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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

1902. - 1903

LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
By DARLING & SON, Ltd., 34-40, Bacon Street, E.

And to be purchased, either directly or through any Bookseller, from
WYMAN and SONS, Ltd., Fetter Lane, E.C.,
or OLIVER & BOYD, Edinburgh;
or E. PONSONBY, 116, Grafton Street, Dublin.

1902.

Price One Shilling and Sixpence.

Mo. Bot. Garden
1906

CONTENTS.

Article.	Subject.	Page.
I.	*Paspalum dilatatum*, an American Fodder-Grass	1
II.	Ginseng in China (*Aralia quinquefolia*)	4
III.	Khasia Patchouli (*Microtæna cymosa*), with plate ...	11
IV.	Tobacco Cultivation in Southern Siam	12
V.	Woad (*Isatis tinctoria*)...	15
VI.	Miscellaneous Notes	17
Appendix I.	List of seeds of hardy herbaceous plants and of trees and shrubs	1
„ II.	Catalogue of the Library. Additions received during 1901	42
„ III.	New garden plants of the year 1901	77
„ IV.	Botanical Departments at home and in India and the Colonies	97

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No. 1. 1902.

I.—PASPALUM DILATATUM, AN AMERICAN FODDER-GRASS.

Paspalum dilatatum, Poir., commonly known as "Hairy-flowered Paspalum," "Large water-grass," and, in Victoria, as "Leichardt grass," is indigenous in Brazil, Uruguay, and the Argentine Republic. According to Doell (*Flora Brasiliensis*) the plant has also been collected in Chile, but it is improbable that it is native on that side of the Andes. It is widely distributed in the Gulf States of North America, and is said to be one of the commonest species in the prairie region of Louisiana. It is found along ditch-sides and in other wet places in Tennessee and the littoral States from South-eastern Virginia to Florida, and westwards to Texas. Throughout this region, in which it is probably naturalised, it is a highly valued fodder-plant, and is widely planted in favourable situations.

Introduced into Australia by Baron F. von Mueller, its cultivation was commenced in the Richmond River district, New South Wales, in 1892. Thence it has spread to Queensland, Victoria, and Western Australia, and is now regarded as one of the best fodder-grasses in the country. From the Wollongbar Experimental Farm (Richmond River) seeds were sent to India, and the grass has been grown, with but moderate success, in the fuel and fodder reserves at Nagpur, though it promises to do well in the plains of the Central Provinces. The Agricultural and Horticultural Society of India report (*Annual Report*, 1900) that it grows vigorously at Mussoorie, in spite of "intense cold." The roots of a clump grown there measured over $3\frac{1}{2}$ feet in length. In the *Annual Report* of the Superintendent of the Royal Botanic Garden, Calcutta, for 1900–1901, occurs the following statement :—

"The use as a fodder-grass of *Paspalum dilatatum*, a native of America, which has proved very valuable in Australia owing to

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its drought-resisting qualities, has led to its introduction to India on as large a scale as possible. Finding that very little seed could be spared by Australian correspondents of the Garden, the assistance of the Agrostologist to the Department of Agriculture of the United States was invoked. Thanks to the kind help of that officer, a large supply of the seed of this grass was obtained from America, and has been freely distributed throughout India."

The attention of South African agriculturists has recently been directed to the valuable properties of *Paspalum dilatatum* as a fodder-grass. A few plants were found at Newcastle (Natal) by Mr. J. Medley Wood in 1897, though when or through what channel introduced is not known. It is now found to be fairly abundant in the neighbourhood of Newcastle, and, in all probability, numerous patches occur in various parts of the Colony. In New Zealand it has been in cultivation since 1896, at the Momohaki Experimental Station, where it has produced a yield of grass equal to 9½ tons an acre. It is, however, killed by the cold of the New Zealand winter. The plant is found also, as a weed or escape, in Porto Rico, Mauritius, and the Straits Settlements.

This grass is a coarse leafy perennial, with a tendency to grow in clumps ; it attains a height of 2 feet and over—in favourable situations even reaching 6 feet. It thrives best upon rich moist land, and grows very luxuriantly in black alluvial soils. It is said to succeed also in sandy soils, even when a considerable proportion of salt is present. Being a very deep-rooted grass it has a remarkable capacity for withstanding conditions of drought. In Western Australia it flourishes in poor mountain soils. When once established it withstands frosts, if not continuous, and, in Victoria, is successfully cultivated up to an elevation of 2,000 feet. It is, in fact, admirably suited for cultivation in tropical and sub-tropical climates.

As a permanent pasture grass, *Paspalum dilatatum* holds a high position among tropical grasses. Notwithstanding its luxuriant habit, its tissues are soft and succulent, and contain only a normal proportion of woody cells. There is "no part of it, from the crown to the head, that stock will not eat." When well-established it endures long periods of drought without injury. It starts its new growth early in the spring, and continues to grow vigorously until late autumn. It thus affords excellent late summer and autumn feed. Its permanence on suitable soil is undoubted, for at Wollongbar, after four years' grazing, "the paddocks are still improving, and giving an increased quantity of feed." (H M. Williams, in *N.S.W. Agricultural Gazette*, 1898.) Excellent results are obtained by using *Paspalum dilatatum* as a constituent of a mixed pasture, which contains also Cocksfoot (*Dactylis glomerata*) or other grass which makes growth in the winter, at which time the Paspalum is at its worst. The pasture should be allowed to seed during the second year, that the Paspalum may distribute its seed, as it spreads very slowly from the roots. For dairying purposes, Paspalum is of great value, as it has great milk-producing properties.

For hay, this grass is rather coarse, and usually has a bad colour when dry. It is, however, of excellent quality, and the yield is very large. A sample grown on the Wollongbar Experimental

Farm gave the following results on analysis (F. B. Guthrie, in *N.S.W. Agricultural Gazette*, 1897) :—

Moisture	10·55		
Albuminoids ...	10·31	soluble	1·38
		insoluble	8·93
Digestible fibre ...	29·96		
Woody fibre	27·95		
Ash	6·37	soluble	4·32
		insoluble	2·05
Amide compounds } Chlorophyll, &c. }	14·86	total nitrogen ...	2·66
		amide nitrogen ...	1·01
	100·00		

This analysis compares very favourably with that of ordinary English hay, and shows a larger proportion of digestible and nourishing material. In deeply worked rich soils at least three crops may be obtained per annum when the plant is well established. On the Richmond River (N.S.W.) Government Farm, in one year, 14 tons per acre were obtained on the first cutting, 8 to 10 on the second, after which a third crop of 6 to 7 tons was gathered—making a total yield of 28 to 31 tons per acre.

An analysis of a sample of the crop grown on good cultivated land on the creek flats of the Queensland Agricultural College, and cut on April 22nd, 1901, compares rather unfavourably with the foregoing. The yield of grass in this crop was 10·525 tons per acre, and of hay (air-dried grass), 2·858 tons per acre. The analysis of the hay yielded the following figures (J. C. Brünnich, F.C.S., in *Queensland Agricultural Journal*, 1901, pp. 245, 246) :—

Moisture	10·72		
Albuminoids ...	4·81	soluble	0·96
		insoluble	3·85
Digestible fibre ...	26·97		
Woody fibre	34·45		
Ash	10·14	soluble	6·06
		insoluble	4·08
Amide compounds, } Chlorophyll, fat, &c. }	12·91	total nitrogen ...	0·882
		amide nitrogen ...	0·112
	100·00		

There is a remarkable difference in nitrogen yield between this sample and that analysed by Mr. Guthrie. The apparent inferiority of this crop is attributed by Mr. Brünnich to the facts that the grass was over-ripe when cut, and had been grown in exceptionally dry weather, and on a larger scale than the Wollongbar sample.

From the time that the first seeds in each spike are mature, the ripening of the whole spike occupies about three weeks. In consequence, the harvesting of the seeds is a matter of some difficulty. Those collected during the first few days of ripening are of better quality than those shed later, for a much larger proportion of them are mature, and will germinate. To produce a good pasture on well-prepared land, 5 to 8 lbs. of seed per acre is recommended as being sufficient. The plant should be allowed to shed its seed

until the growth is established. The best time for sowing is in the beginning of the warm season, just before the rains are expected. Under favourable conditions the seeds germinate in 18 to 21 days. For quick results, and also on account of the difficulty of obtaining reliable seed, the planting of "roots" is recommended, particularly when a mixed pasture is being formed. At Wollongbar the "roots" are planted 4 or 5 feet apart, each way, and the ordinary grass or clover seeds are afterwards sown in their proper seasons.

Sets for planting can be obtained from the Wollongbar Experimental Farm, Richmond River, New South Wales; seeds are supplied by Messrs. Law, Somner & Co., 139–141, Swanston Street, Melbourne.

II.—GINSENG IN CHINA.

(*Aralia quinquefolia.*)

Aralia quinquefolia grows in Japan, Corea, and Manchuria, also in Saghalien, in the mountains of China from north to south, in the Himalaya, and in a part of North America which comprises the East of Canada and the Temperate and Eastern United States. In this extensive area can be recognised a number of varieties differing in the leaves and rhizome, or in the length of the peduncle; and it would seem that they differ also in medicinal properties.

China is almost the only market for the drug. There, where medicine works hand in hand with the occult sciences, where the efficacy of the stuff commonly sold to heal is not inquired into, Ginseng, discarded after trial in Europe and America, remains the panacea for almost all ills.

American Ginseng is grown for export to China. It was the subject of a notice in an earlier issue (*K. B.*, 1893, p. 71), and an excellent account of it by G. V. Nash, is published as *Bulletin No.* 16 by the United States Department of Agriculture, Division of Botany. We shall not concern ourselves with it except in its relation to China.

A mature plant of Ginseng consists of a stem 1–2 feet high, bearing at the top an umbel of inconspicuous greenish-yellow flowers, and towards or above the middle a whorl of four or five compound leaves. The leaflets are 5–7 in number and are lanceolate or lanceolate-obovate or obovate, rather regularly serrate, acuminate, and with white bristles sparsely scattered along the veins.

The stem which bears the leaves and flowers is renewed every year from an underground rhizome, to which in some forms (probably in all at one period of the life of the plant) is attached a fleshy root. In the American and Manchurian varieties the root is large and the rhizome generally very small, but in others the rhizome is large and fleshy. Both rhizome and root afford commercial Ginseng.

The plant is of long duration. The rhizome elongates year by year, though the growth may be but little, and the old fleshy root may give place to a fresh one; it may branch, or may give rise to two or three fleshy roots, according to the vigour of the plant. But these features vary in the different varieties which will be

described ; and branching is more common where the plants are well nourished, as in cultivation. One old rhizome preserved in a museum in America has 65 scars of annual shoots.

Fleshy roots are sometimes human in form, a likeness not hard to increase by a little dexterous snipping. Such roots are the most valued in China, and sell at an enormous price. A Chinaman who cannot afford the long figure necessary for these is content to purchase rhizomes, and the poorer put up with scraps, classified in the *Chinese Customs Reports* as "Beards, Clippings, &c."

The rhizome may be as thick as the little finger, or even thicker ; when gathered in the height of summer it shrivels in drying and becomes much wrinkled ; sometimes it closely resembles that of *Polygonatum officinale* (Solomon's Seal) ; sometimes it is swollen at intervals.

We recognise the following varieties of *Aralia quinquefolia* ; for convenience a dichotomous key for them is given :—

Peduncle hardly exceeding the petioles ;
  scale at the base of the annual shoot papery ; American plant ... ... type.
Peduncle conspicuously exceeding the petioles ; scale at the base of the annual shoot sometimes fleshy ; Asiatic plants :
  Larger leaflets so narrowing towards the base that the sides are somewhat rounded :
    Broadest part of the larger leaflets at or above the middle :
      Rhizome very short ; root fusiform ... ... var. Ginseng.
      Rhizome long, creeping, with fusiform roots attached or not (?) :
        Leaflets with few setae, very conspicuously shining ; petiolule $\frac{1}{8}$–$\frac{1}{2}$ in. long, sometimes longer var. repens.
        Leaflets with plentiful setae, usually less shining ; petiolule mostly $\frac{1}{2}$–1 in. long :
          Leaflets, when dry, hardly translucent, large ... ... var. major.
          Leaflets, when dry, translucent :
            Setae very abundant, leaflets to $4\frac{1}{2}$ ins. long ... var. pseudo-Ginseng.
            Setae less abundant, leaflets to $5\frac{1}{2}$ ins. long ... var. notoginseng.
    Broadest part of the larger leaflets near the base ... ... var. angustifolia.
  Larger leaflets, so narrowing towards the base that the sides are straight... var. elegantior.

Description of the Varieties.

Aralia quinquefolia, *Decne. & Planch. in Rev. Hortic.*, sér. iv., iii., p. 105, (typus ad varietates discriminandas ex parte descriptus). *Foliola* majora late obovata, conspicue acuminata (acumine $\frac{1}{4}$–$\frac{1}{2}$ poll. longo), basi rotundata vel obtusissima, margine serrata, dentibus majoribus iterum minute serrulatis, $3\frac{1}{2}$–$4\frac{1}{2}$ poll. longa, $1\frac{3}{4}$–2 poll. lata, lævia, subnitida. *Pedunculus* petiolis fere æquans vel rare sublongior; *Umbella* singula. *Radix* crassa fusiformis; *rhizoma* sæpe breve.—*Kew Bulletin*, 1893, p. 71; *Panax quinquefolium*, Linn.; *D.C. Prod.*, iv., p. 252; *Bot. Mag.*, t. 1333; Barton, *Med. Bot.* (1818), ii., t. 45, p. 191; Nees, *Ic. Pl. Med. oder Sammlung Off. Pfl.* (1828) fasc. 5, t. 15; Bigelow, *Med. Bot.*, ii., t. 29, p. 82; Butz in *Pennsylvania Dept., Agric. Bull.*, No. 27, pp. 8–13; Nash in *U.S. Dept., Agric. Bot. Bull.*, No. 16, pp. 5–12; *P. Ginseng*, Spach, *Hist. Nat. Végét.*, t. 39.

Hab. United States and Canada.

Var. Ginseng, *Guide to Kew Museum, No.* 1 (1886), p. 87. *Foliola* majora elliptico-oblonga, acuminata (acumine ad 4 lin. longo), basi rotundata vel obtusissima, margine regulariter serrata, dentibus parvis, ad $3\frac{1}{2}$ poll. longa, ad $1\frac{3}{4}$ poll. lata, setis paucis ad venas majores obsita, vix nitentia; petiolus ad $\frac{3}{4}$ poll. longus. *Pedunculus* petiolis cum laminis longior. *Umbella* speciminibus visis singula. *Rhizoma* perbreve; *radix* fusiformis.—*Kew Bulletin*, 1892, p. 107. *Aralia quinquefolia*, A. Gray, in Mem. Amer. Acad. Sc., n.s., vi., p. 391; Hemsl. in Journ. Linn. Soc. Bot. xxiii., p. 338. *Panax quinquefolium*, var. *Ginseng*, Regel & Maack ex Regel in *Gartenflora*, 1862, p. 314, t. 375; *P. quinquefolium* var. *coreense*, Sieb., in *Verhandl. bot. Genootsch.* xii.; *Panax Ginseng*, C. A. Meyer in *Bull. Phys.-Math. Acad., St. Petersb.*, i., 1843, p. 340; Franchet and Savatier, *Enum. Fl., Jap.*, i., p. 192 *in nota*; *Useful Plants of Japan* (published by Agric. Soc., Japan, 1895) p. 115, t. 431; *Honzo-zufu*, vol. i., figs. 5, 6 and 8; *Somoku-zusetsu*, vol. iv., fig. 45.

Hab. Manchuria, and cultivated in Japan and Corea. Usuri, *Maack*; Chang-pei-shan, between Mukden and Kirin, *James*.

"Ninzin," the Japanese name, is of very wide application. *Sium Ninsi* gets its specific name from it and many Umbelliferæ, among them the carrot, have it in combination with some epithet for their Japanese name.

1279 **Var. repens,** *Burkill.* *Foliola* majora elliptico-ovata vel late obovata, acuminata (acumine ad $\frac{1}{2}$ poll. longo), basi subacuta. margine regulariter serrata vel plantarum japonicarum forsan vix maturatarum irregulariter argute apicem versus grosse serrata, dentibus iterum serratulatis, ad 5 poll. longa, ad 3 poll. lata vel raro multe angustiora, lævia, nitentia; petiolulus brevis. *Pedunculus* petiolis cum laminis, saepe bis longior. *Umbella* singula vel umbellis lateralibus parvis consociata. *Rhizoma* repens, elongatum; *radicem* crassam (*teste scriptorum*)—*Panax repens*, Maxim. in *Bull. Acad., St. Petersb.*, 1868, p. 64; Franchet and Savatier, *Enum. Pl. Jap.*, i., p. 192; *Useful Plants of Japan* (published by Agricultural Society, Japan, 1895), p. 114, t. 430. *Honzo-zufu*, vol. i., fol. 7; *Somoku-zusetsu*, vol. iv., fig. 47.

Hab. Corea and Japan. Japan: Mt. Yanazu, and Hakone, *Collector for Imperial Univ., Tokyo;* Mambetisu, *Faurie;* Osorezan, *Faurie;* Hakodate, *Maximowicz.* Corea: Tsusima island, *Wilford*, 825.

This is the Tochiba-ninzin of Japan; possibly it exists in two forms.

1280 **Var. major,** *Burkill. Foliola* majora fere elliptica vel elliptico-ovata, acuminata (acumine fere ad 1 poll. longo), basi rotundata vel obtusa, margine regulariter serrata, dentibus nec semper serratulatis, ad 10 poll. longa, ad 4 poll. lata at tamen vulgo 5–6 poll. longa, 2–2½ poll. lata, setis ad venas obsita, nec nitentia. *Pedunculus* talis ut in var. *repente* sed longior, ramosus, floribus numerosis. *Rhizoma* repens, frequentius late repens, nunc cicatricibus conspicue notatum, nunc nodulosum; *radicem* crassam non vidi.

Hab. Central China. Hupeh, Ichang, *A. Henry*, 932; Chien shih, *A. Henry*, 5396c; Hsingshan and Fang, *A. Henry*, 5396g and s; Kwei, *A. Henry*, 7728; Szechuen, N. Wushan, *A. Henry*, 7121.

Var. pseudo-Ginseng, *Burkill. Foliola* majora elliptico-obovata vel obovato-lanceolata conspicuissime acuminata (acumine ad ¾ poll. longo), basi subacuta, marginibus argute serrata, dentibus serrulatis, ad 4½ poll. longa, ad 1½ poll. lata, setis conspicue obsita, vix nitentia, infra pallida, translucentia. *Pedunculus* petiolis cum laminis æquilongus 1-umbellatus. *Rhizoma* breve; *radix* fusiformis, lignosa. — *A. pseudo-Ginseng* Benth. ex. C. B. Clarke in *Hook. fil. Fl. Brit. Ind.*, ii., *p.* 721 (*in part*). *Panax pseudo-Ginseng*, Wall. *Pl. As. Rar.* ii., 30.

Hab. Nepal. Shevpore, *Wallich*, 3730.

1274 Var. **notoginseng,** *Burkill. Foliola* majora obovata, conspicue acuminata (acumine ½–⅔ poll. longo), basi subacuta, margine argute serrata, dentibus serrulatis, ad 5½ poll. longa, ad 2 poll. lata, setis ad venas obsita, nitentia, translucentia. *Pedunculus* foliis longior, 1-umbellatus, floribus numerosis. *Rhizoma* ad formam varietatis *repentis* tendens, crassum; *radicem* fusiformem in planta perparva vidi.

Hab. South China. Yunnan, mountains near Mengtze, 5,000 ft., *A. Henry*, 11,407; Szemao, 4,500–6,000 ft., *A. Henry*, 12,259, 12,259a.

1275 Var. **angustifolia,** *Burkill. Foliola* majora lanceolata conspicuissime acuminata (acumine 1 poll. longo), basi rotundata vel angustata vel subcordata margine minute serrata, ad 5½ poll. longa, vix 1 poll. lata, setis sparsim obsita nec nitentia infra pallida; petioluli conspicui. *Pedunculus* petiolis cum laminis æquans. *Umbella* plerumque singula. *Rhizoma* repens vel crassum vel nodulosum.—*A. pseudo-Ginseng*, Benth. ex. C. B. Clarke in *Hook. fil. Fl. Brit. Ind.* ii., *p.* 721 (*in part*).

Hab. Sikkim, Bhotan and Khasia Hills. Sikkim, Lachen, 9–12000 ft., *Hooker;* Sundukphoo, 10000 ft., *C. B. Clarke*, 35,685d; Neebay, 7000 ft., *C. B. Clarke*, 25,338; Buckeen, 7,500 ft., *C. B. Clarke*, 25,301a; Rungbee, 5000 ft., *C. B. Clarke*, 12,336, 12,411b; Kula Panee, *Hooker*, 1,320; Bhotan, *Griffith*, 2,077, 2,658; Khasia, 5000 ft., *Hooker*.

Var. **elegantior**, *Burkill*. *Foliola* majora oblanceolata, acuminata (acumine ½ poll. longo), basi acuta, marginibus argute serrata, dentibus ½ lin. longis, ad 3¾ poll. longa, ad 1⅛ poll. lata, infra pallida. *Pedunculus* petiolis cum laminis ter longior. *Umbella* plura, terminalis magnus. *Rhizoma* longe repens, nodulosum.

Hab. Central China. Hupeh, Fang and Hsingshan, *A. Henry*.

Of these varieties, var. *Ginseng* is the source of Manchurian Ginseng, var. *repens* of the larger part of Japanese Ginseng, and var. *notoginseng* of that of South China. The rest, excepting the American type, are of no known economic value.

Nothing of value to us is to be gained by an examination of the botanical works published in Europe before A.D. 1700. Ginseng root was known by its great repute in China, but the leaves and flowers of the plant were generally quite incorrectly represented. The first important contribution was made by the Jesuit missionary Jartoux, who in 1709 was employed by the Emperor of China to make a map of his domains. This Emperor, it may be added, was a Manchu, and his house first sat on the throne of China in 1644, having conquered it from Manchuria. Part of the royal revenue of the new Manchu emperors came from a monopoly of the Ginseng trade, the emperor reserving to himself the right of trading in the Manchurian drug. Jartoux describes his meeting with an army of 10,000 Tartars collecting Ginseng for the emperor (*Phil. Trans. Roy. Soc.*, (*abridged*) vi., p. 58). "These herbarists," he says, "carry with them neither tents nor beds, everyone being sufficiently loaded with his provision, which is only millet parched in an oven. So that they are constrained to sleep under trees, having only their branches and barks, if they can find them, for their covering." Each collector was employed on the condition that he "should give His Majesty two ounces of the best, and that the rest should be paid for according to its weight in fine silver. It was computed that by this means the emperor would get this year, 1709, about 20,000 Chinese pounds of it, which would not cost him above one-fourth part of its value."

Jartoux adds that the district producing the Ginseng was fenced off and guarded by a patrol, lest the Chinese should break in on the monopoly, "their greediness after gain inciting them to do so"; and that writers who affirmed that Ginseng grew elsewhere in China were mistaken. In the last statement he must have been in error, for 60 years after it was reported from South China by another traveller—Osbeck (*Voyage to China*, i., p. 223).

The royal monopoly does not exist now; but a temporary prohibition against the importation of American roots made some sixty years later, and the present cultivation in the Royal Hunting Park north of Pekin of a certain very highly priced kind, are probably the outcome of it.

Jartoux strangely prophesied the discovery of Ginseng in Canada; he described its habitat in China accurately, and added, "all this makes me believe that if it is to be found in any country in the world, it may be particularly in Canada, where the forests and mountains, according to the relation of them who have lived there, very much resemble these here." A French missionary,

Sarasin, ascertained that it grew near Quebec, but though he found it to be used a little medicinally by the Indians, it had no extraordinary reputation with them.

From Canada the French of Quebec began to export it through France to China. The profits at first were very great, and Indian labour, save for the collecting of Ginseng, became unobtainable about Quebec. These profits led to the discovery of the root over some of the States of New England, and to the exportation taking large proportions. The usual exhaustion of the supply followed; poor roots were gathered, until a miserable cargo sent from Bordeaux to China found no purchaser, and for the time the trade terminated about 1810. When later the trade was renewed American roots took the lowest price and continue to do so.

Ginseng is a tonic and stimulant and some attribute to it aphrodisiac properties, but these are doubtful. The Chinese believe that it prolongs and sustains life more than any other drug.

It has been tried in Europe and North America, and almost discarded except as a demulcent. Bigelow says of it (*Med. Bot.*, ii., p. 82) that in his time it was sold as a masticatory, and adds, "it is certainly one of the most innocent articles for this purpose. Its place in medicine is near liquorice, but it is not active."

Undoubtedly European opinion is largely based on experiments with American roots. It is not clear that the Asiatic root is as inert as the North American. Some writers say it is more active, which seems possible, but an exact statement cannot be made. Possibly the most valued kinds are really less inert than others.

The cultivation of Ginseng is very similar everywhere. The necessary shade has to be provided either by planting under trees, or by some form of covering. Butz (*op. cit.*) at p. 21 figures the lattice shading used in the United States; and for the methods in vogue in North America reference can be made to his article, and to the *Kew Bulletin* (1893, p. 71).

The method in use in Japan is described by Fesca in *Beiträge zur Kenntniss der Japanischen Landwirthshaft*, ii., pp. 333–336. The plants are shaded throughout the summer by means of a thatched straw roof.

Henry, in a letter to Kew, describes the cultivation in South China as follows:—

"My native collector procured the specimens sent forward under Nos. 11,407 and 11,407A in the mountains lying about 50 miles south-east of Mengtse. Here the cultivation of the plant is carried on in small plots in clearings of the forests by some of the peculiar aborigines named *Yao-jen*. The seeds are sown about 5 inches apart in carefully prepared soil. In the second year the young rhizomes, from which the leaves and rootlets have been cut off, are transplanted to other plots; and in the fourth year the rhizomes are dug up and sun-dried. The growing plants are protected from the glare of the sun by rude stagings made of vertical stakes across which are laid leafy branches of trees. This mode of cultivation under partial cover is also used by the Chinese in Hupeh in the case of huang-lien (*Coptis Teeta*, Wall.), another valued drug-plant.

"The specimens sent include both wild and cultivated plants from the same neighbourhood; but my native collector thinks that the wild specimens are only escapes from cultivation. In the mountains, which I visited, all around Mengtse, I never met with this form of Aralia growing wild.

"In Hupeh and Szechwan I found in the mountains growing wild several forms of Aralia of the section *Ginseng*, to which the natives gave the name of *San-ch'i*, and these forms were referred at Kew to *Aralia quinquefolia*, Planch. et Decne., and *Aralia repens*, Maxim., but it is possible they may all belong to only one species. *Aralia bipinnatifida*, C. B. Clarke, also occurred, but only in the highest parts of the mountains; and it seems to be a well-marked distinct species. No cultivation of *San-ch'i* occurs in Hupeh or Szechwan; and the rhizomes of these wild plants were of no value commercially. *Shan-yeh*, leaves of a Panax, exported from Hankow as a drug, is however derived from these wild forms, but it is of no importance, the quantity in commerce being most trifling.

"It is remarkable that *Ginseng* and *San-ch'i*, perhaps the two most esteemed drugs in China, one occurring in the extreme north, the other in the south, should be so closely allied botanically.

"With regard to the name *San-ch'i*, while it is primarily given to the Kwangsi-Yunnan drug, yet several other plants are often spoken of under the name of *San-ch'i* or *t'u-san-ch'i*. These plants are cultivated in pots and are of no particular value as medicines in the eyes of the Chinese. They are *Gynura pinnatifida*, DC., *Sedum Aizoon*, Linn., and in Formosa, also, *Panax fruticosum*, Linn.

"AUGUSTINE HENRY.

"Szemao,
"12th July, 1898."

The crop requires 3–4 years growth to reach the right age for profit. This period is the same in North America, Japan and China. The plant is always grown from seed, and the first leaves of the seedlings may be much more cut than those of the mature plants. This is especially the case in var. *notoginseng*, and in it the very young rhizome probably produces two or three shoots in the first year.

The great demand which has caused so much extinction of the plant in the United States has caused the same in Asia. In the time of Jartoux it seemed to occur nearer Pekin than now (Bretschneider, *Early Eur. Res.*, p. 19). Legislation has been resorted to in both places. In North America the State of Virginia enacted (1875–76) that no Ginseng should be dug between March 15 and September 15; in Canada the law determined the forbidden period to extend from January 1 to September 1; other laws are in force elsewhere. In Corea, (*fide James*), no Ginseng may be sold before a certain date, and he describes the way in which the wild roots are sought for.

The structure of the "root" in section is not dissimilar to that of Chærophyllum, in which the large quantity of parenchymatous xylem makes the structure fleshy; in the pith and elsewhere are star crystals. The outer tissue of the bark is torn and full of

A.D.Mulla, del.

Microtœna cymosa. Prain.

crystals and near the periphery are a few resin (?) canals. The latter are in such a position that they may be removed by the scraping which the root often undergoes in preparation for the market.

Adulteration is not uncommon. Rootstocks of *Centaurea*, *Adenophora*, *Angelica*, *Platycodon*, *Rehmannia*, etc., are used in the East, *Campanula glauca* being said to be common in Japanese Ginseng. *Sium Ninsi* was formerly confused with Ginseng, perhaps, because it was offered as a substitute.

Roots of Ginseng once used for making an extract are not uncommonly dried and fraudulently sold for good roots.

An enquiry into the medicinal value of the more highly priced Ginsengs may prove of some scientific interest. The sums given, *e.g.*, three hundred shillings for one single root, would seem incredible were the drug altogether inert.

When Louis XIV., of France, received envoys from Siam, part of the royal gift they brought was in Ginseng.

ISAAC HENRY BURKILL.

III.—KHASIA PATCHOULI.

(*Microtœna cymosa*, Prain.)

With Plate.

Commercial Patchouli is derived from a species of *Pogostemon* [*Kew Bulletin* for 1888, p. 73]. This plant is sparingly grown in India, and is more generally cultivated in the Malay Peninsula and Archipelago. It also occurs in the Philippines; whether it be cultivated there is not clear. It is, moreover, possible that more than one species of *Pogostemon* may be cultivated; this point it is hoped may be dealt with in a future note.

In Malaya the cultivation of Patchouli is largely in the hands of Chinese settlers. This fact may possibly explain a suggestion which has been made that China is the original home of the Patchouli-yielding *Pogostemon*. However, no *Pogostemon* with the Patchouli smell has hitherto been reported from China.

There is, however, no reason why Chinese settlers in Malaya should not be familiar with Patchouli-yielding plants, for the Patchouli odour is not confined to the genus *Pogostemon*. It is associated with more than one species of the genus *Microtœna*, the majority of which are natives of China. One species, *Microtœna robusta*, Hemsley, a native of Szechuen, where, according to a note by M. Farges, it is known as *Chi-kiang-tsao*, is employed on account of its odour much as the Patchouli imported from Malaya is used in India. Another species, *Microtœna cymosa*, Prain, of which a figure is here given, appears to be similarly used in South-Eastern China (Kwang-tung) and in various parts of Indo-China. There is also a solitary record of its occurrence in Java. It has been already referred to in the *Kew Bulletin* [1888, p. 74] under the provisional name *Plectranthus Patchouli*.

An examination of the herbarium material of this species shows that it was first collected in the Eastern Naga Hills, Assam, by Griffith about 1839, was shortly afterwards collected by Jenkins

in some part, not specified, of Assam, and was again collected, in 1845, by Zollinger, in Java. No one appears to have met with it again till Clarke obtained it in 1871 in the Khasia Hills, Assam; Clarke's field note says "cultivated in Khasia and said to be the true Patchouli." In 1884 the species was collected in Kwang-tung by B. C. Henry, and in 1885 it was met with by Clarke in Manipur, a small State situated between Assam and Burma. Since then it has been obtained in Tonkin by Balansa, in the Burmese Shan States by General Collett, and in the Shan States of Siam by Lord Lamington.

The small local demand for Patchouli in Calcutta is said at one time to have been met by supplies from the Khasia Hills. The Khasia Patchouli has, however, been replaced in the Calcutta market by the Malayan article. Clarke's note of 1871 and a subsequent note by Mann, in 1887, of the occurrence of *Microtæna cymosa* as a cultivated plant in the Khasia Hills shows that the practice of growing it had long survived the loss of an outside market. The plant is not wild in the Khasia Hills, and Clarke has noted that even in Manipur he suspects that it may have been originally planted. This suspicion extends not only to the Assam records of Griffith and Jenkins, but to the Shan records of General Collett and Lord Lamington, and to one out of three records of the plant from Tonkin. There is hardly room for doubt that Zollinger's record from Java points to *M. cymosa* as an introduced species in that island; during the past 60 years it has not again been reported from Malaya.

In two Tonkin localities recorded by Balansa, the nature of his notes and the character of his specimens point to the plant being there a wild species; the same is true of some of the specimens collected in Kwang-tung by B. C. Henry, and subsequently by Ford. There is, therefore, hardly room for doubt that the isolated record of the Khasia Patchouli from Java may be explained by its introduction to that island by Chinese settlers, and there are good grounds for supposing that its occurrence in the Shan country and in Assam is due to its having spread thence as a cultivated plant from South-Western China or Tonkin.

D. Prain.

IV.—TOBACCO CULTIVATION IN SOUTHERN SIAM.

The following notes on the cultivation of Tobacco in the Northern Siamese Malayan States of the Malay Peninsula were made by Mr. W. W. Skeat during the Cambridge exploring expedition in 1900. Tobacco has never been successfully cultivated in the Southern Malay States, probably on account of the inferiority of the soil.

At a village near Perlis I made enquiry about the local methods of growing tobacco.

There are two kinds of tobacco generally grown here :—

(1.) Tembakau Chĕnak.
(2.) Tembakau Lērek.

The Tembakau Chĕnak, which is said to derive its name from a village in "Ulu Patani," has the smaller leaf of the two, but it

can most easily be distinguished from Tembakau Lērek by the fact of the latter having two small lobes or stipules (?) (or "ears," as the Malays call them) close to the stem at the base of the leaf. The leaf of Tembakau Lērek is said to run to a full hasta (about 18 inches) in length by about 8 inches in breadth, whereas the leaf of Tembakau Chĕnak runs only to about 12 inches in length, with a breadth of 6 inches. The former would appear to be but little inferior to the tobacco grown by the Bataks in the neighbourhood of Deli, in Sumatra, where I am informed that a good average leaf to look for in native gardens would be, say, 18 inches by 12 inches (or a little less). In Sumatra, however, the natives have had the advantage of being able to pick up ideas for the improvement of their tobacco from the well-known tobacco plantations of the Europeans at Deli, whereas the Peninsular Malays have had nothing but the light of Nature to assist them. On the whole, the Malays of Perlis prefer the Tembakau Chĕnak or smaller-leaved variety, as they say it "turns red" (*i.e.*, ferments) more quickly than the other.

The seeds are sown in small cylindrical pots, which are made of rolled-up screw-palm leaves, and which are deposited upon a carefully prepared bed or nursery. These rudimentary pots measure about 3 inches across, and have no bottom. Their main use is no doubt to keep the earth from being too much shaken away from the roots at planting out.

The young plants, as soon as they are big enough for transplanting (usually when about 20 days old), when the leaf is a palm's-breadth across, are put out in a small and carefully fenced clearing and allowed to grow for three months, at the end of which time the first leaves should be ready for picking. Both kinds are topped just before they fruit, but a single shoot is often allowed to grow again when necessary in order to provide seed for the next year's crop. The bigger sort (Tembakau Lērek) requires to be thoroughly manured twice (with bullock and fowl dung), but the Tembakau Chĕnak only requires a single manuring, which is given it when it is planted out.

Only one crop a year is planted, and the yield is reckoned as follows :—

10 plants of T. Chĕnak will only yield 1 chupak ;

16 trees of T. Lērek will yield 6 katis (or a gantang less 4 tahils, as it is usually reckoned).

The sale for the leaf is only local, and both varieties fetch the same price as per weight, *i.e.*, 50 cents per gantang ; whereas 1 kati of Deli or Langkat tobacco is sold here by the Chinese for 75 cents.

The leaves are picked in the early morning, and are then washed, dried, and put aside in a dry shady place until the evening, when they are piled and pressed for the sweating process. Care must, however, be taken to see that they are fairly dry before sweating, as otherwise they will go bad (jadi bohuk) and become unfit for use.

The leaves of both varieties are allowed to ferment as follows :—

One hundred leaves of tobacco are carefully piled upon each other, and are then deposited between a couple of stout leaf-wrappers. Each leaf-wrap consists of a banana leaf and an areca

palm leaf, the banana leaves being placed outside. The pile of leaves thus composed is rolled tightly up in an ordinary Malay sleeping-mat (in order to keep in the heat and so promote "sweating") and put aside for three or four nights. It is then unrolled and inspected, and when any leaves that have turned red (*i.e.*, fermented) are observed, they are removed from the pile and the remainder rolled up again and put back till the next day, when they are once more examined, the process being continued until the fermentation of all the leaves is complete.

The fermented or "red" leaves when extracted from the pile are sliced off into very fine shreds or filaments by means of a special (tobacco-cutting) apparatus and are then exposed to the sun upon a frame until they are thoroughly dry, when they are tightly packed in cylindrical receptacles (measuring about 12 inches in depth by 8 inches across, and made of screw-palm leaves), when they are ready for sale if required.

In Ulu Kelantan the process was similar, the following rules being observed :—

(1.) Sow in fifth month (Sĕmai) ; in a nursery.
(2.) Plant out in sixth month (Chĕdung ?).
(3.) Tend and manure it carefully.
(4.) Pick from three to four months later (Pĕtik).

[N.B.—For reasons of magic, the sowing takes place at night, when the enemies of the plant cannot see the seed. So, too, the planting out takes place in the early morning, the young plants being treated like new-born infants, as is the case with the first of the young rice-seedlings.]

After picking the leaves are piled up in a heap (di-pram) for three or four nights with branches over them. This is intended, it is said, to "ripen" them. The riper (*i.e.*, fermented) ones are afterwards selected and shredded on the "Kuda-kuda" with a long sharp knife. The shreds are then deposited upon a bamboo frame (anchak) measuring about 2 hasta (cubits) in length by 1 hasta in width, four or five divisions (tēpek) going to each frame or anchak (usually reckoned at 1 kati). *Late* tobacco is called "sayup." When dry the tobacco is packed in round receptacles made of palm-cloth (upih), which are called ēpåk.

The shredding machine is called "Pasong tembakan" or "Kuda-kuda." It consists of a short horizontal wooden trough or channel along which the leaves are pushed until they reach a circular opening in what is called the "mask" or "topeng" of the machine. On reaching this opening the leaves are pushed gradually through it, the protruding part being sliced off in fine strips with a sharp knife. The trough, which is about 3 feet long, is supported on two uprights which fit into wooden blocks.

A specimen of this machine, which was bought in Ligeh, is now in the Cambridge Museum. The shredding knife sometimes has a bent neck or haft ("berk'rēko^{n}k").

V.—WOAD.

(*Isatis tinctoria*, L.)

Enquiries are from time to time addressed to Kew respecting the cultivation of woad. This still continues in the Eastern Counties. The following interesting account of it, by Mr. Francis Darwin, F.R.S., and Professor Meldola, F.R.S., is borrowed from *Nature* (November 12, 1896, pp. 36, 37) :—

"A reference to any old gazetteer under the name Wisbech will show that this town was once an important centre of the English woad industry. It is not generally known, however, that woad is still grown and worked up in a few localities, and it was with some surprise that we learnt that the processes connected with the manufacture might be seen in operation at Parson Drove, near Wisbech, at the present time. There are said to be three other places where the plant is cultivated and worked up for use by dyers—one near Boston and two near Holbeach, in Lincolnshire ; but at these centres the introduction of steam power has destroyed the primitive character of the manufacture. As an interesting survival of the past, the mill at Parson Drove is well worthy of a visit.

"It is hardly to be expected that a feeble tinctorial substance, such as woad, can retain a permanent footing as an English product in view of the circumstance that it has to compete with indigo, as well as with its modern coal-tar substitutes. The thought that this old-time industry, like the potash-making in Essex,* is sooner or later destined to become extinct, has led us to place upon record the information which we gathered during a visit to the Parson Drove mill in July of this year. We may add that descriptions of this mill were given in the *Gardeners' Chronicle* in 1881† and 1882 ; but, as we obtained later and more detailed statements on the spot, concerning the actual operations as now conducted, it may be of interest to chronicle the facts once again while it is still possible to get particulars from the woad-men at first hand.

"The leaves of the plant (*Isatis tinctoria*) are wrenched off at the base by the pickers, the root being left undisturbed, so as to permit the growth of a second crop. The first process consists in crushing the leaves to a pulp under rollers. The latter, of which there are three at the Parson Drove mill, are hollow, slightly conical, wooden drums, with about two dozen iron cross-bars arranged round the circumference, these iron bars furnishing the effective crushing edges. The three rollers are geared to a long projecting horizontal pole, which is made to move round by means of a horse. The pulpy mass resulting from the crushing operation is then kneaded by hand into balls, about the size of cricket-balls, on a wooden stage, the balls, when made, being placed in three rows on wooden trays, which, as they are packed, are pushed up a sloping plank till high enough to go on to the

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"* See a paper by Henry Laver in the *Essex Naturalist*, vol. ix., p. 119.

"† The writer of this article acknowledges, as the source of his information, a recent paper in the *Friends' Quarterly Examiner*. An interesting popular account of the mill appeared in *Aunt Judy's Annual* volume in 1883."

head of a man who stands at the end to receive them. Each tray, as it is delivered, is carried to the drying sheds. The balls are allowed to dry in the air for about four weeks, and are for this purpose transferred from the trays to wooden gratings arranged in tiers in the roofed, open framework sheds, known locally as 'ranges.' When dry, the balls are again ground up under the rollers, and the material then conveyed to the floor of another roofed shed, where it is sprinkled with water, and allowed to ferment for a period of nine weeks. The shed in which this process goes on is known as the 'couching-house.' The fermenting mass is constantly turned over by the workmen, and water added from time to time. We were told that the fermentation is at first very vigorous, the mass getting quite hot and steaming. At the end of the process in the couching-house the woad is ready for the market, and is simply packed tightly into wooden casks for sending away.

"The primitive character of the manufacture makes it not only of interest as a lingering survival of an ancient rural industry, but the antiquarian and lover of folk-lore may derive instruction from the mode of construction of the rough sheds, and from the technicalities used by the workmen. Thus the term 'couching' is used in a similar sense by maltsters, and is no doubt a Norman survival (Fr. *Coucher*): the sloping plank is called the 'firm' (? form), and the tray on which the pulp is kneaded is known as the 'balling-horse.' The balls were formerly dried on wattles, known as 'fleaks,' a term apparently identical with the word still used for hurdles in Scotland; but these are no longer used at Parson Drove. The central circular shed containing the rollers is built of wooden planks and posts, and thatched with a conical roof; the lateral couching-house is constructed of thick turf walls, with the slabs arranged in a peculiar herring-bone form, and also roofed with thatch. The whole construction was evidently framed with a view to cheapness and simplicity, so as to be easily removable. In the palmy days of the industry the sheds were not permanent erections, but were moved about from one place to another, so as to be near the crops.

"We content ourselves with recording the bare facts without comment or criticism. Any science that lurks behind this ancient manufacture has been found out empirically, and handed down by tradition from a remote past. The imaginative person may indulge his fancy by carrying back the woad industry to that period when the early inhabitants of this country furnished that solitary scrap of personal information which is still the historical stock-in-trade of the average school-boy. It may be well, however, to point out in this connection that *Isatis tinctoria* appears not to be a native of Britain.* We were told that in former times the woad-men were limited to certain families, and that they had traditional chants of their own; but these are passing into oblivion, and we were unable to ascertain the words.† The

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"* In the 'Flora of the British Islands' (ed. 1870), Hooker says: 'The ancient Britons stained themselves with this plant; later the Saxons imported it.' Can it be that even at that remote period the British colour industry could not hold out against continental competition?

"† A verse is recorded by Miss Peckover in the article in *Aunt Judy's Annual* volume for 1883, p. 549."

object of drying the pulp first, and then wetting it again before allowing it to ferment, is not at first sight obvious, nor could we learn why this practice has been found advantageous. The fermentation itself is no doubt a zymolytic decomposition of glucosides. The use of woad as a source of indigo is now very limited, being confined to some of the old-fashioned Yorkshire dye-houses, where it is used in conjunction with indigo in the so-called 'woad vat,' a description of which will be found in any work on dyeing."

As to the present use of woad in manufactures, Dr. Schunck, F.R.S., has kindly supplied the following note :—

Kersal, Manchester,
August 31, 1897.

I AM not aware that woad is still used *alone* without the addition of indigo. Some years ago, when writing an article on blue dyeing for *Ure's Dictionary*, I went to Yorkshire and studied the process of blue dyeing in one of the first establishments there.

I found they used woad, madder, bran, and caustic lime, in addition to indigo. The woad can add very little to the intensity of the colour, its only use, in my opinion, being to start and keep up the process of fermentation which is necessary in order to dissolve the indigo for dyeing purposes. The process is a ticklish one ; it is subject to one or two mishaps ; the vat may either become too alkaline or too acid. In either case the liquor is spoiled, and the indigo is lost or destroyed. I should think better and simpler processes are now employed.

EDW. SCHUNCK.

Museum No. I. at Kew contains (Case 6) a fine series illustrating the details of the Wisbech factory, including an example of the peculiar iron-tool employed for weeding woad. These were presented in 1881 by A. Peckover, Esq., through Professor Oliver, F.R.S.

VI.—MISCELLANEOUS NOTES.

Visitors during 1901.—The number of persons who visited the Royal Botanic Gardens during the year 1901 was 1,460,169 ; that for 1900 was 1,111,024. The average for 1891–1900 was 1,346,861. The total number on Sundays was 594,371, and on week-days 865,798. The maximum number on any one day was 88,543 on May 27th, and the smallest 35 on December 12th.

The detailed monthly returns are given below :—

January	12,923
February	18,450
March	39,513
April	190,878
May	307,052
June	235,726
July	193,936
August	245,598
September	147,108
October	40,242
November	15,717
December...	13,026

COL. SIR HENRY COLLETT, K.C.B.—This distinguished soldier and enthusiastic botanist died on Dec. 21st of last year on the eve of publication of his *Flora Simlensis*. The Kew Staff did the little that was still necessary, and the Director contributed the following "IN MEMORIAM" :—

I have watched the progress of this work with sympathy and interest. I had not thought that the death of its distinguished author would impose on me the sad task of writing these words to his memory.

Sir Henry Collett was born in 1836 and entered the Bengal Army when he was only nineteen. His military career was one of great distinction. The Commander-in-Chief, Field Marshal Earl Roberts, K.G., V.C., etc., has with great kindness given me the following account of it.

March 1, 1902.

Dear Sir William Thiselton-Dyer,—I was indeed well acquainted with the late Sir Henry Collett, and had a great regard for him. Throughout his military life he was as persevering and thorough as you describe him to be in the preparation of his book on the indigenous plants of Simla.

Sir Henry Collett took a prominent part in several campaigns. As quite a boy he served during the Indian Mutiny. The following year, 1858, he took part in the Sittana Expedition on the N.W. Frontier of India.

Five years later (1862–63) he was with a force employed in the Cossya and Jyntea hills on the S.E. Frontier of India, and received a severe wound in the ankle, which lamed him for life.

In 1867–68 he took part in the Abyssinian Expedition, and it was then, I think, I first made his acquaintance

When the second Afghan war broke out in 1878, I applied for Major (as he then was) Collett to be attached to my column as Assistant Quarter-Master General. He remained with me during the two years the war lasted, and afforded me very valuable assistance. It was from information gained by Major Collett, by means

of a personal reconnaissance he made, that I was enabled to adopt the Spingawi route and thus turn the strong position held by the Afghans on the Peiwar Kotal.

Between the years 1886–90, Colonel Collett served first as Quarter-Master-General in India, then in command of a brigade in Burma, and subsequently in command of the Eastern Frontier District during the Chin-Lushai Expedition. In 1891, Major-General Collett commanded the expedition to Manipur, and acted as Chief Commissioner of Assam.

General Collett was frequently mentioned in despatches, he was thanked by the Government of India for his services in Assam, and before he retired from the Army in 1893, he had the honour of being made a Knight Commander of the Bath.

No one who was acquainted with Sir Henry Collett could fail to appreciate his kindly disposition and charm of manner, as well as his many soldierly qualities. He was one of the few officers in the Army I have met with who was as devoted to science as to his professional duties.

Sir Henry Collett's retirement was a serious loss to the Indian Army, but I rejoice to think that the last years of his life were spent in pursuits which were thoroughly congenial to him, with a result which confirms my high estimate of his application, resolution, and ability.

Believe me,
Yours very truly,
ROBERTS.

For nearly forty years Collett was actively employed in military duties, and mostly in India. From his youth he had a strong taste for scientific studies. It is remarkable that he was able, practically unaided, to prosecute them with such success. Our common friend, Mr. J. S. Gamble, C.I.E., F.R.S., late Director of the Forest School, Dehra Dun, has given me some interesting particulars. He "used to say of himself, that his wound, obtained at an early period of his service, incapacitated him for the games which most soldiers, at any rate young men, delight in." He first took up astronomy and physics. Mr. Gamble continues: "I always used to envy him his power of application and his wonderful capacity of concentrating his attention on a new subject and not resting till he had got to understand it. . . . He had a wonderfully clear power of explaining. . . . When the discoveries of the telephone and microphone etc. were made, he was much interested; and he amused himself by constructing a microphone and sending messages from one end of his house to the other. Often I have spent some hours over it with him, and he was delightfully pleased when he could induce a fly to walk on the drum and listen to its footsteps."

Collett seems to have first become interested in botany in 1878 during the Kuram Valley expedition, perhaps influenced by the late Brigade-Surgeon Aitchison, C.I.E., F.R.S.

The latter wrote: "Early in 1879, I proposed to the Quarter-Master-General, Major Collett, that it might prove advantageous to science if some one were appointed to accompany the column in the contemplated advance on Kabul. General Roberts at once

recommended the proposal to superior authority, which ultimately resulted in my being attached to the force as botanist." The result was embodied in the important paper published in the "Journal of the Linnean Society" (Botany, xviii. pp. 1–113).

Late in 1879 Collett paid a brief visit to England. He wrote to Sir Joseph Hooker on September 16th, apologising for his inability to deliver a letter from Aitchison in person, having "to return immediately in consequence of the news which has been received from Kabul." He adds: "I had not much time when in Kuram for botanical pursuits, but I collected most of the plants which were new to me, and some of them will be forwarded to you."

It was, however, about 1885 that Collett's attention was seriously turned to botanical work. In the summer of that year the Simla Naturalists' Society was founded. Sir Courtenay Ilbert, K.C.S.I., was President, and Collett was an original member. The present work is the fulfilment of a hope expressed by the President in the preface to the first number of the journal that one outcome of its work would be "a handbook such as may be worthy of a district singularly rich in objects of interest to the naturalist, and as may furnish information to be sought in vain in the arid pages of a district manual." The Society has been described as "a small band of ardent naturalists." They no doubt confirmed Collett in his permanent devotion to botany. He contributed his first botanical papers to its journal and is also reported to have delivered to it a lecture on polarised light.

Collett collected assiduously the plants of Simla and formed a herbarium which he used in the preparation of this book. After his death it was given by his family to Kew. In 1887–8 he was in command of a brigade in Burma, and in the Southern Shan States on the little-explored frontier of Upper Burma he found an opportunity of breaking new ground. In A. H. Hildebrand, C.I.E., the superintendent of the Southern Shan States, he found a colleague of tastes sympathetic with his own. Collett says: "I began collecting plants in this region partly to gratify my own love of botany, and partly in response to the request of my friend Dr. (now Sir George) King, K.C.I.E., F.R.S." The results were published in 1890 in the "Journal of the Linnean Society" (Botany, xxviii. pp. 1–150). No fewer than 725 species of flowering plants were enumerated. These were worked out at Kew and published under the joint names of Collett and W. B. Hemsley. The collection included two of the most remarkable plants ever introduced into European gardens. Both are remarkable for the size of their flowers: *Rosa gigantea* is the largest single-flowered rose known, it is described as having flowers 5–6 inches in diameter; it climbs to the top of the tallest trees, and Collett is said to have detected it at the distance of two miles by means of a field-glass; *Lonicera hildebrandiana* is a honeysuckle with flowers seven inches long; it was named in honour of his friend who "kindly gave much assistance in collecting," and who, after an infinity of trouble, ultimately succeeded in transmitting living seeds to Kew. In 1889 Collett had himself sent to Kew living plants of two extremely remarkable orchids which he had discovered, *Bulbophyllum racemosum* and *Cirrhopetalum Collettii*.

After 1889 Collett's hands were pretty full of serious military and administrative duties. I heard nothing from him till after his retirement in 1893. Even then it is an open secret that high professional advancement was still within his reach. But he had begun to be afflicted with deafness, and as he told me in after years he thought no one with that infirmity was justified in assuming high military command.

He eventually settled in London, and it must have been early in 1895 that he came to consult me about his projected "Flora of Simla." He had a good practical knowledge of it in the field, and his first idea was that he might make a sort of rough draft and that some member of my staff might put it into a proper technical shape. I pointed out to him that such a collaboration would be in no way satisfactory, that the merit of the book would be the personal impress that he would give to it himself, and that I should not be inclined to aid the undertaking unless he undertook it single-handed. Collett pleaded his want of technical knowledge, but the real obstacle was only his excessive modesty. He was a little shy of coming to work amongst us with only the equipment of the amateur, and though possessed of indomitable pluck was diffident as to the result. I assured him that it was merely a question of learning the grammar of an unfamiliar language; that it might be an irksome task for a few weeks, but that he would soon acquire the necessary facility and that he would then feel a new interest in the prosecution of his work. I promised him that his path should be smoothed by the willing assistance of my staff, and he agreed with some demur to make the attempt. I call to mind no similar case of a man late in life, after a course of exceptional distinction, quietly taking the position of a pupil in another field. But the wisdom of my advice was abundantly justified. Collett stuck to his task with bulldog tenacity occasionally relieved by a groan. But he soon mastered his difficulties and became the severest critic of his own work, the early portions of which he entirely rewrote. For several succeeding years he worked at Kew with the greatest regularity, spending the best part of the day in the Herbarium and ending with a walk in the gardens, where I was often amused to find that the habit of the old Quarter-Master General had not been lost and that nothing escaped his observant eye.

Some failure of his health probably took place, though so imperceptibly as to escape observation. The old military fire was roused by the outbreak of the South African war, which he followed with absorbing attention. His first estimates of its course were extravagantly optimistic, to be followed by others equally pessimistic. With no military knowledge but some conception of the conditions, I ventured to differ from him in both respects. But the war weighed heavily on him, and he told me he could not sleep at night for thinking of it and its consequences. He had, however, almost completed the manuscript of his book, and commenced printing. He then took a holiday in Ireland with Mr. Gamble. It is possible that he over-fatigued himself. On his return he had some kind of sudden seizure, and for some time he was in a precarious state, but slowly recovered. He then came to see me at Kew, and though he was obviously very much broken I did not feel any immediate anxiety about

him. But he had repeated failure of the heart's action, and to this he eventually succumbed. He spent his life strenuously and with distinction in the service of his country and in the interests of science, and the end came with the simple exhaustion of his physical powers.

Almost his last inquiry was as to the progress of his book. This fortunately had been left in a state which enabled Mr. W. B. Hemsley, F.R.S., the Keeper of the Herbarium, to see it through the press with little difficulty. I think Collett felt no real anxiety as to its fate. He hoped that it would stimulate an interest in a subject which he himself had found a pleasant recreation in the midst of official duties. Those who use it will speedily discover that it is no mere compilation, but the outcome of conscientious and independent work. Collett had the true scientific temperament. He had no respect for scientific authority and distrusted textbooks. He was never content without verifying the facts for himself. He described his plants fresh from the field, and at once entered in his notebooks copious memoranda and excellent drawings, and these he constantly used in working up his material at Kew.

At first sight there may seem something anomalous in a distinguished soldier devoting his years of retirement to botanical studies, still more perhaps in prosecuting them in the midst of his professional duties. As a matter of fact, the obligations of botanical science to the Army are very great; it is sufficient to recall the names so familiar to botanists of the late General Munro, C.B.; of the late Colonel Grant, C.B., C.S.I., and of Lieutenant-General Sir Richard Strachey, G.C.S.I. The flora of Tibet would be hardly known to us but for the collections made by military officers, of whom Captain Deasy, the late Captain Wellby and Captain Malcolm, D.S.O., may more particularly be mentioned. Nor is it easy to estimate the position our knowledge of the Indian flora would occupy without the labours of a long series of officers of the Indian Medical Department. And among Russian officers the name of General Przewalski will always stand out pre-eminent for his botanical work in Western Asia. The fact is that the qualities that make for success both in the soldier and the botanist are largely identical: they are quick observation and the power of rapidly drawing correct observations from minute facts. When Collett discovered his giant rose through his field-glass he was using his eyes and his reasoning powers precisely as he would have done in a military reconnaissance.

Collett's personality had something wholly out of the common. Rather below the average height he had a spare, erect and well-knit figure. A bright, frank and alert expression was accompanied by a singular charm of manner. In many ways he constantly reminded me of the late General Gordon. And as with him a keen glance would sometimes flash from the eyes which showed that stern resolution would not be wanting on occasion. There was nothing about him of the *beau sabreur*, but he had all the impress of a man destined to lead and command. As with most distinguished soldiers, his address was singularly modest and simple; at the same time he held decided views on most subjects and with extreme tenacity, though rarely caring to give expression

to them. Nor did he ever refer to his past career. In fact, I never induced him to talk about it except in the case of the Manipur expedition, on which on merely geographical grounds I asked for information. He was not a copious correspondent, and his letters were always strictly to the point and expressed with soldierly terseness.

Mr. Gamble, himself a botanist of distinction, who had long worked with him in India, sums up his estimate of Collett's powers in words with which from my own experience I entirely concur : —

" I am convinced that if Collett had been a professional botanist he would have made a great name for himself; and it is possible that had he been spared, his work, supported by his knowledge of the world, his wide reading and by his distrust of anything he could not personally verify, would have been more original and so perhaps more valuable. He was quite undaunted ; he talked of taking up the Simla mosses when his Phanerogamic Flora should be published ! "

I devote these words to the memory of my friend. I will but add this : no one who has ever come to work amongst us at Kew has more completely won the affectionate regard of everyone with whom he has come in contact.

W. T. THISELTON-DYER.

Kew, 1902.

Mr. THOMAS WILLIAM BROWN, formerly a member of the gardening staff of the Royal Botanic Gardens, who recently retired from the post of Assistant Curator of the Botanic Station, Aburi, Gold Coast, on the ground of ill-health, has been engaged to lay out the gardens of the Sultan of Morocco at Fez.

Mr. JOHN ERSKINE LESLIE, a member of the gardening staff of the Royal Botanic Gardens, has been appointed on the recommendation of Kew, by the Secretary of State for India in Council, a probationer gardener for employment in the Royal Botanic Gardens, Calcutta.

Mr. WALTER CHARLES FISHLOCK, a member of the gardening staff of the Royal Botanic Gardens, has been appointed, on the recommendation of Kew, by the Secretary of State for the Colonies, Agricultural Instructor in the Virgin Islands.

Mr. ALEXANDER HISLOP, a member of the gardening staff of the Royal Botanic Gardens, has been appointed Assistant Superintendent of the Municipal Gardens, Queenstown, Cape Colony.

Mr. MORLEY THOMAS DAWE, a member of the gardening staff of the Royal Botanic Gardens, has been appointed, on the recommendation of Kew, by the Secretary of State for Foreign Affairs, Assistant in the Scientific Department, Uganda.

Mr. ERNEST LONG, a member of the gardening staff of the Royal Botanic Gardens, has been appointed, on the recommendation of Kew, by the Secretary of State for India in Council, a probationer gardener for employment in the Royal Botanic Gardens, Calcutta.

Mr. FRANK GARRETT, left the service of Kew where he had held the post of Decorative Foreman for over sixteen years, on Oct. 31st, to take that of Head Gardener to the Duke of Marlborough at Blenheim. He is succeeded by Mr. A. Osborn, sub-foreman in the Ferneries.

Research in Jodrell Laboratory in 1902 :—

Boodle, L. A.—On Lignification in the Phloem of *Helianthus annuus*. (Ann. Bot., Vol. XVI., pp. 180–3.)

Brebner, G.—On the Anatomy of *Danaea* and other Marattiaceae. (Ann. Bot., Vol. XVI., pp. 517-52, tt. 22 and 23.)

Brown, H. T., and Escombe, F.—The Influence of varying Amounts of Carbon Dioxide in the Air on the photosynthetic Process of Leaves and on the Mode of Growth of Plants. (Proc. Roy. Soc., Vol. 70, pp. 397–413, tt. 5–10.)

Fritsch, F. E.—The Affinities and Anatomical Characters of *Plagiopteron fragrans*, Griff. (Ann. Bot., Vol. XVI., pp. 177–80.)

Fritsch, F. E.—Algological Notes I., II., and III. Observations on Species of *Aphanochaete*, Braun. (Ann. Bot., Vol. XVI., pp. 403–412, with 1 Fig. in text.)

The Germination of the Zoospores in *Oedogonium*. (Ann. Bot., Vol. XVI., pp. 412–417, with 1 Fig. in text.)

Preliminary Report on the Phytoplankton of the Thames. (Ann. Bot., Vol. XVI., pp. 576–84.)

Fritsch, F. E.—The Structure and Development of the young Plants in *Oedogonium*. (Ann. Bot., Vol. XVI., pp. 467–485, with 3 Figs. in text.)

Massee, G.—Larch and Spruce Fir Canker. (Journ. of Board of Agriculture, September, 1902, reprint, pp. 1–15, tt. 1–3.)

Massee, G., and Salmon, E. S.—Researches on Coprophilous Fungi. II. (Ann. Bot., Vol. XVI., pp. 57–93, tt. 4 and 5.)

Salmon, E. S.—On the Increase in Europe of the American Gooseberry-Mildew. (Journ. Roy. Hort. Soc., Vol. XXVII., reprint, pp. 1–6, with 1 Fig. in text.)

Scott, D. H.—On the primary Structure of certain Palaeozoic Stems with the *Dadoxylon* type of Wood. (Trans. Roy. Soc. Edinburgh, Vol. XL., Part II., pp. 331–365, tt. 1–6, with 3 Figs. in text.)

Worsdell, W. C.—The Nature of the Vascular System of the Stem in certain Dicotyledonous Orders. (Ann. Bot., Vol. XVI., pp. 599–600.)

INDEX.

Appointments, 23.
Aralia quinquefolia, 4.
— — var. angustifolia, 7.
— — — Ginseng, 6.
— — — major, 7.
— — — notoginseng, 7.
— — — pseudo-Ginseng, 7.
— — — repens, 6.

Brown, T. W., 23.

China, Ginseng in, 4.
Collett, Sir Henry, 18.

Dawe, M. T., 24.

Fishlock, W C., 23.
Flora Simlensis, 18.
Fodder-grass, American, 1.

Garrett, F., 24.
Ginseng in China, 4.

Hislop, A., 23.

Isatis tinctoria, 15.

Jodrell Laboratory, research in, 1902, 24.

Kew, Library catalogue, supplement to, Appendix II.
— Visitors during 1901, 17.
Khasia Patchouli, 11.

Leslie, J. E., 23.
Long, E., 24.

Microtaena cymosa, with plate, 11.
Miscellaneous Notes, 17.

New garden plants of 1901, Appendix III.

Paspalum dilatatum, 1.
Patchouli, Khasia, 11.

Seeds available for exchange, Appendix I.
Siam, Tobacco cultivation in, 12.
Staffs of botanical departments at home and abroad, Appendix IV.

Tobacco cultivation in Southern Siam, 12.

Visitors during 1901, 17.

Woad, 16.

ROYAL GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

APPENDIX I.—1902.

LIST OF SEEDS OF HARDY HERBACEOUS PLANTS AND OF TREES AND SHRUBS.

The following is a list of seeds of Hardy Herbaceous Annual and Perennial Plants and of Hardy Trees and Shrubs which, for the most part, have ripened at Kew during the year 1901. These seeds are not sold to the general public, but are available for exchange with Colonial, Indian, and Foreign Botanic Gardens, as well as with regular correspondents of Kew. No application, except from remote colonial possessions, can be entertained after the end of March.

HERBACEOUS PLANTS.

Acaena glabra.
laevigata.
microphylla.
myriophylla.
Novae-Zealandiae.
ovalifolia.
Sanguisorbae.
sericea.

Acanthus longifolius.

Achillea Ageratum.
Clavenae.
decolorans.
Gerberi.
leptophylla.
ligustica.
macrophylla.

Achillea, *cont.*
magna.
odorata.
Ptarmica.
rupestris.
setacea.
sibirica.
sieheana.
taygetea.
Trautmanni.
umbellata.

Acnida cannabina.

Aconitum ferox.
— var. atrox.
— var. crassicaule.
Fischeri.

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Aconitum, *cont.*
Fortunei.
Lycoctonum.
Napellus.
Napellus var. hians.
palmatum.
reclinatum.
uncinatum.

Actea spicata var. arguta.

Actinomeris squarrosa.

Adenophora lilifolia.
stricta.

Adlumia cirrhosa.

Adonis autumnalis.

Aethionema cappadocicum.
persicum.
pulchellum.
saxatile.

Agrimonia Eupatoria.
leucantha.
odorata.

Agropyron acutum.
caninum.
cristatum.
dasyanthum.
desertorum.
repens.
Richardsoni.
tenerum.
villosum.

Agrostis alba.
laxiflora.
nebulosa.
pulchella.
vulgaris.

Ajuga reptans.

Alchemilla alpina.
arvensis.
conjuncta.
splendens.
vulgaris.

Alisma Plantago.

Allium acuminatum.
angulosum.
: tropurpureum.
carinatum.

Allium, *cont.*
fistulosum.
giganteum.
globosum var. albidum.
hirtifolium.
junceum.
karataviense.
Kesselringi.
odorum.
oreophilum.
orientale.
platycaule.
polyphyllum.
roseum.
Schoenoprasum.
— var. sibiricum.
scorzoneræfolium.
senescens.
subvillosum.
Suworowi.
Tubergeni.
urceolatum.
ursinum.

Alonsoa Warscewiczii.

Alopecurus geniculatus.
pratensis.

Alstroemeria aurea.

Althaea armeniaca.
cannabina.
— var. narbonensis.
ficifolia.
kurdica.
officinalis.
pallida.
pontica.
rosea.
taurinensis.

Alyssum alpestre.
argenteum.
creticum.
gemonense.
Heinzi.
incanum.
minimum.
moellendorfianum.
montanum.
podolicum.
Wierzbickii.
wulfenianum.

Amaranthus caudatus.
hypochondriacus.

Amaranthus, *cont.*
polygamus.
retroflexus.
speciosus.

Amethystea caerulea.

Ammi majus.

Ammobium alatum.

Ammophila arundinacea.

Amsonia Tabernaemontana.

Anacyclus officinarum.
Pyrethrum.
radiatus.

Anagallis arvensis.
linifolia.

Anaphalis cinnamomea.
margaritacea.
nubigena.

Anchusa italica.
officinalis.

Andropogon cirratus.
nutans.
provincialis.

Androsace filiformis.
lactiflora.

Andryala varia var. aprica.

Anemone alpina.
angulosa.
Halleri.
Hepatica.
multifida.
nemorosa.
pennsylvanica.
rivularis.
sulphurea.
sylvestris.
trifolia.
virginiana.

Anoda hastata.
Wrightii.

Antennaria dioica var. tomentosa.

Anthemis aetnensis.
arvensis.
blancheana.
Cotula.
cupaniana.
nobilis.
— var. discoidalis.
tinctoria.

Anthericum Liliago.
— var. algeriense.
ramosum.

Anthoxanthum odoratum.
Puelii.

Anthriscus Cerefolium.
nemorosa.
sylvestris.

Anthyllis sericea.
Vulneraria.

Antirrhinum Asarina.
majus.
Orontium.

Apera interrupta.
Spica-venti.

Apium graveolens.

Aplopappus rubiginosus.

Aquilegia canadensis.
chrysantha.
formosa.
glandulosa.
Kitaibelii.
leptoceras.
olympica.
sibirica.
vulgaris.
— var. atrata.

Arabis albida.
Allionii.
alpina.
arenosa.
blepharophylla.
hirsuta.
muralis var. rosea.
pumila.

Aralia cachemirica.
cordata.
racemosa.

Archangelica littoralis.
officinalis.

Arctium majus.
minus.

Arenaria aretioides.
balearica.
capillaris.
fasciculata.
festucoides.
foliosa.
gothica.
graminifolia.
— var. multiflora.
gypsophiloides.
laricifolia.
muscosa.
pinifolia.
rigida.
sajanensis.
serpyllifolia.

Argemone grandiflora.
hispida.
mexicana.

Arisarum proboscideum.

Armeria berlengensis.
elongata var. californica.
majellensis.
maritima.
plantaginea.
pungens.
Welwitschii.

Arnica amplexicaulis.
Chamissonis.
foliosa.
latifolia.
longifolia.
montana.
sachalinensis.

Arnoseris pusilla.

Arrhenatherum avenaceum.

Artemisia Absinthium.
annua.
campestris.
camphorata.

Artemisia, *cont.*
dracunculoides.
lanata.
ludoviciana.
paniculata.
parviflora.
pectinata.
scoparia.
siversiana.

Arum italicum.

Asarum europaeum.
Shuttleworthii.

Asparagus officinalis.

Asperella Hystrix.

Asperula azurea.
cynanchica.
galioides.
odorata.
taurina.
tinctoria.

Asphodeline liburnica.
lutea.
pannonica.

Asphodelus albus.
fistulosus.
ramosus.

Aster alpinus.
acris var. punctata.
acuminatus.
Amellus.
angustus.
corymbosus.
dahuricus.
foliaceus.
Herveyi.
laevis.
lindleyanus.
longifolius.
macrophyllus.
nanshanicus.
Porteri.
ptarmicoides.
puniceus.
— var. lucidulus.
pyrenaeus.
Radula.
scaber.
sibiricus.
sikkimensis.

Aster, *cont.*
spectabilis.
stellaris.
tanacetifolius.
tardiflorus.
tricephalus.
trinervis.
Vahlii.

Asterolinum stellatum.

Astilbe chinensis.

Astragalus alopecuroides.
boeticus.
caryocarpus.
chinensis.
chlorostachys.
Cicer.
danicus.
frigidus.
glycyphyllus.
kahiricus.
pentaglottis.
ponticus.
tomentosus.
xiphocarpus.

Astrantia Biebersteinii.
carniolica.
major.

Athamanta Matthioli.

Atriplex hastata.
hortensis.
littoralis.
nitens.
rosea.
sibirica.

Atropa Belladonna.
lutescens.

Aubrietia deltoidea.
erubescens.
libanotica.
Pinardi.

Avena bromoides.
fatua.
montana.
pratensis.
pubescens.

Baeria coronaria.
gracilis.

Ballota hispanica.

Baptisia australis.

Barbarea intermedia.
praecox.
vulgaris.

Basella rubra.

Beckmannia erucaeformis.

Berkheya Adlami.
purpurea.

Beta maritima.
trigyna.

Bidens cernua.
grandiflora.
leucantha.
tripartita.

Biscutella auriculata.
ciliata.
didyma.
laevigata.

Blumenbachia insignis.

Bocconia cordata.
microcarpa.

Boltonia asteroides.
incisa.
indica.

Bouteloua oligostachya.

Brachycome iberidifolia.

Brachypodium distachyum.
pinnatum.
sylvaticum.

Brassica campestris.
— var. glauca.
Cheiranthos.
Erucastrum.
juncea.
oleracea.

Brickellia grandiflora.

Briza geniculata.
media.

Brodiaea capitata.
californica.

Brodiaea, *cont.*
Hendersoni.
ixioides.
multiflora.
uniflora.

Bromus adoënsis.
breviaristatus.
brizaeformis
carinatus.
ciliatus.
inermis.
Kalmii.
macrostachys.
madritensis.
maximus.
mollis.
purgans.
rubens.
sterilis.
Tacna.
tectorum.
unioloides.

Browallia viscosa.

Bryonia dioica.

Bulbine annua.

Bulbinella Hookeri.
— var. latifolia.

Bunias Erucago.
orientalis.

Buphthalmum salicifolium.
speciosum.

Bupleurum aristatum.
aureum.
Candollei.
gracile.
longifolium.
petraeum.
protractum
rotundifolium.

Butomus umbellatus.

Caccinia strigosa.

Calamagrostis confinis.
epigeios.
varia.

Calamintha Acinos.
alpina.
Clinopodium.
grandiflora.
officinalis.

Calandrinia grandiflora.
pilosiuscula.
umbellata.

Calceolaria mexicana.

Calendula arvensis.
microphylla.
nöeana.
officinalis.

Callistephus hortensis.

Caltha biflora.
polypetala.

Calystegia silvatica.

Camassia Cusickii.
esculenta.
Fraseri
Leichtlinii.

Camelina sativa.

Campanula alliariaefolia.
barbata.
bononiensis.
carpatica.
drabaefolia.
Erinus.
glomerata.
— var. dahurica.
lactiflora.
latifolia
— var. macrantha.
— var. versicolor.
macrostyla.
Medium.
persicifolia.
pulla.
pusilla.
pyramidalis.
ramosissima.
rapunculoides.
reuteriana.
rotundifolia.
rupestris.
Scheuchzeri.

Campanula, *cont.*
sibirica.
— var. divergens.
spicata.
Steveni.
thyrsoides.
Trachelium.
waldsteiniana.

Cannabis sativa.

Carbenia benedicta.

Cardamine chenopodifolia.
digitata.

Carduus crispus.
defloratus.
niveus.
pycnocephalus.

Carex alopecoidea.
aquatilis.
axillaris.
binervis.
canescens.
crinita.
decomposita.
depauperata.
divulsa.
flava.
— var. lepidocarpa.
— var. Oederi.
fusca.
glauca.
Grayii.
grisea.
hirta.
hordeistichos.
leporina.
longirostris.
paniculata.
pendula.
remota.
sparganioides.
stellulata.
straminea.
strigosa.
sylvatica.
tenella.
teretiuscula.
testacea, var. attenuata.
tomentosa.
tribuloides.

Carex, *cont.*
Vilmorini.
vulpina.
vulpinoidea.

Carlina acanthifolia.
acaulis.

Carthamus flavescens.
lanatus.
tinctorius.

Carum Bulbocastanum.
buriacticum.
Carvi.
copticum.

Catabrosa aquatica.

Catananche caerulea.
lutea.

Cedronella mexicana var. c

Celsia betonicaefolia.
Daenzeri.
heterophylla.
orientalis.
pontica.

Cenchrus tribuloides.

Cenia turbinata.

Centaurea amara.
americana.
Cineraria.
Crocodylium.
Cyanus.
cynaroides.
dealbata.
diluta.
eriophora.
Fontanesii.
Friderici.
glastifolia.
Jacea.
lugdunensis.
macrocephala.
melitensis.
montana.
Moschata.
nigra.
nigrescens.
— var. vochinensis.

Centaurea, *cont.*
phrygia.
pulchra.
ruthenica.
salmantica.
Scabiosa.
— var. oliveriana.
solstitialis.
valesiaca.

Centranthus Calcitrapa.
longiflorus.
macrosiphon.
ruber.
Sibthorpii.

Cephalaria alpina.
leucantha.
radiata.
tatarica.

Cerastium alpinum var. lanatum.
arvense.
chloraefolium.
grandiflorum.
macranthum.
perfoliatum.
purpurascens.
tomentosum.

Cerinthe alpina.
major.

Chaenostoma foetidum.

Chaerophyllum aromaticum.
aureum.
nodosum.

Charieis heterophylla.

Cheiranthus Allionii.
alpinus.
Cheiri.
mutabilis.

Chelidonium franchetianum.
majus.
— var. laciniatum.

Chelone Lyoni.
nemorosa.

Chenopodium ambrosoides.
Bonus-Henricus.
Botrys.

Chenopodium, *cont.*
ficifolium.
foetidum.
hybridum.
polyspermum.
Quinoa.
urbicum.
virgatum.
Vulvaria.

Chionodoxa Luciliae.
— var. sardensis.

Chlora perfoliata.

Chloris barbata.

Chlorogalum pomeridianum.

Chorispora tenella.

Chrysanthemum Balsamita.
carinatum.
carneum.
coccineum.
caucasicum.
cinerariaefolium.
coronarium.
corymbosum.
lacustre.
Leucanthemum.
macrophyllum.
multicaule.
Myconis.
pallens.
Parthenium.
prealtum.
segetum.
uliginosum.
viscosum.

Chrysopogon Gryllus.

Cicer arietinum.

Cichorium Intybus.
pumilum.

Cimicifuga cordifolia.
elata.
foetida.
racemosa.

Circaea lutetiana.

Cladium Mariscus.

Clarkia elegans.
pulchella.
rhomboidea.

Claytonia perfoliata.
sibirica.

Clematis integrifolia.
recta.

Cleome violacea.

Cleonia lusitanica.

Clintonia borealis.
umbellata.
uniflora.

Clypeola cyclodontea.
Jonthlaspi.

Cnicus acaulis.
arachnoideus.
canus.
conspicuus.
Diacantha.
eriophorus.
heterophyllus.
horridus.
lanceolatus.
ligularis.
monspessulanus.
ochroleucus.
oleraceus.
pulcherrimus.
rivularis.
serrulatus.
spathulatus.
stellatus.
syriacus.

Cnidium serbicum.

Cochlearia danica.
glastifolia.
officinalis.
saxatilis.

Codonopsis rotundifolia.
viridiflora.

Coix Lacryma-Jobi.

Collinsia arvensis.
bartsiaefolia.
bicolor.
grandiflora.

Collinsia, *cont.*
Parryi.
Torreyi.
verna.

Collomia coccinea.
gilioides.
grandiflora.
linearis.

Conium maculatum.

Conringia orientalis.

Convallaria majalis.

Convolvulus siculus.
tricolor.
undulatus.

Coreopsis auriculata.
Drummondi.
grandiflora.
lanceolata.
tinctoria.
tripteris.

Coriandrum sativum.

Corispermum hyssopifolium.

Cornucopiae cucullatum.

Coronilla coronata.
cretica.
elegans.
scorpioides.
vaginalis.
varia.

Corrigiola littoralis.

Cortusa Matthioli.

Corydalis capnoides.
claviculata.
glauca.
lutea.
nobilis.
racemosa.
sibirica.

Corynephorus canescens.

Cosmos bipinnatus.
diversifolius var. atrosanguineus.

Cotula coronopifolia.

Cousinia Hystrix.

Crambe cordifolia.
hispanica.
maritima.
orientale.
pinnatifida.

Crassula glomerata.

Crepis alpestris.
alpina.
aurea.
blattarioides.
Candollei.
grandiflorum
montana.
paludosa.
reuteriana.
rubra.
setosa.
sibirica.
taraxacifolia.
virens.

Crithmum maritimum.

Crocus asturicus.
biflorus.
cancellatus var. cilicicus
chrysanthus.
etruscus.
hadriaticus.
— var. chrysobelonicus
Imperati.
Korolkowi.
longiflorus.
Malyi.
nudiflorus.
Olivieri.
pulchellus.
Sieberi.
speciosus.
susianus.
tommasinianus.
Tournefortii.
vernus.
zonatus.

Crucianella aegyptiaca.

Crupina vulgaris.

Cryptostemma calendulaceum.

Cucubalus baccifer.

Cucurbita Pepo.

Cuminum Cyminum

Cuphea lanceolata.
Llavea.
procumbens.
Zimapani.

Cuscuta Epilinum.

Cyclamen neapolitanum.

Cynara Cardunculus.

Cypripedium spectabile.

Cynodon Dactylon.

Cynoglossum furcatum
microglochin.
officinale.
petiolatum.
Wallichii.

Cynosurus Balansae.
cristatus.
echinatus.

Cyperus longus.
rotundus.
vegetus.

Dactylis glomerata

Dahlia coccinea.
scapigera.

Dalea Lagopus.

Danthonia Thomasoni.

Datisca cannabina

Datura ceratocaulon.
inermis.
Stramonium.
Tatula.

Daucus Carota.
gummifer.
setulosus.

Delphinium Ajacis.
brunonianum.
cashmirianum.
caucasicum.
dasyanthum.
decorum.

Delphinium, *cont.*
dictyocarpum.
elatum.
formosum.
grandiflorum.
hybridum.
occidentale.
orientale.
Requienii.
speciosum.
— var. glabratum.
tatsienense.
vestitum.

Demazeria loliacea.
sicula.

Deschampsia caespitosa.

Desmodium canadense.

Dianthus anatolicus.
arenarius.
Armeria.
atrorubens.
caesius.
carthusianorum.
Caryophyllus.
chinensis.
ciliatus.
cruentus.
fragrans.
furcatus.
giganteus.
hirtus.
monspessulanus.
neglectus.
nitidus.
noeanus.
patens.
petraeus.
pinifolius.
plumarius.
— var. serotinus.
pungens.
Requienii.
Seguieri.
squarrosus.
strictus var. bebius.
superbus.
— var. speciosus.
sylvestris.
tener.
viscidus.
Waldsteinii.

Diarrhena americana.

Dicentra eximia.
Scouleri.

Dictamnus albus.

Dierama pulcherrimum.

Digitalis ambigua.
lutea.
media.
purpurea.
Thapsi.

Dimorphotheca annua.
hybrida.
pluvialis.

Dioscorea Batatas.

Diotis candidissima.

Dipcadi serotinum.

Diplotaxis erucoides.
tenuifolia.

Dispacus asper.
ferox.
fullonum.
laciniatus.
plumosus.
sylvestris.

Dischisma spicatum

Doronicum hungaricum.
orphanidis.
Pardalianches.
plantaginea.
scorpioides.

Dorycnium herbaceum.
rectum.

Downingia elegans.
pulchella.

Draba aizoides.
Aizoon.
alpina.
altaica.
aurea.
carinthiaca.
hirta.
incana.
lactea.
muralis.
rigida.

Draba, *cont.*
stellata.
tomentosa.
— var. frigida.

Dracocephalum Moldavica.
nutans.
parviflorum.
peregrinum.
ruyschiana.

Dryas octopetala.

Drypis spinosa.

Dulichium spathaceum.

Ecballium Elaterium.

Eccremocarpus scaber.

Echinaria capitata.

Echinops bannaticus.
chantavicus.
globifer.
niveus.
sphaerocephalus.
— var. albidus.

Echium rosulatum.
vulgare.

Ehrharta panicea.

Eleusine coracana.
aegyptiaca.
stricta.

Elsholtzia blanda.
cristata.
strobilacea.

Elymus arenarius.
dasystachya.
giganteus.
sibiricus.
virginicus.

Emilia flammea.

Encelia calva.

Epilobium alpinum.
angustifolium.
billardierianum.
Dodonaei.
glabellum.

Epilobium, *cont.*
hirsutum.
Lamyi.
linnaeoides.
luteum.
melanocaulon.
montanum.
nummularifolium.
roseum.
rosmarinifolium.
tetragonum.

Epipactis palustris.

Eragrostis Brownei.
minor.
pectinacea.

Eranthis hyemalis.

Eremurus altaicus.
spectabilis.

Erianthus fastigiatus.
fulvus.
strictus.

Erigeron alpinus.
aurantiacus.
compositus.
Coulteri.
elongata.
glabellus.
— var. asper.
macranthus.
mucronatus.
multiradiatus.
philadelphicus.
strigosus.
uniflorus.

Erinus alpinus.

Eriophorum vaginatum.

Eriophyllum confertiflorum.

Erodium chium.
ciconium.
cicutarium.
gruinum.
guttatum.
hymenodes.
macradenum.
Manescavi.

Erodium, *cont.*
moschatum.
Semenovii.
tmoleum.

Eruca sativa.

Eryngium agavifolium.
alpinum.
amethystinum.
Bourgati.
bromeliaefolium.
campestre.
dichotomum.
ebracteatum.
giganteum.
maritimum.
oliverianum.
paniculatum.
planum.
Serra.
spinalba.
Vaseyi.
vesiculosum.
Zabelii.

Erysimum hieracifolium.
marschallianum.
ochroleucum.
— var. helveticum.
perofskianum.

Erythraea capitata.
Centaurium.
linariifolia.
littoralis.
ramosissima.

Eschscholzia californica.
glauca.
tenuifolia.

Eucharidium Breweri.
concinnum.

Eupatorium ageratoides.
cannabinum.
Kirilowii.
japonicum.
perfoliatum.
purpureum.

Euphorbia altissima.
coralloides.
dentata.
Esula.
exigua.

Euphorbia, *cont.*
Lagascae.
Lathyris.
Myrsinites.
Peplus.
pilosa.
platyphyllos.
portlandica.
segetalis.
tinctoria.
virgata.

Fagonia cretica.

Fagopyrum esculentum.

Fedia Cornucopiae.

Felicia abyssinica.
fragilis.

Ferula communis.
Ferulago.
glauca.
jaeschkeana.
Narthex.
nodiflora.
syriaca.
tingitana.

Festuca arundinacea.
bromoides.
capillifolia.
duriuscula.
elatior.
— var. pratensis.
Eskia.
gigantea.
heterophylla.
Myuros.
rigida.
scoparia.
unilaterale.

Foeniculum vulgare.

Fragaria indica.

Fritillaria acmopetala.
acutiloba.
armena.
aurea.
imperialis.
Meleagris.
pallidiflora.

Fritillaria, *cont.*
pluriflora.
tenella.
— var. orsiniana.

Fumaria officinalis.
Vaillantii var. Laggeri.

Funkia caerulea.
lancifolia.
ovata.
sieboldiana.

Gagea arvensis.

Gaillardia aristata.
lanceolata.
pulchella.

Galactites tomentosa.

Galanthus Elwesii.
nivalis.

Galega officinalis.
patula.
orientalis.

Galeopsis ochroleuca.
pyrenaica.

Galinsoga brachystephana.
parviflora.

Galium Aparine.
boreale.
Mollugo.
recurvum.
tenuissimum.
tricorne.

Gastridium australe.

Gaudinia fragilis.

Gaura Lindheimeri.
parviflora.

Gentiana Andrewsii.
asclepiadea.
cruciata.
decumbens.
septemfida.
tibetica.

Geranium albanum.
anemonaefolium.
armenum.
bohemicum.

Geranium, *cont.*
collinum.
Endressi.
eriostemon.
gracile.
incisum.
libanoticum.
Londesii.
lucidum.
palustre.
pratense.
pusillum.
Richardsoni.
rivulare.
robertianum.
rotundifolium.
sanguineum.
— var. lancastriense.
striatum.
sylvaticum.
wallichianum.

Gerbera kunzeana.

Geum chiloense.
coccineum.
Heldreichii.
macrophyllum.
montanum.
parviflorum.
pyrenaicum.
rivale.
strictum.
triflorum.
urbanum.

Gilia achilleaefolia.
androsacea.
capitata.
densiflora.
dianthoides.
laciniata.
liniflora.
micrantha.
multicaulis.
squarrosa.
tricolor.

Gillenia trifoliata.

Gladiolus atroviolaceus.
illyricus.
segetum.

Glaucium corniculatum.
flavum var. fulvum.

Glyceria distans.

Glycine Soja.

Glycyrrhiza echinata.
foetida
glandulosa.

Gnaphalium indicum.
luteo-album.

Gratiola officinalis.

Grindelia lanceolata.

Guizotia abyssinica.

Gunnera manicata.

Gypsophila libanotica.
paniculata.
repens.
Rokejeka.

Hablitzia tamnoides.

Halenia elliptica.
Perrottetii.

Hastingia alba.

Hebenstreitia comosa.
tenuifolia.

Hedysarum boreale.
coronarium.
elongatum.
esculentum.
microcalyx.
neglectum.
obscurum.

Helenium Bigelovii.
quadridentatum.
tenuifolium.

Helianthella quinquenervis.

Helianthemum salicifolium.
villosum.
vulgare.

Helianthus annuus.
argophyllus.
debilis.
decapetalus.
giganteus.
mollis.

Helianthus, *cont.*
Nuttallii.
pumilus.
rigidus.

Helichrysum bracteatum.

Heliophila amplexicaulis.

Heliopsis laevis.
pitcheriana.

Heliotropium europaeum.

Helipterum humboldtianum.
Manglesii.
roseum.

Hemerocallis flava.
minor.
Middendorfii.

Heracleum candicans.
giganteum.
gummiferum.
lanatum.
lehmannianum.
mantegazzianum.
pyrenaicum.
Sphondylium.
villosum.

Herniaria glabra.
hirsuta.

Hesperis matronalis.

Heterospermum pinnatum.

Heuchera Drummondi.
glabra.
pilosissima.

Hibiscus Trionum.

Hieracium amplexicaule.
anglicum.
aurantiacum.
blyttianum.
Bornmülleri.
bupleuroides.
Clusii.
compositum.
corymbosum.
crocatum.
eximium.
florentinum.

Hieracium, *cont.*
foliosum.
glaucum.
gracilentum.
gymnocephalum.
Heldreichii.
humile.
intybaceum.
iricum.
lanatum.
lactucaefolium.
longifolium.
maculatum.
murorum var. integrifolium.
norvegicum.
pallidum.
pannosum.
prenanthoides.
rigidum.
rubrum.
rupestre.
staticifolium.
stoloniflorum.
umbellatum.
villosum.
vulgatum.

Hilaria rigida.

Hippocrepis multisiliquosa.

Hippuris vulgaris.

Holcus lanatus.

Holosteum umbellatum.

Hordeum bulbosum.
europaeum.
jubatum.
maritimum.
murinum.

Humulus japonicus.
— var. variegatus.
Lupulus.

Hunnemannia fumariaefolia.

Hutchinsia petraea.

Hyacinthus amethystinus.
azureus.

Hydrophyllum appendiculatum.
canadense.
virginicum.

Hyoscyamus niger.

Hypecoum grandiflorum.
procumbens.

Hypericum delphicum.
erectum.
linarifolium.
monogynum.
montanum.
olympicum.
orientale.
perforatum.
polyphyllum.
pulchrum.
pyramidatum.
rhodopeum.
Richeri.

Hypochoeris aetnensis.
glabra.

Hyssopus officinalis.
—var. aristatus.

Iberis amara.
pectinata.
pinnata.
umbellata.

Illecebrum verticillatum.

Impatiens balsamina.
fulva.
parviflora.
Roylei.
Thomsoni.

Incarvillea Delavayi.
variabilis.

Inula barbata.
bifrons.
britannica.
ensifolia.
glandulosa.
grandiflora.
Helenium.
Hookeri.
Oculus-Christi.
salicina.
squarrosa.
thapsoides.

Ionopsidium acaule.

Ipomoea purpurea.

Iris albopurpurea.
ensata.
foetidissima.
— var. citrina.
graminea.
— var. latifolia.
gueldenstaedtiana.
— var. sogdiana.
humilis.
juncea.
laevigata.
missouriensis.
Monnieri.
neglecta.
orientalis.
pumila.
setosa.
sibirica.
— var. acuta.
— var. coreana.
— var. orientalis.
spuria.
— var. desertorum.
— var. notha.
tenax.
versicolor.
— var. virginica.
xiphioides.

Isatis glauca.
tinctoria.
Villarsii.

Isopyrum fumarioides.

Isotoma axillaris.

Iva xanthifolia.

Jasione montana.
perennis.

Jasonia tuberosa.

Juncus alpinus.
arcticus.
bufonius.
Chamissonis.
compressus.
conglomeratus.
effusus.
glaucus.
lamprocarpus.
maritimus.
squarrosus.
tenuis.

Jurinea alata.

Kitaibelia vitifolia.

Kniphofia aloides.
corallina.
foliosa.
Tuckii.

Kochia scoparia.

Koeleria albescens.
cristata.
phleoides.
— var. grandiflora.

Lactuca Bourgaei.
brevirostris.
muralis.
perennis.
Plumieri.
saligna.
sativa.
Scariola.
virosa.

Lagenaria vulgaris.

Lagurus ovatus.

Lallemantia canescens.
iberica.
peltata.

Lamarkia aurea.

Lamium purpureum.

Lapsana communis.

Laserpitium hispidum.
latifolium.
Siler.

Lasiospermum radiatum.

Lasthenia glabrata.

Lathraea Squamaria.

Lathyrus angulatus.
Aphaca.
articulatus.
Cicera.
cirrhosus.
Clymenum.
cyaneus.

Lathyrus, *cont.*
filiformis.
giganteus.
Gorgoni.
grandiflorus.
latifolius.
luteus var. aureus.
maritimus.
niger.
Nissolia.
Ochrus.
odoratus.
palustris.
polyanthus.
sativus.
sphaericus
sylvestris.
tingitanus.
tuberosus.
undulatus.
variegatus.
venosus.
vernus.
violaceus.

Lavatera cachemiriana.
Olbia.
plebeia.
thuringiaca.
trimestris.

Layia elegans.
glandulosa.
platyglossa.

Lens esculenta.

Leontodon crispus.
Ehrenbergii.
hastilis.

Leontopodium alpinum.

Leonurus Cardiaca.
sibiricus.
tataricus.

Lepachys columnaris.

Lepidium campestre.
Draba.
graminifolium.
incisum.
Menziesii.
nebrodense.
sativum.

Leptosyne Bigelovii.
Douglasii.
maritima.

Lepturus cylindricus.

Leuzea conifera.

Levisticum officinale.

Liatris spicata.

Ligusticum alatum.
pyrenaicum.
scoticum.
Seguieri.

Lilium Martagon.
monadelphum.
pomponium.
pyrenaicum.

Limnanthes alba.
rosea.

Linaria albifrons.
alpina.
anticaria.
bipartita.
dalmatica.
Elatine.
genistifolia.
heterophylla.
hirta.
maroccana.
melanantha.
minor.
multipunctata.
origanifolia.
pelisseriana.
peloponnesiaca.
purpurea.
reticulata.
saxatilis.
spartea.
spuria.
striata.
triornithophora.
triphylla.
tristis.
vulgaris.

Lindelofia spectabilis.

Linum angustifolium.
flavum.
grandiflorum.

Linum, *cont.*
narbonense.
nervosum.
perenne.
usitatissimum.

Lippia nodiflora.

Loasa hispida.
lateritia.
vulcanica.

Lobelia cardinalis.
Erinus.
inflata.
sessilifolia.
syphilitica.
tenuior.
triquetra.

Lolium multiflorum.
perenne.
temulentum.

Lonas inodora.

Lopezia coronata.

Lotus corniculatus.
edulis.
Jacobaeus.
ornithopodioides.
siliquosus.
Tetragonolobus.

Lupinus affinis.
angustifolius.
Cosentini.
Cruckshanksii.
densiflorus.
elegans.
leptophyllus.
micranthus.
mutabilis.
nanus.
pilosus.
polyphyllus.
propinquus.
pubescens.
subcarnosus.
tricolor.
varius.

Luzula Forsteri.
maxima.
nivea.

Lychnis alba.
chalcedonica.
Coeli-rosa.
coronaria.
— var. oculata.
dioica.
Flos-cuculi.
Flos-jovis.
fulgens.
Githago.
haageana.
pyrenaica.
Viscaria.

Lycopersicum esculentum.

Lycopsis arvensis.

Lycopus europaeus.
exaltatus.

Lycurus phleoides.

Lysimachia atropurpurea.
barystachys.
clethroides.
Ephemerum.
punctata.
vulgaris.

Lythrum Graefferi.
hyssopifolia.
Salicaria.

Madia elegans.
sativa.
— var. congesta.
stellata.

Malcolmia flexuosa.
maritima.
mongolica.

Malope malacoides.
trifida.

Malva Alcea.
borealis.
crispa.
Durieui.
oxyloba.
parviflora.
rotundifolia.
sylvestris.

Malvastrum limense.

Marrubium astracanicum.
catariaefolium.
pannonicum.
vulgare.

Martynia formosa.
fragrans.
lutea.
proboscidea.

Matricaria glabra.
inodora.
Tchihatchewii.

Matthiola incana.
sinuata.
tricuspidata

Mazus rugosus.

Meconopsis cambrica.
heterophylla.
Wallichii.

Medicago apiculata.
carstiensis.
hispida.
littoralis.
lupulina.
maculata.
marina.
Murex.
orbicularis
ruthenica.
sativa.
scutellata.
turbinata.

Melica altissima.
ciliata.
—var. Magnoli.
glauca var. nebrodensis.
nutans.
uniflora.

Melilotus alba.
indica.
officinalis.

Melissa officinalis.

Mentha Pulegium.
rotundifolia
rubra.
sylvestris.
viridis.

Mentzelia Lindleyi.

Mercurialis annua.

Mesembryanthemum pomeridianum.
pinnatifidum.
pyropeum.
tricolor.

Meum Athamanticum.

Mibora verna.

Microseris attenuata.

Mimulus cardinalis.
luteus.
moschatus.

Mirabilis divaricata.
Jalapa.
longiflora.

Modiola multifida.

Molinia cœrulea.

Molopospermum cicutarium.

Monarda citriodora.
didyma.
fistulosa.

Monolepis trifida.

Moricandia arvensis.

Morina longifolia.

Muehlenbergia mexicana
sylvatica.
Willdenowii.

Muscari Argaei.
armeniacum.
atlanticum.
Bourgaei.
comosum.
compactum.
Heldreichii.
latifolium.
neglectum.
polyanthum.
racemosum.
sartorianum.
suaveolens.
szovitsianum.

Myagrum perfoliatum.

Myosotis arvensis.
palustris.
sylvatica.

Myosurus minimus.

Myrrhis odorata.

Nardus stricta.

Narthecium ossifragum.

Nemesia floribunda.
pubescens.
strumosa.
versicolor.

Nemophila insignis.
maculata.
Menziesii.
— var. atomaria.
parviflora.

Nepeta caesarca.
Cataria.
concolor.
dirphya.
discolor var. cœrulea.
macrantha.
Mussini.
Nepetella.
nuda.
spicata.
suavis.

Nertera depressa.

Nesaea salicifolia var. grandiflora.

Nicandra physaloides.

Nicotiana acuminata.
alata.
Bigelovii.
Langsdorffii.
noctiflora.
paniculata.
rustica var. scabra.
sylvestris.
Tabacum.

Nigella damascena.
hispanica.
orientalis.
sativa.

Nolana prostrata.

Nonnea lutea.

Nothoscordum fragrans.
striatum.

Ocimum gratissimum.

Odontospermum aquaticum.

Œnanthe crocata.
globosa.
Lachenalii.
pimpinelloides.
silaifolia.

Œnothera albicaulis.
amoena.
berteriana.
biennis.
— var. grandiflora.
densiflora.
dentata.
fruticosa.
glauca.
minutiflora.
nocturna.
odorata.
pumila.
riparia.
rosea.
sinuata.
speciosa.
tenella.
tetraptera.
triloba.
Whitneyi.

Omphalodes linifolia.

Onobrychis Pestalozzæ.
sativa.

Ononis arvensis.
Natrix.
rotundifolia.
spinosa.

Onopordon Acanthium.
illyricum.

Onosma albo-roseum.

Orchis foliosa.
incarnata.
latifolia.

Origanum pulchellum.
vulgare.

Ornithogalum arcuatum.
exscapum.
fimbriatum.
narbonense.
nutans.
orthophyllum.

Ornithopus ebracteatus.
perpusillus.
sativus.

Orobanche elatior.
Hederae.
minor.
ramosa.

Oryza sativa.

Oryzopsis multiflora.

Ostrowskia magnifica.

Oxybaphus nyctagineus.

Oxytropis baikalensis.
campestris.
ochroleuca.

Pachysandra procumbens.

Paeonia anomala.
arietina.
Broteri.
decora.
microcarpa.
officinalis.
paradoxa.
peregrina.

Palaua dissecta.

Pallenis spinosa.

Panicum adspersum.
capillare.
colonum.
Crus-galli.
Isachne.
miliaceum.
sanguinale.
virgatum.

Papaver alpinum.
aculeatum.
apulum.
arenarium.

Papaver, *cont.*
Argemone.
commutatum.
dubium.
glaucum.
laevigatum.
nudicaule.
orientale.
— var. bracteatum.
pavoninum.
persicum.
pilosum.
Rhoeas.
— var. latifolium.
rupifragum.
— var. atlanticum.
somniferum.
spicatum.

Pappophorum commune.

Paradisia Liliastrum.

Parietaria officinalis.

Parnassia nubicola.
palustris.

Paspalum dilatatum.

Patrinia hispida.

Peganum Harmala.

Peltaria alliacea.

Pennisetum longistylum.
macrourum.
Ruppellii.
typhoideum.

Pentstemon barbatus.
campanulatus.
coeruleus.
confertus.
deustus.
glaber.
glaucus var. stenosepalus.
heterophyllus.
laevigatus var. Digitalus.
Menziesii var. Newberryi.
— var. Scouleri.
ovatus.
pubescens.

Peplis Portula.

Perezia multiflora.

Petunia nyctaginiflora.

Peucedanum aegopodioides.
coriaceum.
graveolens.
hispanicum.
officinale.
sativum.
Schottii.
Sowa.
verticillare.

Phacelia bipinnatifida.
campanularia.
divaricata.
hispida.
loasaefolia.
malvaefolia.
Menziesii.
Parryi.
tanacetifolia.
viscida.
Whitlavia.

Phalaris arundinacea.
canariensis.
minor.
paradoxa.
tuberosa.

Phaseolus aconitifolius.
multiflorus.
Mungo.
pilosus.
ricciardianus.
tuberosus.
vulgaris.

Phleum asperum.
Boehmeri.
pratense.
tenue.

Phlomis agraria.
cashmiriana.
lunarifolia.
setigera.
tuberosa.
umbrosa.
viscosa.

Physalis Alkekengi.
Francheti.
peruviana.
philadelphica.

Physochlaina orientalis.

Physostegia virginiana.

Phyteuma canescens.
hemisphaericum.
laxiflorum.
Michelii.
orbiculare.
Scheuchzeri.
— var. Charmelii.
scorzonerifolium.
serratum.
spicatum.

Phytolacca acinosa.
bogotensis.
octandra.

Picridium tingitanum.

Picris echioides.
hieracioides.
pauciflora.
pilosa.

Pimpinella cnidioides.
magna.
rotundifolia.

Pisum arvense.
elatius.
sativum.

Plantago arenaria.
Candollei.
Coronopus.
Cynops.
maritima.
media.
ovata.
patagonica.
virginica.

Platycodon grandiflorum.
— var. Mariesii.

Platystemon californicus.

Plectranthus glaucocalyx.

Pleurospermum angelicoides.

Plumbago europaea.
micrantha.

Poa abyssinica.
alpina var. badensis.
caesia.
caespitosa.
Chaixii.
compressa.
nemoralis.

Poa, *cont.*
nevadensis.
palustris.
pratensis.
trivialis.
violacea.

Podolepis acuminata.

Podophyllum Emodi.
peltatum.

Polemonium caeruleum.
dissectum.
flavum.
himalayanum.
mexicanum.
pauciflorum.

Polygonatum biflorum.
verticillatum.

Polygonum affine.
alatum.
alpinum var. polymorphum.
amplexicaule.
baldschuanicum.
Bistorta.
capitatum.
cilinode.
compactum.
Convolvulus.
cuspidatum.
divaricatum.
Laxmanni.
molle.
orientale.
Persicaria.
sachalinense.
viviparum.
Weyrichii.

Polypogon littoralis.
maritimus.
monspeliensis.

Portulaca grandiflora.
oleracea.

Potentilla alchemilloides.
alpestris.
argentea.
— var. calabra.
arguta.
argyrophylla.

Potentilla, *cont.*
calycina.
chinensis.
chrysantha.
Comarum.
collina.
desertorum.
Detommasii.
glandulosa.
gracilis.
heptaphylla.
hippiana.
hirta.
— var. pedata.
kurdica.
leschenaultiana.
montenegrina.
multifida.
nepalensis.
peduncularis.
pennsylvanica var. arachnoidea.
pyrenaica.
recta.
— var. laciniata.
— var. macrantha.
— var. palmata.
rivalis var. millegrana.
rupestris.
sanguisorbifolia.
semi-laciniata.
sericea.
Sibbaldi.
tanacetifolia.
Thurberi.
tridentata.
villosa.
Visianii.
wrangeliana.

Poterium alpinum.
diandrum.
officinale.
Sanguisorba.
sitchense.
tenuifolium.

Pratia angulata.
begonifolia.

Prenanthes purpurea.

Preslia cervina.

Primula denticulata
elatior.

Primula, *cont.*
farinosa.
frondosa.
japonica.
officinalis.
rosea.
variabilis.
vulgaris.

Prunella alba.
grandiflora.
laciniata.
vulgaris.

Psoralea acaulis.
macrostachya.
Onobrychis.
physodes.

Pterostegia drymarioides.

Pulicaria dysenterica.
vulgaris.

Pycnanthemum lanceolatum.

Pyrrhopappus carolinianus.

Queria hispanica.

Ramondia pyrenaica.

Ranunculus aconitifolius.
acris.
anemonaefolius.
arvensis.
brutius.
chaerophyllos.
Chius.
Cymbalaria.
falcatus.
lanuginosus.
muricatus.
parviflorus.
sardous.
subscaposus.
trilobus.

Raphanus maritimus.
sativus.

Relhania sessilifolia.

Reseda alba.
glauca.
lutea.
Luteola.
odorata.
virgata.

Rhagadiolus stellatus.

Rheum Franzenbachii.
macropterum.
moorcroftianum.
nobile.
officinale.
palmatum.
— var. tanghuticum.
Rhaponticum.
Ribes.
undulatum.
webbianum.

Richardsonia pilosa.

Ricinus communis.

Rodgersia podophylla.

Roemeria hybrida.

Romulea candida.
Requienii.

Rubia cordifolia.
tinctorum.

Rudbeckia amplexicaulis.
digitata.
laciniata.
speciosa.

Rumex alpinus.
biformis.
bucephalophorus.
conglomeratus.
Hydrolapathum.
maritimus.
maximus.
occidentalis.
orientalis.
Patientia.
pulcher.
salicifolius.
sanguineus.
scutatus.
vesicarius.

Ruta graveolens.
montana.

Sagina glabra.
— var. pilifera.

Sagittaria sagittifolia.

Salsola Kali var. Tragus.

Salvia argentea.
Beckeri.
cadmica.
carduacea.
Columbariae.
glutinosa.
Horminum.
interrupta.
japonica.
moorcroftiana.
nubicola.
nutans.
officinalis.
pratensis.
schiedeana.
Sclarea.
tiliaefolia.
Verbenaca.
— var. rubella.
verticillata.
virgata.
viscosa.

Sambucus Ebulus.

Samolus Valerandi.

Santolina incana.

Saponaria orientalis.
officinalis.
Vaccaria.

Saracha Jaltomata.

Satureia hortensis.

Saussurea candicans.
deltoidea.
Russowi.

Saxifragra Aizoides.
Aizoon.
— var. notata.
burseriana var. major.
caesia.
caespitosa.
cartilaginea.
catalaunica.
cernua.
cochlearis.
Cotyledon.
— var. pyramidalis.
crustata.
cuneifolia var. infundibuliformis.

Saxifragra, *cont.*
— var. multicaulis.
decipiens.
— var. villosa.
flagellaris.
Geum.
glaucescens.
granulata.
Hostii.
— var. altissima.
— var. macnabiana.
hypnoides.
lingulata.
— var. lantoscana.
luteo-viridis.
macnabiana.
marginata.
mertensiana.
montavoniensis.
pedatifida.
peltata.
Regelii.
rocheliana var. coriophylla.
rotundifolia.
— var. hirsuta.
sarmentosa.
Sibthorpii.
sponhemica.
stenoglossa.
taygetea.
tenella.
trifurcata.
— var. ceratophylla.
umbrosa.
vochinensis.

Scabiosa arvensis.
atropurpurea.
australis.
banatica.
calocephala.
caucasica.
Columbaria.
Fischeri.
fumarioides.
graminifolia.
gramuntia.
integrifolia.
isetensis.
lancifolia.
leucophylla.
longifolia.
macedonica.
micrantha.
orientalis.

Scabiosa, *cont.*
palaestina.
plumosa.
prolifera.
Pterocephala.
succisa.
triniaefolia.
vestina.

Scandix Balansae.

Schizanthus pinnatus.
retusus.

Schizopetalum Walkeri.

Scilla amoena.
bifolia.
festalis.
hispanica.
messeniaca.
parviflora.
patula.
peruviana.
sibirica.
verna.

Scirpus Caricis.
Eriophorum.
Holoschoenus.
lacustris.
maritimus.
polyphyllus.
sylvaticus.
triqueter.

Scleranthus annuus.

Scolymus hispanicus.
maculatus.

Scopolia lurida.

Scorpiurus vermiculata.

Scorzonera austriaca var. latifolia.
villosa.

Scrophularia alata.
aquatica.
nodosa.
peregrina.
sylvatica.
vernalis.

Scutellaria albida.
alpina.
altissima.

Scutellaria, *cont.*
baicalensis.
galericulata.
indica.
scordiifolia.

Securigera Coronilla.

Sedum acre.
Aizoon.
album.
Ewersii.
hispanicum.
populifolium.
pulchellum.
roseum.
rubens.
spathulifolium.
spectabile.
Telephium.

Selinum Carvifolia.
Gmelini.
vaginatum.

Sempervivum arachnoideum.
— var. Laggeri.
arvernense.
assimile.
boutignyanum.
caucasicum.
Funckii.
leucanthemum.
mettenianum.
montanum.
parvulum.
Royeni.
Schottii var. acuminatum.
speciosum.
tectorum.
— var. rusticanum.
Verloti.

Senecio adonidifolius.
balbisianus.
chrysanthemoides.
Cineraria.
diversifolius.
Doria.
doriaeformis.
Doronicum.
elegans.
Fetisowii.
japonicus.
macrophyllus.
nemorensis.

Senecio, *cont.*
paludosus.
sarracenicus.
Schimperi.
squalidus.
suaveolens
thapsoides.
viscosus.

Serratula coronata.
Gmelini.
quinquefolia.
tinctoria.

Sesamum indicum.

Seseli gummiferum.
Libanotis.
osseum.
tenuifolium.

Setaria glauca.
italica
macrochaeta.
verticillata.
viridis.
vulpiseta.

Sherardia arvensis.

Sida Napaea.

Sidalcea candida.
Listeri.
malvaeflora.
spicata.

Sideritis Eubaea.
montana.
scordioides.
theezans.

Siegesbeckia orientalis.

Silaus alpestris.
flavescens.
tenuifolius.

Silene alpestris.
anglica.
Armeria.
ciliata.
clandestina.
colorata.

Silene, *cont.*
conoidea.
cretica.
Cucubalus.
diurniflora.
echinata.
fimbriata.
flavescens.
Fortunei.
fuscata.
gallica.
glauca.
Griffithii.
italica.
juvenalis.
laeta.
linicola.
longicilia.
maritima.
melandrioides.
monachorum.
Muscipula.
noctiflora.
nocturna.
nutans,.
obtusifolia.
odontopetala
Otites.
paradoxa.
pendula.
portensis.
quadrifida.
rubella .
Saxifraga.
Schafta.
sedoides.
squamigera.
stylosa.
tenuis.
Thorei.
vallesia.
verecunda.
vesiculifera.
viridiflora.
Viscaria.
wolgensis.
Zawadskii.

Silphium integrifolium.
laciniatum.
perfoliatum.
scaberrimum.
terebinthinaceum.
trifoliatum.
— var. ternatum.

Silybum eburneum.
Marianum.

Sisymbrium assoanum.
austriacum.
multifidum.
polyceratium.
Sophia.
strictissimum .
tanacetifolium.
Thalianum.

Sisyrinchium grandiflorum.
iridifolium.
Sellowii.
striatum.

Sium Sisarum.

Smilacina stellata

Smyrnium apiifolium.
Olusatrum.
rotundifolium.

Solanum etuberosum.
nigrum.
rostratum.
villosum.

Solidago arguta.
canadensis.
elliptica.
elongata.
lithospermifolia.
neglecta.
nemoralis.
petiolaris.
rigida.
serotina.
Shortii.
ulmifolia.

Sonchus arvensis
asper.
palustris.

Sophora flavescens.

Sorghum vulgare.

Sparganium simplex.

Spartina polystachya.

Specularia falcata.
hybrida.
pentagonia.
perfoliata.
Speculum.

Sphaeralcea rivularis.

Spilanthes Acmella.

Spiraea Aruncus.
digitata.
Filipendula.
palmata,
Ulmaria.

Stachys Alopecuros.
alpina.
Betonica.
grandiflora.
lanata.
longifolia.
recta.
scardica.
setifera.
sylvatica.

Statice bellidifolia.
Bonduelli.
caspia.
cosyrensis.
echioides.
eximia.
Gmelini.
gougetiana.
incana var. nana.
Limonium.
reticulata.
sinensis.
sinuata.
speciosa.
Suworowi.
tatarica.

Stevia Eupatoria.
ovata.
serrata.

Stipa Aristella.
arundinacea.
Calamagrostis.
capillata.
papposa.
pennata.
sareptana.
sibirica.
spartea.
viridula.

Stropholirion californicum.

Symphyandra Hofmanni.
pendula.
Wanneri.

Symphytum asperrimum.
officinale.
peregrinum.

Synthyris reniformis.

Syrenia sessilifolia.

Tagetes erecta.
patula.
signata.

Tamus communis.

Tanacetum vulgare.

Taraxacum gymnanthum.
montanum.
officinale.

Teesdalia Lepidium.

Telephium Imperati.

Tetragonia crystallina.
expansa.

Tetrapoma barbaraefolia.

Teucrium Botrys.
canadense.
Chamaedrys.
graecum.
multiflorum.
oxyodon.
Scorodonia.

Thalictrum angustifolium.
aquilegiifolium.
Cornuti.
corynellum.
flavum.
glaucum.
minus.
—var. collinum.
—var. elatum.
—var. pubescens.
—var. purpurascens.
odoratum.
squarrosum.

Thelesperma filifolium.

Thermopsis caroliniana.
fabacea.
montana.
rhombifolia.

Thladiantha dubia.

Thlaspi alpestre.
arvense.
montanum.
perfoliatum.

Thymus Chamaedrys var.
comosus.

Tinantia fugax.

Tolmiea Menziesii.

Tolpis barbata.

Tordylium cordatum.

Trachymene coerulea.
pilosa.

Tradescantia congesta.

Tragopogon major.

Tragus racemosus.

Tribulus terrestris.

Tricholepis furcata.

Tridax trilobata.

Trifolium agrarium.
alpestre.
angustifolium.
armenum.
arvense.
Balansae.
clypeatum.
diffusum.
fragiferum.
glomeratum.
hybridum.
incarnatum.
Johnstoni.
leucanthum.
Lupinaster.
maritimum.
medium.
pannonicum.
Perreymondi.
physodes.
pratense.
roscidum.
repens.
resupinatum.

Trifolium, *cont.*
rubens.
scabrum.
squarrosum.
striatum.
tridentatum

Triglochin maritimum.
palustre.

Trigonella corniculata.
caerulea.
cretica.
Foenum-graecum.
ovalis.
polycerata.
suavissima.

Trillium grandiflorum.

Trinia Kitaibelii.

Triosteum perfoliatum.

Tripteris cheiranthifolia.

Triptostegia glandulosa.

Triticum Aegilops.
amyleum.
monococcum.
ovatum.
polonicum.
Spelta.
turgidum.
violaceum.
vulgare.

Tritonia crocosmaeflora.
Pottsii.

Trollius asiaticus.
europaeus.

Tropaeolum majus.
minus.

Troximon grandiflorum.
laciniatum.

Tunica olympica.
prolifera.
Saxifraga

Tussilago Farfara.

Typha angustifolia.
latifolia.
minima.
stenophylla.

Uniola latifolia.

Urospermum picroides.

Ursinia pulchra.

Urtica pilulifera.
— var. balearica.
thunbergiana.

Valeriana officinalis.
— var. sambucifolia.
Phu.

Valerianella carinata.
coronata.
dentata.
echinata.
eriocarpa.
olitoria.
vesicaria.

Velezia rigida,

Vella annua.

Venidium perfoliatum.

Veratrum nigrum.
viride.

Verbascum Chaixii.
floccosum.
gnaphalodes.
Lychnitis.
nigrum.
phlomoides.
pulverulentum.
tomentosum.
wiedmannianum.

Verbena angustifolia.
Aubletia.
biserrata.
bonariensis.
caroliniana.
officinalis.
urticifolia.

Verbesina encelioides.
helianthoides.

Veronica acinifolia.
Anagallis.
anagalloides.
austriaca.
Beccabunga.
caucasica.
deltigera.
exaltata.
glauca.
incana.
longifolia.
— var. japonica.
officinalis.
pectinata.
peduncularis.
peregrina.
persica.
Ponæ.
saxatilis.
serpyllifolia.
spicata.
subsessilis.
Teucrium, var. dubia.
virginica.

Vicia amphicarpa.
atropurpurea.
bithynica.
calcarata.
Cracca.
disperma.
Faba.
— var. equina.
fulgens.
gigantea.
graminea.
hirsuta.
lutea.
— var. hirta.
melanops.
narbonensis.
Orobus.
picta.
pyrenaica.
sativa.
sepium.
sicula.
sylvatica.
unijuga.
villosa.

Vincetoxicum fuscatum.
nigrum.
officinale.

Viola arenaria
cornuta.
cucullata.
elatior.
hirta.
lutea.
mirabilis.
odorata.
palustris.
pratensis.
Patrinii.
persicaefolia.
pubescens.
rothomagensis.
rotundifolia.
sagittata.
striata.
sylvestris.
syrtica.
tricolor.

Vittadenia australis.

Volutarella Lippii.
muricata.

Wahlenbergia dalmatica.
gracilis.
lobelioides.

Xanthium spinosum.
strumarium.

Xanthocephalum gymnospermoides.

Xeranthemum annuum.

Zea Mays.

Zephyranthes candida.

Zinnia pauciflora.

Ziziphora tenuior.

Zygadenus elegans.
leimanthoides.
muscitoxicus.

TREES AND SHRUBS.

Abies amabilis.
balsamea.
cephalonica.
concolor.
Fraseri.
grandis.
lasiocarpa.
numidica.
sibirica.

Acanthopanax sessiliflorum.

Acer campestre.
— var. aetnense.
— var. collinum.
caudatum.
circinatum.
coriaceum.
insigne.
japonicum.
macrophyllum.
monspessulanum.
Negundo.
— var. californicum.
— var. violaceum.
opulifolium.
— var. neapolitanum.
pennsylvanicum.
platanoides.
Pseudo-Platanus.
— var. purpureum.
rufinerve.
spicatum.
tataricum.
— var. Ginnala.

Ailanthus glandulosa.

Alnus cordifolia.
glutinosa.
incana.
japonica.
nitida.
oregana.
orientalis.
rhombifolia.
serrulata.
sitchensis.
subcordata.
viridis.

Amelanchier alnifolia.
canadensis.
vulgaris.

Amorpha canescens.
fruticosa.

Aplopappus ericoides.

Aralia spinosa.

Arbutus Andrachne.
Unedo.

Aucuba japonica.

Baccharis halimifolia.
patagonica.
salicina.

Berberis aetnensis.
angulosa.
Aquifolium.
— var. fascicularis.
— var. murrayana.
aristata.
buxifolia.
canadensis.
concinna.
Lycium.
repens.
serotina.
Sieboldii.
sinensis.
Thunbergi.
virescens.
vulgaris.
— var. foliis purpureis.
wallichiana.

Betula alba.
— var. pubescens.
alpestris.
corylifolia.
davurica.
Ermani.
fruticosa.
humilis.
lenta.

C

Betula, *cont.*
lutea.
nigra.
occidentalis.
papyrifera.
populifolia.
ulmifolia.
utilis.

Bruckenthalia spiculifolia.

Buddleia intermedia.
japonica.
variabilis.

Buxus sempervirens.
— var. latifolia.
— var. prostrata.

Calluna vulgaris.

Calophaca wolgarica.

Calycanthus occidentalis.

Caragana arborescens.
— var. Redowskii.
aurantiaca.
brevispina.
frutescens.
microphylla.
pygmaea.

Carmichaelia australis.

Carpinus Betulus.
— var. incisa.
caroliniana.
orientalis.

Cassandra calyculata.

Cassinia fulvida.
leptophylla.

Catalpa cordifolia..

Ceanothus americanus.
Arnoldi.
azureus.
integerrimus.
ovatus.

Cedrus atlantica.
Deodara.
Libani.

Celastrus articulatus.

Celtis australis.
occidentalis.
Tournefortii.

Cercis Siliquastrum.

—

Chionanthus virginica.

Cistus hirsutus.
laurifolius.
vaginatus.
villosus.

Cladrastis amurensis.
— var. Buergeri.

Clematis aethusifolia.
alpina.
aromatica.
campaniflora.
crispa.
Flammula.
fusca.
montana.
orientalis.
— var. tangutica,
Pitcheri, var. lasiostylis.
songarica.
Viorna.
virginiana.
Vitalba.
Viticella, var. alba.
— var. rubra.

Clerodendron trichotomum.

Clethra acuminata.
alnifolia.
canescens.

Colutea arborescens.
cruenta.
melanocalyx.

Conyza ivaefolia.

Coriaria japonica.
terminalis.

Cornus alba.
alternifolia.
Amomum.
Baileyi.

Cornus, *cont.*
candidissima.
circinata.
florida.
glabrata.
Kousa.
Mas.
pubescens.
sanguinea.
stolonifera.

Coronilla Emerus.

Cotoneaster acuminata.
affinis.
bacillaris.
— var. floribunda.
buxifolia.
frigida.
horizontalis.
integerrima.
laxiflora.
lucida.
microphylla.
multiflora.
Nummularia.
pannosa.
rotundifolia.
Simonsii.
thymifolia.

Crataegus aprica.
arkansana.
arnoldiana.
Carrierei.
coccinea.
— var. macracantha.
coccinoides.
collina.
cordata.
Crus-Galli.
— var. splendens.
Douglasii.
erythropoda.
flava.
heterophylla.
hiemalis.
melanocarpa.
mollis.
monogyna.
nigra.
nitida.
orientalis.
— var. sanguinea.
oxyacanthoides.

Crataegus, *cont.*
— var. fructu luteo.
pentagyna.
pinnatifida.
punctata.
Pyracantha.
rivularis.
sanguinea.
— var. songarica.
sorbifolia.
succulenta.
tanacetifolia.
tomentosa.
uniflora.
viridis.

Cryptomeria japonica.

Cupressus lawsoniana.
macrocarpa.
nutkatensis.
obtusa.
pisifera.
thyoides.

Cytisus albus.
biflorus.
capitatus.
frivaldskyanus.
monspessulanus.
nigricans.
praecox.
procumbens.
purgans.
purpureus.
scoparius.
— var. andreanus.
— var. pendulus.
— var. sulphureus.
sessilifolius.

Daboëcia polifolia.

Daphne Mezereum.

Desmodium viridiflorum.

Deutzia crenata.
gracilis.

Diervilla hortensis.
sessilifolia.
— var. splendens.

Diospyros Lotus.
virginiana.

Dirca palustris.

Eccremocarpus scaber.

Elaeagnus angustifolia.
argentea.
multiflora.
umbellata.

Erica arborea.
australis.
carnea.
ciliaris.
cinerea.
mediterranea.
— var. alba.
multiflora.
scoparia.
stricta.
vagans.

Escallonia exoniensis.
illinita.
punctata.
rubra.
viscosa.

Euonymus europaeus.
latifolius.

Exochorda Alberti.

Fontanesia Fortunei.
phillireaeoides.

Fraxinus americana.
Excelsior
— var. heterophylla.
nigra.
Ornus.

Gaultheria Shallon.

Gaylussacia resinosa.

Genista aethnensis.
anglica.
germanica.
hispanica.
pilosa.
sagittalis.
tinctoria var. elatior.
virgata.

Halesia corymbosa.
hispida.
tetraptera.

Halimodendron argenteum.

Hedera Helix.

Hedysarum multijugum

Helianthemum canum.
formosum.
halimifolium.
polifolium.
vulgare.
— var. mutabile.
— var. rhodanthum.

Hippophaë rhamnoides.

Hydrangea Hortensia.
paniculata.
petiolaris.
pubescens.

Hypericum Androsaemum.
Ascyron.
aureum.
calycinum.
corymbosum.
densiflorum.
elatum.
erectum.
hircinum.
hookerianum.
inodorum.
kalmianum.
moserianum.
olympicum.
patulum.
prolificum.
uralum.

Ilex ambigua.
Aquifolium.
cornuta.
decidua.
glabra.
opaca.
Sieboldii.
— var. fructu luteo.
verticillata.
— var. fructu luteo.

Indigofera gerardiana.
hebepetala.

Itea virginica.

Jamesia americana.

Jasminum fruticans.
humile.

Juniperus chinensis.
excelsa.
macropoda.

Kalmia angustifolia.
glauca.
latifolia.

Laburnum alpinum.
— var. biferum.
vulgare.

Larix davurica.
europaea.
— var. sibirica.
leptolepis.
pendula.

Ledum latifolium.
palustre.

Leiophyllum buxifolium.

Lespedeza bicolor.

Leucothoe Catesbæi.
racemosa.

Leycesteria formosa.

Ligustrum Ibota.
sinense.
vulgare.

Lonicera alpigena.
angustifolia.
depressa.
etrusca.
glauca.
hirsuta.
iberica.
japonica.
Korolkowii.
Maximowiczii.
Morrowii.
nervosa.

Lonicera, *cont.*
nigra.
obovata.
orientalis.
Periclymenum.
segreziensis.
Sullivantii.
syringantha.
translucens.
Xylosteum.

Lupinus arboreus.

Lycium chinense.
pallidum.

Lyonia paniculata.

Magnolia Kobus.
macrophylla.
soulangeana.
tripetala.

Menispermum canadense.

Microglossa albescens.

Myrica carolinensis.
cerifera.
Gale.

Myricaria germanica.

Neillia amurensis.
malvacea.
opulifolia.

Neviusia alabamensis.

Olearia Haastii.

Ononis aragonensis.
fruticosa.
rotundifolia.

Paliurus australis.

Pernettya mucronata.

Petteria ramentacea.

Philadelphus acuminatus.
Billardi.
cordifolius.
coronarius.
— var. tomentosus.
Falconeri.
gordonianus.

Philadelphus, *cont.*
grandiflorus.
Lemoinei.
Lewisii.
Satsumi.

Picea alba.

Pieris floribunda.
japonica.
nitida.

Pinus albicaulis.
Jeffreyi.
koraiensis.
Laricio.
— var. monspeliensis.
mitis.
monophylla.
parviflora.
Peuce.
sylvestris.
Taeda.
torreyana.

Piptanthus nepalensis.

Platanus acerifolia.
occidentalis.
orientalis.

Populus deltoidea.
nigra.

Potentilla fruticosa.
salesoviana.

Prunus acida var. semperflorens.
alleghaniensis.
americana.
Besseyi.
Brigantiaca.
Capollin.
cerasifera.
Chamæcerasus.
demissa.
divaricata.
humilis.
Laurocerasus.
Lusitanica.
Mahaleb.
maritima.
nigra.
Padus.
Puddum.

Prunus, *cont.*
serotina.
spinosa.
triflora.
Watsoni.

Ptelea trifoliata.

Pyrus alnifolia.
alpina.
americana.
arbutifolia.
Aria.
— var. Hostii.
Aucuparia.
baccata.
Balansae.
canescens.
communis.
coronaria.
Cydonia.
decaisneana.
floribunda.
germanica.
intermedia.
japonica.
lanata.
lanuginosa.
lobata.
longipes.
Maulei.
Michauxii.
nigra.
nivalis.
parviflora.
pinnatifida.
prunifolia.
Ringo.
rotundifolia.
salicifolia.
sikkimensis.
sinensis.
Sorbus.
spuria.
Toringo.

Rhamnus Alaternus.
— var. angustifolius.
californicus.
catharticus.
davuricus.
Frangula.
libanoticus.
purshianus.

Rhododendron Albrechtii.
californicum.
campanulatum.
catawbiense.
ciliatum.
ferrugineum.
flavum.
hirsutum.
kewense.
ledifolium.
ponticum.
— var. cheiranthifolium.
— var. lancifolium.
punctatum.
quinquefolium.
racemosum.

Rhodotypus kerrioides.

Rhus aromatica.
cotinoides.
Cotinus.
glabra.
— var. laciniata.
Osbeckii.
Toxicodendron.
typhina.

Ribes alpinum.
— var. pumilum.
aureum.
— var. aurantiacum minus.
— var. tenuiflorum.
divaricatum.
fasciculatum.
gracile.
multiflorum.
petraeum.
robustum.
rubrum.
— var. Schlechtendalii.
sanguineum.

Robinia neo-mexicana.
Pseudacacia.
viscosa.

Rosa acicularis.
agrestis
alba.
alpina.
— var. pyrenaica.
arkansana.
beggeriana.
blanda.

Rosa, *cont.*
californica.
canina.
carolina.
— var. nuttalliana.
cinnamomea.
— var. glandulifolia.
damascena.
fedtschenkoana.
Fendleri.
ferox.
ferruginea.
foliolosa.
gallica.
glutinosa.
gymnocarpa.
hibernica.
humilis.
— var. triloba.
involuta, var. Wilsoni.
Jundzilli.
macrophylla.
Malyi.
micrantha.
microphylla.
mollis.
moschata.
multiflora.
nipponensis.
nitida.
nutkana.
ochroleuca.
pisocarpa.
pomifera.
repens.
rubella.
rubiginosa.
rugosa.
Sayi.
Seraphini.
sericea.
setigera.
spinosissima.
— var. altaica.
— var. hispida.
stylosa.
tomentosa.
virginiana.
— var. alba.
— var. grandiflora.
webbiana.
wichuraiana.

Rubus affinis.
balfourianus.

Rubus, *cont.*
Bellardi.
biflorus.
caesius.
clavatus.
Colemanni.
corylifolius.
deliciosus.
dumetorum.
echinatus.
erythrinus.
exsecatus.
foliolosus.
fuscus.
glandulosus.
Guentheri.
Hystrix.
Idaeus.
Koehleri.
laciniatus.
leucodermis.
leucostachys.
lindleyanus.
longithyrsiger.
macrophyllus.
melanolasius.
micans.
mucronatus.
mutabilis.
neglectus.
nutkanus.
occidentalis.
odoratus.
parvifolius.
phoenicolasius.
pubescens.
Purchasii.
Radula.
ramosus.
rhamnifolius.
scaber.
suberectus.
thyrsiflorus.
thyrsoideus.
ulmifolius.
— var. leucocarpus.
villicaulis.
villosus.
xanthocarpus.

Ruta graveolens.

Salix ambigua.
Caprea.
cinerea-repens.

Salix, *cont.*
myrtilloides.
— var. pedicellaris.
nigra.
nigricans.
pentandra.
rubra.
smithiana.

Sambucus canadensis.
glauca.
melanocarpa.
nigra.
racemosa.
— var. serratifolia.

Skimmia japonica.

Spartium junceum.

Spiraea Aitchisoni.
bella.
betulifolia.
bracteata.
brumalis.
cana.
canescens.
chamaedrifolia.
crenata.
discolor.
Douglasii.
expansa.
intermedia.
japonica.
— var. glabrata.
lindleyana.
longigemmis.
nobleana.
notha.
nudiflora.
pikoviensis.
salicifolia.
Schinabecki.
sorbifolia.
tomentosa.
trilobata.

Staphylea colchica.
Coulombieri.
pinnata.

Symphoricarpus Heyeri.
mollis, var. ciliatus.
racemosus.
rotundifolius.

Syringa Emodi.
japonica.
Josikaea.
vulgaris.

Tamarix anglica.
Pallasii.
tetrandra.

Taxus baccata.
canadensis.
cuspidata.

Thuja gigantea.
japonica.
occidentalis.
— var. Dicksoni.
orientalis.

Tilia americana.
argentea.
cordata.
dasystyla.
heterophylla.
petiolaris.
platyphyllos.
vulgaris.

Tsuga pattoniana.
— var. glauca.

Ulex europaeus.
nanus.

Vaccinium ovatum.

Veronica Traversii.

Viburnum acerifolium.
cassinoides.
dentatum.
dilatatum.
Lantana.
Lentago.
molle.
nudum.
Opulus.
phlebotrichum.
prunifolium.
Tinus.

Vitis aestivalis.
amurensis.
Berlandieri.
heterophylla.
quinquefolia.
vinifera.
— var. laciniosa.

Widdringtonia Whytei.

Wistaria multijuga.

Zanthoxylum Bungei.

Zenobia speciosa.
— var. pulverulenta.

ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

APPENDIX II.—1902.

NOTE.

In the preface to the *Catalogue of the Library of the Royal Botanic Gardens*, which was issued as Volume III. of the *Additional Series* of the *Kew Bulletin*, it was stated that annual lists of future additions would be published in the *Bulletin*.

The present instalment contains the additions made to the Library by gift or purchase during the year 1901, with the exception of such current periodicals and annuals as continue sets already catalogued.

Like the Catalogue, the List is printed on one side of the page, to allow of its being cut up. It is probable that many persons and institutions will make the Kew Catalogue the basis of their own, and will use the lists of additions to supply printed slips for fresh titles.

10765—1375—1/1902 Wt 44 D & S 29 A

CATALOGUE OF THE LIBRARY.

Additions received during 1901.

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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

APPENDIX III.—1902.

NEW GARDEN PLANTS OF THE YEAR 1901.

The number of garden plants annually described in botanical and horticultural publications, both English and foreign, is now so considerable that it has been thought desirable to publish a complete list of them in the *Kew Bulletin* each year. The following list comprises all the new introductions recorded during 1901. These lists are indispensable to the maintenance of a correct nomenclature, especially in the smaller botanical establishments in correspondence with Kew, which are, as a rule, only scantily provided with horticultural periodicals. Such a list will also afford information respecting new plants under cultivation at this establishment, many of which will be distributed from it in the regular course of exchange with other botanic gardens.

The present list includes not only plants brought into cultivation for the first time during 1901, but the most noteworthy of those which have been re-introduced after being lost from cultivation. Other plants included in the list may have been in gardens for several years, but either were not described or their names had not been authenticated until recently.

In addition to species and well-marked varieties, hybrids, whether introduced or of garden origin, have been included where they have been described with formal botanical names. Mere cultural forms of well-known garden plants are omitted, for obvious reasons.

In every case the plant is cited under its published name, although some of the names are doubtfully correct. Where, however, a correction has appeared desirable, this is made.

The name of the person in whose collection the plant was first noticed or described is given where known.

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An asterisk is prefixed to all those plants of which examples are in cultivation at Kew.

The publications from which this list is compiled, with the abbreviations used to indicate them, are as follows :—*Bull. Mus. Paris.*—Bulletin du Muséum d'histoire naturelle, Paris. *B. M.*—Botanical Magazine. *Gard.*—The Garden. *G.C.*—Gardeners' Chronicle. *Gfl.*—Gartenflora. *G. M.*—Gardeners' Magazine. *Jard.*—Le Jardin. *Journ. de Bot.*—Journal de Botanique. *J. of H.*—Journal of Horticulture. *J. H. F.*—Journal de la Société nationale d'horticulture de France. *L.*—Lindenia. *Lemoine Cat.*—Lemoine, Catalogue. *M. K.*—Monatsschrift für Kakteenkunde. *N. B.*—Notizblatt des Königl. botanischen Gartens und Museums zu Berlin. *O. R.*—Orchid Review. *R. H.*—Revue Horticole. *R. H. B.*—Revue de l'Horticulture Belge. *S. C. A. A.*—Southern California Acclimatizing Association Catalogue. *Späth Cat.*—L. Späth, General Nursery Catalogue. *W. G.*—Wiener Illustrirte Garten-Zeitung.

The abbreviations in the descriptions of the plants are :—*diam.*—Diameter. *ft.*—Foot or Feet. *G.*—Greenhouse. *H.*—Hardy. *H. H.*—Half-hardy. *in.*—Inches. *S.*—Stove.

Abies arizonica. (*G. C.* 1901, xxix, 86 ; 134, f. 52, 3.) Coniferæ. H. This silver fir is *A. lasiocarpa* var. *arizonica*, Lemmon. Arizona. (Henkel, Darmstadt.)

Acrospira asphodelioides. *B.T.O.* 1901, 327.) Liliaceæ. H.H. An Eremurus-like plant with spikes of scentless white flowers. Angola, &c. (Sprenger, Naples.)

***Aëranthes caudata.** (*K. B.* 1901, 149.) Orchidaceæ. S. The sepals and petals are pale pellucid green, and the lip greenish white. Madagascar. (Glasnevin.)

Aëranthes ramosa. (*O.R.* 1901, 352.) S. Remarkable for its very long, slender, branched raceme. The flowers are dull olive-green in colour, and most resemble those of *A. dentiens*. Madagascar. (Glasnevin, and A. A. Peeters, Brussels.)

Agapanthus caulescens. (*Gfl.* 1901, 21 ; 281, t. 1487.) Liliaceæ. G. Allied to *A. umbellatus*, but with dark violet-blue flowers, the outer row of which are nodding. S. Africa. (Sprenger, Naples.)

Agave Langlassei. (*R.H.* 1901, 349, ff. 147–8). Amaryllidaceæ. G. A species of the section *Manfreda*, with a persistent subwoody rootstock terminated by several short, channeled, green leaves. General aspect of the plant is that of *Furcræa Bedinghausii*. Inflorescence about 3 ft. high. Mexico. (André, Golfe St. Juan, France.)

Agave Weberi. (*Jard.* 1901, 265.) G. "Easily distinguished by almost complete absence of marginal teeth. Leaves are greenish-grey, pruinose, supple, of medium thickness, slightly concave, sometimes almost flat ; longitudinally plicate, like certain species of *Furcræa*." Mexico. (Diguet, Paris.)

Aloe Grusoni. (*M. K.* 1901, 57, f.) Liliaceæ. G. A garden hybrid between *A. Schimperi* and *A. humilis*). (Henze, Magdeburg.)

Aloe macrocarpa. (*M. K.* 1901, 65.) G. A fine species with a rosette of fleshy, toothed, white-spotted leaves and a tall inflorescence of red, bell-shaped, yellow-margined flowers. Abyssinia. (Berlin B. G.)

Anthurium andreanum rhodochlorum. (*R. H.* 1901, 452, t.) Araceæ. S. A variety with spathes of a light soft rose colour in the upper part, passing into a light green on the lateral lobes. (Chantrier frères, Mortefontaine, France.)

Arabis aubretioides. (*G. C.* 1901, xxix, Suppl. 4.) Cruciferæ. H. A

species with the habit, &c., of *A. albida*, flowers of the same size as that species but of a pale pink colour. Cilicia. (Miss Willmott.)

***Aralia handsworthensis.** (*Gard.* 1901, lix, 401.) Araliaceæ. S. shrub with very finely-cut leaves of a beautiful pink tint. Fisher, Son & Sibray, Ltd.) [This is *A. Veitchii gracillima.*]

***Arctotis Gumbletoni.** (*B. M.* t. 7796.) Compositæ. G. Stem short, clothed, as are the leaves and peduncles, with a thin white densely-matted tomentum. Basal leaves 6 to 12 in. long by 1 to 1½ in. broad, long-stalked, pinnatifid or pinnatisect. Flower-head 3 in. across; ray-flowers deep orange-red. Namaqualand. (W. E. Gumbleton; Kew.)

***Arctotis staechadifolia.** (*G. C.* 1901, xxx, 108. f. 34.) G. An old plant first introduced upwards of a century ago, but apparently lost to cultivation until re-introduction a year or two ago. S. Africa.

***Asparagus sieberianus.** (*Lem. Cat.* 1901, No. 149.) Liliaceæ. S. A garden hybrid between *A. crispus* and *A. tenuissimus.* (Lemoine, Nancy.)

Aster carnosus. (*G. C.* 1901, xxx, 219.) Compositæ. H. A straggling, loosely-branched plant with slender glabrous branches, linear entire sessile glabrous leaves and flower-heads with violet rays and orange disk. N. America. (Henkel, Darmstadt.)

Aster subcœrulea. (*G. C.* 1901, xxx, 385.) H. Apparently nearest *A. lingulatus*, but differing from it in leaf; shape of involucral leaves; pale blue, not purple, ray-florets; different pappus, &c. N.W. India. (Leichtlin, Baden.)

Asterogyne Martiana. (*G. C.* 1901, xxix, 217.) Palmæ. S. "The stem attains a height of a foot and a half, and is about 2 inches in diameter. The leaves are about 4 feet long, spatulate, narrowed at the base, incised 1 foot deep at the apex; the petiole is about 2 feet long, the lamina 3 feet long, 10 inches broad, much folded." Guatemala and Costa Rica. (U. Dammer, Berlin.)

***Begonia forgetiana.** (*G. C.* 1901, xxx, 66.) Begoniaceæ. S. Stems nearly 2 ft. high and more or less branched; leaves fleshy, glossy green, 6 to 7 in. long and 2 in. broad, semi-cordate at the base; flowers pink and white, about an inch in diameter, borne in axillary clusters. Brazil. (F. Sander & Co.)

Begonia Theulieri rosea. (*Jard.* 1901, 344, t.) G. A garden hybrid derived from *B. semperflorens.* (Theulier, Paris).

***Berberis dictyophylla.** (*Jard.* 1901, 265.) Berberidaceæ. H. A decidusus shrub with glaucous oborate leaves, finely reticulated beneath, flowers pale yellow, solitary or in pairs, somewhat long-stalked. Fruit red, pruinose. Yunnan.

***Beschorneria Wrightii.** (*B. M.*, t. 7779.) Amaryllidaceæ. G. Much the largest of the five species of the genus which have as yet flowered at Kew. Most nearly allied to *B. decosteriana*, which differs in its quite glabrous flowers. Leaves densely crowded, spreading and recurved, ensiform, coriaceous, four to five feet long by two inches broad about the middle. Panicle pyramidal, eight feet high; flowers nodding, green, pubescent. Mexico? (Kew.)

Brodiæa crocea. (*G. C.* 1901, xxx, 126, f. 39.) Liliaceæ. H. A small species with linear leaves, a slender naked peduncle a foot long, and a large umbel of yellow flowers. Northern California. (Wallace).

Buddleia Columbiæ. (*R. H.* 1901, 37, f. 7). Loganiaceæ. G. A species with long, curved, drooping, terminal inflorescences like those of *B. lindleyana;* flowers white. Native country uncertain, but believed to be temperate S. America. (E. André, Golfe-Juan, France.)

Bupleurum croceum. (*G. C.* 1901, xxx, 6.) Umbelliferæ. H.? A showy perennial with flowers and involucral bracts a bright yellow colour. Asia Minor. (A. K. Bulley.)

***Calceolaria polyrhiza.** (*G. C.* 1901, xxx, 6.) Scrophulariaceæ. H. A dwarf tufted species from the Patagonian Andes; flowers yellow, inclining to orange. (A. K. Bulley.)

***Calorhabdos cauloptera.** (*B. M.* t. 7800.) Scrophulariaceæ. G. A slender erect herb with much the general aspect of certain Veronicas. Terminal

inflorescence 6–8 in. long; corollas small, dark red-purple. China. (Kew.)

Calyptrogyne sarapiguensis. (*G. C.* 1901, xxix, 217.) Palmæ. S. "The stem is short, about 6 ft. high, and many-leaved. The leaves are about 6 ft. long; the petiole has a length of 16 to 20 inches; the laminæ are oblong, 24 to 28 in. broad, 4 to 4½ ft. long, pinnate." Costa Rica. (U. Dammer, Berlin.)

***Campanula michauxoides.** (*Gfl.* 1901, 637, f. 87.) Campanulaceæ. H. A tall-growing species with bluish-white flowers with recurved segments. Much like *Michauxia campanuloides* in general aspect. Asia Minor. (Haage & Schmidt, Erfurt.)

Castilleja integra. (*G. C.* 1901, xxx, 218.) Scrophulariaceæ. H. A perennial species with loosely-branched stems, linear sessile leaves, and dense terminal spikes with orange-scarlet bracts. New Mexico. (Henkel, Darmstadt.

***Catasetum quadridens.** (*K. B.* 1901, 149.) Orchidaceæ. S. The flowers are remarkable for the presence of a pair of short, acute teeth, situated at the lower angles of the abortive stigma, in addition to the usual pair of antennæ. The flowers are light green, blotched all over with dark brown. (Kew.)

Cattleya Clarkiæ (*O. R.* 1901, 15.) Orchidaceæ. G. A garden hybrid between *C. bicolor* and *C. labiata*. (E. F. Clark.)

Cattleya dowiana Rosita. (*G. M.* 1901, 35, f.) S. Sepals creamy white, tinged with purple; petals rose-purple, tinged with yellow at the base; lip crimson-purple with golden veining. (C. Maron, Brunoy, France.)

Cattleya flavescens. (*O. R.* 1901, 299, 303, 317.) See *C. fulvescens*.

Cattleya fulvescens. (*G. M.* 1901, 644, f.) S. A garden hybrid between *C. Forbesii* and *C. dowiana aurea*. (Charlesworth & Co.)

Cattleya geleniana. (*W. G.* 1901, 111.) G. A garden hybrid, probably between *C. luddemanniana* and *C. bicolor*. (Baron Hruby, Hungary.)

Cattleya Germania. (*O. R.* 1901, 315.) G. A garden hybrid between *C. granulosa schofieldiana* and *C. hardyana*. (Charlesworth & Co.)

Cattleya gloriosa. (*G. C.* 1901, xxix, 418.) G. A garden hybrid between *C. Warneri* and *C. schilleriana*. (A. A. Peeters, St. Gilles, Brussels.)

Cattleya Iris. (*O. R.* 1901, 317.) S. A garden hybrid between *C. bicolor* and *C. dowiana aurea*. (Charlesworth & Co.)

Cattleya Juliæ. (*O. R.* 1901, 368.) G. A garden hybrid between *C. bowringiana* and *C. labiata*. (Stanley, Ashton & Co.)

Cattleya kerchoviana. (*G. C.* 1901, xxix, May 25, Suppl. 1.) G. A garden hybrid between *C. schilleriana* and *C. schofieldiana*. (A. A. Peeters, St. Gilles, Brussels.)

Cattleya Lansbergei. (*L.* 1901, t. 725.) S. A garden hybrid between *C. labiata vera* and *C. dowiana aurea*. (L'Horticole Coloniale, Brussels.)

Cattleya lueddemanniana Stanleyi. (*O. R.* 1901, 317.) G. A form with a white flower of fine shape, with the disc of the lip yellow and the front lobe lined with purple. (Stanley, Ashton & Co.)

Cattleya Mendelii gigantea. (*O. R.* 1901, 185.) G. "A fine light form with a very large lip." (H. Little.)

Cattleya Mendelii hackbridgensis. (*Gard.* 1901, lix, June 8, vii.) G. Petals blotched with crimson from the apex to the centre, the front lobe of the lip being also exceedingly dark. (A. H. Smee.)

Cattleya Mossiæ coundoniensis. (*G. C.* 1901, xxx, 24.) G. A variety with flowers of great size and rich colour. (G. Singer.)

Cattleya Mossiæ dulcis. (*G. C.* 1901, xxix, May 25, Suppl. 2.) G. "A grand rose-tinted flower, with extraordinary lip, orange in the centre, and rich rose-crimson in front, which is finely crimped." (Sir F. Wigan.)

Cattleya peckaviensis. (*W. G.* 1901. 431, f. 52.) G. A garden hybrid between *C. guttata* and *C. schilleriana*. (Baron Hruby.)

Cattleya schilleriano-Harrisoniæ. (*Gard.* 1901, 223.) *See* Laelio-cattleya Harrisoniæ-schilleriana.

Cattleya Schröderæ heatonense. (*G. M.* 1901, 304, f.) G. A fine pale lilac form with fringed lip. (H. T. Pitt.)

Cattleya Trianæ gratrixiana. (*O. R.* 1901, 55.) G. A large and richly coloured form. (S. Gratrix.)

Cattleyo Vigeri. (*Gfl.* 1901, 1062.) S. A garden hybrid between *C. aurea* and *C. labiata flammea*. (C. Maron, Brunoy, France.)

Ceratostigma Polhilli. (*G. C.* 1901, xxx, 6.) Plumbaginaceæ. H. A dwarf creeping species with flowers of the delicate colour of those of *Plumbago capensis*. Western China. (A. K. Bulley.)

Cercocarpus Traskiae. (*M. D. G.* 1901, 41.) Rosaceæ. G. A small tree approaching *C. fothergilloides*, the Mexican species, more nearly than any other. White tomentose flowers and small dark glossy green leaves. (Darmstadt B. G.) Santa Catalina Island.

Cereus Jusbertii. (*M. K.* 1901, 145.) Cactaceæ. G. Outer floral leaves green or greenish-white, inner white. A climbing species next to *C. tortuosus*. Argentina or Paraguay.

Cereus perlucens. (*M. K.* 1901, 88.) G. A species in general aspect much like *Pilocereus strictus*. Amazonia. (Berlin B. G.)

Cereus sonorensis. (*M. K.* 1901, 135, f.) G. A columnar species with 8 ribs beset with erect white spines, upper portion sparingly clothed with white felt. This is remarkable on account of its peculiar short narrow cinnabar-red flowers. Mexico. (Hempel, Ohorn, Germany.)

***Ceropegia Lugardæ.** (*G. C.* 1901, xxx, 302.) Asclepiadaceæ. S. Stems twining; leaves thin, 1–2 in. long, white at the very base, very light green on the inflated part, then white, passing into sulphur-yellow on the upper part of the tube and lobes, spotted on the outside of the tube with purple; inside the tube is of a very rich blackish-crimson on the lower half, sulphur-yellow above, with the purple spots on the outside faintly showing through. The tube is about 1 in. long, abruptly curved immediately above the inflated base, dilating at the apex into a funnel-shaped mouth ½ in. in diameter. Bechuanaland. (Kew.)

Chamaedorea hybrida. (*W. G.* 1901, 197, f. 22.) Palmæ. S. A garden hybrid between *C. concolor* and *C. Ernesti Augusti*. (Katzer, Pawlowsk, Austria.)

***Chelonopsis moschata.** (*B. M.* t. 7783.) Labiatæ. H. A perennial herb with musky odour, nettle-shaped leaves and showy pale yellow and rose-purple flowers. China and Japan. (A. K. Bulley; Kew.)

Chlidanthus Ehrenbergi. (*G. C.* 1901, xxix, 312.) Amaryllidaceæ. G. Appears to be a taller plant than *C. fragrans*, carries its flowers at a nearly horizontal position instead of erect. The flowers are also carried on distinct pedicels instead of being sessile and the three outer segments are markedly wider than the three inner. Mexico. (A. Worsley.)

***Cineraria pentactina.** (*B. M.* t. 7799.) Compositæ. G. A species closely allied to *C. lobata*, L'Hérit. but differing chiefly from that in its very slender, climbing habit, less divided leaves, and lax paniculate inflorescence. Peduncles and pedicels pale red, ray-florets, five in number, golden yellow. S. Africa? (Kew.)

***Cirrhopetalum appendiculatum.** (*K. B.* 1901, 148.) Orchidaceæ. S. The dorsal sepal and petals are pale yellow; all have numerous purple leaf-like appendages attached by a filiform base. The lateral sepals are speckled with reddish purple on a lighter ground. The lip is rosy purple with dark purple margins, keels and numerous spots. Sikkim. (H. J. Elwes.)

***Clematis brachiata.** (*G.C.* 1901, xxx, 367, f. 111.) Ranunculaceæ. G. A species with pinnate leaves, and small greenish-white fragrant flowers. S. Africa. (Cambridge B.G.)

Clematis globulosa. (*Lem. Cat.* 1901, No. 149.) H. A garden hybrid between *C. Scottii* and *C. coccinea*. (Lemoine, Nancy.)

Clematis vernalis. (*Lem. Cat.* 1901, No. 149.) H. A garden hyhrid between *C. ochroleuca* and *C. Scottii*, (Lemoine, Nancy.)

***Codonopsis viridiflora.** (*Gfl.* 1901, 637.) Campanulaceæ. G. A small free-flowering perennial climber with bell-shaped whitish-green, gray and violet flowers. Asia Minor. (Haage & Schmidt, Erfurt.)

Colchicum giganteum. *Gard.* 1901, lx, 251.) Liliaceæ. H. Probably a form of *C. speciosum.* (Leichtlin, Baden.)

Colchicum hydrophyllum. (*G. C.* 1901, xxix, 102, f. 43.) H. An early spring flowering species with flowers of a bright clear rose colour. Most nearly resembling *C. fasciculare.* Taurus Mountains.

***Coleus Mahoni.** (*J. of H.* 1901, xlii, 224.) Labiatæ. G. A winter flowering species, 1½ to 2 feet in height, with large graceful terminal panicles of small purple flowers with golden anthers. British Central Africa. (Kew.)

Commelina sellowiana rosea. (*Gfl.* 1901, 163, f. 28.) Commelinaccæ. G. A form with rose-coloured flowers. (Herb & Wulle, Naples.)

***Compteris brazziana.** (*G. C.* 1901, xxix, May 25, Suppl. 2.) Filices. "A remarkably distinct fern, with long bipinnate fronds, narrow at the base, broad across the middle, and tapering off to a narrow point; barren pinnæ oval or oblong, and simple; fertile pinnæ distinctly lobed." (L'Horticole Coloniale, Brussels.)

Coryanthes mastersiana. *G. C.* 1901, xxix, 19, f. 9.) Orchidaceæ. S. A species near *C. maculata;* ground colour of flower yellowish, tinged and freckled with different shades of copper-red or light claret-crimson. United States of Columbia. (Sir T. Lawrence.)

***Corydalis thalictrifolia.** (*Gard.* 1901, lx, 362. Papaveraceæ. H. A handsome perennial with Thalictrum-like leaves and a profusion of rather large yellow flowers. China. (J. Veitch & Sons, Ltd.)

***Cotyledon nana.** (*G. C.* 1901, xxx, 270.) Crassulaceæ. G. A very dwarf plant, densely branched, forming a tuft about 1 to 1½ inches in height. Nearly related to *C. hemisphærica*, but the leaves are smaller, with no trace of an apiculus at their apex, and are of a much lighter, somewhat yellowish green. S. Africa. (Kew.)

Crinum Alexandræ. (*B. T. O.* 1901, 307.) Amaryllidaceæ. G. A garden hybrid between *C. longifolium album* and *C. yemense.* (Sprenger, Naples.)

Crinum Belladonna. (*B. T. O.* 1901, 309.) G. A garden hybrid between *C. longifolium riparium* and *C. pratense.* (Sprenger, Naples.)

Crinum Fortunæ. (*B. T. O.* 1901, 310.) G. A garden hybrid between *C. longifolium* and *C. lineare.* (Sprenger, Naples.)

Crinum Victoriæ. (*B. T. O.* 1901, 308.) G. A garden hybrid between *C. yemense* and *C. Schmidti.* (Sprenger, Naples.)

Crinum Worsleyi. (*G. C.* 1901, xxix, 72.) G. A garden hybrid between *C. scabrum* and *C. Moorei.* (A. Worsley.)

***Cyanastrum cordifolium.** (*J. H. F.* 1901, 317.) This is the correct name of plant mentioned in list for 1896 as *Schænlandia gabonensis.*

***Cyanotis hirsuta.** (*B. M.* t. 7785.) Commelinaceæ. S. A perennial herb with globose tubers, linear flaccid leaves clothed with soft hairs, rose-coloured sepals and blue-bearded filaments. Abyssinia. (Kew.)

Cyathea angolense. (*R. H. B*, 1901, 147.) Filices. S. No description given. Congo Free State.

Cyclamen Pseud-ibericum. (*Gfl.* 1901, 573.) Primulaceæ. H. A new, scented, spring-flowering species with obcordate leaves dark green with silvery markings above, dark violet below. Calyx-lobes lanceolate; corolla tube rather long, ovate, somewhat narrowed at the throat, segments without auricles at the base, violet red above, pure white with black-violet blotch below. Hab.? (C. G. van Tubergen, Haarlem.)

Cypripedium annamense. *G. C.* 1901, xxix, 98.) S. Orchidaceæ. A garden hybrid of unrecorded parentage. (T. Statter.) [*Paphiopedilum.*]

Cypripedium argo-rothschildianum. (*O. R.* 1901, 252.) S. A garden hybrid between the species indicated in the name. (N. C. Cookson.) [*Paphiopedilum.*]

Cypripedium Bookeri. (*O. R.* 1901, 368.) S. A garden hybrid between *C. ciliolare* and *C. spicerianum*. (S. Gratrix.) [*Paphiopedilum.*]

Cypripedium bruxellense. (*L.* 1901, t. 751.) S. A garden hybrid between *C. rothschildianum* and *C. venustum*. (L'Horticole Coloniale, Brussels.) [*Paphiopedilum.*]

Cypripedium callosum aureum. (*G. M.* 1901, 66.) S. Much like *C. c. Sanderæ*, but the dorsal sepal is much deeper yellow, while the petals are faintly tinged with pink. (H. Low & Co.) [*Paphiopedilum.*]

Cypripedium drapsianum. (*L.* 1901, t. 724.) A garden hybrid between *C. leeanum* and *C. villosum*. [*Paphiopedilum.*]

Cypripedium eilersianum. *R. H. B.* 1901, 71.) S. "Dorsal sepal of good form, but of a dirty yellowish-white colour; rest of flower a superb golden yellow." (Stepman, Belgium). [*Paphiopedilum.*]

Cypripedium Exul aurantiacum. (*L.* 1901, t. 746.) S. A form distinguished from the type by the general bright orange-yellow colour of the lateral petals and lip. (L'Horticole Coloniale, Brussels.) [*Paphiopedilum.*]

Cypripedium glonerianum. (*L.* 1901, t. 753.) S. A garden hybrid between *C. Victoriæ Mariæ* and *C. leeanum*. (L. Linden, Mortebeek, Belgium.) [*Paphiopedilum.*]

Cypripedium gottianum. (*G. C.* 1901, xxix, May 25, Suppl. 1.) S. A garden hybrid between *C. Godefroyæ leucochilum* and *C. harrisianum*. (F. Sander & Co.) [*Paphiopedilum.*]

Cypripedium insigne arthurianum. (*O. R.* 1901, 367.) G. A form with large dark markings on the dorsal sepal. (R. J. Measures.) [*Paphiopedilum.*]

Cypripedium insigne speciosum. (*O. R.* 1901, 368.) S. (O. O. Wrigley.) [*Paphiopedilum.*]

Cypripedium kerchoveanum. (*G. C.* 1901, xxix, 413.) S. A garden hybrid between *C. Curtisii* and *C. barbatum*. R. Young.) [*Paphiopedilum.*]

Cypripedium Lansbergeæ. (*L.* 1901, t. 727.) S. A garden hybrid between *C. bellatulum* and *C. Boxalli*. (L'Horticole Coloniale, Brussels.) [*Paphiopedilum.*]

Cypripedium lawrenceano-Charlesworthii. (*O. R.* 1901, 252.) S. A garden hybrid between the species indicated in the name. (H. Low & Co.) [*Paphiopedilum,*]

Cypripedium Lawrenworthii. (*O. R.* 1901, 351.) See *C. lawrenceano-Charlesworthii*.

Cypripedium Macfarlanei. (*O. R.* 1901, 350.) S. A garden hybrid between *C. harrisianum* and *C. bellatulum*. (T. Statter.) [*Paphiopedilum.*]

Cypripedium Prewetti. (*Gard.* 1901, lix, 88.) S. A garden hybrid of unrecorded parentage. (H. Low & Co.) [*Paphiopedilum.*]

Cypripedium radians. (*O. R.* 1901, 367.) S. A garden hybrid between *C. Charlesworthii* and *C. spicerianum*. (A. J. Keeling.) [*Paphiopedilum.*]

Cypripedium Rolfei. (*G. C.* 1901, xxx, 172.) S. A garden hybrid between *C. bellatulum* and *C. rothschildianum*. (W. M. Appleton.) [*Paphiopedilum.*]

Cypripedium rothschildiano-augustum. (*J. H. F.* 1901, 917.) S. A garden hybrid between the plants indicated by the name. (Bleu, Paris.) [*Paphiopedilum.*]

Cypripedium stottianum. (*G. C.* 1901, xxx, 102.) S. A garden hybrid between *C. Charlesworthii* and *C. ænanthum superbum*. (Capt. G. W. Law-Schofield.) [*Paphiopedilum.*]

Cypripedium Thomyris. (*Jard.* 1901, 223.) S. A garden hybrid be ween *C. robustum* and *C. barbato-veitchianum*. (Dallemagne, France.) [*Paphiopedilum.*]

***Cyrtopodium palmifrons.** (*B. M.* t. 7807,) Orchidaceæ. S. The specific name is in allusion to the resemblance which the leafing stem bears to the leaf of an Arecoid Palm, the leafless portion of the stem answering to the petiole, and the distichous narrow leaves to the pinnules of the palm. Flowers about an inch broad, shortly-stalked, lemon colour, spotted with rose-pink. Brazil. (Dr. E. A. Heath,)

Cyrtostachys Renda duvivieri-anum. (*R. H. B.* 1901. 145, t.) Palmæ. S. A form with very brightly-coloured leaf-stalks. Malayan Archipelago. (De Smet - Duvivier, Ghent.)

***Dædalacanthus Watti.** (*G. M.* 1901, 644, f.) Acanthaceæ. S. A plant of slender growth, 2 ft. in height; flowers of a deep blue colour, arranged on terminal branched spikes. (Col. Beddome.)

Delphinium scopulorum. (*G. C.* 1901. 218.) Ranunculaceæ. H. A tall-growing species, slightly puberulous, with spikes of medium-sized, intensely blue glabrous flowers. Rocky Mountains. (Henkel, Darmstadt.]

Dendrobium Amesiæ. (*O. R.* 1901, 349.) Orchidaceæ. S. Much like *D. tauricum*, with the flowers white, tinted with rose. New Guinea. (H. Low & Co.)

Dendrobium Ashworthiæ. (*O. R.* 1901, 50; *G. C.* 1901, xxix, 86, f. 36.) S. Allied to *D. macrophyllum*. The flowers are greenish-white, the petals distinctly stalked, and the lip curiously crumpled over the column, (E. Ashworth.)

Dendrobium capituliflorum. (*K. B.* 1901, 146.) S. The flowers, which are borne in dense axillary heads, are greenish white, with the column and disc of the lip bright green. New Guinea. (F. Sander & Co.)

Dendrobium Ellisii. (*O. R.* 1901, 37.) S. A garden hybrid between *D. nobile* and *D. Hildebrandii*. (W. S. Ellis.)

Dendrobium Isis. (*O. R.* 1901, 16.) S. A garden hybrid between *D. moniliforme* and *D. hercoglossum*. (Dr. Cranstoun.)

Dendrobium Lotus. (*G. C.* 1901, xxix, 279.) S. A garden hybrid between *D. nobile* and *D. suavissimum*. (N. C. Cookson.)

Dendrobium Mantini. (*Jard.* 1901, 7; *O. R.* 1901, 93.) S. A garden hybrid between *D. nobile* and *D. fimbriatum oculatum*. (Mantin, Orleans.)

Dendrobium puniceum. (*K. B.* 1901, 146.) S. The flowers, together with the pedicels, are light rose-pink, with light yellow tips to the sepals and petals. They resemble those of *D. rutriferum*, but are borne in racemes, not in axillary fascicles. New Guinea. (F. Sander & Co.)

Dendrobrium quinarium. (*K. B.* 1901, 147.) S. Flowers light yellow, with several light brown nerves in front of the lip. New Guinea. (H. Low & Co.)

Dendrobium spectabile Simondsii. (*G. C.* 1901, xxix, 50.) S. In this variety the lip is much longer than in the type, white, veined with dark purple. (H. F. Simonds.)

Dendrobium wardianum aureum. (*O. R.* 1901, 183.) S. A form with light yellow sepals and petals. (F. A. Rehder.)

Dendrobium Wilsoni. (*O. R.* 1901, 196.) S. A garden hybrid between *D. nobile* and *D. owenianum*. (D. Wilson.)

Diascia Barbaræ. (*Gfl.* 1901, 640, f. 95.) Scrophulariaceæ. H. An annual with two-spurred flowers somewhat like those of *Nemesia strumosa* in colour. S. Africa. (Haage & Schmidt, Erfurt.)

Diervilla rivularis. (*M. D. G.* 1901, 40.) Caprifoliaceæ. H. A species nearly allied to *D. trifida*, Mœnch. Eastern United States. Arnold Arboretum.

Dracæna Mayi. (*G. C.* 1901, xxx, 296. Liliaceæ. S. A brilliantly coloured *Cordyline* of garden origin. (H. B. May.)

Dracæna Parrei. (*G. C.* 1901, xxix, 305.) S. "Has long green leaves two inches wide, with a reddish band along the centre on the exterior side." (J. Veitch & Sons, Ltd.) [A form of *Cordyline australis*.]

***Echidnopsis Bentii.** (*B. M.* t. 7760.) Asclepiadaceæ. S. Stem and branches one-half to three-quarters of an inch in diameter, seven to eight-ribbed, each rib consisting of a single series of mamillæ, each of which is crowned by a minute leaf about one-twentieth of an inch long. Flowers—in pairs towards the tips of the branches—a rich, deep, vinous-purple in colour. S. Arabia. (Kew.)

Echinocactus Anisitsii. (*M. K.* 1901, 129.) Cactaceæ. G. A species nearly allied to *E. denudatus*, but characterised by its white spines surrounded with curly hair. Paraguay. (Berlin B. G.)

***Echinocactus de Laetii.** (*M. K.* 1901, 149, 186, f.) G. A new species somewhat resembling *E. Saglionis* in form but differing widely in the remarkable spathulate tips of the outer floral segments—brownish-green in colour. Native country not stated.

Echinocactus Geissei. (*M. K.* 1900, 121.) A species near *E. multiflorus* and *E. gibbosus*. Chili or Bolivia. (Hempel, Ohorn, Germany.)

Echinocactus Hartmannii. (*M. K.* 1901, 184, f.). The length of the flower is about 3 in., the outer floral leaves are greenish-white with a more deeply-coloured median stripe, the inner ones pure white. Stamens pale yellow.

***Echinocactus MacDowellii.** (*M. K.* 1901, 150.) G. Name only mentioned.

Echinocactus microspermus. (*M. K.* 1901, 149.) G. A remarkable small-growing species with hooked spines. Flowers varying from orange-yellow to golden yellow. Argentina.

Echinocactus nidus. (*M. K.* 1901, 88.) A globular species covered with countless curved spines which give a nest-like aspect to the plant. Chili. (Berlin B. G.)

Echinocactus Quehlii. (*M. K.* 1901, 129.) This species is characterised by its slender ovary and handsome white flowers freely produced throughout the summer months. A dwarf species belonging to the group of *E. denudatus*. Andes of Argentina. (Haage, Erfurt.)

Echinocactus Reichei. (*M. K.* 1901. 88.) The name only is given here. Chili. (Berlin B. G.)

Echinocactus Söhrensii. (*M. K.* 1901, 75, f.) G. A small depressed globose species with 16 ribs separated by deep furrows. Flowers brownish-yellow. Cordilliera of Valparaiso. (Berlin B. G.)

Echinocereus strausiana. (*M. K.* 1901, 88, 107, f,) Cactaceæ. G. Shortly columnar, 13-ribbed, slightly woolly, armed with very strong red spines. Texas. (Straus, Bruchsal.)

Echinopsis rhodotricha. (*M. K.* 137, f.) Cactaceæ. G. Forms groups of 8 to 10 column-like 8–13 ribbed stems from a common base: attaining a height of about 30 in. with a thickness of about 4 in.; spines brownish, flowers white. Paraguay. (Berlin B. G.)

***Encephalartos Lemarinelli.** (*R. H. B.* 1901, 147.) Cycadaceæ. S. Name only mentioned. Congo Free State.

Epicattleya Orpeti. (*O. R.* 1901, 114.) Orchidaceæ. G. A garden hybrid between *Cattleya amethystoglossa* and *Epidendium o'brienianum*. (E. O. Orpet, Mass.)

Erigeron Coulteri. (*G. C.* 1901, xxx, 91, f. 32.) .Compositæ. H. A perennial of caespitose habit, sending up stems bearing several flower-heads of a soft white colour. Colorado.

Erigeron neo-mexicanus. *G. C.* 1901, xxx, 218.) H. A perennial (?) sparingly beset with coarse hairs, branches wiry spreading. Flower-heads loosely panicled: ray florets linear, white, recurved disk-florets tubular yellow. New Mexico. (Henkel, Darmstadt.)

***Eucalyptus Gunnii montana.** (*B. M.* t. 7808.) Myrtaceæ. H. A mountain form of *E. Gunnii*, the only species which withstands the climate of the east of England. (Kew.)

***Eulophia Woodfordi.** (*G. C.* 1901, xxx, 240.) Orchidaceæ. S. A species with tall, many-flowered inflorescences, the flowers on which have green sepals and petals, and a dull, claret-purple lip. Old Calabar. (Kew.)

***Eupatorium petiolare.** (*G. C.* 1901, xxix, 379, f. 142.) Compositæ. G. "A free blooming, sweet - scented plant." (H. Henkel, Darmstadt.) [*E. Purpusi.*]

Euphorbia hermentiana. (*R. H. B.* 1901, 147.) Euphorbiaceæ. S. No description given. Congo Free State.

***Exorrhiza wendlandiana.** (*B. M.* t. 7797.) Palmæ. S. A noble pinnate-leaved palm, attaining in its native country 60 ft. in height. Fiji Islands. (Kew.)

Fritillaria orsiniana. (*W. G.* 1901, 127, t. 1.) Liliaceæ. H. This is very nearly allied to, if not identical with, *F. tenella*. Central Appenines. (University B. G., Vienna.)

Gazania hybrida. (*R. H.* 1901, 510.) Compositæ. G. A garden hybrid between *G. nivea* and *G. stenophylla*. (Dammann & Co., Naples.)

Gazania splendens × nivea. (*R. H.* 1901, 510.) G. A garden hybrid the parents of which are indicated by the name. (Thiébaut, Paris.)

Gentiana Favrati. (*Jard.* 1901, 222.) Gentianaceæ. H. Supposed to be a natural hybrid between *G. verna* and *G. bavarica*. Switzerland.

Geranium incisum. *G. C.* 1901, xxx, 218.) Geraniaceæ. H. A tall-growing loosely-branched perennial with viscid glandular pubescence. Flowers ½ in. across, purple. North - west America. (Henkel, Darmstadt.)

Gerbera Jamesoni transvaalensis. (*B. T. C.* 1901, 308.) Compositæ. G. A form with larger flower-heads of a somewhat lighter colour than the type. S. Africa. (Sprenger, Naples.)

Gleditschia texana. (*M. D. G.* 1901, 40.) Leguminosæ. H. A species of Honey Locust recently discovered in Texas. Arnold Arboretum.

Gloriosa lutea. (*G. C.* 1901, xxix, 413.) Liliaceæ. S. "Has perfectly yellow flowers, rather smaller in size than those of *G. superba*. (Hon. E. Cecil.)

***Hæmanthus Diadema.** (*W. G.* 1901, 199.) Amaryllidaceæ. S. A form of *H. Lindeni* with salmony rose-red flowers. (L'Horticole Coloniale, Brussels.)

Hæmanthus Fascinator. (*G. C.* 1901, xxix, 209.) S. A form of *H. Lindeni* with a very large showy umbel of bright red flowers. Congo. (L'Horticole Coloniale, Brussels.)

Hæmanthus mirabilis. (*G. C.* 1901, xxix, 209, 332, f.) S. Flowers orange-red, segments one-third of an inch wide, and rather short. Congo. (L'Horticole Coloniale, Brussels.) [A form of *H. Lindeni*.]

***Hamamelis mollis.** (*G. C.* 1901, xxix, 183.) Hamamelidaceæ. H. A species differing from the other members of the genus in having larger leaves which are clothed beneath with a soft felt-like covering of hairs. Flowers large, clear yellow. Hupeh, China. (Veitch & Sons.)

***Helichrysum Gulielmi.** (*B. M.* t. 7789.) Compositæ. G. A robust leafy branching perennial herb covered with the exception of the flower heads with white wool. Involucre bracts white or rose-red on the outer surface. Eastern Tropical Africa. (W. E. Gumbleton.)

Heliotropium regale. (*Gfl.* 1901, 163, f. 29.) Boraginaceæ. A garden race of *H. peruvianum*. (Herb & Wulle, Naples.)

Hicoria texana. (*M. D. G.* 1901, 40.) Juglandaceæ. H. A species of *Carya* most nearly allied to *C. olivaeformis*. Texas. Arnold Arboretum.

Hyssopus officinalis grandiflorus. (*G. C.* 1901, xxx, 386.) Labiatæ. H. A striking form, characterised by the diffuse habit of the flowering shoots and the lax arrangement of the partial inflorescences, but especially by the large open flowers. Lake Baikal (Leichtlin, Baden.)

***Ilex Marnocki.** (*G. C.* 1901, xxx, 118.) Aquifoliaceæ. H. A form of the common holly. (Fisher, Son, & Sibray.)

***Ilex Wilsoni.** (*G. C.* 1901, xxx, 118, f. 36.) H. A large-leaved variety of the common holly. (Fisher, Son, & Sibray.)

Illicium laurifolium. (*R. H.* 1901, 16, f. 1.) Magnoliaceæ. G. A handsome evergreen shrub with shortly-stalked oval leaves and terminal many-flowered cymes of yellowish-white flowers. Origin uncertain. (MM. Besson frères, Nice.)

***Impatiens chrysantha.** (*B. M.* t. 7786.) Geraniaceæ. H. A handsome annual with golden yellow flowers. Nearly allied to *J. Edgeworthii*. Western Himalaya. (Kew.)

***Impatiens psittacina.** (*B. M.* t. 7809.) S. A handsome species with axillary solitary flowers 2 in. long pendulous from an arching peduncle 1 in. long. Sepals green, standard pale rose-coloured, wings streaked with red, hooked spur white with an irregular dash of bright carmine towards the base. "The Cockatoo Balsam." Burma. (Kew.)

***Impatiens Thomsoni.** (*B. M.* t. 7795.) H. An erect annual about 1 ft. in height with pale rose-coloured flowers ½ in. to ¾ in. long. Himalaya. (Kew.)

Indigofera Kirilowi. (*M. D. G.* 1901, 40.) Leguminosæ. H. Said to be the most beautiful species yet introduced. Flowers as large as those of *Robinia Pseudacacia* and of the colour of those of *R. hispida*. Mandshuria. (Darmstadt B. G.)

Iris chrysantha. (*B. M.* t. 7784.) Iridaceæ. H. This species belongs to the section *Pogoniris* and is easily distinguished from the species already known by its narrow leaves, long peduncle, with a single cluster of flowers, large spathe-valves and large pale yellow flower, with a short tube. Persia? (Cambridge B. G.)

Iris dichotoma Giraldi. (*B. T. O.* 1901, 326.) G. A form differing from the type mainly in the colour of its scentless fugacious flowers. China. (Sprenger, Naples.)

Iris ewbankiana. (*G. C.* 1901, xxix, 397, f. 152; *R. H.* 1901, 398, ff. 172–3.) H. An Oncocyclus Iris near *acutiloba* and *meda*, but sufficiently distinguished from both by its lanceolate outer segments, which are extended horizontally, and show no tendency to be recurved. Flowers creamy-white veined with brown purple. Persia. (Van Tubergen, Haarlem.)

Iris sindpers. (*G. C.* 1901, xxix, 105, f. 46.) H. A garden hybrid between *I. sindjarensis* and *I. persica*. (Van Tubergen, Haarlem.)

***Iris Tauri.** (*B. M.* t. 7793.) H. An early-flowering bulbous species with bright green leaves which lengthen considerably after flowering period. Perianth-tube 4 in. long, violet, segments obovate-spathulate, outer 2 in. long, reflexed from beyond the middle, sides erect, dark violet, with broad streaks of white; crest orange-yellow bordered with white; inner segments 1 in. long, undulate, violet. Asia Minor. (Kew.)

Iris tectorum candida. (*B. T. O.* 1901, 326.) H. A white-flowered form of a handsome species. Central China. (Sprenger, Naples.)

Iris willmottiana. (*G. C.* 1901, xxix, 261, f. 100.) H. A species with the general habit and aspect of *I. caucasica*, but with lavender (not yellow) or pale purple flowers blotched with white. Eastern Turkestan. (Van Tubergen, Haarlem.)

Kennedya audomariensis. (*R. H. B.* 1901, 25, t.) Leguminosæ. G. A reputed hybrid between *Hardenbergia monophylla* and *Kennedya Marryatæ*, but apparently only a form of the first-named with rosy-red flowers.

Lælia anceps Simondsii. (*O. R.* 1901, 50.) Orchidaceæ. G. A variety in which the flowers are pure white except for slate blue lines on the disc, and a few small bluish spots on the front lobe. (H. F. Simonds.)

Lælia cornuta. (*Jard.* 1901, 16.) G. A garden hybrid between *Lælia autumnalis* and *Cattleya labiata*. (C. Maron, Brunoy, France.)

Lælia jongheana Ashworthiæ. (*O. R.* 1901, 153.) G. An albino with silvery white flowers and the usual orange coloured disc to the lip (E. Ashworth.)

Lælia jongheana Kromeri. (*J. of H.* 1901, xlii, 319, f.) G. A variety with very bright rose-purple sepals and petals, and heavy bands of purple on the lip. (E. Kromer.)

Lælia purpurata Kromeri. (*G. C.* 1901, xxx, 4.) G. An albino form. (E. Kromer.)

Lælia purpurato-cinnabarina. (*G. C.* 1901, xxix, 375.) G. A garden hybrid between the species indicated in the name. (Hon. Walter Rothschild.)

Lælio-cattleya Alberti. (*L.* 1901, t. 723; *O. R.* 1901, 15.) Orchidaceæ. G. A garden hybrid between *Lælia purpurata* and *Cattleya velutina*. (L'Horticole Coloniale, Brussels.)

Lælio-cattleya aleschiana. (*L.* 1901, t. 754.) G. A garden hybrid between *Lælia purpurata* and *Cattleya schilleriana*.

Lælio-cattleya Ballii. (*O. R.* 1901, 197.) G. A garden hybrid between *Lælia cinnabarina* and *Cattleya Schröderæ*. (E. F. Clark.)

Lælio-cattleya Coustoni. (*J. H. F.* 1901, 1186.) G. A garden hybrid between *Lælia tenebrosa* and *L. callistoglossa*. (C. Maron, Brunoy, France.)

Lælio-cattleya Cybele. (*G. M.* 1901, 254.) G. A garden hybrid between *Lælia elegans* and *Cattleya Trianæ*. (J. Veitch & Sons, Ltd.)

Lælio-cattleya Donizetti. (*J. H. F.* 1901, 908.) G. A garden hybrid between *Cattleya Aclandiæ* and *Lælia cinnabarina*. (Maron, Brunoy, France.)

Lælio-cattleya flaveola. (*J. H. F.* 1901, 97; *G. C.* 1901, xxix, 194.) G. A garden hybrid between *Lælia cinnabarina* and *Cattleya Schroderæ*. (O. Doin, Paris.)

Lælio-cattleya gottoiana Heberti. (*J. H. F.* 1901, 1137.) G. A garden hybrid between *Cattleya Warneri* and *Lælia tenebrosa*. (Beranek, Paris.)

Lælio-cattleya Hamiltoni. (*O. R.* 1901, 363.) G. A garden hybrid between *Cattleya bicolor* and *Lælia dayana*. (Sir J. Miller.)

Lælio-cattleya haroldiana. (*O. R.* 1901, 284.) G. A garden hybrid between *Lælia tenebrosa* and *Cattleya hardyana*. (R. Tunstill.)

Lælio-cattleya Harrisoniæ-schilleriana. (*Gard.* 1901, lix, 395.) G. A natural hybrid between *Cattleya Harrisoniæ* and *Lælio-cattleya schilleriana*. (R. H. Measures.)

Lælio-cattleya labiato-anceps (*J. F. H.* 1901, 29.) G. A garden hybrid between *Lælia anceps* and *Cattleya labiata*. (C. Maron, Brunoy, France.)

Lælio-cattleya luminosa. (*O. R.* 1901. 366.) G. A garden hybrid between *Lælia tenebrosa* and *Cattleya aurea*. (Charlesworth & Co.)

Lælio-cattleya Luna. (*O. R.* 1901, 365.) G. A garden hybrid between *Cattleya harrisoniana* and *Lælia harpophylla*. (Charlesworth & Co.)

Lælio-cattleya Marica. (*G. C.* 1901, xxix, 102.) G. A garden hybrid between *Lælia cinnabarina* and *Cattleya amethystoglossa*. (R. Young.)

Lælio-cattleya Maronæ. (*O. R.* 1901, 329, f. 48.) G. A garden hybrid between *Cattleya Warscewiczii imperialis* and *Lælia digbyana*. (C. Maron, Brunoy, France.)

Lælio-cattleya Pisandra. (*O. R.* 1901, 39.) G. A garden hybrid between *Lælia crispa* and *Cattleya Eldorado*. (Cappe & fils, France.)

Lælio-cattleya Powelii. (*O. R.* 1901, 350.) G. A garden hybrid between *Cattleya Mendelii* and *L.-c. schilleriana Wolstenholmiæ*. (Col. Brymer.)

Lælio-cattleya praestans-bicolor. *O. R.* 1901, 316.) G. A form of *L.-c. Binoti*.

Lælio-cattleya Pringiersi. (*Jard.* 1901, 276; *L.* 1901, t. 750. G. A garden hybrid between *L. elegans* and *L. purpurata*. (L'Horticole Coloniale, Brussels.)

Lælio-cattleya schilleriano-xanthina. (*Jard.* 1901, 223.) G. A garden hybrid. (Truffaut, Versailles.)

Lælio-cattleya tigrina. (*J. H. F.* 1901, 97; *G. C.* 1901, xxix, 194.) G. A garden hybrid between *Lælia elegans prasiata* and *Cattleya Aclandiæ*. (O. Doin, Paris.)

Lælio-cattleya truffautiana. (*J. H. F.* 1901, 996; *O. R.* 1901, 333.) G. A garden hybrid between *Lælia tenebrosa* and *Cattleya dowiana aurea*. (C. Maron, Brunoy, France.)

Lælio-cattleya Vacuna. (*G. C.* 1901, xxix, 179.) G. A garden hybrid between *Lælia cinnabarina* and *Cattleya guttata*. (J. Veitch & Sons, Ltd.)

Lælio-cattleya Valvassori. (*R. H. B.* 1901, 192.) G. A garden hybrid between *Cattleya labiata Warneri* and *Lælia purpurata*. (Marquis de Wavrin.)

Lælio-cattleya Vinesiæ. (*O. R.* 1901, 197.) G. A garden hybrid between *Lælia tenebrosa* and *L.-c. Phœbe*. (E. F. Clark.)

Lælio - cattleya watellieriana. (*J. H. F.* 1901, 102.) A garden hybrid between *Cattleya guttata Leopoldi* and *Lælia crispa*. (Belin, Argenteuil.)

Lapageria rosea Bensoni. *G. C.* 1901, xxx, 171.) Liliaceæ. G. Flowers "of a lighter tint than those of *L. rosea*, especially in the interior of the flower." (A. Benson.)

Lapageria rosea gattoniensis. (*G. C.* 1901, xxx, 171.) G. "Does not appear to differ greatly from the type." (A. Benson.)

***Libocedrus macrolepis.** (*G. C.* 1901, xxx, 467.) Coniferæ. G. A handsome conifer nearly allied to *L. decurrens* of California. Yunnan. (J. Veitch & Sons.)

***Listrostachys hamata.** (*O. R.* 1901, 61.) Orchidaceæ. Allied to *L. chailluana*, but remarkable for having all the long spurs hooked at the tip. West Tropical Africa. (Kew.)

Lycaste Rogersoni. (*O. R.* 1901, 367.) Orchidaceæ. G. A supposed natural hybrid between *L. Skinneri* and *L. plana*. (E. Rogerson.)

Lycaste Tunstilli. (*G. C.* 1901, xxx, 462.) G. A supposed natural hybrid imported with *L. Skinneri*. Sepals, rose-coloured; petals, white with small rose-pink spots in the middle; lip, ruby-red with white markings. (R. Tunstill.)

Malortiea koschnyana. (*G. C.* 1901, xxix, 341.) Palmæ. S. A species nearly allied to *M. simplex*, from which it differs in the simple, not branched spadix, and the somewhat larger leaves, which are paler below, and split down at the apex for about 2 inches. Costa Rica. (Dr. Dammer, Berlin.)

Malus communis Morilei. (*J. H. F.* 1901, 128.) Rosaceæ. H. A form with the leaves margined with white. (Simon-Louis frères, Metz.) [*Pyrus*.]

Mamillaria Brandegeei. (*M. K.* 1901, 153, f.) Cactaceæ. G. Plant spherical, sometimes depressed globose beset with pure white felt and dark brown scales. Flowers greenish-yellow. California.

Mamillaria matzatlanensis. (*M. K.* 154.) G. Flowers funnel-shaped, outer-floral segments lanceolate pointed, brown and white, inner carmine-red margined with white, filaments carmine red, anthers chrome-yellow.

Mamillaria plumosa. (*M. K.* 1901, 150.) G. Name only mentioned.

Masdevallia Alceste. (*G. M.* 1901, 221.) Orchidaceæ. G. A garden hybrid between *M. veitchiana* and *M. Asmodia*. (J. Veitch & Sons, Ltd.)

Masdevallia venosa. (*K. B.* 1901, 146.) G. Perianth straw-yellow, densely spotted and more or less suffused at the base with dull purple; lip dull red-purple. Colombia. (F. Sander & Co.)

***Megaclinium leucorhachis.** (*B. M.* t. 7811.) Orchidaceæ. S. A bulbophyllum-like orchid with a dilated flattened white rhachis of the inflorescence and shortly-stalked decurved, velvety-yellow flowers. Lagos. (Kew.)

Melocactus Negryi. (*M. K.* 1901, 168, f.) Cactaceæ. G. Plant dark green without the "cap" four inches high, six inches in diameter, spines greyish in groups of seven to nine, the lower ones longest. Flowers inconspicuous. Brazil.

Melocactus Riistii. (*M. K.* 1901, 106.) G. A species characterised by its 'dense armature and strongly developed cap. Honduras. (Hamburg B. G.)

Miltonia crawshayana. (*O. R.* 1901, 293, 315.) Orchidaceæ. G. A form of *M. Binoti*.

Miltonia travassosiana. (*O. R.* 1901, 284.) G. Apparently a form of *M. Regnellii* with yellow sepals and petals. (J. Colman.)

Miltonia vexillaria chelsoniensis. (*O. R.* 1901, 206.) A good form bearing a rich brown blotch on the disc of the lip, which breaks up into radiating lines in front. (Sir F. Wigan.)

Mimulus Burneti. (*G. C.* 1901, xxx, 107, f. 33.) Scrophulariaceæ. H. A garden hybrid between *M. luteus* and *M. cupreus*.

***Modecca senensis.** (*B. M.* t. 7763.) Passifloraceæ. S. A tall glabrous, rather glaucous climber with palmately five-partite pale green leaves and axillary dichotomous few-flowered cymes of pale yellow flowers. Delagoa Bay, &c. (Kew.)

***Musa arnoldiana.** (*J. H. F.* 1901, 995.) Scitamineæ. S. A species nearly allied to *M. religiosa*, but differing from that in having the midribs of the leaves reddish and not green. Central Tropical Africa. (Vilmorin-Andrieux & Cie., Paris.)

Musa Gilettii. (*J. H. F.* 1901, 385.) S. An ally of *M. religiosa*. Plant 4 ft. to 6 ft. high, swollen at the base. Fruit, oblong, angular, subpyriform, glabrous, greyish externally. Seeds smooth, of a brilliant black colour. Lower Congo.

Musa rubra. (*Jard.* 1901, 152.) S. [See *M. sapientum* var. *sanguinea*.] (Truffaut, Versailles.)

***Musa sapientum sanguinea.** (*G. C.* 1901, xxix, 376, f. 124; *Jard.* 1901, 232, t.) Leaves a fine brown velvety red, sometimes with a tinge of orange. French Congo. (Jardin Colonial, Vincennes.)

Musanga Smithii. (*J. H. F.* 1901, 95.) Urticaceæ. S. Recommended as a shade tree in cocoa and coffee plantations, also as an ornamental foliage plant in European gardens. W. Tropical Africa. (Jardin Colonial, Nogent, France.)

Neonicholsonia Georgei. (*G. C.* 1901, xxx, 178.) Palmæ. S. "The stemless plant has leaves with the blade about 4½ ft. long, the blade being 8 in. long, the glabrous quadrangular petiole 20 in., and the rachis, which becomes triangular at the upper part, about 27 in. long. The rachis bears on each side ten or eleven pinnules, which are lanceolate, long, acuminate, with three primary nerves, one central and two marginal, and six to eight secondary nerves. They are 12 in. to 16 in. long, ½ in. to 2 in. broad, the first pair opposite, the others alternate, 2 in. to 4 in. distant each from another, the terminal pair confluent only at the base, 8 in. long, 1 in. broad. (Dr. U. Dammer, Berlin.)

Nymphæa castonensis. (*J. H. F.* 1901, 173.) Nymphæaceæ. S. A garden hybrid between *N. smithiana* and *N. o'marana*.

Nymphæa Lælia. (*J. H. F.* 1901, 173.) H. A garden hybrid between *N. colombiana* and *N. smithiana*.

Nymphæa rubicunda. (*J. H. F.* 1901, 173.) S. A garden hybrid between *N. Sturtevantii and N. Lotus*.

Odontoglossum Braeckmani. (*L.* 1901, t. 744.) Orchidaceæ. G. A garden hybrid supposed to be between *O. Halli* and *O. harryanum*. (Metdepenningen, Ghent.)

Odontoglossum crawshayanum. (*G. C.* 1901, xxx, 60, f. 27; *O. R.* 1901, 252; *G. M.* 1901, 546, f.) G. A form of O. *Braeckmanii*. (De B. Crawshay.)

Odontoglossum crispum auriferum. (*L.* 1901, t. 722.) G. A form with the sepals each having eight or nine irregular golden-yellow spots. (L'Horticole Coloniale, Brussels.)

Odontoglossum crispum citrinum. (*G. C.* 1901, xxix, 214.) G. Sepals bright yellow; petals light yellow; lip pale yellow; callus and disc dark yellow; column yellowish-white. (F. Sander & Co.)

Odontoglossum crispum mannianum. (*G. C.* 1901, xxix, 306.) G. "A fine flower with a large blotch in each segment." (W. W. Mann.)

Odontoglossum crispum rosefieldense. (*O. R.* 1901, 218.) G. Has a well-formed white flower, spotted with dark purple. (De B. Crawshay.)

Odontoglossum Hallii heatonense. (*O. R.* 1901, 187.) G. A variety in which the disc of all the segments is suffused with deep chocolate-brown. (Charlesworth & Co.)

Odontoglossum lindleyanum aureum. (*G. C.* 1901, xxx, 238.) G. A variety in which the brown blotching of the normal form is suppressed. (De B. Crawshay.)

Odontoglossum lucasianum. (*G. C.* 1901, xxix, 413,) G. A reputed hybrid between *O. Hallii* and *O. cristatellum*. (C. J. Lucas.)

Odontoglossum maculatum thompsonianum. (*O. R.* 1901, 252, 337, f, 49; *G. M.* 1901, 546, f.) G. An exceptionally large and handsome form. (W. Thompson.)

Odontoglossum nevadense rosefieldense. (*G. M.* 1901, 97, f.) G. A variety with large flowers: sepals and petals rich chocolate, red edged and tipped with dull yellow; lip white, marked at the base with red-brown, the side fringes being yellow. (De B. Crawshay.)

Odontoglossum triumphans delangheana. (*G. C.* 1901, xxix, May 25, Suppl. 1.) G. A variety with very large flowers, the broad sepals of which are of a rich brown colour: the petals are reddish-brown with some irregular yellow markings from the margin; lip broadly ovate, chestnut brown, with yellow crest and white margin. (F. Sander & Co.)

Oncidium marshallianum sulphureum. (*O. R.* 1901, 155.) Orchidaceæ. G. A yellow variety in which the usual brown spotting is nearly suppressed. (W. Cobb.)

Onobrychis viciæfolia. (*G. C.* 1901, xxx, 6.) Leguminosæ. H. A dwarf, spreading alpine, with pinnate foliage, and innumerable spikes of bright red flowers. Europe, &c. (A. K. Bulley.)

Onopordon bracteatum. (*Gn.* 1901, 637, f. 89.) Compositæ. H. A handsome biennial with silvery-white spiny thistle-like leaves and heads of lilac-purple flowers. Asia Minor. (Haage & Schmidt, Erfurt.)

Opuntia formidabilis. (*M. K.* 1901, 150.) Cactaceæ. G. An Argentinian species which Dr. Schumann regards as identical with *O. auracantha*, Lem.

***Opuntia myriacantha.** (*M. K.* 1901, 62; *G. C.* 1900, xxvii, 177, f. 56.) G. Branches yellow-green, flattened obovate, usually 8–10 in. long, by 6–7 in. broad, pendulous when plant is old, areoles clothed with clusters of yellow bristles about ¼ in. long in their upper part and in their lower part numerous long, very slender, sharp, deflexed spines of a bright golden-yellow varying from 1 to 5 in. in length. Petals pure yellow. Galapagos Islands. (R. Gosselin, Nice.)

***Ornithocephalus multiflorus.** (*K. B.* 1901, 149.) Orchidaceæ. S. A very graceful and floriferous species; flowers white, with the exception of the incurved apex of the crest, which is bright green. Brazil. (Kew.)

Oxalis dispar. (*B. M.* t. 7794.) Geraniaceæ. S. A small softly pubescent undershrub, about 2 ft. high with long-stalked trifoliolate leaves and golden-yellow flowers an inch across. British Guiana. (F. Sander & Co.)

Panax divaricatum. (*M. D. G.* 1901, 40.) Araliaceæ. H. A species nearly allied to *Acanthopanax sessiliflorum*. Japan. [*Acanthopanax divaricatum.*] (Darmstadt B. G.)

Panisea tricallosa. (*K. B.* 1901, 148.) Orchidaceæ. S. The flowers are pale translucent yellowish green, with three yellow calli on the disc, tipped with brown. Assam. (Glasnevin.)

Paphiopedilum Barbeyæ. (*O. R.* 1901, 93.) Orchidaceæ. S. A garden hybrid between *P. lawrenceanum atrorubens* and *P. tonsum*. (O. O. Wrigley.)

Paphiopedilum Eos. (*O. R.* 1901, 14.) S. A garden hybrid between *P. niveum* and *P. Charlesworthii*. (W. M. Appleton.)

Paphiopedilum Rappartii. (*O. R.* 1901, 272.) S. A garden hybrid between *P. Charlesworthii* and *P. lathamianum*. (D. B. Rappart.)

Paphiopedilum Vanneri. (*O. R.* 1901, 190.) S. A garden hybrid between *P. chamberlainianum* and *P. Calypso Cooksoni*. (W. Vanner.)

Paphiopedilum Youngiæ. (*O. R.* 1901, 186.) S. A garden hybrid between *P. bellatulum* and *P. Hookeræ volonteanum*. (R. Young.)

Parsonia Paddisoni. (*R. H.* 1901, 322.) Apocynaceæ. G. A climber with woody glabrous stems—attaining a height of about 15 ft.—and opposite, stalked oboval-lanceolate, glabrous

leaves. This species produces tubers—as large as Beetroot—which serve as food both to natives and colonists. New South Wales.

Pelargonium inæquilobum. (*G. C.* 1901, xxix, 133.) Geraniaceæ. G. "The stem is somewhat shrubby below, the whole of the herbaceous portions thinly pilose with straggling hairs; the leaves are three-lobed, the terminal lobe larger than the two spreading basal lobes, ovate lanceolate, two-lobulate in the centre; lobules remotely toothed. The stipules are deltoid lanceolate; flowers umbellate, three to five to the umbel; buds oblong, sepals ultimately reflexed, petals five, linear oblong retuse, greenish-yellow. with a small purplish spot at the base, double the length of the sepals." E. Tropical Africa. (W. Goodliffe.)

Pentstemon virgatus. (*G. C.* 1901. xxx, 218.) Scrophulariaceæ. H.H, Stem 18–24 in. high, with flowers loosely arranged in long, erect racemose cymes; corolla pale lilac, irregularly funnel-shaped. Mexico, &c. (Henkel, Darmstadt.)

Phacelia grandiflora. (*Gfl.* 1901, 639, f. 91.) Hydrophyllaceaæ. H. A handsome annual, with sky-blue purple-veined flowers—the largest-flowered species in the genus. California. (Haage & Schmidt, Erfurt.)

Phaio-calanthe grandis. (*O. R.* 1901, 127.) Orchidaceæ. S. A garden hybrid between *Phaius grandifolius* and *Calanthe Bryan.* (N. C. Cookson.)

Phaio-calanthe schröderiana. (*G. M.* 1901, 387, f.) S. A garden hybrid between *Phaius Wallichii* and *Calanthe.* Baron Schröder. (J. Veitch & Sons, Ltd.)

Phaius fragrans. (*Jard.* 1901, 359, f. 162.) Orchidaceæ. S. This belongs to the same group as *P. tuberculosus*, but its flowers are smaller and more numerous, and resemble in colour those of *P. Humbloti.* Madagascar.

***Phaius simulans.** (*O. R.* 1901, 43, 52.) S. The epiphytal species known in gardens under the name of *P. tuberculosus* is not the original plant, and has been re-named *P. simulans* in allusion to the remarkable resemblance which its flowers bear to those of the origiral species. [The plant figured in Bot. Mag. t. 7307, under name of *P. tuberculosus* is *P. simulans.*]

Phaius tuberculosus. (*O. R.* 1901, 41, 52, f. 7; *G. C.* 1901, xxix, 77, f. 31.) S. (*P. Warpuri*, Hort.) "A terrestrial species, identical with the original plant of Thouars. Recently introduced for the first time by M. Warpur." Madagascar. [The plant figured under this name in Bot. Mag. t. 7307 is *P. simulans.*]

Phalaenopsis amabilis rimestadiana. (*L.* 1901, t. 736.) Orchidaceæ. S. A form with remarkably large pure-white sepals and petals, the lip with yellow on the lateral lobes.

Phyllocactus capelleanus. (*M. K.* 1901, 138.) Cactaceæ. G. A garden hybrid between *P. phyllanthoides* and *P. Ackermannii.*

Picea parryana glauca pendula. (*R. H.* 1901, 181, f. 67.) Coniferæ. H. A weeping form of the "Blue Spruce." (Koster & Co., Boskoop, Holland.)

Pitcairnia micheliana. (*R. H.* 1901, 576, t.) Bromeliaceæ. S. A tufted stemless species, with linear channelled leaves upwards of 2 ft. long, and tall scapes bearing spikes of scarlet-red flowers. Mexico. (Micheli, Geneva.)

Pitcairnia punicea × xanthocalyx. (*Gfl.* 1901, 305.) S. A garden hybrid. (B. G. Utrecht.)

Plectranthus Coppini. (*Jard.* 1901, 360.) Labiatæ. S. A herb of no value from an ornamental standpoint, but of interest as furnishing edible tubers in the Soudan. Tropical Africa. (Paris B. G.)

***Primula gambleana.** (*Gard.* 1901, lix, 407.) Primulaceæ. H. A Himalayan species about 6 in. high, near *P. rotundifolia*, with large purple yellow-eyed flowers. (Kew.)

***Primula megasæfolia.** (*G. C.* 1901, xxix, 209, 223, f. 84.) H. An interesting species with rosette of roundish hairy leaves 1½ in. across, and a scape 5 in. or 6 in. high bearing a head of rosy-lilac flowers about 1 in. in diameter. Asia Minor. (Correvon, Geneva.)

***Pteris Wavrini.** (*R. H. B.* 1901, 192.) Filices. G. A supposed hybrid between *P. cretica* and *P. umbrosa.*

Pyrethrum leucopiloides. (*Gfl.* 1901, 639.) Compositæ. H. A sub-alpine

perennial with silvery-white leaves and large yellow flower-heads. Suitable for rockery. Asia Minor. (Haage & Schmidt, Erfurt.)

Rheum gunneroides. (*Gfl.* 1901, 607.) Polygonaceæ. H. A garden hybrid between *R. Emodi* and *R. palmatum.* (Koehler & Rudel.)

Ribes coloradense. (*Späth Cat.* No. 109, 109.) Saxifragaceæ. H. A prostrate species with rather large long-stalked 5-lobed leaves, pale greenish brown-tinted racemes and black berries. Colorado. (Späth, Berlin.)

Richardia macrocarpa. (*B. T. O.* 1901, 261.) Araceæ. Principally characterised by its very large fruits. Spathe medium size, white internally, light green outside. S. Africa. (Sprenger, Naples.)

Rodgersia aesculifolia. (*B. T. O.* 1901, 172,) Saxifragaceæ. H. A species with horse-chestnut-like leaves and panicles of small white flowers. China. (Florence, B. G.)

***Rodgersia pinnata.** (*G. C.* 1901, xxx. 6.) H. Differs from *R. podophylla* in the leaves, which are hairy when young, more or less pinnate, and in the inflorescence, which is of a beautiful rose colour. (Kew.)

***Rosa pernetiana.** (*G. C.* 1901, xxix, 2,) Rosaceæ. H. A garden hybrid between "Persian yellow" and a Tea Rose. (Pernet, Lyons.)

Rosa wichuraiana rubra. (*R. H.* 1901, 20, t.) H. A garden hybrid between *R. wichuraiana* and R. "Crimson Rambler. (M. M. Barbier frères, Orleans.)

***Rubus palmatus.** (*B. M.* t. 7801.) Rosaceæ. G. A shrub with slender branches, palmately 5 or 6 lobed leaves and solitary axillary flowers 1 to 1½ in. across. China and Japan. (Veitch & Sons.)

Salvia Przewalskii. (*G. C.* 1901, xxx, 6.) Labiatæ. H. A rather showy plant, three feet high, with numerous spikes of large purple flowers. China. (A. K. Bulley.)

Salvia verbascifolia. (*Gfl.* 1901, 640.) H. A handsome species with white felted leaves and large white flowers beset with blue hairs. Lebanon. (Haage & Schmidt, Erfurt.)

***Sarcochilus lilacinus.** (*B. M.* t. 7754.) Orchidaceæ. S. A climbing orchid with slender stems, alternate ovate pale green leaves, 1½ in. to 2 in. long, cordate and amplexicaul at the base. Raceme 1 to 8 in. long, rachis very stout, compressed, few or many-flowered. Flowers very shortly stalked about 1½ in. broad, pale rose-lilac. Malaya. (Kew.)

Sarracenia Dormeri. (*G. C.* 1901, xxx, 141.) Sarraceniaceæ. G. Supposed to be a natural hybrid between *S. purpurea* and *S. flava.* (R. Veitch & Son.)

Selenipedium comicea. (*G. C.* 1901, xxix, 146.) Orchidaceæ. S. A garden hybrid between *S. caudatum Wallisii* and *S leucorrhodum.* (J. Veitch & Sons, Ltd.) [*Phragmipedilum.*]

Selenipedium suave. (*G. C.* 1901, xxix, 146.) S. A garden hybrid between *S. klotzschianum* and *S. Sedeni candidulum.* (J. Veitch & Sons, Ltd.) [*Phragmipedilum.*]

***Senecio magnificus.** (*B. M.* t. 7803.) Compositæ. G. A tall, stout, quite glabrous, glaucous, sparingly-branched undershrub. Leaves rather coriaceous, coarsely sub-crenately toothed. Flower-heads in loose leafless corymbs, golden yellow. Australia. (Kew.)

Senecio Tabularia. (*R. H.* 1901, 24, f. 2.) G. A species with large handsome irregularly lobed leaves about 2 ft. high: the inflorescence attains a height of 5 ft. and is made of a large number of small greenish flower heads. Mexico. (M. Micheli, Geneva.)

Sophro-cattleya Nydia. (*O. R.* 1901. 366.) Orchidaceæ. G. A garden hybrid between *Sophronitis grandiflora* and *Cattleya calummata.* (Charlesworth & Co.)

Sophrolælia Gratrixiæ. (*O. R.* 1901, 315.) Orchidaceæ. G. A garden hybrid between *Lælia tenebrosa Charlesworthii* and *Sophronitis grandiflora.* (Charlesworth & Co.)

Sophrolælia Orpeti. (*O. R.* 1901, 288.) G. A garden hybrid between *Lælia* pumila and *Sophronitis grandiflora.* (E. O. Orpet, S. Lancaster, Mass.)

Sorbus pohuashanensis. (*M. D. G.* 1901, 116.) Rosaceæ. H. A species which assembles and is nearly related to our common mountain ash. Mountains near Pekin. [*Pyrus pohuashanensis.*] Arnold Arboretum.

Stanhopea connata. (*O. R.* 1901, 295.) Orchidaceæ. S. First introduced in 1853 but lost to cultivation since 1860. (Sir T. Lawrence.)

Stanhopea langlasseana. (*G. C.* 1901, xxx, 426.) S. The flowers have a very distinct appearance; the comparatively small lip is erect, rigid, and closely pressed against the column which is also erect; the petals also are ascending, and pressed against the column, while the sepals are extended horizontally. The shape of the lip is also remarkable; the hypochile is short, rather broader than long, very shining, in form a flattened sphere without appendages or any projections; the epichile is almost square, the top much inrolled, and it bears on the back, by the inrolled part, a large projection in the form of a blunted tooth. (M. Micheli, Geneva.)

***Stapelia atrosanguinea.** (*G. C.* 1901, xxx, 425.) Asclepiadaceæ. G. The flowers are of a particularly rich and intense blackish-crimson which contrasts very effectively with the light colour of the corona. Kalahari Desert. (Kew.)

Stapelia maculosoides. (*G. C.* 1901, xxx, 270.) G. At first sight the flower of this species is so much like that of *S. maculosa* that it might easily be mistaken for it; but there is no raised annulus on the disc, and the coronal lobes and stems are quite different. (J. Corderoy.)

***Stapelia nobilis.** (*B. M.* t. 7771.) S. Closely allied to *S. gigantea* but differing in the stems not being so stout, and their angles much less compressed. The flowers are similar in colour but those of *S. nobilis* are much smaller and are more hairy within. S. Africa. (Kew.)

***Strobilanthes gossypinus.** (*B. M.* t. 7790.) Acanthaceæ. S. An erect shrub, covered with a matted fulvous tomentum. Leaves three to seven inches long, acute or acuminate, nerves about twelve pairs, arched, close-set. Corolla about three-quarters of an inch long, pale blue. Nilghiri Hills. (Kew.)

***Swainsona M'Cullockiana.** (*G. C.* 1901, xxix, 338.) Leguminosæ. G. An Australian species, with large reddish-brown flowers, pure white eye, surrounded with very dark brown or chocolate colour. (H. Low & Co.)

Syringa affinis. (*J. H. F.* 1901, 731.) Oleaceæ. H. A white-flowered lilac intermediate between *S. oblata* and *S. vulgaris.* China. (B. G. Paris.)

Tacca Chantrieri. (*R. H.* 1901, 541, f. 241.) Taccaceæ. S. Somewhat resembling *T. cristata* but differing from that species in its much larger proportions, its more numerous long-stalked flowers, in the form of the perianth lobes, &c. Malaya. (Chantrier frères, Mortefontaine, France.)

Tamarix hispida aestivalis. (*R. H.* 1901, 379, f. 158.) Tamaricaceæ. H. A seedling which flowers in July instead of September as in the type. (L. Chenault, Orleans.)

Thalictrum sulfureum. (*Lem. Cat.* 1901, No. 149.) Ranunculaceæ. H. A garden hybrid between *T. rubellum* and *T. angustifolium.* (Lemoine, Nancy.)

Tulipa micheliana. (*R. H.* 1901, 398.) Liliaceæ. H. The leaves of this species resemble those of *T. Greigi*, the flowers are large, red in colour with a black blotch broadly margined with yellow. Persia. (Micheli, Geneva.)

Tulipa Wilsoniana. (*G. C.* 1901, xxix, 327, f. 121.) A species with wavy red-margined leaves; remarkably bright red flowers without blotch, red filaments and golden yellow anthers. Persia. (Van Tubergen, Haarlem.)

Valeriana arizonica. (*G. C.* 1901, xxix, 198, f. 75.) Valerianaceæ. H. In general aspect resembles our native *V. dioica.* Flowers whitish or pink. Arizona, &c. (Henkel, Darmstadt.)

Vanda dalleana. (*J. H. F.* 1901, 193.) Orchidaceæ. S. A garden hybrid between *V. lamellata* and *V. Boxalli.* (Dallé, Paris.)

Vernonia Arechavaletæ. (*R. H.* 1901, 284, t.) Compositæ. G. A glabrous shrub from 3 ft. to 6 ft. high

with sessile leathery linear-lanceolate leaves and cymes of reddish-violet flower-heads. Nearly allied to *V. nitidula*. Uruguay. (E. André, Golfe Juan, France.)

Veronica glauca. (*B. M.* t. 7759.) Scrophulariaceæ. H. A slender much-branched annual a few inches high with large blue flowers. Greece. (Hon. Chas. Ellis.)

***Viburnum Sargenti.** (*Späth Cat.* No. 109, 126.) Caprifoliaceæ. H. Nearly allied to *V. Oxycoccus* with rather large 3-lobed leaves—the middle lobe being long pointed; inflorescence with outer flowers barren, the inner fertile ones with bright violet-coloured anthers. Fruit bright red. North China. (Späth, Berlin.)

Vriesia flammea. (*J. H. F.* 1901, 1134.) Bromeliaceæ. S. A garden hybrid between *V. Van Geertii* and *Encholirion Youngii*. (Duval et fils, Versailles.)

Vriesia quintusiana. (*Gfl.* 1901, 273.) Bromeliaceæ. S. Leaves lorate, in a rosette 3 ft. across, blunt, apiculate; bracts of the distichous inflorescence shaded with purple-red or red-brown; scape 3 ft. high, spike 1 ft. long. Native country not given. (Quintus, Gröningen.)

Zantedeschia aethiopica candidissima. (*Gfl.* 1901, 36.) Araceæ. G. A form with less rigid spathes than the next named, and with dull grey-green leaves. (Nicolai, Dresden.) [*Richardia africana candidissima.*]

Zantedeschia aethiopica grandiflora. (*Gfl.* 1901, 36.) G. A large-flowered form taller than the type, with dark green leaves. S. Africa. (Nicolai, Dresden.) (*Richardia africana grandiflora.*]

ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

APPENDIX IV.—1902.

LIST of the STAFFS of the ROYAL BOTANIC GARDENS, Kew, and of Botanical Departments and Establishments at Home, and in India and the Colonies, in Correspondence with Kew.

* Trained at Kew. † Recommended by Kew.

Royal Botanic Gardens, Kew:—

Director - - - - -	Sir W. T. Thiselton-Dyer, K.C.M.G., C.I.E., F.R.S., LL.D., Ph.D., M.A., F.L.S.
Private Secretary - - -	——
Assistant (Office) - - -	H. H. W. Pearson, M.A., F.L.S.
" " - - -	*John Aikman.
" " - - -	*William Nicholls Winn.
Keeper of Herbarium and Library	*William Botting Hemsley, F.R.S., F.L.S.
Principal Assistant (Phanerogams)	Otto Stapf, Ph.D., A.L.S.
" " (Cryptogams) -	George Massee, F.L.S.
Assistant (Herbarium) - -	Nicholas Edward Brown, A.L.S.
" " - -	*Robert Allen Rolfe, A.L.S.
" " - -	Charles Henry Wright, A.L.S.
" " - -	*Sidney Alfred Skan.
" " -	Thomas Archibald Sprague, B.Sc.
" for India - - -	Stephen T. Dunn, B.A., F.L.S.
Honorary Keeper, Jodrell Laboratory - - - - -	Dukinfield Henry Scott, M.A., Ph.D., F.R.S., F.L.S.

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Keeper of Museums - - -	John Masters Hillier.
Assistant (Museums) - - -	*John H. Holland, F.L.S.
Preparer - - - - -	George Badderly.

Curator of the Gardens - -	William Watson.
Assistant Curator - - -	*William J. Bean.
Foremen :—	
Herbaceous Department - -	*Walter Irving.
Greenhouse and Ornamental Department.	Frank Garrett.
Arboretum - - - -	*William Dallimore.
Tropical Department - -	*Walter Hackett.
Temperate House - - -	*Charles P. Raffill.

Cambridge.—University Botanic Garden :—

Professor - - -	Harry Marshall Ward, M.A., D.Sc., F.R.S., F.L.S.
Assistant Curator, University Herbarium.	R. H. Yapp, B.A.
Secretary to Botanic Garden Syndicate	A. C. Seward, M.A., F.R.S.
Curator - - -	*Richard Irwin Lynch, A.L.S.

Dublin.—Royal Botanic Gardens, Glasnevin :—

Keeper - - -	Frederick W. Moore, A.L.S.

Trinity College Botanic Gardens :—

Professor - - -	E. Perceval Wright, M.A., M.D., F.L.S.
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Assistant (Museum) -	H. F. Tagg, F.L.S.
,, (Herbarium)	*J. F. Jeffrey.
Head Gardener - -	*R. L. Harrow.
Assistant Gardener -	Henry Hastings.

Glasgow.—Botanic Gardens :—

University Professor -	F. O. Bower, M.A., D.Sc., F.R.S., F.L.S.
Curator - - -	James Whitton.

Oxford.—University Botanic Garden :—

Professor - - -	Sydney H. Vines, M.A., D.Sc., F.R.S., F.L.S.
Curator - - -	*William Baker.

COLONIES.

Antigua.—Botanic Station :—

Curator - - -	*W. N. Sands.
Agricultural Superintendent.	F. R. Shepherd.

Barbados.—Dodd's Reformatory, Botanic Station :—

Superintendent -	John R. Bovell, F.L.S., F.C.S.
Assistant Superintendent.	C. E. Stoute.
Lecturer in Agricultural Science.	Longfield Smith, B.Sc., Ph.D.

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Superintendent -	†G. A. Bishop.

British Central Africa.—Scientific Department :—

Zomba - -	Head of Department -	J. McClounie.
	Forester - - -	*J. M. Purves.

British East Africa.—

East Africa Protectorate.—

Botanist - - -	†Alexander Whyte, M.A., F.L.S.

Uganda.—Botanic Station :—

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Assistant Curator -	*John Mahon.

Zanzibar - -	Director of Agriculture.	R. N. Lyne, F.L.S.
	Assistant Director -	——

Dunga Experimental Station :—

Superintendent -	W. Buzzacott.

British Guiana.—Botanic Gardens :—

Georgetown -	Superintendent and Government Botanist.	——
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	Agricultural Assistant	*Robert Ward.

Promenade Garden :—

Head Gardener -	William Jackson.
Berbice - - Keeper - - -	Richard Hunt.

British Honduras.—Botanic Station :—

Curator - - -	Eugene Campbell.

Canada.—

Ottawa - -	Dominion Botanist -	Prof. John Macoun, M.A., F.R.S.C., F.L.S.
	Assistant „ -	Jas. M. Macoun.
	Director of Government Experimental Farms.	Prof. Wm. Saunders, LL.D., F.R.S.C., F.L.S.
	Director's Assistant and Superintendent of Botanic Garden.	W. T. Macoun.
	Botanist and Entomologist.	James Fletcher, F.L.S.
Montreal - -	Director, University Botanic Garden.	Prof. D. P. Penhallow, B.Sc.

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	Government Botanist	Prof. MacOwan, D.Sc., B.A., F.L.S.

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	Director - - -	†John C. Willis, M.A., F.L.S.
	Mycologist and Assistant Director.	J. B. Carruthers, F.L.S.
	Government Entomologist.	E. E. Green.
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	Superintendent, Experimental Garden.	Herbert Wright.
	Clerk - - -	R. H. Pereira.
	Draughtsman - -	W. de Alwis.
Hakgala - -	Superintendent - -	*William Nock.
	Clerk and Foreman -	A. Perera.
Henaratgoda -	Conductor - -	S. de Silva, Arachchi.
Anurà̀dhapura	„ - - -	D. F. de Silva.
Badulla - -	„ - - -	D. D. Fernando.

Dominica.—Botanic Station :—

Curator - - -	*Joseph Jones.
Agricultural Instructor.	G. F. Branch.

Agricultural School :—

Officer in Charge -	*D. Tannock.

Falkland Islands.—Government House Garden :—

Head Gardener - -	*Albert Linney.

Federated Malay States.—Experimental Plantations :—

Superintendent -	*Stanley Arden.

Perak (Taiping).—Government Gardens and Plantations :—

Superintendent - -	*Robert Derry.

Fiji.—Botanic Station :—

Curator - -	*Daniel Yeoward

Gambia.—Botanic Station :—

	Curator - - -	——

Gold Coast.—Botanic Station :—

	Curator - - -	*William H. Johnson, F.L.S.
	Assistant Curator -	*Alfred Evans.

Grenada.—Botanic Garden :—

	Curator - - -	*Walter E. Broadway.
	Agricultural Instructor.	*M. McNeill.

Hong Kong.—Botanic and Afforestation Department :—

	Superintendent - -	†Charles Ford, F.L.S.
	Assistant Superintendent	*W. J. Tutcher.

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	Travelling Instructor	*William Cradwick.
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Hope Experiment Station.	,, -	*Thomas J. Harris.
Castleton Garden	,, -	*William J. Thompson.
Cinchona (Hill Garden).	,, -	——
Kingston Parade Garden.	,, -	John Campbell.
King's House Garden.	,, -	James Briscoe.
Lecturer in Agricultural Science		- †W. R. Buttenshaw, M.A., B.Sc.

Lagos.—Botanic Station :—

	Curator - - -	*E. W. Foster.
	Assistant - - -	*T. B. Dawodu.

Malta —Argotti Botanic Garden :—

	Director -	- Dr. Francesco Debono.

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Pamplemousses -	Director - - -	J. Vankeirsbilck.
	1st Assistant - -	Paul Koenig.
	2nd ,, - - -	S. E. Pougnet.
	Overseer - - -	J. Powell.
Curepipe - -	Overseer - - -	F. Bijoux.
Reduit - -	,, - - -	W. A. Kennedy.

Montserrat.—Botanic Station :—

	Curator - - -	——
	Agricultural Instructor.	*A. J. Jordan.

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Durban	Curator	John Medley Wood, A.L.S.
	Head Gardener	*James Wylie.
Pietermaritzburg	Curator	G. Mitchell.

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	Superintendent	George Harwood.
	Botanical Assistant	E. Betche.

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	Curator	R. T. Baker, F.L.S.

New Zealand :—

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Dunedin	Superintendent	J. McBean.
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Invercargill	Head Gardener	Thomas Waugh.
Auckland	Ranger	William Goldie.
Christchurch	Head Gardener	*Ambrose Taylor.

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Botanic Gardens :—

Director	*Philip MacMahon.
Overseer	J. Tobin.

Acclimatisation Society's Gardens :—

	Secretary and Manager	Edward Grimley.
	Overseer	James Mitchell.
Rockhampton	Superintendent	J. S. Edgar.

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Agricultural School :—

Officer in Charge	John Belling, B.Sc.

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Curator	*John Chisnall Moore.
Agricultural Instructor.	George S. Hudson.

St. Vincent.—Botanic Station :—

Curator	*Henry Powell.

Agricultural School :—

Officer in Charge	C. H. Knowles, B.Sc.

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	Curator - - -	*J. P. Quinton.

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	Assistant Curator -	——

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	Assistant Superintendent.	*Walter Fox.
Penang - -	Assistant Superintendent.	†Charles Curtis, F.L.S.

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	Agricultural Instructor.	N. Lord.

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	Assistant „ -	*W. Leslie.

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	Curator - - -	J. G. Luehmann, F.L.S.

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	Travelling Superintendent.	G. W. Smith.
	Technical Assistant -	W. G. Freeman, B.Sc., F.L.S.
	Entomologist - -	†H. M. Lefroy, B.A., F.E.S.
	Lecturer in Agricultural Science.	†Albert Howard, B.A., F.C.S.
	Honorary Consulting Chemist.	Prof. J. B. Harrison, M.A., F.I.C., F.C.S.
	„ „	Prof. J. P. d'Albuquerque, M.A., F.I.C., F.C.S.

Western Australia.—Department of Agriculture :—

Perth- - -	Botanist - - -	Alexander Morrison.

INDIA.

Botanical Survey.—Director, Major D. Prain, M.B., I.M.S., F.L.S., F.R.S.E.

Bengal, Assam, Burma ; the Andamans and Nicobars ; North-East Frontier Expeditions :—

Superintendent of the Royal Botanic Gardens, Calcutta	Major D. Prain, M.B., I.M.S., F.L.S., F.R.S.E.

Bombay, including Sind :—

Professor of Botany, College of Science, Poona -	G. A. Gammie.

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North-Western Provinces and Oudh ; the Punjab ; the Central Provinces ; Central India ; Rajputana ; North-West Frontier Expeditions :—

Director of the Botanic Department, Northern India, Saharanpur, N.W.P. - -	†J. F. Duthie, B.A., F.L.S.

Bengal :—

Reporter on Economic Products to the Government of India, Indian Museum, Calcutta	†George Watt, M.B., C.M., C.I.E., F.L.S.
Assistant Reporter -	†I. H. Burkill, M.A., F.L.S.

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	Cryptogamic Botanist.	†E. J. Butler, M.B., B.Ch.
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	Assistant „ -	*H. F. Green.
	Probationer -	*J. E. Leslie.

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	Superintendent -	A. J. B. Gisseleire.
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	Deputy ,, -	*R. Pantling.
	1st Assistant -	*Joseph Parkes.
	2nd ,, -	*Amos Hartless.
	3rd ,, -	*George H. Cave.
	4th ,, -	*Oliver T. Hemsley.

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	Curator - - -	*W. A. Kennedy.

Darbhangah.—Maharajah's Garden :—

	Superintendent -	Herbert Thorn.

Bombay.—

Poona - -	——	——
	Professor of Botany	G. A. Gammie.

Ghorpuri.—Botanic Garden :—

	Superintendent -	P. G. Kanitkar.

Bombay.—Municipal Garden :—

	Superintendent -	C. D. Mahaluxmivala.

Karachi.—Municipal Garden :—

	Superintendent -	——

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Nagpur - -	Superintendent of Public Gardens.	*J. Horne Stephen.

Madras.—Botanic Department :—

Ootacumund -	Government Botanist	†C. A. Barber, M.A. F.L.S.
	Director of Government Cinchona Plantations.	W. M. Standen.
	Curator of Gardens and Parks.	*Robert L. Proudlock.

Madras.—Agri-Horticultural Society :—

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	Superintendent - -	*B. Cavanagh.

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Gwalior - -	„	-	†C. Maries, F.L.S.
Morvi - - -	„	-	*Joseph Beck.
Travancore (Trivandrum)	„	-	H. S. Ferguson, F.L.S.
Udaipur - -	„	-	T. H. Storey.

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Agra (Taj Garden)	Superintendent	-	*A. E. P. Griessen.
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Cawnpur - -	„	-	*Norman Gill.
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Lucknow - -	„	-	*Matthew Ridley.
Saharanpur and Branch Garden, **Mussoorie.**	„	-	William Gollan.

Punjab.—

Lahore - -	Superintendent	-	H. G. Hein.

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Kew.

ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

1903.



LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
By DARLING & SON, Ltd., 34-40, Bacon Street, E.

And to be purchased, either directly or through any Bookseller, from
WYMAN and SONS, Ltd., Fetter Lane, E.C.,
or OLIVER & BOYD, Edinburgh;
or E. PONSONBY, 116, Grafton Street, Dublin.

1903.

Price Two Shillings.

Mo. Bot. Garden
1906

CONTENTS.

Article.	Subject.	Page.
I.	Blue Gum (*Eucalyptus Globulus*)	1
II.	Kew in the Eighteenth Century	11
III.	The 'Nara (*Acanthosicyos horrida*)	13
IV.	Poison Ivy	15
V.	Stapelias	17
VI.	Rahat Loukoum	19
VII.	Planting Bog Land	22
VIII.	Pai-t'an Tree (*Dalbergia hupeana*) (with plate)	25
IX.	Pottery Trees	25
X.	Vegetable Rennets	27
XI.	Miscellaneous Notes	28
Appendix I.	List of seeds of hardy herbaceous plants and of trees and shrubs	1
„ II.	Catalogue of the Library. Additions received during 1902	39
„ III.	New garden plants of the year 1902	77
„ IV.	List of Staffs of Botanical Departments at home and in India and the Colonies	103

24310

ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

No. 1.] [1903.

I.—BLUE GUM.

(*Eucalyptus Globulus*, Labill.)

Few plants have been the cause of more disappointment than the Blue Gum. This has arisen from excessive trust in it as an empirical remedy for an evil without sufficient knowledge of the real nature of the evil or what it depended on.

The Blue Gum is a native of Victoria in Australia and of Tasmania. It grows with readiness and rapidity in warm temperate countries but is not adapted to a cooler climate. In its juvenile form it is often to be seen in our gardens as a decorative plant in summer, but can only endure our winter in the warmest parts of our South Coast.

In 1873 a paper by Mons. Gimbert appeared in the *Comptes rendus* for Oct. 6 (pp. 764–5) on the "Sanitary improvements of marshy districts by means of *Eucalyptus Globulus*." Of this, the following is a translation :—

"According to documents which come to us on all sides and from the most reliable sources, it appears to be an established fact of Hygiene and Agriculture, that Intermittent fever disappears wherever *Eucalyptus Globulus* prospers. A tree which grows with incredible rapidity, and can absorb in the soil ten times its own weight of water in twenty-four hours, and diffuses in the atmosphere camphorous antiseptic emanations, must certainly play a very important part in the amelioration of miasmatic countries. Thanks to these singular properties, it could pump water directly and rapidly from marshy surfaces, prevent the fermentations which are produced there, and paralyze, by means of its emanations, the organic miasma which might arise therefrom. These anticipations, announced in 1869, are

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being daily realised. It will suffice to record here some of the numerous results of sanitary improvement produced by this plant to convince the reader.

"The English first experimented with sanitary plantations in the Cape Colony. In two or three years they have changed the climatic conditions and the aspect of the unhealthy regions of this possession. Some years afterwards the Algerians planted *Eucalyptus* in our part of Africa. The following are some of the results obtained :—

"At Pondouk, 32 kilometres from Algiers, says M. Trottier, I possessed a property, the house of which was situated near the river Hamyze, which by its emanations gave ague every year to the farmers and their servants. In the spring of the year 1867 I planted on this farm 13,000 *Eucalyptus Globulus*. In July, 1867, the season at which the fevers begin to rage, the farmers enjoyed a complete immunity. The trees, however, were scarcely 2 or 3 metres in height. From that time the resident population has been exempt from fevers."

"The farm of Ben-Machydlin in the neighbourhood of Constantine was, some years since, noted for its insalubrity. It was covered with marshes in winter and summer. To-day all this has disappeared. 14,000 plants of *Eucalyptus* have in five years completely dried the soil. They constantly exhale into the atmosphere aromatic vapours ; the farmers no longer have fever ; their children are the picture of health and vigour. The factory at Gué de Constantine was surrounded by a marsh, the pestilential emanations of which rendered the use of the establishment impossible during summer. The idea occurred to M. Saulève of sowing in these marshes a great quantity of *Eucalyptus*. In three years five hectares of boggy land were converted into a magnificent park. The water had been literally drunk up by the trees, and the workmen no longer had fever.

"The same hygienic revolution occurred in consequence of extensive plantations of *Eucalyptus Globulus* on the farm of La Maison-Carrée, situated in the same neighbourhood, and in which the inhabitants frequently succumbed to ague. These great and rapid successes are recorded in a Report drawn up by an Agricultural Jury, and are consequently by no means the result of individual prepossession. Residents in Cuba, upon whose statements we can rely, have assured us that in the unhealthy districts of the island in which they have been planting *Eucalyptus* for some years, malarious diseases have disappeared.

"According to Ramel, Australia is salubrious where *Eucalyptus* prospers, pestilential in places where the tree does not exist.

"On the banks of the Var there is near the railway-bridge a caretaker's house adjoining the embankment which was made to narrow the river before building the bridge. This lodge was pestilential. Every year the caretaker, whose health was ruined by the malaria, had to be changed.

"M. Villard, engineer of the railway, had forty trees planted two years ago near the house. From that year, the employés were protected from fever, and since that time this post has been one of the healthiest in the country.

"The above account renders it unnecessary for me to dilate further on the importance of similar results. I shall be satisfied if I succeed in inducing either private individuals or the Government to make use of this process of sanitary improvement."

It is to be observed that M. Gimbert attributes the sanitary effect of the Blue Gum to two causes: (i) the effective drainage of marshy soil resulting from the rapid growth of the trees and the constant transpiration from the leaves of the water taken up by the roots; the influence of their "antiseptic emanations" on the "organic miasma" to which at that time malaria was attributed.

As to the first, the facts were undoubted. As to the second, the statements were purely hypothetical, and Kew preserved an attitude of discreet scepticism. Notwithstanding a "boom" for planting Blue Gum and other species of *Eucalyptus* spread over the world. An attempt was made at great expense to correct the unhealthiness of the Messaria Plain in Cyprus by planting young *Eucalyptus* trees, to be promptly killed by the first frost.

Doubt, in fact, was from time to time thrown on many of M. Gimbert's facts, and the value of planting Blue Gum in combating malaria became more than doubtful.

In a letter to the *British Medical Journal* (Sept. 27, 1884), Dr. L. Aitken, of Rome, denied the correctness of the statement that had been repeated over and over again, that the sanitary state of the neighbourhood of that city had been improved by the planting of *Eucalyptus* trees. Except at Tre Fontane, he says, where the unpaid labour of monks and convicts keeps the trees alive, the experiment of planting the Campagna has proved a costly failure, only three or four per cent. of the trees planted under the conditions attending the plantation of other young forest trees having survived. Even at Tre Fontane the Government has found it necessary to restrict the amount of convict labour which it at first placed at the disposal of the Trappist monks for planting operations, in consequence of the sickness among the warders and convicts. The monks themselves, too, are known still to succumb to malaria, though Dr. Aitken more than hints that the whole truth is not made public, lest it should affect the sale of the Eucalyptus elixir which is prepared at the monastery and adds materially to its revenue. Dr. Aitken does not deny that the deaths from severe malarial fevers have decreased during the last year or two, but apart from the fact that this may be due to fluctuations in the intensity of the malarial poison, he is inclined to attribute any slight improvement which may be claimed quite as much to the necessary subsoil draining and preparation of the ground as to any influence of the young gum trees.

M. Charles Rivière, Director of the Jardin d'Essai at Algiers, wrote as follows in 1885 (*Bull. de la Soc. Nat. d'acclim. de France*, Jan., pp. 17–18) :—

"I think I ought to call the attention of the Minister of Marine to some exaggerations with which public opinion has been pleased to invest the qualities of this Australian tree, especially from a hygienic point of view. Many of the legends published about this arborescent Myrtaçea do not at present rest on any scientific

basis confirmed by experience. It is of the highest importance therefore, to state the truth on this question, or at least to suggest a doubt seeing that it involves the development and prosperity of our colony of the Gaboon.

" Dr. Tommasi-Crudeli, member of parliament, one of the most competent men both from his theoretical and practical knowledge to discuss the question, has lately shown, in his report to the Italian Minister of Agriculture, that the history of the *Eucalyptus* plantations formed at the farm of Trois-Fontaines, in the Roman Campagna, exhibit the singular fact that, during 1882, the dangerous fevers were actually confined to this locality which was considered to have been rendered healthy for a long time previously, and the convicts employed in the establishments had to be withdrawn.

" Professor Liversidge, of the University of Sydney, in Australia, has drawn attention to the fact that, for many years, fevers have prevailed with great intensity in the *Eucalyptus* forests of that country, their native land.

" Finally, Dr. Tommasi-Crudeli gives the same result in the case of the plantations in Algeria. Having superintended very large plantations of *Eucalyptus* in Algeria, from Tunis to Morocco (of which several are about fourteen years old) I admit that their success as vegetation is moderately satisfactory. It is incontestable that many large groves of trees now replace depressions formerly marshy, but it would be impossible to affirm that they have had a febrifugal action. The example of Lake Fetzara has been much quoted ; its marshy miasma infected the large mining works of Mokta-el-Hadid, decimated the staff, and rendered existence in this locality insupportable. Now, thanks to well developed forests of *Eucalyptus*, it presents all the conditions of a tolerable hygiene. As I first planted these unhealthy slopes and took an active part in the development of some hundreds of thousands of trees, I can readily show how manifest an error it would be to attribute entirely to the *Eucalyptus* effects the cause of which is to be sought elsewhere. The *Eucalyptus* plantations have isolated by a curtain of foliage the lake from the works. The material prosperity of the management of the mine has extended itself to the staff ; the means of existence have been easier of attainment, the medical attendance better secured, and, what is of most importance, the greater part of the staff is conveyed to the mine every morning and taken back in the evening by the first and last trains to Bône, 36 kilometres off, that is to a sea-side town constantly swept by the sea-breezes.

" The prophylactic action of the *Eucalyptus* is then far from demonstrated in fever stricken countries ; and there cannot *à priori* be any reason to believe in its direct action, when one remembers the extreme resistance of all these bacteria to the most violent antiseptic agents."

Blue Gum proved, as might have been expected, quite unsuited for planting in tropical countries.

Mr. Horne, Director of Forests and Gardens, reported in 1886 :—

" The blue gum, *Eucalyptus Globulus*, is a useless species for Mauritius and should not be planted except as a garden plant,"

Nevertheless public opinion was still in favour of *Eucalyptus*-planting, and forest and other officers were practically compelled to devote money to it which might have been more profitably employed.

Mr. Gamble wrote [*Progress Report of Forest Admin., Northern Circle, Madras*, 1888–9] :—

"The Conservator has no faith in the endeavour to acclimatize the various species of *Eucalyptus* in the Indian plains. Doubtless, and as these trials show, a few plants can be reared if treated very carefully, garden-fashion, and at some expense, but that is not what the Forest Department aims at. What we require are trees that can be grown easily and cheaply and on poor soil (for we have very little good soil indeed and what there is is mostly already covered with fine indigenous timbers of far greater value than those of the Eucalypti) in dry and rocky places, and it is a pity to waste money and time on such experiments when they might be applied so much more advantageously to works which we know are likely to succeed and pay, directly or indirectly" (p. 38).

Mr. Cameron, Superintendent of the Government Botanical Gardens, Bangalore, reported to the same effect in 1890. He thought, however, that *E. citriodora* might take the place of *E. Globulus* in combating malaria.

"The blue gum experiments have proved conclusively that this tree is not adapted to the plains of India. At Bangalore it attains a height of 15 to 20 ft. and then dies out. We have been much more successful with the species *saligna*, *rostrata*, *marginata*, and *citriodora*, all of which are established in the gardens and furnish seeds for local use and general distribution. Numerous species of Eucalypti have been tried at intervals, but excepting those mentioned above, the genus is better adapted to the hills than the maidan. The success attained at Ootacamund is encouraging and indicates that *E. Globulus*, as well as other species, will succeed in the higher altitudes of the Bababudan hills, should their acclimatisation be desired at any time. Fast growing trees of the class are important as a possible source of fuel for railways and mills. *E. citriodora* is a desirable tree to plant in the vicinity of swamps, or in villages that are infested by malarial fever, the fragrance arising from its foliage and bark being a powerful deodoriser."

We owe to Crudeli and Klebs the abandonment of the old theory of an "organic" or "paludine miasma." For this they substituted that of an organism which established itself in the blood of malarious patients.

The following interesting account of the position in 1894 is reproduced from the *United States Consular Reports* for September of that year. It, at any rate, gave the final *coup de grâce* to the value of blue gum.

"Before considering the hygienic effects of *Eucalyptus* plantations with reference to malaria, it may not be irrelevant to present the views of the distinguished Italian professor, Tommaso Crudeli, now senator of the Kingdom, on malaria. He has made exhaustive investigations as to the origin of the scourge, and was the

first (1879), together with Klebs, to discover the microbe of malaria—the *Bacillus malariæ*. In 1885 Crudeli published his important and interesting work, 'The Climate of Rome.' It is indispensable, he says, to form an exact idea of malaria and of the conditions in which it is produced, to free the mind from the prejudice that has taken possession of the medical fraternity, as well as of the laity, that malaria can only be produced from stagnant water, resulting from the putrefaction of dead vegetable and animal organisms contained therein. It was thought that a step forward had been made when the morbific ferment that produces malarial infection was called paludine miasma; but the reverse was true. Italians use the word malaria to indicate the specific agent of intermittent and pernicious fevers. Italy has enjoyed the unenviable privilege of sending this word around the world and causing it to be received into every language. It has at least the advantage of not prejudicing any opinion with regard to the nature and production of this specific agent. It only specifies an established fact, namely, that this agent diffuses itself in the atmosphere, making it capable of infecting human organisms into which it may have been introduced by respiration.

"Malaria is produced in the soil and not in water. The *sine quâ non* of the production of malaria is the presence of malarial ferment in the soil. Soils that do not contain this ferment may possess every possible form of saturation by water, which, in turn, may contain all possible forms of putrefaction, but there will be no production of malaria. Water is undoubtedly an indispensable factor of this mischievous product, because if malarial soil is not kept moist during warm weather, it is incapable of producing malaria. Hence, all other conditions being equal, malarial soils containing stagnant water are, by right, considered the most dangerous, because in them is always found the humidity indispensable to the hurtful product, even during the driest summers. But it is by no means necessary that the soil should be marshy in order that malaria shall be produced. Were such the case, Italy would be a much more fortunate country than it is, because at least two-thirds of its malaria-producing soil would be perfectly healthy. But little humidity is required to awaken malaria in soil that contains its germ, and we frequently meet with soil in valleys, on hill-sides, and on mountains whose surface is arid during summer, but gives off malaria owing to the slight humidity held in the subsoil. Nay, it can happen, and often does happen, that accumulations of water on the surface of a malarial soil prevent the specific poisoning of the atmosphere. This always happens when the water covers the infected soil uniformly. A film of water interposed between the malarial-producing soil and the atmosphere operates as an obstacle to malarial germs and protects the atmosphere of the locality from contamination.

"Malaria-producing soils are to be met with in nearly every part of the globe. With the exception of localities situated beyond the polar circles, no part of the globe is known in which malaria may not make its appearance in a greater or lesser degree. What is worse is that, with the exception of solid rock, we know of no soil that can be, *a priori*, declared to be incapable of generating this infection of the atmosphere. Malaria is produced from soils

of the most varied composition and of the most varied exposure—in low places rich in water and organic substances, in soils of volcanic origin, as well as in sedimentary soils of every geological period, and even in soils composed of sandy quartz. Next to the septic ferment the malarial ferment is, of all the disease-breeding ferments, the most widely disseminated, and that which most readily finds conditions suited to its development and propagation. What is this ferment? Prof. Crudeli declares it to be an organism, the microbe of malaria, the *Bacillus malariæ*. This organism dwells in the soil; but a minimum temperature of 68° F., a certain amount of moisture, and the action of the atmosphere on the soil in which it is contained are necessary for its development; so that it is possible to prevent its spreading by interrupting the communication of the soil with the atmosphere, either by covering it with water or by grasses the roots of which would constitute, as it were, an impervious mat.

"Prof. Crudeli remarks that sections of the city of Rome, which were covered by parks and gardens a few years ago, and which were very malarious, have become very healthful, owing to the lands being now covered by buildings and the new streets paved, all contact of the air with the soil being thus shut off.

"From the days of Varro it has been surmised that this ferment was derived from a living organism; but it was only in 1879 that Crudeli and Klebs took up the investigation of a great number of malarial soils, dry as well as marshy. They cultivated the very smallest organisms found in these soils, experimenting with the products of these cultures on animals; analyzed the blood and organs of men and animals infected with malaria, and established, beyond all doubt, the existence of a living parasite. This parasite attacks the red globules of the blood and destroys them after having produced in them a series of characteristic alterations which indicate with certainty the existence of malarial infection.

"The effects of malaria are suspended by covering the ground with buildings or by sowing the land in grasses, thus preventing the contact of the atmosphere with the soil, and by drainage, that is, by removing the moisture from the soil.

"But, as man does not control the rain, it is evident that after a rain even a drained soil will give off malaria, unless that soil is cut off from contact with the atmosphere. In order to drain certain portions of the Roman Campagna, the experiment has been tried of planting trees that would absorb a great quantity of water from the soil. With the preconceived idea that malaria is due to putrid decomposition in marshy ground, it has been proposed to make this attempt by means of the *Eucalyptus*. It was thought that these trees of rapid growth would dry up marshy lands and destroy, at the same time by means of the aroma of their leaves, all miasmatic emanations.

"Up to date (1886) not a single instance of hygienic improvement by the sole means of *Eucalypti* has been ascertained, but the possibility of so doing is not denied. It can be admitted that these trees sometimes prove useful in certain malarial soils. I frankly maintain, however, that frequently they are of no use whatever, and that it is well to guard against exaggerations that often blind the judgment.

"It would have been possible to avoid these exaggerations and the disappointments which followed as a consequence if, instead of regarding these plantations from a theoretical point of view, the public had begun by studying their results in the very home of the *Eucalypti*. It would then have been known in time that even in the southern hemisphere, where the *Eucalypti* thrive better than with us, there are forests of *Eucalypti* in which malaria reigns supreme, as has been stated by Prof. Liversidge, of the University of Sydney. In Italy, although the newspapers had persuaded everyone that the farm of the 'Tre Fontane,' near Rome, had become healthful by means of the *Eucalypti*, it proved a disagreeable surprise to learn of a sudden outbreak of malaria in 1882 that caused much sickness among the farm hands, while the rest of the Campagna remained particularly healthful.

"The experiments with the *Eucalypti* at 'Tre Fontane' are interesting and instructive. On the road to Ostia, at about 3 miles from Rome, is situated the abbey of the 'Tre Fontane.' There is a monastery of Trappist monks there, who, for many years, have been endeavouring to improve the land adjacent to the monastery by means of setting out extensive vineyards, draining the soil and planting the *Eucalyptus*. It was reported that the hygienic condition of the locality had been much improved, and this improvement was ascribed by the public and the Government to the planting of the *Eucalyptus* by the Trappists; hence it was decided to extend the setting out of these trees.

"To facilitate this experiment, the Government in 1880 established an agricultural colony of penitentiary convicts and put them in quarters near the monastery, that is, on that part of the farm supposed to have already been improved by the *Eucalypti*. The convicts were surrounded by hygienic conditions far superior to those of the agricultural labourers of the Campagna, and, notwithstanding this, nearly all the convicts were taken down with malarial fever, more or less severe, in 1880. The Trappists started the setting out of the *Eucalyptus* in 1870.

"During the summer and autumn of 1882, all of the inhabitants of the 'Tre Fontane' were attacked. The Trappists, it would seem, suffered from slight attacks, but all suffered. Some of the convicts had slight and some severe attacks. Nearly every guard had a severe attack; the guards had all to be changed. There were no deaths because medical assistance was at hand. The fever-striken patients were well cared for in one of the hospitals of Rome.

"In January, 1883, Prof. Crudeli (then a deputy, now a senator) called upon the Government to suspend all work during the sickly season. He had noticed that the guards suffered more from malaria than the convicts. He thinks that the convicts, while at labour, threw off some of the evil effects of the malaria, while the guards, remaining stationary, inhaled and retained in their systems more malaria than the convicts.

"If to the reasonable doubts as to the hygienic effects of the *Eucalypti* is added the uncertainty of their thriving, it follows that all this enthusiasm for the *Eucalyptus* tree is in no wise justified. The tree is most capricious. As it is full of sap during the winter of our hemisphere, it is frequently killed by a freeze,

by late spring frosts, and by other causes that botanists have not yet fully determined. In localities where the winters are mild and the soil deep, this tree grows too rapidly and is easily split by winds of moderate velocity. It should also be borne in mind that it is frequently very expensive to grow this tree. For instance, if the soil be very wet, it is necessary to drain it; otherwise the roots of the tree rot. If, on the other hand, the soil be very stiff, it is necessary to dig deep holes to make room for the roots, which holes require to be drained to prevent water from standing in them and rotting the roots. It is, therefore, more prudent to hold to methods less uncertain, and when the condition of a locality indicates the advisability of planting trees for the absorption of moisture, it is better to set out trees belonging to our hemisphere. It is less expensive, and there is less likelihood of the trees dying.

"One of the most generally accepted theories is that forests produce malaria independently of the quality of the soil which they cover. On every hand we meet with forests in which the production of malaria is most abundant, and we find on every hand vast tracts of country which remained uninhabited by reason of malaria so long as they were wooded and that became more or less completely healthful upon being cleared. These facts are interpreted as showing that malaria is produced in the forests by the putrefaction of the leaves, branches, and dead insects that become accumulated on the ground and there slowly decompose. But such an explanation cannot stand, because, were such the case, we ought to meet with malaria in every forest of the world, where decomposition of organic detritus occurs, whereas, on the contrary, many forests are free from malaria. Forests are factors of malaria in an indirect way only; they do not produce it themselves, but favour its development whenever they cover lands that are malarial. They intercept the solar rays, and hence prevent an active evaporation from the soil, so that it retains a great deal of humidity in the warm season. If the soil does not contain the malarial ferment, the forest is not infected and *vice versâ*. Malarial forests are frequently met with in nature, and the clearing away of these forests has rendered the localities occupied by them much more healthful, if not entirely so.

"Dr. Montechiare, a practising physician of Rome who for years was physician to the penal colony at "Tre Fontane," tells me that his experience justifies him in declaring that no beneficial result against malaria has been derived from the planting of the *Eucalyptus*. The monks set out no less than 50,000 trees on a few acres. Had the efficacy of the *Eucalyptus* proven real, the entire settlement of the "Tre Fontane" would have become a veritable Eden on account of its wholesome, balsamic air, which has by no means been the case. In 1870, Dr. Montechiare, being in charge of St. John's Hospital, experimented with all the preparations of *Eucalyptus* against malarial fever, and found that not one lowered the temperature of the patient by a tenth of a degree. The only value of the elixir of *Eucalyptus* consists in the alcohol that it contains. The efficacy of the *Eucalyptus* for the improvement of the air is no greater than that of the elm, pine, and mulberry. If it recommends itself by its rapidity of growth, the trees just mentioned recommend themselves by being hardier and more easily grown.

"Professor (now Senator) Torelli has also written on the subject of the *Eucalyptus*. He sums up by declaring that the much-vaunted merits of the *Eucalyptus* have not been established.

"The *Eucalyptus* is killed by the cold when the thermometer marks 12° F. below freezing. The species that have shown the greatest resistance to cold are the *Globulus* (blue gum), *viminalis* (swamp gum), *rostrata*, *robusta*, *meliodora*, *resinifera* (red gum), *paniculata*, *saligna*, *coriacea*, and *cornuta*.

"*E. Globulus* is considered by all as the species that possesses hygienic properties in the highest degree, *resinifera* coming next. Marquis Garzoni has succeeded in growing the prodigious number of 93 species on his farm near Viareggio, Italy.

WALLACE S. JONES,
Consul-General."

"Rome, March 19, 1894.

That malaria is produced by the presence of an organism in the blood is now undoubted. But this is not *Bacillus malariæ* as supposed by Crudeli, but one which is rather animal than vegetable. The true parasite was observed in 1880 by Laveran, a French Army Surgeon serving in Algeria. It is to Manson and Ross we owe the demonstration of the fact that it is carried by mosquitoes to healthy persons from those who are suffering from the disease. It has been proved that persons efficiently protected from mosquito-bites escape its attacks, even in the most malarious districts.

Malaria is therefore not due to an "emanation" in the air or to something derived from either soil or water, but to a blood parasite carried from one individual to another. We now see that the attempt to check it by planting any kind of *Eucalyptus* was futile. In some cases it may indirectly have done good: (i.) by drying up pools in which mosquitoes breed; (ii.) by forming a screen which stopped their flight. In others there is reason to think that it actually did harm. At the request of the Government of Lagos a good deal of trouble was taken to introduce tropical species into the colony. But it was found that buildings near which they were planted actually became malarious. The tree harboured mosquitoes which otherwise the sea breeze would have blown away.

And unfortunately the wholesale planting of Blue Gum has not been rewarded by the production of useful timber. As the results of his experiments at the Californian University, Berkeley, California, Professor Hilgard stated:—

"The *Eucalyptus* is a fast growing tree, but when it comes to the utilisation of the wood, the fast growing gum is a failure. It is fit for firewood only." (*Cape Agricultural Journal*, Nov. 1, 1894.)

The moral of the whole story is the unwisdom of relying on a plausible nostrum for the remedy of an evil without accurate knowledge of its cause.

II.—KEW IN THE EIGHTEENTH CENTURY.

Kew, as a scientific establishment, dates from 1759, when a Botanic, or as it was then called a Physic, Garden was established by the Princess Augusta of Saxe-Gotha, Dowager Princess of Wales.

It was energetically maintained by her son, George III., with the scientific assistance of Sir Joseph Banks, who was virtually, for the greater part of his life, Director. Under his advice collectors were sent to all parts of the world. The first New Holland plants were introduced during Cook's voyages, 1768–80. At Sir Joseph Banks' instance the system of inter-colonial exchange through Kew was commenced, which has been maintained ever since. The most memorable undertaking of this kind was the voyage of the "Bounty" (1787) for the purpose of introducing the bread-fruit tree from the South Seas into the West Indies. Nelson, the Kew collector, was amongst those sent adrift by the mutineers, and eventually died of the exposure.

Sir Joseph Banks' papers and correspondence virtually comprised the early archives of Kew till his death in 1820. It is much to be regretted that after being deposited for many years in the British Museum they were eventually dispersed. From time to time small parcels which have come into the market have been purchased for the Library of the Royal Botanic Gardens, Kew.

The following interesting letter was acquired in this way. It bears eloquent testimony to Sir Joseph Banks' wise and untiring activity :—

Mr. HENRY SHIRLEY to Sir JOSEPH BANKS.

Kingston, Jamaica,
20th December, 1794.

SIR,

THE Committee appointed by the House of Assembly of this island for superintending the public Botanical Gardens, being sensible of the share this country enjoys in the general advantages derived from your zeal and abilities, as well as of the interest you take in our success, particularly with respect to the valuable collection of plants lately received, have directed me to communicate to you such particulars concerning them as may tend to give you a just idea of their actual condition, appearance, and progress. It is, therefore, with great pleasure I take the opportunity of complying with their desire, by informing you that the bread-fruit plants (*Artocarpus incisa*, L.) are thriving with the greatest luxuriance in every part of the island, particularly in the parish of St. Thomas-in-the-East; the nursery at Bath contains 40 of those which were chosen as the strongest and most forward plants, and the largest of them now measures 15 feet in height and 17 inches in circumference round the stem; all the others are beautiful, strong, healthy, and bushy trees, just now beginning to throw up suckers from the roots, and likely to produce fruit in a short time. There are 15 bread-fruits on Holland Estate, in

Plantain Garden river, which are making an equal progress, the largest measuring 13 feet high and 11½ inches in circumference round the stem. The Botanic Garden in Liguanea contains 20 plants, which, notwithstanding the inferiority of the soil of that parish, are thriving exceedingly well; the largest is a beautiful bushy plant 7 feet 9 inches high and 7½ inches in circumference of stem; 28 plants have been propagated by layers from the two gardens, and some gentlemen in the Leeward parishes have succeeded in striking several cuttings.

The Ayyah (*Eugenia malaccensis*) and Rattah (*Inocarpus edulis*) of Otaheite, are in a very flourishing state in various parts of the Island, particularly in the Liguanea Garden and the Nursery at Bath; 16 plants of the Ayyah have been cultivated by layers and cuttings.

Eight plants of the Avee (*Spondias mangifera*) were landed in tolerable health from the Providence, all of which are since dead, but there are several plants of a variety of the Avee in the Botanic Garden of Liguanea, which were imported at the same time with the Mangos and Cinnamons, some of them, however, are not in a very thriving state, and this variety is much inferior to the Otaheite kind.

The Mattee and Ettow (*Cordia Myxa*), dye plants of Otaheite, have succeeded wherever they have been planted; 38 of the former have been raised by layers.

The Peeah (*Tacca pinnatifida*) of Otaheite just keeps alive in this country; it has been tried in various soils and situations, but without success.

The Vahee, or large red plantain of Otaheite (*Musa sapientum*) has produced eight fine suckers, but has not yet fruited there are also several suckers from the Oriah, which appears to be the same as the common maiden plantain of this country.

All the Timor plants, as well as those in the Botanic Garden of Liguanea, as in the Nursery at Bath, are making a very rapid progress; 45 plants of the Jambolan (*Eugenia Jambolana*) and 36 of the Lemon China have been propagated by layers.

The Nanka or East India Jaack (*Artocarpus integrifolia*) is in a very forward state, and appears a different variety of that already bearing fruit here.

The Cherimailha (*Anona Cherimolia*) and Bimbling (*Averrhoa Bilimbi*) have already perfected their fruits, and a great number of each kind have been already raised from the seed.

The Peenang or Betel-nut palm (*Areca Catechu*), together with the long and black peppers, have been raised from layers and seeds, but the true black pepper yet remains to be introduced into this island.

The Jambo iremava succeeds very well; this is the same plant as the Ayyah of Otaheite (*Eugenia malaccensis*).

There is one plant of the Caltaphas (*Terminalia Catappa*) in the Nursery at Bath which is near 12 feet high, and in the most luxuriant state of growth.

From this detail of the prosperous condition of the plants, there is every reason to expect complete success, and it will be extremely grateful to me to be directed by the Committee, to inform you of it within a short time; in the meanwhile I am desired to offer whatever the island affords in the Botanical line that may be agreeable to you.

I have, &c.,

(Signed) HENRY SHIRLEY,
Chairman of the Committee.

Sir Joseph Banks, Bart.

The *Handbook of Jamaica* for 1901 (pp. 395–400) contains an interesting account of the history of the Botanic Institutions of the Colony (by Sir Daniel Morris), which has not been reprinted in subsequent editions. According to this :—

"A private garden possessing many rare and valuable plants had been formed by Mr. Hinton East in Liguanea (Gordon Town), which, on the death of the founder, became the property of his nephew, Mr. E. H. East, who with great generosity offered it to the Assembly of Jamaica for the use of the public at their own price."

It was accordingly purchased in 1792–3. A catalogue of the plants cultivated in it under the title of "Hortus Eastensis," is an appendix to Bryan Edwards's *History of the British West Indies.*

The garden was ultimately sold by the House of Assembly in 1810.

III.—THE 'NARA.

(*Acanthosicyos horrida*, Welw.)

The 'Nara is a remarkable plant, native of Namaqualand and Southern Angola. It belongs to the Melon family (*Cucurbitaceæ*), and was first described by the distinguished botanist and traveller Welwitsch in the *Trans. Linn. Soc.* (xxvii., 31).

Repeated attempts have been made to cultivate it at Kew, but without success.

Kew is indebted to Prof. MacOwan for the following interesting account of the habits and uses of this singular plant by Mr. John J. Cleverley, at the time Resident Magistrate at Walfisch Bay.

Resident Magistrate's Office, Walfisch Bay,
9th February 1891.

The 'Nara grows freely over the low sand hills covering the tract of country known as the "'Nara Veldt," which consists of a waste of shifting sands lying between the ancient mouth of the Kuisip at Sandwich Harbour and the point where the river now disembogues at Walfisch Bay. The lower course of the river has gradually been pushed by the advancing sand-dunes from

Sandwich Harbour northwards to Walfisch Bay, but water can be found almost anywhere between the old and the new mouths by digging in the sand. Hence it would appear that the river water still travels seawards under the sands of its ancient bed. The sand of the district is composed of the disintegrated rocks of the neighbouring formation, consisting principally of granite, gneiss, mica-schist, and quartz. The clay deposits of the river contain much saline matter.

The 'Nara is popularly supposed to be independent of moisture, but I strongly doubt if this is really the case. The natives never attempt its cultivation or to aid in its propagation in any way. When the idea is suggested to them they simply laugh and say "The new 'Naras grow when the river comes down and there are plenty."

The Kuisip only runs at long intervals. It is now about seven years since it last "came down." Of course on the rare occasions when the stream flows into the sea along its present bed there is a great increase of underground drainage along the ancient water-ways beneath the 'Nara veldt. I believe that after the river has been down the buried seeds of many past seasons begin to germinate and the new plants spring up in the sands of these river-beds after the water has disappeared from the surface. The blown sand then gradually forms round and covers the stem and runners which continually push upwards to the surface. A hillock or small dune is then formed, overspread with the bush, and so the process of growing and burying goes on till a considerable sand hill is formed crowned with the grey-green 'Nara —the stem of which now assuming the appearance of a root reaches far down to tap the water underlying the arid river-bed.

The fruit ripens about the end of January and lasts till May. For nearly half the year it forms almost the sole food of the Topnaars, while cattle, dogs, and jackals eat it readily. The seeds are sold to the local store-keepers and form an article of commerce under the name of "butter-pits." The taste of the fruit is by no means agreeable to the civilised palate, but the liking for it is sometimes acquired by the European residents who cannot easily obtain any other fruit.

It is said to possess great medicinal virtues and to be beneficial in cases of consumption. The natives undoubtedly thrive upon it, and those who go into the 'Nara veldt sickly and weak, come out at the end of the season strong and healthy looking. But these people live during the cold and foggy winter months on a not always sufficient diet of fish. The change to an abundance of fresh and satisfying fruit during the fine summer weather, in a healthy atmosphere, must of itself be an element in the beneficial result.

The curative properties of the fruit, *per se*, have yet to be tested. The root or buried stem is certainly used by the natives as a remedy for gonorrhœa, it is said with perfect success. "A decoction of the root, which is a strong purgative, is administered internally, and in severe cases an external application of the oil (?) extracted from the ripe fruit is made use of." (Mr. Wrey's Report of Survey.)

It has been stated that the 'Nara grows nowhere but near Walfisch Bay, but the natives say that it is to be found at intervals near the Coast, southward, in the direction of Angra Pequina, and northwards, towards the Cuanene River. As far, however, as I can gather, it would seem to flourish only near sandy river-beds where the roots can strike downwards to the underlying waters. If it were totally independent of this moisture there is nothing to prevent it spreading over the sand-dunes, but it does not do so.

In this district it does not grow to the northward of the Kuisip bed, although the sand-dunes extend to the River Swakop. I have seen a solitary stunted specimen growing near Rooikop, a granite kopje in the desert to the eastward, but it almost certainly sprang from seed carried by the black and white crows which nest there, and has no significance as regards the true habit of the plant. I have heard of a bush on the rocky banks of the Swakop, near Salem, but that also is a straggler and its presence is noted as a curiosity.

The views above expressed as to the dependence of the 'Nara on underground moisture may or may not be correct. They are borne out, however, by observation in this district, but more knowledge is required of the conditions under which this strange plant flourishes elsewhere, before a decided opinion can be arrived at.

(Signed) JOHN J. CLEVERLY,
Resident Magistrate.

IV.—POISON IVY.

The Poison Ivy of the United States is occasionally grown in this country, where its poisonous effects are little known and excite little alarm. Disagreeable effects are, however, apt to follow the use of its autumn-coloured leaves for table decoration. *Primula obconica* produces somewhat similar effects, and cases have occurred amongst the gardeners at Kew of serious irritation to the skin as the result of incautiously handling it.

The following article is reprinted from *Rhodora*, for March, 1902 (pp. 43-45) :—

IVY POISONING AND ITS TREATMENT.

Franz Pfaff, M.D., Ph.D.

Of all the cutaneous eruptions caused by poisoning plants those produced by poison ivy (*Rhus Toxicodendron*), and by poison sumach (*R. venenata*), are probably the most common in this country.

It is the general belief of the public and of most physicians that the eczematous conditions, which occur in many persons after handling such plants, may be caused also by emanations from the plant, the active principle being thought to be a volatile substance.

The two attempts to isolate the active principles failed. One of the investigators, J. Khittel, attributed the action of poison ivy to

a volatile alkaloid, the other, John M. Maisch, denied it, stating that volatile acid, which he called "toxicodendric acid," is the active principle.

Both statements proved to be erroneous, as experiments which I made a few years ago have shown.

The lack of any rational treatment of ivy poisoning may be ascribed to the imperfect knowledge of the cause of this disease.

In my researches (*Journal of Exper. Med.*, Vol. II., No. ii., p. 97) I used different parts of the plants, gathered at different seasons of the year, and found that the so-called "toxicodendric acid," which Maisch did not produce in the chemically pure state, is nothing but acetic acid, and, therefore, not the cause of the eruption peculiar to ivy poisoning.

Further investigations showed that the active principle is an oil, which I named "Toxicodendrol," and which can be found in all parts of the plants, both in *Rhus Toxicodendron* and *Rhus venenata*. This oil is easily soluble in alcohol, ether, chloroform, &c., but is insoluble in water. Toxicodendrol is easily decomposed by heat, but very slowly at ordinary temperatures. A sample of it, which had been kept in an open porcelain dish for over 13 months, was partly converted into resin, but the remaining oil proved to be just as active as before. The active oil was also prepared from plants collected during the winter, after having been covered with snow for weeks, and from dry stems and branches which had been kept in the laboratory for over a year.

To test the strength of the "Toxicodendrol," I made many experiments and found the oil active in the minutest quantities; in one case as little as $\frac{1}{1000}$ mg. of the oil dissolved in 2 drops of olive oil proved effective.

The time of incubation varied from 18 hours to 9 days. This long period of incubation and the stability of the oil explain the belief that direct contact is not necessary to contract the disease. When the first symptoms appear, several days have usually passed. and a person may then not remember having come in contact with the plant. On the other hand, some of the oil may stick to the clothing, &c., and this may cause the disease even after several months have passed. In making these experiments, I handled more than 25 kg. of the plants, and several hundred persons passed through the laboratory, where these experiments were made, but not one of those who did not come in direct contact with the plants or the free oil was poisoned.

It seems possible that poisoning might be caused by small particles of the plant, such as pollen and the hairs from the leaves, being carried through space by the wind and thus brought in contact with the skin or clothing, for, as above stated, the oil is contained in all parts of the plant, and even the hairs of the leaves may be seen under the microscope to contain oil.

Having defined the properties of "Toxicodendrol" we may now outline the rational treatment of ivy poisoning. As we have said, "Toxicodendrol" is not a volatile oil, but, on the contrary, is very stable; we must endeavour to remove it as quickly as possible and prevent its spreading.

This can be done by vigorously washing the affected and exposed parts with soap and water and a scrubbing brush; that is to say, by mechanically removing the oil. As the active principle is very soluble in alcohol, other processes may be employed to remove the oil. The exposed parts may be washed repeatedly with fresh quantities of alcohol and a scrubbing brush. The poisonous oil may be thus removed in alcoholic solution. Another way of proceeding would be to wash the exposed parts with an alcoholic solution of lead acetate; in this case the poisonous principle would be first transformed in its insoluble lead compound and then washed away with alcohol.

The washing must be done thoroughly when alcohol is employed, as otherwise the alcohol might only serve to distribute the oil more widely over the skin. The finger nails should be cut short and also perfectly cleaned with the scrubbing brush. Oily preparations, or anything which dissolves the poisonous oil, if used, should be immediately removed, as they may only spread the poison, giving it a larger area on which to work.

The treatment above outlined cannot cure the already inflamed parts, which must heal by the usual process of repair, but it does prevent the spreading of the inflammation, and may serve to remove the poison before it has had time to produce its characteristic effects upon the skin.

Harvard Medical School, Boston.

V.—STAPELIAS.

The *Asclepiadeæ* are remarkable amongst Dicotyledons for having, like the *Orchideæ* amongst Monocotyledons, their pollen coherent into waxy masses called *pollinia*. There is no other resemblance between the two families, and the complicated modes of fertilization to which their peculiarity of structure lends itself are essentially different in the two cases. Amongst the *Asclepiadeæ* no tribe is marked out by such striking characters as the *Stapelieæ*. They were amongst the earliest South African plants to attract the attention of cultivators in Europe. Francis Masson, "then one of the under-gardeners at Kew," who was sent out in 1792 to collect plants for the establishment, paid particular attention to them, and in 1796 published a folio volume of coloured figures and description of species of the group which is now rare.

Stapelias are by no means easy to keep alive under horticultural conditions.

The following memorandum drawn up by Mrs. Barber, a well-known African botanist and an accomplished artist, gives some account of their habits in their native country: —

In this colony the name Stapelia is given indiscriminately to all the different species included in the genera *Piaranthus*, *Huernia*, and *Stapelia*. They are all commonly known as "Stapelias" throughout the land.

These remarkable plants, are wonderfully adapted to thrive in the uncertain climate of South Africa. It will nevertheless be found that their habits and peculiarities render them at all times somewhat uncommon and rare. A stranger unaccustomed to seek out their hidden abodes might traverse the whole country without seeing a single specimen, and yet they are so well dispersed that no locality is without especial varieties. They lie hidden in remote nooks and corners, in which they may so easily be overlooked, even when you know them well, that you find them where you are not expecting; you come upon them as it were unawares, beneath some shady bush or perchance clinging to the face of a rugged precipice, or behind some projecting rock. Some species prefer shade, while others delight in the full blaze of an African sun. They are exceedingly tenacious of life, surviving long seasons of protracted drought, and even when their roots have entirely failed, some of the succulent branches that have fallen to the earth strike root afresh, and rise as it were from the ashes of the original plant.

Stapelias are true evolutionists, they do not grow where they would choose to grow, nor where they would thrive the best, but where they are enabled to hold their own against an all-powerful and overwhelming host of grasses, and other irrepressible plants, in some secluded spot, frequently where a shelving rock will lend a helping hand against invasion. Nevertheless I am sorry to state that these interesting plants are rapidly disappearing from all parts of South Africa. Civilization and colonization are both dead against them. They are eaten up by "all kinds and conditions" of cattle. For instance, if an ostrich finds a Stapelia plant he seldom leaves without taking nearly the whole of it with him. Cattle, sheep, and goats, in like manner feed upon them greedily. The native tribes during years of severe drought and famine use these plants as food, and native children delight in their sweet young succulent branches. The florist and the gardener go hand in hand with the rest in this work of destruction, for you will hear them exclaiming "Oh! here is one of those curious Stapelias," and it will speedily be pulled up and planted in some flower-bed, where for want of care it will be overgrown by other plants and lost.

The great bulk of Stapelia-species blossom in the autumn season; occasionally some of the small kinds flower in spring after the rains have fallen, and continue in blossom during the whole of the summer, when rarely flowers and seed pods may be found upon the same plant, but not upon the same branches.

As a rule Stapelias do not seed freely; a great proportion of the flowers remain unfertilized. When fertilization has taken place the large blossom speedily falls, while the stem with the ovary grows thick and large, and turns down where it becomes hidden among the succulent branches, remaining in this position during the whole of the ensuing winter, being thus secure from all harm, not rising again until after the rains have fallen in spring, at which time it will be observed mounting up in a perpendicular manner from its lowly bed, and standing out above the plant, when the pods will be rapidly developed like great horns. They then remain stationary until they become ripe, when the pods open

and the winged seeds are carried off by the first high wind that blows, and removed far from the locality and the lowly plant from whence they sprang, and the world is all before them.

In some of my paintings the large seed pods might be supposed to be growing on the same plant as the flower. I have placed them in this position to show the manner in which they usually appear in nature. However, the paintings mostly consist of two or more plants, together with their whole belongings, roots, branches, flowers, seeds, etc., etc.

The paintings are in all cases measured; they are exactly the life size of the plants. In the painting of *Stapelia grandiflora* the leaves are not shorter than they often appear, although in many cases when they are amongst bushes, they are drawn out to a much longer length than they are in my painting of the flower.

M. E. Barber.

VI.—RAHAT LOUKOUM.

Rahat Loukoum is the Turkish name of a sweetmeat much consumed in Greece and occasionally offered for sale in Western Europe. According to a report by Mr. W. H. Cottrell [F. O. Reports, Annual, No. 1362, p. 14]:—"the primitive article" was "flavoured with otto of roses and Chio mastic. The latter drug, which is the product of *Pistacia Lentiscus*, was held in the greatest esteem in the Middle Ages and down to the 17th century, Chio being long regarded as the only region in the world capable of affording it. It is still used in the East as a masticatory, and it would appear possible that out of this use 'Rahat loukoum' developed."

This seems more than probable. Masticatories of some kind or other are used by all races. They increase the flow of saliva which supplies the ferment which converts the starch of food into digestible sugar, and thus aids digestion. This, however, does not wholly account for their use, which is often excessive. Mastic was perhaps one of the most primitive. The sweetmeat was probably at first only its vehicle. Now it has practically superseded it, and mastic only remains as a flavouring ingredient.

The following account is extracted from the *Journal of the Society of Arts* for July 27, 1894, p. 756:—

"The *Revue d'Orient* says that of all the various descriptions of confectionery prepared in Turkey, that known by the name of *locoum* enjoys the highest reputation. This sweetmeat is manufactured at Constantinople, Smyrna, and Syra, and is exported in very large quantities, principally to Marseilles. There are different kinds of locoum, according as to whether for flavouring purposes essence of roses, pistachio, or almonds enter into its composition. In Turkish, locoum is called *rahat locoum*. It might be supposed, in seeing the warm and transparent colour of this sweetmeat, that a variety of elements enter into its composition, and that it is a difficult thing to make, but, as a matter of fact, only two ingredients are used, sugar and starch, and its preparation is very

simple. As regards its manipulation, great care and attention must be devoted to it, and in this lies the whole secret of its manufacture, which has never yet been successfully accomplished in Europe, although very frequently attempted. The first operation is to melt some starch in cold water; this starch is then placed in a large pan with a certain quantity of sugar, and the pan is placed on a fire for about two hours, two men taking it in turn to stir the mixture. The sugar must be stirred without intermission, and always in the same way, otherwise the paste will not become uniform; any mistake in this manipulation resulting in the crystallisation of the sugar. When the paste is well formed, it is poured out into little wooden moulds, these moulds being first of all sprinkled with finely-powdered sugar, to prevent the sweetmeat adhering to them. The contents of the moulds are then poured out on to marble slabs, and, by the aid of a peculiarly shaped knife, the locoum is cut into strips about three centimetres wide, and these strips are again cut into small cubical pieces. It has been stated above that pistachio and almonds are used in the preparation of locoum, and to these must be added mastic, but these articles are only introduced when the cooking of the mass is completed; they are then in certain proportions added to the paste, which is well stirred. In the case of the mastic, this, reduced to a very fine powder, is thrown into the pan at the very last moment. It may here be observed that mastic is very largely used and in many different ways in the East. There it is used by women, who chew it, with the object of imparting fragrance to the breath and a good colour to the teeth. The men mix it with alcohol during distillation, and a cheap liqueur is obtained, which is largely consumed. The best mastic comes from Chio."

Some enquiry having been made, the following report was obtained through the good offices of the Foreign Office :—

British Consulate,
Syra, November 4, 1893.

My Lord,

With reference to the manufacture of Syra "Rahat Loukoum" (Turkish Delight) mentioned in Sir Villiers Lister's Commercial Despatch No. 1, of the 20th ultimo, I have the honour to submit the following remarks as desired by the Director of the Royal Gardens at Kew.

The decline of this once flourishing industry is to be attributed on the one hand to the depreciation of the forced currency, which has steadily increased for the last three or four years, attaining the present ruinous proportion, and on the other to the heavy Custom dues levied on nearly every article of import.

As a matter of fact, the price of sugar, the chief ingredient in the manufacture of this sweetmeat, is now unprecedentedly high, the Custom duty on the same being 1·10 drachmas per oke (2·8 lbs.), which exceeds the value of the article itself.

The price of starch and the flavouring essences have also increased considerably in proportion, the Custom dues on the same being at present 20 leptas and 5 drachmas per oke respectively.

Vanilla, a favourite flavouring essence, is exceptionally dear, paying 20 drachmas per oke Custom duty alone. Vanilla is brought from Germany in dried pods.

Mastic, another flavouring material, is brought from Chio in semi-transparent resinous tears, exuding from the mastic tree grown on that island, and also obtained by incision.

Pistachio is either brought in nuts from Syria, or in a liquid state yielded from the kernel.

Chocolate is brought in cakes from France and Germany, whilst the other flavouring essences, viz. :—banana, rose, violet, citron, mandarine, mint, pine, almond, orange, lemon, &c., are brought in liquids from Germany.

An inferior quality of citron is produced locally from the rind of the Naxos citron.

The confection has up to the present been generally consumed throughout Greece, and the manufacturers are unable to increase the prices, as the Greeks will not pay more than they have been accustomed to do for so many years.

Several attempts have, however, been made to introduce the article in England, but it has been found impossible to compete with the Smyrna produce, which is by far inferior in quality, on account of its cheapness.

This obstacle will, it is hoped, be removed by the coming in force of a Bill already passed in the Greek Chamber of Deputies, in virtue of which the Syra manufacturers will be given the option of drawing from the Custom House, free of duty, a stated quantity of sugar under guarantee that it will be returned in the shape of "Rahat Loukoum" for exportation.

The Bill has not come in force yet through some unknown delay on the part of the Government, but the Syra merchants hope the matter will be taken in hand as soon as a change of Ministry takes place, which is generally anticipated.

As stated in our Trade Report for last year, the excellence of this confection is chiefly attributed to the water of the island, and the circumstance, illustrative of this statement, may be mentioned, of some of the Syra manufacturers having attempted to establish factories at Trieste, Smyrna and New York, but failed to produce the excellent article made here, owing apparently to the employment of a different kind of water.

"Rahat Loukoum," as the words imply, is essentially of Turkish origin, the primitive article having been flavoured with otto of roses or Chio mastic.

The industry was introduced into Syra from that island, over half a century ago, by a certain Otamatelaki, one of the numerous fugitives from the massacre of Chio in 1822, who found refuge and established themselves in the Cyclades. His children, who succeeded him in the trade, have gradually perfected the article, stripping it of its Eastern peculiarity and making it more suitable to European taste, for which they have been awarded prizes on different occasions.

Although other factories not connected with the above have also been at work for many years, the firm which originally introduced the industry still enjoys the primacy.

Another innovation introduced by the same firm is *candied* "Rahat Loukoum," a quantity of it having been prepared expressly for the Chicago Exhibition, but owing again to some unfortunate delay on the part of the officials appointed for the purpose, the article was not sent in time, thus depriving the manufacturers of another well-merited prize.

I have the honour to be,
My Lord,
With the greatest respect,
Your Lordship's most obedient, humble servant,

W. H. COTTRELL,
Consul.

The Right Honourable,
The Earl of Rosebery, K.G.,
Her Majesty's Principal Secretary
of State for Foreign Affairs.

VII.—PLANTING BOG LAND.

The Congested Districts Board for Ireland made an experiment, which does not appear to have been attended with much success, to plant bog land at Knockboy, in the West of Ireland. Professor Schlich, F.R.S., was invited in 1895 to inspect and report on the result.

In order to prepare himself for the work, Professor Schlich, with characteristic thoroughness, "visited a number of places situated in the North of Germany, between Bremen, Hamburg, and Cuxhaven on the North Sea."

The result of Professor Schlich's observations was given in a departmental report which for some years was regarded as "confidential." They are, however, so valuable as to deserve the wider circulation which it is hoped will now be given to them :—

"The soil throughout the Knockboy estate may be described as more or less boggy, except small portions on the hill where the rock appears on the surface. The depth of bog varies from a few inches to over ten feet. So far, it has not been possible to observe any decided difference in the progress of the young trees on shallow and on deep bog. The oldest plantation is, however, only four years old, and this particular area is exposed to other very unfavourable conditions. Of the older plantations which I saw in County Galway, none are situated on deep bog land, so that they do not teach us in how far success on deep bog may be looked for. Under these circumstances I had to look elsewhere for evidence, and this I found in a number of bogs situated in the vicinity of Bremen and Hamburg. There I visited more particularly the reclamation works which have been carried out in the bogs of Hellweger, Augustendorf, and Burgsittensen.

Hellweger Bog.

This bog has a depth of up to 25 feet. On parts where the peat had been cut, and the upper layer only unfit for fuel, left on the mineral soil, I found very flourishing woods of Oak, Spruce, and Scotch Pine. On the uncut bog of an original depth of 24 feet, where draining operations were commenced nearly 100 years ago, and in the vicinity of a settlement, I found very fine Spruce and Oak woods. Both were about 42 years old, and the trees showed the following average dimensions :—

Spruce.—Height 54 feet, diameter = 12 inches, measured at 4 feet from the ground. The trees were straight and in every way well grown.

Oak.—Height 45 feet, diameter = 16 inches, measured at 4 feet from the ground, with clean boles up to 23 feet long.

I also found Apple trees close by laden with fruit.

All these trees were in the immediate neighbourhood of the settlement, on an area which had been drained for a considerable number of years before the trees were planted. Cattle, pigs, geese, and fowls, were constantly straying into these woods, so that the soil had the benefit of their droppings.

Here then is an instance which shows that good trees can be grown on bog land which has been drained for some time, and which has to some extent been manured.

Augustendorfer Bog.

Of this bog an area of about 2,800 acres has been planted up with forest trees.

The depth of the bog ranges from 20 to 26 feet, and its composition resembled in every way the deeper bogs found in County Galway. The surface is covered with heather, with here and there a little grass. Under the heather lies a thin layer of humus produced by the heather, then comes a layer of light yellowish brown peat (used for the manufacture of litter), and this goes gradually over into a darker mass, which is cut and used as fuel.

The process of cultivation was as follows :—

The area was drained, so that the ditches divided it in strips 30 feet broad. The ditches on each side of the strips were 2 feet deep, while the main ditches were of sufficient depth to carry off the water. During six years the surface layer of the soil was lightly burned, and buck wheat grown. After the harvesting of the sixth crop, the ditches were deepened to 3 feet, and each strip was divided into two 15-feet broad strips by an additional ditch. The soil taken out of the ditches was spread over the intervening areas. Then forest trees were planted, especially Oak, Spruce, Scotch Pine ; and later on also, Larch, Weymouth Pine, and Austrian Pine, while Birch appeared in large numbers from seed brought by the wind.

The first forest plantation was made in 1868, so that it is now twenty-seven years old ; the youngest is eight years old.

These plantations did at first very well, so that very promising results were expected. At the age of ten to twelve years, however, the trees began to fall off, and now it is clear that the whole must be put down as a failure. The Oaks have mostly disappeared, and those which still exist are miserable specimens of the species. The Spruce also has done very badly. The Scotch Pine suffers dreadfully from the leaf-shedding disease, and from the attacks of an insect (*Retinia buoliana*); in a few places it has done better, where the bog is less deep, but even here it is very branchy. Larch looked miserable in most parts, and only fairly well in a few. Austrian Pine, of which only a few specimens existed, had done fairly well, but it had a very bushy appearance. Weymouth Pine had, up to an age of fifteen years, done better than any of the above-mentioned pines. Best of all had, no doubt, done Birch. That tree was at first cut away, because it threatened to interfere with the other species; now it is being sown in strips, to replace them, where they have failed.

The result of my inspection of the Augustendorfer bog is, that profitable forestry without artificial manuring is not practicable on deep bogs.

Burgsittensen Bog.

I next visited this bog, where I was told plantations have been established on varying depths of bog-land. Here the land had been drained by ditches fifteen feet apart, and the species grown were the same as on the Augustendorfer bog. The depth of bog ran from perhaps eighteen inches to several feet. I went carefully through the plantations which run up to an age of about thirty years, and I came to the conclusion that success depends in the first place on the depth of the bog. Wherever it was not more than about three feet, the plantations did well; as soon as the depths increased beyond a yard, the growth of the trees fell off at once. Places with a depth of four-and-a-half or five feet could be picked out at a glance by the inferior development of the trees. This I consider a very important lesson, which I learned on this tour.

As regards species, Burgsittensen showed that *splendid* Oak can be produced on bog not more than two feet deep, and fair Oak up to three feet deep, but not beyond. Weymouth Pine here also had done particularly well; Scotch Pine came next, and then Spruce. Of Larch, not much was seen here.

The conclusion to be derived from the above notes may be thus worded:—

On old-drained and manured bog-lands profitable forestry can be carried on, irrespective of their depth; on newly drained bog-lands profitable forestry ceases with a depth of bog of about three feet, unless such land is manured or improved by bringing mineral soil on to it.



M.S. del. et lith.

Dalbergia hupeana, Hance.

VIII.—PAI-T'AN TREE.

(*Dalbergia hupeana*, Hance.)

(With Plate.)

This is a tree of moderate size, rarely attaining 50 feet in height, which is common in the central provinces of China, being recorded from Szechwan, Hupeh, Kiangsu, and Chekiang. It is essentially a tree of the plains and low hills, and is never met with in the mountain forests. It is now usually seen planted along road-sides and around villages.

Its wood is hard and durable and is used for purposes where strength and elasticity are required, as in the making of rammers for oil-presses, tool handles, wheel-spokes, and blocks and pulleys. A pulley made of this wood, sent by me from Ichang, is now in the Museum at Kew, where there are also specimens of the timber forwarded from Ningpo by Consul Cooper.

The tree is known in Hupeh as the *t'an* tree, and at Ningpo as the *pai-t'an*. The t'an tree has been familiar to the Chinese from the earliest times,[1] and is frequently mentioned in their classical writings. Chariots made of its wood were employed in the famous battle of *Mu-Ye*, which occurred in B.C. 1122. Another early allusion refers to its use in making the naves of wheels. It is figured in the illustrated Chinese Botany, the *Chih Wu-Ming*, xxxv. 24; and the author of the great Chinese Herbal, the *Pên-Ts'ao Kang Mu*, describes it as a tree with a finely-veined hard wood and with leaves resembling those of *Sophora japonica*. European translators of the Chinese Classics have erroneously identified this tree with Sandalwood, which is called *T'an-ksiang*, and has always been an import into China.

The plate is reproduced from *Hooker's Icones Plantarum* (t. 1968), which may be referred to for botanical details.

AUGUSTINE HENRY.

IX.—POTTERY TREES.

Nothing is, perhaps, more remarkable than the empirical knowledge possessed by uncivilised peoples of the properties, useful or otherwise, of the vegetation amongst which they live.

One of the most curious is the use by the Brazilian aborigines of the ashes of the bark of a tree in the manufacture of a rude pottery. This was first pointed out by Aublet, and is the subject of a note by the well-known traveller, the late R. Spruce, A.L.S., whose acute observation nothing escaped, in the *Kew Journal of Botany*, 1850, p. 73.

Apparently the alluvial clay used in making the native pottery is incapable without additional silica of producing a body of sufficient hardness when fired for practical purposes. But ordinary sources of silica are not available. The bark of the Pottery tree appears to yield what is wanted.

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(1) *See* Bretschneider, *Botanicon Sinicum*, ii. 375. (*Shanghai*, 1892.)

The Kew Museums contain a fine series of specimens illustrating the practice, collected by Spruce. There was some uncertainty as to the precise species employed in their case, and an enquiry received the following interesting reply :—

Coneysthorpe, Malton, Yorkshire,
13th June 1880.

DEAR SIR,

THE piece of pottery about which you ask, from its size and colours, was probably made on the River Naupés, where I saw Caraipé ware in the greatest abundance and perfection. I have somewhere a list of all the articles I sent to Kew, but it is many years since I saw it last, and it has been so carefully stowed away that now when I want it to refer to it I cannot find it.

If the vessel be really from the Naupés, there is little doubt that the flinty bark mixed with the clay to render it fireproof was not derived from what you call "*Moquilea utilis*," but from one or more of at least half-a-dozen different Chrysobalans, all of which I have seen used for that purpose on the Naupés. Even at Pará, I should much doubt that Caráipé (as it is called) was the product of only a single species ; but my stay there was too short to ascertain the fact. Since the days when I was a botanist the species of *Chrysobalaneæ* have been banded about among sundry genera, but all the trees of which I gathered specimens, and whose bark I saw used in making pottery, were referred by Mr. Bentham to *Licania* ; there was not a single large-flowered species among them—no *Parinarium*, no *Couepia*, &c. If I recollect rightly, the tree which afforded the best Caraipé on the Naupés was one I sent specimens of under the name of *Licania crassivenia*.

* * * * *

Faithfully yours,
RICHARD SPRUCE.

The late Dr. Flight, F.R.S., very kindly determined the silica in the ash of the bark. It proved to consist of something less than a quarter of its weight.

2nd June, 1880.

The bark was pounded in a mortar, which is easily done, and dried in each case at 110° C. during several hours. Three portions were examined :—

No. 1. The entire bark.
„ 2. The outside (very thin layer).
„ 3. The inside („ „).

And the ash (burned quite white) amounted in each case to :—

No. 1. 21·92 per cent. of bark.
„ 2. 18·19 „ „
„ 3. 23·02 „ „

I enclose No. 2. You might like to see it under the microscope. I analysed No. 1 in a way. I drove off the silicic acid with ammonium fluoride and after converting the fluorides of the residue into sulphates weighed them : they amounted to 1·33 per

cent. It appeared to consist entirely of lime and potash sulphate. Phosphoric acid, magnesia, lithia, &c., were absent. Assuming the lime sulphate and potash sulphate to be present in equal equivalent proportions, which appeared to be the case, the above amount of sulphate corresponds to about 0·66 per cent. of bases which being deducted (in the case of No. 1., the ash analyzed) leaves 21·26 per cent. of silica. The mixed sulphates when heated were decidedly green in colour, but became white when cold. I tried this over several times.

X.—VEGETABLE RENNETS.

The *Kew Report* for 1881 (pp. 36–37) contained some account of *Withania coagulans*, a well-known North-West Indian plant which possesses the power of coagulating milk. The interest of the subject arose from the fact that if cheese was to be made in India the religious prejudices of the Hindoos would not allow the rennet of the calf to be used for the purpose.

The "Rennet Ferment" contained in the seeds was investigated by Mr. Sheridan Lea. (*Proc. Roy. Soc.* Vol. XXXVI., pp. 55–58.)

Meanwhile Mr. W. R. Robertson, Agricultural Reporter to the Government of Madras, in his Annual Report for 1882–3 (pp. 74, 75) gave an interesting account of some experiments on other Indian plants with similar properties.

As this is practically inaccessible it is reproduced here.

"Attention having been directed to the properties of the berries of *Withania coagulans* for curdling milk in cheese-making, it was thought desirable to try the properties of a nearly allied plant *Withania somnifera*, a well-known plant in South India, where *Withania coagulans* is unknown.

"The curd on being sufficiently formed was broken up and the whey separated as far as this was possible ; the broken curd after a little salt had been added was put into a roughly made cheese press.

"In one set of experiments twenty-one ollocks of milk were taken and kept aside until the milk was faintly acid to test-paper. The milk was then gently heated to 110° F. and divided into seven portions of three ollocks each. To the first were added twelve drops of churn milk, to the second twelve drops of lime-juice, to the third twelve drops of tamarind-juice of the consistency of the milk itself, to the fourth about a teaspoonful of the extract of the *Withania* berries, to the fifth twelve drops of the juice of the bilimbi fruit (*Averrhoa Bilimbi*), to the sixth the raw juice of twelve *Withania* berries, and to the seventh about one drop of the milky juice of *Epicarpurus orientalis* (Prayam or Cootty pela). All these agents were tested with blue litmus paper, and they had a distinctly acid reaction. In three hours, the milk treated with the milky juice of the Prayam plant was found to have changed into a very firm cylindrical block of curd with a layer of clear supernatant whey. There is not a doubt but that this is quite equal to rennet ; it does not in the least affect

the flavor of the cheese, nor does it require any preliminary preparation; it is procurable at all times, and the plant is very common. When the curd produced by this coagulant was put into a dish, it at once formed a circular disc without the least disintegration. The curd was then cut up with a clean bamboo spatula, the greater part of the whey drained off, and the curds were then evenly mixed up with finely-powdered salt at the rate of $3\frac{1}{4}$ ounce to 1 gallon of the curds, and put under the press. The quantity of cheese thus obtained from three ollocks of milk was $2\frac{3}{8}$ ounces, or about $6\frac{1}{3}$ ounces per Madras measure of milk. The quantity of the salt added was found to have been excessive; probably half the quantity would have been quite sufficient. The milk treated with the churn-milk took five hours to curdle, and the curds were not firm; and the curds in the other experiments were even more inferior. It appears that the firmness of the curds depends, not on the strength of acidity in the curdling agent, but on the strength of some fermentative principle in it. The extract of the *Withania* berries was prepared by simmering half an ounce of the berries in one ollock of water for about four hours on slow fire.

"It has been found that the best results are obtained with Prayam leaves when using 16 leaves to one measure of milk. The great drawback to the use of this curdling agent is the necessity of taking the milk to be curdled to the tree, as the minute globules of juice, at the fracture where the leaf is broken from the branches, drop off in removing the leaves to the dairy. These experiments will be continued. It may be possible to collect from the leaves of Prayam bush the coagulating agent and to store it for future use."

XI.—MISCELLANEOUS NOTES.

Visitors during 1902.—The number of persons who visited the Royal Botanic Gardens during the year 1902 was 1,323,376; that for 1901 was 1,460,169. The average for 1892–1901 was 1,355,503. The total number on Sundays was 562,611, and on week-days 760,765. The maximum number on any one day was 63,257 on March 31, and the smallest 85 on February 3.

The detailed monthly returns are given below:—

January	20,872
February	19,502
March	156,409
April	95,408
May	157,068
June	210,499
July	172,959
August	212,154
September	162,467
October	63,524
November	32,947
December	19,567

HERMANN WENDLAND.—Hermann Wendland, the distinguished Director of the famous Royal Gardens at Herrenhausen, who died on January 12, 1903, after a long illness, stands out conspicuously as one who has accomplished much in the fields of both botany and horticulture.

He was born in October, 1823, in Herrenhausen, where his father and grandfather preceded him as Director of the Gardens, and where he received his early training. He afterwards worked for a time in the Botanic Gardens at Göttingen and in the Imperial Gardens at Schönbrunn, proceeding thence to Kew. Here he was employed for nearly two years as a gardener, leaving in 1849 to return to Herrenhausen as assistant to his father, whom he succeeded as Director on the latter's death in 1870. In 1857 he was sent on a botanical expedition to Guatemala and Central America, where he collected many new and interesting plants, several of which he introduced to cultivation. Amongst these, perhaps the most notable was *Anthurium scherzerianum*, which he found in Costa Rica.

He prepared and published in 1854 a list of the palms cultivated in European collections. This was followed by researches amongst the species of this difficult order with so much zeal and activity that he soon became the recognised authority with regard to them. In their cultivation he was no less enthusiastic and successful, and the collection of palms at Herrenhausen probably rivals even that of Kew.

Mr. GEORGE S. JENMAN, F.L.S., was born in the south of England in 1845. After a period of training at Kew he was appointed, in 1873, Superintendent of the Castleton Garden, Jamaica. Six years later he became Government Botanist and Superintendent of the Botanic Garden, Georgetown, British Guiana, a post he held until his death on February 28, 1903. While in this position he was largely occupied in developing the economic resources of the colony. In this direction mention must be made of the important series of experiments with seedling sugar-canes which he carried out, at first on his own initiative and later in association with Professor Harrison, the Government Chemist. His principal botanical work was amongst the Ferns of the West Indies, to which he had long devoted special attention. In addition to numerous descriptions of new species published in various journals, he published in 1881 a *Hand-list of Jamaica Ferns*; and in 1898 commenced in the *Bulletin* of the Royal Botanic Gardens, Trinidad, an enumeration, with descriptions, of the Ferns of the British West Indies and Guiana, a work for which he was eminently qualified, but which unfortunately he was destined not to carry to completion.

Mr. J. F. DUTHIE, B.A., F.L.S., having retired from the position of Director of the Botanical Department of Northern India, has been appointed Assistant for India on the staff of the Royal Botanic Gardens by the Secretary of State for India in Council.

Mr. S. F. D. HARWOOD, B.A., of St. John's College, Cambridge, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Professor of Chemistry in the Royal College, Mauritius. Before leaving for Mauritius, Mr. Harwood spent a short time at Kew for the purpose of acquainting himself with the experimental work which has been done in Barbados and British Guiana in connection with sugar cultivation.

Mr. L. LEWTON-BRAIN, B.A., of St. John's College, Cambridge, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Mycologist and Lecturer in Agriculture to the Imperial Department of Agriculture for the West Indies.

Mr. STEPHEN TROYTE DUNN, B.A., F.L.S., Assistant for India in the Herbarium of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Superintendent of the Botanic and Afforestation Department, Hong Kong.

Mr. HENRY HAROLD WELCH PEARSON, M.A., F.L.S., an Assistant in the Royal Botanic Gardens, has been appointed by the South African College Council, on the recommendation of Kew, Professor of Botany in the South African College, Cape Town.

Mr. FREDERICK SAMPSON SILLITOE, a member of the Gardening Staff of the Royal Botanic Gardens, has been appointed by the Governor of Khartoum Province, on the recommendation of Kew, Head Gardener of the Palace Gardens at Khartoum.

Mr. DAVID TANNOCK, formerly a member of the Gardening Staff of the Royal Botanic Gardens, and late Officer-in-Charge of the Agricultural School, Dominica, has been appointed Superintendent of the Botanic Garden, Dunedin, New Zealand.

Mr. ARCHIBALD BROOKS, a member of the Gardening Staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Officer-in-Charge of the Agricultural School, Dominica, in succession to Mr. D. Tannock.

Mr. W. R. ELLIOTT, formerly a member of the Gardening Staff of the Royal Botanic Gardens, and for some years Curator of the Botanic Garden at Grenada, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Forestry Officer in Northern Nigeria.

Mr. FRANK EVANS, a member of the Gardening Staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Assistant Superintendent of the Royal Botanic Gardens, Trinidad.

Mr. WILLIAM DON, a member of the Gardening Staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, an Assistant Curator of Botanic Stations on the Gold Coast, to take charge of a newly-established branch station at Tarkwa, in the western district of the colony.

Mr. WALTER FOX, formerly a member of the Gardening Staff of the Royal Botanic Gardens. and late Assistant Superintendent of the Botanic Gardens, Singapore, has been appointed by the Secretary of State for the Colonies, Superintendent of Garden and Forests, Penang, in succession to Mr. C. Curtis, retired.

Mr. ROBERT DERRY, formerly a member of the Gardening Staff of the Royal Botanic Gardens, and successively Assistant Superintendent of the Botanic Gardens, Malacca, and Superintendent of the Government Gardens and Plantations, Perak, has been appointed Assistant Superintendent of the Botanic Gardens, Singapore, in succession to Mr. Fox.

Mr. HENRY POWELL, formerly a member of the Gardening Staff of the Royal Botanic Gardens, and late Curator of the Botanic Station, St. Vincent, has been appointed by the Secretary of State for Foreign Affairs, Assistant in charge of the Tropical branch of the Department of Agriculture of the East Africa Protectorate.

Mr. ERNEST BROWN, a member of the Gardening Staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for Foreign Affairs, Assistant in the Scientific Department of the Uganda Protectorate.

Dr. Alexander Prior's Herbarium and Botanical Library.—Dr. Richard Chandler Alexander Prior died on December 8th, 1902, in his ninety-fourth year. He bequeathed the whole of his herbarium to Kew, together with a sum of money to defray the cost of removing the same from his residence at Halse, near Taunton, to Kew, where it was delivered April 15th, 1903. Dr. Prior travelled and collected plants on a large scale in the South of Europe, South Africa, Canada and the West Indies, and distributed duplicates during his lifetime. His *Herbarium proprium* is estimated to contain about 30,000 sheets, of which some 7,000 are South African, and 4,500 West Indian, mainly from the Blue Mountains, Jamaica. These two collections form the most valuable part, and were all collected by himself.

Dr. Prior had also a considerable Botanical Library, a selection from which, of about 140 volumes, was presented to Kew, by his heir, Sir Prior Goldney, Bart. They are classical works of which Kew greatly needed second copies for the use of the ever-increasing number of workers here.

W. B. H.

Anabasis Haussknechtii, *Boiss.*—The twigs of this plant are sold in the bazaars of Ispahan, where I myself have bought a sample of them. They were called "sodab," a name which, however, is usually applied to specimens of *Haplophyllum*, and were said to be used for washing. Mr. Th. Strauss, in Sultanabad, sent me some time ago a small sample of the same material by the name of "galiab," together with a specimen of the plant from which it is derived. He then said that it is used in the dyeing manufactory. On my request to give more particulars about the use of the plant he informed me that the dyers use it for washing wool, and that it makes with boiling water a sort of lather. At the same time he sent a large sample of what he meant to be the same drug. It contained, indeed, twigs of *Anabasis Haussknechtii*, but I convinced myself from the sample now in our museum that it consists *chiefly* of the twigs and leaves of *Seidlitzia florida*, M.B., another Salsolacea. *Anabasis Haussknechtii*, Boiss., was found by Dr. Haussknecht and myself near Ispahan, where it grows in abundance over large areas of gravelly and somewhat salty soil. It is frequent, according to Mr. Th. Strauss, in the salty plain near Sultanabad, and there is also a specimen in the Herbarium from Chehar Mehall in Persia, collected by Dr. Haussknecht. *A. Haussknechtii* is closely allied to *A. aphylla*, L., and a closer investigation may well prove it to be only a variety or form of it. *Seidlitzia florida*, M.B., is distributed from the salty steppes of Transcaucasia through North-Western Persia beyond Isaphan, where I saw it frequently in the desert on the lower Sajende Rua and in the Garokhane.

With regard to the statement that the material makes with boiling water a sort of lather I am inclined to suggest that it only does so in the presence of raw sheep wool, in which case the potash of the plant and the grease of the wool would naturally form a soap, thus producing a lather.

O. STAPF.

Research in Jodrell Laboratory in 1903 :—

Boodle, L. A.—Comparative Anatomy of the Hymenophyllaceæ, Schizaeaceæ, and Gleicheniaceæ. IV. Further Observations on *Schizaea*. (Ann. Bot., Vol. XVII., pp. 512–537, with three Figs. in text.)

Boodle, L. A.—On Descriptions of Vascular Structures. (New Phytologist, Vol. II., pp. 107–112.)

Fritsch, F. E.—Algological Notes. IV. Remarks on the periodical Development of the Algae in the Artificial Waters at Kew. (Ann. Bot., Vol. XVII., pp. 274–278.)

Fritsch, F. E.—Further Observations on the Phytoplankton of the River Thames. (Ann. Bot., Vol. XVII., pp. 631–647.)

Fritsch, F. E.—Two Fungi parasitic on Species of *Tolypothrix* (*Resticularia nodosa*, Dang., and *R. Boodlei*, n. sp.). (Ann. Bot., Vol. XVII., pp. 649–664, t. 29.)

Fritsch, F. E.—Observations on the young Plants of *Stigeoclonium*, Kütz. (Beihefte zum Botanischen Centralblatt, Vol. XIII., pp. 368–387, tt. 11 and 12.)

Pearson, H. H. W.—On some species of *Dischidia* with double Pitchers. (Journ. Linn. Soc., Vol. XXXV., pp. 375–390, t. 9.)

Salmon, E. S.—A Monograph of the Genus *Streptopogon*, Wils. (Ann. Bot., Vol. XVII., pp. 107–150, tt. 8–10.)

Salmon, E. S.—Infection-Powers of Ascospores in Erysiphaceæ. (Journ. Bot., Vol. 41, pp. 159–165 and 204–212.)

Scott, D. H.—The Origin of Seed-bearing Plants, pp. 1–14. A Lecture delivered at the Royal Institution of Great Britain on May 15, 1903.

Oliver, F. W., and Scott, D. H.—On *Lagenostoma Lomaxi*, the Seed of *Lyginodendron*. (Ann. Bot., Vol. XVII., pp. 625–629.)

Worsdell, W. C.—Abnormal "Flowers" of *Helenium autumnale*, L. (Journ. Roy. Hort. Soc., Vol. XXVII., pp. 943–955, with ten Figs. in text.)

INDEX.

Acanthosicyos horrida, 13.
Anabasis Haussknechtii, 32.
Appointments, 29.
Augustendorfer bog, planting of, 23.

Barber, Mrs. M. E., Stapelias, 17.
Blue Gum, 1.
Bog land, planting, 22.
Botanical staffs, list of, Appendix IV.
Brain, L. Lewton-, 30.
Brooks, A., 30.
Brown, E., 31.
Burgsittensen bog, planting of, 24.

Dalbergia hupeana, 25.
Derry, R., 31.
Don, W., 31.
Dunn, S. T., 30.
Duthie, J. F., 29.

Elliott, W. R., 31.
Eucalyptus citriodora, 5.
— Globulus, 1.
Evans, F., 31.

Fox, W., 31.

Galiab, 32.
Goldney, Sir Prior, presentation to Kew, 32.

Harwood, S. F. D., 30.
Hellweger bog, planting of, 23.

Ivy poisoning, 15.

Jenman, G. S., 29.
Jodrell laboratory, research in, in 1903, 33.

Kew, Dr. A. Prior's herbarium and botanical library, 32.
— in the Eighteenth Century, 11.
—, Jodrell laboratory, research in, 33.
— library catalogue, supplement to, Appendix II.
—, visitors in 1902, 28.

Lewton-Brain, L., 30.

Malaria, 6.
Miscellaneous notes, 28.

'Nara, 13.
New garden plants of 1902, Appendix III.

Obituary notices, 29.

Pai-t'an tree, 25.
Pearson, H. H. W., 30.
Pfaff, Dr. F., Ivy poisoning, 15.
Pistacia lentiscus, 19.
Planting bog land, 22.
Poison Ivy, 15.
— sumach, 15.
Pottery trees, 25.
Powell, H., 31.
Prior, Dr. A., herbarium and botanical library, 32.

Rahat Loukoum, 19.
Rennets, vegetable, 27.
Rhus Toxicodendron, 15.
— venenata, 15.

Seeds available for exchange, Appendix I.
Seidlitzia florida, 32.
Sillitoe, F. S., 30.
Sodab, 32.
Stapelias, 17.

Tannock, D., 30.
Toxicodendrol, 16.
Trees, pottery, 25.

Vegetable rennets, 27.
Visitors to Kew in 1902, 28.

Wendland, H., 29.
Withania coagulans, 27.
— somnifera, 27.

ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

APPENDIX I.—1903.

LIST OF SEEDS OF HARDY HERBACEOUS PLANTS AND OF TREES AND SHRUBS.

The following is a list of seeds of Hardy Herbaceous Plants and of Hardy Trees and Shrubs which, for the most part, have ripened at Kew during the year 1902. These seeds are available only for exchange with Botanic Gardens and with regular correspondents of Kew. No application, except from remote colonial possessions, can be entertained after the end of March.

HERBACEOUS PLANTS.

Abronia umbellata.

Acaena glabra.
laevigata.
microphylla.
myriophylla.
Novae-Zelandiae.
ovalifolia.
Sanguisorbae.

Acanthus longifolius.

Achillea Ageratum.
decolorans.
Gerberi.
leptophylla.
ligustica.
macrophylla.
magna.
odorata.
Ptarmica.

Acnida cannabina.

Aconitum barbatum.
columbianum.
ferox.
— var. atrox.
— var. crassicaule.
Fischeri.
Kusnezoffii.
Lycoctonum.
— var. ranunculifolium.
Napellus.
Napellus var. hians.
palmatum.
uncinatum.

Actinella odorata.

Actinocarpus Damasonium.

Actinomeris squarrosa.

1375 Wt 35 12/02 D & S 29 13058

Adenophora stricta.

Aethionema cappadocicum.
pulchellum.
saxatile.

Agrimonia Eupatoria.
leucantha.
odorata.

Agropyron acutum.
caninum.
cristatum.
dasyanthum.
desertorum.
glaucum var. occidentale.
japonicum.
repens.
Richardsoni.
tenerum.
villosum.

Agrostis alba.
nebulosa.
pulchella.
vulgaris.

Ajuga reptans.

Alchemilla alpina.
arvensis.
conjuncta.
splendens.
vulgaris.

Alisma Plantago.

Allium angulosum.
atropurpureum.
carinatum.
fistulosum.
giganteum.
globosum var. albidum.
hirtifolium.
junceum.
karataviense.
neapolitanum.
odorum.
orientale.
ostrowskianum.
platycaule.
polyphyllum.
Porrum.
Schoenoprasum.
— var. sibiricum.
scorzoneræfolium.
senescens.

Allium, *cont.*
sphaerocephalum.
subvillosum.
Suworowi.
Tubergeni.
urceolatum.
ursinum.

Alonsoa Warscewiczii.

Alopecurus geniculatus.
pratensis.

Althaea armeniaca.
cannabina.
— var. narbonensis.
ficifolia.
kurdica.
officinalis.
pallida.
pontica.
rosea.
taurinensis.

Alyssum alpestre.
argenteum.
corymbosum.
creticum.
gemonense.
Heinzi.
incanum.
maritimum.
minimum.
podolicum.
saxatile.
Wierzbickii.
wulfenianum.

Amaranthus caudatus.
hypochondriacus.
polygamus.
retroflexus.
speciosus.

Amethystea caerulea.

Ammobium alatum.

Ammophila arundinacea.

Amsonia Tabernaemontana.

Anacyclus officinarum.
radiatus.

Anagallis arvensis.]
linifolia.

Anaphalis cinnamomea.
margaritacea.
nubigena.

Anarrhinum bellidifolium.

Anchusa capensis.
italica.
officinalis.

Andropogon halepensis.
Ischaemum.
nutans.

Androsace filiformis.
lactiflora.
sarmentosa.

Anemone acutiloba.
chinensis.
Halleri.
Hepatica.
multifida.
nemorosa.
Pulsatilla.
rivularis.
sulphurea.
sylvestris.
virginiana.

Anoda Wrightii.

Antennaria dioica.

Anthemis aetnensis.
arvensis.
blancheana.
Cotula.
cupaniana.
mixta.
nobilis.
— var. discoidalis.
tinctoria.

Anthericum Liliago.
— var. algeriense.
ramosum.

Anthoxanthum odoratum.
ovatum.
Puelii.

Anthriscus nemorosa.

Anthyllis sericea.
Vulneraria.

Antirrhinum Asarina.
majus.
Orontium.
sempervirens.

Apera interrupta.
Spica-venti.

Apium graveolens.

Aplopappus rubiginosus.

Aquilegia aurea.
canadensis.
caucasica.
glandulosa
— var. jucunda.
Kitaibelii.
leptoceras.
olympica.
pyrenaica.
vulgaris.
— var. atrata.

Arabis alpestris.
alpina.
arenosa.
hirsuta.
muralis var. rosea.
pumila.

Aralia cordata.
racemosa.

Archangelica littoralis.
officinalis.

Arctium majus.
minus.

Arenaria balearica.
fasciculata.
foliosa.
graminifolia.
— var. multiflora.
gypsophiloides.
laricifolia.
nardifolia.
pinifolia.
rigida.
serpyllifolia.

Argemone mexicana.
stenopetala.

Arisarum proboscideum.

Aristida coerulescens.

Armeria boetica.
maritima.
plantaginea.
pungens.
Welwitschii.

Arnica amplexicaulis.
Chamissonis.
latifolia.
longifolia.
montana.
sachalinensis.

Arnoseris pusilla.

Artemisia Absinthium.
annua.
campestris.
camphorata.
dracunculoides.
lanata.
ludoviciana.
paniculata.
parviflora.
scoparia.
siversiana.

Arum italicum.

Asarum europaeum.

Asclepias Cornuti.
incarnata.
obtusifolia.

Asparagus officinalis.

Asperella Hystrix.

Asperula azurea.
cynanchica.
galioides.
odorata.
tinctoria.

Asphodeline liburnica.
pannonica.

Asphodelus albus.
fistulosus.
ramosus.

Aster alpinus.
acris var. punctata.
acuminatus.
Amellus.
angustus.

Aster, *cont.*
corymbosus.
dahuricus.
diffusus.
foliaceus.
Herveyi.
laevis.
lindleyanus.
longifolius.
macrophyllus.
Porteri.
ptarmicoides.
puniceus.
— var. lucidulus.
pyrenaeus.
Radula.
sibiricus.
sagittifolius.
Shortii.
spectabilis.
stellaris.
tanacetifolius.
tardiflorus.
Thomsoni.
tricephalus.
trinervius.

Asterolinum stellatum.

Astilbe chinensis.

Astragalus boeticus.
chinensis.
chlorostachys.
Cicer.
danicus.
frigidus.
glycyphyllus.
kahiricus.
pentaglottis.
ponticus.

Astrantia Biebersteinii.
carniolica.
major.

Athamanta Matthioli.

Atriplex hastata.
hortensis.
littoralis.
nitens.
rosea.
sibirica.

Atropa Belladonna.
lutescens.

Aubrietia erubescens.
Pinardi.

Avena bromoides.
fatua.
montana.
pratensis.
pubescens.

Baeria coronaria.
gracilis.

Ballota hispanica.

Baptisia australis.

Barbarea intermedia.
praecox.
vulgaris.

Basella rubra.

Beckmannia erucaeformis.

Belamcanda punctata.

Berkheya Adlami.
purpurea.

Beta maritima.
trigyna.
vulgaris.

Bidens cernua.
grandiflora.
leucantha.
tripartita.

Biscutella auriculata.
ciliata.
didyma.
laevigata.

Blumenbachia insignis.

Bocconia cordata.
microcarpa.

Boehmeria japonica. var.
tricuspis.
sieboldiana.

Boenninghausenia albiflora.

Boltonia incisa.
indica.

Brachycome iberidifolia.

Brachypodium distachyum.
pinnatum.
sylvaticum.

Brassica campestris.
— var. glauca.
Cheiranthos.
Erucastrum.
juncea.
oleracea.

Briza geniculata.
media.

Brodiaea capitata.
californica.
Hendersoni.
ixioides.
Leichtlini.
uniflora.

Bromus adoënsis.
breviaristatus.
brizaeformis
carinatus.
ciliatus.
inermis.
Kalmii.
macrostachys.
madritensis.
maximus.
mollis.
purgans.
racemosus.
rubens.
sterilis.
Tacna.
tectorum.
unioloides.

Browallia viscosa.

Bryonia dioica.

Bulbine annua.

Bulbinella Hookeri.

Bunias Erucago.
macrocarpa.
orientalis.

Buphthalmum salicifolium.
speciosum.

Bupleurum aristatum.
Candollei.
gracile.
petraeum.
rotundifolium.
sachalinense.

Butomus umbellatus.

Caccinia strigosa.

Calamagrostis confinis.
epigeios.
varia.

Calamintha Acinos.
Clinopodium.
grandiflora.
officinalis.

Calandrinia grandiflora.
pilosiuscula.
speciosa.
umbellata.

Calceolaria mexicana.

Calendula arvensis.
microphylla.
nöeana.
officinalis.

Callistephus hortensis.

Caltha palustris.
polypetala.

Calystegia silvatica.

Camassia Cusickii.
esculenta.
Fraseri
Leichtlinii.
montana.

Camelina sativa.

Campanula alliariaefolia.
bononiensis.
carpatica.
drabaefolia.
Elatines.
Erinus.
glomerata.
— var. dahurica.
lactiflora.
latifolia.
— var. macrantha.
Medium.
persicifolia.
pusilla.
pyramidalis.
ramosissima.
rapunculoides.
reuteriana.

Campanula, *cont.*
rhomboidalis.
rotundifolia.
Scheuchzeri.
sibirica.
spicata.
Steveni.
strigosus.
thyrsoides.
Trachelium.

Cannabis sativa.

Carbenia benedicta.

Cardamine chenopodifolia.

Carduus pycnocephalus.

Carex crinita.
decomposita.
divulsa.
flava.
— var. lepidocarpa.
— var. Oederi.
fusca.
glauca.
Grayii.
hirta.
hordeistichos.
leporina.
paniculata.
pendula.
sparganioides.
straminea.
sylvatica.
teretiuscula.
testacea, var. attenuata.
vulpina.

Carthamus flavescens.
lanatus.
tinctorius.

Carum buriacticum.
Carvi.
copticum.
heterophyllum.
Petroselinum.

Catabrosa aquatica.

Catananche caerulea.

Caucalis triradiata.

Celsia betonicaefolia.
heterophylla.
orientalis.
pontica.

Cenchrus tribuloides.

Centaurea amara.
americana.
Cineraria.
Crocodylium.
Cyanus.
cynaroides.
dealbata.
diluta.
eriophora.
Friderici.
glastifolia.
Jacea.
macrocephala.
melitensis.
montana.
moschata.
nigra.
nigrescens.
— var. vochinensis.
pulchra.
ruthenica.
salmantica.
Scabiosa.
— var. oliveriana.
solstitialis.
valesiaca.

Centranthus Calcitrapa.
ruber.
Sibthorpii.

Cephalaria alpina.
leucantha.
radiata.
tatarica.

Cerastium chloraefolium.
perfoliatum.
purpurascens.
tomentosum.

Cerinthe alpina.
major.

Chaenostoma foetidum.

Chaerophyllum aromaticum.
aureum.
nodosum.
roseum.

Charieis heterophylla.

Cheiranthus Allionii.

Chelidonium franchetianum.
majus.
— var. laciniatum.

Chelone Lyoni.
nemorosa.
obliqua.

Chenopodium ambrosoides.
Bonus-Henricus.
Botrys.
ficifolium.
foetidum.
hybridum.
murale.
opulifolium.
polyspermum.
Quinoa.
urbicum.
virgatum.
Vulvaria.

Chionodoxa Luciliae.
— var. sardensis.

Chloris acicularis.
barbata.

Chlorogalum pomeridianum.

Chorispora tenella.

Chrysanthemum Balsamita.
carinatum.
carneum.
coccineum.
caucasicum.
cinerariaefolium.
coronarium.
corymbosum.
lacustre.
Leucanthemum.
macrophyllum.
multicaule.
pallens.
Parthenium.
prealtum.
segetum.
viscosum.

Chrysopogon Gryllus.

Cicer arietinum.

Cichorium Intybus.

Cimicifuga cordifolia.
foetida.
racemosa.

Circaea lutetiana.

Citrullus vulgaris.

Cladium Mariscus.

Cladanthus proliferus.

Clarkia elegans.
pulchella.
rhomboidea.

Claytonia asarifolia.
perfoliata.
sibirica.

Clematis integrifolia.
recta.

Cleome violacea.

Cleonia lusitanica.

Clintonia umbellata.

Clypeola cyclodontea.
Jonthlaspi.

Cnicus arachnoideus.
canus.
conspicuus.
Diacantha.
eriophorus.
horridus.
ligularis.
monspessulanus.
ochroleucus.
oleraceus.
pulcherrimus.
serrulatus.
spathulatus.
syriacus.

Cnidium serbicum.

Cochlearia danica.
glastifolia.
saxatilis.

Codonopsis rotundifolia.

Coix Lacryma-Jobi.

Collinsia bartsiaefolia.
bicolor.
Parryi.
verna.

Collomia gilioides.
grandiflora.
linearis.

Conium maculatum.

Conringia orientalis.

Convallaria majalis.

Convolvulus siculus.
tricolor.
undulatus.

Coreopsis auriculata.
Drummondi.
lanceolata.
tinctoria.
tripteris.

Coriandrum sativum.

Corispermum hyssopifolium.

Cornucopiae cucullatum.

Coronilla coronata.
cretica.
elegans.
scorpioides.
varia.

Corrigiola littoralis.

Cortusa Matthioli.

Corydalis glauca.
lutea.
racemosa.
sibirica.

Corynephorus canescens.

Cosmos diversifolius var. atrosanguineus.

Cotula coronopifolia.

Cousinia Hystrix.

Crambe cordifolia
maritima.
pinnatifida.

Crepis blattarioides.
Candollei.
grandiflorum
montana.
paludosa.
rubra.
setosa.
sibirica.
taraxacifolia.
virens.

Crithmum maritimum.

Crocus asturicus.
biflorus.
cancellatus var. cilicicus
chrysanthus.
etruscus.
hadriaticus.
— var. chrysobelonicus
Imperati.
longiflorus.
Malyi.
nudiflorus.
pulchellus.
reticulatus.
Sieberi.
speciosus.
susianus.
tommasinianus.
vernus.
zonatus.

Crucianella aegyptiaca.

Crupina vulgaris.

Cryptostemma calendulaceum.

Cucubalus baccifer.

Cucurbita Pepo.

Cuminum Cyminum.

Cuphea Zimapani.

Cuscuta Epilinum.

Cynara Cardunculus.
Scolymus.

Cypripedium spectabile.

Cynodon Dactylon.

Cynoglossum furcatum.
microglochin.
officinale.
petiolatum.
Wallichii.

Cynosurus cristatus.
echinatus.

Cypella plumbea.

Cyperus longus.
rotundus.
vegetus.

Dactylis aschersoniana.
glomerata.

Dahlia coccinea.
Merckii.

Dalea Lagopus.

Danthonia Thomasoni

Datisca cannabina.

Datura ceratocaulon.
inermis.
Stramonium.
Tatula.

Daucus Carota.
gummifer.

Delphinium Ajacis.
brunonianum.
cashmirianum.
caucasicum.
dasyanthum.
decorum.
dictyocarpum.
elatum.
formosum.
grandiflorum.
hybridum.
maackianum.
occidentale.
orientale.
pictum.
Requienii.
speciosum.
— var. glabratum.
tatsienense.
vestitum.

Demazeria loliacea.
sicula.

Deschampsia caespitosa.

Desmodium canadense.

Dianthus arenarius.
Armeria.
atrorubens.

Dianthus, *cont.*
caesius.
carthusianorum.
Caryophyllus.
ciliatus.
cruentus.
furcatus.
giganteus.
hirtus.
monspessulanus.
petraeus.
pinifolius.
plumarius.
— var. serotinus.
pungens.
Seguieri.
squarrosus.
superbus.
— var. speciosus.
Waldsteinii.

Diarrhena americana.

Dicentra eximia.

Dictamnus albus.

Dierama pulcherrimum.

Digitalis ambigua.
ferruginea.
laevigata.
lutea.
purpurea.
tomentosa.

Dimorphotheca annua.
hybrida.
pluvialis.

Diotis candidissima.

Dipcadi serotinum.

Diplachne fusca.

Diplotaxis erucoides.
tenuifolia.

Dipsacus asper.
ferox.
fullonum.
inermis.
laciniatus.
pilosus.
plumosus.
sylvestris.

Dischisma spicatum.

Doronicum hungaricum.
orphanidis.
Pardalianches.
plantaginea.

Dorycnium herbaceum.
rectum.

Downingia pulchella.

Draba aizoides.
Aizoon.
alpina.
altaica.
carinthiaca.
hirta.
incana.
lactea.
rigida.
stellata.
tomentosa.
— var. frigida.

Dracocephalum moldavica.
nutans.
parviflorum.
peregrinum.
ruyschiana.

Dryas octopetala.

Dulichium spathaceum.

Ecballium Elaterium.

Eccremocarpus scaber.

Echinodorus ranunculoides.

Echinops bannaticus.
chantavicus.
globifer.
humilis.
niveus.
sphaerocephalus.

Echium rosulatum.

Eleusine coracana.
stricta.

Elsholtzia cristata.
polystachya.

Elymus arenarius.
dasystachya.
giganteus.
sibiricus.
virginicus.

Emilia flammea.

Encelia calva.

Epilobium angustifolium.
Dodonaei.
glabellum.
hirsutum.
Lamyi.
linnaeoides.
luteum.
montanum.
nummularifolium.
rosmarinifolium.
tetragonum.

Epipactis palustris.

Eragrostis minor.
pectinacea.

Eremurus altaicus.
himalaicus.
robustus.
spectabilis.

Erianthus fastigiatus.
fulvus.
strictus.

Erigeron alpinus.
compositus.
elongata.
glabellus.
macranthus.
mucronatus.
multiradiatus.
strigosus.
uniflorus.

Erinus alpinus.

Eriophorum virginicum.

Erodium chium.
ciconium.
gruinum.
malacoides.
Manescavi.
tmoleum.

Eruca sativa.

Eryngium agavifolium.
alpinum.
amethystinum.
Bourgati.

Eryngium, *cont.*
campestre.
dichotomum.
ebracteatum.
giganteum.
Lassauxii.
Leavenworthii.
maritimum.
oliverianum.
palmatum.
paniculatum.
planum.
Vaseyi.
vesiculosum.
Zabelii.

Erysimum hieracifolium.
marschallianum.
ochroleucum.
— var. helveticum.
perofskianum.

Erythraea Centaurium.
littoralis.

Eschscholzia californica.
tenuifolia.

Eucharidium Breweri.
concinnum.

Eupatorium ageratoides.
cannabinum.
Kirilowii.
japonicum.
maculatum.
perfoliatum.
purpureum.

Euphorbia altissima.
amygdaloides.
coralloides.
dentata.
Esula.
exigua.
Lagascae.
Lathyris.
Myrsinites.
palustris.
Peplus.
pilosa.
platyphyllos.
portlandica.
segetalis.
spinosa.
tinctoria.
virgata.

Fagopyrum tataricum.

Fedia Cornucopiae.

Felicia fragilis.
tenella.

Ferula communis.
glauca.
monticola.
Narthex.
nodiflora.
syriaca.
tingitana.

Festuca arundinacea.
bromoides.
capillifolia.
duriuscula.
elatior.
Eskia.
gigantea.
Halleri.
heterophylla.
Myuros.
ovina.
Poa.
rigida.
scoparia.
unilaterale.

Foeniculum vulgare.

Fragaria indica.

Fritillaria acutiloba.
aurea.
citrina.
imperialis.
Meleagris.
pallidiflora.
pluriflora.

Fumaria officinalis.
spicata.

Funkia caerulea.
lancifolia.
ovata.
sieboldiana.

Gagea arvensis.

Gaillardia pulchella.

Galactites tomentosa.

Galanthus Elwesii.
nivalis.

Galega officinalis.
patula.
orientalis.

Galeopsis ochroleuca.

Galinsoga brachystephana.
parviflora.

Galium Aparine.
boreale.
Mollugo.
recurvum.
tenuissimum.
tricorne.

Gastridium australe.

Gaudinia fragilis.

Gaura parviflora.

Gentiana asclepiadea.
cruciata.
lutea.
macrophylla.
phlogifolia.
septemfida.
tibetica.

Geranium anemonaefolium.
bohemicum.
collinum.
eriostemon.
incisum.
Londesii.
lucidum.
palustre.
pratense.
pusillum.
rivulare.
robertianum.
rotundifolium.
sanguineum.
— var. lancastriense.
striatum.
wallichianum.
wlassovianum.

Gerbera kunzeana.

Geum chiloense.
coccineum.
Heldreichii.
macrophyllum.
montanum.
pyrenaicum.
rhaeticum.

Geum, *cont.*
rivale.
strictum.
urbanum.

Gilia achilleaefolia.
capitata.
dianthoides.
laciniata.
liniflora.
multicaulis.
pinnatifida.
squarrosa.
tricolor.

Gillenia trifoliata.

Gladiolus atroviolaceus.
illyricus.

Glaucium corniculatum.
flavum.
— var. fulvum.

Glyceria distans.

Glycine Soja.

Glycyrrhiza echinata.
glandulosa.

Gnaphalium indicum.
luteo-album.

Grindelia lanceolata.

Guizotia abyssinica.

Gunnera manicata.

Gymnolomia multiflora.

Gypsophila libanotica.
paniculata.
Rokejeka.
Steveni.

Hablitzia tamnoides.

Hacquetia Epipactis.

Halenia Perrottetii.

Hastingia alba.

Hebenstreitia comosa.
tenuifolia.

Hedysarum boreale.
coronarium.
elongatum.
esculentum.
microcalyx.
neglectum.
obscurum.

Helenium Bigelovii.
quadridentatum.

Helianthella quinquenervis.

Helianthemum salicifolium.
villosum.
vulgare.

Helianthus annuus.
argophyllus.
decapetalus.
giganteus.
hirsutus.
Nuttallii.
rigidus.

Helichrysum bracteatum.
vestitum.

Heliophila crithmifolia.
pilosa.

Heliopsis laevis.
pitcheriana.

Heliotropium anchusaefolium.

Helipterum humboldtianum.
Manglesii.
roseum.

Hemerocallis flava.
minor.
Middendorfii.

Hemizonia corymbosa.

Heracleum candicans.
giganteum.
gummiferum.
lanatum.
lehmannianum.
Leichtlinii.
pyrenaicum.
Sphondylium.

Herniaria glabra.
hirsuta.

Hesperis matronalis.
violacea.

Heuchera Drummondi.
glabra.
pilosissima.

Hibiscus Trionum.

Hieracium amplexicaule.
aurantiacum.
Bornmülleri.
bupleuroides.
Clusii.
compositum.
corymbosum.
crocatum.
eximium.
florentinum.
gracilentum.
gymnocephalum.
Heldreichii.
humile.
intybaceum.
iricum.
lanatum.
lactucaefolium.
longifolium.
maculatum.
pallidum.
prenanthoides.
pustaricum.
rubrum.
scoticum,
staticifolium.
stoloniflorum.
umbellatum.
vulgatum.

Hilaria rigida.

Hippocrepis multisiliquosa.

Hippuris vulgaris.

Holcus lanatus.

Hordeum bulbosum.
europaeum.
jubatum.
maritimum.
murinum.

Humulus Lupulus.

Hunnemannia fumariaefolia.

Hutchinsia petraea.

Hyacinthus amethystinus
azureus.

Hydrophyllum canadense.
virginicum.

Hyoscyamus albus.
niger.

Hypecoum grandiflorum.
procumbens.

Hypericum atomarium.
delphicum.
monogynum.
olympicum.
orientale.
perforatum.
pyramidatum.
quadrangulum.
rhodopeum.
Richeri.

Hypochoeris glabra.

Hyssopus officinalis.
—var. aristatus

Hysterionica pinifolia.

Iberis correaefolia.
pectinata.
pinnata.
umbellata.

Illecebrum verticillatum.

Impatiens amplexicaule.
parviflora.
Roylei.
scabrida.
Thomsoni.

Incarvillea Delavayi.

Inula barbata.
bifrons.
britannica.
ensifolia.
glandulosa.
grandiflora.
Helenium.
Hookeri.
Oculus-Christi.

Inula, *cont.*
salicina.
squarrosa.
thapsoides.

Ionopsidium acaule.

Iris albopurpurea.
Delavayi.
ensata.
foetidissima.
— var. citrina.
graminea.
— var. latifolia.
gueldenstaedtiana.
— var. sogdiana.
laevigata.
neglecta.
orientalis.
pumila.
setosa.
sibirica.
— var. acuta.
— var. coreana.
— var. orientalis.
spuria.
— var. desertorum.
tenax.
versicolor.
— var. virginica.
watsoniana.
xiphioides.

Isatis glauca.
tinctoria.
Villarsii.

Isopyrum fumarioides.

Iva xanthifolia.

Jasione montana.
perennis.

Jasonia tuberosa.

Juncus alpinus.
arcticus.
bufonius.
Chamissonis.
compressus.
conglomeratus.
effusus.
glaucus.
maritimus.
squarrosus.
tenuis.

Jurinea alata.
ambigua.

Kitaibelia vitifolia.

Kniphofia aloides.
Tuckii.
Tysoni.

Kochia arenaria.
scoparia.

Koeleria cristata.
phleoides.
— var. grandiflora.

Lactuca Bourgaei.
brevirostris.
muralis.
perennis.
sativa.
Scariola.
virosa.

Lagascea mollis.

Lagenaria vulgaris.

Lagurus ovatus.

Lallemantia canescens.
iberica.
peltata.

Lamarkia aurea.

Lamium purpureum.

Lapsana communis.

Laserpitium hispidum.
latifolium.
Panax.

Lasiospermum radiatum.

Lasthenia glabrata.

Lathraea Squamaria.

Lathyrus amphicarpos.
angulatus.
Aphaca.
articulatus.
Cicera.
cirrhosus.
Clymenum.
grandiflorus.
latifolius.

Lathyrus, *cont.*
maritimus.
niger.
Nissolia.
Ochrus.
odoratus.
palustris.
polyanthus.
sativus.
sphaericus.
sylvestris.
tingitanus.
tuberosus.
variegatus.
venosus.
vernus.

Lavatera cachemiriana.
Olbia.
plebeia.
thuringiaca.
trimestris.

Layia elegans.
glandulosa.
platyglossa.

Lens esculenta.

Leontodon crispus.
Ehrenbergii.
hastilis.

Leontopodium alpinum.

Leonurus Cardiaca.
sibiricus.
tataricus.

Lepachys columnaris.

Lepidium campestre.
Draba.
graminifolium.
Menziesii.
sativum.

Leptosyne Douglasii.
gigantea.
maritima.

Lepturus cylindricus.

Leuzea conifera.

Levisticum officinale.

Liatris macrostachya.
spicata.

Ligusticum pyrenaicum.
scoticum.
Seguieri.

Lilium Martagon.
monadelphum.
pomponium.
pyrenaicum.

Limnanthes alba.

Linaria alpina.
anticaria.
bipartita.
dalmatica.
genistifolia.
hirta.
melanantha.
minor.
multipunctata.
purpurea.
reticulata.
saxatilis.
striata.
triphylla.
tristis.
vulgaris.

Lindelofia spectabilis.

Linum flavum.
nervosum.
perenne.
usitatissimum.

Lippia nodiflora.

Loasa hispida.
vulcanica.

Lobelia sessilifolia.
syphilitica.

Lolium multiflorum.
temulentum.

Lotus corniculatus.
edulis.
ornithopodioides.
Tetragonolobus.

Lunaria biennis.

Lupinus Cosentini.
Cruckshanksii.
elegans.
luteus.
micranthus.
mutabilis.
nanus.
polyphyllus.
propinquus.
pubescens.
tricolor.

Luzula Forsteri.
maxima.
nivea.
pilosa.

Lychnis alba.
alpina.
chalcedonica
Coeli-rosa.
coronaria.
— var. oculata.
dioica.
Flos-jovis.
Githago.
haageana.
Lagascae.
pyrenaica.
Viscaria.

Lycopersicum esculentum.

Lycopsis arvensis.

Lycopus europaeus.
exaltatus.

Lycurus phleoides.

Lysimachia barystachys.
clethroides.
Ephemerum.
punctata.

Lythrum Graefferi
Salicaria.

Madia sativa.
— var. congesta.
stellata.

Malcolmia bicolor.
maritima.
mongolica.

Malope trifida.

Malva Alcea.
borealis.
crispa.
oxyloba.
parviflora.
rotundifolia.
sylvestris.

Malvastrum limense.

Marrubium astracanicum.
pannonicum.
vulgare.

Matricaria inodora.
Tchihatchewii.

Matthiola annua.
incana.
sinuata.

Mazus rugosus.

Meconopsis cambrica.
heterophylla.
nepalensis.
Wallichii.

Medicago apiculata.
hispida.
littoralis.
lupulina.
maculata.
marina.
Murex.
orbicularis
sativa.
scutellata.
turbinata.

Melica altissima.
ciliata.
—var. Magnoli.
glauca var. nebrodensis.
nutans.
uniflora.

Melilotus alba.
indica.
officinalis.

Melissa officinalis.

Menispermum canadense.

Mentha Pulegium.
rotundifolia

Mentha, *cont.*
rubra.
sylvestris.
viridis.

Mentzelia Lindleyi.

Mercurialis annua.

Mesembryanthemum pyropeum.
tricolor.

Meum Athamanticum.

Microseris attenuata.

Mimulus luteus.
ringens.

Mirabilis divaricata.
Jalapa.
longiflora.

Modiola multifida.

Molinia cœrulea.

Molopospermum cicutarium.

Monarda didyma.
fistulosa.

Monolepis trifida.

Moricandia arvensis.

Morina longifolia.

Muehlenbergia mexicana.
racemosa.
sylvatica.
Willdenowii.

Muscari armeniacum.
botryoides.
Bourgaei.
comosum.
compactum.
latifolium.
neglectum.
paradoxa.
polyanthum.
racemosum.
sartorianum.

Myagrum perfoliatum.

Myosotis alpestris.
arvensis.
palustris.
sylvatica.

Myrrhis odorata.

Nardostachys jatamansi.

Nardus stricta.

Narthecium ossifragum.

Nemesia floribunda.
strumosa.
versicolor.

Nemophila insignis.
maculata.
Menziesii.
— var. atomaria.
parviflora.

Nepeta azurea.
caesarea.
Cataria.
discolor var. coerulea.
longipes.
macrantha.
Mussinii.
Nepetella.
nuda.
spicata.

Nesaea salicifolia var. grandiflora.

Nicandra physaloides.

Nicotiana Langsdorffii.
paniculata.
rustica var. scabra.
Tabacum.

Nigella damascena.
hispanica.
orientalis.
sativa.

Nolana prostrata.

Nonnea lutea.

Nothoscordum fragrans.
striatum.

Œnanthe crocata.
globosa.

Œnanthe, *cont.*
Lachenalii.
pimpinelloides.
silaifolia.

Œnothera albicaulis.
amoena.
biennis.
— var. grandiflora.
dentata.
fruticosa.
glauca.
minutiflora.
nocturna.
pumila.
riparia.
rosea.
sinuata.
speciosa.
tenella.
tetraptera.
triloba.
Whitneyi.

Omphalodes linifolia.

Onobrychis Pestalozzæ.
sativa.

Ononis arvensis.
rotundifolia.
spinosa.

Onopordon Acanthium.
illyricum.

Orchis foliosa.
incarnata.
latifolia.

Origanum hirtum.
vulgare.

Ornithogalum arcuatum.
exscapum.
fimbriatum.
nutans.

Ornithopus ebracteatus
perpusillus.
sativus.

Orobanche elatior.
Hederae.
minor.
ramosa.

Oryza sativa.

Oryzopsis multiflora.

Oxalis corniculata.

Oxyria digyna.

Oxytropis baikalensis.
ochroleuca.
purshiana.

Pachysandra procumbens.

Paeonia arietina.
Broteri.
decora.
microcarpa.
officinalis.
paradoxa.
peregrina.

Panicum bulbosum.
capillare.
colonum.
Crus-galli.
Isachne.
miliaceum.
sanguinale.
virgatum.

Papaver alpinum.
aculeatum.
apulum.
arenarium.
Argemone.
commutatum.
dubium.
glaucum.
laevigatum.
nudicaule.
orientale.
— var. bracteatum
pavoninum.
persicum.
Rhoeas.
— var. latifolium.
rupifragum.
— var. atlanticum
somniferum.
spicatum.

Parietaria officinalis.

Parnassia palustris.

Paspalum dilatatum.

Peganum Harmala.

Pelargonium australe.

Pennisetum longistylum.
macrourum.
Ruppellii.
typhoideum.

Pentstemon barbatus.
campanulatus.
confertus.
glaucus var. stenosepalus.
laevigatus.
Menziesii var. Newberryi.
ovatus.
pubescens.
secundiflorus.

Peplis Portula.

Perezia multiflora.

Pericome caudata.

Peucedanum aegopodioides.
graveolens.
hispanicum.
officinale.
sativum.
Schottii.
Sowa.
verticillare.

Phacelia hispida.
loasaefolia.
malvaefolia.

Phalaris arundinacea.
canariensis.
minor.
paradoxa.
truncata.
tuberosa.

Phaseolus aconitifolius.
multiflorus.
Mungo.
pilosus.
tuberosus.
vulgaris.

Phleum asperum.
Boehmeri.
pratense.

Phlomis agraria.
cashmiriana.
lunarifolia.
setigera.

Phlomis, *cont.*
tuberosa.
umbrosa.
viscosa.

Phlox maculata.

Physalis Alkekengi.
Francheti.
peruviana.

Physochlaina orientalis.

Physostegia virginiana.

Phyteuma canescens.
Michelii.
orbiculare.
Scheuchzeri.
— var. Charmelii.
serratum.

Phytolacca acinosa.
bogotensis.
icosandra.
octandra.

Picridium tingitanum.

Picris echioides.
hieracioides.
pauciflora.
pilosa.

Pimpinella cnidioides.
magna.
rotundifolia.

Pisum arvense.
sativum.

Plantago arenaria.
Candollei.
Coronopus.
Cynops.
lanceolata.
major.
maritima.
media.
ovata.
patagonica.
virginica.

Platycodon grandiflorum.
— var. Mariesii.

Platystemon californicus.

Plectranthus glaucocalyx.

Pleurospermum angelicoides.
Golaka.

Plumbago europaea.
micrantha.

Poa abyssinica.
alpina var. badensis.
caesia.
caespitosa.
Chaixii.
compressa.
nemoralis.
palustris.
pratensis.

Podolepis acuminata.

Polemonium caeruleum.
dissectum.
flavum.
foliosissimum.
himalayanum.
mexicanum.
pauciflorum.

Polygonatum biflorum.
verticillatum.

Polygonum affine.
alatum.
alpinum var. polymorphum.
amplexicaule.
baldschuanicum.
Bistorta.
capitatum.
cilinode.
compactum.
cuspidatum.
dumetorum.
orientale.
Persicaria.
sachalinense.
viviparum.
Weyrichii.

Polypogon littoralis.
maritimus.
monspeliensis.

Portulaca grandiflora.
oleracea.

Potentilla alchemilloides.
argentea.
— var. calabra.
arguta.
argyrophylla.
chinensis.
chrysantha.
desertorum.
Detommasii.
Fenzlii.
gelida.
glandulosa.
gracilis.
heptaphylla.
Herbichii.
hippiana.
hirta.
kurdica.
leschenaultiana.
mollis.
montenegrina.
multifida.
nepalensis.
pennsylvanica var. arachnoidea.
pyrenaica.
recta.
— var. laciniata.
— var. macrantha.
— var. palmata.
rivalis var. millegrana.
rupestris.
sanguisorbifolia.
semi-laciniata.
Sibbaldi.
tanacetifolia.
Thurberi.
tridentata.
villosa.
wrangeliana.

Poterium alpinum.
diandrum.
officinale.
Sanguisorba.
sitchense.
tenuifolium.

Pratia angulata.

Prenanthes purpurea.

Preslia cervina.

Primula denticulata.
elatior.

Primula, *cont.*
japonica.
officinalis.
rosea.
scotica.
variabilis.
vulgaris.

Prunella alba.
grandiflora.
laciniata.
vulgaris.

Psoralea macrostachya.
Onobrychis.
physodes.

Pterostegia drymarioides.

Pulicaria dysenterica.
vulgaris.

Pulmonaria arvernense.
saccharata.

Pyrrhopappus carolinianus.

Queria hispanica.

Ramondia pyrenaica.

Ranunculus aconitifolius.
acris.
anemonaefolius.
arvensis.
brutius.
chaerophyllos.
Chius.
Cymbalaria.
falcatus.
lanuginosus.
Nelsoni.
parviflorus.
sardous.
sceleratus.
trilobus.

Raphanus maritimus.
Raphanistrum.
sativus.

Relhania sessilifolia.

Reseda alba.
glauca.
lutea.
Luteola.
odorata.
virgata.

Rhagadiolus stellatus.

Rheum Franzenbachii.
moorcroftianum.
nobile.
officinale.
palmatum.
— var. tanghuticum.
Rhaponticum.
Ribes.
undulatum.
webbianum.

Ricinus communis.

Rodgersia podophylla.

Roemeria hybrida.

Romulea candida.
Requienii.

Rubia cordifolia.

Rudbeckia amplexicaulis.
digitata.
laciniata.
speciosa.

Rumex alpinus.
biformis.
conglomeratus.
domesticus.
Hydrolapathum.
maritimus.
maximus.
occidentalis.
orientalis.
Patientia.
pulcher.
salicifolius
sanguineus.
vesicarius.

Ruta graveolens.
montana.

Sagina glabra.
— var. pilifera

Salsola Kali.
— var. Tragus.

Primula, *cont.*
japonica.
officinalis.
rosea.
scotica.
variabilis.
vulgaris.

Prunella alba.
grandiflora.
laciniata.
vulgaris.

Psoralea macrostachya.
Onobrychis.
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falcatus.
lanuginosus.
Nelsoni.
parviflorus.
sardous.
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Raphanistrum.
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Hydrolapathum.
maritimus.
maximus.
occidentalis.
orientalis.
Patientia.
pulcher.
salicifolius
sanguineus.
vesicarius.

Ruta graveolens.
montana.

Sagina glabra.
— var. pilifera

Salsola Kali.
— var. Tragus.

Salvia argentea
Beckeri.
cadmica.
carduacea.
Columbariae.
glutinosa.
Horminum.
interrupta.
japonica.
nubicola.
nutans.
officinalis.
pratensis.
regeliana.
schiedeana.
Sclarea.
tiliaefolia.
Verbenaca.
— var. rubella.
verticillata.
virgata.

Sambucus Ebulus.

Sanguinaria canadensis.

Sanicula chinensis.

Santolina incana.

Saponaria orientalis.
officinalis.
Vaccaria.

Saracha Jaltomata.

Satureia hortensis.

Saussurea Lappa.
Russowii.

Saxifraga adscendens.
Aizoides.
Aizoon.
— var. Malyi.
— var. notata.
— var. stabiana.
burseriana var. major.
caespitosa.
cartilaginea.
Cotyledon.
— var. pyramidalis.
crustata.
cuneifolia var. infundibuliformis.
flagellaris.
Geum.

Saxifraga, *cont.*
glaucescens.
granulata.
Hostii.
— var. altissima.
lingulata.
— var. lantoscana.
luteo-viridis.
macnabiana.
marginata.
pedatifida.
rocheliana var. coriophylla.
rotundifolia.
Sibthorpii.
sponhemica.
stenoglossa.
tenella.
vochinensis.

Scabiosa arvensis.
atropurpurea.
australis.
balcanica.
brachiata.
calocephala.
candolleana.
caucasica.
Columbaria.
Fischeri.
fumarioides.
graminifolia.
gramuntia.
isetensis.
leucophylla.
longifolia.
micrantha.
prolifera.
Pterocephala.
succisa.
triniaefolia.
vestina.

Scandix Balansae.
Pecten-Veneris.

Schizanthus pinnatus.
retusus.

Scilla amoena.
bifolia.
festalis.
hispanica.
messeniaca.
parviflora.
patula.

Scilla, *cont.*
peruviana.
sibirica.
verna.

Scirpus Caricis.
Eriophorum.
Holoschoenus.
lacustris.
polyphyllus.
setaceus.
sylvaticus.
triqueter.

Scleranthus annuus.

Scolymus hispanicus.
maculatus.

Scopolia lurida.

Scorpiurus vermiculata.

Scorzonera austriaca var. latifolia.
villosa.

Scrophularia alata.
nodosa.
peregrina.
vernalis.

Scutellaria albida.
altissima.
galericulata.
scordiifolia.

Secale cereale.

Securigera Coronilla.

Sedum acre.
Aizoon.
Ewersii.
maximum.
populifolium.
pulchellum.
roseum.
spectabile.
Telephium.

Selinum Carvifolia.
Gmelini.
vaginatum.

Sempervivum arachnoideum.
— var. Laggeri.
arvernense.
assimile.

Sempervivum, *cont.*
boutignyanum.
calcareum.
Funckii.
mettenianum.
parvulum.
Pomelii.
Schottii var. acuminatum.
speciosum.
tectorum.
Verloti.

Senecio adonidifolius.
aureus.
balbisianus.
chrysanthemoides.
diversifolius.
Doria.
doriaeformis.
Doronicum.
elegans.
Fetisowii.
macrophyllus.
nemorensis.
paludosus.
sarracenicus.
Schimperi.
songaricus.
squalidus.
suaveolens
thapsoides.
viscosus.

Serratula coronata.
Gmelini.
quinquefolia.
tinctoria.

Sesamum indicum.

Seseli gummiferum.
Hippomarthrum.
Libanotis.
osseum.
tenuifolium.
tortuosum.

Setaria glauca.
italica.
macrochaeta.
verticillata.
viridis.
vulpiseta.

Sherardia arvensis.

Sidalcea candida.
Listeri.

Sideritis theezans.

Siegesbeckia orientalis.

Silaus alpestris.
flavescens.
tenuifolius.

Silene alpestris.
anglica.
Armeria.
ciliata.
clandestina.
colorata.
conica.
conoidea.
cretica.
Cucubalus.
diurniflora.
echinata.
fimbriata.
flavescens.
Fortunei.
fuscata.
gallica.
glauca.
Griffithii.
italica.
juvenalis.
linicola.
longicilia.
maritima.
melandrioides.
monachorum.
Muscipula.
noctiflora.
nocturna.
nutans.
odontopetala
Otites.
paradoxa.
pendula.
portensis.
quadrifida.
rubella.
Sartori
sedoides.
Sendtneri.
stylosa.
tenuis.
undulata.
vallesia.

Silene, *cont.*
verecunda.
viridiflora.
Zawadskii.

Silphium integrifolium.
laciniatum.
perfoliatum.
scaberrimum.
terebinthinaceum.
trifoliatum.
— var. ternatum.

Silybum eburneum.
Marianum.

Sisymbrium austriacum.
multifidum.
polyceratium.
Sophia.
strictissimum.
Thalianum.

Sisyrinchium iridifolium.
Sellowii.
striatum.

Sium Sisarum.

Smilax herbacea.
rotundifolium.

Smyrnium apiifolium.
Olusatrum.

Solanum etuberosum.
nigrum.
villosum.

Solidago arguta.
canadensis.
elliptica.
elongata.
lithospermifolia.
neglecta.
nemoralis.
petiolaris.
serotina.
Shortii.
ulmifolia.

Sonchus arvensis

Sophora flavescens.

Sorghum vulgare.

Sparganium racemosa.
simplex.

Spartina polystachya.

Specularia falcata.
hybrida.
pentagonia.
perfoliata.

Spergula arvensis.

Sphaeralcea rivularis.

Spilanthes Acmella.

Spiraea Aruncus.
digitata.
Filipendula.
palmata,
Ulmaria.

Sporobolus asper.

Stachys alopecuros.
alpina.
Betonica.
coccinea.
grandiflora.
lanata.
longifolia.
recta.
scardica.
sericea.
setifera.
sylvatica.

Statice bellidifolia.
caspia.
cosyrensis.
echioides.
eximia.
Gmelini.
gougetiana.
Heldreichii.
Limonium.
sinensis.
sinuata.
Suworowi.
Thouini.

Stevia ovata.
serrata.

Stipa Aristella.
Calamagrostis.
capillata.
papposa.

Stipa, *cont.*
pennata.
sareptana.
spartea.
viridula.

Swertia connata.
cordata.
longifolia.

Symphyandra armena.
Hofmanni.
pendula.
Wanneri.

Symphytum asperrimum.
officinale.

Syrenia sessilifolia.

Tagetes erecta.
patula.

Tamus communis.

Tanacetum vulgare.

Taraxacum gymnanthum.
montanum.

Teesdalia Iberis.
Lepidium.

Telephium Imperati.

Tetragonia crystallina.
expansa.

Tetrapoma barbaraefolia.

Teucrium Botrys.
canadense.
Chamaedrys.
multiflorum.
Scorodonia.

Thalictrum angustifolium.
aquilegiifolium.
Cornuti.
corynellum.
Fendleri.
foliosum.
glaucum.
minus.
—var. collinum.
—var. elatum.
—var. pubescens.
—var. purpurascens.
odoratum.
squarrosum.

Thapsia garganica.

Thelesperma filifolium.

Thermopsis caroliniana.
fabacea.
montana.

Thladiantha dubia.

Thlaspi arvense.
perfoliatum.

Tinantia fugax.

Tolpis barbata.

Trachymene coerulea.
pilosa.

Tradescantia congesta.

Tragopogon major.

Tribulus terrestris.

Tricholepis elongata.
furcata.

Trichosanthes anguina.

Tridax trilobata.

Trifolium agrarium.
alexandrinum.
alpestre.
angustifolium.
armenum.
arvense.
Balansae.
clypeatum.
diffusum.
fragiferum.
glomeratum.
hybridum.
incarnatum.
Johnstoni.
leucanthum.
Lupinaster.
maritimum.
medium.
Molineri.
pannonicum.
Perreymondi.
physodes.
pratense.
repens.
rubens.

Trifolium, *cont.*
scabrum.
squarrosum.
striatum.
tridentatum.

Triglochin maritimum.

Trigonella corniculata.
caerulea.
cretica.
Foenum-graecum.
ovalis.
polycerata.

Trinia Kitaibelii.

Triosteum perfoliatum.

Tripteris cheiranthifolia.

Trisetum flavescens.

Triticum Aegilops.
amyleum.
dicoccum.
monococcum.
ovatum.
polonicum.
Spelta.
turgidum.
violaceum.
vulgare.

Tritonia crocosmaeflora.

Trollius asiaticus.
europaeus.

Tropaeolum aduncum.
majus.
minus.

Troximon grandiflorum.
laciniatum.

Tunica olympica.
prolifera.
Saxifraga.

Tussilago Farfara.

Typha angustifolia.
latifolia.
Shuttleworthii.
stenophylla.

Uniola latifolia.

Urospermum picroides.

Ursinia pulchra.

Urtica pilulifera.
— var. balearica.

Valeriana montana.
officinalis.
— var. sambucifolia.
Phu.

Valerianella congesta.
coronata.
dentata.
echinata.
eriocarpa.
olitoria.

Velezia rigida.

Venidium perfoliatum.

Veratrum nigrum.
viride.

Verbascum Chaixii.
Lychnitis.
nigrum.
olympicum.
phlomoides.

Verbena angustifolia.
biserrata.
caroliniana.
officinalis.

Verbesina encelioides.
helianthoides.

Veronica acinifolia.
Anagallis.
anagalloides.
austriaca.
Beccabunga.
crassifolia.
deltigera.
exaltata.
glauca.
guthriana.
incana.
longifolia.
officinalis.
persica.

Veronica, *cont.*
Ponæ.
saxatilis.
serpyllifolia.
spicata.
subsessilis.
Tournefortii.
virginica.
— var. japonica.

Vicia amphicarpa.
atropurpurea.
bithynica.
calcarata.
Cracca.
disperma.
Faba.
— var. equina.
fulgens.
gigantea.
lutea.
— var. hirta.
narbonensis.
Orobus.
picta.
pisiformis.
pyrenaica.
sativa.
sylvatica.
unijuga.

Vincetoxicum fuscatum.
nigrum.
officinale.

Viola cucullata.
elatior.
hirta.
mirabilis.
odorata.
palustris.
pratensis.
Patrinii.
persicaefolia.
pubescens.
purpurea.
rothomagensis.
rotundifolia.
sagittata.
striata.
sylvestris.
syrtica.
tricolor.

Volutarella Lippii.
muricata.

Wahlenbergia lobelioides.

Xanthium macrocarpum.
strumarium.

Xanthocephalum gymnospermoides.

Xeranthemum annuum.

Zea Mays.

Zephyranthes candida.

Zinnia pauciflora.

Ziziphora tenuior.

Zygadenus elegans.
leimanthoides.
muscitoxicus

TREES AND SHRUBS.

Abies balsamea.
bracteata.
cephalonica.
Fraseri.
lasiocarpa.
magnifica.
— var. shastensis.
numidica.
sibirica.
sub-alpina.

Acanthopanax sessiliflorum.

Acer campestre.
— var. aetnense.
— var. collinum.
caudatum.
circinatum.
coriaceum.
Ginnala.
hyrcanum.
insigne.
macrophyllum.
monspessulanum.
Negundo.
— var. violaceum.
opulifolium.
— var. neapolitanum.
pennsylvanicum.
pictum.
platanoides.
— var. Reitenbachii.
Pseudo-Platanus.
— var. purpureum.
spicatum.
tataricum.

Ailanthus glandulosa.

Alnus alnobetula.
cordifolia.
glutinosa.
incana.
japonica.
nitida.
oregana.
orientalis.
rhombifolia.
serrulata.
subcordata.
viridis.

Amelanchier alnifolia.
canadensis.
vulgaris.

Amorpha canescens.
fruticosa.
microphylla.

Andromeda axillaris.

Aralia spinosa.

Arbutus Andrachne.
Menziesii.

Aucuba japonica.

Baccharis halimifolia.
patagonica.
salicina.

Berberis angulosa.
Aquifolium.
aristata.
buxifolia.
canadensis.

Berberis, *cont.*
concinna.
Darwinii.
Lycium.
repens.
sinensis.
stenophylla.
Thunbergii.
virescens.
vulgaris.
— var. foliis purpureis.
— var. lucida.
wallichiana.

Betula alaskana.
alba.
alpestris.
corylifolia.
davurica.
Ermani.
fruticosa.
humilis.
lenta.
lutea.
nigra.
occidentalis.
papyrifera.
populifolia.
ulmifolia.
utilis.

Bruckenthalia spiculifolia.

Buddleia intermedia.
japonica.
variabilis.

Buxus sempervirens.
— var. latifolia.

Calluna vulgaris.

Calophaca wolgarica.

Calycanthus occidentalis.

Caragana arborescens.
— var. Redowskii.
aurantiaca.
brevispina.
frutescens.
microphylla.
pygmaea.

Carmichaelia australis.

Carpinus Betulus.
caroliniana.
orientalis.

Cassandra calyculata.

Cassinia fulvida.
leptophylla.

Catalpa bignonioides.
cordifolia.

Ceanothus americanus.
— var. opacus.
azureus.
integerrimus.
ovatus.

Cedrus atlantica
Deodara.
Libani.

Celastrus articulatus.

Celtis australis.
occidentalis.
Tournefortii.

Cercis Siliquastrum.

Cistus hirsutus.
laurifolius.
villosus.

Cladrastis amurensis.

Clematis aethusifolia,
— var. latisecta.
alpina.
campaniflora.
coccinea.
connata.
crispa.
Flammula.
fusca.
Hendersonii.
heracleaefolia.
integrifolia.
lanuginosa.
montana.
orientalis.
— var. tangutica
Pitcheri.
songarica.
stans.
virginiana.

Clematis, *cont.*
Vitalba.
Viticella.

Clethra acuminata.
alnifolia.

Colutea arborescens.
cruenta.
longialata.
persica.

Coriaria japonica.

Cornus alba.
alternifolia.
Amomum.
Baileyi.
candidissima.
circinata.
florida.
glabrata.
Kousa.
Mas.
oblonga.
pubescens.
stolonifera.

Coronilla Emerus.

Cotoneaster affinis.
bacillaris.
— var. floribunda.
buxifolia.
frigida.
horizontalis.
laxiflora.
lucida.
microphylla.
Nummularia.
pannosa.
rotundifolia.
Simonsii.
thymifolia.

Crataegus apiifolia.
aprica.
arkansana.
arnoldiana.
azarolus, var. canadensis.
Canbyi.
Carrierei.
coccinea.
— var. macracantha.
coccinoides.
collina.

Crataegus, *cont.*
cordata.
Crus-Galli.
— var. durobrivensis
— var. prunifolia.
— var. splendens.
Douglasii.
elliptica.
erythropoda.
flava.
fruticosa.
halmesiana.
heterophylla.
hiemalis.
lobulata.
maloides.
melanocarpa.
mexicana.
mollis.
monogyna.
— var. praecox.
nigra.
nitida.
orientalis.
— var. sanguinea.
oxyacanthoides.
— var. fructu luteo.
pentagyna.
pinnatifida.
Pringlei.
pruinosa.
punctata.
— var. fructu luteo.
Pyracantha.
rivularis.
sanguinea.
— var. songarica.
semiorbiculata.
sorbifolia.
succulenta.
tanacetifolia.
tomentosa.
uniflora.
Vailiae.
viridis.

Cryptomeria japonica.

Cupressus lawsoniana.
macrocarpa.
— var. guadeloupensis.
nutkatensis.
obtusa.
pisifera.
thyoides.

Cytisus albus.
biflorus.
capitatus.
nigricans.
praecox.
purgans.
purpureus.
scoparius.
— var. andreanus.
— var. pendulus.
— var. sulphureus.
sessilifolius.

Daboëcia polifolia.

Desmodium viridiflorum.

Deutzia crenata.
gracilis.

Diervilla hortensis.
Lonicera.
sessilifolia.
— var. splendens.

Diospyros Lotus.

Elaeagnus argentea.
multiflora.
umbellata.

Ephedra viridis.

Epigaea repens.

Erica ciliaris.
cinerea.
— var. atropurpurea.
Mackaii.
maweana.
multiflora.
scoparia.
stricta.
tetralix.
vagans.
Watsoni.

Escallonia exoniensis.
illinita.
punctata.
rubra.
viscosa.

Euonymus europaeus.
latifolius.

Exochorda Alberti.

Fontanesia Fortunei.
philliraeoides.

Fraxinus americana.
Excelsior.
— var. heterophylla.
nigra.
Ornus.

Gaultheria Shallon.

Genista aethnensis.
anglica.
dalmatica.
germanica.
hispanica.
radiata.
sagittalis.
tinctoria var. elatior.
virgata.

Halesia hispida.
tetraptera.

Hedysarum multijugum.

Helianthemum canum.
formosum.
halimifolium.
polifolium.
vulgare.
— var. croceum.
— var. citrina.
— var. mutabile.
— var. mutabile roseum.
— var. rhodanthum.

Hippophaë rhamnoides.
salicifolia.

Hydrangea arborescens.
paniculata.
petiolaris.
pubescens.

Hypericum Androsaemum.
aureum.
calycinum.
corymbosum.
densiflorum.
elatum.
erectum.
galioides.

Hypericum, *cont.*
hircinum.
hookerianum.
inodorum.
kalmianum.
moserianum.
olympicum.
patulum.
prolificum.
uralum.

Ilex Aquifolium.
decidua.
glabra.
opaca.
Sieboldii.
— var. fructu luteo.
verticillata.
— var. fructu luteo.

Indigofera gerardiana.

Itea virginica.

Jasminum fruticans.
humile.

Juniperus chinensis.

Kalmia angustifolia.
glauca.
latifolia.

Laburnum alpinum.
— var. biferum.
vulgare.

Larix davurica.
europaea.
— var. sibirica.
leptolepis.
pendula.

Ledum latifolium.
palustre.

Lespedeza bicolor.

Leucothoe Catesbæi.
racemosa.

Leycesteria formosa.

Ligustrum Ibota.
medium.
ovalifolium.
sinense.
vulgare.

Lonicera alpigena.
coerulescens.
glauca.
iberica.
japonica.
Maximowiczii.
Morrowii.
mundeniensis.
nigra.
notha var. grandiflora.
orientalis.
— var. kamschatica.
segreziensis.
Sullivantii.
tartarica.
translucens.
Xylosteum.

Lupinus arboreus.

Lycium chinense.
pallidum.

Lyonia paniculata.

Magnolia conspicua.
grandiflora.
macrophylla.
tripetala.

Microglossa albescens.

Myrica carolinensis.
cerifera.
pumila.
Gale.

Myricaria germanica.

Neillia amurensis.
opulifolia.
thyrsiflora.

Nyssa aquatica.

Olearia Haastii.

Ononis aragonensis.
rotundifolia.

Paliurus australis.

Pernettya mucronata.

Petteria ramentacea.

Philadelphus acuminatus.
Billardi.

Philadelphus, *cont.*
cordifolius.
coronarius.
— var. tomentosus.
hirsutus.
Lemoinei.
Lewisii.
— var. californica.

Picea alba.

Pieris japonica.
nitida.

Pinus australis.
contorta.
koraiensis.
Laricio.
— var. monspeliensis.
mitis.
monophylla.
montana.
parviflora.
Peuce.
rigida.
sylvestris.
Taeda.

Platanus acerifolia.
occidentalis.
orientalis.

Populus deltoidea.

Potentilla fruticosa.
salesoviana.

Prunus acida var. semperflorens.
alleghaniensis.
americana.
Besseyi.
cerasifera.
demissa.
divaricata.
hortulana.
humilis.
Laurocerasus.
lusitanica.
maritima.
— var. fructu luteo.
nigra.
pendula.
serotina.
spinosa.
tarda.

Ptelea trifoliata.

Pyrus alnifolia.
americana.
arbutifolia.
Aria.
— var. graeca.
— var. Hostii.
Aucuparia.
baccata.
Balansae.
canescens.
communis.
coronaria.
Cydonia.
decaisneana.
floribunda.
germanica.
intermedia.
japonica.
lanata.
lanuginosa.
lobata.
longipes.
Malus.
Maulei.
nigra.
nivalis.
pinnatifida.
Ringo.
rivularis.
rotundifolia.
Schiedsckeri.
sikkimensis.
sinaica
sinensis.
Sorbus.

Quercus castaneaefolia.
Cerris.
— var. cana minor.
Ilex.
serrata var. pendula.

Rhamnus Alaternus
— var. angustifolius.
californicus.
carolinianus.
catharticus.
davuricus.
Frangula.
libanoticus.
purshianus.
spathulifolius.

Rhododendron anthopogon.
californicum.
campanulatum.
catawbiense.
Cunninghamii.
ferrugineum.
gemmiferum.
maximum.
ponticum.
quinquefolium.
racemosum.
Wilsoni.

Rhodotypus kerrioides.

Rhus aromatica.
Cotinus.
glabra.
— var. laciniata.
insignis.
Osbeckii.
succedanea.
Toxicodendron.
typhina.

Ribes alpinum.
— var. pumilum.
aureum.
— var. tenuiflorum.
divaricatum.
Grossularia.
Menziesii.
nigrum.
petraeum.
robustum.
rubrum album.
— var. Schlechtendalii.
sanguineum.

Robinia Pseudacacia.
viscosa.

Rosa acicularis.
agrestis
alba.
alpina pyrenaica.
arkansana.
beggeriana.
blanda.
californica.
canina.
— var. Bakeri.
carelica.
carolina.
— var. nuttalliana.

Rosa, *cont.*
cinnamomea.
— var. glandulifolia.
Fendleri.
ferox.
ferruginea.
foliolosa.
Froebeli.
gallica.
glutinosa.
hibernica.
humilis.
— var. triloba.
involuta, var.
involuta, var. Wilsoni.
Jundzilli.
lucida.
— var. alba.
lutea, var. bicolor.
macrantha.
macrophylla.
Malyi.
micrantha.
— var. Briggsii.
microphylla.
mollis.
multiflora.
nitida.
nutkana.
pisocarpa.
Pissardi.
pomifera.
repens.
rubella.
rubiginosa.
rugosa.
— var. kamschatica.
Sayi.
Seraphini.
sericea.
setigera.
spinosissima.
— var. altaica.
— var. hispida.
stylosa.
tomentosa.
venosa.
virginiana.
— var. alba.
— var. grandiflora.
webbiana.
wichuraiana.

Rubus affinis.
Arrheni.

Rubus, *cont.*
balfourianus.
biflorus.
Bloxami.
caesius.
carpinifolius.
ciliatus.
clavatus.
Colemannii.
corylifolius.
deliciosus.
dumetorum.
dumnoniensis.
echinatus.
erraticus.
erythrinus.
foliolosus.
fuscus.
griffitheanum.
Guentheri.
gymnostachys.
hallandicus.
Hystrix.
Koehleri.
insularis.
laciniatus.
Lespinassi.
leucostachys.
Lintoni.
lindleyanus.
longithyrsiger.
macrophyllus.
melanolasius.
micans.
mucronatus.
nemoralis.
niveus.
occidentalis.
opacus.
parvifolius.
phoenicolasius.
podophyllus.
polyphyllus.
pubescens.
pulcherrimus.
Purchasii.
ramosus.
rhamnifolius.
Rudis.
scaber.
Selmeri.
Sprengeli.
suberectus.
thyrsiflorus.
thyrsiger.
thyrsoideus.
ulmifolius.
villicaulis.
villosus.
xanthocarpus

Ruta graveolens.

Salix alba.
ambigua.
Caprea pendula.
cinerea-repens.
grisea.
nigricans.
— var. forsteriana.
— var. prunifolia
pentandra.
phylicifolia.
— var. repens.
rubra.

Salvia officinalis.

Sambucus canadensis.
glauca.
melanocarpa.
nigra.
racemosa.
— var. serratifolia.

Sassafras officinale.

Schizandra grandiflora.

Skimmia japonica.

Solanum Dulcamara.

Spartium junceum.

Spiraea Aitchisoni.
albiflora.
assimilis.
bella.
betulifolia.
brachybotrys.
bracteata.
brumalis.
canescens.
chamaedrifolia.
concinna.
conspicua.
crenata.
discolor.
Douglasii.
expansa.

Spiraea, *cont.*
Foxii.
giesleriana.
intermedia.
— var. glabrata.
longigemmis.
margaritæ.
microthyrsa.
mongolica.
nobleana.
nudiflora.
pachystachys.
pikoviensis.
pulchella.
revirescens.
rubra.
salicifolia.
sanssouciana.
sorbifolia.
superba.
syringantha.
tomentosa.
trilobata.

Staphylea colchica.
Coulombieri.
pinnata.

Symphoricarpus Heyeri.
mollis, var. ciliatus.
oreophilus.
racemosus.

Symplocos crataegoides.

Syringa Emodi.
Josikaea.
vulgaris.

Tamarix anglica.
tetrandra.

Taxus baccata.
canadensis.
cuspidata.

Thuja gigantea.
japonica.
occidentalis.
— var. Dicksoni.
orientalis.

Tilia americana.
argentea.
cordata.
dasystyla.
heterophylla.
petiolaris.
platyphyllos.
vulgaris.

Torreya nucifera.

Tsuga canadensis.

Ulex europaeus.
nanus.

Ulmus crassifolius.

Vaccinium arboreum.
corymbosum.
ligustricifolium.
ovatum.
padifolium.
pennsylvanicum.

Viburnum acerifolium.
Burejaeticum.
cassinoides.
dentatum.
dilatatum.
Lantana.
Lentago.
molle.
nudum.
nepalense.
Opulus.
phlebotrichum.
prunifolium.
rufotomentosum.
Tinus.

Vitis aestivalis.
heterophylla.
Labrusca.
quinquefolia.

Widdringtonia Whytei.

Zanthoxylum Bungei.

Zenobia speciosa.
— var. pulverulenta.

ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

APPENDIX II.—1903.

NOTE.

In the preface to the *Catalogue of the Library of the Royal Botanic Gardens*, which was issued as Volume III. of the *Additional Series* of the *Kew Bulletin*, it was stated that annual lists of future additions would be published in the *Bulletin*.

The present instalment contains the additions made to the Library by gift or purchase during the year 1902, with the exception of such current periodicals and annuals as continue sets already catalogued.

Like the Catalogue, the List is printed on one side of the page, to allow of its being cut up. It is probable that many persons and institutions will make the Kew Catalogue the basis of their own, and will use the lists of additions to supply printed slips for fresh titles.

1375 Wt 35 3/03 D & S 29 13613 A

CATALOGUE OF THE LIBRARY.

Additions received during 1902.

§ 1.—GENERAL.

Ahern, George P. Compilation of notes on the most important timber tree species of the Philippine Islands. (Manila, 1901.) 4to.

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Alston, Charles. A dissertation on Botany. Translated from the Latin by a Physician. London, 1754. 8vo.

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Anguillara, Luigi. Life. See **Legré, L.** 1901.

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Babington, Charles Cardale. A list of Plants observed near Cromer in the months of July, August, and September, in 1875 and 1876. (Trans. Norfolk & Norwich Nat. Soc. ii.) [Norwich] (1877). 8vo.

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Bailey, Frederick Manson. Contributions to the Flora of British New Guinea. (New Guinea Report, 1901–02.) (Brisbane, 1902.) fol.

Bailey, Liberty Hyde. Cyclopedia of American Horticulture, etc. Assisted by W. MILLER. London & New York, 1900–02. 4 vols. la. 8vo.

(**Bain, Samuel M.**) The action of copper on leaves, with special reference to the injurious effects of fungicides on peach foliage. (Bull. Agric. Exper. Stat. Tennessee, xv. n. 2.) Knoxville, Tennessee, 1902. 8vo.

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Baker, John Gilbert. Biographical notes on the early botanists of Northumberland and Durham. (Nat. Hist. Trans. of Northumberland, etc., xiv.) [Newcastle-upon-Tyne, 1902.] 8vo.

Baker, Richard Thomas, & Henry G. Smith. A research on the Eucalypts, especially in regard to their Essential Oils. (Technical Education Series, No. 13.) Sydney, 1902. 4to.

Balfour, Isaac Bayley. Angiosperms. (Encycl. Brit., 1902.) Edinburgh (1902). 8vo.

Bangalore. Government Gardens and Parks in Mysore. Annual Reports, 1863–1901. Bangalore, 1864–1901. fol.

Barker, B. T. P. On spore-formation among the Saccharomycetes. (Journ. Federated Inst. of Brewing, viii.) [London, 1902.] 8vo.

Barr, Peter. Reading on the cultivation of the Daffodil, etc. Cape Town (1901). 12mo.

—— Readings on the Lilies of the World, their cultivation, etc. (Cape Town, 1901.) 12mo.

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[**Batten, Henry Howard.**] Chelsea Physic Garden. Memorandun on the origin and history of the Garden. [London] (1902). 8vo.

Belon, Pierre. Life. See **Legré, L.** 1901.

Bennett, Alfred William. See **Sachs, F. G. J. von.** Text-Book 1875.

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Berkeley, Miles Joseph. Outlines of British Fungology. Supplement. See **Smith, W. G.** 1891.

Berthold, Gottfried. See **Reinke, J., & G. B.** 1879.

Blair, Patrick. Pharmaco-Botanologia: or, an alphabetical and classical dissertation on all the British indigenous and garden Plants, etc. London, 1723. 4to.

Blankaart, Stephanus. Verhandelinge van de Coffee. See **Bontekoe, C.** 1686.

Boissier de Sauvages, Abbé. Mémoires sur l'éducation des vers à soie. 1–3. Nismes, 1763. 8vo.

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—— De la culture des muriers. Nismes, 1763. 8vo.

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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

APPENDIX III.—1903.

NEW GARDEN PLANTS OF THE YEAR 1902.

The number of garden plants annually described in botanical and horticultural publications, both English and foreign, is now so considerable that it has been thought desirable to publish a complete list of them in the *Kew Bulletin* each year. The following list comprises all the new introductions recorded during 1902. These lists are indispensable to the maintenance of a correct nomenclature, especially in the smaller botanical establishments in correspondence with Kew, which are, as a rule, only scantily provided with horticultural periodicals. Such a list will also afford information respecting new plants under cultivation at this establishment, many of which will be distributed from it in the regular course of exchange with other botanic gardens.

The present list includes not only plants brought into cultivation for the first time during 1902, but the most noteworthy of those which have been re-introduced after being lost from cultivation. Other plants included in the list may have been in gardens for several years, but either were not described or their names had not been authenticated until recently.

In addition to species and well-marked varieties, hybrids, whether introduced or of garden origin, have been included where they have been described with formal botanical names. Mere cultural forms of well-known garden plants are omitted, for obvious reasons.

In every case the plant is cited under its published name, although some of the names are doubtfully correct. Where, however, a correction has appeared desirable, this is made.

The name of the person in whose collection the plant was first noticed or described is given where known.

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An asterisk is prefixed to all those plants of which examples are in cultivation at Kew.

The publications from which this list is compiled, with the abbreviations used to indicate them, are as follows :—*Bull. Mus. Paris.*—Bulletin du Muséum d'histoire naturelle, Paris. *B. M.*—Botanical Magazine. *B. T. O.*—Bullettino della R. Società Toscana di Orticultura. *Gard.*—The Garden. *G. C.*—Gardeners' Chronicle. *Gfl.*—Gartenflora. *G. M.*—Gardeners' Magazine. *Jard.*—Le Jardin. *J. of H.*—Journal of Horticulture. *J. H. F.*—Journal de la Société nationale d'horticulture de France. *K. B.*—Bulletin of Miscellaneous Information, Royal Botanic Gardens, Kew. *L.*—Lindenia. *M. D. G.*—Mitteilungen der Deutschen Dendrologischen Gesellschaft. *M. K.*—Monatsschrift für Kakteenkunde. *O. R.*—Orchid Review. *R. H.*—Revue Horticole. *R. H. B.*—Revue de l'Horticulture Belge. *Späth Cat.*—L. Späth, General Nursery Catalogue. *Veitch Cat.* — Veitch & Sons, Catalogue of Hardy Trees. *W. G.*—Wiener Illustrirte Garten-Zeitung.

The abbreviations in the descriptions of the plants are :—*diam.*—Diameter. *ft.*—Foot or Feet. *G.*—Greenhouse. *H.*—Hardy. *H. H.*—Half-hardy. *in.*—Inches. *S.*—Stove.

Abies andreana, A. beissneriana, A. kentiana, A. mastersiana. (*R. H.* 1902, 163, 164.) Coniferæ. H. Garden hybrids between *A. Pinsapo* and *A. nordmanniana.* (Moser, Versailles.)

Acacia harpophylla. (*Gard.* 1902, lxi, 168 ; *J. of H.* 1902, xliv, 190.) Leguminosæ. G. Phyllodes broad at the base, tapering sharply to the apex, and bending to one side. Flowers yellow, in globular heads, which are arranged in axillary and terminal racemes. Queensland. (Mrs. Denison.)

Acacia inermis variegata. (*G. C.* 1902, xxxi, suppl. May 31, iii.) G. Leaves green and white in the Spring; later the white changes to yellow. (Fisher, Son, and Sibray.) [*Robinia Pseudacacia*, var.]

Acalypha Sanderi alba. (*G. C.* 1902, xxxi, 440.) Euphorbiaceæ. S. Spikes of flowers creamy-white. (F. Sander & Sons.) [*A. hispida alba.*]

Acanthus arboreus. (*G. C.* 1902, xxxi, 221, f. 70.) Acanthaceæ. G. or H. H. An evergreen prickly shrub attaining a height of nearly 20 ft. Leaves 6–12 in. long, lanceolate, prickly, and undulate. Spikes terminal, up to 10 in. long, furnished with spiny bracts. Corolla 1¾ in. long, waxy-white at the base, purple or carmine elsewhere. North-eastern Tropical Africa. (C. Sprenger, Naples.)

***Acer dasycarpum Schwerini.** (*M. D. G.* 1902, 104.) Sapindaceæ. H. A new variety in which the leaves are cut into almost filiform segments. (Fritz Graf von Schwerin, Wendisch-Wilmersdorf, Germany.)

***Agave Bakeri.** (*Gard.* 1902, lxi, 240, ff.) Amaryllidaceæ. G. A new species having leaves 3 ft. long and 5 in. wide, and a flower-spike 8½ ft. high. The flowers are crowded, nearly 2 in. long, with pale greenish-yellow segments. The habit of the plant has been described as resembling that of a gigantic *Eremurus.* Mexico ? (Kew.) [This is *A. Bakeri*, Hook. f., *Bot. Mag.* t. 7890 ; *A. Bakeri*, Ross, Ic. Pl. Hort. Bot. Panormitani, t. 2, described in 1896 from a plant in the Palermo Botanic Garden, is a totally different species, closely allied to, if not the same as, *A. rigida.*]

Alocasia Alexandra Regina. (*G. C.* 1902, xxxi, 440 ; *G. M.* 1902, 410.) Araceæ. S. A garden hybrid, having dark green leaves with whitish ribs. (F. Sander & Sons.)

***Aloe Lastii.** (*K. B.* 1901, 135.) Liliaceæ. S. Stem simple, slender, 1½ ft. high. Leaves lanceolate, 12–15 in. long, in a dense rosette. Peduncle simple, 1½–2 ft. long. Flowers 15 lin. long, pale yellow, greenish at the top, arranged in a dense capitate raceme. Zanzibar. (Kew.)

***Aloe oligospila.** (*B. M.* t. 7834.) S. A new species most nearly allied to *A. obscura*. It is stemless, with ascending lanceolate-acuminate leaves under a foot long, in a dense rosette. Peduncle simple, rather longer than the leaves. Flowers about ¾ in. long, pendulous, pale red, tipped with green, arranged in a dense raceme 3 or 4 in. long. Abyssinia. (Cambridge B.G.)

Aloe pendens. (*B. M.* t. 7837.) S. A shrubby species having a stem about 16 in. long and 1¼ in. thick. Leaves narrowly ensiform, 17–18 in. long, spreading and recurved. Scape slender, branched. Racemes erect, cylindric, many-flowered, 6–8 in. long. Flowers drooping, dull yellowish-red, nearly 1 in. long. South Arabia. (Sir T. Hanbury, La Mortola, Italy.)

Amelanchier oxyodon. (*Gfl.* 1902, 609, f. 126B.) Rosaceæ. H. A new species differing but little from *A. alnifolia*. The teeth of the leaves are more numerous and deeper, and the calyx-teeth in the fruiting stage are long and reflexed. North-west America. (Cultivated in the Zöschen Arboretum in 1889 under the name of *A. Botryapium*.)

Anthericum Bicheti. (*Jard.* 1902, 335; *J. H. F.* 1902, 692.) Liliaceæ. G. A new species of an elegant habit, having flexible leaves variegated with white. Gaboon, West Tropical Africa. (Jardin Colonial, Nogent-sur-Marne, France.)

Anthurium scherzerianum. (*G. C.* 1902, xxxi, 279.) Araceæ. S. The following varieties are mentioned or briefly described:—*burfordiense*, *elegans*, *latifolium*, and *triumphans*. (Sir Trevor Lawrence.)

***Aquilegia Helenæ.** (*W. G.* 1902, 104.) Ranunculaceæ. H. A garden hybrid between *A. flabellata nana alba* and *A. cærulea*. (G. Arends, Ronsdorf, Germany.)

Aristolochia macroura × brasiliensis. (*Jard.* 1902, 142.) Aristolochiaceæ. S. A hybrid between the species named.

Aristolochia pontica. (*G. C.* 1902, xxxi, 333, f. 113.) H. Rootstock globose. Stem erect or ascending, unbranched. Leaves large, broadly ovate, cordate at the base. Flowers very large, greenish-purple, much curved, fœtid. Batoum, Caucasus. (C. Sprenger, Naples.)

Arum palæstinum foliis variegatis. (*B. T. O.* 1902, 43.) Araceæ. H. H. A variety with variegated leaves.

Asparagus filicinus. (*B. T. O.* 1902, 142; *Jard.* 1902, 203.) Liliaceæ. G. Resembles *A. lucidus*. It is an erect plant, about 3 ft. high, with short falcate acuminate cladodes 2 to 5 together, in whorls. The flowers are brownish, on pedicels ¼–½ in. long. North India; China. (Florence B. G.)

Asparagus Greenfieldi. (*G. M.* 1902, 441; *G. C.* 1902, xxxi, 397.) See *A. myriocladus*.

Asparagus japonicus. (*G. M.* 1902, 42; *Gard.* 1902, lxi, Jan. 25, vii; *J. of H.* 1902, xliv. 66.) G. An erect free-growing plant, with opposite ovate-lanceolate flat cladodes about ½ in. long, slightly glaucous. (H. & J. Elliott.) [*A. scandens*, Thunb.]

***Asparagus longipes.** (*K. B.* 1901, 134.) G. A copiously branched undershrub, with subterete slender green cladodes ½–1 in. long, in whorls of 9 to 12. Cameroon Mountains. (F. Sander & Sons; Kew.)

***Asparagus myriocladus.** (*G. M.* 1902, 441; *Gard.* 1902, lxii. 19; *J. of H.* 1902, xlv. 4.) G. A dwarf species, having rather stout stems and short needle-like deep green cladodes in dense whorls. The young growths are light grey-green. Natal.

Asparagus plumosus Blampiedi. (*G. C.* 1902, xxxi, 150.) G. A free-growing variety, which requires less heat than the type. (Blampied & Taudeirn, Guernsey.)

Asparagus Sprengeri var. **falcatoides.** (*Gfl.* 1902, 162.) G. The cladodes are solitary, or up to 5 or 6 in a whorl, and are slightly falcate. (C. Sprenger, Naples.)

Asparagus Sprengeri var. **ochroleuca.** (*Gfl.* 1902, 133.) G. A variety with yellow fruits. (C. Sprenger, Naples.)

Aster acris nanus. (*G. C.* 1902, xxxii, 293.) Compositæ. H. A very dwarf form, never exceeding 15 in. in height. (Royal Horticultural Society.)

Aster Cordelia. (*G. C.* 1902, xxxii. 293.) H. Appears to be a hybrid between *A. lævis* and *A. cordifolius*. (Miss Willmott.)

Aster cordifolius elegans. (*G. C.* 1902, xxxii, 293.) H. A particularly floriferous variety, "sending up flowering shoots from the lower portions of the plant long after those on the summit have withered." (Dobbie & Co.)

Aster cordifolius magnificus. (*G. C.* 1902, xxxii, 238.) H. Flowers small, pale blue or delicate lilac, produced freely on stems 4½ ft. high. (E. Beckett.)

Aster Novi-Belgii semi-plena. (*G.C.* 1902, xxxii, 293.) H. A showy variety with large lavender-blue semi-double flowers. (Miss Willmott.)

Aster vimineus perfectus. (*G. C.* 1902, xxxii, 238.) H. "A slender-growing variety 3½ ft. high. Ray-florets white, suffused and tipped with pink." (E. Beckett.)

***Astilbe Davidii.** (*G. C.* 1902, xxxii, 95, 122, f. 34.) Saxifragaceæ. H. A handsome, strong-growing plant 4–6 ft. high, having panicles more than 2 ft. long. Calyx pink. Petals bluish-violet. Stamens with violet filaments and blue anthers. China. (J. Veitch & Sons.)

***Aubrietia tauricola.** (*Gard.* 1902, lxi. 266.) Cruciferæ. H. A dwarf, compact, very floriferous species. The flowers are deep violet-purple, and are so crowded that they hide the leaves. (Max Leichtlin, Baden - Baden.) [Apparently the same as *A. deltoidea*, var. *taurica*.]

Begonia Bertini. (*Gfl.* 1902, 550.) Begoniaceæ. G. This belongs to the same group as *Gloire de Lorraine*, but the flowers are bright scarlet. (Haage & Schmidt, Erfurt.)

Begonia rhizocarpoides. (*W. G.* 1902, 203.) S. An epiphytic species allied to *B. rhizocarpa*, with lanceolate leaves about 9 in. long, and unattractive flowers. The female flowers are solitary, axillary, and shortly stalked, and the male are in inflorescences having a stalk nearly as long as the leaves. South Brazil. (Vienna B. G.)

Berberis japonica flore lutea. (*Gard.* 1902, lxii. 258.) Berberidaceæ. H. Flowers chrome-yellow. (Lemoine, Nancy.)

Bolleo-chondrorhyncha frœbeliana. (*G. C.* 1902, xxxii, 243.) Orchidaceæ. G. Apparently a natural hybrid between *Bollea cœlestis* and *Chondrorhyncha Chestertoni*. New Grenada. (O. Frœbel, Zurich.)

Brasso-cattleya Chamberlainiæ. (*O. R.* 1902, 326.) Orchidaceæ. S. A garden hybrid between *Brassavola digbyana* and *Cattleya quadricolor*. (J. Chamberlain.)

Brasso-cattleya conspicua. (*G. M.* 1902, 440; *O. R.* 1902, 243.) S. A garden hybrid between *Cattleya Leopoldi* and *Brassavola glauca* or *B. digbyana*. (F. Sander & Sons.)

Brasso-cattleya heatonensis. (*G. C.* 1902, xxxii, 239; *O. R.* 1902, 310.) S. A garden hybrid between *Brassavola digbyana* and *Cattleya hardyana*. (Jules Hye, Ghent.)

Brasso-cattleya Mariæ. (*O. R.* 1902, 366; *J. of H.* 1902, xlv, 535.) S. A garden hybrid between *Cattleya Warneri* and *Brassavola digbyana*. (J. Chamberlain.)

***Buddleia albiflora.** (*G. C.* 1902, xxxii, 118, 139.) Loganiaceæ. H. Resembles *B. variabilis*. It forms a tree 20–30 ft. high. Leaves lanceolate, 5–9 in. long. Flowers about ¼ in. long, lilac with a yellow eye, in dense panicles. Central China. (J. Veitch & Sons.)

***Buddleia variabilis** var. **veitchiana.** (*G. C.* 1902, xxxii, 139, 142; *J. of H.* 1902, xlv, 381, f.) H. Differs from the type in having larger and denser inflorescences. China. (J. Veitch & Sons.)

Calanthe triumphans. (*G. M.* 1902, 785; *Gard.* 1902, lxii, 372.) Orchidaceæ. S. A garden hybrid of which the parents are not definitely known. *C. vestita rubro-oculata* is supposed to be one. (N. C. Cookson.)

Calla elliottiana × albomaculata. (*R. H.* 1902, 374.) Araceæ. G. A garden hybrid between the species named. (J. Tailby, Wellesley, Mass., U.S.A.) [*Richardia*.]

Campanula grandis pallida. (*G.C.* 1902, xxxii, 24.) Campanulaceæ. H. Flowers heliotrope - coloured. (A. Perry.)

***Caralluma torta.** (*K. B.* 1901, 142.) Asclepiadaceæ. S. Stem obtusely 4-angled, 4–5 lin. thick. Leaves 1½ lin. long, lanceolate-subulate. Flowers

solitary, shortly stalked. Corolla about 8 lin. long, with linear lobes. Corona brown-purple, pallid at the tips of the lobes. South Arabia or Socotra. (Kew.)

Carmichælia odorata. (*G. C.* 1902, xxxii, 81.) Leguminosæ. H. A shrub with stiff erect flattened leaf-like stems, minute trifoliolate leaves, and small white flowers in short axillary clusters. New Zealand. (R. Lindsay.)

Catalpa syringæfolia Koehnei. (*M. D. G.* 1902, 44.) Bignoniaceæ. H. A variety in which the leaves have a broad golden-yellow margin. (H. A. Hesse, Weener, Germany.)

Cattleya amethystoglossa Sanderæ. (*G. M.* 1902, 202.) Orchidaceæ. G. A creamy-white variety. (F. Sander & Sons.) [*C. guttata Prinzii* var.]

Cattleya aurea superba. (*R. H. B.* 1902, 263.) S. A form with very richly-coloured and finely-shaped flowers. (A. A. Peeters, Brussels.)

Cattleya bowringiana triumphans. (*G. C.* 1902, xxxii. 313.) G. A variety having fine flowers of a rich purple colour. (J. Gurney Fowler.)

Cattleya bowringiano-superba. (*G. C.* 1902, xxxii. 313.) G. A garden hybrid between the species indicated in the name. (Charlesworth & Co.)

Cattleya Clymene. (*O. R.* 1901, 302; *L.* xvi. t. 761.) G. A garden hybrid between *C. Rex* and *C. Gigas*. (L'Horticole Coloniale, Brussels.)

Cattleya Firmini. (*R H. B.* 1902, 238.) S. Probably the same as *C. goossensiana*. (M. Lambeaux, Belgium.)

Cattleya Gigas var. **meulenaereana.** (*L.* xvii, t. 775.) G. Sepals and petals pale rose-coloured; lip rose-purple on the limb and tube, and yellow at the throat. (L'Horticole Coloniale, Brussels.)

Cattleya Grossii pallida. (*O. R.* 1902, 339.) S. "A nearly white form, having the sepals slightly tinged with green, and the lip of a pale rose." (H. Low & Co.)

Cattleya Hyades. (*G. M.* 1902, 517.) G. A garden hybrid between *C. bicolor* and *C. speciosissima*. (Charlesworth & Co.)

Cattleya labiata amesiana. (*G C.* 1902, xxxii, 344; *O. R.* 1902, 63, 362.) S. Flowers white, with a lilac-pink tint on the lip. (J. Bradshaw; H. Low & Co.)

Cattleya labiata cærulea. (*O. R.* 1902, 364.) G. Flower tinted with blue all over, the lip darker in colour. (H. A. Tracy.)

Cattleya labiata cærulescens. (*R. H. B.* 1902, 281.) G. A rather dull-coloured flower, having the lip marbled with bright purple. (Marquis de Wavrin.)

Cattleya labiata concolor. (*G. C.* 1902, xxxii, 313.) G. Flowers blush-white, with a purple blotch on the lip. (J. Gurney Fowler.)

Cattleya labiata Cooksoniæ. (*G. C.* 1902, xxxii, 344.) G. A variety having fine white flowers with a purple lip. (Sir F. Wigan.)

Cattleya labiata glauca. (*G. C.* 1902, xxxii, 344; *O. R.* 1902, 364.) G. Flowers tinged with lavender-blue. (H. Low & Co.)

Cattleya labiata oakwoodiensis. (*G. C.* 1902, xxxii. 383; *O. R.* 1902, 366.) G. A form in which the lip is claret-crimson throughout. (N. C. Cookson.)

Cattleya labiata perfecta. (*L.* xvi. t. 766.) G. Sepals and petals deep blush-colour; lip dark purple on the limb, brownish yellow at the throat, with two lateral light blotches. (L'Horticole Coloniale, Brussels.)

Cattleya labiata reedleyensis. (*O. R.* 1902, 368.) G. "A pretty variety, having white sepals and petals and a pale rose-coloured lip." (R. Tunstill.)

Cattleya labiata salmoneana. (*R. H. B.* 1902, 281.) G. Sepals and petals salmon-rose, the fine lip bordered with the same colour. (Marquis de Wavrin.)

Cattleya Leucothoe. (*O. R.* 1902, 272.) G. A garden hybrid between *C. granulosa* and *C. walkeriana*. (E. O. Orpet, South Lancaster, Mass.)

Cattleya Loddigesii delicata. (*G.C.* 1902, xxxii, 237.) S. A very distinct form with blush-white flowers. (Stanley, Ashton & Co.)

Cattleya Loddigesii innocens. (*R. H. B.* 1902, 263.) S. Flower milky white and finely shaped. (F. Sander & Sons.)

Cattleya magneana. (*Jard.* 1902, 328, t.; *Gard.* 1902, lxii, 448.) G. A garden hybrid between *C. guttata Leopoldi* and *C. massaiana*. (C. Maron, Brunoy, France.)

Cattleya Memoria Bleui. (*L.* xvi, t. 764.) G. A garden hybrid between *C. Aclandiæ* and *C. granulosa*. (A. Bleu.)

Cattleya Mendelii Berti. (*Jard.* 1902, 112.) G. Flowers white, tinted with rose. (M. Bert, Colombes, France.)

Cattleya Mendelii leucoglossa. (*G. M.* 1902, 321.) G. "A pretty form with blush-tinted sepals." (W. P. Burkinshaw.)

Cattleya Mendelii Liptoni. (*G. C.* 1902, xxxi, 442.) G. Flowers blush-white, with a purple blotch on the lip. (Stanley, Ashton & Co.)

Cattleya Mendelii Lowiæ. (*G. M.* 1902, 440.) G. Lip white, pale purple at the apex. (Sir F. Wigan.)

Cattleya Mendelii wisetonensis. (*G. M.* 1902, 350; *Gard.* 1902, lxii, 388.) G. Flower well-formed; sepals and petals blush; lip rich rose-purple, delicately veined; throat yellow, veined with reddish purple. (Captain J. F. Laycock; H. Low & Co.)

Cattleya Mossiæ alba cœlestis. (*G. M.* 1902, 328.) G. Flowers white, with a lavender-marked lip. (F. Sander & Sons.)

Cattleya Mossiæ boelensis. (*R. H. B.* 1902, 166.) G. A dark-coloured form with a finely-shaped lip. (A. Faelens, Belgium.)

Cattleya Mossiæ cœlestis. (*G. C.* 1902, xxxi, 442.) G. A form with lavender-tinted flowers. (Sir F. Wigan.)

Cattleya Mossiæ fulgens. (*G. C.* 1902, xxxi, 442.) G. Flowers fine in colour and shape. (Sir F. Wigan.)

Cattleya pittiana. (*G. C.* 1902, xxxii, 95.) S. A garden hybrid between *C. dowiana aurea* and *C. granulosa schofieldiana*. (H. T. Pitt.)

Cattleya Rothwelliæ. (*O. R.* 1902, 43.) G. A garden hybrid between *C. Eldorado* and *C. bowringiana*. (J. E. Rothwell, Brookline, Mass.)

Cattleya schilleriano-Gigas. (*R. H.* 1902, 371.) G. A garden hybrid between the species indicated in the name. (Dallemagne, Rambouillet, France.)

Cattleya semontiana. (*J. H. F.* 1902, 400; *R. H.* 1902, 302.) G. A garden hybrid between *C. aurea* and *C. Gigas sanderiana*. (O. Doine, Dourdan, France.)

Cattleya Stepmanni. (*R. H. B.* 1902, 280.) G. A garden hybrid between *C. corbeillensis* and *C. Warscewiczii*. (A. A. Peeters, Brussels.)

Cattleya Trianæ candida. (*R. H. B.* 1902, 47.) G. Sepals and petals snow-white; lip ivory-white, with a faint violet spot. (J. Boelens.)

Cattleya Trianæ coundonensis. (*O. R.* 1902, 115.) G. A variety with purple-rose sepals and petals, the front lobe of the lip crimson, and the disc orange. (G. Singer.)

Cattleya Trianæ Mariæ. (*O. R.* 1902, 89.) G. "A large and handsome form having silvery-white sepals and petals, delicately tinged and veined with pink, and the front of the lip deep magenta crimson, with two yellow blotches in the throat." (L. de Rothschild.)

Cattleya Trianæ Memoria Lindeni. (*S. H.* 1900, 54; *L.* xvii, t. 770.) G. A variety with very large dark mauve flowers, with the ends of the sepals and petals purple-red, and the lip velvety purple-red. (L'Horticole Coloniale, Brussels.)

Cattleya Trianæ. (*R. H. B.* 1902, 47, 94, 117.) G. Descriptions are given of the following forms:—*angelica*, *bella*, *Brayi*, *Gemma*, and *rubens*. (Marquis de Wavrin.)

Cattleya wiganiana. (*Gard.* 1902, lxii, 71.) S. A variety of *C. wavriniana*, a garden hybrid between *C. Warscewiczii* and *C. granulosa schofieldiana*. (Sir F. Wigan.)

Cattleya winniana. (*O. R.* 1902, 326.) G. A garden hybrid between *C. gaskelliana* and probably *C. Forbesii*. (J. Chamberlain.)

Cedrus verticillata glauca. (*G. C.* 1902, xxxi, 442.) Coniferæ. H. A. variety with blue-green leaves. (J. Cheal & Sons.)

***Celmisia coriacea.** (*G. C.* 1902, xxxii, 191, f. 65.) Compositæ. H. H. A tomentose plant with oblong-lanceolate radical leaves, and flower-heads 1½–3 in. in diameter. Ray-florets white; disc yellow. New Zealand. (Glasnevin B. G.)

Celsia pontica. (*Gard.* 1902, lxi, 366.) Scrophulariaceæ. H. A plant "with whitish leaves and pure white flowers." (G. Jackman & Son.) [*C. pontica*, Boiss., from Asia Minor, is described as having green leaves and yellow flowers.]

Cereus trigonus var. **costaricensis.** (*Bull. Mus. Paris*, 1902, 457). G. Cactaceæ. A climbing plant with white flowers more than 12 in. long and broad, producing an excellent fruit known under the name of "Pitahaya." Costa Rica. (Paris B. G.)

Cereus Tunilla. (*Bull. Mus. Paris*, 1902, 460.) A new species with slender climbing usually 4-angled stems, and rose-coloured flowers 2½ in. long and 1¾ in. in diameter. Costa Rica. (Paris B. G.)

Chænomeles simirenkiana. (*Gfl.* 1902, 103.) Rosaceæ. H. A sport from *C.* (*Cydonia*) *japonica*, having white leaves. (L. Simirenko, Gorodistsche, Kiew, Russia. [Exhibited in Paris in 1895.]

Chondro-bollea fœbeliana. (*O. R.* 1902, 347.) See *Bolleo-chondrorhyncha fœbeliana.*

Chrysanthemum segetum pumilum. (*Gfl.* 1902, 555, f. 114.) Compositæ. H. A very dwarf form, scarcely exceeding 8 in. high. (Haage & Schmidt, Erfurt.)

***Cirrhopetalum Hookeri.** (*B. M.* t. 7869.) Orchidaceæ. S. A small plant with tufted grooved pseudobulbs an inch long, elliptic-oblong or -lanceolate leaves 2 in. long, and a 6–10-flowered umbel on a slender peduncle rather longer than the leaves. The flowers are about an inch long, yellow, with reddish-purple streaks on the dorsal sepal. Western Himalaya. (Kew.)

***Clianthus puniceus albus.** *Gfl.* 1902, 75.) Leguminosæ. G. A white-flowered variety. (E. Benary, Erfurt.)

Cœlogyne præcox albens. (*G. C.* 1902, xxxii, 334.) Orchidaceæ. S. A nearly white form. (J. W. Moore.)

Colchicum speciosum maximum. (*G. C.* 1902, xxxii, 309.) Liliaceæ. H. Plant 7½ in. high. Flowers deep rosy-mauve, with segments 3 in. long and 1¾ in. broad, white at the base. (S. W. Fitzherbert.)

***Cordyline Mayi.** (*G. C.* 1902, xxxi, 280.) Liliaceæ. G. Leaves green, 2 in. wide, margined with red. The young leaves are wholly red. (H. B. May.) [*Dracæna Mayi* in the list of 1901.]

***Corydalis cheilanthifolia.** (*G. C.* 1902, xxxii, 288.) Papaveraceæ. H. A small graceful plant with finely-cut fern-like leaves and racemes of small yellow flowers. Central China. (J. Veitch & Sons.)

***Cotoneaster angustifolia.** (*R. H.* 1902, 542; *Jard.* 1902, 372.) Rosaceæ. H. A spiny shrub somewhat resembling *Cratægus Pyracantha.* It attains a height of 6½ ft. Secondary branches many and short. Leaves elongated, persistent. Flowers small, white, in corymbs. Fruits at first pale yellow, later bright orange-yellow. Yunnan, China. (Maurice de Vilmorin, Les Barres, France.)

***Cotoneaster Francheti.** (*R. H.* 1902, 379, ff. 159–161, 164.) H. A new species closely allied to *C. pannosa.* It is a shrub 3¼–5 ft. high, having erect branches. Leaves elliptic-lanceolate, 1¼ in. long, ¾ in. broad. Flowers 5–15, in terminal corymbs. Fruit oblong, nearly ½ in. long, orange-yellow. Yunnan, China. (Maurice de Vilmorin, Les Barres, France.)

***Crassula congesta.** (*G. C.* 1902, xxxii, 171.) Crassulaceæ. G. A new species. Plant not more than 3½ in. high, very robust. Leaves thick and fleshy, ovate-lanceolate, 1–1⅓ in. long. Flowers numerous, densely crowded in a sessile terminal head 1–1¼ in. in diam. Petals scarcely ½ in. long, white. South Africa. (Kew.)

***Crassula conjuncta.** *G. C.* 1902, xxxi, 106.) G. Closely allied to *C. perforata*, but distinguished by

concave leaves, a narrower and more compact inflorescence, and larger and pure white flowers. South Africa. (Kew.)

***Crassula sedifolia.** (*G. C.* 1902, xxxii, 429.) G. A pretty new species. Plant 1-2 in. high when in flower. Leaves in small tufts at the base, with 3 or 4 pairs on the flowering-stems, 1-3½ lin. long, ¾-1¼ lin. broad, ciliate, bright green, with a few red-brown spots along each margin. Flowers 3-9 together in terminal cymes. Petals white, 1½-2 lin. long. South Africa. (Kew.)

Cratægus saligna. (*Späth Cat.* 1902-03, 86.) Rosaceæ. H. A shrub growing to 15 feet high. Branches reddish brown, with thorns 5-10 lin. long, and lanceolate or ovate-lanceolate leaves, shining on the upper side. Mountains of Colorado. (L. Späth, Berlin.)

Crinum D'Anconæ. (*B. T. O.* 1902, 302.) Amaryllidaceæ. G. A garden hybrid between *C. jemense* and *C. Moorei*. (C. Sprenger, Naples.)

Crinum grillianum. (*B. T. O.* 1902, 300.) G. A garden hybrid between *C. longifolium* and *C. lineare*. (C. Sprenger, Naples.)

***Crinum Johnstoni.** (*B. M.* t. 7812.) S. A new species resembling *C. latifolium* in its flowers and *C. longifolium* in its leaves. These in the new species are 5-6 ft. long, and 2-2½ in. broad low down, the inner narrower. Peduncles rather stout, about 2 ft. long. Flowers many, in an umbel; pedicels about 1 in. long. Perianth-tube 4 in. long, green; segments about 3 lin. long, white, tinged with pink outside. British Central Africa. (Kew.)

Crinum lawsonianum. (*B. T. O.* 1902, 300.) G. A garden hybrid between *C. longifolium album* and *C. variabile*. (C. Sprenger, Naples.)

Crinum Malbranchii. (*B. T. O.* 1902, 301.) G. A garden hybrid between *C. Moorei* and *C. jemense*. (C. Sprenger, Naples.)

Crinum maximum. (*B. T. O.* 1902, 303.) G. A garden hybrid between *C. Schmidtii* and *C. jemense*. (C. Sprenger, Naples.)

***Crinum natans.** (*B. M.* t. 7862.) S. An aquatic species having submerged strap-shaped leaves 4-5 ft. long, 1½-2 in. broad, strongly waved along both margins. Peduncle 1 ft. long. Flowers umbellate, sessile. Perianth-tube 6 in. long, cylindric, pale green; segments 3 in. long, narrow, white, spreading and recurved. Guinea. (Kew.)

Crinum polezanthes. (*B. T. O.* 1902, 339.) G. A garden hybrid between *C. jemense* and *C. abyssinicum*. (C. Sprenger, Naples.)

Crinum ressowskianum. (*B. T. O.* 1902, 339.) G. A garden hybrid between *C. jemense* and *C. longifolium*. (C. Sprenger, Naples.)

Crinum roseum. (*B. T. O.* 1902, 303.) G. A garden hybrid between *C. jemense* and *C. Moorei*. (C. Sprenger, Naples.)

Crinum Samueli. (*G. C.* 1902, xxxii, 304.) G. A new species allied to *C. pauciflorum*. Bulb about 3 in. in diameter by 2½ in. long. Leaves up to 4 ft. long and 2½ in. broad, with scabrous edges. Flowers 2, sessile, on a scape about 1 ft. long, white, slightly flushed with pink, odourless, 4½ in. in diam.; tube 3-3½ in. long. Central Africa. (A. Worsley.)

Crinum Wimbushi. (*G. C.* 1902, xxxii, 303.) G. A new species closely resembling *C. Samueli*, differing in having leaves not scabrous on the edges, flowers with short pedicels, faintly fragrant, more fugacious, and with a longer style. Central Africa. (A. Worsley.)

***Crossosoma californicum.** (*R. H.* 1902, 103.) Dilleniaceæ. G. Shrub 3-15 ft. high. Leaves elliptic or oblong, 1-3 in. long. Flowers solitary, terminal; petals round, white, more than ½ in. in diam. Santa Catalina and Guadalupe Islands, South California. (W. E. Gumbleton.)

Cuphea miniata alba. (*Gfl.* 1902, 76.) Lythraceæ. G. A white-flowered variety. (E. Benary, Erfurt.)

Cupressus lawsoniana Stewarti. (*G. M.* 1902, 133.) Coniferæ. H. "A handsome golden form of graceful habit." (J. Veitch & Sons.)

***Cupressus lawsoniana Wisselii.** (*G. C.* 1902, xxxi, 442.) H. A variety "with intensely dark green foliage, which is very compact and close to the shoots." (J. Cheal & Sons.)

Cymbidium Holmesii. (*G. C.* 1902, xxxii, 314; *O. R.* 1902, 343, 361.) Orchidaceæ. G. A garden hybrid between *C. Mastersii* and *C. giganteum*. (W. Holmes.)

Cymbidium lowio-grandiflorum. (*O. R.* 1902, 90, 100.) G. A garden hybrid between the species indicated in the name. (J. Veitch & Sons.)

Cymbidium lowio-Mastersii. (*G. M.* 1902, 96, 128, f.; *O. R.* 1902, 90.) G. A garden hybrid between the species indicated in the name. (Charlesworth & Co.)

***Cymbidium rhodochilum.** (*O. R.* 1901, 10; 1902, 184; *Jard.* 1901, 276, f. 133; *J. of H.* 1902, xlv, 49.) S. A distinct species remarkable in having the front lobe of the lip a rich rose-red colour. The sepals and petals are yellowish-green, the latter being heavily blotched and dotted with black. Madagascar. (Kew.)

***Cymbidium simonsianum.** (*B. M.* t. 7863.) G. Leaves 2–3 ft. long, about ½ in. broad. Raceme pendulous, loosely 10–20-flowered. Flowers 2 in. broad. Sepals and petals linear-oblong, greyish-white, with a blood-red central streak. Lip about half as long as the sepals, the terminal lobe white, with a yellow blotch, and the side lobes white, streaked with blood-red. Sikkim and Assam. (Kew.)

Cymbidium wiganianum. (*O. R.* 1902, 92.) G. A garden hybrid between *C. eburneum* and *C. tracyanum*. (F. Sander & Sons.)

Cymbidium zaleskianum. (*L.* xvii, t. 778.) G. Very probably a natural hybrid between *C. giganteum* and *C. grandiflorum*. Assam. (L'Horticole Coloniale, Brussels.)

***Cynorchis villosa.** (*B. M.* t. 7845.) Orchidaceæ. S. A new species, one of the smallest-flowered of the genus. It has a dense spike-like raceme 3–4 in. long. The flowers are about ½ in. long, rose-purple, the spur about as long as the lip. Madagascar. (Kew.)

Cytisus handsworthensis. (*G. C.* 1902, xxxi, suppl. May 31, iii.) Leguminosæ. H. "A white-flowered plant suitable for the rockery." (Fisher, Son & Sibray.)

Cypripedium Argo-arthurianum. (*O. R.* 1902, 91.) Orchidaceæ. S. A garden hybrid between the species indicated in the name. (R. I. Measures.) [*Paphiopedilum.*]

Cypripedium auriferum. (*L.* xvii, t. 771.) S. A garden hybrid between *C. Boxalli superbum* and *C. bellatulum* or *C. Sallieri*. (L'Horticole Coloniale, Brussels.) [*Paphiopedilum.*]

Cypripedium berkleyanum. (*O. R.* 1902, 90, 118.) S. A garden hybrid between *C. bellatulum* and *C. Boxallii*. (Sir Trevor Lawrence; Charlesworth & Co.) [*Paphiopedilum.*]

Cypripedium calloso-Warneri. (*G. C.* 1902, xxxii, 445.) S. A garden hybrid between the species indicated in the name. (O. O. Wrigley.) [*Paphiopedilum.*]

Cypripedium callosum aureum. (*O. R.* 1901, 56; *G. C.* 1902, xxxii, 370.) S. Flower almost white, with a pale yellow pouch. (S. Gratrix.) [*Paphiopedilum.*]

Cypripedium callosum Gratrixiæ. (*O. R.* 1901, 368; *G. C.* 1902, xxxii, 370.) S. Sepals and petals white, with emerald-green lines and pink tips; lip of a deep crimson-ruby tint. (S. Gratrix.) [*Paphiopedilum.*]

Cypripedium Castalia. (*R. H.* 1902, 146.) S. A garden hybrid between *C. godseffianum* and *C. Druryi*. (Dallemagne, Rambouillet, France.) [*Paphiopedilum.*]

Cypripedium caudatum ashworthianum. (*G. C* 1902, xxxi, 281.) S. A fine variety resembling *C. caudatum Wallisii*. (E. Ashworth.) [*Phragmipedilum.*]

Cypripedium Charlesworthii-leeanum. (*Jard.* 1902, 69.) S. A garden hybrid between the species named. (Cappe & Son, Vésinet, France.) [*Paphiopedilum.*]

Cypripedium Charlesworthii marginatum. (*G. C.* 1902, xxxii, 238.) S. Upper sepal nearly white, tinged with rose at the margin and base (J. Cypher.) [*Paphiopedilum.*]

Cypripedium Charlesworthii virginale. (*G. C.* 1902, xxxii, 313.) S. Upper sepal pure white, with green at the base, and a pale purple central band. (F. Sander & Sons.) [*Paphiopedilum.*]

Cypripedium coundonensis. (*G. C.* 1902, xxxi, 151.) S. A garden hybrid of unrecorded parentage. (G. Singer.) [*Paphiopedilum.*]

Cypripedium Curtisii giganteum. (*O. R.* 1902, 245.) S. "A very large form." (C. Parker.) [*Paphiopedilum.*]

Cypripedium dowlerianum. (*O. R.* 1902, 91.) See *Paphiopedilum dowlingianum.*

Cypripedium dowlingeanum. (*G. M.* 1902, 134.) See *Paphiopedilum dowlingianum.*

Cypripedium edgbastonense. (*O. R.* 1902, 117.) S. A garden hybrid between *C. nitens* and *C. chamberlainianum.* (Birmingham B. G.) [*Paphiopedilum.*]

Cypripedium Edithæ. (*G. C.* 1902, xxxi, 281.) S. A garden hybrid between *C. bellatulum* and *C. chamberlainianum.* [*Paphiopedilum.*] [This name has already been given to a hybrid between *C. conchiferum* and *C. Schlimii.* See *G. C.* 1892, xii, 458.]

Cypripedium giganteum. (*O. R.* 1902, 54.) S. A garden hybrid between *C. lawrenceanum* and *C. Sallieri hyeanum.* (T. Statter.) [*Paphiopedilum.*]

Cypripedium Graceæ. (*G. C.* 1902, xxxii, 294.) S. A garden hybrid between *C. niveum* and *C. Boxallii.* (A. J. Keeling.) [*Paphiopedilum.*]

Cypripedium hoogendyckianum. (*L.* xvi, 93.) S. A garden hybrid between *C. leeanum* and *C. villosum.* (F. Stepman, Brussels.) [*Paphiopedilum.*]

Cypripedium insigne corrugatum. (*G. C.* 1902, xxxii, 445.) S. A form "with curiously corrugated lip." (O. O. Wrigley.) [*Paphiopedilum.*]

Cypripedium insigne holfordianum. (*G. C.* 1902, xxxii, 382, 413, f. 141.) S. Dorsal sepal pure white on the upper half, with a few rose-purple spots; greenish-yellow on the lower half, with purple brown markings. Petals broad, yellow, with brownish-purple reticulation. Lower sepals whitish, with a few purple lines. Lip similar in colour to the petals. (Captain G. L. Holford.) [*Paphiopedilum.*]

Cypripedium Laflacheri. (*Jard.* 1902, 86.) S. A garden hybrid between *C. insigne* and *C. villosum.* (Château de la Flachère, France.) [*Paphiopedilum.*]

Cypripedium lathamiano-Charlesworthii. (*Jard.* 1902, 48.) S. A garden hybrid between the species indicated in the name. (Cappe & Son, Vésinet, France.) [*Paphiopedilum.*]

Cypripedium lawrenceanum hackbridgense. (*G. M.* 1902, 323; *O. R.* 1902, 212.) S. A richly coloured form. Dorsal sepal heavily suffused with rose-purple, and marked with heavy purple lines. The green in the petals and lip is darker than in the type. (H. T. Pitt; Sir Trevor Lawrence; F. Wellesley.) [*Paphiopedilum.*]

Cypripedium purum. (*G. C.* 1902, xxxii, 294.) S. A garden hybrid between *C. callosum* and *C. superbiens.* (C. Parker.) [*Paphiopedilum.*]

Cypripedium ridolfianum. (*Jard.* 1902, 63; *J. H. F.* 1902, 140.) S. A garden hybrid between *C. villosum* and *C. leeanum.* (Duval & Son, Versailles.) [*Paphiopedilum.*]

Cypripedium Salliero-ciliolare. (*Jard.* 1902, 79.) S. A garden hybrid between the species indicated in the name. (Duval & Son, Versailles.) [*Paphiopedilum.*]

Cypripedium Seguini. (*J. H. F.* 1902, 778.) S. A garden hybrid of unrecorded parentage. The flowers resemble those of *C. Boxallii atratum.* (C. Béranek, Paris.) [*Paphiopedilum.*]

Cypripedium spicerianum rubescens. (*R. H. B.* 1902, 48.) S. Dorsal sepal very large. (F. Spae.) [*Paphiopedilum.*]

Cypripedium Stepmaniæ. (*L.* xvi, t. 765.) S. A garden hybrid between *C. leeanum* and *C. villosum.* (F. Stepman, Brussels.) [*Paphiopedilum.*]

Cypripedium Stevensii. (*O. R.* 1902, 51.) Orchidaceæ. S. A garden hybrid between *C. Calypso* and *C. Albert Hye.* (W. Thompson.) [*Paphiopedilum.*]

Cypripedium Thurgoodi. (*O. R.* 1902, 308.) S. A garden hybrid derived from *C. bellatulum*, and a species of which the name is not recorded. (H. T. Pitt.) [*Paphiopedilum.*]

Cypripedium Troilus. (*O. R.* 1902, 26.) S. A garden hybrid between *C. Sallieri hyeanum* and *C. insigne Sanderæ.* (J. Gurney Fowler.) [*Paphiopedilum.*]

Darlingtonia californica rubra. (*G. M.* 1902, 351.) Sarraceniaceæ. G. "Differs from the type in being of a reddish hue instead of green." (A. J. A. Bruce.)

***Davidia involucrata.** (*R. H.* 1902, 377, f. 158.) Cornaceæ. H. A tree reaching a height of 30 ft., having leaves resembling those of a *Tilia*, and remarkable for the large white bracts (which are sometimes 7 in. long and 4 in. broad), borne in pairs at the ends of the branches, just below the flowers. Central China. (Maurice de Vilmorin, Les Barres, France.)

Dendrobium Cypheri. (*O. R.* 1902, 100.) Orchidaceæ. S. A garden hybrid between *D. findlayanum* and *D. crassinode.* (J. Cypher.)

Dendrobium Holbrookii. (*O. R.* 1902, 56.) S. A garden hybrid between *D. Cassiope* and *D. dominianum.* (Dr. Cranstoun; E. Ashworth.)

Dendrobium Hunteri. (*O. R.* 1902, 153.) S. A garden hybrid between *D. brymerianum* and *D. nobile.* (H. J. Hunter.)

Dendrobium nobile colmanianum. (*G. C.* 1902, xxxi, 116.) S. "A fine large pure white variety, with sulphur-yellow disc to the lip." (J. Colman.)

Dendrobium nobile jaspidium. (*L.* xvii, t. 781; *G. M.* 1902, 265.) S. Flowers very showy; apex of the segments red variegated with purple, or rose-coloured striated with red. (L'Horticole Coloniale, Brussels.)

Dendrobium Phalænopsis Lindeniæ. (*L.* xvi, t. 768.) S. Flowers large, creamy white, with the lip and edges of the petals streaked rose-purple, and the throat sulphur-yellow. (L'Horticole Coloniale, Brussels.)

Dendrobium Phalænopsis rubescens. (*O. R.* 1902, 343.) S. "An exceptionally dark form." (S. Gratrix.)

Dendrobium wardianum fowlerianum. (*O. R.* 1902, 53.) S. A curious form in which the lateral sepals have each a yellow blotch with some dark purple markings at their inner angles near the base. (J. Gurney Fowler.)

***Desmodium amethystinum.** (*G. C.* 1902, xxxii, 210.) Leguminosæ. G. A new shrubby species 3–5 ft. high. Leaves trifoliolate; leaflets elliptic, 4–7 in. long. Flowers about ½ in. long, amethyst-coloured, in a terminal panicle. Yunnan, China. (Kew.)

Deutzia corymbiflora erecta. (*J. H. F.* 1902, 308; *R. H.* 1902, 267, 351.) Saxifragaceæ. H. Differs from the type in its more slender habit, longer and narrower leaves, and less crowded inflorescences. Yunnan, China. (Boucher, Paris.)

Deutzia discolor floribunda. (*J. H. F.* 1902, 311; *Gard.* 1902, lxi, 154.) H. A garden hybrid between *D. discolor purpurascens* and *D. gracilis.* (Lemoine, Nancy.) [Distributed in 1901.]

***Deutzia gracilis carminea.** (*J. H. F.* 1902, 310; *Gard.* 1902, lxi, 407.) H. A garden hybrid between *D. gracilis* and *D. discolor purpurascens.* (Lemoine, Nancy.) [Distributed in 1900.]

***Deutzia gracilis eximia.** (*Gard.* 1902, lxi, 154; *J. H. F.* 1902, 310.) H. A garden hybrid between *D. gracilis* and *D. discolor purpurascens.* (Lemoine, Nancy.) [Distributed in 1901.]

***Deutzia kalmiæflora.** (*J. H. F.* 1902, 311.) H. A garden hybrid between *D. discolor purpurascens* and *D. parviflora.* (Lemoine, Nancy.) [Distributed in 1900.]

***Dimorphanthus mandshuricus foliis argenteis marginatis.** (*G. C.* 1902, xxxi, 280.) Araliaceæ. H. The same as *D. mandshuricus foliis variegatis*, included in the list of 1886. (J. Russell.)

Disa Luna. (*G. C.* 1902, xxxi, 314.) Orchidaceæ. G. A garden hybrid between *D. racemosa* and *D. Veitchi.* (J. Veitch & Sons.)

Echinacea purpurea var. **atropurpurea** and var. **rosea elegans.** (*R. H.* 1902, 507.) Compositæ. H.

Varieties differing from the type in the colour of the ray-florets. (Cayeux & Le Clerc, Paris.)

Echinacea rosea spectabilis. (*Gard.* 1902, lxii, 410.) H. A garden hybrid of which one of the parents is *E. angustifolia.*

Echinocactus knippelianus. (*M. K.* 1902, 9, 103.) Cactaceæ. G. A new species with simple cylindric grass-green stems, having about 13 ribs, and canary-yellow flowers. Paraguay. (K. Knippel, Klein Quenstedt, Germany.)

Echinocactus microspermus var. **macrancistrus.** (*M. K.* 1902, 157, f.) G. The spines are longer than in the type. (F. de Laet, Contich, Belgium.)

***Echium Wildpretii.** (*B. M.* t. 7847.) Boraginaceæ. G. A handsome new species, cultivated for some time under the erroneous name of *E. candicans.* Stem 2–3 ft. high, simple. Leaves long and narrow. Flowers pale red, in a long dense thyrsus. Canary Islands. (Kew.)

***Epiphyllum delicatum.** (*G. C.* 1902, xxxii, 411.) Cactaceæ. S. A. pretty new species very similar to *E. truncatum*, but the plant is more erect, the branches are more strongly toothed, and the flowers are larger and white, flushed with pink. Brazil. (W. Bull & Sons.)

Erigeron grandiflorus elatior. (*Jard.* 1902, 107, f. 56.) Compositæ. H. The stems are 12–16 in. high, each bearing 1–4 rather large lilac-coloured flower-heads. (Heinemann, Erfurt, Germany.)

Eupatorium adenophorum foliis variegatis. (*R. H.* 1902, 218.) Compositæ. G. The leaves are variegated with white or yellowish-white. (Cayeux & Le Clerc, Paris.)

Euphorbia cereiformis var. **submamillaris.** (*M. K.* 1902, 106, 125, f.) Euphorbiaceæ. G. Differs from the type in having the ribs divided by transverse furrows into rectangular acute mamillæ. (Berlin B. G.; Sir T. Hanbury, La Mortola.) [Often cultivated as *E. imbricata.*]

Euphorbia heptagona var. **fulvispina.** (*M. K.* 1902, 109.) G. Differs from the type in having a more grey-green stem, and more numerous reddish-brown spines. (Sir T. Hanbury, La Mortola.)

Euphorbia mammillaris var. **spinosior.** (*M. K.* 1902, 109, f.) G. Spines longer and more numerous than in the type. (Sir T. Hanbury, La Mortola.)

***Euphorbia viperina.** (*M. K.* 1902, 39.) G. A new species belonging to the group *Meduseæ.* Stem short, obconical, thickened, stellately branched at the apex; branches many, spreading, with 6 or 7 spiral rows of hexagonal tubercles. Cape? (Palermo B. G.; Kew.)

Euryops socotranus. (*B. M.* t. 7838.) Compositæ. G. A glabrous undershrub about 3 ft. high. Leaves deeply divided into 3 or 4 long narrowly linear segments. Flower-heads yellow, about 1¼ in. in diam., on slender peduncles as long as the leaves. Socotra. (Edinburgh B. G.)

***Exacum Forbesii.** (*G. C.* 1902, xxxi, 50, 93, f. 32.) Gentianaceæ. G. Of bushy habit, a foot or less in height. Leaves triangular, 1¼ in. across at the base; flowers about ½ in. across, in terminal racemes, purple in colour, with prominent yellow anthers. Socotra. (J. Veitch & Sons.)

Farfugium giganteum. (*B. T. O.* 1902, 142.) Compositæ. H. A new name proposed for *Senecio Kæmpferi* var. *aureo-maculata.*

***Ficus pandurata.** (*G. C.* 1902, xxxi, 440.) Urticaceæ. G. A robust erect plant. Leaves often more than 1 ft. long, fiddle-shaped, glabrous, shining above, cordate at the base, very shortly stalked. (F. Sander & Sons.) [This is not *F. pandurata*, Hance, a species from South China, of which the leaves are only 2–4 in. long, scabrous, acute at the apex, and not cordate at the base.]

***Freesia Armstrongii.** (*Gard.* 1901, lix, 374, f.; *G. M.* 1902, 352.) Iridaceæ. G. In general appearance much like *F. refracta*, but widely different in the colour of the flowers; the tube is white, with orange at the base, and the segments are heavily margined with rich rose, in which there is a suspicion of purple. Cape Colony. (Kew.) [Introduced about four years ago.]

***Fritillaria askabadensis.** (*J. H. F.* 1902, 145; *B. M.* t. 7850; *J. of H.* 1902, xliv, 292, 386, f.; *G. M.* 1902, 744, f.) Liliaceæ. H. A new species belonging to the section *Petilium*. Stem about 3 ft. high, stout. Uppermost leaves 5–6 in. long, linear-lanceolate, forming a whorl-like cluster. Flowers 5 to 8, pendulous among the uppermost leaves. Perianth about 1 in. long, campanulate, pale yellow-green. Central Asia. (Van Tubergen, junr., Haarlem; Miss Willmott.)

***Fritillaria tuntasia.** (*Gard.* 1902, lxi, 307; *J. of H.* 1902, xliv, 540.) H. Plant 8–10 in. high. Leaves long and glaucous. Flowers campanulate, 4 to 6 together, intensely dark maroon, about 1 in. across. Native country unknown. (Max Leichtlin, Baden-Baden.)

Gazania. (*B. T. O.* 1902, 45, 314, 315.) Compositæ. G. The following garden hybrids are described or mentioned:—*G. Arctotis*, *coronata*, *diademata*, *elmensis*, *gloriosa*, *illustris*, *Italia*, *ochroleuca*, *romana*, *Trinacria*, *vomerensis*.

Gentiana acaulis var. **Kochii.** (*Gard.* 1902, lxii, 411.) Gentianaceæ. H. Flowers very large and finely-coloured. Mountains of Greece. (S. Arnott.) [This is probably *G. kochiana*, Perr. & Song. = *G. acaulis*.]

***Geranium grandiflorum.** (*G. C.* 1902, xxxii, 300.) Geraniaceæ. H. "May be described as a dwarf and refined *G. pratense* with enlarged flowers." Himalaya. (Max Leichtlin, Baden-Baden.)

Gerbera Jamesoni var. **illustris.** (*B. T. O.* 1902, 167.) Compositæ. G. A very robust variety. (C. Sprenger, Naples.)

***Gladiolus Mackinderi.** (*B. M.* t. 7860.) Iridaceæ. G. A new species. Stem slender, about 2 ft. high. Leaves narrowly linear, the lower about 1 ft. long. Spike 6 in. long, 5 or 6-flowered. Perianth-tube yellow; limb scarlet, 1½ across, with broad segments. Mount Kenia, British East Africa. (Kew.)

Gomphocarpus textilis. (*R. H.* 1902, 34, f. 10.) Asclepiadaceæ. G. A subshrubby plant about 3 ft. high. Stems slender, not much branched. Leaves long, linear-lanceolate. Flowers in pendulous terminal corymbs, white, with violet coronal lobes. Tropics, precise country unknown. (Villa Thuret, Antibes, France.)

***Goodyera nuda.** (*O. R.* 1902, 239.) Orchidaceæ. S. Leaves variegated. "Flowers whitish, with the petals and mid-vein of the sepals light brown, and barely two lines long." An imperfectly known species. Mascarene Islands. (Kew.)

Gypsophila paniculata flore-pleno. (*G. C.* 1902, xxxii, 236, 336.) Caryophyllaceæ. H. "The flowers are not double in the usual manner, but present really an instance of prolification, each apparent bloom being really a head of blooms." (D. S. Thomson & Sons.)

Gypsophila repens monstrosa. (*Gard.* 1902, lxi, 365.) H. Said to be a new plant of great merit. (A. Perry.)

Habenaria Medusa. (*L.* xvii, t. 783; *O. R.* 1902, 164.) Orchidaceæ. S. The white flowers are remarkable in having the lip divided nearly to the base into about forty narrow filaments. Java. (L'Horticole Coloniale, Brussels.)

***Hæmanthus imperialis.** (*G. C.* 1902, xxxi, 85, 93, f. 33; *G. M.* 1902, 84, f.; *Gard.* 1902, lxi, 84; *J. of H.* 1902, xliv, 110.) Amaryllidaceæ. S. Resembles a finely developed *H. mirabilis*. It produces a large globular umbel of orange and salmon-coloured flowers, in which the segments are unusually broad. Congo. (L'Horticole Coloniale, Brussels.)

***Hæmanthus Laurentii.** (*J. H. F.* 1902, 289.) S. A new species allied to *H. Lindeni*, but differing in the length of the perianth-tube, which is scarcely 5 lin. long. The flowers are salmon-coloured, in a rather dense globose umbel about 7 in. across. Congo. (Brussels B. G.)

Helenium grandicephalum atropurpureum. (*G. C.* 1902, xxxi, 441.) Compositæ. H. A variety of *H. autumnale*, with almost entirely crimson flower-heads. (T. S. Ware.)

***Heliconia Edwardus Rex.** (*G. C.* 1902, xxxi, 440.) Scitamineæ. S. A species with crimson *Canna*-like foliage. (F. Sander & Sons.)

Heuchera brizoides gracillima. (*Gard.* 1902, lxii, 9; *J. of H.* 1902, xliv, 520.) Saxifragaceæ. H. A garden hybrid between *H. micrantha*, or its var. *rosea*, and *H. brizoides*. (Lemoine, Nancy; R. Wallace & Co.)

Hibiscus Manihot dissecta. (*R. H.* 1902, 113, f. 43.) Malvaceæ. G. The leaves are cut almost to the petiole into narrow lobes. (Vilmorin, Andrieux & Co., Paris.)

Hibiscus Scotti. (*B. M.* t. 7816.) S. A large bush or small tree. Leaves shortly stalked, usually ovate, entire 3-lobed or toothed. Flowers 3½ in. across, bright golden yellow, with carmine at the base of the broad petals. Socotra. (Edinburgh B. G.)

Hieracium Bornmulleri. (*G. C.* 1902, xxxii, 195, 221.) Compositæ. H. Something like *H. villosum*, but the leaves are thicker and more woolly, though not so white, and the flower-heads are larger and of a brighter yellow. Asia Minor. (S. Arnott.)

Hippeastrum Kromeri. (*G. C.* 1902, xxxi, 38, 165.) Amaryllidaceæ. G. Said to be a new species most closely allied to *H. correiense*, and having fulvous foliage. Brazil. (E. Kromer.)

***Hippeastrum stylosum nudum.** (*G. C.* 1902, xxxi, 39.) G. "Filaments remarkably exserted, and the stamens spread out as in *H. calyptratum*." (A. Worsley.)

Hunteria Ballayi. (*Bull. Mus. Paris*, 1902, 279, 231.) Apocynaceæ. S. A new species. It is a glabrous shrub, with large elliptic leaves and few-flowered axillary inflorescences. The corolla-tube is 3 lin. long, and the lobes 1½–1¾ lin. long. Gaboon. (Paris B. G.)

Hyacinthus azureus var. **amphibolis.** (*Gard.* 1902, lxi, 358.) Liliaceæ. H. Spikes 8 in. high, consisting of about 50 flowers, which are rather paler in colour than in the type. (R. Wallace & Co.)

Hydrangea superba. (*Gard.* 1902, lxii, 210.) Saxifragaceæ. G. A garden hybrid between *H. Otaksa* and *H. Hortensia cyanoclada*. (H. Walsh, Wood's Holl, Mass., U.S.A.)

Iberis hyacinthiflora. (*Gfl.* 1902, 62.) Cruciferæ. H. An annual with long racemes of milk-white flowers. (Prussian Hort. Soc.)

Idesia polycarpa foliis variegatis. (*B. T. O.* 1902, 139.) Bixaceæ. H. Leaves variegated with sulphur-yellow and grey. (P. Pravert, Padua.)

Imantophyllum cyrtantho-miniatum (*J. of H.* 1902, xlv, 135.) Amaryllidaceæ. S. Presumably a garden hybrid between the species indicated in the name. (W. Bull & Sons.) [*? Clivia cyrtanthiflora.*]

Impatiens cuspidata var. **arthritica.** (*B. M.* t. 7844.) Geraniaceæ. S. Differs from the type in having the lower nodes very much thickened. Nilghiri Mountains. (Edinburgh B. G.)

***Indigofera caudata.** (*G. C.* 1902, xxxii, 210.) Leguminosæ. G. A new shrubby species, 3–8 ft. high, covered on the young shoots with a copper-coloured pubescence. The flowers are white, about 4 lin. long, arranged in very long tail-like racemes. Yunnan, China. (Kew.)

***Iris Aschersoni.** (*Gard.* 1902, lxi, 288, ff.) Iridaceæ. H. A new species closely allied to *I. Grant-Duffii*, but having much narrower leaves. The flowers appear to be greenish-yellow, with thin purple lines. Asia Minor. (Siehe.)

***Iris bucharica.** (*G. C.* 1902, xxxi, 385, f. 135; *G. M.* 1902, 243, f.) H. A new species resembling *I. orchioides*, but the falls are different in shape, having a strap-shaped claw and an obovate blade, which bears a large crest. Eastern Bokhara. (Van Tubergen, junr., Haarlem.)

Iris lupina robusta. (*Gard.* 1902, lxi, 393.) H. The colour of the flowers appears to differ from that of the type. Amongst other characters the standards are described as silver-grey, veined with brown. (R. Wallace & Co.)

Iris Masiæ. (*Gard* 1902, lxi, 288.) H. Closely resembles *I. Grant-Duffii*, but it has deep-purple flowers. Asia Minor? (Max Leichtlin, Baden-Baden.)

Iris paracina. (*G. C.* 1902, xxxi, 397.) H. A garden hybrid between *I. paradoxa* and *I. sambucina*. (Barr & Sons.)

Iris sarpedon. (*G. C.* 1902, xxxi, 398; *G. M.* 1902, 383, 476, f.; *Gard.* 1902, lxi, June 14, viii, misprinted *sarpedord*). H. Said to be a hybrid between *I. pallida dalmatica* and *I. asiatica*. (G. Yeld.)

***Iris sofarana magnifica.** (*G. M.* 1902, 348, 351, f.; *Gard.* 1902, lxi, 388, 393; lxii, 10, f.) H. A large-flowered form. The falls are broad, red-brown, shaded with purple, and have a purple crest. Standards somewhat paler, beautifully reticulated. (R. Wallace & Co.; Barr & Sons.)

***Iris warleyensis.** (*G. C.* 1902, xxxi, 386, f. 134; *Gard.* 1902, lxi, 232, 241, f.) H. A new species very similar to *I. orchioides cærulea*, from which it differs chiefly in the colour of the flowers, shades of violet predominating in those of the new species. Eastern Bokhara. (Van Tubergen, junr., Haarlem; Miss Willmott.)

Ismene calathina grandiflora. (*Jard.* 1902, 214, f. 112.) Amaryllidaceæ. G. The corona is larger than in the type. (J. Barth Bos, Overveen, near Haarlem.) [*Hymenocallis calathina* var.]

Jasminum floribundum. (*G. C.* 1902, xxxii, 20.) Oleaceæ. G. Resembles the well-known *J. officinale*. The leaves are pinnate, with usually five leaflets. Flowers white, fragrant, nearly 1 in. across, in terminal and lateral few-flowered cymes. Abyssinia and Somaliland. (Cambridge B. G.)

***Jasminum Maingayi.** (*B. M.* t. 7823.) S. A scandent shrub. Leaves ovate-oblong or lanceolate, 3–4 in. long. Flowers in terminal cymes. Corolla white; tube 1 in. long; limb 1½ in. across, with 8 to 10 narrowly oblong segments. Penang. (F. Sander & Sons; Kew.)

***Kalanchoe diversa.** (*G. C.* 1902, xxxii, 210.) Crassulaceæ. G. A new species in general appearance somewhat resembling *K. Kirkii*. Stem 1½–2 ft. high. Leaves lanceolate to elliptic-ovate, up to 5¼ in. long, toothed, glabrous, with petioles ¼–1½ in. long. Flowers in subcorymbose cymes; corolla-tube about ½ in. long, green; lobes 2–2½ lin. long, pale vermilion-orange. Somaliland. (Kew.)

***Kalanchoe kewensis.** (*G. C.* 1902, xxxi, 387; *Gard.* 1902, lxii, 26, ff.) G. A garden hybrid between *K. Bentii* and *K. flammea*. (Kew.)

***Kalanchoe Kirkii.** (*G. C.* 1902, xxxii, 110; *B. M.* t. 7871.) G. A new species. Stem 2–4 ft. high. Lower and middle leaves oblong to lanceolate, 1¾–4½ in. long, with petioles ½–2 in. long. Flowers brilliant orange-scarlet, in large corymbose cymes. Nyasaland and Portuguese East Africa. (Earl Fitzwilliam; Kew.) [Introduced in 1893, and cultivated under the name of *K. coccinea*, with which species it has been confused.]

***Kalanchoe somaliensis.** (*B. M.* t. 7831.) G. A new species with an erect shrubby habit. Leaves obovate, or oblong-obovate, 4–6 in. long, toothed. Flowers in a loose cyme 6–10 in. long and broad. Corolla white, faintly tinged with yellow; tube 2½ in. long; segments of the limb ⅔ in. long, ovate-lanceolate. Somaliland. (Kew.)

Kitaibelia Lindemuthii. (*J. of H.* 1902, xliv, 253; *Gard.* 1902, lxii, 211.) Malvaceæ. H. A graft-hybrid, produced by grafting *K. vitifolia* on *Abutilon Thompsoni*. The leaves are prettily marbled as in the *Abutilon*. (H. Lindemuth, Berlin.)

***Kniphofia longiflora.** (*K. B.* 1901, 134.) Liliaceæ. G. Leaves linear, 2 ft. long. Peduncle stout, 3 ft. high or more. Raceme dense, oblong, 3 in. long. Perianth slender, deflexed, 1½ in. long, yellow-red. Natal. (Kew.)

Kosteletzkya pentacarpa. (*B. T. O.* 1902, 169.) Malvaceæ. H. An erect plant rather more than a yard high, with cordate toothed leaves, and rather large pale rose flowers, borne singly on peduncles a little shorter than the leaves. Russia.

Lælia flavina. (*O. R.* 1902, 147; *G. M.* 1902, 267.) Orchidaceæ. S. A garden hybrid between *L. pumila* and *L. flava*. (J. Veitch & Sons.)

Lælia Gilbertii. (*Gard.* 1902, lxii, 372; *G. C.* 1902, xxxii, 384.) S. Supposed to be a natural hybrid between *L. tenebrosa* and *L. elegans*. (F. Wellesley.)

Lælia præstans. (*R. H. B.* 1902, 264, 281.) S. The following forms are described: — *Lindeni*, *ronseleana*, *vinckeana*, and *virginalis*. (Marquis de Wavrin.) [*L. pumila* var.]

Lælio-cattleya amœna. (*R. H.* 1902, 582.) Orchidaceæ. G. A garden hybrid between *Lælia harpophylla* and *Cattleya Eldorado alba.* (C. Maron, Brunoy, France.) [This name has already been used for a hybrid between *Cattleya Loddigesii* and *Lælia Perrinii.*]

Lælio-cattleya burbagensis. (*O. R.* 1902, 271.) G. A garden hybrid probably between *Cattleya granulosa* and *Lælia purpurata.* (C. C. Hurst.)

Lælio-cattleya choletiana. (*O. R.* 1902, 99; *G. M.* 1902, 134, 214, f.) G. A garden hybrid between *Cattleya Mossiæ* and *Lælia superbiens.* (Dallemagne, Rambouillet, France.)

Lælio-cattleya conspicua. (*G. C.* 1902, xxxii, 25; *O. R.* 1902, 243.) See *Brasso-cattleya conspicua.*

Lælio-cattleya Cooksonæ. (*O. R.* 1902, 307.) G. A garden hybrid between *L.-c. Clive* and *Cattleya labiata.* (N. C. Cookson.)

Lælio-cattleya digbyano-Schrœderæ. (*G. C.* 1902, xxxi, 219, 235, 239, f. 75.) G. A garden hybrid between the species indicated in the name. (J. Veitch & Sons.)

Lælio-cattleya dormaniano-aurea. (*R. H.* 1902, 494.) S. A garden hybrid between *Lælia dormaniana* and *Cattleya aurea.* (O. Doin, Dourdan, France.)

Lælio-cattleya Duchesnei. (*L.* xvii, t. 777.) S. A garden hybrid between *Lælia purpurata* and *Cattleya schilleriana.* (L'Horticole Coloniale, Brussels.)

Lælio-cattleya Edwardi. (*G. M.* 1902, 169.) G. A garden hybrid between *Lælia cinnabarina* and *Cattleya hardyana.* (F. Sander & Sons.)

Lælio-cattleya godiniana. (*R. H.* 1902, 218.) G. A garden hybrid between *Cattleya Gigas* and *Lælia grandis tenebrosa.* (Dallemagne, Rambouillet, France.)

Lælio-cattleya gracilis. (*R. H. B.* 1902, 280.) S. A garden hybrid between *Cattleya bowringiana* and *Lælia anceps.* (A. A. Peeters, Brussels.)

Lælio-cattleya Groganiæ. (*O. R.* 1902, 30, 64.) G. A garden hybrid between *Lælia dayana* and *Cattleya harrisoniana.* (Mrs. Grogan.)

Lælio-cattleya Hodgkinsonæ. (*O. R.* 1902, 219.) G. Supposed to be a garden hybrid between *Lælia harpophylla* and *Cattleya Mossiæ.* (Dr. Hodgkinson.)

Lælio-cattleya Humberti. (*R. H.* 1902, 297; *J. H. F.* 1902, 337.) S. A garden hybrid between *Lælia majalis* or *L. superbiens* and *Cattleya Aclandiæ.* (Dallemagne, Rambouillet, France.)

Lælio-cattleya Liptoni. (*O. R.* 1902, 29.) G. A garden hybrid between *Lælia anceps* and *Cattleya labiata.* (A. A. Peeters, Brussels.)

Lælio-cattleya Mariæ. (*G. C.* 1902, xxxii, 384.) See *Brasso-cattleya Mariæ.*

Lælio-cattleya mollis. (*O. R.* 1902, 342.) G. A garden hybrid between *Cattleya Mossiæ* and *Lælia boothiana.* (F. Sander & Sons.)

Lælio-cattleya Mossiæ-grandis. (*R. H.* 1902, 261.) G. A garden hybrid between *Cattleya Mossiæ* and *Lælia grandis.* (Dallemagne, Rambouillet, France.)

Lælio-cattleya Pauli. (*L.* xvii, t. 784.) S. A garden hybrid between *Lælia purpurata* and *Cattleya schilleriana.* (L'Horticole Coloniale, Brussels.)

Lælio-cattleya Perrino-Mossiæ. (*R. H.* 1902, 582.) S. A garden hybrid between *Lælia Perrinii* and *Cattleya Mossiæ.* (C. Béranek, Paris.)

Lælio-cattleya Rex. (*G. M.* 1902, 328.) G. A garden hybrid between *Cattleya Mossiæ reineckiana* and *Lælia purpurata.* (F. Sander & Sons.)

Lælio-cattleya wylamiana. (*G. C.* 1902, xxxii, 183.) G. A garden hybrid between *Cattleya granulosa* and *Lælia crispa.* (J. S. Moss.)

Lathyrus Mulkak. (*Gard.* 1902, lxi, 407.) Leguminosæ. H. Like *L. grandiflorus*, "but bears more flowers, which are deeper in colour, and fragrant." Central Asia. (Max Leichtlin, Baden-Baden.)

Layia gaillardioides. (*G. C.* 1902, xxxii, 61, f. 23.) Compositæ. H. A loosely branched hispidly hairy annual 1–2 ft. high, having lanceolate or linear leaves, and rather large flower-heads; ray-florets 12-20, orange-yellow. California. (W. E. Gumbleton; Dammann & Co., Naples.)

Leptolælia Veitchii. (*O. R.* 1902, 149, 157.) Orchidaceæ. G. A garden hybrid between *Leptotes bicolor* and *Lælia cinnabarina*. (J. Veitch & Sons.)

Ligustrum yunnanense. (*R. H.* 1902, 497, ff. 223–225.) Oleaceæ. H. A vigorous deciduous shrub 10–13 ft. high, with divaricate sometimes pendulous branches, elliptic-lanceolate leaves $2\frac{1}{2}$–$7\frac{1}{2}$ in. long, and large terminal paniculate inflorescences. Yunnan, China. (Paris B. G.)

Lilium longiflorum var. **insulare.** (*Gard.* 1902, lxi, Jan. 4, vii, f.) Liliaceæ. H. H. Similar to the variety *Harrisii*, but the perianth is longer. Magelhaes Archipelago, South of Japan.

Linaria Pancici. (*Gfl.* 1902, 105.) Scrophulariaceæ. H. A beautiful dwarf species with narrowly lanceolate leaves and large canary-yellow flowers. Orient. (Dammann & Co.) [This is not the true *L. Pancici*, Janka, which is referred to *L. dalmatica* var. *macedonica*, a tall erect plant, with large ovate-lanceolate leaves and a dense raceme of large yellow flowers.]

***Listrostachys bracteosa.** (*O. R.* 1902, 296.) Orchidaceæ. S. Stem very short. Leaves oblong, 6–9 in. long, arching, with an unequally lobed apex. Raceme axillary, few-flowered. Flowers fleshy, pale yellowish green. Mascarene Islands. (Kew.)

Lycaste Cappei. (*J. H. F.* 1902, 139.) Orchidaceæ. G. A garden hybrid between *L. plana* and *L. Skinneri*. (M. Cappe, Vésinet, France.)

Lycaste Charlesworthi. (*G. C.* 1902, xxxi, 135.) G. A garden hybrid of unrecorded parentage. (Charlesworth & Co.)

Lycaste lucianiana. (*O. R.* 1902, 53.) G. A natural hybrid between *L. Skinneri* and *L. lasioglossa*. (Frau Ida Brandt, Zurich.)

Lycaste Skinneri denholmiana. (*Gard.* 1902, lxi, 231.) G. The upper lobes of the flower are rich crimson, and the lip almost white. (Stanley, Ashton & Co.)

Lycoris radiata var. **pumila.** (*B. T. O.* 1902, 242.) Amaryllidaceæ. G. Much dwarfer than the type. Central China. (C. Sprenger, Naples.)

Lycoris Sprengeri. (*G. C.* 1902, xxxii, 469.) H. A distinct new species, having short ovate spathe-valves, long pedicels, rose-pink or purplish-rose flowers without any distinct tube above the ovary. Japan? (C. Sprenger, Naples.)

***Magnolia salicifolia.** (*Veitch Cat.* [1902], 45.) Magnoliaceæ. H. A small tree with slender branches. Leaves lanceolate, 5–6 in. long, light green above and silvery white beneath. North Japan. (Arnold Arboretum.)

Mammillaria Bussleri. (*M. K.* 1902, 47, f.) Cactaceæ. G. Stem subglobose, furnished with long spreading spines. Flowers $1\frac{1}{4}$ in. long and $1\frac{3}{4}$–2 in. in diameter, apparently white. Mexico. (W. Mundt, Pankow, Germany.)

Maranta insignis. (*G. C.* 1902, xxxii, 63; *J. of H.* 1902, xlv, 218, f.) Scitamineæ. S. Leaves about 15 in. long and 2 in. broad in the middle, tapering to the apex, wavy on the margins, bright green, with olive-green markings. Brazil. (W. Bull & Sons.)

Masdevallia xipheres. (*O. R.* 1902, 228.) Orchidaceæ. G. Allied to *M. muscosa*, differing in having several-flowered scapes, and rather larger greenish brown flowers, with traces of darker spots, and stouter purple-brown tails. (F. Sander & Sons.)

Maxillaria macrura. (*O. R.* 1902, 343.) Orchidaceæ. G. This is the correct name for the plant called *M. longisepala* in the list of 1890.

***Mertensia primuloides.** (*Gfl.* 1902, 248; *Gard.* 1902, lxii, 178.) Boraginaceæ. H. A small tufted plant growing about 6 in. high. Leaves lanceolate. Flowers about $\frac{1}{2}$ in. across, in dense racemes; pedicels very short. Corolla indigo-blue passing into white and yellow. Western Himalaya. (Max Leichtlin, Baden-Baden.)

***Mesembryanthemum Mahoni.** (*G. C.* 1902, xxxii, 190.) Ficoideæ. G. A new species. Plant about 6 in. high, densely covered with minute crystalline papillæ. Leaves subterete, 1–1⅔ in. long, 1¼–1½ lin. broad. Flowers in terminal cymes. Petals bright violet-purple, in two series, 3–6 lin. long. South Rhodesia. (Kew.)

***Mesembryanthemum racemosum.** (*G. C.* 1902, xxxii, 350.) G. A new species most nearly allied to *M. asperum* and *M. compressum*, differing in having racemose sessile flowers; these are about 1 in. across, deep rose-pink, having the petals in about three series. South Africa. (Kew.)

Miltonia vexillaria gigantea. (*G. M.* 1902, 416; *J. of H.* 1902, xlv, 49, f.) Orchidaceæ. S. Flowers large, of a deep reddish-rose colour, paler at the base of the lip, and having a large yellow disk marked with rose and crimson lines. (Sir F. Wigan.)

Minkelersia biflora. (*B. M.* t. 7819.) Leguminosæ. G. A tuberous-rooted plant with slender twining stems, trifoliolate stalked leaves, and 2-flowered axillary peduncles about 2½ in. long. The flowers are pale red-purple, 1½ in. long. The genus is allied to *Phaseolus*. Mexico. (Kew.)

***Moschosma riparium.** (*G. C.* 1902, xxxi, 123, f. 35.) Labiatæ. G. A shrub with hairy stems, stalked ovate cordate crenate leaves, and very numerous small cream-coloured flowers in erect panicles. Tropical South Africa. (J. Veitch & Sons; Kew.)

Musa imperialis. (*B. T. O.* 1902, 235.) Scitamineæ. S. Said to be a magnificent species, belonging to the same group as *M. Ensete*. It has a subterranean perennial stem, and enormous somewhat lanceolate leaves. Cameroons.

Nephrolepis Piersoni. (*G. M.* 1902, 230.) Filices. S. A sport from the Boston Fern (*N. exaltata* var. *bostoniensis*) in which the pinnæ are very much divided. (F. Pierson & Co., Tarrytown, New York.)

Nerine flexuosa alba. (*G. M.* 1902, 710; *G. C.* 1902, xxxii, 325.) Amaryllidaceæ. G. A white-flowered variety. South Africa. (Barr & Sons.)

Odontoglossum Alexandra Regina. (*G. C.* 1902, xxxi, 442; *O. R.* 1902, 214; *Gard.* 1902, lxii, 17.) Orchidaceæ. G. A supposed hybrid between *O. schlieperianum* or *O. Insleayi* and *O. grande*. (Charlesworth & Co.)

Odontoglossum Alexandræ Imperatrix Regina. (*Gard.* 1902, lxii, 17.) See *O. crispum Imperatrix Reginæ*.

Odontoglossum ardentissimum. (*O. R.* 1902, 175; *G. C.* 1902, xxxii, 50, f. 19.) G. A garden hybrid between *O. crispum* and *O. Pescatorei*. (Ch. Vuylsteke, Ghent.)

Odontoglossum armainvillierense var. **ardentissimum.** (*O. R.* 1902, 209, 240 f. 22.) See *O. ardentissimum*.

Odontoglossum bellatulum. (*O. R.* 1902, 99.) G. Supposed to be a garden hybrid between *O. Pescatorei* and *O. sceptrum*. (Ch. Vuylsteke, Ghent.) [This is not the same *O. bellatulum* recorded in the list of 1899.]

Odontoglossum chromaticum. (*G. C.* 1902, xxxi, suppl. May 31, ii.) G. A garden hybrid of unrecorded parentage. (L'Horticole Coloniale, Brussels.)

Odontoglossum concinnum. (*O. R.* 1902, 175, 210.) G. A garden hybrid between *O. crispum* and *O. Pescatorei*. (Ch. Vuylsteke, Ghent.)

Odontoglossum crispum ardentissimum. (*G. C.* 1902, xxxi, suppl. May 31, ii; *G. M.* 1902, 349, f.) See *O. ardentissimum*.)

Odontoglossum crispum Backhousei. (*G. C.* 1902, xxxi, 266.) G. An unspotted variety. (A. Warburton.)

Odontoglossum crispum concinnum. (*G. C.* 1902, xxxi, suppl. May 31, ii; *G. M.* 1902, 349.) See *O. concinnum*.

Odontoglossum crispum dulce. (*G. C.* 1902, xxxi, suppl. May 31, ii; *G. M.* 1902, 349.) See *O. dulce*.

Odontoglossum crispum etterbeekensis. (*O. R.* 1902, 176.) G. Remarkable for its light yellow segments prettily spotted with brown. (Fl. Claes, Brussels.)

Odontoglossum crispum gratrixianum. (*G. C.* 1902, xxxii, 25.) G. "A closely-flowered spotted form." (S. Gratrix.)

Odontoglossum crispum Imperatrix Reginæ. (*O. R.* 1902, 214; *G. C.* 1902, xxxi, 443.) G. "A fine purplish rose form, with some reddish purple in the middle of each segment, and some white at the base." (F. Sander & Sons.)

Odontoglossum crispum Memoria Bulli. (*L.* xvii, t. 780.) G. Flowers well-formed, marked with very large brownish red blotches. (L'Horticole Coloniale, Brussels.)

Odontoglossum crispum Pittiæ. (*G. C.* 1902, xxxi, 314.) G. Flowers heavily and symmetrically blotched with dark chocolate-purple. (H. T. Pitt.)

Odontoglossum crispum Poultoni. (*G. C.* 1902, xxxii, 314, 344.) G. Flowers white, heavily blotched with purplish-rose. (T. Baxter; De B. Crawshay.)

Odontoglossum crispum reedleyense. (*G. C.* 1902, xxxi, 67, 123.) G. A colour variety. (R. Tunstill.)

Odontoglossum crispum Robsoni. (*O. R.* 1902, 93.) G. "A fine round form rather nicely marked." (J. Robson.)

Odontoglossum crispum truffautianum. (*O. R.* 1902, 115.) G. A white form with irregular clusters of red brown blotches in the middle of the segments. (Baron Sir H. Schröder.)

Odontoglossum crispum venificum. (*G. C.* 1902, xxxi, suppl. May 31, ii; *G. M.* 1902, 349.) See *O. venificum.*

Odontoglossum dickensianum. (*R. H.* 1902, 218.) G. A garden hybrid between *O. Halli* and *O. crispum* var. *Patcho.* (Dallemagne, Rambouillet, France.)

Odontoglossum dulce. (*O. R.* 1902, 175, 210.) G. A garden hybrid between *O crispum* and *O. Pescatorei.* (Ch. Vuylsteke, Ghent.)

Odontoglossum Edwardus Rex. (*G. C.* 1902, xxxi, 413, f. 152; *G. M.* 1902, 350, f.) G. Supposed to be a natural hybrid, probably between *O. crispum* and *O. excellens.* (F. Sander & Sons.)

Odontoglossum galbum. (*L.* xvii, 12; *G. C.* 1902, xxxi, 281.) G. Supposed to be a natural hybrid between *O. odoratum* and *O. hunnewellianum.* (L'Horticole Coloniale, Brussels.)

Odontoglossum harryano-excellens. (*G. M.* 1902, 328.) G. A garden hybrid between the species indicated in the name. (J. Rutherford.)

Odontoglossum harryano-triumphans. (*G. C.* 1902, xxxi, 442; *Gard.* 1902, lxii, 17.) G. A garden hybrid between the species indicated in the name. (Charlesworth & Co.)

Odontoglossum Hystrix secundum nulli. (*Gard.* 1902, lxi, 315.) G. "Sepals deep chocolate, with pale greenish-yellow tips, the petals being less heavily marked. The heavily fringed white lip is marked with red." (H. T. Pitt.)

Odontoglossum leeanum crawshayanum. (*G. C.* 1902, xxxi, 50.) G. "More densely spotted than the type." (De B. Crawshay.)

Odontoglossum Mulus hellemmense. (*Jard.* 1902, 92.) G. A beautiful variety with clear canary-yellow flowers. (M. Fanyau, Hellemmes, Nord, France.)

Odontoglossum Pescatorei Charlesworthii. (*G. C.* 1902, xxxi, suppl. May 31, ii; *G. M.* 1902, 349.) "A fine white flower, profusely blotched with violet-purple." (Charlesworth & Co.)

Odontoglossum Pescatorei inusitatum. (*G. M.* 1902, 328.) G. Large flowers with pure white sepals and petals. (Ch. Vuylsteke, Ghent.)

Odontoglossum Pescatorei virginale. (*G. C.* 1902, xxxii, 25.) G. "A chaste form with a pale yellow blotch on the lip." (S. Gratrix.)

Odontoglossum sceptro-crispum. (*L.* xvii, t. 773.) G. A garden hybrid between *O. sceptrum* and *O. crispum.* (L'Horticole Coloniale, Brussels.)

Odontoglossum tripudio-crispum. (*O. R.* 1902, 367.) G. A garden hybrid between the species indicated in the name. (F. Sander & Sons.)

Odontoglossum triumphans Cobbiæ. (*J. of H.* 1902, xliv, 326.) G. Flowers larger and finer than those of the type. (W. Cobb.)

Odontoglossum triumphans latisepalum. (*Gard.* 1902, lxi, 315; *G. M.* 1902, 302.) G. "The broad sepals and petals are tipped with green, the

remaining portion being chocolate-brown. The marking on the petals is slightly relieved by streaks of white at the base. The lip is white, heavily marked with a light chocolate." (Baron Schröder.)

Odontoglossum venificum. (*O. R.* 1902, 175, 210.) G. A garden hybrid between *O. crispum* and *O. Pescatorei.* (Ch. Vuylsteke, Ghent.)

Odontoglossum Vuylstekei. (*O. R.* 1902, 99.) G. A garden hybrid of unrecorded parentage. (Ch. Vuylsteke, Ghent.)

Oncidium Forbesii atratum. (*L.* xvii, t. 779.) Orchidaceæ. G. Flowers very large, the predominating colour purple-brown. (L'Horticole Coloniale, Brussels.)

Oncidium Forbesii Bradshawæ. (*G. C.* 1902, xxxii, 184; *O. R.* 1902, 308.) G. An albino form, in which the purple markings of the type are changed to bright yellow. (Stanley, Ashton & Co.)

Oncidium punctatum. (*G. C.* 1902, xxxii, 239.) G. A supposed natural hybrid between *O. Forbesii* and *O. Gardneri.* (Cowan & Co.)

Oncidium tigrinum Crookii. (*O. R.* 1902, 375.) G. A distinct and pretty variety, in which the markings on the sepals and petals consist of 3 or 4 light brown bands. (T. M. Crook.)

Oncidium varicosum Charlesworthi. (*G. M.* 1902, 566, f.) G. A particularly fine variety, the lip being 2¾ in. across. (Charlesworth & Co.)

Oncidium varicosum moortebeekiense. (*G. M.* 1902, 177, f.; *L.* xvi, t. 767.) G. Inflorescence very compact. Flowers golden-yellow, with a large reddish-brown blotch at the base of the lip. (L'Horticole Coloniale, Brussels.) [*O. varicosum* var *insigne.* See *O. R.* 1902, 151.]

Oncoba aristata. (*Bull. Mus. Paris*, 1902, 68.) Bixaceæ. S. A small glabrous tree with polygamous flowers. Leaves oblong, 9–12 in. long, abruptly acuminate, with rather long petioles. Flowers about ½ in. across, in slender axillary racemes about 2 in. long. Gaboon. (Paris B. G.) [Introduced in 1895, and flowered for the first time in 1900.]

***Ornithogalum kewense.** (*Gard.* 1902, lxi, 339.) Liliaceæ. G. A garden hybrid between *O. thyrsoides* and *O. aureum.* (Kew.)

Papaver Moneti. (*R. H.* 1902, 150.) Papaveraceæ. H. A spontaneous hybrid between *P. glaucum* and *P. Rhœas.* (C. Monet.)

Papaver piloso-bracteatum. (*R. H.* 1902, 525, f. 237.) H. A garden hybrid between the species indicated in the name. (F. Cayeux.)

Paphiopedilum burbagense. (*O. R.* 1902, 220.) Orchidaceæ. S. A garden hybrid between *P. insigne Chantini* and *P. selligerum rubrum.* (C. C. Hurst.)

Paphiopedilum dowlingianum. (*O. R.* 1902, 101.) S. A garden hybrid between *P. insigne punctato-violaceum* and *P. Godefroyæ leucochilum.* (W. M. Appleton.)

Paphiopedilum Hunteri. (*O. R.* 1902. 100.) S. A garden hybrid between *P. tonsum* and *P. bellatulum.* (W. S. Steel.)

Paphiopedilum insigne radiatum. (*O. R.* 1902, 374.) S. A form in which the spots of the flower are replaced by light brown lines. (R. I. Measures.)

Paphiopedilum insigne vars. (*O. R.* 1902, 23, 24.) G. Forms named *berryanum, macranthum, smaragdinum, tesselatum, Thompsoni,* and *youngianum* are here described. (O. O. Wrigley.)

Paphiopedilum prestonense. (*O. R.* 1902, 101.) S. A garden hybrid between *P. marmorophyllum* and *P. Argus.* (C. Parker.)

Paphiopedilum Venetia. (*O. R.* 1902, 241, f. 25.) S. A garden hybrid between *P. Morganiæ burfordiense* and *P. lawrenceanum.* (H. J. Ross, Florence.)

***Passiflora ambigua.** (*B. M.* t. 7822.) Passifloraceæ. S. A handsome new species allied to *P. laurifolia* and *P. maliformis.* Leaves entire, oblong-lanceolate or ovate-lanceolate, 8–10 in. long. Peduncles 1½–2 in. long. Flowers 5 in. across, white and pale pink dotted with rose purple; the corona nearly 2 in. long, red and violet, banded with white. Nicaragua. (Kew.)

Passiflora maculifolia. (*G. C.* 1902, xxxii, 334, f.) S. A new species. Leaves roundish, cordate, slightly 3-lobed at the top, dark green above, with yellow blotches, purplish beneath. Flowers cream-coloured, about 1 in. across. Venezuela. (Charlesworth & Co.)

Pescato-bollea bella. (*O. R.* 1902, 347.) Orchidaceæ. S. Supposed to be a natural hybrid between *Bollea cælestis* and *Pescatorea Klabochorum*. (O. Frœbel, Zurich.) [This name is proposed for the plant called *Pescatorea bella* in the list of 1878.]

Phaio-cymbidium chardwarensis. (*G. M.* 1902, 202; *O. R.* 1902, 117.) Orchidaceæ. S. A garden hybrid between *Phaius grandifolius* and *Cymbidium giganteum*. (G. F. Moore.)

Phlox setacea cærulescens. (*G. C.* 1902, xxxii, 136.) Polemoniaceæ. H. A variety with bluish flowers. (Henkel, Darmstadt.)

***Piaranthus Sprengeri.** (*B. T. O.* 1902, 168.) Asclepiadaceæ. This is evidently the same plant included in the list of 1893 as *Huernia Sprengeri* = *Caralluma Sprengeri*, N. E. Br.

Plagiospermum sinense. (*M. D. G.* 1902, 68; *R. H.* 1902, 421.) Rosaceæ. H. A spiny shrub with oval-lanceolate or oblong-lanceolate entire shortly stalked leaves, $1\frac{1}{4}$–$1\frac{3}{4}$ in. long. Flowers nankin-yellow, about $\frac{1}{2}$ in. across, borne on slender peduncles about $\frac{1}{2}$ in. long, 2–6 together, in the axils of the leaves. N. China. (Regel & Kesselring, St. Petersburg; Darmstadt B.G.) [In cultivation five years ago. The genus is now referred to *Prinsepia*.]

Platyclinis barbifrons. (*G. C.* 1902, xxxi, 366.) Orchidaceæ. S. A new species closely resembling *P. filiformis*. Its flowers are whitish-green, and the lip is remarkable in having its anterior parts from the middle to the top bordered by a dense mass of filiform warts. Sumatra. (Baron von Fuerstenberg, Düsseldorf.)

***Platyosprion platycarpum.** (*G. C.* 1902, xxxii, 259.) Leguminosæ. H. This is the correct name for *Sophora platycarpa*, included in the list of 1896.

***Plectranthus albocæruleus.** (*K. B.* 1901, 130.) Labiatæ. G. A tall branched herb with stalked broadly ovate leaves 2–4 in. long, and rather crowded spike-like inflorescences. The corolla is about $\frac{1}{2}$ in. long, white and bluish. British Central Africa. (Kew.) [Flowered for the first time in 1899.]

***Plectranthus Mahonii.** (*B. M.* t. 7818.) G. Stem 3 ft. high. Leaves ovate, 3–4 in. long, petiolate, the lower cuneate, the upper cordate at the base, toothed. Racemes 3–8 in. long, loosely many-flowered. Flowers rather small, violet-blue. British Central Africa. (Kew.)

***Plectranthus saccatus.** (*B. M.* t. 7841.) G. A very ornamental species, probably the largest-flowered of the genus. Subshrubby and rather succulent. Branches about 1 ft. long, spreading horizontally. Leaves 2–3 in. long, ovate, coarsely toothed. Racemes erect, simple, lax-flowered. Corolla large, pale blue. Natal. (Cambridge B. G.)

***Polypodium irioides ramocristatum.** (*G. C.* 1902, xxxii, 25; *G. M.* 1902, 440.) Filices. G. "The strong fronds are much divided towards the apex, and in nearly every case these divisions are freely crested." (W. Bull & Sons.)

Populus charkowiensis. (*G. C.* 1902, xxxii, 163; *W. G.* 1902, 373.) Salicaceæ. Stated to be a hybrid between *P. nigra* and *P. pyramidalis*. (J. J. Gabeschtoff, Charkow, Russia.)

***Potentilla lanuginosa.** (*G. C.* 1902, xxxii, 262.) Rosaceæ. H. A shrubby or subshrubby species, rather decumbent in habit, not more than 9 in. high, having greyish or silvery leaves and clear yellow flowers nearly an inch across. Caucasus? (S. Arnott.)

Primula obconica semi-plena. (*G. C.* 1902, xxxii, 445; *G. M.* 1902, 827.) Primulaceæ. G. The flowers are deep rose, and in most cases semi-double. (Sir Trevor Lawrence.)

***Primula violodora.** (*G. C.* 1902, xxxii, 129.) H. A new species allied to *P. mollis*, but easily distinguished by the colour and shape of the calyx. The flowers are mauve, and emit, especially in the evening, a scent resembling that of violets. Central China. (J. Veitch & Sons.)

***Primula Wilsoni.** (*G. C.* 1902, xxxi, 413.) H. A new species resembling in habit *P. japonica* and *P. imperialis*.

Leaves oblanceolate, 4–12 in. long, stiff and glabrous. Stems 2–4 ft. high, bearing 5 or 6 whorls of reddish-purple to pale mauve flowers, which are about 1 in. across, and are sweet-scented. Mountains of Yunnan, China. (J. Veitch & Sons.)

***Prunus serrulata Hisakura.** (*Gfl.* 1902, 2, 49, t. 1494b.) Rosaceæ. H. A form with large semi-double pale rose-red flowers. (L. Späth, Berlin.)

Pteris Alexandræ. (*G. C.* 1902, xxxi, 279.) Filices. S. Fronds variegated and crested. (H. B. May.)

Pteris semisagittata. (*W. G.* 1902, 203.) S. A new species with broad semi-sagittate fronds. South Brazil. (Vienna B. G.)

Pteris Wimsettii multiceps. (*G. C.* 1902, xxxi, 280; *G. M.* 1902, 274.) S. "The fronds have fine crests and are prettily cut." (J. Hill & Son.) [A form of *P. cretica Wimsettii*.]

Pyrus Aria himalaica. (*G. C.* 1902, xxxi, suppl. May 31, iii.) Rosaceæ. H. Leaves up to 1½ ft. long, white-felted beneath, bright green above. (Fisher, Son & Sibray.)

Rauwolfia pleiosciadia. (*Bull. Mus. Paris*, 1902, 279.) Apocynaceæ. S. A shrub or small tree up to 20 ft. high. Leaves in whorls of 3 or 4, lanceolate to elliptic, 3–7 in. long. Flowers in dichotomous cymes arranged in umbels. Corolla white; tube 3–3½ lin. long; lobes ½–¾ lin. long. Tropical Africa. (Paris B. G.) [*R. vomitoria*, Afz.]

Retinospora obtusa Crippsii. (*G. C.* 1902, xxxi, suppl. May 31, iii.) An attractive variety in which the slender pendulous growths are coloured pale sulphur to golden yellow. (T. Cripps & Son.)

Rhamnus californica tomentella. (*Späth Cat.* 1902–03, 110.) Rhamnaceæ. H. Striking on account of the delicate shades of colour of its foliage. The leaves are narrowly elliptic, 2½–4 in. long, entire, bright grey-green above, and covered with a bluish-white tomentum beneath. Mountains of California. (L. Späth, Berlin.)

Richardia Rehmanni var. **speciosa.** (*B. T. O.* 1902, 112.) Araceæ. G. Dwarfer and more robust than the type. Scape longer than the leaves; spathe bright red. (C. Sprenger, Naples.)

Richardia Sprengeri. (*G. C.* 1902, xxxii, 350.) G. This species is remarkable in having leaves truncate (not hastate or cordate) at the base, and the yellow spathes are broader than in any other species. Transvaal. (C. Sprenger, Naples.)

Robinia Holdtii. (*M. D. G.* 1902, 117.) Leguminosæ. A hybrid between *R. neomexicana* and *R. Pseudacacia*. (F. von Holdt, Alcott, Colorado, U.S.A.)

***Romneya trichocalyx.** (*G. C.* 1902, xxxii, 191.) Papaveraceæ. H. "Differs from *R. Coulteri* in its setose calyx, in its thinner weaker suffruticose laxly spreading more leafy stems, and in its pinnately 3 to 5 parted leaves, which closely surround the bud." California. (H. C. Baker.)

Rosa aschersoniana. (*Gfl.* 1902, 561, t. 1504, f. 1.) Rosaceæ. H. A garden hybrid between *R. blanda* and *R. indica*. (Zabel, Gotha.)

Rosa Mariæ Græbneriæ. (*Gfl.* 1902, 564, t. 1504, f. 4.) H. A garden hybrid between *R. carolina* and *R. humilis* var. *lucida*. (Zabel, Gotha.)

Rosa scharnkeana. (*Gfl.* 1902, 562, t. 1504, f. 2.) Rosaceæ. H. A garden hybrid between *R. californica* and *R. nitida*. (Zabel, Gotha.)

Rosa spaethiana. (*Gfl.* 1902, 563, t. 1504, f. 3.) H. A garden hybrid between *R. carolina* and *R. rugosa*. (Zabel, Gotha.)

Rudbeckia conspicua. (*Gard.* 1902, lxi, 154, 219, 267.) Compositæ. H. Grows 18 in. high, and is exceptionally free-flowering; it has long narrow orange-yellow ray florets and a black disc. (B. Ladhams.) [A variety of *R. hirta*.]

Ruellia lorentziana. (*R. H.* 1902, 136, t.) Acanthaceæ. G. A sparingly branched erect plant with elliptic

leaves 5–6 in. long, and loose terminal panicles of violet-blue flowers about 1½ in. across. Uruguay. (E. André, Lacroix, France.)

***Sedum Stahlii.** (*W. G.* 1902, 220.) Crassulaceæ. G. A dwarf species with brownish-red stems and leaves. The leaves are crowded, very turgid, ellipsoid, ¼–⅓ in. long. Flowers yellow. Mexico. (Count Solms - Laubach, Strassburg.)

Selenipedium mauricianum. (*J.H.F.* 1902, 722.) S. Orchidaceæ. A garden hybrid between *S. lindleyanum* and *S. caudatum*. (R. Lemoinier.)

***Senecio clivorum.** (*G. C.* 1902, xxxii, 142, 217, f.) Compositæ. H. A strong - growing perennial herb about 3 ft. high. Leaves thick, reniform or cordate-reniform, the lower ones 12–15 in. broad, with long petioles. Flower-heads 4 in. across, about 12, in a loose corymb; ray-florets many and broad, orange-yellow. Western and Central China; Japan. (J. Veitch & Sons.)

Sievkingia suavis. (*O. R.* 1902, 325.) Orchidaceæ. S. Resembles a *Stanhopea* in habit. Pseudobulbs ovoid, in a tuft, bearing a single elliptic-oblong leaf 5–6 in. long. The scapes are pendulous, 2 or 3-flowered. Sepals greenish-yellow, ovate, ¾ in. long. Petals and lip deep yellow, the latter with a few minute blackish dots inside and some larger ones on the basal crest. Costa Rica. (Sir Trevor Lawrence.)

Silene Fortunei nana. (*B. T. O.* 1902, 122, f. 37.) Caryophyllaceæ. H. A dwarf variety with more deeply coloured flowers than in the type. (Vilmorin, Andrieux & Co., Paris.)

***Solanum Xanti.** (*B. M.* t. 7821.) Solanaceæ. G. Stem branched, woody at the base. Leaves varying from linear to ovate, ½–4 in. long. Cymes terminal or on short lateral branchlets, few-flowered; pedicels slender, 1–1½ in. long. Corolla 1–1½ in. broad, pale purple, marked at the base with five round white spots having a green centre. Berry purple, sometimes as large as a cherry. South California. (Cambridge B.G.)

Sophro - cattleya marriottiana. (*Gard.* 1902, lxi, 248.) Orchidaceæ. G. A garden hybrid between *Sophronitis grandiflora* and *Cattleya aurea*. (W. Cobb.)

Sophro-lælia heatonensis. (*O. R.* 1902, 339; *G. M.* 1902, 694, 698, f.) Orchidaceæ. G. A garden hybrid between *Sophronitis grandiflora* and *Lælia purpurata*. (Charlesworth & Co.)

Spiræa Kneiffii. (*Gard.* 1902, lxi, 366.) Rosaceæ. H. A form of *S. Aruncus*, in which the leaflets are deeply cut into narrow segments. (M. Prichard.)

Sterculia russelliana. (*G. M.* 1902, 580; *G. C.* 1902, xxxii, 183.) Sterculiaceæ. G.? "An elegant *Aralia*-like plant. The leaf stalks and the main stem are light green, but the narrow divisions of the leaf—usually seven—are very dark green." (J. Russell.)

Streptocarpus Armitagei. (*G. C.* 1902, xxxii, 394.) Gesneraceæ. G. Closely allied to *S. Dunnii*, differing in having a corolla much less funnel-shaped and straighter, with less spreading lobes. Though originally described as monophyllus, four leaves developed in the cultivated plant. Transvaal. (Cambridge B. G.)

***Streptocarpus Mahoni.** (*B. M.* t. 7857.) S. A new monophyllous species allied to *S. Saundersii*. Leaf 1 ft. long or more. Scapes many, crowded, stout, erect. Cymes much-branched. Flowers on long pedicels. Corolla violet-blue; tube ⅔ in. long, decurved, inflated below the mouth; limb round, 1 in. across. British Central Africa. (Kew.)

Syringa Bretschneideri hybrida. (*R. H.* 1902, 40, t.) Oleaceæ. H. A garden hybrid between *S. Bretschneideri* and *S. Josikæa*.

Syringa Josikæa hybrida. (*R. H.* 1902, 41.) H. A garden hybrid between *S. Josikæa* and *S. Bretschneideri*.

Thalictrum orientale. (*Gard.* 1902, lxi, 388; *G. M.* 1902, 352.) Ranunculaceæ. H. "A very handsome plant that will grow 3 ft. high in a good situation. It has elegant much-divided fern-like leaves of a glaucous green hue, surmounted with light branching heads of white flowers." Greece; Asia Minor. (A. Perry.)

Trichopilia suavis var. **candida.** (*L.* xvii, t. 788.) Orchidaceæ. G. Flowers pure white except a yellow blotch at the base of the lip. (L'Horticole Coloniale, Brussels.)

Tridax gaillardioides. (*Gfl.* 1902, 105.) See *Layia gaillardioides.*

Tropæolum lobbianum Regina. (*Gfl.* 1902, 78.) Geraniaceæ. G. Flowers bright salmon-red or salmon-orange. (E. Benary, Erfurt.)

***Tulipa ingens.** (*G. C.* 1902, xxxii, 14, f. 7.) Liliaceæ. H. A new species with flowers 3 to 4 in. long, bright scarlet-vermilion; the outer segments have a broad yellowish band on the outside, and all are marked with a prominent black blotch at the base. Bokhara. (J. Hoog, Haarlem.)

***Tulipa wilsoniana.** (*G. C.* 1902, xxxii, 50). H. A distinct and beautiful new species, allied to *T. linifolia.* The bulb bears a mass of protruding woolly hairs. Peduncle 2–4 in. long. Perianth about 2 in. long, deep vermilion-scarlet, each segment having a small black blotch at the base. Transcaspian Region. (J. Hoog, Haarlem.)

***Tupistra grandis.** (*B. M.* t. 7829.) Liliaceæ. S. Leaves tufted, 2–3 ft. long, lanceolate. Peduncle stout, red-brown. Spike 8–10 in. long. Flowers subsessile, crowded. Perianth campanulate; tube ½ in. long, red-brown; lobes dark red-purple. Stigma broadly peltate, on a white columnar exserted style. Perak. (Kew.)

Typhonium giganteum var. **Giraldi.** (*G. C.* 1902, xxxii, 150, f. 51; *B. T. O.* 1902, 168.) Araceæ. H. Leaves large, undulate, thick-ribbed. Spathe purple, oblong, undulate, a little shorter than the blackish spadix. North China. (T. Hivudi, Tuscany.)

Vanda confusa. (*O. R.* 1902, 196.) Orchidaceæ. S. A new name proposed for *V. cærulescens* var. *Boxallii*, a natural hybrid between *V. cærulescens* and *V. parviflora.* Burma.

Vanda sanderiana Froebeliæ. (*O. R.* 1902, 364; *G. C.* 1902, xxxii, 334.) S. The flowers are very large, nearly circular in outline, and very richly coloured. (O. Froebel, Zurich.) [*Vanda sanderiana* var. *froebeliana*, Cogn.]

Vanda sanderiana roseo-alba. (*O.R.* 1902, 26.) S. Upper sepal and petals nearly white, with some purple spots on the inner halves; the lower petals greenish, with some purple veining at the base. (Sir Trevor Lawrence.)

Verbascum Hinkei. (*G. C.* 1902, xxxi, suppl. May 31, iv.) Scrophulariaceæ. H. Flowers in a plume-like spike, yellow. (G. Jackman & Son.) [*V. nigrum.*]

Vernonia arkansana alba. (*B. T. O.* 1902, 74.) Compositæ. H. A white-flowered variety. (C. Sprenger, Naples.)

Veronica floribunda. (*G. C.* 1902, xxxii. 81.) Scrophulariaceæ. H. A garden hybrid between *V. pimeleoides* and a species of which the name is not recorded. (R. Lindsay.)

***Viburnum Carlesii.** (*G. C.* 1902, xxxii, 261, f. 88; *Jard.* 1902, 229, f. 116.) Caprifoliaceæ. H. A shrub mostly covered with a stellate tomentum, the rather slender flowering-branches glabrescent. Leaves broadly ovate, 1–2 in. long, toothed. Flowers rather crowded, in small terminal umbellate cymes, fragrant. Corolla at first pink-white, then pure white; limb ⅕ in. across, with rounded lobes. Corea. (L. Bœhmer & Co., Yokohama; Kew.)

Viburnum Tinus roseum. (*W. G.* 1902, 135.) H. A sport from the type, having most of the flowers rose-coloured. (Moser, Versailles.)

Viburnum tomentosum Mariesi. (*Veitch Cat.* [1902], 49, 67.) H. Closely allied to the variety *plicatum*, differing "chiefly in its more hairy leaves, and in its sterile flowers being generally confined to the outer part of the inflorescence." (J. Veitch & Sons.)

***Viscum cruciatum.** (*B. M.* t. 7828.) Loranthaceæ. G. Resembles *V. album* in habit, foliage and inflorescence, but the leaves are very pale yellow-green and 3-nerved, the male flowers are much larger, and the berries are red-brown, larger, and long-stalked. Spain, N. E. Africa, Syria. (Hon. Charles Ellis; Kew.)

Vriesia Leoni. (*R. H.* 1902, 27.) Bromeliaceæ. S. A garden hybrid between *V. Rex* and *V. mirabilis.* (Duval & Son, Versailles.) [*Tillandsia.*]

Vriesia. (*Jard.* 1902, 28.) S. A list of hybrids obtained since 1895 is given, with parentage, date, and name of raiser. [*Tillandsia.*]

Yucca rekowskiana. (*G. C.* 1902, xxxii, 90.) Liliaceæ. H. or H. H. A garden hybrid between *Y. filamentosa* and *Y. gloriosa.* (C. Sprenger, Naples.)

Zantedeschia Solfatara. (*Gfl.* 1902, 315, 362.) Araceæ. G. A garden hybrid between *Z. elliottiana* and *Z. Adlami.* (C. Bornemann, Blankenburg, Germany.) [*Richardia.*]

Zygonisia rolfeana. (*G. C.* 1902, xxxi, 443; xxxii, 30, f. 11; *O. R.* 1902, 214, 220.) Orchidaceæ. S. A hybrid between *Aganisia lepida* and *Zygopetalum Gautieri.* (F. Sander & Sons.)

Zygopetalum crinito-Gautieri. (*G. C.* 1902, xxxi, 151.) Orchidaceæ. G. A garden hybrid between the species indicated in the name. (F. Sander & Sons.)

Zygopetalum roeblingianum. (*O. R.* 1902, 220.) S. A garden hybrid between *Z. rostratum* and *Z. Gautieri.* (C. J. Roebling, Trenton, New Jersey.)

ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

APPENDIX IV.—1903.

LIST of the STAFFS of the ROYAL BOTANIC GARDENS, Kew, and of Botanical Departments and Establishments at Home, and in India and the Colonies, in Correspondence with Kew.

* Trained at Kew. † Recommended by Kew.

Royal Botanic Gardens, Kew:—

Director - - - - -	Sir W. T. Thiselton-Dyer, K.C.M.G., C.I.E., F.R.S., LL.D., Ph.D., M.A., F.L.S.
Private Secretary - -	*John Stocks.
Assistant (Office) - -	*John Aikman.
" " - -	*William Nicholls Winn.
Keeper of Herbarium and Library	*William Botting Hemsley, F.R.S., F.L.S.
Principal Assistant (Phanerogams)	Otto Stapf, Ph.D., F.L.S.
" " (Cryptogams) -	George Massee, F.L.S.
Assistant (Herbarium) - -	Nicholas Edward Brown, A.L.S.
" " - -	*Robert Allen Rolfe, A.L.S.
" " - -	Charles Henry Wright, A.L.S.
" " - -	*Sidney Alfred Skan.
" "	- Thomas Archibald Sprague, B.Sc.
" " - -	Arthur Disbrowe Cotton, F.L.S.
" for India - - -	J. F. Duthie, B.A., F.L.S.
Honorary Keeper, Jodrell Laboratory - - - - -	Dukinfield Henry Scott, M.A., Ph.D., F.R.S., F.L.S.

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Keeper of Museums - - -	John Masters Hillier.
Assistant (Museums) - - -	*John H. Holland, F.L.S.
Preparer - - - - -	George Badderly.

Curator of the Gardens - -	William Watson, A.L.S.
Assistant Curator - - -	*William J. Bean.
Foremen :—	
Herbaceous Department - -	*Walter Irving.
Greenhouse and Ornamental Department.	*Arthur Osborn.
Arboretum - - - -	*William Dallimore.
Tropical Department - -	*Walter Hackett.
Temperate House - - -	*Charles P. Raffill

Cambridge.—University Botanic Garden :—

Professor - - -	Harry Marshall Ward, M.A., D.Sc., F.R.S., F.L.S.
Assistant Curator, University Herbarium.	——
Secretary to Botanic Garden Syndicate	A. C. Seward, M.A., F.R.S., F.L.S.
Curator - - -	*Richard Irwin Lynch, A.L.S.

Dublin.—Royal Botanic Gardens, Glasnevin :—

Keeper - - -	Frederick W. Moore, A.L.S.

Trinity College Botanic Gardens :—

Professor - - -	E. Perceval Wright, M.A., M.D., F.L.S.
Curator - - -	*F. W. Burbidge, M.A.

Edinburgh.—Royal Botanic Garden :—

Regius Keeper - -	Isaac Bayley Balfour, M.D., D.Sc., F.R.S., F.L.S.
Assistant (Museum) -	H. F. Tagg, F.L.S.
„ (Herbarium)	*J. F. Jeffrey.
Head Gardener - -	*R. L. Harrow.
Assistant Gardener -	Henry Hastings.

Glasgow.—Botanic Gardens :—

University Professor -	F. O. Bower, M.A., D.Sc., F.R.S., F.L.S.
Curator - - -	James Whitton.

Oxford.—University Botanic Garden :—

Professor - - -	SydneyH.Vines,M.A., D.Sc., F.R.S., P,L.S.
Curator - - -	*William Baker,

COLONIES.

Antigua.—Botanic Station :—

	Curator - - -	——
	Agricultural Superintendent.	F. R. Shepherd.

Barbados.—Dodd's Reformatory, Botanic Station :—

	Superintendent -	John R. Bovell, F.L.S., F.C.S.
	Assistant Superintendent.	A. H. Worm.
	Lecturer in Agricultural Science.	Longfield Smith, B.Sc., Ph.D.

Bermuda.—Botanic Station :—

	Superintendent -	†G. A. Bishop.

British Central Africa.—Scientific Department :—

Zomba - -	Head of Department -	J. McClounie.
	Forester - - -	*J. M. Purves.

British East Africa.—

East Africa Protectorate.—

	Director of Agriculture.	Andrew Linton, B.Sc.
	Assistant - - -	*Henry Powell.
	Forester - - -	C. F. Elliott.

Uganda.—Botanic Station :—

	Curator - - -	*M. T. Dawe.
	Assistant Curator -	*Ernest Brown.
Zanzibar - -	Director of Agriculture.	R. N. Lyne, F.L.S.
	Assistant Director -	——

Dunga Experimental Station :—

	Superintendent -	W. Buzzacott.

British Guiana.—Botanic Gardens :—

Georgetown -	Superintendent - - -	A. W. Bartlett, B.A. B.Sc., F.L.S.
	Assistant Superintendent.	B. Gainfort.
	Head Gardener -	†John F. Waby, F.L.S.
	Agricultural Assistant	*Robert Ward.

Promenade Garden :—

	Head Gardener -	William Jackson.
Berbice - -	Keeper - - -	Richard Hunt.

British Honduras.—Botanic Station :—

	Curator - - -	Eugene Campbell.

Canada.—		
Ottawa - -	Dominion Botanist -	Prof. John Macoun, M.A., F.R.S.C.
	Assistant „ -	Jas. M. Macoun.
	Director of Government Experimental Farms.	Prof. Wm. Saunders, LL. D., F. R. S. C., F.L.S.
	Director's Assistant and Superintendent of Botanic Garden.	W. T. Macoun.
	Botanist and Entomologist.	James Fletcher, F.R.S.C., F.L.S.
Montreal - -	Director, University Botanic Garden.	Prof. D. P. Penhallow, B.Sc., F.R.S.C.
Cape Colony.—		
	Government Botanist	Prof. MacOwan, D.Sc., B.A., F.L.S.
	Conservator of Forests	D. E. Hutchins.
	Gardens and Public Parks :—	
Cape Town -	Superintendent - -	H. J. Chalwin.
Grahamstown -	Curator - - -	Edwin Tidmarsh.
Port Elizabeth -	Superintendent - -	John T. Butters.
King Williamstown.	Curator - - -	George Lockie.
Graaff-Reinet -	„ - - -	*C. J. Howlett.
Uitenhage -	„ - - -	H. Fairey.
Ceylon.—Royal Botanic Gardens :—		
Peradeniya -	Director - - -	†John C. Willis, M.A., F.L.S.
	Mycologist and Assistant Director.	J. B. Carruthers, F.L.S.
	Government Entomologist.	E. E. Green, F.E.S.
	Government Chemist	M. K. Bamber, F.I.C., F.C.S.
	Scientific Assistant -	R. H. Lock, B.A.
	Controller, Experiment Station.	Herbert Wright, F.L.S.
	Curator - - -	*Hugh F. McMillan.
	Clerk - - -	R. H. Pereira.
	Draughtsman - -	A. de Alwis.
Hakgala - -	Superintendent - -	*William Nock.
	Clerk and Foreman -	D. D. Fernando.
Henaratgoda -	Conductor - -	W. Perera.
Anurà dhapura	„ - - -	D. F. de Silva Guneratne.
Badulla - -	„ - - -	D. T. de Alwis.
Nuwara Eliya -	„ - - -	D. Michael.

Cyprus :—

	Principal Forest Officer.	A. K. Bovill.
	Director of Agriculture.	P. Gennadius.

Dominica.—Botanic Station :—

Curator - - -	*Joseph Jones.
Agricultural Instructor.	G. F. Branch.

Agricultural School :—

Officer in Charge -	*Archibald Brooks.

Falkland Islands.—Government House Garden :—

Head Gardener - -	*Albert Linney.

Federated Malay States.—Forest Department :—

Chief Forest Officer -	A. M. Burn-Murdoch.

Experimental Plantations :—

Superintendent -	*Stanley Arden.

Perak (Taiping).—Government Gardens and Plantations :—

Superintendent - -	——

Fiji.—Botanic Station :—

Curator - - -	*Daniel Yeoward

Gambia.—Botanic Station :—

Curator - - -	——

Gold Coast.—Botanic Station :—

Curator - - -	*William H. Johnson, F.L.S.
Assistant Curator -	*Alfred Evans.
,, ,, -	*William Don.

Grenada.—Botanic Garden :—

Curator - - -	*Walter E. Broadway.
Agricultural Instructor.	——

Hong Kong.—Botanic and Afforestation Department :—

Superintendent - -	†S. T. Dunn, B.A., F.L.S.
Assistant Superintendent	*W. J. Tutcher.

Jamaica.—Department of Public Gardens and Plantations :—

	Director - - -	†William Fawcett, B.Sc., F.L.S.
——	Travelling Instructor	*William Cradwick.
	,, ,,	*William J. Thompson.
Hope Gardens -	Superintendent -	*William Harris.
Hope Experiment Station.	Assistant Superintendent.	John Campbell.
Castleton Garden	Agricultural Instructor.	*Thomas J. Harris.

Jamaica.—*cont.*			
Kingston Parade Garden.	Superintendent -	-	*William J. Thompson.
King's House Garden.	„	-	James Briscoe.
	Lecturer in Agricultural Science	-	T. F. Teversham.
Lagos.—Botanic Station :—			
	Curator - -	-	*E. W. Foster.
	Assistant - -	-	*T. B. Dawodu.
	Superintendent of Woods and Forests	-	Cyril Punch.
Malta —Argotti Botanic Garden :—			
	Director -	-	Dr. Francesco Debono.
Mauritius.—Department of Forests and Botanic Gardens :—			
Pamplemousses-	Director - -	-	J. Vankeirsbilck.
	1st Assistant -	-	Paul Koenig.
	2nd „ - -	-	S. E. Pougnet.
	Overseer - -	-	J. Powell.
Curepipe - -	Overseer - -	-	F. Bijoux.
Reduit - -	„ - -	-	W. A. Kennedy.
Montserrat.—Botanic Station :—			
	Curator - -	-	——
	Agricultural Instructor.		*A. J. Jordan.
Natal.—Botanic Gardens :—			
Durban - -	Curator - -	-	John Medley Wood, A.L.S.
	Head Gardener -	-	*James Wylie.
Pietermaritzburg	Curator - -	-	G. Mitchell.
	Conservator of Forests -	-	*T. R. Sim, F.L.S.
New South Wales.—Botanic Gardens :—			
Sydney - -	Director and Government Botanist.		J. H. Maiden, F.L.S.
	Superintendent	-	George Harwood.
	Botanical Assistant	-	E. Betche.
Technological Museum :—			
	Curator - -	-	R. T. Baker, F.L.S.
New Zealand :—			
Wellington.—State Forest Department :—			
	Chief Forester -	-	Henry John Matthews.
Colonial Botanic Garden :—			
	Head Gardener -	-	——
Dunedin - -	Superintendent -	-	*D. Tannock.
Napier - -	„	-	W. Barton.
Invercargill -	Head Gardener -	-	——
Auckland - -	Ranger - -	-	William Goldie.
Christchurch -	Head Gardener -	-	*Ambrose Taylor.

Northern Nigeria :—

Forestry Officer- - *W. R. Elliott.

Orange River Colony :—

Forest Officer - - C. Watson.

Queensland.—Botanic Department :—

Brisbane - - Colonial Botanist - F. M. Bailey, F.L.S.

Botanic Gardens :—

Director - - - *Philip MacMahon.
Overseer - - - J. Tobin.

Acclimatisation Society's Gardens :—

Secretary and Manager Edward Grimley.
Overseer - - - James Mitchell.

Rockhampton - Superintendent - - R. Simmons.

St. Kitts-Nevis.—Botanic Station :—

Curator - - - ——

Agricultural School :—

Officer in Charge - John Belling, B.Sc.

St. Lucia.—Botanic Station :—

Curator - - - *John Chisnall Moore.
Agricultural Instructor. George S. Hudson.

St. Vincent.—Botanic Station :—

Curator - - - *W. N. Sands.
Agricultural Instructor. Thomas Osment.

Agricultural School :—

Officer in Charge - C. H. Knowles, B.Sc.

Seychelles.—Botanic Station :—

Curator - - - R. Dupont.

Sierra Leone.—Botanic Station :—

Curator - - - *J. P. Quinton.

Soudan :—

Khartoum - Director of Woods and Forests. A. F. Broun.
Superintendent of Palace Gardens. *F. S. Sillitoe.

South Australia.—Botanic Gardens :—

Adelaide - Director - - - Maurice Holtze, F.L.S.
Port Darwin - Curator - - - Nicholas Holtze.

Woods and Forests :—

Conservator - - Walter Gill.

Southern Nigeria.—Botanic Garden :—

Old Calabar	-	Curator - - -	——
		Assistant Curator -	——
		Conservator of Forests - -	H. N. Thompson.

Straits Settlements.—Botanic Gardens :—

Singapore	-	Director - - -	†H. N. Ridley, M.A., F.L.S.
		Assistant Superintendent.	*R. Derry.
Penang	- -	Superintendent - -	*Walter Fox.

Tasmania :—

Hobart Town	-	Government Botanist	Leonard Rodway.
		Chief Forests Officer -	J. C. Penny.
		Botanic Gardens :—	
		Superintendent - -	F. Abbott

Tobago.—Botanic Station :—

		Curator - - -	*Henry Millen.
		Agricultural Instructor.	N. Lord.

Transvaal.—Department of Agriculture :—

Pretoria	- -	Botanist - - -	J. Burtt Davy, F.L.S.

Trinidad.—Botanic and Agricultural Department :—

		Superintendent - -	†John H. Hart, F.L.S.
		Assistant „ - -	*F. Evans.
		Agricultural Instructor.	*W. Leslie.
		Agricultural Instructor.	H. A. Nurse.
		Forest Officer - - -	C. S. Rogers.

Victoria.—Botanic Gardens :—

Melbourne	-	Curator - - -	W. R. Guilfoyle.
		National Herbarium :—	
		Curator - - -	J. G. Luehmann, F.L.S.
		Acting Conservator of Forests -	H. R. Mackay.

Virgin Islands.—

		Agricultural Instructor.	*W. C. Fishlock.

West Indies.—Imperial Department of Agriculture :—

Barbados	- -	Commissioner - -	Sir Daniel Morris, K.C.M.G., D.Sc., M.A., F.L.S.
		Travelling Superintendent.	G. W. Smith, F.L.S.

West Indies.—*cont.*

Barbados—*cont.*

	Scientific Assistant -	†W. R. Buttenshaw, M.A., B.Sc.
	Acting Entomologist -	H. A. Ballou, B.Sc.
	Mycologist and Agricultural Lecturer.	†L. Lewton-Brain, B.A., F.L.S.
	Honorary Consulting Chemist.	Prof. J. B. Harrison, M.A., F.I.C., F.C.S.
	,, ,,	Prof. J. P. d'Albuquerque, M.A., F.I.C., F.C.S.

Western Australia.—Department of Agriculture :—

Perth- -	- Botanist - - -	Alexander Morrison.

INDIA.

Botanical Survey.—Director, Major D. Prain, I.M.S., M.B., LL.D., F.L.S., F.R.S.E.

Bengal, Assam, Burma ; the Andamans and Nicobars ; North-East Frontier Expeditions :—

Superintendent of the Royal Botanic Gardens, Calcutta	Major D. Prain, I.M.S., M.B., LL.D., F.L.S., F.R.S.E.

Bombay, including Sind :—

Professor of Botany, College of Science, Poona -	G. A. Gammie.

Madras : the State of Hyderabad and the State of Mysore :—

Government Botanist, Madras.	†C. A. Barber, M.A., F.L.S.

United Provinces of Agra and Oudh ; the Punjab ; the Central Provinces ; Central India ; Rajputana ; North-West Frontier Expeditions :—

Director of the Botanic Department, Northern India, Saharanpur -	——
Cryptogamic Botanist.	†E. J. Butler, M.B., B.Ch., F.L.S.

Bengal :—

Reporter on Economic Products to the Government of India, Indian Museum, Calcutta	†Sir George Watt, M.B., C.M., C.I.E., F.L.S.
Officiating Reporter	†I. H. Burkill, M.A., F.L.S.

Bengal.—Royal Botanic Gardens :—

Calcutta (Seebpore)	Superintendent -	Major D. Prain, I.M.S., M.B., LL.D., F.L.S., F.R.S.E.
	Curator of Herbarium.	Captain Gage, I.M.S., M.A., M.B., B.Sc., F.L.S.
	Government Entomologist.	H. Maxwell - Lefroy, M.A.
	Curator of Garden -	*G. T. Lane.
	Assistant „ -	*J. E. Leslie.
	Probationer -	*Ernest Long.

Calcutta.—Agri-Horticultural Society of India :—

	Secretary - -	P. Lancaster.
	Superintendent -	A. J. B. Gisseleire.

Mungpoo -	Superintendent, Government Cinchona Plantations	Major D. Prain, I.M.S., M.B., LL.D., F.L.S., F.R.S.E.
	Deputy „ -	*R. Pantling.
	1st Assistant -	*Joseph Parkes.
	2nd „ -	*Amos Hartless.
	3rd „ -	*W. A. Kennedy.
	4th „ -	*H. F. Green.

Darjeeling.—Lloyd Botanic Garden :—

	Curator - - -	*George H. Cave.

Darbhangah.—Maharajah's Garden :—

	Superintendent -	Herbert Thorn.

Bombay.—

Poona - -	——	——
	Professor of Botany	G. A. Gammie.

Ghorpuri.—Botanic Garden :—

	Superintendent -	P. G. Kanitkar.

Bombay.—Municipal Garden :—

	Superintendent -	C. D. Mahaluxmivala.

Karachi.—Municipal Garden :—

	Superintendent -	——

Central Provinces.—

Nagpur - -	Superintendent of Public Gardens.	*J. Horne Stephen.

Madras.—Botanic Department :—

Chepauk - -	Government Botanist	†C. A. Barber, M.A., F.L.S.
	Director, Government Cinchona Plantations.	W. M. Standen.
Ootacamund -	Curator of Gardens and Parks.	*Robert L. Proudlock.

Madras.—Agri-Horticultural Society :—

	Hon. Secretary -	A. G. Bourne, D.Sc., F.R.S., F.L.S.
	Superintendent -	*B. Cavanagh

Native States :—

Mysore (Bangalore)	Superintendent	- *J. Cameron, F.L.S.
Baroda - -	„	- *G. H. Krumbiegel.
Gwalior - -	„	- ——
Morvi - - -	„	- ——
Travancore (Trivandrum)	„	- H. S. Ferguson, F.L.S.
Udaipur - -	„	- T. H. Storey.

United Provinces of Agra and Oudh :—

Agra (Taj Garden)	Superintendent	- *A. E. P. Griessen.
Allahabad - -	„	- *H. J. Davies.
Cawnpur - -	„	- *Norman Gill.
Kumaon (Ramghur)	„	- *F. W. Seers.
Lucknow - -	„	- *Matthew Ridley.
Saharanpur and Branch Garden, **Mussoorie.**	„	- William Gollan.

Punjab :—

Lahore - -	Superintendent	- *Oliver T. Hemsley.
