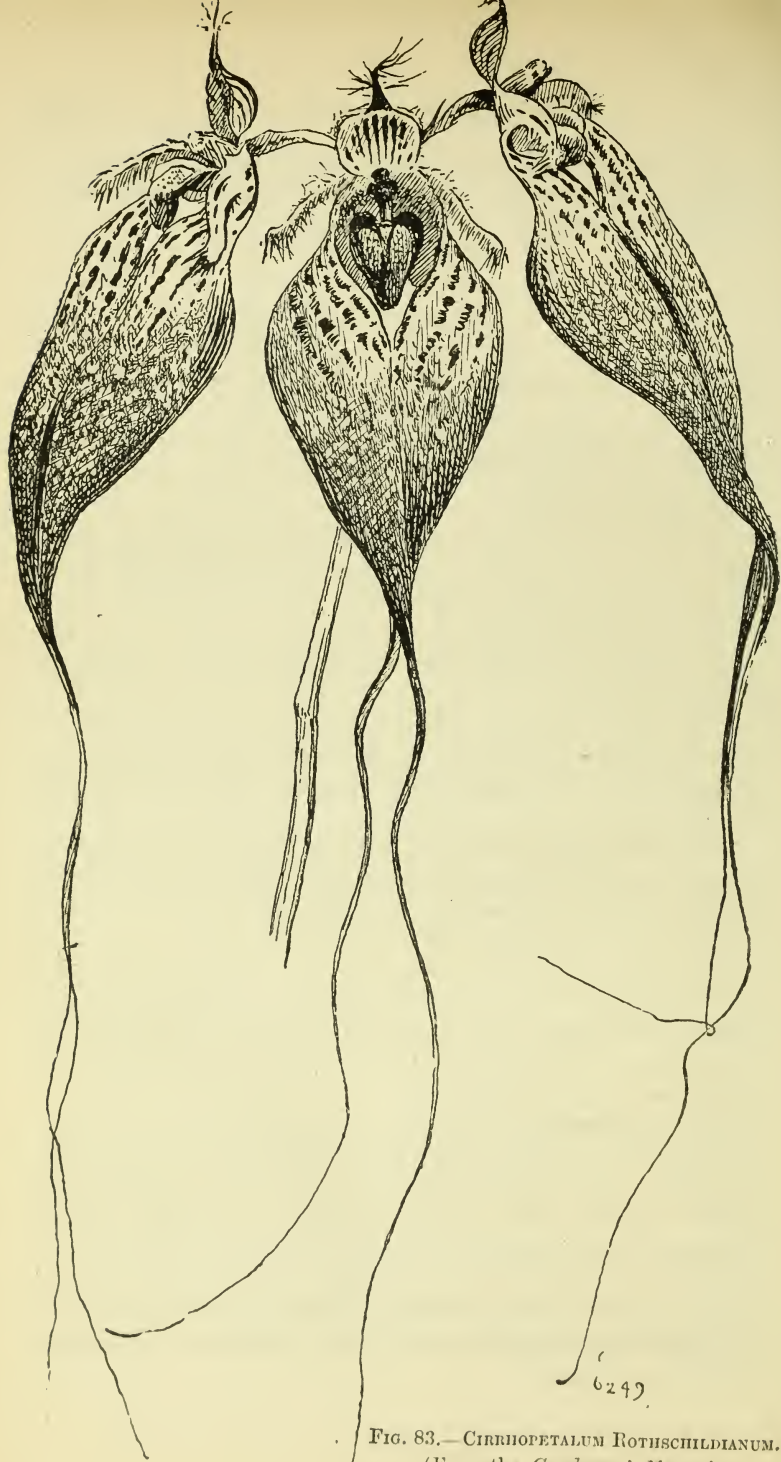
To Messrs. Charlesworth & Co., Heaton, Bradford, for a group of Orchids, the central figure of which was a specimen of *Vanda cærulea* with eight spikes, bearing together about 100 flowers.

To Messrs. Hugh Low & Co., Clapton, for a group of *Cattleya labiata* and other Orchids, including the singular *Bulbophyllum mandibulare* and *Phalænopsis* × *intermedia*.

First Class Certificate.

To *Cattleya labiata* Cooksonæ (votes, unanimous), from Norman C. Cookson, Esq., Oakwood, Wylam-on-Tyne (gr. Mr. W. Murray). A very beautiful form, with pure white sepals and petals and purplish crimson lip.

To *Cirrhopetalum Rothschildianum* (votes, 10 for, 5 against), from the Hon. Walter Rothschild, Tring Park, Tring (gr. Mr. E. Hill). An extraordinary species of the *C. ornatissimum* class, imported from beyond Darjeeling. Its large purple flowers, heavily fringed on the upper sepal and petals, somewhat resembled *Masdevallia chimæra*. The upper part of the lower sepals was over 1 inch across, the lower part was continued into tendril-like appendages, the whole measuring over 6 inches in length. (Fig. 83.)



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FIG. 83.—CIRRIHOPETALUM ROTHSCHILDIANUM.
(From the *Gardeners' Magazine*.)

Award of Merit.

To *Sobralia Lindenii* (votes, unanimous), from C. J. Lucas, Esq., Warnham Court, Horsham (gr. Mr. Duncan). A species having smaller flowers than those of *S. macrantha*; bluish white with purple markings in the lip.

To *Lælio-Cattleya* × *Gottoiana rosea* (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. A supposed natural hybrid of *Lælia tenebrosa* and *Cattleya labiata*. Flowers as in *L. tenebrosa*, but wholly of a clear rose colour.

To *Cattleya labiata*, Thompson's var. (votes, unanimous), from W. Thompson, Esq., Walton Grange, Stone, Staffordshire (gr. Mr. W. Stevens). A noble and richly coloured form.

To *Cattleya labiata cærulea* (votes, unanimous), from W. Thompson, Esq. (gr. Mr. W. Stevens). A distinct form with lavender-coloured petals and slate-blue lip.

To *Cypripedium Charlesworthii marginatum* (votes, 8 for, 5 against), from W. Thompson, Esq. (gr. Mr. W. Stevens). A pretty variety with white dorsal sepal, having the base rose and bearing within the white margin a rose-coloured band.

To *Cattleya labiata Lowæ* (votes, unanimous), from Messrs. Hugh Low & Co., Clapton. A pretty white variety with purple lip.

To *Cattleya* × *Mantini* (*C. Bowringiana* ♀ × *C. Dowiana* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Son, Chelsea. Two varieties were shown, the one much darker in colour than the other. Its flowers resembled large *Cattleya Skinnerii*, but bore a yellow tinge over the rich rose colour of its petals and labellum. (Fig. 84.)

To *Miltonia* × *Cobbiana* (votes, unanimous), from Walter Cobb, Esq., Dulcote, Tunbridge Wells (gr. Mr. J. Howes). One of the numerous supposed natural hybrids which commenced with *M. Lamarckiana*, *Reich. f.*, to which this bears a resemblance.

To *Cypripedium* × *Alfred Hollington* (*C. ciliolare* ♀ × *C. philippinense* ♂) (votes, unanimous), from A. J. Hollington, Esq., Forty Hill, Enfield (gr. Mr. Ayling). A noble variety of *C. × selligerum* class.

Cultural Commendation.

To W. Thompson, Esq., Walton Grange, Stone, Staffordshire (gr. Mr. W. Stevens), for a fine plant of *Vanda Kimballiana* with seven spikes, grown in an *Odontoglossum* house.

Other Exhibits.

Messrs. B. S. Williams & Son, Holloway, sent a nice group of Orchids.

Mr. McArthur, Maida Vale, staged an interesting group of Orchids.



FIG. 84.—CATTLEYA × MANTINI. (From the *Journal of Horticulture*.)

Messrs. James Veitch & Sons sent *Lælio-Cattleya* × *Eunomia* *superba* (*L. pumila* ♀ × *C. Gaskelliana* ♂), *L.-C.* × *Fortuna* (*C. Mossiæ* ♀ × *L.-C.* × *elegans alba* ♂), and *L.-C.* × *Isis* (*L. pumila* ♀ × *C.* × *Marstersoniæ* ♂).

Thos. Statter, Esq., Stand Hall, Whitefield, Manchester (gr. Mr. Johnson), sent *Lælio-Cattleya* × *Parisiana* (*L. purpurata* ♀ × *C. lab. Warnerii* ♂), which the Committee pronounced to be *L.-C.* × *eximia*, and other Orchids.

De B. Crawshay, Esq., Rosefield, Sevenoaks (gr. Mr. S. Cooke), showed *Vanda Kimballiana* Studd's var.

Sir Frederick Wigan, Clare Lawn, East Sheen (gr. Mr. Young), sent a grand spike of *Cœlogyne pandurata*.

M. A. A. Peeters, Brussels, sent *Cypripedium* × François Peeters of unrecorded parentage but resembling *C.* × Chas. Rickman; and *Cattleya labiata* Peeters' var.

G. Marshall, Esq., Claremont House, Grimsby, sent cut examples of *Vanda Kimballiana*, and other Orchids.

S. G. Lutwyche, Esq., Eden Park, Beckenham (gr. Mr. Paterson), sent *Oncidium tigrinum*, and other species.

A. Shipley, Esq., Elmfield, Westbury-on-Trym, Bristol, showed *Cattleya elongata* (Alexandræ).

Sir Wm. Marriott, Down House, Blandford, sent *Cypripedium* × Marriottianum of unrecorded parentage, and resembling *C.* × *microchilum*.

F. W. Moore, Esq., Royal Botanical Gardens, Glasnevin, Dublin, sent *Bulbophyllum disciflorum* and *Restrepia maculata*.

Fred. Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. T. Stafford), showed *Cattleya Bowringiana* Hardy's var.

J. F. Ebner, Esq., Woodlands, Beckenham (gr. Mr. Waite), showed two hybrid *Cypripediums*.

ORCHID COMMITTEE, OCTOBER 29, 1895.

HARRY J. VEITCH, Esq., in the Chair, and eleven members present.

Awards Recommended :—

Silver Flora Medal.

To Thos. Statter, Esq., Stand Hall, Whitefield, Manchester (gr. Mr. R. Johnson), for a collection of cut spikes of *Cattleya Dowiana aurea*, *C. labiata*, &c.

To Messrs. Hugh Low & Co., Clapton, for a group of Orchids in flower.

Silver Banksian Medal.

To R. I. Measures, Esq., Cambridge Lodge, Camberwell (gr.

Mr. H. J. Chapman), for a collection of *Cypripediums* and other Orchids.

To Fred. Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. T. Stafford), for varieties of *Cattleya labiata*, *C. × Harrisii*, &c.

First Class Certificate.

To *Cattleya × Mantinii*, var. *colorata* (*C. Bowringiana* ♀ × *C. Dowiana* ♂) (votes, unanimous), from Mons. Georges Mantin, Château de Bel Air, Olivet, Loiret, France. A very fine plant bearing a strong inflorescence was exhibited, the flowers having much the colour of a dark *C. Bowringiana*.

To *Cattleya × Mantinii* (votes, unanimous), from Messrs. Jas. Veitch & Sons, Chelsea, who showed two dissimilar varieties, as they did on October 15, when it received an Award of Merit.

To *Cattleya Dowiana aurea Johnsonii* (votes, unanimous), from Thos. Statter, Esq., Stand Hall, Whitefield, Manchester (gr. Mr. R. Johnson). A variety near to *C. aurea marmorata*, with buff sepals and petals marbled with lilac.

Award of Merit.

To *Lælio-Cattleya × Euphrosyne* (*L. pumila* × ♀ *C. Warscewiczii* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Sons, Chelsea. A plant of dwarf habit, with large flowers; sepals and petals bright rose, lip purple with yellow disc.

To *Cattleya × Eurydice* (*C. labiata* ♀ *C. Aclandiae* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Sons, Chelsea. The flower was of the same pale lilac as *C. guttata Prinzii*, and with a few purple spots. Lip broad and open at the side lobes, and of a rich crimson colour.

To *Cypripedium insigne*, "Laura Kimball" (votes unanimous), from Messrs. Hugh Low & Co., Clapton. A clear yellow form approaching *C. insigne Sanderæ*.

To *Cypripedium × Allanianum superbum* (*C. Spicerianum* ♀ × *C. Curtisii* ♂) (votes, unanimous), from R. I. Measures, Esq., Cambridge Lodge, Camberwell (gr. Mr. H. J. Chapman). A very fine flower, in colour white, tinged with brownish rose, and with fine purple lines in the upper sepal. (Fig. 85.)

To *Cattleya Bowringiana gigantea* (votes, 4 for, 3 against),

from Fred. Hardy, Esq., Tyntesfield, Ashton-on-Mersey (gr. Mr. T. Stafford).

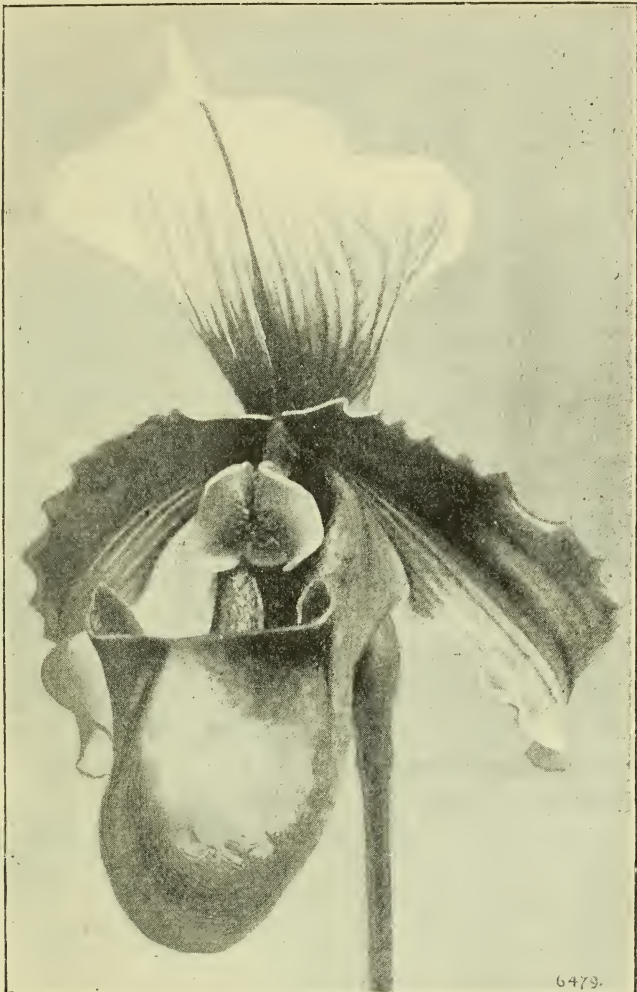


FIG. 85.—*CYPRIPEDIUM* × *ALLANIANUM* SUPERBUM.
(From the *Gardeners' Magazine*.)

Botanical Certificate.

To *Houlletia tigrina* (votes, unanimous), from Sir Trevor

Lawrence, Bart, Burford, Dorking (gr. Mr. W. H. White). A very singular and handsome species, with cream-white sepals and petals spotted with rose, and white lip spotted with crimson, the inflorescence being decumbent. (Fig. 86.)

Other Exhibits.

Messrs. F. Sander & Co. staged a group of rare Orchids.

Geo. C. Raphael, Esq., Castle Hill, Englefield Green (gr. Mr. Adams), showed varieties of *Cattleya labiata* and the fine *Vanda cærulea* Raphael's variety.

Messrs. W. L. Lewis & Co., Soutingate, arranged a small group of Orchids.

Wilberforce Bryant, Esq., Stoke Park, Slough (gr. Mr. D. Kemp), showed a fine form of *Cattleya labiata*.

Walter C. Clark, Esq., Orleans House, Sefton Park, Liverpool, sent flowers of varieties of *Cypripedium insigne*.

Reginald Young, Esq., Fringilla, Linnet Lane, Sefton Park, Liverpool, sent *Cattleya labiata*, *Cypripedium* × *Clotho* (*C. politum* ♀ × *C. Boxalli atratum* ♂), and *Lælia pumila*.

Mons. Truffaut, Rue des Chantiers, Versailles, France, sent *Lælio-Cattleya* × *Andreana* (*C. bicolor* ♀ × *L.-C.* × *elegans* ♂) which resembled a slender *L.-C.* × *Schilleriana*.

ORCHID COMMITTEE, NOVEMBER 12, 1895.

HARRY J. VEITCH, Esq., in the Chair, and twelve members present.

Awards Recommended :—

Silver Flora Medal.

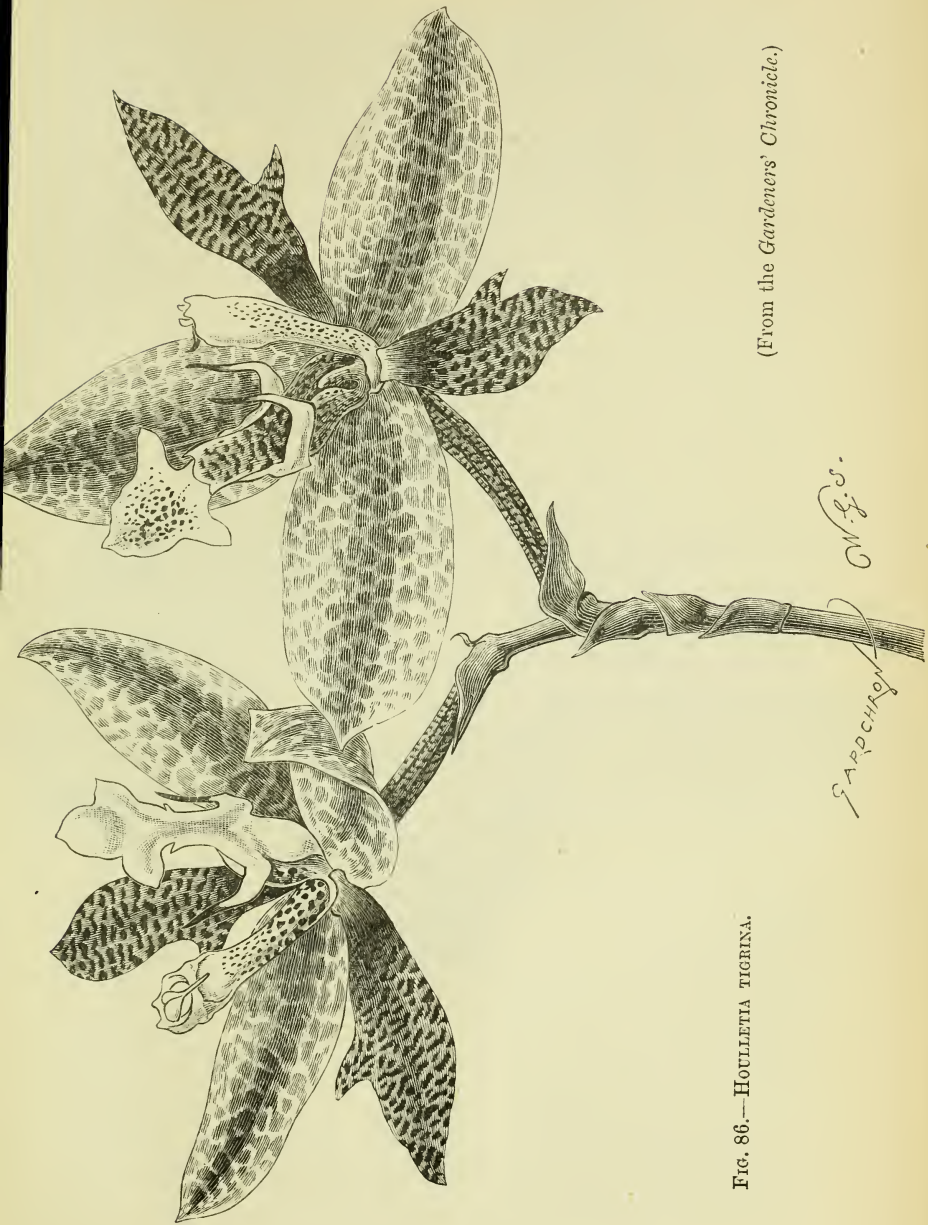
To Messrs. Jas. Veitch & Sons, Chelsea, for an excellent group of rare Orchids.

Silver Banksian Medal.

To Thos. Statter, Esq., Stand Hull, Whitefield, Manchester (gr. Mr. R. Johnson), for a fine collection of cut spikes of *Cattleya Dowiana aurea*, *C. labiata*, &c.

To Messrs. F. Sander & Co., St. Albans, for an extensive group of Orchids.

To Messrs. B. S. Williams & Son, Upper Holloway, for a good group of Orchids.



(From the *Gardeners' Chronicle*.)

FIG. 86.—HOULETIA TIGRINA.

First Class Certificate.

To *Lælio-Cattleya* × *callistoglossa ignescens* (*L. purpurata* ♀ × *C. Warscewiczii Sanderiana* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Sons. A fine improvement on the ordinary form, with glowing purple labellum.

To *Cypripedium* × *Milo grande* (*C. insigne Chantinii* ♀ × *C. ænanthum superbum* ♂) (votes, unanimous), from Messrs. J. Veitch & Sons, Chelsea, which differed from the variety previously exhibited in its larger and darker-tinted flowers, which in this example had the lower sepals divided. (Fig. 87.)

To *Cypripedium* × *Marchioness of Salisbury* (*C. bellatulum* ♀ × *C. barbatum superbum* ♂) (votes, unanimous), from Messrs. Sander & Co. A handsome flower of the *C.* × *Charles Rickman* class, with white flowers spotted with chocolate, and with a rose-coloured flush over the upper sepal and petals.

To *Luedemannia triloba*, *Rolfe n. sp.* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). The plant shown had a pendant inflorescence 2 ft. long bearing thirty-three orange-coloured flowers with distinctly tri-lobed lip, the sepals being tinged with copper colour.

Award of Merit.

To *Cypripedium* × *Pollettianum*, “*Burford Beauty*” (*C.* × *calophyllum* ♂ × *C.* × *ænanthum superbum*) (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). A very large and brightly coloured form.

To *Cattleya labiata* “*Clara Measures*” (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. Flowers white with crimson-purple lip.

To *Cattleya* × *Lady Ingram* (*C. l. Eldorado* ♀ × *C. Dowiana aurea* ♂) (votes, unanimous), from C. L. N. Ingram, Esq., Elstead House, Godalming (gr. Mr. T. W. Bond). The plant bore a three-flowered inflorescence. Sepals and petals pale yellow, tube of lip orange, front lobe crimson.

To *Cattleya* × *Cecilia* (*C. Lawrenceana* ♀ × *C. L. Trianae* ♂) (votes, unanimous), from C. L. N. Ingram, Esq. (gr. Mr. T. W. Bond). Flowers pale lilac, and much resembling those of *C. Lawrenceana* concolor.

To *Laelio-Cattleya* × *Othello* (*C. maxima peruviana* ♀ × *L. C. × elegans Turnerii* ♂) (votes, unanimous), from C. L. N. Ingram, Esq. Plant slender, like *L.-C. elegans*. Flowers rose-colour, with purplish front to the lip.

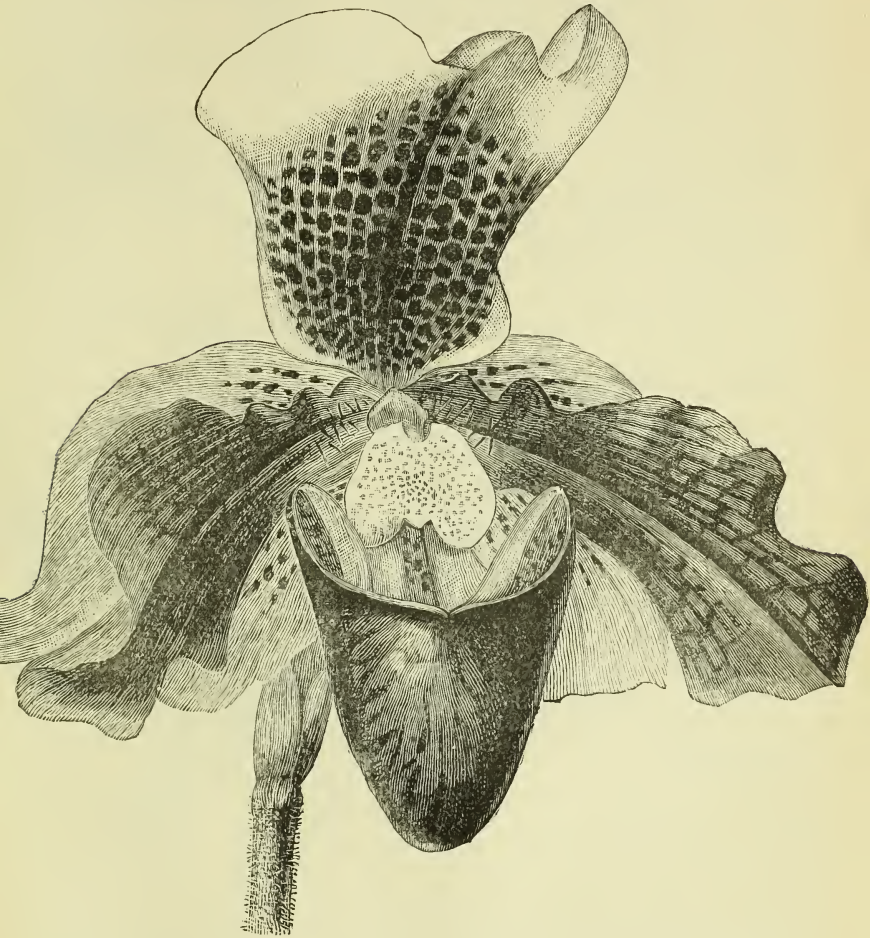


FIG. 87.—*CYPRIPEDIUM* × *MILO GRANDE*. (From the *Journal of Horticulture*.)

To *Laelio-Cattleya* × *Semiramis* (*L. Perrinii* ♀ × *C. Gaskelliana* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Sons, Chelsea. Flowers large, and of the general appearance of *L. Perrinii*. In colour soft rose with purple-veined lip.

Botanical Certificate.

To *Spathoglottis pubescens* (votes, unanimous), from F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin.

To *Phalænopsis denticulata* (votes, unanimous), also from F. W. Moore, Esq.

To *Cœlogyne Gardneriana* (votes, unanimous), from Messrs. B. S. Williams & Son, Upper Holloway.

To *Saccolabium acutifolium* (votes, unanimous), from Messrs. F. Sander & Co., St. Albans. A small-flowered species of the *S. bellinum* class.

To *Masdevallia abbreviata* (votes, unanimous), from R. I. Measures, Esq., Cambridge Lodge, Camberwell (gr. Mr. H. J. Chapman).

To *Pleurothallis longissima* (votes, unanimous), from R. I. Measures, Esq.

Other Exhibits.

Messrs. Jas. Veitch & Son, Chelsea, showed *Phalænopsis* × *Vesta* (*P. Aphrodite* ♀ × *P. rosea leucaspis* ♂), *Epidendrum* × *Wallisio-ciliare* and *Lælio-Cattleya* × *Decia* (*L. Perrinii* ♀ × *C. aurea* ♂).

Messrs. F. Sander & Co. showed the new *Anæctochilus Sanderianus*, the handsome *Trichopilia brevis* (Fig. 88), and a fine pan of *Habenaria Susannæ*.

J. Gurney Fowler, Esq., Glebelands, South Woodford (gr. Mr. J. Davis), sent a fine inflorescence of *Cymbidium Traceyanum*.

T. W. Swinburne, Esq., Corndean Hall, Winchcombe, sent twin-flowered spikes of *Cypripedium insigne* and *C.* × *Ashburtoniæ*.



FIG. 88.—*TRICHOPIILIA BREVIS*.
(From the *Gardeners' Chronicle*.)

ORCHID COMMITTEE, NOVEMBER 26, 1895.

HARRY J. VEITCH, Esq., in the Chair, and seventeen members present.

Awards Recommended:—*Silver Banksian Medal.*

To Messrs. F. Sander & Co., St. Albans, for a group of hybrid *Calanthes* and other Orchids.

First Class Certificate.

To *Catasetum imperiale*, *Linden et Cogn.* (votes, unanimous), from Messrs. Linden, l'Horticulture Internationale, Brussels. The flowers resembled those of *C. Bungerothii*, but the labellum was rich purple, and there were purple spots on the other segments. Probably a form of *C. × splendens* (*C. Bungerothii* × *C. macrocarpum*).

Award of Merit.

To *Cypripedium* × *platy-color* (*C. concolor* ♀ × *C. Stonei platytænium* ♂) (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). A most extraordinary and beautiful hybrid; the flowers (of which the inflorescence bore four) resembling in some degree those of *C. × concolawre*. The colour cream-white, flushed and spotted with rose.

To *Masdevallia chimæra aurea* (votes, unanimous), from F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin. A very distinct form, with patches of clear yellow colour on the flowers.

To *Cypripedium* × *Madeline* (*C. Argus* ♀ × *C. bellatulum* ♂) (votes, unanimous), from G. L. Palmer, Esq., Springfield, Trowbridge (gr. Mr. Chas. Rickman). A pretty hybrid of a now rather large class, possessing a certain family likeness to each other. Flowers pale yellow, spotted purple.

To *Cattleya aurea Marantina* (votes, unanimous), from Thos. Statter, Esq., Stand Hall, Whitefield, Manchester (gr. Mr. R. Johnson). Flowers tinged with copper colour, the petals having the veining filled in with rose.

To *Epidendrum* × *Wallisio-ciliare* (*E. ciliare* ♀ × *E. Wallisii* ♂) (votes, 7 for, 3 against), from Messrs. J. Veitch & Sons, Chelsea.

A very singular hybrid, with flowers having yellow sepals and petals, and white lip, with purple markings in the centre. The parent species were also shown.

Botanical Certificate.

To *Arundina chinensis* (A. Philippi) (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). A slender species, resembling a small form of *A. bambusæfolia*.

To *Calanthe Moorei* (votes, unanimous), from F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, Dublin. A fine species of the *C. sylvatica* class, but with an elongated head of dark rose-purple flowers, which before passing change to light rose, the labellum bronzy yellow.

To *Dendrobium subclausum* (votes, unanimous), from Messrs. Jas. Veitch & Son, Chelsea. A Malayan species, with a few-flowered inflorescence of bright orange colour.

Other Exhibits.

Messrs. Vervaet & Co., Ghent, again showed the rich purple-spotted *Odontoglossum Franz Masereel*.

The Dowager Marchioness of Londonderry (gr. Mr. A. Gribble) showed a good form of *Lælia anceps*.

Stanley Clark, Esq., Oak Alyn, Wrexham, sent *Cattleya Trianae*, "Mrs. Stanley Clark," a very large and handsome flower.

Sir Frederick Wigan, Clare Lawn, East Sheen (gr. Mr. W. H. Young), showed a fine stand of cut specimens of *Epidendrum (Barkeria) Lindleyanum*, and *Lælio-Cattleya* × "Wm. Murray."

C. J. Lucas, Esq., Warnham Court, Horsham, sent *Cypripedium* × *Warnhamense* (*C. Curtisii* ♀ × *C. philippinense* ♂), which is identical with *C.* × *Clinkaberryanum*.

G. L. Palmer, Esq., Trowbridge (gr. Mr. Chas. Rickman), sent various hybrid *Cypripediums*.

J. W. Temple, Esq., Leyswood, Groombridge (gr. Mr. E. Bristow), showed *Cattleya* × *Miss Williams* (*C. Harrisoniæ* ♀ × *C. l. Gaskelliana* ♂), and *C. labiata* "Temple's variety."

T. W. Swinburne, Esq., Corndean Hall, Winchcombe, sent *Cypripedium* × *Wallaertianum*.

Messrs. Hugh Low & Co., Clapton, showed *Phalænopsis* × *intermedia* and *P.* × *Brymeriana*.

F. W. Moore, Esq., Royal Botanic Gardens, Glasnevin, sent *Odontoglossum præstans* and *Phaius Bernaysii*, received from Fiji.

ORCHID COMMITTEE, DECEMBER 10, 1895.

HARRY J. VEITCH, Esq., in the Chair, and seventeen members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Jas. Veitch & Sons, Chelsea, for a group of rare Orchids.

Silver Banksian Medal.

To Baron Schröder, The Dell, Egham (gr. Mr. H. Ballantine), for a large collection of cut flowers of rare Cypripediums, numbering over sixty species and hybrids.

To J. T. Bennet-Pöe, Esq., Holmwood, Cheshunt, for a group of Orchids.

To Messrs. F. Sander & Co., St. Albans, for a group of new hybrid *Calanthes*, &c.

First Class Certificate.

To *Dendrobium Treacherianum* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). The fine plant of this rare rose and crimson species exhibited bore three spikes, having together twenty-three flowers. (Fig. 89.)

Award of Merit.

To *Laelio-Cattleya* × *Lady Rothschild* (*L. Perrinii* ♀ × *C. Warscewiczii* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Sons, Chelsea. A noble flower of the size of *Cattleya labiata*, but bearing resemblance to an enlarged *Laelia Perrinii*. Sepals and petals clear rosy-lilac; disc of the lip primrose yellow, with some fine purple markings at the base; front lobe bright purple.

To *Calanthe* × *Harrisi* (*C. Veitchii* ♀ × *C. Turnerii* ♂) (votes, unanimous), from Messrs. Jas. Veitch & Sons, Chelsea, S.W. A pure white flower.



FIG. 89.—DENDROBIUM TREACHERIANUM.
(From the *Journal of Horticulture*.)

To *Masdevallia pachyura* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). This, the true plant, bearing three or four yellow and brownish purple flowers of good size on a spike, was exhibited for the first time. The plant known under this name hitherto in gardens is the small *M. caloptera*.

To *Masdevallia macrura* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White). A fine orange-tinted form was shown.

To *Oncidium tigrinum* (votes, unanimous), from D. B. Crawshay, Esq., Rosefield, Sevenoaks (gr. Mr. S. Cooke).

To *Cypripedium* × *Ashtonii* (*C. ciliolare* ♀ × *C. × seligerum majus* ♂), from Messrs. W. Lewis & Co., Southgate, N. A fine hybrid with massive flowers resembling those of *C. × Alfred Hollington*.

To *Mormodes Lawrenceanum* (*Lindenia* t. 275) (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. Mr. W. H. White).

Botanical Certificate.

To *Angræcum pertusum* (votes, unanimous), from Sir Trevor Lawrence, Bart., Burford, Dorking (gr. W. H. White), with eighteen racemes of flowers.

Cultural Commendation.

To Sir Trevor Lawrence, Bart. (gr. Mr. W. H. White), for *Angræcum pertusum*.

To Sir Trevor Lawrence, Bart., for *Dendrobium Treacherianum*.

To J. T. Bennet-Pöe, Esq., Holmwood, Cheshunt, for *Vanda carulea*.

Other Exhibits.

Messrs. Hugh Low & Co., Clapton, sent a group of Orchids, &c.

Messrs. B. S. Williams & Son, Holloway, exhibited a collection of *Cypripediums*, &c.

Thos. Statter, Esq., Stand Hall, Whitefield, Manchester (gr. Mr. R. Johnston), showed rare cut Orchids.

H. Tate, Esq., Allerton Beeches, Liverpool (gr. Mr. Osborne),

sent *Cypripedium insigne*, Tate's var., which had the lower sepals similarly marked, and tipped with white to the upper sepal.

T. W. Swinburne, Esq., Corndean Hall, Winchcombe, Cheltenham, showed two varieties of *Cypripedium* × *Swinburnei* and other hybrids.

G. Shoreland Ball, Esq., Earlscliffe, Bowden, Cheshire, sent *Cattleya labiata alba*, *Cypripedium insigne* Sanderæ, and *C. I. Ballianum*, also a yellow variety.

F. W. Moore, Esq., Royal Botanic Gardens, Dublin, sent *Oncidium pictum*.

Walter C. Walker, Esq., Winchmore Hill (gr. Mr. G. Cragg), showed various Orchids.

This being the last meeting of the year, the Chairman read a letter of thanks from the Council to the members of the Committee for their services during the year.

Votes of thanks to the Chairman and Hon. Secretary were passed by the Committee.

DONORS OF PLANTS, SEEDS, &c., TO THE SOCIETY'S GARDENS
AT CHISWICK DURING THE YEAR 1895.

Arnott, S., Carsethurn, by Dumfries. 'Collection of Campanulas.

Barr & Son, Messrs., Covent Garden. Collection of Vegetables, Seeds, Rock Plants, &c.

Benary, E., Erfurt. Vegetable and flower seeds.

Bonsall, T., Elmet Hall, Leeds. Tomato seed.

Briggs, J., Matlock, Bath. Seed Potatos.

Cannell & Sons, H., Messrs., Swanley. Bouvardias and Cactus Dahlias.

Carter & Co., Messrs., High Holborn. Vegetable and flower seeds.

Cockerill, T., The Gate House, Wirksworth. Seed Potatos.

Cooper, Miss, Hartley, Plymouth. Nine packets of vegetable seeds from Brazil.

Copp, G. H., Holnest Park, Sherborne. White Runner Bean seeds.

Crowley, Philip, Waddon House, Croydon. Dracænas.

Cuthbertson, M., Rothesay. Violas, &c.

Daniels Bros., Messrs., Norwich. Seed Potatos, &c.

Dean, R., Ealing. Seed Potatos.

Department of Agriculture, Burnley, Victoria. Collection of fruit-tree scions.

Director, Royal Gardens, Kew. Chrysanthemums.

Dobbie & Co., Messrs., Rothesay. Collection of Cactus Dahlias.

Dod, Rev. C. Wolley, Edge Hall, Malpas. Chrysanthemums.

Dicksons, Ltd., Messrs., Chester. Collection of Tea Roses.

Eckford, H., Wem, Salop. Culinary and Sweet Pea seeds.

Empson, W. J., Ampthill. Carrot seeds.

Endtz, L. J., Boskoop. Cupressus Lawsoniana Triomphe de Boskoop.

Fleming's Oil & Chemical Co., Leadenhall Street, E.C. Tin of Insecticide.

Forbes, J., Hawick. Flower seeds, &c.

Freeman-Mitford, A. B., Moreton-in-Marsh. Dendrocalamus membranaceus.

Guildford Hardy Plant Co., Guildford. Campanulas and Auriculas.

- Harraway & Scott, Messrs., Warminster. Seed Potatos.
- Harrison & Sons, Messrs., Leicester. Vegetable seeds.
- Heaton, S., Newport, Isle of Wight. Peas.
- Herbst, H., Kew Road, Richmond. Seeds, Currants, and Standard Gooseberries.
- Hodgkins, Mrs., Didsbury. Flower seeds.
- Hurst & Sons, Messrs., Houndsditch. Vegetable seeds.
- Henderson & Co., Messrs., New York. Vegetable seeds.
- Johnson & Son, W. W., Messrs., Boston. Peas.
- Kent & Brydon, Messrs., Darlington. Vegetable seeds.
- Laxton Bros., Messrs., Bedford. Seed Potatos.
- Leece, G., Grange-over-Sands. Seed Potatos.
- Letellier & Fils, Messrs., Caen, Calvados, France. Strawberries and Spineless Gooseberries.
- Low & Co., Hugh, Messrs., Clapton. Bouvardias.
- Mackie & Co., J., Messrs., Fyvie, Aberdeenshire. Culinary Peas.
- Marshall, W., Bexley. Chrysanthemums.
- Masters, Dr., Ealing. Three volumes of "Index Kewensis."
- McMullend & Co., E., Messrs., Hertford. Culinary Peas.
- Miles, Mr., Leicester. Seed Potatos.
- Morse, R., Berkley House, Frome. Seed Potatos.
- Mount, G., Canterbury. Collection of Tea Roses.
- Neild, Mr., Holmes Chapel, Bowden. Tomato Seed.
- Needham, W. H., Hall Road, Bowden. Vegetable seeds, &c.
- Newland, A. R., Nuneham, Brooke. Seed Potatos.
- Normand, P. H., Aberdour, Fife. Veronicas and Helianthemums.
- Nutting & Sons, Messrs., Southwark Street, S.E. Vegetable seeds.
- Paul & Son, W., Messrs., Waltham Cross. Collection of Tea Roses.
- Prince, G., Oxford. Collection of Tea Roses.
- Prior & Son, D., Messrs., Colchester. Collection of Tea Roses.
- Revens, G., Burnwell, Cambridge. Seed Potatos, &c.
- Ross, C., Welford Park, Newbury. Seed Potatos.
- Ross, F., Merstham. Grevillea and Eucalyptus seeds.
- Rumsey, W., Waltham Cross. Collection of Tea Roses.
- Sim, T., Greenmyre, Fyvie. New hybrid green Kale.

Smith, Bros., Messrs., Uitenhage, South Africa. One show Dahlia.

Stuart, Dr., Hillside, Chirnside, N.B. Nine varieties of new Tufted Pansies.

Sutton & Sons, Messrs., Reading. Vegetable seeds.

Sydenham, R., Birmingham. Tomato seeds.

Thompson, Col. Halford, East Cliff, Teignmouth. Jadoo Fibre.

Thomson, D. W., Edinburgh. Vegetable seeds.

Toogood & Sons, Messrs., Southampton. Vegetable Marrow seeds.

Veitch & Sons, J., Messrs., Chelsea. Vegetable seeds and collection of Tea Roses.

Veitch & Son, R., Messrs., Exeter. Collection of vegetable and flower seeds.

Vilmorin & Co., Messrs., Paris. Vegetable seeds.

Waterer, A., Knaphill, Woking. Six plants of Spiræa Bumalda Anthony Waterer.

Webb, C. S., Kendal. Lettuce seeds.

Webber, F., Tonbridge. Seed Potatos.

Wilks, Rev. W., Shirley, Croydon. Helianthus rigidus Miss Mellish.

Wrench & Sons, J., Messrs., King William Street, E.C Vegetable seeds.

Wythes, G., Syon House, Brentford. Vegetable seeds.

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